Dean Lewis Estates

Land off Old Ashford Road, Lenham

Ecological Mitigation and Management Plan

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1.0 INTRODUCTION

1.1 The following Ecological Mitigation and Management Plan has been prepared by FPCR Environment and Design Ltd on behalf of Dean Lewis Estates for land off Old Ashford Road, Lenham (central OS Grid Reference TQ 907 519). It provides details of biodiversity enhancements proposed within the site. This document also includes management measures to ensure the successful maintenance of habitats into the future, thus retaining ecological value. This includes both habitats recommended within the green infrastructure (GI) and those that are recommended directly as compensation and / or mitigation for protected species recorded.

1.2 The GI throughout the site should ensure a balance between recreational and biodiversity interests, with a mosaic of habitats created in place of existing arable and intensively grazed grassland. Recreational features include footpaths within GI that will provide connections to existing Public Rights of Way (PROW), sports pitches, a play area; areas of open space will provide areas of play, off lead dog exercise and opportunities for wildflower meadows and tussock grassland. Such features will provide long term 'multi-functional' green spaces in line with the aspirations of the National Planning Policy Framework (NPPF) and Natural England's description of green space as a, '*multifunctional resource capable of delivering a wide range of environmental and quality of life benefits (ecosystem services) for local communities*'[1].

1.3 Species specific mitigation and management has also been incorporated into the scheme to ensure that no offences are committed under the Wildlife and Countryside Act as amended (1981)[2] and the Conservation of Habitats and Species Regulations 2017 (as amended)[3] with particular regards to hazel dormouse *Muscardinus avellanarius*, great crested newts *Triturus cristatus* and reptiles since these species have been recorded on site. Mitigation measures to be implemented during the construction phase will ensure no risk to individuals will occur; this will include appropriate timing of vegetation removal. Additional mitigation measures should include strengthening existing hedgerows and planting new linear features, retaining buffers along linear features, which will be sensitively managed ensuring more refuge and foraging opportunities for dormice, great crested newts and reptiles and thus ensuring that a Favourable Conservation Status (FCS) in maintained into the future.

1.4 Additional mitigation and enhancement measures have been included within the scheme which will have a beneficial effect on a wide range of wildlife, such as birds, bats and invertebrates.

1.5 Management regimes for habitats created / enhanced are also detailed within the plan; these are to be reviewed five years post construction, following an assessment of the habitats created, where the programme can be changed to address specific maintenance and habitat requirements.

[1] Natural England (2009) Green Infrastructure Guidance [online]

[2] Act of Parliament, (1981). The Wildlife and Countryside Act 1981 (as amended), London: HMSO

[3] *The Conservation of Habitats and Species Regulations* (as amended 2012). [Online]. Available from: http://www.legislation.gov.uk/uksi/2010/490/contents/made

2.0 BACKGROUND

2.1 The site largely comprises a mix of arable fields and sheep grazed poor semi-improved pastures bound by fence lines, grassland, hedgerows, ditches and scrub. Other habitats present include mature trees, species-poor hedgerows, tall ruderal vegetation, bare ground, ditches and streams, both dry and flowing.

2.2 A hybrid planning application (19/504724/HYBRID) has been submitted for an outline application (all matters reserved except for access) for up to 100 dwellings with formal and informal public open space including children's play area, SUDs and vehicular / pedestrian access from Old Ashford Road and full application for change of use of land for public sports, play and recreation. This outline Mitigation and Management Plan has been written in order to satisfy a request made by Kent County Council Ecologist, Helen Forster who stated:

'An overview of the proposed mitigation has been submitted however we advise that the submitted information is insufficient and there is a need for an outline mitigation and management plan to be submitted prior to determination of the planning application.'

3.0 OBJECTIVES

Ecological Management Objectives

3.1 The main objectives of this management plan are to protect, maintain and enhance the ecology and nature conservation value of habitats and species within the site.

3.2 Habitats should be created that are suitable for species identified during surveys completed during 2018. Habitat creation and management should be tailored to increase the overall suitability of the site, and therefore not preclude future colonisation by species not currently recorded.

3.3 A variety of habitats / micro-habitats should be created, which will include specific management regimes and structural manipulation to create gradual habitat gradients ("ecotones") and natural habitat edges that are not uniform or linear, which will create functional edges (edge effects).

3.4 Management of the habitats provided within the site should be completed in accordance with the prescriptions agreed within this document and should be undertaken by a 'management company' employed by the developer following the completion of development, until such time, that management is adopted by another relevant body. To inform the ongoing management plan the habitats created should be assessed during and post construction, whereby the programme can be changed to address specific maintenance and habitat requirements. A five year management plan following the prescriptions set out in this document should be implemented post construction which will be reviewed at the end of the fifth year following an assessment of the site by an ecologist and a further five year work programme created.

3.5 The key objectives are:

Objective 1:

3.6 To retain and protect the ecology and nature conservation value of existing habitats and protected species both during construction and operational phases of the development.

Objective 2:

3.7 To enhance existing habitats, create a variety of new habitats and establish a suitable management strategy to increase the biodiversity value of the site and provide suitable green corridors / linkages into the wider local landscape.

Objective 3:

3.8 To create 'multifunctional' green spaces where both recreational and functional requirements for wildlife interests are balanced effectively, to ensure they are not detrimental to the objectives outlined above.

Objective 1: To Retain & Protect Existing Ecological Features

Habitats

3.9 Approximately 5.41ha of the 11.89ha site, will comprise GI with recreational and ecological features. Existing habitats should be retained and enhanced within the development and sports areas and within the GI including periphery features such as hedgerows and trees. Consideration will also be given to the stream/ditches throughout the site. This objective will focus on the habitats below:

- Hedgerows;
- Scrub & Treelines;
- Species-poor semi-improved grassland; and
- Watercourse.

Hedgerows / Scrub / Treelines

3.10 The existing network of hedgerows and trees within the site is largely continuous providing good connectivity between habitats both around the site and within the immediate landscape. The hedgerows are largely managed and formed arable field boundaries. In accordance with the Hedgerow Evaluation and Grading System (HEGS)[4] six of the 15 hedgerows were found to be of moderately high to high conservation value (H8, H9, H11 - H14) with the remaining nine (H1 – H7, H10 and H15) of moderate value. One hedgerow (H12) qualified as important under the wildlife and landscape criteria of the Hedgerow Regulations 1997[5].

3.11 All hedgerows have been identified as Habitats of Principal Importance under the Natural Environment and Rural Communities (NERC) Act 2006[6]. Under the NPPF, development should seek to contribute a net gain in biodiversity with an emphasis on improving ecological networks and linkages where possible.

Protection

3.12 The majority of hedgerows, scrub and treelines are to be retained and enhanced through additional planting and improved management as outlined in Objective 2 below.

3.13 All hedgerows will be retained and buffered within the proposals, except for two sections of hedgerow H5 on the northern boundary which are proposed to be removed (approximately 63m and 147m in length) for pedestrian and vehicular access and to incorporate visibility splays. Hedgerow H5 is of moderate value under HEGS.

3.14 Scattered scrub comprising hawthorn *Crataegus monogyna* and bramble *Rubus fruticosus* agg. was present along the southern boundary of the residential area and within the treeline bordering the stream S1. The treeline was dominated by hawthorn with occasional ash *Fraxinus excelsior* trees, with scattered bramble scrub understorey.

[4] Clements, D.K. & Tofts, R.J. (1992) Hedgerow Evaluation and Grading System (HEGS): A methodology for the ecological survey, evaluation and grading of hedgerows.

[5] Hedgerow Regulations (1997), Statutory Instrument No: 1160 [online] http://www.legislation.gov.uk/uksi/1997/1160/regulation/5/made

[6] The Natural Environment and Rural Communities Act 2006. [Online]. Available from: http://www.legislation.gov.uk/ukpga/2006/16/contents

3.15 The majority of the scrub and treeline will be retained, with exception of c. 4.8m of scrub along the southern boundary of the residential site and c. 19m of treeline, both to provide vehicular access to the sports area.

3.16 The area of loss of hedgerows, scrub and treelines should be adequately compensated for through additional planting behind the visibility splays / management as detailed in Objective 2.

3.17 Further details on suitable methods to be used for removal of vegetation are provided in the faunal section below to ensure legal compliance with regards to the presence of dormice and birds.

3.18 Protection of retained hedgerows and associated features from the construction phase of the development should be achieved through the protection of Root Protection Ares (RPA) with Heras fencing or similar, which are detailed within the *BS* 5837:2012 Trees in Relation to Design, Demolition and Construction[7]. The RPA fencing should be in place along the lengths of all retained hedgerows, scrub and trees, where the buffer should include the canopy spread and / or equivalent to 5m.

3.19 The management of the existing hedgerows, scrub and treelines are detailed in Objective 2.

Poor Semi-Improved Grassland

3.20 The site comprised two heavily grazed pasture fields, largely dominated by grass species indicative of neutral conditions. The herb composition included species indicative of nutrient rich soils, such as white clover *Trifolium repens* and creeping buttercup *Ranunculus repens* and heavy grazing limited the ecological value of the grassland.

3.21 The field margins also comprised species-poor semi-improved grassland and ranged from 1-7m in width and comprised frequent perennial rye-grass *Lolium perenne*, cock's-foot *Dactylis glomerta* and Yorkshire fog *Holcus lanatus*. Sections of the margin were left unmanaged forming greater sward density and tussock areas.

3.22 The majority of the grassland will be lost to facilitate the residential development, however in the south of the site the GI will retain and enhance a proportion of this grassland habitat, where a neutral species-rich sward will be created, this will be managed through a traditional hay meadow cutting regime with a single cut in early spring or late summer / early autumn (see Objective 2 for detailed management strategy). Further details on suitable methods to be used for removal of vegetation are provided in the faunal section below to ensure legal compliance with regards to the presence of herpetofauna.

Watercourse

3.23 A series of streams occurred across the site. Stream S1 was flowing southwards from within an adjacent residential garden. The depth of the stream was approximately 5-10cm with clear water flowing gently and was noted to have a stone and pebble substrate. The overall width of the watercourse was 1-2m and ran for approximately 230m within the site, continuing south offsite from the application boundary.

[7] The British Standards Institution (2012) *BS* 5837:2012 Trees in Relation to Design, Demolition and Construction https://www.eden.gov.uk/media/3484/british-standard-bs5837-trees.pdf [online]

3.24 Stream S2 also flows southwards and occurs to the south-west of S1. The water was clear with a depth of 20-30cm, which flowed gently over a substrate of silt. The watercourse was 1-2m in width and occurs for approximately 180m of the site.

3.25 Stream S3 occurs offsite to the south of the site boundary, however, is in close proximity to stream S1. The water flows eastward along the boundary of Mill Wood towards ponds P4 and P3 in the wider area. The water was a depth of 10-20cm and clear within the woodland with a hard gravel substrate.

Protection

3.26 Both streams are to be retained within the GI and will be suitably buffered during the construction phase of development. These features will be fenced off to prevent access / pollution events, as detailed in the hedgerow section above.

3.27 During the construction phase good practice measures for working near water should be followed at all times to ensure no site run-off of water, mud or pollutants enter the watercourse, these include:

- No temporary storage of materials, construction of haul routes, or site machinery will be sited within 20m of the watercourse;
- During inclement weather, temporary material stockpiles will be covered where necessary to prevent runoff becoming polluted with sediments and flowing across exposed ground to the watercourse;
- Once hard surfaces are constructed in the form of roads, silt run-off preventative measures will be provided such as, but not restricted to, metal plates secured to gulley frames with terram, which will prevent silt entering the drainage systems;
- All fuel, oil and chemical storage will be sited on an impervious base within a bund and secured. Diesel pumps and similar equipment (if required) will be placed on drip trays to collect minor spillages. Leaking or empty oil / fuel drums will be removed from the site immediately and disposed of via a licensed waste disposal contractor;
- Refuelling of mobile plant will be carried out in a designated area, where spill kits will be available;
- Daily checks of hoses and valves will be carried out for signs of wear. Valves will be turned off and securely locked when not in use;
- During the construction phase the watercourse will be monitored to ensure that any building material is removed, this will be the responsibility of the onsite contractor;
- In the event of a spillage on site (e.g. diesel), the material should immediately be contained as close to the source as possible using an absorbent material such as sand / soil or commercially available booms. Sorbents will be used to soak up a spill and stop it spreading on hard surfaces. Using sorbents generates waste and this method will only be used on small spills, or where a spill has been contained to stop any further spread. All used sorbents will be disposed of at an accredited site for disposal.

3.28 To ensure the proposed development does not impact the watercourses through the risk of pollution incidents or water levels changes during operation, the surface water management strategy includes creation of SUDs.

3.29 Further enhancement measures for the watercourse are detailed in Objective 2.

Fauna

3.30 Protected species are present within the site and their habitats will be protected through the construction and operational phases with specific mitigation strategies to protect their FCS in the long term. Those species addressed include:

- Hazel dormouse;
- Badgers / mammals;
- Bats;
- Breeding birds; and
- Herpetofauna.

Hazel Dormouse

3.31 The hazel dormouse *Muscardinus avellanarius* is fully protected under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) and Schedule 2 of The Conservation of Habitats and Species Regulations 2017 making it a European Protected Species. It is an offence to:

- capture, kill, disturb or injure hazel dormice (intentionally or recklessly)
- damage or destroy a breeding or resting place (intentionally or recklessly)
- disturb a hazel dormouse while it's in a structure or place of shelter or protection (intentionally or recklessly)
- obstruct access to their resting or sheltering places (intentionally or recklessly)
- possess, sell, control or transport live or dead dormice, or parts of dormice

3.32 During surveys in 2018 a single dormouse nest with an adult dormouse inside was found late on in the survey season along the treeline bordering the stream in the eastern extent of the sports field area. The November survey found an additional dormouse nest which was unoccupied within an offsite area that connects to hedgerow H12 in the southern extent of the site. No further evidence of dormouse was recorded during surveys.

<u>Protection and Working Method Statement</u>

3.33 The majority of hedgerows on site are to be retained and incorporated into the landscaping scheme. Two sections of hedgerow H5 will be removed to facilitate access and visibility splays (refer to paragraph 3.79 for replacement hedging) at the main access point, as well as a small area of scrub c. 4.5m will be lost for vehicular access to connect the residential site to the sports area. An c. 19m section of the same treeline where dormice have been recorded will be lost to incorporate vehicular access and visibility splay.

3.34 A European Protected Species Mitigation Licence will be required from Natural England to legitimise the vegetation removal onsite. The losses proposed will affect the location where the

dormouse nest was found and so mitigation measures will be adopted to ensure the works are legally compliant, using the methods detailed below.

3.35 Persuasion techniques as stated within The Dormouse Conservation Handbook[8] and Natural England's standing advice[9] are to be used to ensure, if dormice are present, that they are displaced from areas of habitat loss. There will be two methods of vegetation clearance, depending on the timing of works; summer clearance and two-phased winter clearance.

Summer Clearance

3.36 In line with Standing Advice, for clearance of a short length of vegetation, summer vegetation clearance can be completed in summer (May to late-September), excluding July and August to minimise disturbance to dormice with dependent young. Depending upon the timing of works, this method could apply to all areas of vegetation loss.

3.37 The summer removal of vegetation will involve the removal of vegetation in small amounts on successive days during the summer when animals are active and able to respond immediately to habitat changes.

3.38 Prior to any habitat removal, permanent dormouse nest boxes should be installed along linear features, particularly where habitat loss is to take place. A box should be installed adjacent to each area of vegetation loss, including within the eastern extent of hedgerow H5 and within H4 to account for the loss in the western extent of hedgerow H5. Boxes should also be placed within the treeline adjacent to S1 and in hedgerow H12, either end of each area of hedgerow loss. This will aim to persuade dormice to use habitats to the south of the site where habitats will be retained and enhanced.

3.39 The removal of vegetation in summer should take place during optimal weather conditions, where temperatures are constant, as dormice will go into hibernation during colder periods, however timing of removal in the summer should avoid such circumstances. The process that will facilitate habitat removal is described below:

- All vegetation removal, where considered necessary by the ecologist, should be completed under the supervision of an ecologist who holds a dormouse licence;
- Vegetation clearance works should take place before autumn (October / November) (weather and temperature dependant);
- Immediately prior to any operations the entire working area and surrounding 10m should be carefully inspected by an experienced / licenced ecologist to ensure that no natural dormouse nests are present. Operations should only proceed once the ecologist has confirmed this area is free of nests;
- Once dormice have been confirmed to be absent vegetation removal should then be undertaken in a phased and controlled manner using only hand tools, with small sections removed daily from the large habitat losses;

[8] English Nature (2006) The Dormouse Conservation Handbook 2nd Edition

[9] Standing Advice: Hazel or common dormice: surveys and mitigation for development projects [online, accessed 17.05.17] www.gov.uk/guidance/hazel-or-common-dormice-surveys-and-mitigation-for-development-projects#mitigation-and-compensation-methods

- The woody vegetation removed each day should be retained in situ overnight and next to the closest adjacent dormouse habitat. This vegetation should then be disposed of appropriately the following day or utilised to create habitats elsewhere on site;
- In the event that dormice or dormice nests are identified during clearance, then works should cease in the immediate area, and further advice sought.
- During all habitat removal, the supervising ecologist should also be checking for nesting birds, if these are found within the immediate area then works will cease until young have fledged.

Two-phased winter clearance

3.40 If works are to commence over winter, a two-phased clearance will be completed. This will involve removal of the canopy during winter with subsequent removal of the roots and coppiced stools in summer. This should remove enough vegetation to persuade dormice emerging in April or May to move to more appropriate habitat nearby. The following applies to this two-stage process:

- All vegetation removal, where considered necessary by the ecologist, should be completed under the supervision of an ecologist who holds a dormouse licence;
- Immediately prior to any operations the entire working area and surrounding 10m should be carefully inspected by an experienced / licenced ecologist to ensure that no hibernating dormice are present (where possible). Operations should only proceed once the ecologist has confirmed this area is free of hibernating dormice (where possible);
- The canopy of the section of vegetation should be cut down between November and March inclusive which avoids the bird breeding season and the period where dormice might be found in nests above ground;
- Vegetation removal should be undertaken in a phased and controlled manner by hand, with small sections removed daily;
- The process of cutting the canopy material should be designed to protect dormice hibernating on the ground, using techniques such as directional felling to minimise ground impact;
- The cut stems should be left either directly adjacent to the retained roots, or on top of the roots to ensure that, should any dormice be hibernating within the roots of the area to be removed, these will have adequate means of dispersal to more suitable habitat elsewhere once they have emerged from hibernation in April or May; and
- Following careful inspection of the area by a licensed ecologist, the coppiced stools and roots, along with any ‘dead hedges’ should be dug up and removed no earlier than May the following season (timing will be decided upon by a licensed ecologist).

General Protection

3.41 To avoid disturbance of habitats that could potentially be used by dormice, the RPAs should be fenced off (see section 3.18). This should avoid damage through material storage and accidental encroachment.

3.42 All on-site workers should be made aware of the presence of dormice through ecological toolbox talks, which will detail habitats / areas to avoid disturbing, identification of the species and reporting suspected sightings.

3.43 To avoid indirect disturbance from construction lighting, nocturnal work during the summer should be avoided (May to September / October); where this is needed, directional lighting should be used that does not illuminate habitats.

3.44 To compensate for the loss of short sections of vegetation there will be significant hedgerow planting within the existing hedgerows as well as new hedgerows within the GI and behind visibility splays, which will strengthen existing habitats and provide additional linkages. Where required, these will be incorporated pre-construction, before any vegetation clearance works commence. Further details on the enhancements for dormice are provided in Objective 2.

Badger / Mammals

3.45 Badgers are protected under the Protection of Badgers Act 1992[10]. This act is based on the need to protect badgers from baiting and deliberate harm or injury and makes it an offence to:

- Wilfully kill, injure, take, possess or cruelly ill-treat a badger, or attempt to do so; and
- Intentionally or recklessly interfere with a sett. Sett interference includes disturbing badgers whilst they are occupying a sett, as well as damaging or destroying a sett or obstructing access routes.

3.46 A sett is defined as:

- "Any structure or place that displays signs indicating current use by a badger".

3.47 Whilst no evidence of badgers was found on site, due to their highly mobile nature precautionary measures are to be implemented during the construction phase to ensure that badgers and other mammals are not indirectly harmed, such as falling into excavations or becoming trapped within piping. The following precautionary measures should be implemented.

- During construction any pipes greater than 250mm in diameter will need to be capped where left overnight, thereby preventing badgers/mammals from becoming trapped;
- Any pits or trenches will similarly need to be covered overnight, or left with a suitable means of escape, e.g. wooden plank;
- During the construction phase, operations shall be restricted to daylight hours where possible, if lighting is required this should be focused on specific working areas, avoiding vegetation, thus limiting disturbance to badger and other nocturnal / crepuscular wildlife; and
- All waste materials are to be appropriately stored, in particular domestic waste from welfare units, as this may attract badgers but also other mammals such as foxes and rats.

Bats

3.48 All UK species of bat are listed on the Conservation of Habitats and Species Regulations 2017 making it illegal to deliberately disturb any such animal or damage / destroy a breeding site or roosting place of any such animal. Bats are also afforded full legal protection under Schedule 5 of the Wildlife and Countryside Act 1981 (*as amended*). Under this legislation it is illegal to recklessly or intentionally kill, injure or take a species of bat or recklessly or intentionally damage or obstruct access to or destroy any place of shelter or protection or disturb any animal whilst they are

[10] The Protection of Badgers Act 1992 (as amended). London: HMSO [Online]. Available from: http://www.legislation.gov.uk/ukpga/1992/51/contents [Accessed 03/05/2016].

occupying such a place of shelter or protection. Some bat species, including soprano pipistrelle, are Species of Principal Importance under Section 41 of the Natural Environment and Rural Communities Act 2006 (NERC).

3.49 Bat surveys in 2018 identified widespread and common species, with registration levels indicating that the assemblage was of site conservation value.

3.50 Five trees were identified on site as having low potential to support roosting bats.

Protection

3.51 The majority of the existing habitats are of little value to bats as they comprise either arable or heavily grazed fields; although hedgerows do provide navigational opportunities. As mentioned in the above sections the hedgerow networks should be retained with only small sectional losses. These will be protected from construction via RPAs, as mentioned above.

3.52 Where gaps are required in hedgerows to facilitate access through the site, these should be kept to a minimum (c. 12m width) and the use of 'hop-overs' should ensure flight lines are maintained. 'Hop-overs' entail the planting / maintenance of taller vegetation on the edges of gaps greater than 7m wide to affectively 'push' passing bats and bird over the gaps, thus avoiding vehicles and light. These should be created after the construction phase, so to not restrict access for large / tall construction vehicles.

3.53 To minimise light spill during the construction phase and to ensure the retention of dark corridors / foraging areas; any temporary or permanent lighting during the construction and operational phases should include the following[11]:

- Construction work is to be restricted to daytime hours where possible;
- The avoidance of direct lighting of existing trees, hedgerows, scrub, woodland, or proposed areas of habitat creation / landscape planting, during construction and operational phase, achieved through directional or shrouded lighting;
- Use of low pressure sodium instead of mercury or metal halide lamps for street and road lighting;
- Lighting columns to be as short as possible, although in some locations taller columns would allow reduced horizontal spill; and
- Lighting levels to be as low as guidelines permit and only used where required for public safety.

3.54 All five trees with bat roosting potential will be retained with a RPA, thus avoiding any indirect or direct disturbance. As above, lighting will be positioned away from this tree to enable possible future colonisation.

[11] As recommended by the Bat Conservation Trust Statement on the Impact and Design of Artificial Light on Bats (May 2011) and the Institution of Lighting Professionals Guidance Notes.

Breeding Birds

3.55 The Wildlife and Countryside Act 1981 (as amended) is the principal legislation affording protection to UK wild birds. Under this legislation all birds, their nests and eggs are protected by law and it is an offence, with certain exceptions, to recklessly or intentionally:

- Kill, injure or take any wild bird;
- Take, damage or destroy the nest of any wild bird while in use or being built; and
- Take or destroy the egg of any wild bird.

3.56 Additional conservation status is given to birds in the UK through their listing as Species of Principle Importance under Section 41 of the NERC Act 2006, and / or as Amber (greater than 25% decline over 25 years) or Red (greater than 50% decline over 25 years) listed species under the Birds of Conservation Concern (BoCC) traffic light system.

3.57 The overall breeding bird assemblage recorded within the application site was typical of edge-of-settlement farmland, with common and widespread generalist woodland / garden species present. The site provides suitable nesting and foraging habitat for urban, woodland edge and farmland birds in the form of hedgerows, scrub, and arable land, with the majority of species recorded in association with these features.

Protection

3.58 Where vegetation within the hedgerows is to be removed during the bird breeding season (March to August / September inclusive), it will be inspected by a suitably qualified ecologist / licenced dormice worker prior to removal, this is to ensure no offence is committed under the Wildlife and Countryside Act 1981 (as amended). If an active nest is discovered, the vegetation containing the nest will remain in situ and an appropriate buffer stipulated by the ecologist adopted until the young have fledged.

3.59 The retained vegetation will be protected with RPA Heras fencing.

Herpetofauna

3.60 All common reptile species, including grass snake, are partially protected under the Wildlife and Countryside Act 1981. In summary this legislation protects the species from intentional killing, injury or sale, offering for sale, or possessing, transporting or publishing advertisements for the purposes of sale. All common reptile species are also listed as a species of principal importance under the provisions of the NERC Act 2006.

3.61 The rough grassland present within the field margins, hedgerow bases, streams and scrub provide a mosaic of habitats suitable for reptiles and great crested newts.

3.62 Low populations of slow worm, common lizard and grass snake were recorded on site during the surveys. All three species were mainly recorded along the western boundary of the site and along hedgerow H10 in the south. Slow worms were also recorded along hedgerows H1 and H3. The suitable areas for reptiles are to largely be retained, with enhancements to be incorporated within the GI. To prevent an offence under the Wildlife & Countryside Act 1981 (as amended); where suitable habitats are to be removed, a period of supervised passive displacement will be undertaken as detailed below.

3.63 GCN are afforded full protection under the Wildlife & Countryside Act 1981 (as amended) and the Conservation of Habitats and Species Regulations 2017 (as amended). They are also a Species of Principal Importance in England under Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006[12] and are listed as a Priority Species within Kent.

3.64 During GCN surveys on four offsite ponds within 250m of the site, a medium and low class population of GCN were recorded within ponds P2 (approximately 50m south-east) and P3 (c. 52m south-east), respectively. Two terrestrial GCN were found during reptile surveys undertaken in September 2018. The first GCN was found in the north-west corner of the proposed residential boundary and the second was found in the southern extent of the site, along the field margin, close to stream S2.

Protection

3.65 No GCN breeding habitat will be lost to the development, however due to the proximity of confirmed breeding ponds (50 and 52m south-east) and the identification of GCN on site, it is likely that terrestrial habitat will be lost to proposals. To mitigate for the loss of terrestrial habitat for GCN, a Natural England licence will be required in order for the development to commence. This will be applied for through the Kent District Level Licensing scheme, which involves paying a financial contribution for the creation of new offsite compensatory habitat.

3.66 Passive displacement will be undertaken under the supervision of an ecologist which will protect both reptiles and great crested newts.

3.67 Passive displacement will involve two cuts, the first to 200mm and the second 1-2 hours later to 50mm of all vegetation where reptiles are known to be present. This technique will affectively 'push' individuals away from the construction area into the retained habitats around the peripheries. Grassland and other ground flora will be managed to encourage displacement by strimming directionally from the centre of the working areas in the direction of retained habitats or offsite habitats.

3.68 Within the construction zone, once displacement measures have been completed, the top soil/grassland will be removed to ensure the habitat remains unsuitable for future colonisation. This will be maintained as unsuitable for the duration of the works. All spoil will be removed from the immediate area. All potential hibernation sites present within the working area shall be removed carefully by hand. Any individuals found will be immediately placed in areas of retained habitat to the north and south.

3.69 The passive displacement will be undertaken during the active period for reptiles, between late March to early-October and during suitable weather conditions when the daytime temperature is above 10˚C.

3.70 The peripheries will be retained and managed for reptiles. During construction works the retained areas will be left uncut and heras fencing will be installed around the perimeter to prevent machinery or materials being moved within this area which may cause injury or death to herpetofauna.

3.71 The site manager and other relevant staff undertaking construction work will be briefed on the possible presence of slow worm, grass snake, common lizard and great crested newt in the area.

[12] The Natural Environment and Rural Communities Act 2006. [Online]. Available from: http://www.legislation.gov.uk/ukpga/2006/16/contents [Accessed 11/11/2013]

Staff will be provided with information relating to the legislation and the procedures to be implemented in the event that herpetofauna are found within the working area. This will be undertaken by nominated site personnel.

Objective 2: Habitat Enhancement, Creation and Management

3.72 The scheme has incorporated a sensitive design to ensure new habitats can be created to increase the biodiversity value of the site and provide connective corridors to existing habitats, and those within the immediate vicinity. It is proposed that the following habitats, as shown in Figure 1, should be created / enhanced:

- Hedgerows;
- Tree / Scrub / Woodland Planting;
- Grassland;
- Attenuation Ponds;
- Watercourse;
- Enhancements Beneficial to Local Fauna.

Hedgerows

Enhancement of Existing Hedgerows

3.73 New native species should be planted throughout the existing hedgerow networks that run through / around the site (see *Figure 1*). This will compensate for the small losses that occur, but also increase species structural diversity, which will benefit foraging, refuge and linkage opportunities for wildlife.

3.74 A diverse range of species will be planted that provide flowers, fruits and nuts throughout the year.

3.75 Standard trees are a beneficial feature of hedgerows, as mentioned previously these can provide 'hop-overs' and habitat linkages for bats and dormice. The number should be limited to avoid over shading but planted where gaps are created for access through existing features, if such specimens are absent.

Creation

3.76 Four hedgerows will be created within the areas of GI; two hedgerows will border the southern sports pitches, the third will form the eastern boundary of the northern sport pitches, connecting to the existing treeline and the fourth hedgerow will border the western access road.

3.77 New hedgerows will also be planted behind the visibility splays on the northern boundary (hedgerow H5) to compensate for the losses in this area and ensure connectivity is maintained in the long term.

3.78 The species planted should be native. As whips are to be used to create the new hedgerows, a temporary wooden post and rail fence should be erected to ensure that the specimens are not damaged by public whilst they mature.

3.79 Hedgerow planting should follow appropriate guidance and recommendations, such as those suggested by Wildlife Trusts[13], which are summarised below:

[13] Adapted from Suffolk Wildlife Trust. (2016). Planting a hedgerow for wildlife (online). http://www.suffolkwildlifetrust.org/Hedgerow-planting

1. The native shrub and tree standards should be planted between October and March with suitable support and weed control in place. Planting should not be undertaken in very cold or wet weather conditions, this is to minimise the risk of damage to roots before they become established;
2. Mark out two parallel lines with string, about 50cm apart along the line of the new hedgerow;
3. Clear any vegetation between the two lines (depending on the time of year / area, this may need to be supervised by an ecologist for breeding birds);
4. Use 20-30cm lengths of cane to mark out the distances between specimens, creating a zig-zag pattern;
5. Plant 60-90cm shrub whips in groups of roughly five of the same species;
6. During the first spring, the shrubs will need to be cut to approximately 45 – 60cm above ground level to encourage the shrubs to develop a bushy structure, thus creating a thick hedgerow;
7. The shrubs and trees should be annually assessed for the first five years to ensure plants remain viable. Any which die during this period must be replaced.

3.80 It is important that any new planting is protected during the early growth from grazers for approximately 3-4 years. Tree guards should be used to protect the leading shoots of trees from deer, which also speeds up the growth process. Chicken wire fencing (600mm high, with maximum 30mm mesh size[14]) fixed to a wooden post and rail fence should be used to limit grazing by rabbits/deer but also avoid disturbance by members of the public.

3.81 Weed / grassland encroachment and lack of water will need to be monitored by designated contractors, this is to ensure successful establishment; mulching material can help in such circumstances.

Management

3.82 Retained and newly planted (once established) hedgerows should be managed using standard hedgerow management practices such as flailing, trimming, coppicing, gapping-up, and grubbing-out; however where possible hedgerow laying should be used, especially on new hedgerows that can be manipulated easily. Hedgerows are dynamic habitats that change over time and have varying management requirements depending on their management history. With this in mind they will be managed according to a regular assessment of their condition and where they are on the Hedgerow Management Scale as shown in Natural England's and Hedgeline's *The Hedgerow Management Cycle*[15]. This scale has been reproduced below in *Table 1* in full.

Table 1: The Hedgerow Management Scale

1	Heavily over-trimmed with many gaps and sparse stems, their bases gnarled or rotting. May be invaded by elder, sycamore or other invasive species. **ACTION: Coppice and re-plant gaps. Grub out or poison invasive species.**
2	Over-trimmed, infrequent stems too far apart to be 'let up' for laying, perhaps evidence of laying in the past. Hard knuckle at trim line, shrubs developing mushroom shaped growth form.

[14] PTES. (2014). Hedgerows a guide to wildlife and management (online). http://ptes.org/wp-content/uploads/2014/06/Hedgerow-guide-web-version.pdf
[15] Hedgelink and Natural England (NO DATE); The Hedgerow Management Cycle. http://www.hedgelink.org.uk/cms/cms_content/files/78_hedgelink_a5_12pp_leaflet_7.pdf

	ACTION Coppice and re-plant gaps.
3	Over-trimmed, frequent stems. Stems still healthy but require more height. Hard knuckle may be starting to form at trim line. **ACTION Allow incremental height gain at each cut or 'let up' up for laying.**
4	Recently layed, coppiced, or planted hedgerow. **ACTION Trim lightly for first few years, then cut on a two or preferably three or more year rotation, allowing height to increase a little each time.**
5	Healthy, dense, hedgerow with frequent stems and more than 2m in height. **ACTION Trim on a two or preferably a three or more year rotation. Raise cutting height if hard knuckle forming at trim line.**
6	a) Hedgerow more than 3m high and trimmed on rotation. b) May also be non-intervention hedge, having intentionally been left un-trimmed for several years. **ACTION a) Enter hedge into non-intervention period. b) Re-shape with circular saw then return to rotational trimming or non-intervention period.**
7	Hedgerow with frequent healthy stems more than 4m high. **ACTION Lay or reduce height and width with circular saw blade. Would also respond well to coppicing.**
8	Mature tall hedgerow with spreading tops. Stems still healthy (although they may be infrequent) but too large (more than 18cm in diameter) for laying. **ACTION Either reduce in height and width with circular saw blade or coppice and re-plant gaps if necessary.**
9	Over-mature hedgerow with tops dying back, collapse possible. Perhaps becoming dominated by tree species such as oak, ash or sycamore. **ACTION Coppice, retaining a few selected healthy trees, and plant up gaps.**
10	Hedge developed into line of trees. **ACTION Manage as a line of trees, if necessary undertake selective thinning. If shrubs still exist beneath trees raise height of tree canopy to allow in more light.**

3.83 The ideal position on the scale for the hedgerows should be cycling between 3 and 8, but also kept at 5 or 6 on the scale for as long as possible where achieved. Hedgerows on site will require assessment prior to management to ensure the most appropriate methods are used.

3.84 Hedgerows at the optimal 5 on hedgerow scale will be cut / trimmed every two to three years to an 'A' profile to encourage growth of healthy hedgerow bases which are more beneficial to wildlife.

3.85 Trimming of all hedgerows within the same year should be avoided to ensure retention of adequate foraging habitats for dormice and birds every year. All planned hedgerow management works should take place outside the nesting bird season and when trees are in their dormant phase during the winter months (October to March). Light trimming where branches are causing obstruction to footpaths and the processing of storm damaged / fallen trees can take place as and when required throughout the year.

3.86 Hedgerows are to be fenced off from adjacent residential dwellings and therefore will be accessible to facilitate management.

Tree / Scrub / Woodland Planting

3.87 A large resource of young, semi-mature and mature trees are present throughout the hedgerows and site boundaries, providing good conditions for invertebrates, bats and birds. The majority of the trees are to be retained, however a small number are likely to be lost to facilitate access / visibility displays.

3.88 To compensate for the loss of small numbers of trees, native standard trees will be planted which, in the long term, will support a variety of invertebrates as well as potential to provide features suitable for refuge and navigational linkages.

Creation

3.89 Small clusters of native broadleaved trees will be planted throughout the grassland within the GI to create a parkland setting and promote habitat diversity. The trees within this open space should be planted with a diverse range of maturity with heavy standards 14-16cm girth and younger bare rooted 'whips' at approx. 60-120cm tall, which will provide a degree of structural diversity at an early stage. Species should include oak *Quercus robur*, field maple *Acer campestre*, hornbeam *Carpinus betulus,* silver birch *Betula pendula* and wild cherry *Prunus avium*.

3.90 Broad-leaved woodland is to be created within the GI connecting with retained hedgerows to provide a wildlife corridor and suitable habitat for species such as dormice. To maximise the value of the woodland for dormice, a large proportion of understorey species known to be beneficial for this species will be included, these include hazel, wayfaring tree, honeysuckle and yew.

3.91 The following species are recommended for use in woodland creation (and where appropriate in landscaping / garden planting schemes) as they are mostly native with many being fruit and nut bearing species which will benefit local wildlife:

- Blackthorn, *Prunus spinosa*
- Crab apple, *Malus sylvestris*
- Dog rose, *Rosa canina*
- Field maple, *Acer campestre*
- Guelder-rose, *Viburnum opulus*
- Hazel, *Corylus avellana*
- Hawthorn, *Crataegus monogyna*
- Holly, *Ilex aquifolium*
- Honeysuckle, *Lonicera periclymenum*
- Hornbeam, *Carpinus betulus*
- Pendunculate Oak, *Quercus robur*
- Rowan, *Sorbus aucuparia*
- Sweet Chestnut, *Castanea sativa*
- Silver birch, *Betula pendula*
- Wayfaring tree, *Viburnum lantana*
- Wild / bird cherry, *Prunus avium / padus*
- Yew, *Taxus baccata*

3.92 Due to the potential risk of spreading ash dieback *Chalara fraxinea*, no ash trees should be planted (Statutory Instrument No. 2707 – The Plant Health (Forestry) (Amendment) Order 2012 effectively prohibits the internal movement of plants or seeds of ash).

3.93 The native species should be planted between October and March but avoid freezing and water logged conditions, and assessed annually for the first five years to ensure plants remain alive and healthy. Any which die during this period must be replaced. Irrigation may be required during drier periods of first year.

3.94 Trees should be planted with suitable stakes and substrate to allow the specimens to establish effectively. The newly planted specimens will be protected from rabbit grazing by the use of spiral guards. Mulch or mulch mats will be used on all specimens for effective weed control as appropriate. Trees should be assessed annually for weeds for the first three years to ensure the weed control mulch and mat is effective. Further weed control may be required through repairs, hand weeding or careful spot treatment with herbicide.

3.95 Woodland trees should not be planted in rows, as even with future thinning it is very difficult to remove such regulated structure, but should be planted in clusters of mixed species with each plant approximately 2m – 4m apart. Edges should be planted with shrub species in a scalloped arrangement to maximise edge habitat

Management

3.96 Once the woodland has established (after c. 10 years) a degree of coppicing on a 10 – 15 year cycle should be undertaken. Coppicing of hazel and sweet chestnut helps reduce shading, create structural diversity and encourages new growth including dense stools which are beneficial for dormice.

3.97 Any standard trees to be felled as part of management will be assessed for their suitability as a bat roost by a licensed bat ecologist.

Grassland

3.98 To maximise the biodiversity value and species diversity of the site four types of grassland should be used. Details of each, including management are provided in *Table 2* below with areas as indicated within *Figure 1*.

3.99 The development of unwanted species or spread of scrub will be monitored with appropriate control measures taken to ensure that such species do not become too dominant. Tree saplings and scrub can be controlled either during the winter by cutting and spot treatment with herbicide, or any time of year by the pulling out saplings.

3.100 Where arisings are to be removed they should be placed in a designated composting area or raked into piles away from public access paths to benefit local wildlife.

Table 2: Grassland Creation (*see Figure 1*)

TYPE	GENERAL MANAGEMENT
Species Rich Neutral Grassland If required - Emorsgate EN1 special pollen and nectar meadow mixture The main grassland type within the GI will be managed to encourage the development of species rich grassland to provide a rich nectar source for invertebrates, in particular pollinators, whilst also being attractive for recreational use.	1. After all ground / construction works in these areas are completed, including storage or soil etc. and levelling, plough and sow the areas to be enhanced with a species-rich seed mix (similar to Emorsgate Seeds EN1) or spread species-rich hay from a local source during the autumn or spring. Protect newly seeded areas. 2. First year: cutting will be undertaken to remove annual weeds, this will be done late summer before annuals set seed and die, avoid leaving cuttings on site; 3. Entire area should be mown on a once a year basis in the either early spring OR late summer to a minimum of 150mm and 'hay' left to dry for 1-5 days before removal to allow seeds to drop.
Wet / Marshy Grassland Emorsgate EM8 meadow mixture for wetlands A grassland mix tolerant of wet / damp conditions around drainage pond and scrapes. Will add to the species diversity and habitat mosaic and provide foraging opportunities for a range of species	1. Ploughed and sown with wet grassland seed mix (similar to Emorsgate Seed mix EM8), during autumn or spring after pond creation 2. Should be mown on a rotation basis every other year in either early spring OR late summer with no more than 50% of the area cut each year to a minimum height of 150mm. During very wet years a full cut may not be necessary depending on inundation levels. 3. Arisings should be left in situ for 1-5 days, and then removed from site. 4. Spot treatment of pernicious weeds should be undertaken using glyphosate based herbicide. Care should be taken not to remove broad-leaved species intentionally sown and generally, when using herbicide adjacent to aquatic habitats.
Tussock Grassland Emorsgate EM10 tussock mixture Tussock grassland will be encouraged within the southern part of the GI and along hedgerows to provide commuting and cover opportunities for small mammals, reptiles and amphibians.	1. Ploughed and sown with tussock grassland seed mix (similar to Emorsgate Seeds EM10) during autumn or spring. 2. In the first year annual weeds to be removed via mowing and or topping. Persistent unwanted perennial weeds may require frequent topping or occasional spot treatment with a suitable herbicide 3. Once established tussock areas to be cut every 2-3 years in Autumn to a minimum height of 150mm. This will be done on a rotational basis so that no more than half of the area is cut in any one year. 4. All arisings will be left in situ for 48 hours to allow for the dispersal of invertebrates and mammals into the surrounding habitats. Arisings will then be removed to prevent enrichment of the soil through decomposition.
Amenity Grassland Emorsgate EL1 Flowering Lawn mixture (sports pitches may require a different amenity mix which is more tolerant to trampling) Disturbance tolerant grassland mix suited for public areas with added floral diversity to provide a nectar source for invertebrates.	1. Ploughed and sown with flowering lawn mixture seed mix (similar to Emorsgate Seeds EL1) during autumn or spring post construction. 2. Once established, a series of cuts will take place after germination (*see Table 4*), after which cutting can be as often as required as species mix is tolerant to frequent cutting. Leaving it longer will allow more flowering species to establish. Arising to be removed to prevent enrichment of the soil through decomposition.

Attenuation Ponds

3.101 Three attenuation ponds will be created, two in the eastern extent of the residential area and one in the eastern extent of the sports field area. These depressions should be designed to hold water permanently, with the edges experiencing occasional inundation. The edge habitats should be seeded with a wet grassland seed mix such as Emorsgate EM8 Meadow Mixture for Wetlands or similar.

Creation

3.102 The attenuation ponds should be designed to have an area that holds water permanently and include a dense reed bed system for pollutant filtration. The ponds should be sensitivity designed to include features that maximise biodiversity value, which will include shallow draw down zones, scalloped edges and central deep water. A diverse range of native marginal and aquatic vegetation should be planted to provide diversity.

3.103 The newly created attenuation ponds will be linked to surrounding habitats by successional vegetation types, leading from aquatic to marginal onto marshy / wet grassland, with new woodland planting beyond which will provide refuge, hibernation and commuting opportunities for a range of species.

Management

3.104 Whilst a reed bed is vital for water filtration it is important that frequent management is undertaken to ensure the waterbody does not silt / vegetate up, as these species have a tendency to spread vigorously. Marginal and emergent aquatic vegetation should not be allowed to engulf open water and should be managed by physical removal. As a guideline at least 50% of the water should be managed as open and free from marginal vegetation.

3.105 It will take a number of years for marginal species to start to dominate, during which period management measures will need to be sensitively implemented. Once mature, to ensure sufficient vegetation is left as refugia / nesting habitat for species such as reed buntings, no more than one third of the vegetation should be removed on a yearly rotational basis during the winter months outside the bird breeding season (March to September / October), ideally in December when reed stems have dried.

3.106 The species assemblage should be monitored and the management plan adjusted as necessary to control species which become over dominant or conversely reduce the cutting regime as required. Similarly, prompt action should be taken if any non-native invasive species are recorded in the water body such as floating pennywort *Hydrocotyle ranunculoides*, parrot's feather *Myriophyllum aquaticum* and water fern *Azolla filiculoides*.

3.107 All species removed from the water, should be left on the banks for 48 hours to allow aquatic invertebrates to return to the water.

3.108 The edge habitats around the drainage ponds should be managed to ensure that scrub and less favourable species are controlled and that encroachment and loss of mosaics is avoided. Scrub should be managed through a bi-annual rotational cut, which will limit spread and promote new growth and increased fruiting bodies.

Watercourses

3.109 Shading of the watercourses will be reduced by clearance of vegetation, and controlling horizontal growth of treelines and hedgerows, which in some areas cover the streams. Management of the hedgerows will follow that detailed in the above hedgerow section (and relevant faunal sections above – birds and dormice), which will ensure that the value of the hedgerow is maintained and that fruiting bodies are encouraged. Shrub / woodland planting along the watercourse should be set back 3-5m to reduce shading and encourage the growth of marginal / aquatic species. There should be no planting of marginal or aquatic species, as these will be left to naturally colonise; however, this will be monitored to ensure that the channel does not become clogged with organic material. If the flow of the channel is compromised then management practices will be undertaken.

Enhancements Beneficial for Local Fauna

Hazel Dormice

3.110 The habitat creation (particularly hedgerows, scrub and woodland), enhancement and management as well as installation of dormouse boxes will increase foraging and nesting opportunities for dormice as well as maintaining connectivity around the site and into the wider landscape. The tree and shrub planting around the site, should incorporate a variety of nut and fruit bearing tree and shrub species. The hedgerows, scrub and shrub areas should provide a dense structure to provide refuge, foraging and commuting habitat for dormice around the peripheries of the site. The hedgerow planting behind the visibility splays for access roads will keep these gaps to a minimum. The tussock forming grassland will provide suitable hibernation features around the peripheries of the site.

3.111 To limit the need for dormice to go to ground to pass these voids, vegetation either side of the break should be managed to increase arboreal linkages, by increasing the height of the crown; this is achieved through the managed pruning of species over a long period. Where suitable vegetation is absent, additional species will be planted and managed accordingly.

3.112 A number of dormouse nesting boxes will be installed within the existing hedgerows, particularly where evidence was found. These will be installed in proximity to flora species that can act as a foraging resource and approximately 1.5m above ground; where there are no suitable specimens capable to hold such boxes, suitable posts will be used, these will be installed as soon as possible, but not within sections where losses may occur. Boxes should be attached with the hole facing inwards to reduce occupation by birds. Wire loops can be used to attach boxes to the tree or support post.

Bats

3.113 The GI will create a mosaic of habitats, including a variety of grasslands, native tree / shrub planting and an attenuation basin which will be designed to enhance the area for invertebrate's therefore providing increased foraging resources for bats. The inclusion of attenuation ponds, designed for biodiversity, and associated marginal vegetation would provide additional foraging habitats for bats.

3.114 Dark corridors will be maintained around the peripheries of the site and within the large area of GI to the north through a sensitive lighting scheme. The GI is designed to maintain flight lines

and connectivity around the site and includes hop-overs to maintain connectivity over access roads.

3.115 To provide roosting opportunities for bats, specially designed boxes should be installed on suitable trees / buildings, indicative locations are shown in *Figure 1*.

3.116 12 bat boxes are to be installed on site, different designs are to be used to provide suitable conditions for the different species / colony types, as specified below:

- 7 x Schwegler 2F - suitable for small bat species
- 3 x Schwegler 2FN - suitable for larger bat species
- 1 x Schwegler 1FD – suitable for maternity roosts for small bat species
- 1 x Schwegler 1 FF – suitable for maternity roosts

3.117 Bat boxes should be installed on suitable mature trees, as indicated in *Figure 1*, in groups of 3 facing different directions to provide a variety of microclimates. They are to be installed c. 4 – 6m height, on corridors of vegetation, ideally sheltered from strong winds but partially exposed to the sun (generally facing south or south-west)[16].

3.118 The bat boxes should be installed in the first year of development. The presence and condition of the boxes should be checked from the ground bi-annually for ten years and suitably replaced as necessary. The bat boxes are also to be checked for the presence of bat occupation by a licenced bat worker every other year.

Birds

3.119 Features that will deliver compensation and enhancement for birds will include:

- New tree, scrub and hedgerow planting around the site and within areas of GI;
- Provision of additional species-rich, tussock and amenity grassland planting, using specific seed mixes in places provide enhanced foraging opportunities;
- Attenuation basin and associated wetland planting; and
- Bird boxes.

3.120 The inclusion of additional tree, hedgerow, scrub, grassland and woodland planting will add structural and species diversity. Mature trees will be retained providing a range of differing age structures.

3.121 Scrub edge will be managed in all greenspaces to create habitat gradients to encourage “edge effects” and micro-habitats. This will favour, among other wildlife, invertebrates and therefore feeding opportunities for birds.

3.122 With regards to the farmland birds recorded onsite, the management of 'A' structure hedgerows in close proximity to adjacent arable habitats will provide suitable nesting habitat for yellowhammer, and management of scrub thickets will provide nesting habitat for linnet.

3.123 The addition of bird boxes will increase nesting opportunities for species that find it hard to establish nests as current house designs allow for no gaps or crevices. A number of boxes will

[16] http://www.bats.org.uk/pages/bat_boxes.html#Putting up your box

be installed on buildings to increase nesting opportunities, the different designs will encourage a more diverse range of species; those to be proved include:

- 3 x 25mm hole – suitable for small passerine species such as blue tit
- 3 x 32mm hole – suitable for larger passerine species such as great tit
- 3 x 45mm hole – suitable for starlings
- 4 x open fronted – suitable for robins, blackbirds, wrens etc.
- 2 x house sparrow terraces (similar to Schwegler 1SP)

3.124 All boxes, with the exception of the house sparrow terraces, should be installed on suitable mature trees / hedges. The two sparrow terraces should be installed, as indicated in *Figure 1*, on a building in the south east of the development which has strong connective links with the GI. All of the boxes should be oriented between north and east and be at least 3m from ground level.

Herpetofauna

3.125 Under the current proposals, the site will be greatly enhanced for reptiles and great crested newts through provision of additional suitable habitat within the GI. These new habitats will continue to provide links across the site and into the wider area and will benefit all three species to ensure that the favourable conservation status of each species is maintained and enhanced.

3.126 The proposed development includes substantial areas of GI which will be delivered as green buffers around the peripheries of the site along with the creation of a large area providing a mosaic of habitats within the eastern extent of the site. The majority of existing suitable habitat, including hedgerows, scrub and grassland, will be retained, buffered and enhanced, with specific measures for herpetofauna including:

- Creation of tussock (species-rich) grassland, shrub and scattered tree habitats providing a mosaic of habitats and micro-climates for basking and foraging;
- Linear features such as hedgerow and tree/shrub planting around boundaries will provide cover for migration around the site into surrounding areas;
- Creation of several hibernacula and log piles to provide increased refuge availability;
- Creation of an attenuation basin, surrounded by GI, providing enhanced foraging opportunities through increasing the diversity and extent of invertebrate prey; and
- Long term management to ensure the site continues to provide suitable habitat for reptiles.

3.127 Grass snakes are not as sedentary and use a wide area and variety of habitats including gardens. They primarily feed on amphibians and fish so are often associated with water. The retention and enhancement of the hedgerow buffers, as well as inclusion of gardens and attenuation facilities to hold an area of permeant water will increase the available habitats for this species as well as providing future potential breeding opportunities for great crested newts.

3.128 A summary of the measures detailed within objectives 1 and 2 is provided in *Table 3* below with indications as to when they should be completed / implemented.

Table 3: Summary of Habitat Protection, Creation, Enhancement and Management Strategy

DESCRIPTION OF WORKS	PRE CONSTRUCTION	DURING CONSTRUCTION	POST CONSTRUCTION
GENERAL MEASURES			
1. Set up and maintain Heras fencing around retained hedgerows / trees	✓	✓	
2. Implement and maintain best practice construction procedures with regards to possible pollution sources / run-off and badgers	✓	✓	
3. Formulate and implement suitable construction and operational lighting scheme for nocturnal wildlife such as bats and dormice	✓	✓	✓
HEDGEROW CREATION AND MANAGEMENT			
1. Obtain permission from the Local Authority to remove 'Important' hedges	✓		
2. The new hedgerows should be planted between November and March pre construction with suitable safe guards for early growth, support and weed control in place.	✓		
3. New hedgerows should be annually assessed for the first five years and any which die must be replaced.		✓	✓
4. Access routes to be created through the hedgerows under ecological supervision and following 'persuasion' methods due to presence of dormouse on site. Other vegetation on site may also require supervision during removal. Dormouse boxes to be installed pre construction and monitored by a licensed person on a yearly basis.	✓	✓	✓
5. Retained (and once stablished, new) hedgerows to be assessed individually according to the Hedgerow Management Scale. Hedgerows should be cycling between 3 and 8, but kept at 5 on the scale for as long as possible.		✓	✓
6. Suitable native woody species should be used for gapping-up or replanting hedgerows to an average diversity of woody species of five species or more per 100m.		✓	✓
7. Retained (and once stablished, new) hedgerows to be managed using standard hedgerow management practices such as trimming, coppicing, gapping-up, grubbing-out, re-planting and laying according to grade on the habitat scale including provision of 'hop overs for bats' on access routes post construction		✓	✓
8. Hedgerows to be rotationally managed in the winter (October to March) every 1 to 3 years avoiding cutting all hedgerows within the same year aiming for a '5' on the hedgerow scale and an 'A' profile to encourage growth of healthy hedgerow bases. Includes provision of 'hop overs for bats' on access routes post construction.		✓	✓
NATIVE TREE / SCRUB / WOODLAND PLANTING			

DESCRIPTION OF WORKS	PRE CONSTRUCTION	DURING CONSTRUCTION	POST CONSTRUCTION
1. The native tree / scrub standards within the GI should be planted between October and March during or post construction, with suitable support and weed control in place.		✓	✓
2. New trees / scrub should be annually assessed for the first five years and any which die during this period replaced.		✓	✓
3. Trees to be assessed annually for weeds for the first three years to ensure the weed control is effective. Further weed control may be required through repairs, hand weeding or careful spot treatment with herbicide.		✓	✓
WATERBODY ENHANCEMENTS AND CREATION			
1. Creation of attenuation ponds	✓	✓	
2. Removal of scrub along watercourse (under ecological supervision where necessary)		✓	✓
3. Monitor reed bed and implement rotation management through physical removal as necessary once established.			✓
4. Monitoring and removal of encroaching scrub along watercourse and around drainage pond			✓
GRASSLAND			
1. Sow areas with appropriate seed mix (as indicated *in Figure 1*) during autumn or spring either pre or post construction.	✓	✓	✓
2. Establish suitable mowing regime, height and frequency of mowing will depend on type of grassland - full details in *Table 2.*		✓	✓
3. Monitor and remove saplings and scrub. Spot treatment of unwanted perennial weeds with glyphosate.		✓	✓
OTHER ENHANCEMENTS			
1. Installation of 15 bird boxes	✓		
2. Installation of 12 bat boxes	✓		
3. Bi annual monitoring presence and condition of bat boxes by licenced bat worker.		✓	✓
4. Boxes should be replaced if lost or in poor condition within the first 10 years.		✓	✓
REVIEW OF WORK PROGRAM			
1. Site walkover by management team to assess if the management objectives are being achieved for each habitat	✓	✓	✓
2. Create further five year work program			✓

Objective 3: Balancing Recreational use with Wildlife Interests

3.129 It is the intention for the GI to be accessible through informal routes of mown pathways through areas of neutral species rich and tussock grassland, which will link up with existing PRoW (see *Figure 1* for indicative routes). The use of designated mown pathways means recreational use can be directed away from more sensitive habitats such as wetland areas, but there is also an interaction with wildlife through natural surfaces.

3.130 A children's play area is to be included within the residential area of the development away from the GI, this means that play will not extend into sensitive areas. The GI will provide opportunities for off lead exercise areas for dogs which will be enclosed through fencing and eventually hedgerows. The circular routes and areas of open grassland will provide opportunities for family play and enjoyment of wildflower assemblages.

3.131 Potential nutrient enrichment from dog's waste within site will be avoided via the strategic placement of dog waste bins along the routes. Litter bins will also be installed on the approach and exit from the GI, and also around the play areas; this will limit the potential for material to damage the more sensitive areas of site. Litter should be promptly removed from the site on a regular basis, as part of the general management and maintenance visits.

3.132 Interpretation boards will be installed within the GI by the side of the footpath, highlighting the importance of the retained habitats, and explaining how to protect it e.g. take away litter, not picking flowers, keeping dogs under control.

4.0 MONITORING

4.1 In order to ensure that the habitats created within the site reach and maintain their maximum biodiversity gains in the long term, all habitats should be monitored on a regular basis.

4.2 The results of monitoring should be used to inform possible revisions of the Ecological Management Plan, particularly after the initial construction phase and again after c. 5 years to allow habitats to establish. A further five-year work programme would then be implemented. The prescriptions provided here should not be set in stone and can be altered if required under agreement with a suitably qualified and experienced ecologist. Flexibility is essential and the management regime should be altered in order to respond promptly to changing circumstances.

Table 4: Five Year Management and Monitoring Program

Description of Works	Years with Priority				
	1	2	3	4	5
EXISTING HEDGEROWS / NEW HEDGEROW & TREE PLANTING					
1. Gapping up of existing hedgerows and new tree planting. Plant native hedgerow species between October and March with rabbit protection. Trees to be planted either side of habitat gaps.	✓				
2. Management of hedgerows on a rotational basis (2-3 years) to provide a continuous supply of fruiting bodies during the winter months. First year new specimens to be cut to approx. 45-60cm.	✓	✓	✓		✓
3. Remove all stems and limbs which are unsafe or are in danger of falling or breaking during gales. Prune back any diseased or rotten wood.	✓	✓	✓	✓	✓
4. Following planting, water trees in periods of extreme drought (2 or more weeks without substantial rainfall) and remove competing species such as grass/scrub.	✓				
5. Top up mulch levels around new specimens where necessary.	✓				
6. Examine specimens to ensure stake supports and ties are effective and required. If the specimens are yet to establish, replace or adjust ties, spacers and stem tubes as appropriate. If the specimens have established well, then remove all stakes, ties, spacers, tubes etc. and make good surfaces disturbed, filling any holes with suitable topsoil.	✓	✓	✓	✓	✓
7. Replace failed specimens on a like-for-like basis.	✓	✓	✓	✓	✓
8. Allow grassland along the hedgerow base to grow to provide a graduated sward height and habitat.	✓	✓	✓	✓	✓
AMENITY GRASSLAND					
1. Plough or rotovate and rake (or harrow) the soil to produce a medium fine, firm tilth. Sow areas as per the manufacturer's instructions. Protect newly seeded areas.	✓				
2. Mow to a height of 50mm two weeks after germination, to 35mm four weeks after germination, and to 30mm six weeks after germination. Subsequently cut to a height of 25mm at 10-14 day intervals throughout the growing season or whenever the grass reaches a height of 60mm. Remove arising's.	✓				
3. Cut to a height of 25mm at 10-14 day intervals throughout the growing season or whenever the grass reaches a height of 60mm. During periods of prolonged wet weather or drought adjust cutting rate accordingly. Collect and remove all litter, stones or other debris prior to grass cutting operations. Remove arising's.		✓	✓	✓	✓
4. Following planting, water amenity grassland in periods of extreme drought (2 or more weeks without substantial rainfall).	✓				
5. Selective weed killer and moss retardant in May and September.	✓	✓	✓	✓	✓
6. Replace failing areas of grassland.		✓	✓	✓	✓
7. Remove all litter and debris at each visit, leaving the site clean and tidy.		✓	✓	✓	✓
SPECIES RICH NEUTRAL GRASSLAND					

1. During autumn or spring, mow the areas to be enhanced as close as possible then scarify/harrow and either sow areas with a species-rich seed mix or spread species-rich hay from a local source. Protect newly seeded areas.	✓				
2. Mow from August onwards after most plants have flowered and set-seed; this date may change depending on weather conditions. Mow again in late October and February.		✓	✓	✓	✓
4. All arising's will be left to dry for 1-5 days to allow seeds to drop (if cut late summer). Arisings should then be removed from site.		✓	✓	✓	✓
5. Monitor for coarse / rank communities, if these occur harrow or scarification in late autumn with additional seed mixes added		✓	✓	✓	✓
6. Monitor scrub, leave areas to develop but controlled via cutting or treatment of glyphosate.			✓	✓	✓
WET / MARSHY GRASSLAND					
1. Plough or rotovate and rake (or harrow) the soil to produce a medium fine tilth. Sow areas with native wet grassland seed mix during autumn / spring or as per the manufacturer's instructions. Protect newly seeded areas.	✓				
2. Mow on a rotational basis every other year in early spring or late summer, with no more than a 50% cut per year to 150mm. Cutting frequency will be dependent on development of the habitat, to be assessed by an ecologist.		✓	✓	✓	✓
3. All arising's will be left to dry for 1-5 days to allow seeds to drop (if cut late summer) and invertebrates to move away. Arisings should then be removed from site.		✓	✓	✓	✓
4. Monitor scrub, leave areas to develop but control via cutting or treatment of glyphosate.			✓	✓	✓
TUSSOCKY GRASSLAND					
1. Mow the areas to be repaired as close as possible, then scarify/harrow and sow areas with tussock seed mix in autumn or spring, or as per the manufacturer's instructions. Protect newly seeded areas.	✓				
2. First year annual weeds removed via mowing and/or topping. If weeds are more persistent then treat with herbicide via a spot treatment. Collect and remove all litter, stones or other debris prior to grass cutting operations. Do not mow the grassland at the bases of hedgerows / woodland / shrub planting.	✓				
3. Once developed, areas to be cut to approximately 150mm on a rotational basis on a 2-3 year regime, with no more than half the area cut in a year. Cutting to be undertaken in autumn.			✓		✓
4. All arisings will be left in situ for 48 hours to allow for the dispersal of invertebrates. Arisings will then be removed to prevent enrichment of the soil through decomposition.			✓		✓
5. Monitor scrub, leave areas to develop but controlled via cutting or treatment of glyphosate.		✓	✓	✓	✓
SCRUB					
1. Planting of woody species between October and March, avoiding periods of inundation or prolonged ground frost.	✓				
2. Selective 'spot' spraying or strimming of weeds.		✓	✓	✓	✓
3. Like for like replacement of failed specimens.		✓	✓	✓	✓
4. Regular monitoring for pests and diseases will also be needed on an on-going basis and any necessary control measures undertaken as soon as possible.		✓	✓	✓	✓
5. Rotational coppice regime.		✓	✓	✓	✓
ATTENUATION PONDS					
1. Following creation of the basin and stabilisation of the substrates/ water levels planting of marginal species to be undertaken in the growing season. Protect newly planted/ seeded areas.	✓				
2. Marginal and emergent habitats will be monitored on an annual basis to ensure that these do not engulf the newly created attenuation basin.	✓	✓	✓	✓	✓
3. Removal of up to 1/3 of marginal/aquatic vegetation annually during autumn on a rotational basis to maintain 50% open water (If required).					✓

4. Replace failed specimens on a like-for-like basis.		✓	✓	✓	✓
5. Monitor presence and dominance of blanket weeds (*Cladophora* sp. *Rhizoclonium* sp., *Enteromorpha* sp. & *Spirogyra* sp.) and duckweed *Spirodela polyrhiza* & *Lemna* sp. Physical removal where required or advice on management.	✓	✓	✓	✓	✓
6. All arising's from emergent and marginal vegetation will be left next to the open water for at least 48 hours in order to allow invertebrates to return to the water. Depending on the volume of material removed, this can be left to decompose naturally, providing microhabitat for invertebrate species or removed to a designated composting area.					✓
7. Spot treatment of pernicious weeds with chemical appropriate for use near water.		✓	✓	✓	✓
WATERCOURSE					
1. Manage encroachment of overhanging vegetation from hedgerow.			✓		✓
2. Monitor presence and dominance of blanket weeds (*Cladophora* sp. *Rhizoclonium* sp., *Enteromorpha* sp. & *Spirogyra* sp.) and duckweed *Spirodela polyrhiza* & *Lemna* sp. Physical removal where required or advice on management.		✓	✓	✓	✓
LOG PILES					
1. Supplement the wood when maintenance is undertaken throughout the development.		✓	✓	✓	✓
LITTER CLEARANCE					
1. Litter picks and general litter clearance should be carried out on a regular basis. Litter picks should be undertaken prior to grass cutting operations.	✓	✓	✓	✓	✓
BAT, DORMICE AND BIRD BOXES					
1. Monitor the use and condition of mitigation boxes. Where boxes need to be replaced this will be done, and all debris removed if target species are not present. Dormouse and bat boxes can only be checked by suitably experienced and licensed persons.			✓		✓

Key

- Amenity Public Greenspace
- Species Rich Neutral Grassland
- Tussock Grassland
- Attenuation Pond
- Wet / Marshy Grassland
- Woodland / Scrub
- Hedgerow - Retained
- Hedgerow - New Planting
- Hedgerow - Removal

Indicative Locations of Ecological Enhancements

- Dormouse Boxes
- Bat Boxes
- Bird Boxes
- Reptile Hibernacula

Dean Lewis Estates Ltd.

Old Ashford Road,
Lenham

MITIGATION MANAGEMENT PLAN

scale 1:2200 | drawn LV | issue 10/1/2020

drawing / figure number **Figure 1** | rev **7968-E-01**

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