Construction Environmental Management Plan – Biodiversity

Solar Farm at Forest Gate, Pewsham, Chippenham

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Prepared for Eden FG Solar Ltd

by
Wychwood Biodiversity

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Introduction

This Construction Environmental Management Plan (CEMP) - Biodiversity has been prepared to discharge Condition 7 of planning permission PL/2021/06112, for the approved solar farm at Forest Gate, Pewsham, Chippenham, Wiltshire.

Condition 7 stipulates that a CEMP shall be submitted to and agreed in writing by the Local Planning Authority; and the plan shall provide details of the avoidance, mitigation, and protective measures to be implemented before and during the construction phase in accordance with measures provided in the Full Ecological Assessment (EA) (Wychwood Biodiversity, 2022a) and the Biodiversity Management Plan (BMP) (Wychwood Biodiversity, 2022b).

This document identifies all potential construction related impacts to the existing biodiversity on site before and during the construction phase, and provides a plan for avoiding, mitigating, and protecting key biodiversity from these potential threats. The report begins with a summary of the proposed construction activities considered potentially impactful to biodiversity. This is followed by all ecological protection areas that were outlined in the BMP, with an accompanying map displaying their extent on site. Then, the construction measures applicable to each biodiversity element are provided. This main section of the report is divided into three parts: construction measures concerning habitats; construction measures concerning species; and construction measures concerning the general ecology onsite. For each entry within the three sections (e.g., breeding birds), their status on site is summarised first, drawing upon survey results presented in the EA; this is followed by the potential impacts to the entry that could arise from construction activities; finally, the corresponding avoidance, mitigation or protection measures are provided, referring to ecological protection areas where required. The main body of the report is followed by details of the key personnel responsible for ensuring the measures are adhered to throughout the construction period; and timetables indicating when works should take place to avoid impacting species.



Figure 1. Forest Gate site and field numbers

Potential impacts of the solar development

This CEMP report is based on the following assumptions relating to the construction period:

- There will be a temporary compound and a network of temporary tracks to support construction.
- Some limited trenching will be required for cables.
- Security fencing will surround the site, usually on pile driven steel or wooden poles.
- The solar panels will sit on pile driven steel posts.
- There will be all-weather hardcore tracks composed of crushed limestone over geotextile membrane allowing access to each area of the site.
- There will be concrete plinths, surface mounted for transformers and substations at several locations across the site.
- Impacts to biodiversity are greatest during the construction period, when construction activities and vehicle movements can cause direct impacts to habitats and species. Furthermore, noise, vibration and temporary lighting may disturb wildlife.

Ecological protection areas

Through interactive working with the engineering and technical consultant team, Wychwood have ensured the following ecological protection (buffer zones) areas are inherent to the site design. The onsite ecologist will supervise activities adjacent to these buffers to ensure they are adhered to throughout the construction phase. Figure 1. displays the locations all ecological protection areas in map format.

P1. *Hedgerow, waterway and drain setbacks*

a) Setbacks of 4.5m from hedgerows, waterways, drainage ditches will be established throughout the site and protected through fencing off during construction. During operations, these areas will only be accessed for occasional hedge and grass cutting, and crossed during maintenance visits albeit tracks in these locations will be constructed using a 'no-dig' technique.

b) Setbacks of 10m will be established from the main Stanley Abbey Farm CWS / Forest Gate dividing hedgerow, and alongside the entire canal route.

P2. *Woodland setback*

The direct impact on tree roots will be avoided by instating a buffer zone of at least 15m between the woodland edge of Close and Derry Woods and the fence-line of the solar farm, in line with standing advice from Natural England and the Forestry Commission.

P3. *Pond 2 setback*

A set back of at least 50m will be retained from Pond 2 (outside the application site boundary) adjacent to Field 4 to protect amphibians which might be using the intervening terrestrial habitats.

P4. *Tree and hedgerow root protection areas*

a) All existing boundary features, including hedgerows and lines of trees will be protected by root protection zones, following the guidance of BS 5837: 2012 Trees in relation to design, demolition and construction as far as is practicable. Limited construction will take place within the RPAs of lower sensitivity trees and hedgerow.

b) Root protection areas (RPAs) will be provided around all trees in accordance with the arboriculture survey (Hayden's, 2022) to avoid compaction from construction machinery. Zones vary in size depending on the size and age of the tree. The RPAs around veteran trees will be protected during construction using fencing, such as Heras, to avoid vehicle movements causing compaction to the soil above the roots. RPAs of less important trees and of hedgerows are also avoided by solar panels and other infrastructure, and where the access road runs through these zones, the road will be built using a no-dig method that will avoid directly impacting roots.

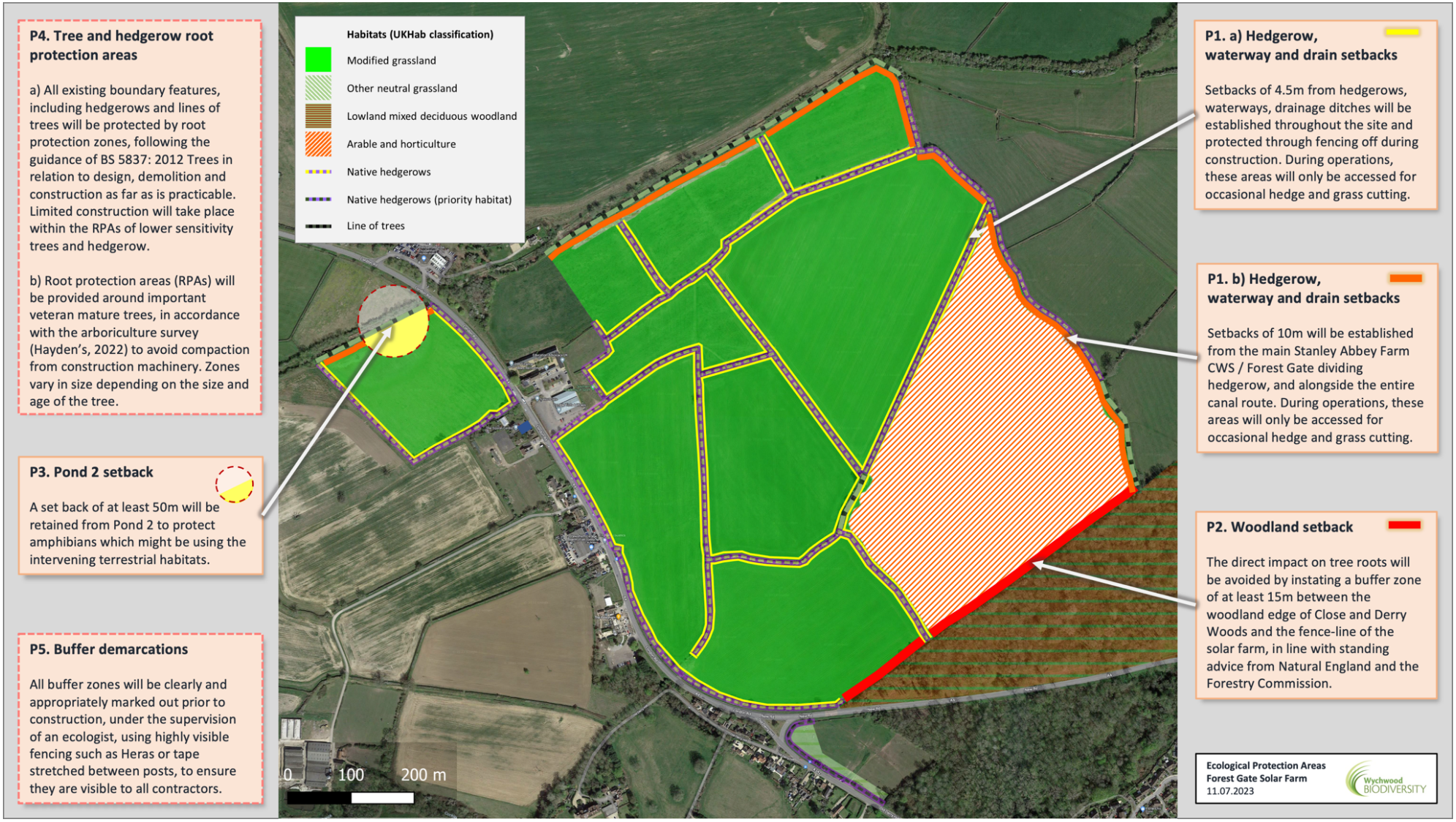
c) Hard surfaces may be constructed under the crown spreads of retained trees and within the RPA if specific detail is paid to the design and specification. In these areas, the design will comply with the principles of the Arboricultural Advisory Information Services (AAIS) Practice Note 12 "*Through the Trees to Development*" - the only difference being that instead of a geo-grid, a geo-textile base is used and the no-fines road stone is incorporated in and retained by, a high density polyethylene cellular confinement system. Given the individual requirements of each site, it is essential that a specialist engineer is consulted to specify the construction detail. Where the hard surface

proposed is impermeable, it must not cover more than 20% of the RPA. Larger extents of permeable surfacing may be acceptable, dependent on the individual circumstances of the site.

P5. *Buffer demarcations*

All buffer zones will be clearly and appropriately marked out prior to construction, under the supervision of an ecologist, using highly visible fencing such as Heras or tape stretched between posts, to ensure they are visible to all contractors.

Figure 1. Ecological protection areas



Construction Measures A: Habitats

The following section includes all habitats identified on site that have the potential to be impacted by the construction of the solar farm. The status on site for each habitat is summarised first, drawing upon survey results presented in the EA; this is followed by the potential impacts to the habitat that could arise from construction activities; finally, the corresponding avoidance, mitigation or protection measures are provided, referring to ecological protection areas where required.

Grassland

Potential impacts

Damage from vehicle movements

Parts of the 4ha of existing grassland on site has the potential to be damaged through the movements of vehicles during construction.

Damage from cable trenching

Trenching will involve ground works to lay cables. This construction activity is expected to impact around 0.35Ha across the entire site.

Permanent loss of grassland

Approximately 1.5Ha of grassland will be permanently lost through construction of the solar panel foundations, permanent tracks, and buildings.

Construction controls

A1. *Damage from vehicle movements*

a) To supervise construction activities, an ecologist will be present on site for a minimum of one day per week, and available for communication at all other times.
b) Key areas of botanical importance will be marked out and avoided in all places where it is possible.
c) Smart vehicle controls will be used to minimise traffic movements.
d) In wetter areas of the site, low-pressure vehicles will be used to minimise impacts to vegetation and soils.
e) If, despite the above measures, any area of grassland becomes damaged in any way, the area will be cultivated and re-seeded at the first available opportunity, using suitable locally sourced seed, thereby "repairing" the habitat.
f) Field margins will inherently be protected during construction as vehicles will not be permitted to drive within 4.5m of field boundaries, other than through those hedgerow openings where tracks will be constructed using a 'no-dig' technique.

A2. *Damage from cable trenching*

a) To supervise construction activities, an ecologist will be present on site for a minimum of one day per week, and available for communication at all other times.
b) Key areas of botanical importance will be marked out and avoided in all places where it is possible.
c) Topsoil and subsoil will be appropriately stored and replaced in the correct manner.

d) All trenched areas will be sown with a suitable local seed source of native grasses. Weeds will be controlled manually, or in exceptional circumstances by spot treatment using a selective herbicide.

A3. *Permanent loss of grassland*

Permanent grassland loss will be compensated by converting cropland to grassland and enhancing the diversity of the existing grassland.

Hedgerows

Most field boundaries on site were marked by intact native hedgerows; and aside from some recent planting, most hedgerows were established and interspersed with mature trees. The hedgerow dividing Forest Gate and Stanley Abbey Farm Meadows - County Wildlife Site (CWS) (H27 & H28 – Appendix II) comprised larger free-standing shrubs and was transitioning between a hedgerow and a line of trees; and a line of small mature trees was also present adjacent to Field 5 (H32).

Hedgerow shrub species comprised mainly blackthorn *Prunus spinosa* and common hawthorn *Crataegus monogyna*, with occasional field maple *Acer campestre*, dog-rose *Rosa canina*, goat willow *Salix caprea*, common hazel *Corylus avellana*, English elm *Ulmus procera*, and elder *Sambucus nigra*. The newly planted hedgerow (H1) along the southern boundary of Field 10 also contained sycamore *Acer pseudoplatanus*. Hedgerow margins consisted of rough grassland with false oat-grass *Arrhenatherum elatius*, Yorkshire fog *Holcus lanatus*, Cock's- foot *Dactylis glomerata*, with bramble *Rubus fruticosus* present.

Potential impacts

Removal of hedgerow shrubs

Removing or damaging hedgerows and lines of trees will impact the resilience of the habitat and reduce connectivity between other woody habitats. Furthermore, it would impact a range of species, including hibernating, foraging, and commuting bats; nesting and foraging birds, and foraging, commuting and nesting reptiles, amphibians, and invertebrates.

The proposed site has been carefully designed to minimise hedgerow removal, however the removal of approximately 17m of hedgerow is required for the creation of maintenance tracks, to provide visibility for vehicles, and facilitate other required infrastructure. Details of the hedgerows requiring cut-throughs are as follows:

- H7 - 4.9m of hedgerow to be removed for a maintenance track, and culverting required to reconnect the adjacent ditch.
- H2 - A short section of hedgerow will be removed to the north of an existing entry gap and 4.5m of the existing gap will be re-planted. The entry gap will be widened to improve visibility to the road.
- H7, H8, H9, H12 & H14 - 1.5m sections removed to widen existing gaps.

Damage to hedgerow root systems

Vehicle movements close to hedgerows and ground works during construction have the potential to impact hedgerow root systems.

Construction controls

A4. *Removal of hedgerow shrubs*

a) All hedgerow removal and ditch culverting will be supervised by an Ecological Clerk of Works (ECoW).
b) Any loss of hedgerow lengths will be compensated by planting new hedgerows and infilling existing hedgerows on site, as set out in the Biodiversity Management Plan (Wychwood Biodiversity, 2022b).

A5. *Impacts to hedgerow root systems*

As specified in '**P4. a)** ***Tree and hedgerow root protection areas',*** all existing boundary features, including hedgerows and lines of trees will be protected by root protection zones, following the guidance of BS 5837: 2012 Trees in relation to design, demolition and construction as far as is practicable. Limited construction will take place within the RPAs of lower sensitivity trees and hedgerows.

As specified in '**P1. a)** ***Hedgerow, waterway and drain setbacks'*****,** setbacks of 4.5m from hedgerows will be established throughout most of the site (excluding the boundary between the Site and Stanley Abbey Farm CWS, and the boundary between the Site and the canal) and protected through fencing off during construction. During operations, these areas will only be accessed for occasional hedge and grass cutting, and crossed during maintenance visits.

a) Where access roads pass through these zones, they will be created using a no-dig method to minimise the impact on the root systems, as detailed in the Tree survey & constraints plan (Hayden's, 2022).

b) Non-destructive methods, including directional drilling, will be used to pass the cable underneath hedgerows to avoid impacts to hedgerows along the entire cable route, within and outside of the application site.

c) Security fencing will be designed so that it passes over hedgerows; and footpaths will cross hedgerows either at points where there are existing gaps or by using stiles.

Please note - At some points, access roads are required to pass through hedgerow RPAs, e.g., where they go through hedgerow gaps between fields.

Trees

Six native tree species were identified on site: European ash *Fraxinus excelsior*, English oak *Quercus robur*, common hawthorn, field maple, sycamore, and willow sp. *Salix spp.* All trees were restricted to hedgerows, with notable concentrations along the easternmost and southernmost site boundaries. No trees were present within the fields.

Please refer to Appendix II for a numbered map displaying all trees identified on site.

Potential impacts

Removal of trees

All mature trees provide ecological benefits. Removing trees would reduce connectivity between woody habitats, and impact a range of species, including hibernating, foraging, and commuting bats; nesting and foraging birds, and foraging, commuting and nesting reptiles, amphibians, and invertebrates.

Damage to tree root systems

Vehicle movements and ground works during construction have the potential to cause damage to the roots of trees.

Construction controls

A6. *Removal of trees*

a) No trees require removal during the construction phase of the solar farm. However, if there is an unforeseen requirement, such as managing ash dieback, two new trees will be planted near to each felled tree as a replacement. In addition, approximately 2Ha of tree planting will occur throughout the solar farm, which would also serve as compensation.

Damage to tree root systems

As specified in '**P4. b)** ***Tree and hedgerow root protection areas',*** root protection areas (RPAs) will be provided around all trees in accordance with the arboriculture survey (Hayden's, 2022) to avoid compaction from construction machinery. Zones vary in size depending on the size and veteran status of the tree. The RPAs around veteran trees will be protected during construction using fencing, such as Heras, to avoid vehicle movements causing compaction to the soil above the roots. RPAs of less important trees and of hedgerows are also avoided by solar panels and other infrastructure, and where the access track runs through these zones, the road will be built using a no-dig method that will avoid directly impacting roots.

Woodland edge

The application site is adjacent to two adjoined ancient semi-natural woodlands: Close Wood CWS and Derry Woods CWS. Both sites are recognised as BAP Priority Habitats for Lowland mixed deciduous woodland and wet woodland.

Potential impacts

Damage to tree root systems

Construction of the solar farm has the potential to directly impact these woodlands by causing damage to tree roots along the woodland edges.

Impacts from habitat changes on site and artificial surfaces

There is also the potential to indirectly impact the woodlands through the change of onsite habitats and through the creation of artificial surfaces, as this could alter the behaviours of species that use both the grassland and woodland habitats.

Construction controls

A7. *Damage to woodland tree root systems*

As specified in **'P2. *Woodland setback',*** the direct impact on tree roots will be avoided by instating a buffer zone of 15m between the woodland edge and the fence-line of the solar farm, in line with standing advice from Natural England and the Forestry Commission.

A8. *Impacts from habitat changes on site and artificial surfaces*

The impacts of habitat change resulting from the solar farm will be minimised by the suite of new habitats and existing habitat enhancements, as specified in the BMP (Wychwood Biodiversity, 2022b). The new habitats will create higher quality foraging and commuting resources, despite the presence of solar panels.

Ponds and waterways

No ponds are present within the application site; however, three ponds were found adjacent to the site boundary:

- Pond 1 - a small (3 x 3m), deep pond with flowing water and no visible vegetation. Located deep on the south-eastern boundary of the adjoining Stanley Abbey Farm Meadows CWS adjacent to Close Wood.
- Pond 2 – approximately 10m in width, 100m in length and 0.5-1m in depth. This pond is a section of the old canal to the southwest of the A4.
- Pond 3 - small shallow section of the old canal beyond the northern corner of the application site, just south of Pudding Brook.

Drainage ditches were present alongside hedgerows throughout much of the site. One drainage ditch contained shallow water throughout the year and appeared to act as a small tributary to Pudding Brook. The remaining ditches appeared to rarely contain water.

Potential impacts

Damage to waterway structure and habitat

The site layout has been carefully thought out to use existing watercourse crossing wherever possible, yet one new crossing (see "hedgerows") will be required to facilitate the access road.

Pollution from sediment, hydrocarbons, and other materials

Without strict control, there is potential for ponds and waterways to be impacted by accidental run-off or spillage of sediment, hydrocarbons, and other materials.

Construction controls

A9. *Damage to waterway structure and habitat*

A 4.5m long culvert will be installed in the location of the new crossing (H7 – Appendix II) to ensure water can continue to flow freely along the drainage ditches. The ECoW will supervise the installation of the culvert to ensure it functions properly, and that minimal disruption is caused to the ditch habitats.

Pollution from hydrocarbons, and other materials

Refer to C1. *Hazardous chemicals*

Construction Measures B: Species

The following section includes all species identified on site that have the potential to be impacted by the construction of the solar farm. The status on site for each species is summarised first, drawing upon survey results presented in the EA; this is followed by the potential impacts to the habitat that could arise from construction activities; finally, the corresponding avoidance, mitigation or protection measures are provided, referring to ecological protection areas where required.

Badgers

Eurasian badger *Meles meles* was observed on two occasions during bat surveys. Two badgers were observed foraging in Field 4 (to the west of the A4) during the night of 20th July 2020; and one badger was observed within Stanley Abbey Farm Meadows CWS adjacent to the application site, during the night of the 30th April 2020.

No badger setts or potential setts were found on the application site or in suitable surrounding habitat.

Potential impacts

Disturbance to setts or burrows

If an undetected badger sett or burrow is present on or adjacent to the site, construction activities including excavation or pile driving could disturb breeding or hibernating individuals. Furthermore, hedgerow removal could destroy active holes.

Risks from pits and entrapment

Trenches and pits excavated during construction can pose a threat to badgers that may become trapped overnight, or during breaks in work. Trapped individuals will have limited access to food, may suffer exposure, or drown during periods of heavy rainfall.

Impacts to foraging activities

There is potential for a slight negative impact of construction on badgers due to the disturbance to their foraging habitat during excavations and with vehicle movements.

Constructing security fencing without access points could remove access to mid-field foraging habitat available for badgers, thus compromising their ability to forage.

Construction controls

B1. *Disturbance to setts or burrows*

To assess the presence of any new or undetected setts that could be impacted by construction, a pre-construction badger survey will be undertaken a minimum of 1 month prior to construction commencing. If active setts or burrows are found on site or within 50m of the proposed development, protective buffers would be instated; and no construction activities or habitat removal would take place within these buffers. The precise width of the buffers would be assessed on a project-by-project basis with acceptance by the LPA.

B2. *Risks from pits and entrapment*

To prevent badgers and other terrestrial mammals from being trapped in ground works, any trenches dug will either be covered overnight or contain an escape ramp in the form of a rough sawn plank.

B3. *Preventing foraging accessibility*

There may be temporary access limitations to badgers foraging on site during the construction period, however, once construction is completed, 10cm gaps will be instated at the base of the perimeter fencing to allow continued badger access to the site during operations.

Bats

At least 14 bat species were recorded within the application area and adjacent land during the survey period. These included serotine bat *Eptesicus serotinus*, Brandt's/whiskered bat *Myotis brandtii/mystacinus*, Daubenton's bat Myotis daubentonii, Natterer's bat *Myotis nattereri*, Leisler's bat *Nyctalus leisleri*, common noctule *Nyctalus noctule*, Nathusius' pipistrelle *Pipistrellus nathusii*, common pipistrelle *Pipistrellus pipistrellus*, soprano pipistrelle *Pipistrellus pygmaeus*, and brown long-eared bat *Plecotus auratus*; and the rarer barbastelle *Barbastella barbastellus*, greater horseshoe bat (GHS) *Rhinolophus ferrumequinum*, lesser horseshoe bat *Rhinolophus hipposideros*, and possible Bechstein's *Myotis bechsteinii*. Bat activity was concentrated along hedgerows, the woodland edge, and field margins.

The application site was found to have moderate to high potential for commuting and foraging bats, according to current guidance (Bat Conservation Trust, 2016). Further, surveys found that the rare Barbastelle, greater horseshoe and lesser horseshoe bats were commuting through and foraging on site. For this reason, the site is considered to have 'Regional' value to both commuting and foraging bats. The hedgerow / line of trees that runs between Forest Gate and Stanley Abbey Farm Meadows CWS was found to act as the main bat highway within the site for commuting and foraging bats of all species, including Barbastelle; greater horseshoe, and lesser horseshoe bats. Further bat commuting routes were present along hedgerows within the CWS and alongside the canal.

With regards to bat roosting sites, three mature oaks that were identified during the tree survey as having "moderate" bat roosting potential (Hayden's, 2020).

Please Note *- since the bat surveys were undertaken in 2020, numerous mature ash trees have been removed from Close and Derry Woods, due to ash dieback, and this is likely to have reduced the value of these neighbouring woodland habitats, and potentially the application site, for bats.*

Potential impacts

Disturbance to roosting, hibernation, or breeding sites

Works on trees, or removing them altogether could disturb, injure, or kill roosting, hibernating, or breeding bats.

Artificial light disturbance

Artificial light used for construction can disrupt the natural rhythm of light and dark for a range of species, including having a detrimental impact on the foraging and commuting behaviour of bats.

There is potential for construction lighting to impact bat commuting activity along important features, such as the dividing hedgerow / line of trees between the site and Stanley Abbey Farm CWS, the canal, and along other hedgerows throughout the site.

GHS has the potential to be most impacted by construction lighting, due to its rarity and the apparent foraging activity within the site. GHS was found to use hedgerows and hedgerow margins, mostly within Stanley Abbey Farm Meadows CWS.

Construction controls

B4. *Disturbance to roosting, hibernation, or breeding sites*

If trees with bat roosting potential are to require works during the construction period, bat roost surveys would be required by a licensed bat surveyor. If roosting bats are found, a mitigation license will be required prior to any works on the trees commencing.

Considering no trees will be removed during the construction of the solar farm, and RPA's will be instated around all trees, no disturbance to bat roosting, hibernation, or breeding sites is expected.

B5. *Artificial light disturbance*

It is possible that limited lighting will be used during construction. To avoid potential lighting impacts, no lighting will be directed at hedgerows or trees throughout construction. Lighting will be required in the compound area during construction, which has been located as far as possible from the CWS in the south western corner of the main site. Lighting around the compound area will be movement-sensitive and will only be used during the winter months (November to mid- March), during working hours of 8am-6pm Monday-Friday and 8am-1pm on Saturday. At these times, most bats will be in hibernation and will therefore not be impacted. Vehicle headlights will also be used at dusk between the months of November and mid-March. No other lighting is expected to be used.

Dormice

The biodiversity data search did not return any records of hazel dormouse *Muscardinus avellanarius* within 2km of the site. However, data from MAGIC maps (DEFRA, 2021) identified that a dormouse license was granted 6km south-west of the site. The area covered by the license was separated from the site by two major roads.

No evidence of dormouse was found during ecological surveys, however the site itself provides suitable dormouse habitat, including intact hedgerows and scrub; and is connected to small areas of woodland and hedgerows in the wider environment, to the north, east and west of the application site.

Potential impacts

Disturbance or destruction of dormouse habitat

Removing one section of hedgerow and widening existing hedgerow gaps (see hedgerows) could disturb, injure, or kill dormice, if present on site, and remove suitable habitat.

Construction controls

B6. *Disturbance or destruction of dormouse habitat*

a) Hedgerow removal will be timed wherever possible to occur within the active season for dormice (March to October, inclusive), to ensure that no animals are disturbed or harmed during hibernation. Work may be able to encroach into November or February, if the weather is warm enough, under advice from an ecologist.

b) The sections of hedgerow to be removed will be surveyed for dormouse nests by the ECoW immediately prior to removal.

c) If evidence of dormouse is found, all works must cease, and the advice of suitably qualified ecologist sought.

Hedgerow or tree nesting birds

Out of the 46 bird species recorded inside the study area during the survey period, nineteen hedgerow or tree nesting species were classified as either confirmed or probable breeders, including eight notable species: common woodpigeon *Columba palumbus*, rook *Corvus frugilegus*, common whitethroat *Sylvia communis*, Eurasian wren *Troglodytes troglodytes*, dunnock *Prunella modularis*, house sparrow *Passer domesticus*, Eurasian bullfinch *Pyrrhula pyrrhula*, and common linnet *Linaria cannabina*.

Potential impacts

Disturbance or destruction of active nests

Removing one section of hedgerow and widening existing hedgerow gaps (see hedgerows) could destroy eggs, and disturb, injure, or kill nesting birds and their young.

Construction controls

B7. *Disturbance or destruction of active nests*

a) Hedgerow removal will ideally take place outside of the main bird breeding season, which runs between March and July inclusive.

b) If removal needs to take place within the breeding season, the ECoW will first assess the sections for active nests immediately prior to the removal, and the check will cover 15 metres either side of the proposed gaps. If active nests are found, hedgerow removal will either be put on hold until the chicks have fledged and the nest is no longer active, or an alternative adjacent section of hedgerow will be removed, on the advice of the ecologist, where there are no active nests, providing that this section is of similar value to the section proposed for removal, i.e., there are not more plants and there are no mature trees removed as a result of the change.

Ground nesting birds

The ground nesting Eurasian skylark *Alauda arvensis* was observed throughout the site, with eight breeding territories registered across Fields 3, 5, 6, 7 and 10. No other ground nesting species were recorded as breeding on site.

Potential impacts

Disturbance or destruction of active nests

There is a high potential for construction activities on the fields to disturb nesting skylarks and to destroy active nests**.**

Construction controls

B8. *Disturbance or destruction of active nests*

a) Construction on fields where Skylarks might be present – Fields 3, 5, 6, 7 & 9, – is advised not to take place during the breeding season if possible (avoiding March to July, inclusive).

b) If construction is required to take place on these fields during the main breeding period, further measures will be taken. A pre- construction bird survey (one visit) will be carried out to assess whether birds are nesting in fields. If any nesting birds are found, development activities will remain at a distance of at least 50m from each nest, with guidance and supervision by the ECoW, until all chicks are confirmed to have fledged successfully.

Reptiles

No reptiles were observed during site visits, but it is considered likely that common reptile species, such as slow worm, are present in small numbers along hedgerow bases.

Potential impacts

Disturbance to terrestrial habitats

Removing sections of hedgerow, widening hedgerow gaps and ditch culverting during construction has the potential to disturb, injure or kill hibernating, foraging or commuting reptiles.

Construction controls

B9. *Disturbance to terrestrial habitats*

a) Reptiles are likely to be present in small numbers along the hedgerow and ditch bases, therefore work to remove sections of hedgerow and create a ditch culvert will be timed wherever possible to occur within the active season for reptiles (March to October, inclusive), to ensure that no animals are disturbed or harmed during hibernation. Work may be able to encroach into November or February, if the weather is warm enough, under advice from an ecologist.

b) The ECoW will check for reptiles immediately prior to hedgerow removal and ditch culverting and will supervise these works at all times. If any reptiles are found, the ECoW will relocate the individuals approximately 100m away, to a safe and suitable section of hedgerow elsewhere on site.

Great crested newts

Great crested newt *Triturus cristatus* (GCN) were confirmed to breed in Pond 2 (outside the application site boundary), which is located adjacent to Field 4, to the west of the A4 road. No ponds east of the A4 were found to support GCN. The grassland habitat around Pond 2 was considered suitable foraging and commuting habitat for GCN and other amphibian species.

GCN population surveys were not carried out on Pond 2, however, the two manual surveys returned only one individual GCN, indicating the population is small.

Potential impacts

Disturbance to breeding ponds

If any construction activities take place within 50m of Pond 2, or any other suitable waterbodies, there is potential for disturbance to breeding GCN, or efts exiting the waterbody after the breeding season.

Disturbance to terrestrial habitats throughout the site

Ground excavations on grassland, and the removal of woody habitats such as hedgerows and trees could disturb, injure, or kill hibernating, commuting or foraging GCN.

Disturbance to terrestrial habitats within Field 4

Terrestrial habitat for the GCN population using Pond 2 is mainly restricted to Field 4, considering the presence of the busy A4 road bisecting the rest of the site from this location, which exhibits a barrier to the majority of terrestrial GCN. Ground excavations on grassland, and the removal of woody habitats such as hedgerows and tree within Field 4 could disturb, injure, or kill hibernating, commuting or foraging GCN.

Construction controls

B10. *Disturbance to breeding ponds*

The proposal is designed so that no development will take place within 50 metres of Pond 2 and there will be no direct impacts to existing ponds or waterways.

Construction of the solar farm will not directly impact any ponds but will involve culverting one ditch. Surveys found that GCN were absent from Ditch 7 and the other ditch did not contain water. Both sections are further than 500m from any pond containing GCN. The new culvert therefore has a negligible likelihood of impacting GCN.

B11. *Disturbance to terrestrial habitats throughout the site*

The disturbance to terrestrial habitat within a further 250m of the GCN pond will be temporary, with a construction period lasting around 6 months. The existing terrestrial habitat throughout the site will be retained and enhanced post-construction.

a) Additional measures will be employed both through the design and construction measures to minimise any potential impacts to a negligible level, ensuring that GCN are protected at all levels in accordance with their legal status.

b) Works will take place more than 4.5m from hedgerows, as a general rule, unless there is no alternative, further decreasing any possible interference with GCN.

c) Roads will be kept to a minimum throughout the site and will be constructed outside of hedgerow and tree RPAs set out in the arboriculture report (Hayden's, 2020) at all possible points. Any track construction taking place within these zones will be carried out using a no-dig method.

B12*. Disturbance to terrestrial habitats within Field 4*

a) A GCN-licensed ecologist will provide all construction workers with a "toolbox talk", to notify them of the possible presence of protected species and will explain a protocol for stopping works if any GCN are discovered during works.

b) The licensed ecologist will be present during initial works in Field 4.

c) Taller vegetation in Field 4 will be strimmed and cut back prior to works commencing.

d) A licensed ecologist will conduct a fingertip search of suitable GCN habitats in Field 4 at all locations where piles will be driven, on the day of the activity, to ensure no GCN are resting in these locations.

e) Works within Field 4 will take place using low-pressure vehicles.

f) Any trenches or excavations made during construction works will be either covered over at night or provided with adequate escape routes if left open and will be checked prior to infilling.

g) In the unlikely event than any GCN is discovered during works in Field 4, all works will cease and the ecologist will liaise with Natural England.

Construction Measures C: General ecology

The following section includes potential construction threats to the ecological resilience of the entire site. The potential construction impacts are presented, followed by the applicable avoidance, mitigation, or protection measures.

Potential impacts

Hazardous chemicals

Hazardous chemicals can have devastating impacts on local ecosystems, particularly if the chemicals seep into nearby water systems. Impacts can include destruction of plants and animal communities, or impacts to natural processes such as reproduction, growth, and dispersal.

Invasive plants

Non-native invasive plant species can change the habitat structure of an area, making it unsuitable for the other organisms that live there. Particularly pernicious species such as Japanese knotweed can overrun localised areas, preventing native plants from growing, thus reducing the overall biodiversity value of the site.

Construction controls

C1. *Hazardous chemicals*

Any chemicals or pollutants used or created by the development will be strictly stored and disposed of correctly according to 'The Control of Substances Hazardous to Health Regulations 2002' (COSHH) (UK Government, 2002). A COSHH risk assessment will be carried out by the asset manager prior to construction and workers will follow the strict protocols at all times. Adhering to the protocols will prevent accidental spillage or run off into terrestrial habitats, ponds, and watercourses, averting ecological impacts.

C2. *Invasive plants*

If any non-native invasive plant species highlighted by DEFRA as special concern are discovered on site, appropriate measures will be undertaken to avoid their spread. Such measures should include physical clearance of invasive plants from the site and disposing of the waste correctly; and cleaning vehicles following best practice, to ensure no vegetation or seeds are transported offsite.

Key personnel and responsibilities

The following section identifies the persons responsible for ensuring the scheme is delivered in accordance with the policy and legislation safeguarding UK wildlife; complies with planning permission commitments; and adheres to the measures, timings and protocols outlined in this CEMP.

Ecological Clerk of Works

The ecological clerk of works (Ecow) is appointed to identify any protected or notable species within the construction area.

The ECoW is responsible for monitoring site based construction activities, to ensure the scheme is delivered in accordance with the policy and legislation safeguarding UK wildlife; complies with planning permission commitments; and adheres to the measures, timings and protocols outlined in this CEMP. The ECoW also identifies and resolves any ecological related issues that may arise during the construction phase of the project and is responsible for providing guidance and information to the work force, to ensure they are aware of their responsibilities.

Prior to the start of construction, a final site walkover will be conducted by an ecologist to re-assess the site for protected species. An ECoW will be on site a minimum of one day per week throughout the construction period, and on call at all times. In particular, they will be present for works in more sensitive parts of the site.

An Ecological Clerk of Works (ECoW) will be appointed by the construction company and Eden FG Solar Ltd, or other potential developer who takes on the development option,) to carry out the required biodiversity monitoring during the construction phase.

Site manager

The site manager is responsible for ensuring the CEMP is understood and complied with by all contractors throughout the construction period.

The site manager will be employed by the EPC company engaged to undertake the construction works.

Work schedules

Construction activities will be timed wherever possible to avoid potential disturbance to fauna and flora onsite.

The sensitive periods for relevant protected and vulnerable species are set out below and summarised in Table 1. Months highlighted in red denote sensitive periods in the natural cycles of each habitat or species, during which they are most likely to be subject to harm or disturbance. Months highlighted in green denote less critical periods, where construction work is less likely to have a negative impact.

The suitable times of year to undertake potentially impactful construction activities are displayed in Table 2, including a summary of the surveys required prior to the activity commencing.

The survey timings and requirements for species that may be impacted by construction activities are displayed in Table 3, which includes details on the survey target areas and key survey activities.

Table 1. Recommended construction timings to avoid impacting sensitive species

Sensitive species	Rational for avoidance	Recommended construction times to avoid disturbance											
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Badgers	Badgers are inactive during hibernation and are at risk of disturbance during this period (November - February, inclusive)	X	X	✓	✓	✓	✓	✓	✓	✓	✓	X	X
Dormice	Dormice are inactive during hibernation and are at risk of disturbance during this period (November - February, inclusive).	X	X	✓	✓	✓	✓	✓	✓	✓	✓	X	X
Breeding birds	Breeding birds and offspring, particularly those that nest on the ground, are at risk of harm or disturbance during the breeding season (April - July, inclusive).	✓	✓	X	X	X	X	X	✓	✓	✓	✓	✓
Reptiles	Reptiles are inactive during hibernation and are at risk of disturbance during this period (November - February, inclusive).	X	X	✓	✓	✓	✓	✓	✓	✓	✓	X	X
Great crested newts	During the breeding period, newts may be moving between refuge habitats such as hedgerows, and ponds and subject to harm or disturbance (March - May, inclusive)	✓	✓	X	X	X	✓	✓	✓	✓	✓	✓	✓

Table 2. Suitable timings for proposed construction activities

Activity	Focal areas	Survey requirements Check timings in 'Species - Contruction Measures'	Suitable months to undertake activity											
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Lighting around compound area	Compound area	None	✓	✓	To mid March	X	X	X	X	X	X	X	✓	✓
Vehicle headlghts	All areas	None	✓	✓	To mid March	X	X	X	X	X	X	X	✓	✓
Tree removal	All trees	If during breeding or hibernating seasons: - Bat roost survey - Bird nest search - Dormouse nest search	NR	NR	NR	NR	NR	NR	NR	✓	✓	✓	NR	NR
Hedgerow removal	Hedgerows: Sections of H2, H7, H8, H9, H12 & H15	If during breeding or hibernating seasons: - Reptile search - Dormouse nest search - Bird nest search - Great crested newt search	NR	NR	NR	NR	NR	NR	NR	✓	✓	✓	NR	NR
Ditch culverting	Ditch along H7	If during breeding or hibernating seasons: - Reptile search - Great crested newt search	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Construction on fields	Fields 3, 5, 6, 7 & 10	If during breeding season: - Bird nest search	✓	✓	NR	NR	NR	NR	NR	✓	✓	✓	✓	✓

Table 3. Species survey/search requirements and timings

Species	Survey type	Target areas	Stage during works	Key activities	Responsible persons	Time of year for conducting surveys/searches											
						Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Badger	Pre-construction badger survey	Field boundaries, woodland, hedgerows, scrub	1 month prior to construction at all times during the year.	A minimum of 1 month prior to construction commencing, a pre-construction badger survey will be undertaken to assess the presence of any new or previously undetected setts that could be impacted by construction.	ECoW	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Bats	Bat roost survey	Trees: (**no removal planned**)	Prior to tree removal at all times of the year.	If trees with bat roosting potential are to require works during the construction period, bat roost surveys would be required by a licensed bat surveyor. If roosting bats are found, a mitigation license will be required prior to works on the trees	Bat licesensed ecologist	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Dormice	Dormouse nest search	Hedgerows: Sections of H2, H7, H8, H9, H12 & H14	Immediately prior to hedgerow removal at all times of the year.	The sections of hedgerow to be removed will be checked for dormouse nests.	ECoW	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Hedgerow/tree nesting birds	Active bird nest search	Hedgerows: Sections of H2, H7, H8, H9, H12 & H15	Immediately prior to hedgerow removal if planned for the period between March to July inclusive.	If removal takes place within bird breeding season, the ECoW will assess the applicable sections for active nests. If active nests are found, hedgerow removal will either be put on hold until the chicks have fledged and the nest is no longer active, or an alternative adjacent section of hedgerow will be removed, on the advice of the ecologist.	ECoW	X	X	✓	✓	✓	✓	✓	X	X	X	X	X
Ground nesting birds (skylark)	Active bird nest search	Fields: Throughout Fields 3, 5, 6, 7 & 9	Immediaetly prior to works on fields if planned for the period between March to July inclusive.	A pre- construction bird survey (one visit) will be carried out to assess whether birds are nesting in fields.	ECoW	X	X	✓	✓	✓	✓	✓	X	X	X	X	X
Reptiles	Reptile search	Hedgerows: Sections of H2, H7, H8, H9, H12 & H15	Immeditately prior to hedgerow removal at all times of the year.	The ECoW will check for reptiles prior to removal and will supervise vegetation removal at all times. If any reptiles are found, the ECoW will relocate the individuals at least 100m away, to another suitable and comparable section of hedgerow on site.	ECoW	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Great crested newt (GCN)	Fingertip search for GCN	Suitable GCN habitats in Field 4	On the day of activity prior to works	A licensed ecologist will conduct a fingertip search of suitable GCN habitats in Field 4 at all locations where piles will be driven, on the day of the activity, to ensure no GCN are resting in these locations.	GCN licesensed ecologist	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

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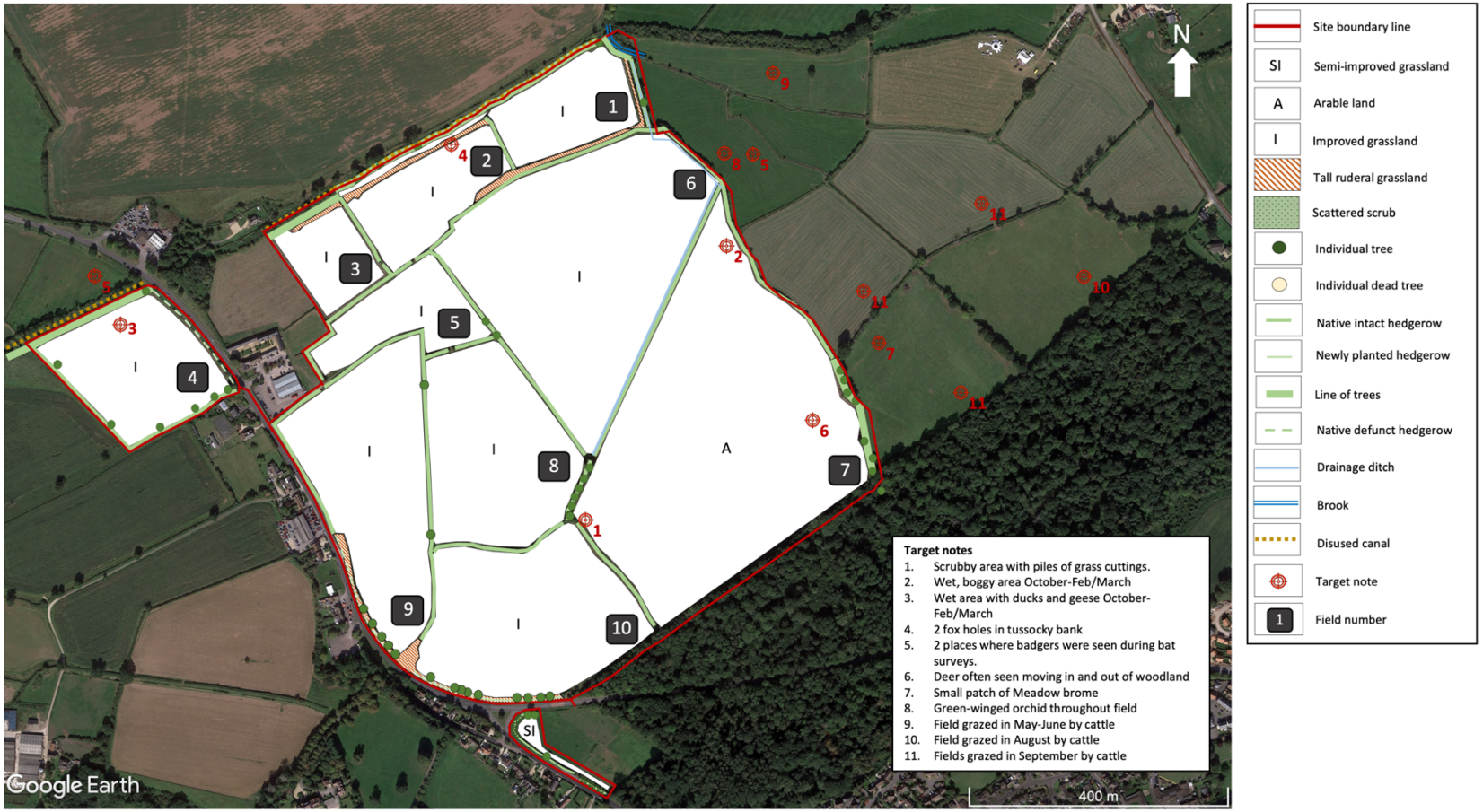
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Appendices

Appendix I. Phase 1 Habitats Map



Appendix II. Tree and hedgerow map



Appendix III. Badgers - Reasonable avoidance working method statement

Construction works throughout the site will be carried out under the following RAMs for badgers:

a) A minimum of 1 month prior to construction commencing, a pre-construction badger survey will be undertaken to assess the presence of any new or previously undetected setts that could be impacted by construction.

b) An ecologist will provide all construction workers with a “toolbox talk”, to notify them of the possible presence of protected species and will explain a protocol for stopping works if any badger setts or burrows are discovered during works.

c) If active setts or burrows are found on site or within 50m of the proposed development, protective buffers would be instated; and no construction activities or habitat removal would take place within these buffers. The precise width of the buffers would be assessed on a project-by-project basis with acceptance by the LPA.

d) To prevent badgers and other terrestrial mammals from being trapped in ground works, any trenches dug will either be covered overnight or contain an escape ramp in the form of a rough sawn plank.

Appendix IV. Bats - Reasonable avoidance working method statement

Any tree works or removal throughout the site will be carried out under the following RAMs for bats:

a) If trees with bat roosting potential are to require works during the construction period, bat roost surveys would be required by a licensed bat surveyor. If roosting bats are found, a mitigation license will be required prior to works on the trees.

b) A bat licensed ecologist will provide all construction workers with a "toolbox talk", to notify them of the possible presence of protected species and will explain a protocol for stopping tree works if any roosting bats are discovered within the trees.

Construction works throughout the site will be carried out under the following RAMs for bats:

a) Works will take place more than 4.5m from lines of trees, as a general rule, unless there is no alternative, further decreasing any possible interference with bats.
b) Tracks will be kept to a minimum throughout the site and will be constructed outside of tree RPAs set out in the arboriculture report (Hayden's, 2020) at all possible points. Any track construction taking place within these zones will be carried out using a no-dig method.
c) No lighting will be directed at hedgerows or trees throughout construction.
d) Lighting around the compound area will be movement-sensitive and will only be used during the winter months (November to mid- March), during working hours of 8am-6pm Monday-Friday and 8am-1pm on Saturday.
e) Vehicle headlights will also be used at dusk between the months of November and mid-March. No other lighting is expected to be used.

Appendix V. Dormice - Reasonable avoidance working method statement

Construction works throughout the site will be carried out under the following RAMs for dormice

a) Works will take place more than 4.5m from hedgerows, as a general rule, unless there is no alternative, further decreasing any possible interference with dormice.
b) Tracks will be kept to a minimum throughout the site and will be constructed outside of hedgerow and tree RPAs set out in the arboriculture report (Hayden's, 2020) at all possible points. Any track construction taking place within these zones will be carried out using a no-dig method.

The removal of hedgerows will be carried out under the following RAMs for dormice:

a) An ecologist will provide all construction workers with a "toolbox talk", to notify them of the possible presence of protected species and will explain a protocol for stopping hedgerow removal if any dormice are discovered during works.
b) The sections of hedgerow to be removed will be surveyed for dormouse nests by the ECoW immediately prior to removal.
c) If evidence of dormouse is found, all works must cease and the advice of suitably qualified ecologist sought.

Appendix VI. Hedgerow and Tree Nesting birds - Reasonable avoidance working method statement

All hedgerow removal will be carried out while adhering to the following RAMs for hedgerow and tree nesting birds:

a) Works will take place more than 4.5m from hedgerows, as a general rule, unless there is no alternative, further decreasing any possible interference with hedgerow nesting birds.
b) Tracks will be kept to a minimum throughout the site and will be constructed outside of hedgerow and tree RPAs set out in the arboriculture report (Hayden's, 2020) at all possible points.
c) The ECoW will provide all construction workers with a "toolbox talk", to notify them of the possible presence of protected species and will explain a protocol for stopping hedgerow removal if any nesting birds are discovered within the respective hedgerow section.
d) The ECoW will be present during all hedgerow removal on site.
e) Hedgerow removal will ideally take place outside of the main breeding season, which runs between March and July.
f) If removal needs to take place within the breeding season, the ECoW will first assess the sections for active nests in the zone of removal and 15m either side.
g) If active nests are found, hedgerow removal will either be put on hold until the chicks have fledged and the nest is no longer active, or an alternative adjacent section of hedgerow will be removed, on the advice of the ecologist. The alternative hedgerow section will contain no active nests and will be identical to the section original proposed for removal, i.e., there are not more plants and there are no mature trees removed as a result of the change.

Appendix VII. Ground nesting birds - Reasonable avoidance working method statement

Construction works within ALL fields will be carried out while adhering to the follow RAMs for ground nesting birds:

a) Construction on fields where skylarks might be present – Fields 3, 5, 6, 7 & 9, – is advised not to take place during the breeding season if possible (avoiding March to July, inclusive).

b) If construction is required to take place on these fields during the main breeding period, a pre-construction bird survey (one visit) will be carried out to assess whether birds are nesting in fields.

c) The ECoW will provide all construction workers with a "toolbox talk", to notify them of the possible presence of protected species and will explain a protocol for stopping works if any nests or chicks are found within the fields.

d) If any nesting birds are found, development activities will remain at a distance of at least 50m from each nest, with guidance and supervision by the ECoW, until all chicks are confirmed to have fledged successfully.

Appendix VIII. Reptiles - Reasonable avoidance working method statement

Construction works be carried out under the following RAMs for reptiles:

a) Works will take place more than 4.5m from hedgerows, as a general rule, unless there is no alternative, further decreasing any possible interference with reptiles.
b) Tracks will be kept to a minimum throughout the site and will be constructed outside of hedgerow and tree RPAs set out in the arboriculture report (Hayden's, 2020) at all possible points. Any track construction taking place within these zones will be carried out using a no-dig method.
c) Any trenches or excavations made during construction works will be either covered over at night or provided with adequate escape routes if left open and will be checked prior to infilling.

Hedgerow removal will be carried out under the following RAMs for reptiles:

d) An ecologist will provide all construction workers with a "toolbox talk", to notify them of the possible presence of protected species and will explain a protocol for stopping hedgerow removal if any reptiles are discovered within hedgerows.
e) The removal of hedgerows will avoid the hibernation period of November to February, inclusive, to avoid harming inactive reptiles.
f) The ECoW will check for reptiles immediately prior to removal and will supervise vegetation removal at all times. If any reptiles are found, the ECoW will relocate the individuals at least 100m away, to another suitable and comparable section of hedgerow on site.

Appendix IX. Great crested newt - Reasonable avoidance working method statement

Construction works throughout the site will be carried out under the following RAMs for great crested newts (GCN):

a) Works will take place more than 4.5m from hedgerows, as a general rule, unless there is no alternative, further decreasing any possible interference with GCN.
b) Tracks will be kept to a minimum throughout the site and will be constructed outside of hedgerow and tree RPAs set out in the arboriculture report (Hayden's, 2020) at all possible points. Any track construction taking place within these zones will be carried out using a no-dig method.
c) Additional measures will be employed both through the design and construction measures to minimise any potential impacts to a negligible level, ensuring that GCN are protected at all levels in accordance with their legal status.

Construction works within Field 4 the site will be carried out under the following RAMs for great crested newts (GCN):

d) A GCN-licensed ecologist will provide all construction workers with a "toolbox talk", to notify them of the possible presence of protected species and will explain a protocol for stopping works if any GCN are discovered during works.
e) The licensed ecologist will be present during initial works in Field 4.
f) Taller vegetation in Field 4 will be strimmed and cut back prior to works commencing.
g) A licensed ecologist will conduct a fingertip search of suitable GCN habitats in Field 4 at all locations where piles will be driven, on the day of the activity, to ensure no GCN are resting in these locations.
h) Works within Field 4 will take place using low-pressure vehicles.
i) Any trenches or excavations made during construction works will be either covered over at night or provided with adequate escape routes if left open and will be checked prior to infilling.
j) In the unlikely event than any GCN is discovered during works in Field 4, all works will cease and the ecologist will liaise with Natural England.