



Ecological Enhancement, Mitigation and Management Plan

Totmonslow Solar

October 2022

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1. Introduction

Background

- 1.1 Phlorum Limited was commissioned by RE Projects Ltd to compile an Ecological Enhancement, Mitigation and Management Plan (EEMMP) in relation to the landscape of proposed development at the land south of Draycott Rd in Draycott in the Moors, here on referred to as the 'site'.
- 1.2 The National Grid Reference for the centre of the site is SJ 99592 39002. The Preliminary Ecological Appraisal (PEA) (Phlorum, 2021) survey area extended over approximately 38.5 hectares (ha).
- 1.3 Previous ecological reports which have been carried out which should be referred to include:
 -  Preliminary Ecological Appraisal (Phlorum 2021); and
 -  National Vegetation Classification (Phlorum, 2022).
- 1.4 It is understood that current proposals are for solar arrays to be placed onto the current pasture fields.

EEMMP Report

- 1.5 This document has been compiled in the context of the proposals stated in this introduction and based on information made available by the client at the time.
- 1.6 Alterations to the scheme and changes in ecological legislation may necessitate amendments to this document at a later stage.
- 1.7 This report is produced with the aim of creating an operational lifetime management plan which recommends annual monitoring for the first five years and then subsequent monitoring every five years up to decommissioning.

2. Project Outline

Aims and Objectives

- 2.1 The landscape conservation objectives for the development site are to avoid any negative impacts to protected species within the works area, and to enhance the biodiversity of the site wherever possible, with regard to the site potential, constraints and the nature of the proposed development.

Design and General Management Objectives

- 2.2 The main design objectives and management objectives in relation to this management plan is to provide an ecological enhancement mitigation and monitoring plan suitable for the landscape and biodiversity during the operational life Totmonslow Solar. This will be achieved by the following objectives:
-  Enhance the current grassland to become species rich and allow local species to disperse;
 -  Enhance the retained hedges and trees;
 -  Provide guidance on BNG;
 -  Provide guidance on management to help achieve proposed habitats; and
 -  Provide overall ecological enhancement of the site.

Roles and Responsibilities

- 2.3 As the eventual scheme operator is currently unknown, the roles and responsibilities are yet to be determined but these will be provided via planning conditions. Therefore, this EEMMP will provide suggestions for responsibilities which is likely to provide the lowest risk of failure. Once the responsibilities are determined this document should be updated.
- 2.4 During the construction phase the Principal Contractor will appoint and manage the Landscape Contractor who will be responsible for carrying out the habitat management plan and undertaking the necessary habitat creation works outlined in this plan.
- 2.5 Post-handover the maintenance, monitoring and management of the habitats outlined within this plan should be the responsibility of the landowner and eventual scheme operator with the help of the project ecologist who can monitor the site to ensure it is achieving the proposed ecological enhancement.

Funding of the Plan

- 2.6 The funding of the plan will be provided by the eventual scheme operator which is not yet known.

Ecological Value and Condition

- 2.7 The ecological value and condition of the site at handover and how this is expected to develop and change over time.
- 2.8 The current ecological value of the site is set out in the PEA and National Vegetation Classification (NVC) reports produced by Phlorum in 2021 and 2022 respectively. In summary the ecological value of the site is moderate as it predominantly comprised grassland with hedges, trees and transitional vegetation.
- 2.9 The scheme will seek to enhance the baseline habitats of improved grassland and neutral grassland and the hedges, trees, scrub vegetation, ruderal vegetation which are found onsite will be retained and enhanced where possible, through management.
- 2.10 As a consequence of the creation of these habitats the value of the site will be overall enhanced, especially during the operational phase of the scheme.

Remedial Triggers

- 2.11 The retained hedgerows and trees will be maintained during the tenure of the site by the occupier, as a result the condition of these features is unlikely to diminish over time as will the woodland; however the grassland meadows could be affected by factors that may impact habitat quality.
- 2.12 The following is potential list of triggers that could negatively impact on the grassland habitats:
-  Extreme wet, cold or hot weather;
 -  Climate change;
 -  Prolonged periods of flooding and wet weather;
 -  Pollution events, such as emergency pollution incidents from nearby road and motorway network;
 -  Changes to the drainage management of local and regional ditches and watercourses;
 -  The accidental introduction or failure to control invasive species.

- 2.13 It is recommended during the lifetime of this habitat management plan the Landscape Contractor and/or Ecologist is contacted for advice during extreme weather events that could cause a negative impact on the wildflower grasslands. If impacts are identified, then remedial measures should be put in place to restore the habitat.
- 2.14 The Occupier of the site should engage with local landowners in regard to local land use and management to ensure remedial measures can be put in place to deal with any significant offsite land use changes.
- 2.15 The Occupier should inform their member of staff responsible for health, safety and environment on the wildlife grassland habitats. In the event of a pollution incident this member of staff should liaise with the appropriate stakeholders and authorities to agree a course of remedial measures.
- 2.16 The grassland meadows should be monitored on a regular basis and any issues should be reported to the Ecologist and/or the Landscape Contractor.

Opportunities

- 2.17 The site is large in size and therefore provides an opportunity to significantly improve biodiversity by creating habitats for protected species and enhancing the grassland which is present.
- 2.18 The predominant habitat identified during the PEA (Phlorum, 2021) was poor semi-improved grassland.
- 2.19 Through correct management as provided within this document there are opportunities which can significantly enhance the current grassland to become species rich which will support local protected species and increase biodiversity as a whole.

3. Review and Discussion of Previous Reports

- 3.1 This section provides a review of the relevant previous ecological reports of Totmonslow Solar.

Preliminary Ecological Appraisal

- 3.2 The PEA survey was carried out by Phlorum on 1st and 2nd November 2021.

- 3.3 The results of the PEA are as follows:

Poor Semi-Improved Grassland

- 3.4 Fields of poor semi-improved grassland was observed across the site. Species included but was not limited to perennial rye (*Lolium perenne*), sweet vernal (*Anthoxanthum odoratum*), cocks foot (*Dactylis glomerata*), dock (*Rumex obtusifolius*), plantain (*Plantago lanceolata*), vetch (*Vicia sativa*), and creeping buttercup (*Ranunculus repens*).

- 3.5 The northern area of the site falls within the north east of Newton (north east of) Local Wildlife Site (LWS). This area is of biological interest as a 'species rich pasture'. It is likely that the survey occurring outside the growing season missed many species,

Hedgerow With Trees

- 3.6 Majority of linear vegetation onsite was likely overgrown stockproof hedging which had not been managed recently and had become hedgerows with trees. Species included but was not limited to blackthorn (*Prunus spinosa*), hawthorn (*Crataegus monogyna*), holly (*Ilex aquifolium*), hazel (*Corylus avellana*), elder (*Sambucas nigra*), and field maple (*Acer campestre*).

Scattered Trees (Broad-Leaved)

- 3.7 Broad leaved trees were observed across the site as pockets of woodland, treelines and individual trees. As mentioned above, trees were also present amongst hedges. Species included but was not limited to oak (*Quercus sp*), ash (*Fraxinus excelsior*), and sycamore (*Acer pseudoplatanus*). Some trees were covered in ivy (*Hedera helix*).

Continuous Scrub

- 3.8 Scattered areas of scrub were observed across the site and typically as marginal understory to scattered trees or unmanaged extensions of hedges. Species included but was not limited to hawthorn, blackthorn, dog rose (*Rosa canina*), and bramble (*Rubus fruticosus*).

Ruderal Vegetation

- 3.9 Small areas of ruderal vegetation were observed across the site and predominantly around areas of scrub. Species included but was not limited to nettles (*Urtica dioica*), willowherb (*Epilobium sp*), herb Robert (*Geranium robertianum*), and common hogweed (*Heracleum sphondylium*).

Intact Hedge

- 3.10 Stockproof hedges were observed across the site and would typically be in long stretches or separate areas mixed into unmanaged hedging. Species included but was not limited to hawthorn and blackthorn.

Water Body

- 3.11 Standing water bodies were observed across the site which would typically be covered by scattered trees or surrounded in scrub.
- 3.12 Tributary streams were observed running south amongst hedgerows and then ultimately west towards the River Blithe.
- 3.13 A dry ditch was observed onsite which led to a standing waterbody.

Protected Species

- 3.14 Overall, the site was assessed as having **moderate** potential to support reptiles.
- 3.15 It was therefore considered that the site offered potential for **high** breeding newts and **high** potential for foraging and commuting newts.
- 3.16 Overall, it was considered that the site offered **low** potential for roosting bats.
- 3.17 Overall, it was considered that the site offered **high** potential for breeding birds.
- 3.18 Overall, the site offered **low** potential for breeding badgers and **moderate** potential for foraging and commuting badgers.
- 3.19 Overall, it was considered that the site offered **low** potential to support breeding dormice.
- 3.20 Overall, it was considered that the site offered **low** potential to support breeding water voles and **low** potential to support commuting and foraging water voles.
- 3.21 Overall, the site offered **moderate** potential for hedgehogs.

National Vegetation Classification

- 3.22 An NVC survey was carried out on the 17th and 18th May 2022.
- 3.23 The following communities were identified in relation to the broad habitats presented within the PEA findings, above:

Table 1: NVC Communities and Broad Habitats

Field	NVC Code	Phase 1 Broad Habitat/ NVC Community
Neutral Grassland		
A	N/A	No Clear NVC community for the grassland
D	N/A	No Clear NVC community for the grassland
E	N/A	No Clear NVC community for the grassland
F	MG12	<i>Festuca arundinacea</i> grassland
G	MG12	<i>Festuca arundinacea</i> grassland
J	N/A	No Clear NVC community for the grassland
K	N/A	No Clear NVC community for the grassland
L	N/A	No Clear NVC community for the grassland
M	N/A	No Clear NVC community for the grassland
Improved Grassland		
B	MG7	<i>Lolium perenne</i> leys and related mesotrophic grasslands
B	OV23	<i>Lolium perenne-Dactylis glomerata</i> open habitat to the south
H	MG7	<i>Lolium perenne</i> leys and related mesotrophic grasslands
Scrub		
A	W24	<i>Rubus fruticosus</i> – <i>Holcus lanatus</i> under scrub
C	W24	<i>Rubus fruticosus</i> – <i>Holcus lanatus</i> under scrub
G	W24	<i>Rubus fruticosus</i> – <i>Holcus lanatus</i> under scrub
G	W22	<i>Prunus spinosa</i> – <i>Rubus fruticosus</i> scrub;
I	W24	<i>Rubus fruticosus</i> – <i>Holcus lanatus</i> under scrub
Marginal Vegetation		
B	S12	<i>Typha latifolia</i> swamp

M	S12	<i>Typha latifolia</i> swamp
Ruderal		
A	OV27	<i>Epilobium angustifolium</i> community
G	OV24	<i>Urtica dioica</i> – <i>Galium aparine</i> community
L	OV25	<i>Urtica dioica</i> – <i>Cirsium arvense</i> community
M	OV25	<i>Urtica dioica</i> – <i>Cirsium arvense</i> community

Discussion

- 3.24 As seen above, there is a difference in habitat definitions. The JNCC Phase 1 Habitats provide broad habitats for the PEA and the JNCC NVC habitats are broken down into very specific communities.
- 3.25 It is understood that a Biodiversity Net Gain (BNG) will be provided for the site. The BNG uses a different classification system, the UK Habitat Classification System (UKHab). With consideration to the JNCC Phase 1 broad habitats and JNCC NVC communities, Appendix A has been created to recommend what habitats should be used for the UKHab definitions when producing the BNG.
- 3.26 Part of the objectives of this report is to provide guidance and management on how to achieve realistic proposed habitats including grassland. The plant species present within the fields can be found within the data in the NVC report (Phlorum, 2022).

4. BNG: Habitats to be Lost, Retained, Enhanced and Created

- 4.1 Where relevant, the following habitats will be referred to using the UK Habitat Classification¹ to help inform the Biodiversity Net Gain (BNG) for the site.
- 4.2 Recommendations for assigning fields with UK Habitat Classification can be found in Appendix A.
- 4.3 The following paragraphs the habitats which will be lost, retained, enhanced and lost:
- 4.4 No habitats will be lost, apart from a small number of trees/hedges to create access points.
- 4.5 The following habitats will be retained:
-  **Other Neutral Grassland:** The current areas which are determined to be 'other neutral grassland' will be retained and not considered to be enhanced.
 -  **Bramble Scrub:** The areas of scrub identified on the PEA will be retained.
 -  **Ruderal / Ephemeral:** Scrub vegetation will be retained.
 -  **Scattered Trees:** All trees will be retained.
 -  **Woodland:** All trees including those around ponds will be retained.
 -  **Ponds:** All ponds will be retained.
 -  **Tree/Hedgerow:** Most of the tree/hedgerows will be retain apart from a small area which will be removed for new access points.
- 4.6 The following habitats will be enhanced:
-  **Modified Grassland:** The current modified grassland will be enhanced to 'other neutral grassland'
 -  **Hedgerows:** Retained hedgerows will be maintained and kept to a height of 3m which will improve their condition.
- 4.7 The following habitats will be created:
-  **Built Linear Features:** access paths will be created.

¹ The UK Habitat Classification (2018) *Habitat Definitions Version 1.0*. The UK Habitat Classification Working Group.

4.8 The following habitats outside of the UK Habitat Classification will be created and the latest Landscape Mitigation Plan created by SPD Studio should be referred to:

-  **Bird Boxes:** Bird boxes will be installed north facing on a number of trees across the site.
-  **Bat Boxes:** Bat boxes will be installed south facing on a number of trees across the site.
-  **Bare ground mound:** Bare ground mound will be created in the allocated 'biodiversity area'.
-  **Hibernaculum:** A hibernaculum will be created in the allocated 'biodiversity area'.

5. Ground Preparation

Ground Preparation

- 5.1 Prior to installation of the solar farm it is likely that the ground will require preparing which can include some vegetation clearance if areas are overgrown.
- 5.2 The following paragraphs will provide guidance on ground preparation and precautionary approaches for protected species:
- 5.3 It is likely some areas of the current grassland will need to undergo some kind of clearance or management prior to installing the solar units and enhancing the current habitat to neutral grassland. Following the final trimming or removal of vegetation in preparation for installation of solar arrays, measures should be taken to help prevent any tall growing plants from becoming established onsite which could outcompete any sown seeds. Areas should be, regularly topped, mown or treated with an appropriate herbicide.
- 5.4 As the site is being seeded, bare patches (around 30%) should be retained to colonise naturally. The successional areas of grassland are a key feature.
- 5.5 If herbicide is required, a suitable approved systemic herbicide shall be applied 4 weeks prior to cultivation at no more than manufacturer's approved rates by spot treatment to emergent weeds only, taking care to prevent spray drift onto the stems or leaves of trees to be retained.
- 5.6 If necessary, a second application may be applied at least 2 weeks prior to cultivation.
- 5.7 Existing ground cover, understorey vegetation, leaf litter and other surface debris shall be removed using hand operated tools only, e.g. chainsaws, brush cutters, rakes etc. Care shall be taken to ensure tools do not cause impact damage to neighbouring tree root protection areas (RPA), stems or branches.
- 5.8 Within the RPAs of the trees to be retained, there shall be no raising of levels with imported topsoil or construction activities within the RPAs which could undermine the stability of any trees.
- 5.9 Ground clearance and excavations should also be undertaken with care in regard to burrowing mammals, rabbits and foxes which could be present on site. Any unnecessary suffering such as 'impale burns, crushes, drownings, drags or asphyxiation' to any wild mammal is an offence within the Wild Mammals Protection Act 1996.

- 5.10 It is understood that majority of trees are to be retained but it is recommended that any minor vegetation clearance or pruning of trees is undertaken outside of the core-bird breeding season (March to August, inclusive) if practical; otherwise a suitably qualified ecologist should check these features prior to the commencement of work, for the presence of any active birds' nests. Should an active bird nest be found, a 5m buffer zone will be constructed round the nest, and weekly updates will be undertaken until nesting has finished.

6. Precautions for Protected Species

Walkover

- 6.1 A suitably qualified ecologist should carry out an updated walkover survey of the site immediately prior to works starting on the site to make sure conditions have not changed and protected species including otters and water voles are not using the site.

Site Induction and Toolbox Talks

- 6.2 All staff will be required to carry out a site induction before they start work on site. This will include informing them of all the ecological issues on site and informing staff not to encourage wildlife into the construction area (e.g. do not leave food waste around, cover bins and stores), and to not create hazards for wildlife (e.g. tidy up after themselves, cover trenches or install ramps). The induction will inform staff to be vigilant and to report ecological issues as soon as they see them. These ecological issues could include the following:
-  seeing a protected species (e.g. bat, badger, reptile, amphibian, or otter);
 -  seeing an actual or suspected new roosting or breeding site for protected species (e.g. bird nest, badger sett, bat roost); or
 -  an actual or potential pollution incident.
- 6.3 Periodically during the construction process tool box talks will be carried out to inform staff of any important ecological issues/process that will be carried out while they are working on site.

Bats

- 6.4 It is considered that bat roosts will likely be present in a number of trees around the site however no trees will be impacted by works. If there are any concerns about impacting trees during low level vegetation clearance, then the project ecologist should be contacted for guidance.
- 6.5 Contractors will remain vigilant throughout the works and any potential bats on site should be reported immediately to the project ecologist. All works must cease until advice has been sought from the ecologist and an appropriate way forward agreed.
- 6.6 Contractors will be informed of the trees in between Field B9 and Field B1 which have roosting features and any noise disturbance will be kept to a minimum.
- 6.7 All construction will take place during daylight hours and no lighting will be required for any night work.

Birds

- 6.8 In order to avoid any potential impact on breeding birds, any clearance of vegetation should be undertaken outside the main bird nesting season which runs from March to August inclusive², with clearance works possible between September and February. Where this is not possible, an ecologist would need to check the vegetation for active nests and signs of bird breeding activity.
- 6.1 Contractors will remain vigilant throughout the works and any breeding or nesting behaviour observed or suspected on site should be reported immediately to the project ecologist. All works must cease until advice has been sought from the ecologist.
- 6.2 In the event that a nest is found, an exclusion zone around the nest would be established. The extent of the buffer area will be determined by the ecologist at the time and will depend on the species, its location, and proximity to the works. Works will then cease within this buffer area until the young birds have fledged. The buffer area will be delineated by tape which will either be attached using stakes or tied around trees.
- 6.3 The ecologist will monitor any nests over a period of a few weeks and inform the on-site contractors when the nest is no longer in use, enabling works to continue in this area.

Great Crested Newts (Amphibians)

- 6.4 A District Licence from Nature Space will be obtained prior to any work commences on site. This licence is dependent on site conditions and recommendations which may change but any works considered to impact great crested newts will require strategies including but limited to trapping and translocation.
- 6.5 The translocation process will include the installation of pitfall traps (buckets) and refuge mats, and then daily inspections of the site. To speed up the translocation process a two phase vegetation clearance work may be carried out towards the end.
- 6.6 The installation of a newt fence may be required in certain areas for the duration of the construction process. As a result, it is important that the site engineer marks out on site the line of the newt fence, and allows several meter of work area around the proposed solar arrays to enable them to be built, site compound, and storage of materials.
- 6.7 A strict management regime will be practiced in regard to on site vegetation to ensure all areas of potential amphibian/reptile habitat remain sub-optimal for the duration of the works.

² It should be noted that this is the main breeding period. Breeding activity may occur outside this period (depending on the particular species and geographical location of the site) and thus due care and attention should be given when undertaking potentially disturbing works at any time of year.

- 6.8 The areas will be strimmed to ground level on a regular basis in an outwardly direction from the working area.

Reptiles

- 6.9 The grassland, hedges and transitional vegetation are considered to provide suitable reptile potential. As areas of the fields will be cleared a precautionary approach to works is recommended to safeguard this species group:
-  All vegetation should be cut in two phases. This will serve to displace reptiles and deter individuals from the area by removing any cover opportunities prior to works. This must be carried out in the active period for reptiles taken to run between March and September inclusive.
 -  In the first phase, all standing vegetation should be reduced in height to approximately 200mm above ground level. Vegetation should be cleared using hand tools, such as chainsaws and strimmers. All cut vegetation should be removed from the site.
 -  The second phase should then be undertaken the following day. Vegetation should be cut to ground level using the same method as detailed above.
 -  For each phase, the vegetation should be cut from the central sections in an outwardly direction, therefore pushing the reptiles out of the working footprint to adjacent habitats that will be retained.
 -  Vegetation within the working area, particularly around the development footprint should be managed at ground level for the duration of the works to ensure the area remains unsuitable for reptiles.
 -  If any reptiles are encountered during the works individuals should be carefully relocated to suitable cover outside the working area.

Water Voles

- 6.10 A suitably qualified ecologist should carry out an updated walkover survey of the site immediately prior to works starting on the site. The ecologist will then give a toolbox talk to the on-site contractors prior to the start of works to discuss a precautionary approach to works.
- 6.11 It is also recommended that any on-site bankside vegetation is cut to ground level using handheld strimmers or similar prior to ground works commencing in order to make the ditch unsuitable for this species group and discourage use of this feature during works. These works should be overseen by a suitably qualified ecologist.

Otters

- 6.12 A suitably qualified ecologist should carry out an updated walkover survey of the site immediately prior to works starting on the site. The ecologist will then give a toolbox talk to the on-site contractors prior to the start of works to discuss a precautionary approach to works
- 6.13 To help maintain the value of the watercourse, the area should be litter picked at the start and end of works, and all construction related materials removed periodically through the contract period and on completion of works.
- 6.14 The use of high intensity lighting which would illuminate the watercourse should be avoided both during the works period and following on from the completion of the project, to ensure that suitable habitat for otter is maintained.
- 6.15 It is recommended that no works within 30m of the watercourse should be undertaken after dusk.
- 6.16 Otters are naturally inquisitive. Any excavations that are left overnight should include a ramp of 45 degrees or less on one face to allow otter and other wildlife to climb out should they fall into the excavation. Excavations should be inspected daily before the start of works.
- 6.17 Construction staff should be aware that otter may lie-up in stacked pipes or beneath pallets. These features should be inspected daily before the start of works.

7. Habitat Management Plan

Species Rich Grassland

- 7.1 The value of grassland lies in the variation of structure. Each species within an area of grassland should be able to undergo its full lifecycle, as each stage will provide food or habitat for a particular species. Bare ground is an important feature, as is dense thatch and accumulation³. A species rich meadow suitable for Totmonslow is easily achievable if a rich meadow mixture is sown in addition to allowing locally important species from adjacent areas disperse onsite.
- 7.2 It should be noted that some suitable species proposed for sowing/dispersal do not flower on the first year or may not even provide any flowers. The choice of appropriate seed mixture and dispersal of local flora to the site aims to create a balance of providing an aesthetically pleasing habitat whilst not forgetting that the main objective is to enhance biodiversity for this site.
- 7.3 Areas of the species rich grassland which surround the retained public footpath will be managed throughout the year to ensure the footpath remains accessible.
- 7.4 Grassland under the solar arrays will be left to grow and will be managed by low density sheep grazing.
- 7.5 The paragraphs below include prescriptions for meadows included in the design proposals.

Aims

-  Enhance the current modified grassland to become species rich;
-  Create a range of vegetation heights from bare ground to regrowth through the remains of previous seasons material;
-  Promote new healthy growth of the meadow species;
-  Allow locally important species to disperse and establish onsite;
-  Increase biodiversity within the site; and
-  Create feeding and sheltering opportunities for wildlife and sheltering opportunities for wildlife.

³ Kirby, P. 1992 Habitat management for invertebrates JNCC and RSPB Sandy, Bedfordshire

Actions

- 7.6 Good ground preparation is the best way to maximise the success of seed germination to mature plant growth. With consideration to the proposed development it is recommended that the mix should contain a range of species for both open sunny conditions and shaded areas. These should be sown equally across the site so the species can establish in the particular conditions they find themselves in.
- 7.7 There is a wide range of suppliers for seed mixtures who can provide appropriate general species rich mixtures. The following information on seeds is recommendations only but seed sources should be UK native and grown, such as Emorsgate Seeds who recommend general purposed mixtures for solar farms.
- 7.8 Before sowing wild flower seeds the most important tasks are:
-  To create space by removing or controlling unwanted vegetation and weeds which may compromise results; and
 -  To create conditions in which seedlings can establish and grow.
- 7.9 There are two main routes to establishing wild seeds and mixtures; firstly sowing in bare ground or sowing into gaps of existing vegetation. To maximise biodiversity seed should be sown in bare ground outside the root protection areas of trees and other retained vegetation.
- 7.10 This may require the removal of some of amenity grassland areas at the site.

Sowing into bare soil cleared of vegetation

-  Generally the most successful way to establish wild flowers and grasses from seed is to sow into a clean seedbed that has been first cleared of all weeds and other vegetation and then cultivated to produce optimum conditions for germination.
-  It is recommended an appropriate meadow mix, suitable for shade is obtained from a supplier such as Emorsgate Seeds.

Sowing into gaps created in existing vegetation

-  Seed sown into gaps in existing vegetation will grow, but more slowly and less reliably as a result of competition from well established neighbours. Where site assessment reveals that the existing vegetation is worth preserving this approach, although slower, could be more appropriate.

Monitoring and Maintenance

-  Avoid creating bare ground within root protection areas of trees and other woody vegetation.

- First year management - Most sown meadow wildflower and grass species are perennial; they will be slow to germinate and grow and will not usually flower in their first growing season. There will often be a flush of annual weeds from the soil in the first growing season which may grow up and obscure the meadow seedlings beneath. This annual weed growth is easily controlled by topping or mowing.
- Mow newly sown meadows regularly throughout the first year of establishment to a height of 40-60mm, removing cuttings if dense. This will control annual weeds and help maintain balance between faster growing grasses and slower developing wildflowers.
- Avoid cutting in the spring and early summer if the mixture has been sown or is autumn sown. These sown annuals should be allowed to flower, then in mid-summer cut back and the cut vegetation removed.
- Carefully dig out or spot treat any residual perennial weeds such as docks.
- Management once established - In the second and subsequent years sowings can be managed in a number of ways which, in association with soil fertility, will determine the character of the grassland. The best results are usually obtained by traditional meadow management based around a main summer hay cut in combination with autumn and possibly spring mowing or grazing.
- Meadow grassland is not cut or grazed from spring through to late July/August to give the sown species an opportunity to flower. After flowering in July or August take a 'hay cut': cut back with a scythe, petrol trimmer or tractor mower to c50mm. Leave the 'hay' to dry and shed seed for 1-7 days then remove from site.
- Mow or graze the re-growth through to late autumn/winter to c 50mm and again in spring if needed.
- The composition of the established grassland will not be uniform and is likely to contain local dominance of certain species. This will likely change over time as succession happens. This is a normal occurrence within grassland areas and unless one species is dominating a large area, this should be tolerated.

Transitional Vegetation

- 7.11 The areas along the pockets of woodland should be managed as gradually transitional areas of shrubs, scrub, herbaceous and grassland species as they can provide good ecological enhancement for protected species.
- 7.12 The paragraphs below include prescriptions for managing transitional vegetation and allowing flora to encroach onsite.

Aim

- Facilitate a range of stages encroaching from the pockets of woodland; from bare ground, through the successional stages to mature trees, and dead wood.

Action

- Brambles and blackthorn should not be controlled unless they are dominating at the expense of other native species.
- Where dead wood needs to be felled or moved for practical or safety reasons, it should be placed as close to its origin as possible. Ideally in a semi-shaded position to maximise the number of species that can use it;
- Sunny woodland margins should contain a range of species such as brambles, hawthorn and cow parsley; and
- Where practical, and in order to maximise wildlife value, trim transitional vegetation growing from hedgerows/woodland on a two or three year rotation in mid-January to the end of February to retain potential winter berries and avoid disturbance to nesting birds.

Native Hedgerow

- 7.13 It is understood that small areas of hedgerows with trees will be removed to create access points. These areas will need to be checked prior to removal to ensure that no protected species is impacted. This inspection must be carried out by an ecologist.
- 7.14 Native hedgerows will be planted towards the north of the site, along the Public Rights of Way. This will help provide a continuity of habitat which can enable transitional areas to proximal habitats⁴ in the wider area.
- 7.15 Where possible, distinctive wildlife corridors including hedgerows should be enhanced rather than introducing new elements. Therefore, any existing hedgerows will be managed to ensure they provide improved habitat connectivity.
- 7.16 The paragraphs below include prescriptions for new native hedge planting included in the design proposals.

Aims

- Provide a continuity of the existing habitats on site through enhancing current hedgerows;
- Create increased continuity of habitats to the wider area; and
- Provide structural variation within these habitats.

⁴ Kirby, P. 1992 Habitat management for invertebrates JNCC and RSPB Sandy, Bedfordshire

Action

-  Plant native species only for proposed hedgerows;
-  Where practical, and in order to maximise wildlife value, trim transitional vegetation growing from hedgerows/woodland on a two or three year rotation in mid-January to the end of February to retain potential winter berries and avoid disturbance to nesting birds.
-  Retained hedgerows will be enhanced through maintaining height at 3m;
-  Where necessary, e.g. adjoining or within traffic sight-lines or where hedgerows would overhang private residences or to avoid overhang or obstruction, hedgerows may be trimmed on an annual basis only where essential to avoid hazard / prevent obstruction.
-  For the areas marked as transitional vegetation on the latest Landscape Mitigation Plan, the transitional vegetation areas should be encouraged so that structural height is staggered. To prevent encroachment of these habitats but to enhance their biodiversity it is recommended that they are cut to a 1-3 year rotation only.
-  In order to comply with legal requirements, an additional annual cut (removing as little material as possible) may be made in early June, taking care to avoid nesting sites and avoiding the removal of berries.
-  Additional cuts will require the written authorisation of the Contract Administrator.

Existing Trees

- 7.17 It is understood majority of trees, will be retained. As stated above all tree removed will be inspected by an ecologist prior to removal. The following paragraphs will help manage the retained trees:

Aims

-  Maintain the healthy growth of the trees;
-  Promote new growth; and
-  Maintain feeding and sheltering opportunities for birds and feeding and commuting opportunities for bats. Retention of these features will also enable a corridor of movement to be maintained for wildlife to the wider surrounds.

Action

-  Annually prune /inspection of the trees; and
-  Install 'floating roads' across root protection areas.

Monitoring and Maintenance

-  Annually prune trees between September and February inclusive.
-  It is preferable to maintain a dense canopy. Pruning outer branches regularly will promote this.
-  Pruning trees between September and February inclusive is outside the breeding bird season, which is taken to run between March and August, and will therefore avoid disturbance to nesting birds and their young.

7.18 It is important to note however that birds can nest outside this period if weather conditions are suitable and due care should be taken when undertaking tree works at any time of the year. If breeding birds, or their nests are suspected, or discovered. Then the pruning of trees in the vicinity of the nest must be postponed until young birds have fledged and the nest is no longer in use.

Bird Boxes

7.1 The location and number of bird boxes is currently unknown as suitable trees were not recorded during the PEA (Phlorum, 2021). The provisional locations of bird boxes can be found within the finalised Landscape Mitigation Plan.

Aims

-  To provide nesting provision for a range of widespread species including Species of Principle Importance for Conservation (BAP species).

Actions

-  Install bird boxes immediately following the construction phase of the development;
-  Bird boxes should be installed on the trees.
-  Bird Boxes should be located out of prevailing wind, rain, and strong sunlight, ideally with a clear flight path to the entrance. Ideally they should be installed two to four metres from the ground facing north or north-east.

Monitoring and Maintenance

-  Once installed the boxes should be inspected annually outside the nesting bird season: between September and February for evidence of nesting birds (evidence may include presence of an old nest and eggs, feathers and/or bird droppings);
-  If old bird nests are found, these should be removed and where possible, the nest box cleaned with warm water; and

- Where external boxes have not been used, the possibility of re-siting them to more suitable areas should be explored and advice should be sought from a suitably qualified ecologist.

Bat Boxes

- 7.2 The location and number of bat boxes is currently unknown as suitable trees were not recorded during the PEA (Phlorum, 2021). The provisional locations of bat boxes can be found within the latest Landscape Mitigation Plan.

Aims

- To provide nesting provision for a range of widespread species including Species of Principle Importance for Conservation (BAP species).

Actions

- At least five bat boxes should be installed on alternative trees within the scheme design. There are several types of bat boxes. However, the Woodcrete or WoodStone (such as Schwegler) are simple to install, inspect and clean and are built to last at least 25 years against damage by weather, rot or natural predators. However, wooden untreated bird boxes can be just as effective, although may need replacing after ten years.
- Bat roosting opportunities should be provided through the incorporation of a bat boxes to be installed on retained boundary trees, and trees and buildings within the scheme design. This could potentially provide roosting habitat and the choice of location is not directly impacted by light and the bats are not disturbed by road noise.
- Bat boxes (1FD Schwegler Bat Box, Wienerberger Ltd or similar) should be installed at an appropriate location, ideally south-east, south, or south-west facing aspects at least 4m from ground level. Ideally they need to be exposed to 6-8 hours of direct sunlight, but sheltered from strong winds.
- Ensure external lighting is minimised particularly around the boundaries. LED lights should be used and designed with minimal light spillage.

Monitoring and Maintenance

- Bat boxes should only be inspected by a licenced bat person

Hibernacula and Log Piles

- 7.1 A hibernaculum will be created within the allocated biodiversity area. The following paragraphs provide information on its management;

-  Log piles should be in sunlight for part of the day and should not be disturbed. They should be kept clear of rank vegetation growth, and not be allowed to become too shaded by overhanging trees.
-  Piles and hibernacula need to be kept topped up with wood as it rots down to ensure they provide a continuity of habitat.

Aims

-  To maintain the habitat piles and hibernacula in a way that maximises their potential to support amphibians, reptiles and other wildlife.

Actions

-  Keep the habitat piles and hibernacula clear of overshadowing vegetation. Ensure that the habitat is maintained with new wood added as it rots down.

Monitoring and Maintenance

-  The hibernacula and log pile should be annually inspected and repaired if required.

Bare Ground Invertebrate/Reptile Mound

- 7.2 An invertebrate/reptile mound will be created in the allocated biodiversity area and should try to use any risings from site works.
- 7.3 This proposed area is visible on the Landscape Mitigation Plan.

Aims

-  Create suitable habitat for invertebrates and reptiles.

Actions

-  Ensure the mound is away from high traffic areas;
-  It is understood the mound will be placed behind a security fence however the height of the mound should not exceed 1m in height and if any large materials such as logs or boulders are used which can create significant gaps then the mound should be signed appropriately to warn people that it is unsafe to climb.
-  The mound should not be constructed in an area shaded by trees or other obstruction to light. Most invertebrates want high levels of warmth and light;

- A south facing slope is desirable as this is usually the warmest side of a mound feature. It will create the micro-climate conditions that invertebrates and reptiles prefer and need for basking. A south facing slope will also mean there are north, west and east facing slopes, providing a variety of micro-climates in a small area.
- The shape may depend on the area of land available, but to maximise a south facing aspect create long thin sides on the east and west axes to use small areas to the optimum. Mounds can be long and thin, squat and fat, T shaped - there really are no rules or ideal shapes.

Monitoring and Maintenance

- As with any disturbed site, there will be initial vegetation colonisers. If the soil is nutrient rich there might be undesirable species, such as thistles and nettles. However, grass can also be a quick coloniser reducing the amount of bare ground. In the first year the mound should be cut two to three times depending on vegetation growth. Depending on the slopes, this will probably need to be a hand operation with a scythe. When the mounds have settled after year two, and if there are no 'holes' in the mound then grazing can be introduced to keep down the vegetation. Bare ground is desirable, especially on the southern slope so areas may need to be scarified by hand on an annual basis.⁵

Invasive Species

- 7.4 The PEA (Phlorum, 2021) identified Himalayan balsam (*Impatiens grandiflora*) was observed offsite along east boundary of the site.
- 7.5 The site should be inspected for invasive species during each monitoring visit and any invasive plants should be treated appropriately to prevent encroachment.

⁵ How to Create Invertebrate and Reptile Mounds [access online]. Available from http://www.magnificentmeadows.org.uk/assets/pdfs/How_to_create_an_earth_mound_for_wildlife.pdf

8. Landscape Management and Monitoring

- 8.1 The Occupier will appoint an Ecologist and/or Landscape Management Contractor to assess changes in site conditions and identify where changes to management prescriptions may need to be made.
- 8.2 If there is significant habitat loss, then the Ecologist will liaise with the Landscape Architect and Landscape Contractor to amend the Landscape and Habitat Management Plan as necessary.
- 8.3 To ensure the site achieves its proposed ecological enhancement **yearly monitoring** will take place for the first five years and **then once every five years** up to the point of decommissioning.
- 8.4 This document will be treated as a live document which is updated following monitoring visits. This will record an accurate understanding of the sites progression and provide recommendation which will not lose sight of achieving the aims of this EEMMP:
 -  Enhance the current grassland to become species rich and allow local species to disperse;
 -  Enhance the retained hedges and trees;
 -  Provide guidance on BNG;
 -  Provide guidance on management to help achieve proposed habitats; and
 -  Provide overall ecological enhancement of the site.
- 8.5 If any of these objectives are considered to not be achievable thought the project then the project ecologist should be contacted and realistic aim will be re-evaluated.

Grassland Meadow

- 8.6 During the monitoring visits, classification of the grasslands should follow the UK Habitat Classification System as this is used to determine the habitats for BNG Natural England Metric 3.1 (or latest version).
- 8.7 If the diversity or abundance of species is not being achieved, then it is recommended that projects ecologist is contacted for advice and additional seeds of appropriate mixtures are sown at the site using the management previously provided.

- 8.8 In the unlikely event that a species rich neutral grassland which includes local flora species appears to be unachievable, then an alternative seed mixture should be sown instead and monitored with the aim of achieving a species rich grassland suitable for this site.
- 8.9 Reliable grassland seed suppliers will be able to advise on suitable grassland seed mixtures for the site if required.

Security Fences

- 8.10 Badger gates will be installed on the security fencing to allow the potential use of site for foraging badgers.

Biodiversity Area

- 8.11 As seen in Appendix A, a dedicated biodiversity area has been allocated which will comprise a hibernacula and bare ground mound. These should be monitored as part of visits and management should be followed as provided within Section 7.

9. Decommissioning

- 9.1 The decommissioning phase will take place at the end of the development's operational life which will be after 40 years or after it permanently stops operating.
- 9.2 As the decommissioning stage is not within the foreseeable future the condition and ecological importance of the site at this stage is currently unknown.
- 9.3 The ecological importance of the site should be assessed prior to decommissioning and the following steps or suitable alternatives should be considered:
 - 🌱 Assessment of baseline conditions and impact of decommissioning/proposed development;
 - 🌱 Reinstatement of any negative impacts;
 - 🌱 National Vegetation Classification assessment on the grasslands; and
 - 🌱 Bat boxes to be checked by a suitably qualified ecologist prior to disturbance.
- 9.4 As stated earlier in this document, this EEMMP will be updated following monitoring visits to ensure the proposed ecological enhancement are realistic and achievable.

Appendix A

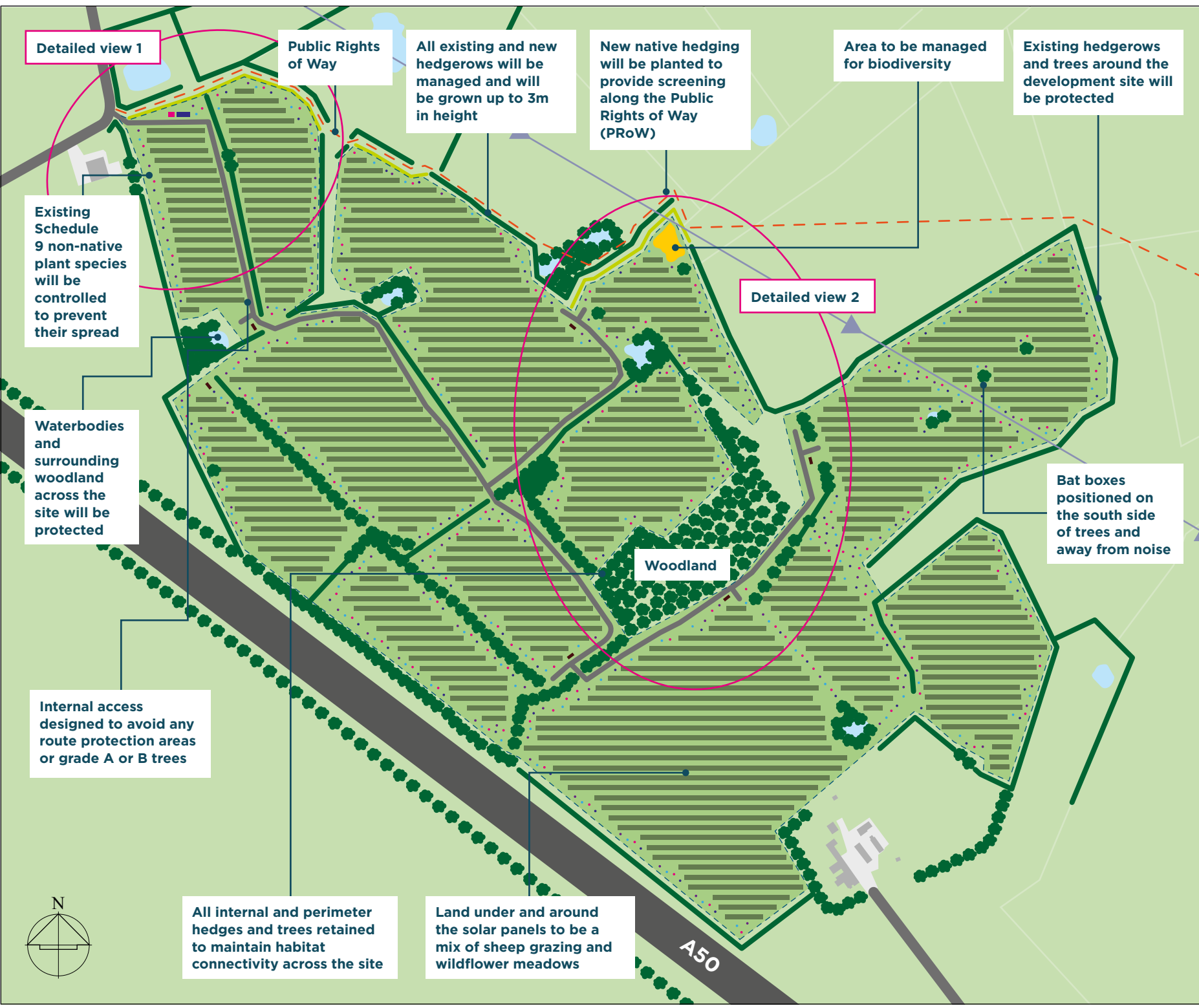
Habitat Classification

Field	NVC Code	Phase 1 Broad Habitat/ NVC Community	UK Habitat Code	UK Habitat Classification	Comment
		Neutral Grassland			
A	N/A	No Clear NVC community for the grassland	G4	Modified Grassland	Fertilised and dominant in Yorkshire fog and broad-leaved species are restricted to common species
D	N/A	No Clear NVC community for the grassland	g3c	Other Neutral Grassland	Dominant in sweet vernal and Yorkshire fog. Modified grassland was considered however neutral grassland should be used as a cautious approach
E	N/A	No Clear NVC community for the grassland	G4	Modified Grassland	Fertilised and dominant in Yorkshire fog, rough meadow grass and broad-leaved species are restricted to common species
F	MG12	<i>Festuca arundinacea</i> grassland	g3c	Other Neutral Grassland	This mesotrophic NVC code contains species listed under this UK Habitat Classification
G	MG12	<i>Festuca arundinacea</i> grassland	g3c	Other Neutral Grassland	This mesotrophic NVC code contains species listed under this UK Habitat Classification
J	N/A	No Clear NVC community for the grassland	G4	Modified Grassland	This field was fertilised and dominated by rough meadow grass and only contained one other grass species.

K	N/A	No Clear NVC community for the grassland	G4	Modified Grassland	Fertilised and comprised only two grass species of rough meadow grass and Yorkshire fog.
L	N/A	No Clear NVC community for the grassland	G4	Modified Grassland	This field was fertilised and dominated by rough meadow grass and only contained one other grass species.
M	N/A	No Clear NVC community for the grassland	G4	Modified Grassland	This field was fertilised and dominated by rough meadow grass and only contained one other grass species.
		Improved Grassland			
B	MG7	<i>Lolium perenne</i> leys and related mesotrophic grasslands	G4	Modified Grassland	Abundant in rye grass.
B	OV23	<i>Lolium perenne</i> - <i>Dactylis glomerata</i> open habitat to the south	G4	Modified Grassland	Abundant in rye grass.
H	MG7	<i>Lolium perenne</i> leys and related mesotrophic grasslands	G4	Modified Grassland	Abundant in rye grass.

Appendix B

Landscape Mitigation Plan



Detailed view 1

Public Rights of Way

All existing and new hedgerows will be managed and will be grown up to 3m in height

New native hedging will be planted to provide screening along the Public Rights of Way (PRoW)

Area to be managed for biodiversity

Existing hedgerows and trees around the development site will be protected

Existing Schedule 9 non-native plant species will be controlled to prevent their spread

Waterbodies and surrounding woodland across the site will be protected

Internal access designed to avoid any route protection areas or grade A or B trees

Detailed view 2

Woodland

Bat boxes positioned on the south side of trees and away from noise

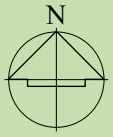
All internal and perimeter hedges and trees retained to maintain habitat connectivity across the site

Land under and around the solar panels to be a mix of sheep grazing and wildflower meadows

A50

- Key**
- Existing mature trees and hedges
 - New hedging along public right of way
 - Security fencing
 - Public rights of way
 - DNO
 - Customer cabin
 - 20ft substation
 - Biodiversity area
 - PV module block
 - Internal access track
 - Wildflower meadow
 - Existing overhead pylons

Project	Totmonslow Solar
Drawing number	1107_11 REV2
Drawing title	Landscape and ecology mitigations and enhancements plan
Date	August 2022
Scale	Not to scale
Size	A4
Client	RE Projects Development Limited



Detailed view 1

Access into the site will be taken from the existing farm access and Public Rights of Way

10m distance between the PRoW and the security fencing

A 6m wide walking corridor and to screen the development from the PRoW

Small gates will be installed on the security fencing to allow badgers to commute and forage across the site

Scrub around field margins, next to hedges and between access paths and hedges

Existing hedges and trees between fields will be retained to maintain linear habitat connectivity

Currently grazed grassland will be enhanced to increase biodiversity for invertebrates and protected species across the site

Key

-  Existing mature trees and hedges
-  New hedging along public right of way
-  Security fencing
-  Public rights of way
-  DNO
-  Customer cabin
-  20ft substation
-  Biodiversity area
-  PV module block
-  Internal access track
-  Wildflower meadow
-  Existing overhead pylons

Project
Totmonslow Solar

Drawing number
1107_11A REV2

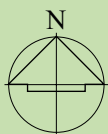
Drawing title
Landscape and ecology mitigations and enhancements plan

Date
August 2022

Scale
Not to scale

Size
A4

Client
RE Projects Development Limited



Detailed view 2

Area will be designed to support reptiles and amphibians. Hibernacula will be positioned near the tree and hedges. An invertebrate/reptile mound will be positioned in a sunnier spot

Currently grazed grassland will be enhanced to increase biodiversity for invertebrates and protected species across the site

District Licensing will fund creation, management and monitoring of aquatic and terrestrial habitats for Great Crested Newts

Locally sourced grassland meadow seeds will be sought and sown. Locally important flora species will be allowed to disperse and establish

All existing ponds, hedgerows and trees including the woodland will be retained

Bird boxes to be placed north side of existing trees

A small amount of tree/hedge removal will be necessary to create the access points. Access tracks near trees will be on 'floating roads' which will not impact Root Protection Areas



Key

-  Existing mature trees and hedges
-  New hedging along public right of way
-  Security fencing
-  Public rights of way
-  DNO
-  Customer cabin
-  20ft substation
-  Biodiversity area
-  PV module block
-  Internal access track
-  Wildflower meadow
-  Existing overhead pylons

Project
Totmonslow Solar

Drawing number
1107_11B REV2

Drawing title
Landscape and ecology mitigations and enhancements plan

Date
August 2022

Scale
Not to scale

Size
A4

Client
RE Projects Development Limited

Appendix C

Timetable of Works

Timetable of Works

Activity	Timing	Comments	Person Responsible
Field clearance for proposed grasslands	As close to development as possible.	Aims to create ideal sowing conditions.	Managing agent/Landowner (with advice from project ecologist)
Install bat and bat boxes	ASAP 2022	The project ecologist can provide advice	Managing agent/Landowner (with advice from project ecologist)
Ecological Monitoring	One visit, annually for the first five years and subsequent visits once every five years (visit May-July each year)	The lowland meadow will be inspected and compared with 'lowland meadow' species mix from the UK Habitat Classification.	Managing agent/Landowner (with advice from project ecologist)
Vegetation clearance	Outside of the bird nesting season (September – February)	Ecological watching brief required or surveys required if it is within the bird nesting season (March – August).	Managing agent/Landowner (with advice from project ecologist)
Post development- Bat boxes inspection/cleaning		Annually, if required. Only by a licensed ecologist	Managing agent/Landowner (with advice from project ecologist)
Post development- grassland cutting	April-September each year	As required	Managing agent/Landowner (with advice from project ecologist)
Post development- hedge and tree maintenance – pruning/replacement of failed plants	April-September each year	As required	Managing agent/Landowner (with advice from project ecologist)



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