
Priory Farm Solar Array
on behalf of Axis PED
Biodiversity Management Plan



Document Control				
Project Name:		Priory Farm Solar Array		
Project Number:		AxisL-043-1480		
Report Title		Biodiversity Management Plan		
Issue	Date	Notes	Prepared	Reviewed
V1.0	08/12/2021	Draft for client review	J. Stevens <i>BSc (Hons)</i>	<i>D. Foy</i> <i>BA (Hons)</i>

This report has been prepared in accordance with the terms and conditions of appointment for Ecological Appraisal [on request]. Avian Ecology Ltd. (6839201) cannot accept any responsibility for any use of or reliance on the contents of this report by any third party.

CONTENTS

1	INTRODUCTION	1
1.1	Report Purpose	1
1.2	Implementation of the BMP	1
2	ECOLOGICAL BASELINE.....	1
3	ECOLOGICAL MITIGATION MEASURES	2
3.1	Designated Sites and Habitats.....	2
3.2	Birds.....	2
3.3	Badger	2
3.4	Bats.....	3
3.5	Amphibians and Reptiles	3
4	ECOLOGICAL ENHANCEMENT MEASURES	3
4.1	Habitat Creation	3
4.2	Wildlife enhancements	7
4.3	Grassland	8
4.4	Hedgerows.....	10
4.5	Woodland	11
4.6	Habitat Piles.....	11
5	ECOLOGICAL MONITORING AND CONTINGENCY.....	12
5.1	Timings	12
5.2	Monitoring Criteria	12
5.3	Contingency Measures.....	13

6 INDICATIVE MANAGEMENT SCHEDULE..... 14

1 INTRODUCTION

1.1 Report Purpose

- 1.1.1 This Biodiversity Management Plan (BMP) sets out habitat protection and enhancement measures for a proposed solar farm and associated infrastructure on land to the north and east of Great Wymondley, Hertfordshire (the Site). This document also details ecological management practices to be adopted with the aim of developing and maintaining wildlife habitats to provide a net gain for local biodiversity. It is considered the implementation of this BMP will allow the Site to achieve the objectives stated within the biodiversity net gain assessment.
- 1.1.2 The site is located east of Great Wymondley, Hertfordshire at approximate site central grid reference TL 22483 28448. The site is split into a north parcel and a southern parcel, bisected by Graveley Lane. Current land use of both parcels is cultivated arable land with fields often bounded by a mixture of defunct and intact, species rich and species poor hedgerows. The southern parcel is bounded by the A1(M) motorway to the east. The northern parcel also has two blocks of mixed woodland adjacent the Site.
- 1.1.3 The site-specific approach provided within this report provides recommendations for long-term management of the land to conserve and improve landscape habitat connectivity with the wider landscape for wildlife through protecting and enhancing potentially important wildlife corridors and habitats. This will contribute to the establishment of coherent ecological networks, supporting the biodiversity net-gain targets of the National Planning Policy Framework (2021).
- 1.1.4 This BMP applies only to the main solar site, with temporary works such as cable routing excluded from the scope of this document.

1.2 Implementation of the BMP

- 1.2.1 The implementation of the BMP will be the responsibility of the Developer of the Site, working in conjunction with the landowners (“Owners”) and/or appointed management organisation.
- 1.2.2 All works associated with the implementation of the BMP will be undertaken by experienced contractors and / or under the watch of a suitably qualified (and where required, licenced) ecologist.
- 1.2.3 The Developer shall be responsible for the cost of implementing the BMP including the cost of carrying out any management, monitoring, or other such activities.

2 ECOLOGICAL BASELINE

- 2.1.1 This Biodiversity Management Plan should be read in conjunction with the Drawing No. 3004-01-12 Landscape Proposals. Detailed descriptions of habitats and species can be found in the *Ecological Assessment Report* (Avian Ecology Limited, 2021¹), hereafter referred to as the Scheme EAR.
- 2.1.2 The Site is not located within any statutory designated site, however four local nature reserves (LNR) and three sites of special scientific interest (SSSI) are located within 5km of the Site, the nearest of which is Purwell Meadows LNR, located 1.4km north west of the Site. The cable route crosses Wymondley Transforming Station Local Wildlife Site (LWS), while a further 16 LWS are located within 2km of the Site.

¹ Avian Ecology Ltd (2021) *Priory Farm Solar Array: Ecological Assessment Report*.

- 2.1.3 The site currently consists of a series of arable fields with three small areas of semi improved grassland likely created as part of a countryside stewardship scheme and a small area of species poor semi-improved grassland.
- 2.1.4 Hedgerows were present as field boundaries throughout the site, the majority of which were species poor, although some species rich hedgerows were present. Hedgerows were generally intact and well maintained.
- 2.1.5 The arable land forming the majority of the Site is considered to be of low ecological value. The boundary hedgerows and line of trees are of higher value and are likely to provide shelter, foraging and commuting habitat for a range of species typical of the local area.
- 2.1.6 Further details on the ecological baseline, including the presence of protected or notable habitats and species can be found within the Scheme EAR

3 ECOLOGICAL MITIGATION MEASURES

3.1 Designated Sites and Habitats

- 3.1.1 Cable route works within Wymondley Transforming Station LWS will be undertaken following a soil management plan to ensure no long-term impacts to the LWS. This will briefly involve storing soil in the layers they are excavated and returning them in the same order, ensuring top soil remains the topmost layer. This will ensure soil conditions such as nutrient levels and PH remain broadly similar, and that any seedbank within the topsoil is able to germinate. The topsoil will be left to recolonise naturally from adjacent, unaffected habitats within the LWS.
- 3.1.2 Adjacent habitats will be protected by perimeter security fencing which will be erected first to prevent the encroachment of construction works beyond the Site boundary.
- 3.1.3 Standard measures to ensure runoff control and pollution prevention will be implemented; these measures will safeguard retained habitats within and surrounding the Site.
- 3.1.4 Hedgerows will be retained on Site and along with mature trees and woodland around the construction area, will be protected in-line with BS 5837:2012 Trees in relation to design, demolition and construction.
- 3.1.5 There will be clear delineation of working areas and access routes for vehicles entering the Site and instructions on these will be given to all site construction staff, delivery drivers and subcontractors.

3.2 Birds

- 3.2.1 Vegetation removal and ground clearance will be undertaken outside of the bird breeding season (March-August inclusive) if possible. If vegetation works are necessary during the breeding season any suitable nesting habitat to be affected by works should be checked by a suitably experienced ecologist prior to works commencing. Works would be permitted to proceed only when the ecologist is satisfied that no nests will be impacted.

3.3 Badger

- 3.3.1 A pre-construction badger survey will be undertaken immediately prior to works commencing to check for active or any newly constructed setts (between the initial baseline survey and the construction start date) within at least 30m of construction areas.
- 3.3.2 If baseline conditions have altered and significant disturbance to badgers or their setts is considered likely during the proposed works, one or both of the following options will be incorporated:

- The development design will be amended to avoid works which may impact upon badgers and their setts (e.g. alteration of the configuration of panels and/or fencing); and/or,
- A development licence will be obtained from Natural England before construction commences.

3.3.3 Any excavations of trenches created during construction will be backfilled or covered overnight to prevent animal entrapment.

3.3.4 Fencing will be raised or mammal gates installed at suitable intervals along the perimeter fence to allow the continued movement of badgers and other small mammals throughout the Site. These should be spaced along the perimeter fencing and sited close to existing linear corridors such as hedgerows.

3.4 Bats

3.4.1 Protection of all mature trees, hedgerows and woodland on and adjacent to the Site or along access routes will safeguard potential roost sites and maintain foraging and commuting opportunities. If any trees are required to be impacted suitable checks for roosting bats will be undertaken in advance of any removal. If bats are confirmed to be roosting within any tree to be impacted by proposed works, the data gathered would be used to inform potential design amendments avoid or reduce impacts or, failing that support a licence application to Natural England to destroy/disturb the bat roost.

3.4.2 In order to protect foraging / commuting bats, lighting required during construction and/or operation of the solar array facility will be used in a sensitive manner and directed away from field boundary habitats and habitats bordering the Site. This will be achieved in a number of ways, including the use of low-level lighting and use of hoods and careful selection of lighting (further information is provided in BCT guidance (2018) *Bats and Artificial Lighting in the UK: Bats and the Built Environment Series*²).

3.5 Amphibians and Reptiles

3.5.1 As a precautionary measure, Reasonable Avoidance Measures (RAMs) would be implemented during the construction phase to safeguard animals during works if minor removal of suitable habitat is required, namely removal of hedgerows or clearance of grassland margins.

4 ECOLOGICAL ENHANCEMENT MEASURES

4.1 Habitat Creation

4.1.1 Management practices are proposed that will enhance the Site for the benefit of local wildlife. The design and long-term management of the land seeks to maintain and improve functionality through protecting and enhancing potentially important wildlife corridors i.e. through creation, enhancement and maintenance of native species hedgerows within and around the Site. Drawing No. 3004-01-12 Landscape Proposals sets out the landscape planting and maintenance specifications.

4.1.2 All planting stock supplied shall be healthy and viable and comply with BS 3936: Parts 1 to 10 as relevant, and BS 4043, the National Plant Specification, published by the Horticultural Trades Association (HTA) as appropriate. Supplying nurseries will be registered under the HTA Nursery Certification Scheme. All plants will be packed and transported in accordance with the Code and Practice for Plant Handling as produced by Committee for Plant Supply and Establishment (CPSE).

² Bat Conservation Trust. (2018). *Bats and Artificial Lighting in the UK: Bats and the Built Environment Series*. available at: <https://cdn.bats.org.uk/uploads/pdf/Resources/ilp-guidance-note-8-bats-and-artificial-lighting-compressed.pdf?v=1542109349>

- 4.1.3 All seeding shall be carried out in accordance with BS 4428:1989 Code of Practice for general landscape operations (excluding hard surfaces), or the most up to date and current British Standard and in accordance with seed supplier's technical advice.
- 4.1.4 It is advised that herbicides are not used on Site; however, if herbicides are required, the herbicide handbook (English Nature, 2003³) provides guidance on appropriate herbicide use in relation to nature conservation works.
- 4.1.5 Planting will not be carried out when the ground is waterlogged, frost bound or during periods of cold drying winds.
- 4.1.6 All bare-root planting stock will be kept covered until actually planted in order to minimise water-loss and prevent the roots from drying out. Bare root stock shall be planted while dormant (November-April) or alternatively cell or container grown stock shall be used.

Grass Seeding

- 4.1.7 Following construction of the solar panels and all infrastructure, all areas of bare earth within the site, including those areas in between temporary protective fencing and existing landscape features, will be sown with grass seed.
- 4.1.8 Between the security fencing and existing/proposed hedgerows a species rich grass and wildflower mix would be sown, such as the Emorsgate EM2 Standard General Purpose Meadow Mixture.
- 4.1.9 In areas surrounding the solar panels and within the security fence line a seed mix suitable for low intensity sheep grazing that has been specifically designed for solar farms would be sown. Both mixes shall be sown in accordance with the landscape specification as set out in the Detailed landscape proposals and also encompassing the additional elements below.

Ground Preparation

- 4.1.10 Following the installation of the array, reinstatement works should include the removal of all stones and other debris to ensure the ground is suitable for use with mowers.
- 4.1.11 Subsequent to the last crop being removed, no fertilizer will be added to the arable land on the site.
- 4.1.12 Construction activities requiring heavy machinery will only take place during periods of dry weather, in order to avoid churning and damaging the soil.
- 4.1.13 Prior to seeding, the ground will be harrowed and rolled, using a tine harrow in order to avoid damaging underground wiring. However, if there are any areas which have suffered high soil compaction, for instance due to heavy machinery being deployed, these will be harrowed using a disc harrow to ensure the soil structure is suitable for subsequent sowing. If such a requirement arises to harrow with discs, caution should be exercised to ensure newly installed underground services are not damaged during harrowing.
- 4.1.14 If there is an abundance of annual or perennial weeds, then small areas of the site may be treated with herbicide prior to seeding.

Seeding

- 4.1.15 All seeding will take place ideally in mid-Spring or Late Summer to Mid-Autumn. Seed will be sown in the first year following completion of underground wiring, and be broadcast by machine (fertiliser spreader, slug pellet applicator, grass seed box) and rolled where possible. The gaps between strings

of panels are to be wide enough to accommodate a tractor travelling between them for harrowing, sowing and rolling purposes. In areas where a machine is unable to access, such as far underneath panels, seeding in these areas should be broadcast by hand. Seeds can be mixed with a substrate such as sand or sawdust for ease of broadcasting.

- 4.1.16 Sowing rate is recommended by the manufacturer as 2.5g per square metre or 25kg/hectare for the pasture grassland mix and at 4g per square metre or 40kg/hectare for the wildflower mix.

Hedgerow Planting

- 4.1.17 Approximately 1.97km of new hedgerow planting is proposed as part of the development, includes a new mixed native species hedgerow within the Site. Hedgerow species have been chosen to be typical of the local area, incorporating species observed during the baseline ecology surveys where appropriate.

- 4.1.18 The following species will form the hedgerow planting within the Site

- Field Maple *Acer campestre*
- Hazel *Corylus avellana*
- Hawthorn *Crataegus monogyna*
- Blackthorn *Prunus spinosa*
- Dog Rose *Rosa canina*
- Elder *Sambucus nigra*

Ground Preparation

- 4.1.19 Where necessary existing weeds will be manually removed or treated with a suitable herbicide as specified within the herbicide handbook (English Nature, 2003) or hand-weeding.
- 4.1.20 All extraneous matter such as plastic, wood, metal and stones greater than 50mm diameter will be removed from site to a registered waste disposal facility.

Planting

- 4.1.21 Hedgerows will be planted in a double staggered row at 5 plants per linear metre, unless specified otherwise in the landscaping proposals.
- 4.1.22 The exact timing of the proposed hedgerow planting will be dependent on the ground conditions but bare-root planting should ideally take place between the months of December-February inclusive. It is expected that ground conditions and climate will allow for earlier planting (i.e. before January), and this will allow the plants more time to establish a network of feeder roots before the onset of spring. Planting should avoid freezing and water-logged conditions.
- 4.1.23 Planting slots shall be made using a planting spade and shall be dug 450mm wide x 450mm depth. Plant notches should be T, L- shaped or straight, using spades of a design suitable for this purpose. The planting notches must be vertical and deep enough for the roots to hang freely, with the transplant being planted so that the root collar is exactly level with the ground surface. The notch must then be closed and the soil will be well firmed round the roots in line with the guidelines as set out in BS 4428 (1989).

- 4.1.24 All plants will be watered in at the end of each day of planting/or as required. After planting a 50mm layer of approved compost fine bark (nominal size 1-10mm) shall be spread along the hedge trench to 1m wide or spread around the pit of each woodland plant at 1m wide.
- 4.1.25 All hedgerow planting stock will be protected from rabbit damage using rabbit proof fencing or individual spirals/shrub guards supported with canes or stakes as advised by the manufacturer. Any spiral/shrub guards used that are not biodegradable, will be removed approximately three years after planting or once established.

Woodland Planting

- 4.1.26 Woodland screen planting is proposed along north western, northern and north eastern boundaries of the Site, as well as on land west of the Site. This planting will be approximately 10m wide and with a total area of 1.66ha. As well as canopy tree species, it is also recommended that a suitable native shrub layer also be incorporated within the woodland planting, encouraging increased structural diversity within the habitat and thereby increasing the overall biodiversity value of the habitat, It is recommended that the following native species will form the tree planting at this Site:

Table 4.1: Woodland planting mix

Species	Common Name	% Mix
<i>Acer campestre</i>	Field Maple	15
<i>Betula pendula</i>	Silver Birch	20
<i>Carpinus betulus</i>	Hornbeam	15
<i>Corylus avellana</i>	Hazel	10
<i>Malus sylvestris</i>	Crab apple	10
<i>Prunus spinosa</i>	Blackthorn	10
<i>Quercus robur</i>	Common Oak	10
<i>Sambucus nigra</i>	Elder	10

Ground Preparation

- 4.1.27 If the formation level is compacted it will be ripped through before topsoiling.
- 4.1.28 Where necessary existing weeds will be uprooted or will be treated with a suitable herbicide as specified within the herbicide handbook (English Nature, 2003). No use of chemicals within 10m from the top of ditches/pond will be undertaken.
- 4.1.29 Trees/shrubs are to be placed into pits that will accommodate the roots comfortably, with approximately 75mm space outside the extent of the roots.
- 4.1.30 The bottom and sides shall be forked to break up the subsoil. All extraneous matter such as plastic, wood, metal and stones greater than half brick size will be removed from site.
- 4.1.31 Topsoil is to be stored in accordance with British Standards or other guidance current at the time of planting. Imported topsoil to conform to requirements of British Standards or other guidance current at the time of planting.

Planting

- 4.1.32 The exact timing of the proposed planting will be dependent on the ground conditions but planting should ideally take place between the months of December and February inclusive, this will allow the

plants more time to establish a network of feeder roots before the onset of spring. Planting should avoid freezing and waterlogged conditions.

- 4.1.33 Trees/shrubs are to be placed into the pits and backfilled with local topsoil previously stripped from the Site. A general-purpose slow release fertiliser (at the rate of 75gm/m²) and Tree Planting and Mulching Compost (at the rate of 20litres/m²) are to be incorporated into the top 150mm of topsoil during backfilling. Where tree pits are more than 300mm deep, backfilled material shall be consolidated / firmed in 150mm layers. Additional topsoil will be imported onto the site if topsoil stripping operations do not provide sufficient topsoil for the entire tree planting.
- 4.1.34 Trees shall be well firmed-in and secured with stakes, proprietary rubber tree ties and spacers as below.
- 4.1.35 All select standard trees will be held so that movement at the root collar is minimised until new roots have developed to anchor the tree. Therefore low staking (75mm diameter x 1.5m length) will be used and attached to the tree at approximately 1200mm above ground level. Stakes will be driven 300mm into undisturbed ground of the bottom of the tree pit before planting the tree, taking care to avoid underground services and cables. The trees will be staked using proprietary rubber ties and must be firmly fixed with a spacing device used to prevent chafing against the tree.
- 4.1.36 All trees will be protected from grazing damage by the fitting of approved tree guards. If the bushiness of the tree prevents the use of standard tree guards then an alternative design of guard shall be used in agreement with the project landscape architect. Composted bark mulch will be spread to a depth of 75mm in a 1m diameter circle around all individual trees, ensuring that desirable groundcover plants (where present) are not buried.
- 4.1.37 All trees/shrubs shall be watered in at the end of each day of planting.

4.2 Wildlife enhancements

Birds

- 4.2.1 Additional bird nesting provision will be made through the inclusion of a minimum of five bird boxes erected on mature and semi-mature trees located around the Site.
- 4.2.2 Bird boxes should ideally be installed in the autumn (September to November) following the cessation of construction works, by the appointed contractor under advice of the suitably competent ecologist.
- 4.2.3 Boxes should be erected at an appropriate height of between 1 to 5 metres. Boxes should be angled so that they face away from the prevailing wind or in a semi sheltered environment. Positioning within or close to hedgerows will increase chances of occupation. Bird boxes will be suitable for a variety of farmland bird species.

Bats

- 4.2.4 Additional bat roost provision will be made through the inclusion of a minimum of five bat roost boxes on mature and semi-mature trees along the Sites northern, western and eastern boundaries. Boxes will be erected in suitable habitats (i.e., along boundary features), at an appropriate height (ideally above 4m in height) and with clear flight paths to utilise the Site boundary features. Boxes should be exposed to sun for at least part of the day and so erected on a south facing aspect. It is often appropriate to erect multiple boxes on the same tree at slightly different heights and aspects to create a variety of microclimates. Minor pruning may be required to ensure a clear drop zone below newly installed bat boxes.

- 4.2.5 Guidance on the installation of bat boxes is available from the Bat Conservation Trust⁴, or a suitably qualified ecologist should be consulted.

5 HABITAT MANAGEMENT

5.1 Grassland

Pasture Grassland

- 5.1.1 grass area shall be mown during Year 1 after seeding and grazed by sheep during subsequent years, as detailed below.

Year 1

- 5.1.2 Newly seeded grassland will be subject to regular cutting to a height of between 40mm and 60mm, with arisings removed during the first year of establishment in order to prevent annual weeds from establishing.
- 5.1.3 This shall constitute a cut 6-8 weeks after sowing and then every month thereafter between May and September.
- 5.1.4 The frequency of cutting will be increased should annual weeds establish.
- 5.1.5 If the mixture is autumn sown or contains yellow rattle *Rhinanthus minor* a high spring cut to between 70-100mm will be undertaken around April with no further mowing until mid-July.

Subsequent years

- 5.1.6 After the first year following seeding, grassland will be managed by rotational low-intensity grazing in accordance with the landowners' requirements, either rotating sheep within the site through control with stock proof fencing or through rotational grazing using nearby fields.
- 5.1.7 Ideally, it is best to aim for a stocking rate just sufficient to maintain a varied structure, rather than the maximum that the grassland can support. Grazing density (As per the table below) is based on medium sized sheep (e.g. 60kg). It is important to constantly monitor the Site to ensure the grassland is not under or over grazed and stock density and duration altered accordingly. The stocking density should be reduced in wet periods or in conditions when poaching would lead to a break-up of the sward and colonisation by aggressive weed species.

Table 5.1: An indicative guide to stocking levels for lowland grassland (number of sheep per hectare). Adapted from the Lowland Grassland Management Handbook produced by Natural England.

Number of grazing weeks per year	Neutral Grassland (sheep per ha)
16	12.5
20	10
24	8
36	5.5
52	4

⁴ <https://cdn.bats.org.uk/uploads/pdf/Bat-Box-Information-Pack-Sept-2020-JF.pdf?v=1600095860>

5.1.8 The following indicators will be used to review and amend stocking densities:

- An increase in the amount of uneaten grass, the accumulation of litter, an increase in vigorous rank and unpalatable grasses, and a reduction in low growing herbs: indicates stocking density is too low (need to increase density).
- A reduction in density/diversity of plants, excessive poaching, weed invasion and the development of bare patches: indicates stocking density is too high (need to reduce density).

5.1.9 Any herbicide applications to control weeds should be undertaken immediately after sheep have been removed from a grazing area.

5.1.10 The areas will be subject to light intermittent grazing by sheep between approximately September and January, where conditions allow. Moderate trampling will expose ground for colonisation by annuals the next spring; however, heavy trampling can lead to ground poaching and infestations by weed species that will be detrimental to the Site. During the spring and summer (March to August), sheep will be removed or stocking density reduced to allow summer flowering plants to set seed. Grazing will be carefully monitored in the winter period in order to prevent excessive compaction of wet earth.

5.1.11 Cutting of any un-grazed areas will be in accordance with measures outlined for species rich grassland below.

Species Rich Grassland

5.1.12 The wildflower shall be mown under differing regimes for Year 1 after seeding and subsequent years, as detailed below.

5.1.13 Mowing will only take place during periods of dry weather to ensure that no waterlogged ground is damaged by machinery.

5.1.14 The grassland will not be improved by chemical fertilizer or slurry and nutrient levels in the soil should be allowed to reduce over time.

5.1.15 All arisings should remain on Site for three to five days following the cut to allow seeds to disperse, and then either removed from site or placed on habitat piles within field margins.

Year 1

5.1.16 Newly seeded grassland will be subject to regular cutting to a height of between 40mm and 60mm, with arisings removed during the first year of establishment in order to prevent annual weeds from establishing.

5.1.17 This shall constitute a cut 6-8 weeks after sowing and then every month thereafter between May and September.

5.1.18 The frequency of cutting will be increased should annual weeds establish.

5.1.19 If the mixture is autumn sown or contains yellow rattle a high spring cut to between 70-100mm will be undertaken around April with no further mowing until mid-July.

Subsequent years

5.1.20 After the first year following seeding, grassland will be managed by mowing as per the schedule below:

Table 5.2: Guide to timings of management of species rich grassland

Timing	Management
July to August	Summer hay cut to a height of 40-75mm. Arisings should be left for between 5 and 7 days before being removed to allow seeds to drop.
September to November	Autumn cut to a height of 40-75mm and remove arisings. Ideally at least two cuts should be undertaken in this period after the summer hay cut. If grass growth is vigorous more frequent mowing may be required.
March	Spring cut to a height of 40-75mm. Need for mowing can be assessed based on growth and is most likely to be required in the first years after establishment.
December to February	No management required

- 5.1.21 Cutting should adopt a systematic method (i.e. working outwards towards the boundary features); this will allow fauna to temporarily and safely vacate the area.
- 5.1.22 The management will take a flexible approach and the exact dates will be dependent upon weather conditions. A phased (rotational) cutting regime is recommended (i.e., ideally the entire area should not be cut at the same time) in order to allow a more varied structured grassland.

5.2 Hedgerows

Existing Hedgerows

- 5.2.1 Existing hedgerows shall be left to grow with minimal selective thinning and maintained to a height of no more than 3m.
- 5.2.2 During establishment, dead, dying and diseased wood is to be removed annually or as required and replaced with stock of a similar size and species by the appointed contractor at their own cost. If the failure of the plant is due to disease and the disease is considered likely to re-occur, then an alternative native species of local provenance may be used as a replacement. Planting should ideally be undertaken between the months of December and February.
- 5.2.3 Hedgerows across the whole site to be cut on a rotational basis, i.e. not all hedgerows in the same year. This will maintain a resource of flowering and fruiting plants across the site, create nesting and foraging habitat for wildlife, and prevent hedgerows becoming leggy. Existing trees within hedgerows will be left to grow naturally and not cut. These will be clearly marked to ensure that they are not cut back during hedgerow trimming/maintenance works.
- 5.2.4 Established hedgerows will be cut between late September and February and no cutting or trimming is to be undertaken during the breeding bird season (1st March to 31st August inclusive).
- 5.2.5 Ground flora will be cut at the base of hedges on a 3 year rotation to 150mm height, with arisings removed. This is to maximise the value of the habitat for overwintering and foraging insects, and prevent scrub establishment. Cutting is to take place in October/November.

New and infill Hedgerows

- 5.2.6 All canes, spirals or guards shall be regularly checked and adjusted or replaced as required. Bases of all hedges are to be kept weed-free with a minimum of 4No. applications of systematic herbicide per growing season; or a combination of visits to manually remove weeds in conjunction with the use of herbicide, during the first three years. After the first three years the ground flora is to be allowed to

develop naturally in order to contribute to the wildlife value of the hedgerow and managed as an existing hedgerow.

- 5.2.7 Any litter accumulated around hedgerow bases is to be cleared at the same time as weed control operations.
- 5.2.8 All hedge lines shall be regularly watered in times of drought to field capacity and shall receive an application of slow-release fertiliser for the first three years.
- 5.2.9 Plants will remain upright and adjusted during treatment of weeds. Rabbit protection will be retained/replaced until no longer needed, when it will be removed from Site and disposed of. This is to be checked annually.
- 5.2.10 All hedges shall be allowed to grow up to 3m high and will be maintained at this height. Any plants that fail to thrive shall be replaced with stock to the original specification.
- 5.2.11 Annual inspection is to be undertaken in September to replace dead/diseased plants at the end of each growing season and to be replaced within the first five years after planting. Pruning will be undertaken to promote healthy growth, where required, between late September – February to avoid bird breeding season.
- 5.2.12 Bark mulch is to be topped up annually or as required, to maintain 50mm deep layer, until the plants have established.
- 5.2.13 Once new and infill sections of hedgerows have established, management operations are to reflect those as set out for existing hedgerows.

5.3 Woodland

Woodland Planting

- 5.3.1 During the establishment period all dead, dying or diseased trees/shrubs will be replaced with specimens of similar size and species by the appointed contractor. If the failure of the plant is due to disease and the disease is considered likely to re-occur then an alternative native species of local provenance may be used as a replacement with agreement from the LPA. The exact timing of the planting of replacement trees is dependent on the ground conditions; however, planting should take place between the months of December and February inclusive, this will allow the plants more time to establish a network of feeder roots before the onset of spring.
- 5.3.2 During the establishment period weeds around the base of each tree will be removed within a 1m to 1.5m radius, using approved hand-weeding or if necessary herbicide treatment (applications in April, June and August). The herbicide handbook (English Nature, 2003) provides guidance on appropriate herbicide use in relation to nature conservation works. Where used, herbicides will be sprayed in appropriate weather conditions, to avoid affecting adjacent habitats.
- 5.3.3 Tree guards and stakes will also be checked and replaced where necessary and removed once trees are sufficiently established that they are no longer required.

5.4 Habitat Piles

- 5.4.1 A small proportion of any wood and grass removed during habitat management or other work operations and not taken off-site should be placed into loose piles and placed along the edge of hedgerows or within areas of woodland creation. These habitat piles should not exceed approximately 1m high by 2m wide and will provide valuable invertebrate habitat and shelter for other species including small mammals/amphibians/reptiles. These should be placed in the same locations each year.

6 ECOLOGICAL MONITORING AND CONTINGENCY

6.1 Timings

- 6.1.1 The development of the biodiversity interest of the Site will be monitored over time by a suitably experienced ecologist. A walkover survey will be undertaken on years 1, 3 and 5 and 10. This will involve an inspection of the grassland, hedgerows and trees to ensure that they are being managed in a manner suitable for the enhancement of wildlife interest.
- 6.1.2 In addition, a habitat survey and condition assessment of the site will be undertaken to ensure created habitats are achieving their target condition as stated in the biodiversity metric calculations.
- 6.1.3 The management plan will be amended if necessary, based on the monitoring recommendations.

6.2 Monitoring Criteria

- 6.2.1 Habitats will be monitored in accordance with the criteria set out with the Biodiversity Metric 3.0 Technical Supplement⁵. Habitats are expected to achieve the conditions set out within the Biodiversity Metric 3.0 Calculation Tool submitted with the original application and summarised below.

Table 6.1: Expected condition of newly created habitats within the Site

Habitat type	Biodiversity metric 3.0 habitat type	Target condition	Time to achieve target condition (years)
Pasture Grassland	Other neutral grassland	Moderate	5
Species rich grassland	Other neutral grassland	Good	10
Woodland planting	Other woodland; broadleaved	Moderate	15
Hedgerow	Native species rich hedgerow	Good	12

- 6.2.2 If habitats are not meeting the description for the particular habitat type, are not achieving the target condition, or appear unlikely to achieve it, a suitably qualified ecologist will be consulted to determine appropriate changes to the management to enable to the proposed habitat type and/ or target condition to be achieved. Suggestions for management changes are outlined in the contingency measures section below, however the exact requirements will be dependent on the cause and extent of any failure.
- 6.2.3 If it is considered it is not possible to achieve either the proposed habitat type or target condition the biodiversity calculator will be revised and the results submitted to the local planning authority with a report detailing the reasons why habitats have not achieved the condition stated, steps taken to rectify this and any additional compensation measures as appropriate.

⁵ Biodiversity Metric 3.0 – Technical Supplement.

<http://publications.naturalengland.org.uk/publication/6049804846366720>

6.3 Contingency Measures

- 6.3.1 If the monitoring outlined above identifies that a habitat is not meeting the target condition, or is not meeting the description for the proposed habitat type the following contingency measures should be considered.

Grasslands

Absence of herbs/ high cover of bare ground

- 6.3.2 If the herb layer is not establishing, or there are large areas of bare ground it may be appropriate to re-seed the area. This should be done using a suitable mix and following the methodology outline in the habitat creation section above. It may be necessary to create batches of bare ground prior to seeding.

Area is over-grazed

- 6.3.3 Should the area become over grazed, as will be indicated by a uniform and short grass sward, it may be appropriate to reduce the grazing density. This could be achieved either through the removal of animals or by grazing for a shorter period each year.

Grasses are over-dominant

- 6.3.4 Should grasses become over-dominant the grazing intensity may need to be increased. This could be achieved either through the introduction of more animals, or grazing for an extended period.
- 6.3.5 Alternatively, it may be appropriate to introduce yellow rattle to the grassland area. This plant parasitises grasses, reducing their competitive ability.

Nutrient levels too high

- 6.3.6 If nutrient levels are too high, resulting in lack of species diversity and indicated by the dominance of a small number of competitive species (e.g., nettles, spear thistle, white clover, coarse grasses), efforts should be made to reduce the nutrient levels in the soils. Grazing should help reduce nutrient levels, however as an additional measure a cut and collect regime may also be the most appropriate way to do this.
- 6.3.7 Cut and collect involves waiting for plants to reach a substantial height before mowing and then removing all arisings from the Site. Any nutrients taken in by the plants during growth will therefore be removed from the site. This method may take a number of years to be effective.

Absence of bare ground

- 6.3.8 Many herb species require patches of bare soil to germinate. If grazing animals are not adequately disturbing the soil, or in ungrazed areas if there are no localised bare patches, it may be appropriate to manually disturb the soil. This should be in no more than 5% of the total area.

Woodland

Woodland becomes over-dense

- 6.3.9 Should the woodland become overly dense with little light reaching understory layers then selective thinning may be required. If not caught early it is also possible that understory shrubs may need to be replanted, and/ or the ground seeded with a shade tolerant flower mix.

7 INDICATIVE MANAGEMENT SCHEDULE

7.1.1 The following management programme shows possible months in which habitat creation and management activities should be undertaken. Note that this schedule should be seen as a guide only and management should be informed by conditions on the Site and any changes to the management regime should be agreed with a suitably qualified ecologist

Initial Habitat Enhancement Year 1

Management Activity	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Year 1												
Grassland creation (*recommended)			✓*	✓*	✓	✓	✓	✓	✓			
Hedgerow and tree/shrub planting	✓	✓										✓*
Installation of bird nest and bat roost boxes	✓	✓							✓	✓	✓	✓

Habitat Management Year 2

Management Activity	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Year 2												
Initial management of grassland / meadows areas (targeted herbicide treatment of perennial weeds or cutting/topping where necessary)				✓		✓		✓				
Herbicide treatment or hand-weeding of hedgerow planting bed and surrounding planted trees				✓		✓		✓				
Trimming of new hedgerows	✓	✓							✓	✓	✓	✓

Ongoing Annual Management

Management Activity	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Year 3 onwards												
Grassland cutting		✓						✓	✓			
Sheep gazing	✓	✓							✓	✓	✓	✓
Herbicide treatment or hand-weeding of hedgerow planting bed and surrounding planted trees (establishment period first five years)				✓		✓		✓				
Trimming of new hedgerows (up to year 3 and established)	✓	✓							✓	✓	✓	✓
Established hedgerows cut on a 2 or 3 year cycle (no more than 1/3 cut in any one year).	✓	✓							✓	✓	✓	✓