



# Appendix 2.1: Biodiversity Management Plan

Longhedge Solar Farm

30/11/2022



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## EXECUTIVE SUMMARY

- 1.1. Objectives have been established to enhance and maintain the biodiversity of lands between Hawksworth and Thoroton, circa 15.5km east of Nottingham, Nottinghamshire, associated with a proposed 49.9MW solar farm with associated infrastructure (the “Proposed Development”).
- 1.2. The objectives include planting of native broadleaved woodland, and species-rich hedgerows and enhancement of hedgerows, to provide a plentiful source of food and shelter for a range of fauna species; developing a species-rich neutral grassland across the site, and installing dormouse, bat and bird boxes, hedgehog houses, herptile hibernacula, invertebrate hotels and bee banks.
- 1.3. Actions have been formulated within this document to enable the objectives to be met and to maximise the Application Site’s potential for supporting wildlife. Species which have been given priority within this management and enhancement plan include barn owl, house sparrow, hedgehog, bat species, bees and herptile species.
- 1.4. An Extended Phase 1 habitat survey of the Application Site was undertaken on 24<sup>th</sup> April 2021 by Kevin Johnson BSc Pgd PGCE MCIEEM. After this survey, an amendment to the Proposed Development boundary was made and the project was reassigned to a new project manager. The additional area was surveyed using the UK Habitats Classification system during January of 2022. For consistency and to allow completion of a Net Gain Assessment, the results from the initial survey were translated from Extended Phase 1 to the UK Habitats Classification system. Any conversions which were not deemed accurate were double checked for accuracy during the July 2022 UK Habitats survey.
- 1.5. As part of the full planning application, an Ecological Assessment (“EcA”) has been conducted to assess the Application Site’s ability to support a range of wildlife both now and during all phases of the Proposed Development. The enhancements and mitigation measures set out in this document have been developed in accordance with the findings of the habitat surveys conducted on site.
- 1.6. Management recommendations have been made for new and existing habitats. Coupled with the above measures, this will ensure that the Application Site can not only be restored to its current agricultural use upon decommissioning, but will have resulted in **net biodiversity gain**.

## INTRODUCTION

### Background

- 1.7. Neo Environmental Ltd has been appointed by RES (the “Applicant”) to produce a Biodiversity Management Plan (“BMP”) for a proposed 49.9MW solar farm with associated infrastructure (the “Proposed Development”) on lands between Hawksworth and Thoroton, circa 15.5km east of Nottingham, Nottinghamshire (the “Application Site”).
- 1.8. Please see **Figure 4 of Volume 2: Planning Application Drawings** for the layout of the Proposed Development.

### Development Description

- 1.9. The Proposed Development will consist of the construction of a c. 49.9MW solar farm. It will involve the construction of bi-facial ground mounted solar photovoltaic (PV) panels, new access tracks, underground cabling, perimeter fencing with CCTV cameras and access gates, 2x temporary construction compounds, substation and all ancillary grid infrastructure and associated works.
- 1.10. The Proposed Development will result in the production of clean energy from a renewable energy resource (daylight) and will also involve additional landscaping including hedgerow planting and improved biodiversity management.

### Adopted Design Principles

- 1.11. Where possible, measures have been implemented as part of the iterative design process to prevent the various phases of the Proposed Development affecting sensitive ecological features. Ecological measures incorporated into the Proposed Development design include the following:
  - Main drainage ditch buffer of 8m (No waterways seem to be defined as watercourse within the site)
  - 5m buffer from hedgerows
  - Various visual buffers from settlements
  - 10m OHL corridor
  - Various PROW buffers
  - Tree buffers
  - 10m woodland buffer

- 10cm gaps at the bottom of security fencing (see **Figure 9 of Volume 2: Planning Application Drawings**).

## Site Description

- 1.12. The Application Site is located in a semi-rural setting on lands between the settlements of Hawksworth (0.1km west) and Thoroton (0.2km southeast), circa 15.5km east of Nottingham, Nottinghamshire. (See **Figure 1 of Volume 2: Planning Application Drawings** for further detail).
- 1.13. Centred at approximate Grid Reference E476129, N343467, the Proposed Development Site comprises nine fields covering a total area of c. 94.24hectares (ha), although only 37.7ha of this area is required to accommodate the solar arrays themselves, with the remaining area being used for ancillary infrastructure and mitigation and enhancement measures. The Proposed Development Site covers low lying lightly undulating agricultural land with an elevation range of c. 20m to 25m AOD. Internal field boundaries comprise, hedgerows, tree lines and several linear strips of woodland shelter belt. External boundaries largely consist of mature to lower hedgerows with individual trees and some evident gaps. In terms of existing infrastructure; electricity pylons extend north-south through fields 5, 6 & 8, whilst electricity lines pass northwest to southwest through fields 4, 5, 6 & 9.
- 1.14. The Application Site will be accessed via the creation of a new entrance off the linear public highway Thoroton Road. The vegetation is set back from the road verge by a few metres and therefore visibility will not be an issue. Appropriate visibility splays are included within the CTMP.
- 1.15. The haul route will be from the A46 to the southwest of the Application Site. The vehicles will exit the A46, signposted A6097 (Mansfield), take the 4th exit at the roundabout onto Bridgford Street followed by the 1st exit at the next roundabout onto Fosse Way. Vehicles will travel along this road for approximately 1.5km to the next roundabout, where they will take the 2nd exit onto Tenman Lane. This road will be travelled on in an eastern direction for approximately 3.2km before taking a left hand turn onto Hawksworth Road and vehicles will travel along here for approximately 2km before taking a right hand turn onto Thoroton Road. Vehicles will travel in a southeast direction for approximately 0.9km before turning left into the Application Site.
- 1.16. There is one recreational route located within the Proposed Development Site (Bridleway 1 & 6 that pass through the northern fields), and several located close by (**See Figure 3 of Vol 2: Planning Drawings**). National Cycle Network (NCN) route 64 shares the minor road on the east side of the Proposed Development Site.
- 1.17. The Proposed Development Site is mostly contained within Flood Zone 1 (at little or no risk of fluvial or tidal / coastal flooding), however there are some areas of Flood Zone 2 and 3a which follow the watercourse/drains within the site and have been carefully considered during the design phase.

## GUIDANCE

- 1.18. Biodiversity is declining across England; however, recent agri-environment schemes indicate that biodiversity can significantly increase through appropriate land management. Well-designed solar farm developments have the potential to support wildlife and increase biodiversity through appropriate management when located on agricultural land.
- 1.19. Due to the nature of solar farm developments, a large proportion of the site is accessible for plant growth and potential wildlife enhancements. Each solar farm development in the UK requires a Biodiversity Management Plan (“BMP”), the purpose of which is to identify objectives for biodiversity and the means by which these objectives will be achieved. This can include the protection of existing species and habitats and the establishment of new habitats, as well as their maintenance and monitoring.
- 1.20. According to ‘Biodiversity Guidance for Solar Developments’<sup>1</sup> the BMP should:
- *“identify key elements of biodiversity on site, including legally protected species, species and habitats of high conservation value such as those listed on Section 41 of Natural Environmental and Rural Communities (NERC) Act 2006<sup>2</sup>, and designated areas in close proximity to the proposed site;*
  - *identify any potential impacts arising from the site’s development, and outline mitigations to address these;*
  - *detail specific objectives for the site to benefit key elements of biodiversity and the habitat enhancements that are planned to achieve these;*
  - *contribute to biodiversity in the wider landscape and local ecological network by improving connectivity between existing habitats;*
  - *identify species for planting and suitable sources for seed and plants;*
  - *consider wider enhancements such as nesting and roosting boxes;*
  - *summarise a management regime for habitats for the entire life of the site;*
  - *provide a plan for monitoring the site; and [sic] adapting management as appropriate to the findings of this monitoring; and,*
  - *set out how the site will be decommissioned.”*

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<sup>1</sup> BRE (2014) Biodiversity Guidance for Solar Developments. Eds G E Parker and L Greene

<sup>2</sup> Natural Environmental and Rural Communities Act (NERC) 2006, available at [www.legislation.gov.uk](http://www.legislation.gov.uk)



- 1.21. This BMP has been informed by the Extended Phase 1 Habitat survey that was conducted in April 2021 and UK Habitats Classification surveys that were conducted in Jan 2022 and July 2022.

## OBJECTIVE OF THE BIODIVERSITY MANAGEMENT PLAN

- 1.22. The objective of this BMP is to minimise any potential negative impacts arising from the Proposed Development, while increasing the habitat diversity. Through generation of renewable energy, the enhancement of the land within the development boundary will increase the site's capability of supporting wildlife.
- 1.23. This will be achieved by:
- Creating and maintaining a diverse species-rich neutral grassland with a varied sward structure;
  - Creating and maintaining native tree planting and species-rich hedgerows;
  - Creating and maintaining wildlife shelters for Priority and locally important species'
  - Ensuring no net loss of biodiversity from the site as a result of the habitat creation scheme; and
  - Maximising the floral and faunal biodiversity of the created and retained habitats.

## CURRENT POLICY

### Environment Act 2021

- 1.24. This Act introduced a legally binding target on species abundance for 2030, aiming to reverse declines of key wild species. It creates a requirement for 10% net biodiversity gain as part of development projects, and for a series of Nature Recovery Strategies to cover England. The new Act makes minor amendments to the 1981 Act and 2017 Regulations (see above). It expands measures taken against illegal deforestation, enshrines a legal duty for water companies to reduce adverse impacts from storm overflow discharge, and gives statutory effect to conservation covenants. To assist in the above, it also creates an Office for Environmental Protection.
- 1.25. The Environment Act supersedes the former UK Post-2010 Biodiversity Framework and UK Biodiversity Action Plan (“BAP”). While certain provisions of the Act are only likely to enter force in 2022 and 2023, some are already current. This **BMP** and the **Net Gain Assessment** at **(Appendix 2.2 of TA 2: Ecological Assessment)** aim to demonstrate how the Proposed Development will assist in achieving the Act’s net gain targets.

### The Natural Environment and Rural Communities (NERC) Act 2006

- 1.26. The Natural Environment and Rural Communities (NERC) Act<sup>3</sup> places a duty on planning authorities to have due regard for biodiversity and nature conservation during operations, ensuring that biodiversity is a key consideration in the local planning process.
- 1.27. A number of habitats and species of principal importance for the conservation of biodiversity (“Priority species” and “Priority habitats”) in England are listed under Section 41 of the NERC Act. These are taken into account in this BMP where relevant.

### National Pollinator Strategy: For Bees and Other Pollinators in England

- 1.28. In 2014, the UK joined a small number of countries in Europe who have developed a strategy to address pollinator decline and protect pollination services. England’s national pollinator strategy<sup>4</sup> was published in November 2014.
- 1.29. Twenty-one governmental and non-governmental organisations have agreed a shared Plan that identifies 34 actions to make England pollinator-friendly. The Plan identifies voluntary actions for farmers to make agricultural land more pollinator-friendly, such as:

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<sup>3</sup> Available at: <https://www.legislation.gov.uk/ukpga/2006/16/contents>

<sup>4</sup> Available at:

[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/794706/national-pollinator-strategy.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/794706/national-pollinator-strategy.pdf)

- Sowing nectar and pollen-rich wildflower seed mixtures on fallow land or buffer strips;
- Managing buffer strips through grazing and cutting to help prevent grass domination and further encourage wildflowers; and,
- Management of hedgerows by reducing the frequency of cutting to encourage hedges to produce flowers.

1.30. The enhancements set out within this **BMP** will create areas of flower-rich habitat and bee banks that will support England’s pollinator species, including bees and flies.

## Biodiversity Action Plans

1.31. The UK Biodiversity Action Plan (“UKBAP”; 1994)<sup>5</sup> was organised to fulfil the Rio Convention on Biological Diversity in 1992, to which the UK is a signatory. Lists of national Priority species and habitats were produced with all listed species/habitats having specific action plans, defining the measures required to ensure their conservation.

1.32. While the UKBAP has since been superseded by the Environment Act 2021 (see above), regional and local BAPs have been produced to develop plans for species/ habitats of nature conservation importance at regional and local levels. The Nottinghamshire BAP<sup>6</sup> contains a list of habitats of conservation concern including, among others:

- Ancient and/or species rich hedgerows,
- Arable fields,
- Cereal field margins,
- Ditches,
- Mixed ash dominated woodland,
- Oak-birch woodland
- Planted coniferous woodland

Several species of conservation concern are also listed. Those most relevant to the habitats within the Application Site and/or the local area in which the Application Site is found include great crested newt, skylark, meadow pipit, linnet, stock dove, corn bunting, yellowhammer, reed bunting, kestrel, red kite, house sparrow, grey partridge, dunnoek, bullfinch, turtle dove, song thrush, mistle thrush, barn owl, lapwing, marbled white butterfly, common hawk

<sup>5</sup> Available at <https://data.jncc.gov.uk/data/cb0ef1c9-2325-4d17-9f87-a5c84fe400bd/UKBAP-BiodiversityActionPlan-1994.pdf>

<sup>6</sup> Available at: <https://nottsbg.org.uk/lbap/lbap-introduction-and-sections-1-to-6/>

dragonfly, goatcheese webcap and snakeskin brownie mushrooms, brown hare, hedgehog, dormouse, noctule, Leisler's bat, soprano pipistrelle, otter, black mustard, wild cabbage, rye brome, cornflower, chamomile, Good-King-Henry and corn parsley.

## Local Conservation & Biodiversity

### Rushcliffe Local Plan

1.33. The *Rushcliffe Local Plan Part 1: Core Strategy*<sup>7</sup> was adopted in December 2014 and is the current Local Plan for the borough in which the Application Site falls. In support of the Core Strategy, development management policies with additional details are set out in the *Local Plan Part 2: Land and Planning Policies*<sup>8</sup>, adopted in October 2019. The relevant policies set out within the Plan include the following ecological provisions:

- Core Strategy Policy 16: Green Infrastructure, Landscape, Parks and Open Spaces
- Core Strategy Policy 17: Biodiversity
- Local Plan Part 2 Policy 16: Renewable Energy
- Local Plan Part 2 Policy 21: Green Belt
- Local Plan Part 2 Policy 34: Green Infrastructure and Open Space Assets
- Local Plan Part 2 Policy 36: Designated Nature Conservation Sites
- Local Plan Part 2 Policy 37: Trees and Woodlands
- Local Plan Part 2 Policy 38: Non-Designated Biodiversity Assets and the Wider Ecological Network.

1.34. For more detail on each of the above stated policies, see **TA 2: Ecological Assessment**.

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<sup>7</sup> [9 Local Plan Part 1 Rushcliffe Core Strategy.pdf](#)

<sup>8</sup> [Rushcliffe LP Part 2 Adoption version.pdf](#)

## BASELINE

### Designated Sites

- 1.35. The Application Site does not lie within or adjacent to any statutory designated environmental sites.
- 1.36. Within 15km of the Application Site boundary there are no internationally designated sites. There is one Site of Special Scientific Interest (“SSSIs”) within 5km of the Application Site, this being the Orston Plaster Pits SSSI. No National Nature Reserve (“NNR”) or Local Nature Reserves (“LNRs”) exist within 5km of the Proposed Development.
- 1.37. Three non-statutory designated sites were identified within 2km of the Proposed Development. These are Barleyholme Wood Local Wildlife Site (“LWS”), Orston Horse Pasture LWS and the River Smite LWS. Mitigation measures have been recommended to ensure that the Proposed Development will have no likely significant effects on local species and Local Wildlife Sites.
- 1.38. The only designated site with potential connectivity to the Application Site is the River Smite Local Wildlife Site, **Figure 2.5 of Volume 3, Technical Appendix 2** illustrate this site. With the implementation of the recommended measures, it has been determined that there will be **no significant adverse effects** on any designated nature conservation site as a result of the Proposed Development.

### Habitats

- 1.39. An Extended Phase 1 habitat survey was conducted in April 2021. In addition to this, UK Habitat Classification surveys were undertaken in January and July 2022. The survey covered all land within the Application Site and a 50m buffer around the entire site, together comprising the Ecological Survey Area (“ESA”). This highlighted the presence of the following 13 habitat types within the ESA:
- h2a – Hedgerow (Priority Habitat),
  - w1g6 – Line of Trees,
  - h2 – Hedgerow,
  - w1 – Broad Mixed and Yew Woodland,
  - r1e – Canals,
  - r1a – Eutrophic Standing Water,
  - c1c – Cereal Crops,

- g4 – Modified Grassland,
- w1g – Other Woodland-Broadleaved,
- w2 – Coniferous Woodland,
- w1h – Other Woodland Mixed,
- g3c – Other Neutral Grassland,
- u1e – Built Linear Features.

## Flora

- 1.40. The majority of the Application Site is dominated by arable land and agricultural grassland of low botanical interest. Neither the Phase 1 Habitat survey, or UK Habitats Classification survey identified any flora species of particular protection.

## Fauna

### Badger

- 1.41. No evidence of badger was recorded during the site visit within the ESA. Patches of woodland within and adjacent to the Application Site provide sett-building habitat for this species, while the hedgerows, arable, improved grassland habitats within the ESA would offer suitable foraging opportunities for the species.

### Bats

- 1.42. The hedgerows and ditches within the Application Site as well as the many wooded areas and coniferous and broadleaved woodland plantations adjacent to and within the site provide foraging and commuting features for bats. These features are largely unlit, being screened from lighting associated with houses, farm buildings or roads. The majority of the site is arable and agricultural grassland, offering more limited foraging interest (generally restricted to the larger British bat species).
- 1.43. The Application Site offers optimal habitats for commuting and foraging bats overall, with good habitat connectivity both within the site and linking it to adjacent areas. Key habitat features include hedges (particularly those containing trees, see **Table 6-3 – Target Notes in TA 2: Ecological Assessment**), woodlands and woodland edges.

## Other Mammals

- 1.44. The Application Site offers suitable sheltering / foraging habitat for hedgehog in the form of hedgerows, woodland, improved grassland and dense scrub, despite no sign of the species during the habitat survey.
- 1.45. The site also offers suitable arable and grassland habitat for brown hare, with sightings of the species recorded during the UK Habitats Classification Survey. In addition, muntjac deer, fox and rabbit were recorded during the survey. Field signs of Roe Deer and Woodmouse being noted.
- 1.46. Brown hare and hedgehog are UK and Nottinghamshire Priority species<sup>9</sup>. However, the presence of roe deer, muntjac deer, red fox, woodmouse and any other wild common mammals that may use the habitats within the Application Site is considered to be of limited nature conservation interest.
- 1.47. No signs of other protected or Priority mammals were observed. It is expected that the Application Site supports an assemblage of common small mammal species.

## Herptiles

- 1.48. The local area contains three ponds (one west of the site within 250m and two ponds just under 500m southwest and southeast from the site). A HSI survey was conducted for the three ponds each returning a HSI score of 0.56, indicating that each pond as **'below average'** suitability for Great Crested Newt (GCN).
- 1.49. An Extended Phase 1 Habitat survey and two UK Habitats Classification surveys were conducted with the main aim of understanding of what habitats are present within the Proposed Development boundary. Multiple ditches were identified which were ultimately defined by the UK Habitats Classification as "Canals" and one ditch as "Eutrophic Standing Water") within the ESA were observed. These features were deemed unsuitable and therefore, unlikely to support GCN.
- 1.50. No other herptile species were spotted during the UK Habitats Classification survey, however, their presence cannot be ruled out. Some of the field margins within the Application Site contain tussocky grass areas suitable for reptiles and amphibians. Hedgerow bases also provide opportunities for commuting, shelter and hibernation. Under the UK habitats classification survey the agricultural ditches on site are best classified as "Canals" and eutrophic standing water habitats are considered to have some limited suitability for herptiles.

## Birds

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<sup>9</sup> See <https://hub.jncc.gov.uk/assets/98fb6dab-13ae-470d-884b-7816afce42d4>



- 1.51. The ESA provides abundant suitable nesting and foraging habitat for a diverse assemblage of birds in the form of hedgerow trees and shrubs, grassland and woodland habitats. This assemblage is likely to include farmland birds of conservation concern. Buildings to the south and west of the Application Site also offer suitable opportunities for species such as house sparrow and barn owl.

### Invertebrates

- 1.52. The vast majority of the site (improved grassland / arable) is considered to be of very limited value to invertebrates as it is species-poor grassland with high levels of herbicide and fertiliser inputs. However, hedges, tree lines, areas of woodland are all considered likely to support a more diverse assemblage. Together with agricultural field drains and the section of eutrophic standing water within the ESA, the site is likely to support a limited assemblage of aquatic invertebrates.

### Other Species

- 1.53. No evidence of other protected or Priority species was found within the Application Site.

## POTENTIAL IMPACTS

- 1.54. Potential impacts which could arise from the development of a solar farm include:
- Potential habitat loss and fragmentation;
  - Disturbance during construction and decommissioning; and
  - Potential contamination of surface waters.

### Potential Habitat Loss and Fragmentation

- 1.55. The main impacts during the construction phase include the direct loss of habitat under the Proposed Development footprint, and indirect loss of habitat due to noise and vibration disturbance, and dust and water pollution. The loss of habitat will primarily occur in arable and improved grassland areas, these habitats are considered to be of negligible significance to nature conservation interest within the local area.
- 1.56. The Proposed Development has been designed in such a way to avoid significant losses of agricultural land during the operational stage, with a total ground disturbance area of 3.98%. Agriculture can continue on the other 96.02% of the land. Circa 20m of hedgerow removal is required for the creation of an access track.

- 1.57. The main habitat loss will occur under the Proposed Development footprint in regard to structures such as access tracks, cable trenches and hardstanding for buildings and inverters. Solar panels will be mounted on frames which will be pile driven into the ground in a similar way to fence posts, therefore limiting soil disturbance. The Application Site can be fully restored upon termination of its use as a solar farm.
- 1.58. Towards the later stage of this planning application a design change occurred, whereby the client specified two areas of exclusion which can be seen in **Figure 1.12 of Volume 3, Technical Appendix 1: Landscape and Visual Appraisal**. These areas of exclusion have been accounted for within the Biodiversity Net Gain calculations.
- 1.59. Existing hedgerow habitats will be enhanced, identified local species will be protected, and proposed habitat loss will be compensated for. New habitats will be created using native species appropriate to the Application Site, and biodiversity value will increase. The proposals will limit fragmentation and provide improved connectivity between wildlife habitats. It is therefore considered that habitat loss and fragmentation from the Proposed Development **will not be significant**.

## Disturbance During Construction and Decommissioning

- 1.60. The construction and decommissioning phases of a development have the potential to impact upon local wildlife.
- 1.61. To minimise any potential disturbance to wildlife, several measures will be implemented prior to construction and decommissioning work taking place. Avoidance and mitigation measures recommended within the Ecological Assessment (**Technical Appendix 2 of Volume 3**) include:
- Avoidance of hedgerows, woodland, watercourses/field drains, trees, and all surface water areas including ponding;
  - Pre-construction badger survey;
  - Pre-construction otter survey;
  - Bat roost assessments for any bat roost potential (“BRP”) trees to be removed;
  - Pre-construction bird surveys if works commence between March and August inclusive;
  - Securely covering all excavations at the end of each working day to prevent accidental trapping of badger or other mammals,
  - Any vegetation removal from March to September to be carried out directionally towards retained habitat. Careful removal of hedgerow to be performed with hand

tools, only when air temperature is above 10°C, and not after long dry spells; ecologist to be contacted if herptiles are found;

- If hedgerow or scrub removal needs to occur between October and February, removal is to be overseen by a suitably qualified and experienced ECoW(Ecological Clerk of Works);
- A 10cm gap between security fence and ground level to permit the movement of wildlife across the local area.

1.62. During the operational phase, the disturbance to local wildlife will be more limited than the levels of disturbance the land is subject to from current farming practice.

1.63. With the creation of new species-rich neutral grassland, native hedgerows and woodland, along with the enhancement of existing hedgerows and sensitive management, the site's potential for supporting local wildlife is anticipated to be increased post-construction. The measures are predicted to result in a **net biodiversity gain** of **187.13%** of area-based habitat and **24.68%** of linear habitat (see **Appendix 2.2 of TA 2: Net Gain Assessment**).

## HABITAT CREATION

- 1.64. The existing arable and agricultural groundcover will be replaced by a mix of tussocky grass species. Existing hedgerows will be enhanced, with new hedgerow and tree planting undertaken within the Application Site. These habitats will be in place and managed for the duration of the Proposed Development (circa 40 years).
- 1.65. Various options exist to enhance the biodiversity value of a solar farm site, including the creation of different habitats, such as hedgerows, field margins, wild flower meadows, nectar-rich areas and winter bird crops. Habitat creation planned as part of the Proposed Development is summarised in **Table 2-3** below. Habitats that will be created include:
- Species-rich neutral grassland,
  - Native species-rich hedgerows,
  - Native woodland,
  - Bat and bird boxes,
  - Hedgehog houses,
  - Hibernacula,
  - Invertebrate hotels and
  - Bee banks (see **Appendix 2.2**).
- 1.66. These habitats individually offer shelter and a food source for supporting a variety of wildlife. The mosaic of these new habitats, combined with the existing hedgerows and ditches, will support the existing wildlife within the Application Site. By offering a wider range of habitats that benefit local wildlife, they also have excellent potential to increase the biodiversity of the site.
- 1.67. The grassland, hedgerows, trees, invertebrate hotels and bee banks will also contribute towards the National Pollinator Strategy, by offering new habitats that will support important pollinator species such as bees and flies.

## MANAGEMENT RECOMMENDATIONS

- 1.68. Management recommendations have been made below for new and existing habitats with the aim of achieving the following:
- to maintain and improve species biodiversity within the site;
  - to enhance the quality of the habitats;
  - increase the site's potential for supporting wildlife; and
  - to avoid any potential negative impacts arising from the development of the site.
- 1.69. Recommended management actions required to achieve the desired site conditions are summarised in **Table 2-2** of this document. The table also provides a brief résumé of the rationale for, and possible constraints on, adopting the recommended management.

### Responsibilities

- 1.70. It will be the responsibility of the Applicant to ensure that the proposed biodiversity management and monitoring is undertaken. It is expected that suitably qualified and experienced vegetation management contractors, arboriculturists and ecologists will be engaged by the Applicant for this purpose.

### Grassland

- 1.71. The planting of species-rich neutral grassland will occur within the Application Site over areas of current arable and improved grassland habitat that will be disturbed during the construction phase. This will primarily be beneath and between the solar PV panels, in all fields where these panels are present. The management regime will ensure a varied sward structure.
- 1.72. Among other wildlife, species-rich neutral grassland is of benefit to invertebrates such as locally important species of marbled white butterfly and common hawker dragonfly. This will in turn encourage foraging by species such as the noctule bat, should this Nottinghamshire Priority bat be present.
- 1.73. It is recommended that soil inversion take place prior to grassland sowing. In addition, given that current grassland species within the red line boundary are dominant, robust and competitive species such as Yorkshire fog and perennial rye grass, it is recommended that a grass such as yellow rattle be sown first in order to weaken these dominant grass species.

## Soil Stabilisation and Sward Establishment

- 1.74. Prior to sowing, the area of existing grassland will be sprayed with an approved herbicide, with repeat application where necessary to kill off any persistent weeds and regrowth of grasses. Emorsgate EG10 Tussock Grass Mixture or a similar semi-shade mix will be sown to provide a locally appropriate mixture of tussocky grasses, limiting erosion as well as increasing interest to pollinating invertebrates.
- 1.75. Species such as common couch, broad-leaved dock, stinging nettle and creeping thistle can be difficult to eradicate and may cause problems with sward establishment. These species should therefore be monitored when undertaking weed control on site. If required, they may need to be targeted by selective scything before they seed in late summer / autumn.
- 1.76. The opportunity for dual use in the form of low intensity sheep grazing means that areas of shorter sward height can be managed and maintained. In years two and three, grazing can be introduced in the months from August to November inclusive. This limited period will allow the sward to establish, in accordance with Forest Research grassland creation guidance<sup>10</sup>.

## Grazing Regime

- 1.77. Due to selective grazing habits, sheep grazing can lead to a diverse sward structure, if stocked at correct numbers. Sheep-grazing the grassland areas after construction benefits local biodiversity by eliminating the requirement for pesticide use as part of the current management regime for crops in the arable field. It also leads to an increase in the nesting suitability of fields for the Nottinghamshire Priority species, skylark<sup>11, 12</sup>.
- 1.78. A hardy Midlands breed such as Border Leicester or Leicester Longwool can be used due to their strong sward maintenance, ability to limit scrub dominance and hardiness<sup>13, 14</sup>. Such breeds are considered suitable for lowland conservation grazing. A grazier would be consulted to specify an appropriate welfare regime, though it is noted that the self-reliance of these breeds will limit the need for welfare checks. All checks that are needed would be performed on foot to minimise disturbance to wildlife.
- 1.79. An appropriate stocking mix (in terms of age and sex) and density would be agreed with the Rare Breeds Survival Trust or a suitably experienced conservation grazier. Stocking density should fall between 0.2 and 0.5 livestock units per hectare per year, as advised by Plantlife<sup>15</sup>, with stocking density at the low end of this range for the first three years.

<sup>10</sup> Harris, P *et al.* (2014) Lowland Neutral Grassland: Creation and management in land regeneration.

<sup>11</sup> RSPB (n.d.) Helping Bird Species: Skylark. Available at: <https://www.rspb.org.uk/our-work/conservation/conservation-and-sustainability/farming/advice/helping-species/skylark/>

<sup>12</sup> Fuller, R.J. (1996) BTO Research Report No. 164: Relationships Between Grazing and Birds with Particular Reference to Sheep in the British Uplands. British Trust for Ornithology, Thetford.

<sup>13</sup> RBST (n.d.) Border Leicester. Available at: <https://www.rbst.org.uk/border-leicester>

<sup>14</sup> RBST (n.d.) Leicester Longwool. Available at: <https://www.rbst.org.uk/leicester-longwool>

<sup>15</sup> Rehabilitation of existing priority lowland grassland: Timescales to achieve favourable condition. Available at: [http://www.magnificentmeadows.org.uk/assets/pdfs/Lowland\\_grassland\\_timescales\\_for\\_recovery\\_advisory\\_note\\_FINAL-Design.pdf](http://www.magnificentmeadows.org.uk/assets/pdfs/Lowland_grassland_timescales_for_recovery_advisory_note_FINAL-Design.pdf)

- 1.80. From the fourth year onwards, grazing can occur between March and November inclusive. Removing grazing over winter reduces the likelihood of soils becoming poached<sup>16</sup>. Sheep would be contained by the security fencing in place during the operational phase. However, they would be allowed to roam freely inside these boundaries to encourage habitat diversity through a more naturalistic grazing process.
- 1.81. In any years that sheep grazing cannot occur, a sit-on mechanical mower and/or manual scything will be used. Cuts down to 50mm will be taken in April, early September (to avoid conflict with nesting birds) and (if necessary) in October. Cuttings will be left onsite for ten days to set seed, before being removed from site.

## Hedgerows and Trees

- 1.82. This management plan will enhance existing hedgerow boundaries by infilling hedgerow gaps through planting a rich composition of hedgerow species **Table 2-1**. Native woodland will also be planted (see **Figure 1.14 of Volume 3, Technical Appendix 1: Landscape and Visual Assessment (LVA)**) for additional ecological interest and to strengthen green infrastructure across the site and the nearby designated sites. The woodland planting will include pedunculate oak, beech, hornbeam, birch to name a few species as well as holly, hawthorn, hazel in the understory **Table 2-1**. Infilling of existing hedgerow will occur with native hedgerow species in order to enhance these habitats further. Infilling of priority hedgerow will occur where possible as recommended by the LVA for the purpose of screening, however the current priority hedgerow habitat (h2a) is in good condition, and this new enhancement infill planting has been excluded from the Biodiversity Net Gain Calculator as it will have no effect on the overall metric.
- 1.83. Creating hedgerows will benefit a range of local species including Priority Species such as terrestrial mammals and newts. If the correct species are planted and maintained correctly, a hedgerow's potential can be maximised, providing food and shelter throughout the year, as well as connecting existing green infrastructure and wildlife movement corridors.
- 1.84. New and compensatory hedgerow planting has been provided at a ratio of approximately 128:1. Hedgerow loss will total circa 20m, with 2551m of new hedgerow to be planted.
- 1.85. The hedgerows will be planted as singular rows with a width of 2m. Eight hedgerows have been proposed to be planted across the site totalling to 2.551km in length. They will contain the species proposed in **Table 2-1**. Percentage composition of hedgerow species can be found in **Figure 1.14 of Volume 3, Technical Appendix 1: Landscape and Visual Assessment (LVA)**.

**Table 2-1: Hedgerow Species Mix**

SCIENTIFIC NAME	ENGLISH NAME
<i>Crataegus monogyna</i>	Common Hawthorn

<sup>16</sup> Harris, P *et al.* (2014) Lowland Neutral Grassland: Creation and management in land regeneration.

<i>Corylus avellana</i>	Hazel
<i>Prunus padus</i>	Bird Cherry
<i>Cornus sanguinea</i>	Dogwood
<i>Acer campestre</i>	Field Maple

1.86. It is also important to maintain ground flora along the hedgerows to provide suitable commuting corridors for small mammals and herptiles. This will be achieved by allowing natural colonisation of ground flora from nearby hedgerows. These will be best suited to flourish in the shaded conditions created.

1.87. Native woodland species proposed to be planted are found in **Table 2-2** below.

**Table 2-2: New Woodland Shaw planting Mix**

SCIENTIFIC NAME	ENGLISH NAME
<i>Quercus robur</i>	Pedunculate Oak
<i>Fagus sylvatica</i>	Beech
<i>Carpinus betulus</i>	Hornbeam
<i>Betula pendula</i>	Birch
<i>Castanea sativa</i>	Sweet Chestnut
<i>Populus Tremula</i>	Aspen
<i>Ilex aquifolium</i>	Holly (understorey)
<i>Corylus avellana</i>	Hazel (understorey)
<i>Crataegus monognya</i>	Hawthorn (understorey)
<i>Prunus spinosa</i>	Blackthorn (understorey)
<i>Acer campestre</i>	Field Maple (understorey)
<i>Taxus bacata</i>	Yew (understorey)

### Management Regime for Application Site

1.88. New hedgerows and trees will be planted within the first available planting season (November to March).

1.89. In year 2, newly planted hedgerow sections will be pruned (see **Figure 1.12 of Volume 3, Technical Appendix 1: Landscape and Visual Assessment** for further details). Existing hedgerows will be cut on a two- (where hawthorn is present) or three-year cycle, with no more than 1/2 cut in any one year. From year 5, new hedgerows will also enter this cycle.

1.90. Newly planted trees will be pruned as needed in years 2 and 3, and as necessary until established. They will then be left to continue their natural development.

1.91. For all hedgerows and trees, any pruning or cutting should be done outside of the breeding bird season (which is March to August inclusive) to minimise disturbance to nesting birds. All



hedgerow and tree management will be undertaken by a suitably qualified and experienced arboricultural professional.

## WILDLIFE SHELTERS

1.92. The creation of wildlife shelters, placed strategically throughout the site, will provide shelter for a range of species.

### Bird and Bat Boxes

- 1.93. Eight bird nest boxes will be erected on retained mature trees. These will be a mixture of:
- 3x Schwegler 1B Nest Box with 26mm entrance for very small species;
  - 3x Schwegler 1B Nest Box with 32mm entrance (suitable for birds including the Nottinghamshire priority species, house sparrow<sup>17</sup>) and
  - 2x Barn Owl Nest Box with a 130mm high x 120mm width entrance<sup>18</sup>
- 1.94. The Schwegler 1B Nest Boxes will be positioned 2-4m up each tree with a clear flight path to each box entrance. The boxes will be slightly tilted forward so that any driving rain will hit the roof and bounce clear, and will face between north and west, thus avoiding strong sunlight and the harshest winds. Indicative locations are shown in **Figure 1.12 of Volume 3, Technical Appendix 1: Landscape and Visual Assessment**); final locations will be decided during the installation process.
- 1.95. The Barn Owl Nest Boxes will be positioned at least 3m up a suitable semi-mature/mature tree within the site as the tree needs to be able to support the substantial weight of the box. The positioning of the box and the tree in which it is placed should ensure access to the entrance hole is visible for barn owls that may fly past open landscape. The chosen trees should be isolated or on a woodland edge in a visible area with a suitably elevated canopy and exposed trunk. Again, indicative locations are shown in **Figure 1.12 of Volume 3, Technical Appendix 1: LVA**); final locations will be decided during the installation process.
- 1.96. Six woodcrete bat boxes will be erected on retained mature trees. These will be a mixture of two of the Schwegler 1FD and three of the 2F-DFP designs (suitable for the Nottinghamshire Priority species soprano pipistrelle (*Pipistrellus pygmaeus*)) or a similar mix if any of these are not available at the time of purchase. The boxes will be positioned 3-5m up the trees with a clear flight path to each box entrance. Boxes will face between southeast and southwest, thus

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<sup>17</sup> See <https://www.nhbs.com/1b-schwegler-nest-box>

<sup>18</sup> See <https://www.nhbs.com/barn-owl-nest-box>

providing natural heating. Indicative locations are shown in **Figure 1.14 of Volume 3, Technical Appendix 1: LVA**; final locations will be decided during the installation process.

- 1.97. If exact models of bird and/or bat box cannot be acquired, boxes of similar construction can be used.

### Maintenance Regime

- 1.98. All boxes will be maintained for a minimum of five years after installation. Boxes will be checked annually by a suitably competent and qualified ecologist. Where necessary, boxes will be cleaned by removing debris with a clean cloth. Any missing or damaged boxes will be replaced as needed. For boxes where bat roosting is discovered, subsequent checks should be carried out by a licensed bat worker. It is worth noting that barn owls are a Schedule 1 species and so an occupied box must only be disturbed or inspected by a licensed individual.

### Hedgehog Houses

- 1.99. Six hedgehog houses and refuge areas will be positioned in the Application Site at quiet corners and habitat edges<sup>19</sup>, especially adjacent to hedgerows.

### Maintenance Regime

- 1.100. The hedgehog houses will be checked annually for a minimum of five years after installation. Any missing or damaged houses will be replaced within seven weeks (to allow for sourcing and deployment).

### Herptile Hibernacula

- 1.101. Six hibernacula will be constructed within the Application Site, close to other features of potential reptile interest. Each hibernaculum comprises of log, rock and stone piles and is aimed at providing shelter for reptile and amphibians to hibernate. It may also be used by a variety of insects and small mammals. Hibernaculum creation will follow the instructions laid out within **Appendix 2.2A** below.

### Management Regime

- 1.102. The hibernacula can be installed at any stage within the first year, and then left to allow natural vegetation colonisation to continue over the subsequent years.

### Invertebrate Hotels

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<sup>19</sup> See <https://www.nhbs.com/hedgehog-house>

- 1.103. Four invertebrate hotels will be erected close to the Application Site margins to provide nesting and sheltering habitat for invertebrates including pollinator species. A number of non-swarming bees, which often adopt these habitats, are Priority species for England.
- 1.104. For optimal warmth, the hotels will be erected in south- or southeast-facing areas not shaded by solar panels (see **Figure 1.14 of Volume 3, Technical Appendix 1: LVA**).

### Maintenance Regime

- 1.105. The invertebrate hotels will be checked once each summer for a minimum of five years after installation. Any missing or damaged hotels will be replaced within seven weeks (to allow for sourcing and deployment).

### Bee Banks

- 1.106. Bee hives already exist on the site, in addition to this three bee banks will be created in south-facing locations across the Proposed Development. These will consist of mounds of loose sand and similar materials, set aside for mining bee species to burrow into. A number of mining bees are Priority species for England.
- 1.107. To create warm conditions, these will be constructed in areas not shaded by solar panels. Further details are provided in **Appendix 2.2B**.

### Management Regime

- 1.108. The banks can be created at any stage within the first year, and then left to allow a cycle of vegetation colonisation and natural disturbance to continue over the subsequent years.

**Table 2-2: Habitat Creation, Management and Maintenance**

Objective	Action Plan Task	Timescale	Notes
Enhance the quality of habitats present	<p><u>Create a diverse grassland with varied structure</u></p> <p>After the development of the solar farm, sections of species-rich grassland seed mix will be sown across the site.</p>	Year 1	<p>Most of the site will be sheep-grazed with a light stocking rate that will allow varied sward structure across the site.</p> <p>Species-rich grassland will support invertebrates, which can encourage foraging by Nottinghamshire Priority bat species.</p>

<p>Create a diversity of habitats within the site</p>	<p><u>New tree planting</u></p> <p>This will include Pedunculate Oak (<i>Quercus robur</i>), Beech (<i>Fagus sylvatica</i>), Hornbeam (<i>Carpinus betulus</i>), Birch (<i>Betula pendula</i>), Sweet Chestnut (<i>Castanea sativa</i>), Aspen (<i>Populus Tremula</i>), Holly (<i>Ilex aquifolium</i>), Hazel (<i>Corylus avellana</i>), Hawthorn (<i>Crataegus monognya</i>), Blackthorn (<i>Prunus spinosa</i>), Field Maple (<i>Acer campestre</i>) and Yew (<i>Taxus bacata</i>)</p>	<p>Year 1</p>	<p>Planting will strengthen ecological connections between non-statutory designated sites</p>
	<p><u>Enhance existing hedgerow boundary</u></p> <p>Plant new hedgerows with Common Hawthorn (<i>Crataegus monogyna</i>), Hazel (<i>Corylus avellana</i>), Bird Cherry (<i>Prunus padus</i>), Dogwood (<i>Cornus sanguinea</i>) and Field Maple (<i>Acer campestre</i>) These corridors will allow the movement of small mammals and herptile species.</p> <p>To ensure a diverse hedgerow with a good structure it is important to maintain ground flora along the hedgerow.</p>		<p>A hedgerow provides shelter and a source of food for a variety of species including birds, small mammals, herptiles and butterflies.</p> <p>If appropriate species are planted and maintained correctly, a hedgerow’s potential can be maximised, providing food and shelter throughout the year.</p>

	<u>Install hibernacula</u>		See <b>Appendix 2.2A of this report</b> .  The hibernacula comprise of log, rock and stone piles, which are aimed at providing shelter for herptile species to hibernate. However, the hibernacula may also be used by a variety of insects and small mammals.
Ensure fencing does not inhibit the movement of wildlife	To allow movement of badgers, brown hares, hedgehogs, small mammals and herptiles across the development area the fence will be above ground level, with at least a 10cm gap at the base, allowing access for these species where required.	Year 1 (during construction phase)	Although badgers will not pass through a 10cm gap, they will dig a depression into the ground at the required areas.
Create a diversity of habitats within the site	<u>Create bat roosting habitat</u>  Native tree species will be planted, which, in time, will create new bat roosting resources.	Year 1	The creation of roosting habitat, along with the creation of species-rich habitat that will encourage an abundance of invertebrate life (a potential food source), will be beneficial to local bats.
	<u>Create bird nesting habitat</u>  Native tree species will be planted, offering new nesting resources.  Low intensity sheep grazing will increase nesting opportunities for skylark.		The creation of nesting habitat, along with the creation of species-rich habitat that will encourage an abundance of invertebrate life (a potential food source) and diverse grassland seed-fall, will be beneficial to local birds including specialist farmland birds.

	<p><u>Create bee banks</u></p> <p>Three earth banks will be created across the site to support bees and other invertebrates.</p>		<p>See <b>Appendix 2.2B of this report</b>.</p> <p>Banks will be left bare and south-facing for insects such as solitary bees</p>
	<p><u>Install hedgehog houses</u></p> <p>Six hedgehog houses will be positioned across the site to help support this Priority species and provide a refuge area.</p>	Year 1	<p>The creation of species-rich habitat that will encourage an abundance of invertebrate life will also benefit hedgehogs, which feed on insects.</p>
	<p><u>Install invertebrate hotels</u></p>		<p>Features aimed at raising invertebrate numbers and diversity will also benefit insectivorous predators such as bats, birds and herptiles.</p>
Maintain tree planting	<p><u>Tree pruning</u></p>	Years 2 and 3 (longer if needed) between January and February	Management will ensure optimal availability of blossom for wildlife as a potential food source.
Maintain new species-rich ground flora around solar PV installation	<p><u>Low intensity sheep grazing</u></p>	Each year	Low intensity sheep grazing will ensure that the areas of shorter and longer swards will be managed and maintained. This will result in an overall increase in biodiversity within the site.
Maintain hedgerows	<p><u>Cut section of hedgerow</u></p>	Each year between January and February	Cutting on a rotational basis, following standard advice <sup>20</sup> , to ensure the optimal availability of berry and blossom for wildlife throughout the year as a potential food source.

<sup>20</sup> Hedgelink UK, The Complete Hedge Good Management Guide, Available at [www.hedgelink.org.uk](http://www.hedgelink.org.uk)

			Management will also ensure a good base is maintained within the hedgerow to provide suitable habitat for a range of wildlife.
Maintain new wildlife shelters	<u>Check bird and bat boxes, hedgehog houses and invertebrate hotels</u>	Summer of years 1 to 5+	<p>Licensed bat worker required for future checks for all bat roosts discovered.</p> <p>Occupied barn owl boxes must only be disturbed or inspected by a licensed individual.</p> <p>Bird and bat boxes to be cleaned as necessary.</p> <p>All boxes that are missing or are damaged so as not to be functional will be replaced.</p>

## GENERAL CONSIDERATIONS

### Obligations

- 1.109. During each of the development phases there are a number of legal obligations that should be considered by all those involved in site work:
- Ensure obligations of the Conservation of Habitats and Species Regulations 2017<sup>21</sup> are met by all involved with the site (see also **Table 4-1** in **Technical Appendix 2: Ecological Assessment (EcA)**).
  - Ensure obligations of the Wildlife & Countryside Act 1981 (as amended)<sup>22</sup> are met by all involved with the site (see **Technical Appendix 2: EcA** for further detail).
  - Ensure all relevant Health & Safety at Work Act obligations<sup>23</sup> are met.

### Good Ecological Practice

- 1.110. Whilst management practices should only be altered if there is a good ecological reason for doing so, they should not rigidly be adhered to if they are obviously detrimental to wildlife.

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<sup>21</sup> Parliament of the United Kingdom, 2017. The Conservation of Habitats and Species Regulations 2017. Available at <https://www.legislation.gov.uk/uksi/2017/1012/contents/made>

<sup>22</sup> Parliament of the United Kingdom, 1981. Wildlife and Countryside Act 1981 (as amended). Available at <http://www.legislation.gov.uk/ukpga/1981/69>

<sup>23</sup> Parliament of the United Kingdom, 1974. Health and Safety at Work etc. Act 1974 (as amended). Available at <https://www.legislation.gov.uk/ukpga/1974/37/contents>



## INDICATIVE MANAGEMENT SCHEDULE

1.111. Table 2-3 below shows possible months in which activities will occur during habitat establishment and continued management.

**Table 2-3: Timeframes for Management Activities**

MANAGEMENT ACTIVITY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
<b>Year 1 – Initial Habitat Enhancement</b>												
Hedgerow and tree planting	✓	✓								✓	✓	✓
Removal of existing vegetation and seeds beneath solar panels			✓	✓	✓							
Cultivate and allow soil to settle						✓	✓					
Grassland sowing beneath solar panels								✓	✓			
<b>Years 2 and 3 - Annual Habitat Management</b>												
Grazing of grassland beneath solar panels (once sward is established)								✓	✓	✓	✓	
Pruning of newly-planted hedgerow sections and trees	✓	✓							✓			

Checks by contractor through the initial maintenance period to comprise weed clearance, watering and pruning			✓	✓	✓	✓	✓	✓				
Replacement of any dead, dying or diseased newly planted trees or hedgerow										✓	✓	✓
Existing hedgerows cut on a 2- or 3-year cycle, with no more than 1/2 cut in any one year	✓	✓										
<b>Ongoing Annual Management – Year 3 onwards</b>												
Grazing of grassland beneath solar panels			✓	✓	✓	✓	✓	✓	✓	✓	✓	
<b>Ongoing Annual Management – Year 4 onwards</b>												
Light pruning of newly planted hedgerow sections	✓	✓							✓			
Existing hedgerows cut on a 2- or 3-year cycle, depending on species. All	✓	✓										

hedgerows from year 5, with no more than 1/2 cut in any one year.													
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## DECOMMISSIONING

- 1.112. At the end of the operational period, decommissioning will take place. This will entail dismantling and removing all of the materials and equipment in order to reinstate the land back to its original condition. Where possible, retaining features such as species-rich grassland and maintaining the hedgerow boundary beyond the 40-year lifespan of the Proposed Development will be of benefit to wildlife. This will enable **net biodiversity gain** (see **Appendix 2.2 of TA 2: Net Gain Assessment**) to be sustained in the long term.

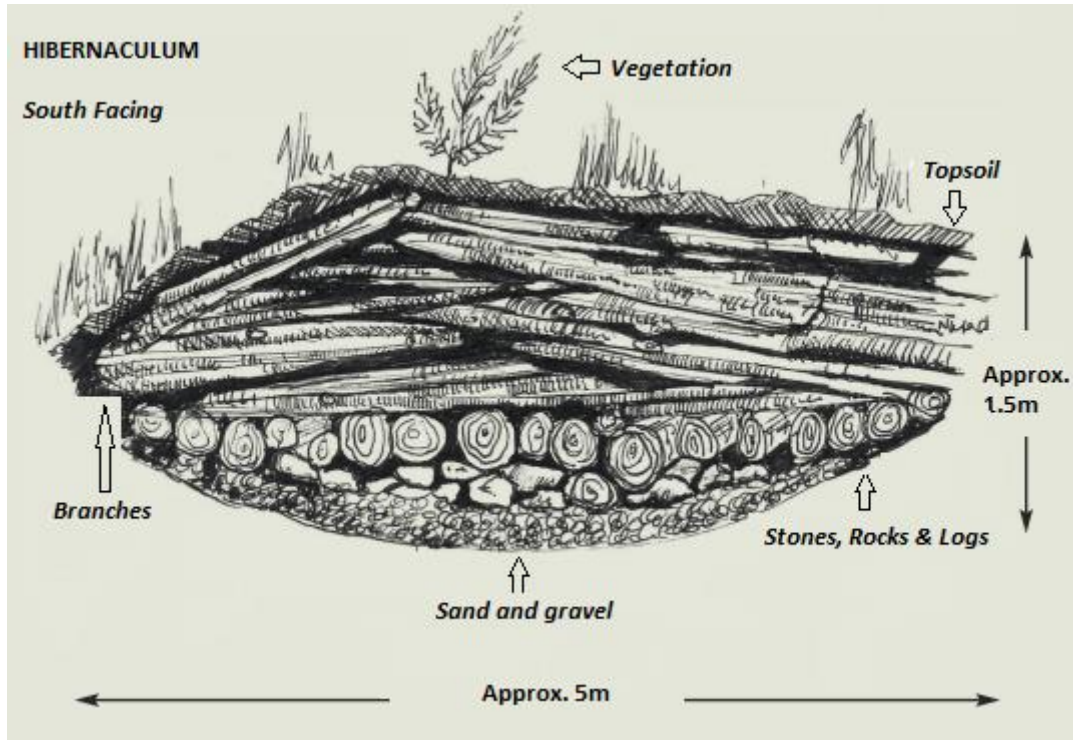
## APPENDICES

Appendix 2.2A – Hibernaculum Construction

Appendix 2.2B – Bee Bank Construction

## APPENDIX 2.2A - HIBERNACULUM CONSTRUCTION

- 1.113. The hibernaculum will follow the basic construction set out below, with the log and stone piles situated to the north of the hibernaculum.



- A 5m long east-west running ditch 1m deep and 1m wide will be dug.
- The base will be lined with sand and gravel.
- This will be followed with layers of stones, rocks and logs.
- Smaller branches will then be placed on top, and covered soil from the excavation will be placed over the pile, leaving gaps for access.
- The soil will be shaped into a mound.
- The north-facing side of the mound will be seeded / planted with species that will attract insects and will also provide extra shelter.
- The south-facing side will be maintained with a sparse vegetation cover to provide an area to bask.
- A log pile of approximately 2m by 1m will be placed to the north of the hibernaculum.

## APPENDIX 2.2B – BEE BANK CREATION

- Material will be built into a crescent-shaped mound with various slopes, hollows and angles that may be utilised and favoured by different species.
- Aggregate and/or soil will be used to create the core of the bank. Builders' sand will be used to cap the bank in a layer of >30cm deep. Bank faces will then be compacted with the back of a spade.
- Banks will be between 0.5m and 1.5m high. A variety of bank heights will be created to provide habitat microdiversity.
- Vertical faces created on bee banks take much longer to vegetate, and this makes them attractive to many species. Over time a bee bank will be vegetated over through succession.
- Planting appropriate vegetation in an open structure in front of a bee bank will provide extra habitat for invertebrates that are attracted to the bee bank.
- These banks will be created close to flower-rich areas that will create important foraging opportunities for pollinators.