



# Ecological Mitigation, Enhancement and Management Plan

212 Swakeleys Road, Uxbridge, UB10 8AY

Vigilant Security Services UK Ltd

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## Industry Guidelines and Standards

This report has been written with due consideration to:

- Chartered Institute of Ecology and Environmental Management (2017). Guidelines for Preliminary Ecological Appraisal. 2nd edition. Chartered Institute of Ecology and Environmental Management, Winchester.
- Chartered Institute of Ecology and Environmental Management (2018). Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine. Version 1.1. Chartered Institute of Ecology and Environmental Management, Winchester.
- Chartered Institute of Ecology and Environmental Management (2017). Guidelines on Ecological Report Writing. Chartered Institute of Ecology and Environmental Management, Winchester.
- Chartered Institute of Ecology and Environmental Management (2020). Guidelines for Accessing, Using and Sharing Biodiversity Data in the UK. 2nd Edition. Chartered Institute of Ecology and Environmental Management, Winchester.
- British Standard 42020 (2013). Biodiversity – Code of Practice for Planning and Development.
- British Standard 8683:2021 (2021). Process for Designing and Implementing Biodiversity Net Gain.

## Proportionality

The work involved in preparing and implementing all ecological surveys, impact assessments and measures for avoidance, mitigation, compensation and enhancement should be proportionate to the predicted degree of risk to biodiversity and to the nature and scale of the proposed development. Consequently, the decision-maker should only request supporting information and conservation measures that are relevant, necessary and material to the application in question. Similarly, the decision-maker and their consultees should ensure that any comments and advice made over an application are also proportionate.

The desk studies and field surveys undertaken to provide a Preliminary Ecological Appraisal (PEA) might in some cases be all that is necessary.

(BS 42020, 2013)

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## 1.0 Introduction

Arbtech Consulting Limited was instructed by Vigilant Security Services UK Ltd to produce an Ecological Mitigation, Enhancement and Management Plan for 212 Swakeleys Road, Uxbridge, UB10 8AY (hereafter referred to as "the site").

The plan was required to inform a planning application for the demolition all existing buildings (B1-B3) on site and create one new building single family house (hereafter referred to as "the proposed development").

A plan showing the proposed development is provided in Appendix 1.

The aim of this plan is to outline mitigation measures required to minimise impacts on biodiversity as well as to outline habitat creation and enhancement opportunities and long-term management which will ensure that a net gain in biodiversity is achieved and maintained on the site, in accordance with the National Planning Policy Framework (NPPF).

This plan has been informed by a Preliminary Ecological Appraisal and Roost Assessment which was completed by Arbtech Consulting Ltd in July 2023.

## 2.0 Site Context and Survey Information

### 2.1 Site Location and Landscape Context

The site is located at National Grid Reference TQ 06617 86180 and has an area of approximately 0.33ha comprising vegetated garden, scattered trees, hard standing, three buildings - the main dwelling (B1), guest building (B2) and an outbuilding (B3). It is surrounded by residential dwellings within Ickenham to the east and south, woodland to the west and arable fields to the north. A site location plan is provided in Appendix 2.

### 2.2 Ecological Information

Table 1 summarises the survey findings for the site and outlines any potential impacts as a result of the proposed development along with recommendations and biodiversity enhancement opportunities, as detailed in Preliminary Ecological Appraisal and Roost Assessment (Arbtech Consulting Ltd, July 2023).

*Table 1: Summary of baseline survey information, potential impacts, recommendations and biodiversity enhancement opportunities for the site (Preliminary Ecological Appraisal and Roost Assessment, Arbtech Consulting Ltd, July 2023.)*

Feature	Survey Results Summary	Impact Assessment	Recommendations	Biodiversity Opportunities <sup>1</sup>	Enhancement
Habitats and flora	<p>There are no notable habitats within the site but six habitats are present within 2km of the site, the closest being deciduous woodland located 340m west from the site.</p> <p>The habitats within the site are common and widespread and have low ecological value.</p>	<p>No impacts to any notable habitats are anticipated due to the small scale and distance of the proposed development from such habitats as well as the urban location of the site with surrounding physical barriers.</p> <p>The proposed development will result in the loss of a small area of vegetated garden. However, this will be compensated by the addition of new trees, a pond, a wildflower meadow and 0.022ha of new grassland.</p>	<p>Best practice measures to minimise the possibility of pollution must be implemented during construction.</p> <p>Retained trees should be protected in line with the measures outlined in the British Standard "Trees in Relation to Design, Demolition and Construction to Construction - Recommendations" (BS 5837) (2012).</p>	<p>The following habitat creation and enhancement opportunities could be incorporated into the proposed development:</p> <ul style="list-style-type: none"> <li>Native tree, hedgerow and shrub planting.</li> <li>Planting of a wildflower meadow.</li> <li>Creation of a wildlife pond.</li> </ul>	

<sup>1</sup> The Local Planning Authority has a duty to ask for enhancements under the NPPF (2021).

Reptiles	The habitats recorded on site are suboptimal as the site is predominately hard standing and vegetated garden, which may provide foraging opportunities but is very open and exposed which increases the risk of predation. The scattered scrub on site has encroached over hardstanding; this is suboptimal for reptiles due to an absence of a subterranean structure limiting refuge opportunities.	Vegetated garden and scrub over hard standing will be removed during construction. The loss of such habitats is likely to be inconsequential to local reptile populations owing to their low value and the presence of more extensive habitat locally. However, site clearance could result in the death or injury of reptiles, if present.	Owing to the nature of the proposed development and the low potential for impacts to reptiles, further surveys are considered to be disproportionate. A precautionary working method will be implemented during construction.	The following habitat creation and enhancement opportunities could be incorporated into the proposed development which would be beneficial for reptiles: <ul style="list-style-type: none"> <li>• Creation of reptile refugia and hibernacula using debris and brash from site clearance.</li> <li>• Planting of native scrub and grassland to increase foraging opportunities.</li> <li>• The creation of basking areas such as rock piles or areas of cleared ground with shelter nearby.</li> <li>• The creation of a wildlife pond.</li> </ul>
Roosting bats (B1-B3)	B1, B2 and B3 have negligible value for roosting bats due to a lack of potential roost features.	Bats are very unlikely to be roosting within these buildings and as such, there are not anticipated to be any impacts on roosting bats as a result of the demolition of this building.	In the unlikely event that a bat or evidence of bats is discovered during the development all work must stop and a bat licensed ecologist contacted for further advice.	The installation of two bat boxes at the site will provide additional roosting habitat for bats.  The bat boxes will be installed on scattered trees onsite.  Bat boxes should be positioned 3-5m above ground level facing in a south or south-westerly direction with a clear flight path

				<p>to and from the entrance, away from artificial light.</p> <p>The bat boxes will be a specification suitable for crevice dwelling bats such as Vivara Pro Woodstone Bat Box or a similar alternative brand.</p>
Foraging and commuting bats	Scattered could be used by local bat populations for foraging and commuting. These could also be used by bats dispersing from nearby roosts outside of the site.	<p>The proposed development will result in the loss of two trees but given the presence of more extensive areas of foraging and commuting habitat in the locality, this is likely to be inconsequential for bats.</p> <p>The proposed development will include the use of lighting which could spill on to bat roosting, foraging or commuting habitat and deter bats from using these areas.</p>	<p>A low impact lighting strategy will be adopted for the site during and post-development.</p>	<p>The following habitat creation and enhancement opportunities could be incorporated into the proposed development which would be beneficial for foraging bats:</p> <ul style="list-style-type: none"> <li>• The creation of a wildlife pond.</li> <li>• Planting of native tree, shrub and hedgerows to increase foraging opportunities.</li> </ul>
Badger	Although no evidence indicating the presence of badgers was recorded during the site survey, the site does have connectivity to the wider landscape for badgers. As such, the future presence of badgers foraging and commuting	The proposed development is predominantly located over the existing building and hardstanding curtilage of limited ecological value. However, approximately 0.014ha of vegetated garden will require removal to facilitate the development. Given the limited vegetation removal required to facilitate the development in addition to the	<p>A precautionary working method will be implemented during construction.</p>	None.

	for transient periods cannot be discounted.	presence of suitable habitat in the wider landscape, proposed habitat removal is likely to be inconsequential for the local badger population. However, construction activities could result in the death or injury of badgers if present.		
Hedgehog	<p>Habitats recorded on site are assessed to provide foraging, commuting, and refuge opportunities for hedgehogs in the form of scattered scrub, albeit limited. However, no evidence indicating the presence of hedgehogs was recorded on site.</p> <p>Although no evidence indicating the presence of hedgehogs was recorded during the site survey, the site does have connectivity for the wider landscape for hedgehogs. As such, the future presence of hedgehogs foraging and commuting for transient</p>	<p>The proposed development is predominantly located over the existing building and hardstanding curtilage of limited ecological value. However, approximately 0.014ha of vegetated garden will require removal to facilitate the development. Given the limited vegetation removal required to facilitate the development in addition to the presence of suitable habitat in the wider landscape, proposed habitat removal is likely to be inconsequential for the local hedgehog population. However, construction activities could result in the death or injury of hedgehogs if present.</p>	<p>A precautionary working method will be implemented during construction.</p>	<p>The following habitat creation and enhancement opportunities could be incorporated into the proposed development to provide additional opportunities for hedgehogs on site:</p> <ul style="list-style-type: none"> <li>• Native tree, hedgerow and shrub planting.</li> <li>• Creation of wildflower grassland.</li> <li>• Creation of a new pond.</li> </ul>

	periods cannot be discounted.			
Birds	No evidence of nesting birds was observed internally or externally on any of the survey buildings. A bird's nest was observed within the pear tree on the western boundary. However, this tree will not be removed as part of the proposed plans.	<p>Two trees will be removed during construction. The loss of such habitats is likely to be inconsequential to local bird populations owing to their low value and the presence of more extensive habitat locally.</p> <p>However, the proposed development could result in the destruction or the disturbance and subsequent abandonment of active bird nests.</p>	<p>Works (tree removal) should be undertaken outside the period 1st March to 31st August. If this timeframe cannot be avoided, a close inspection of the tree should be undertaken immediately, by qualified ecologist, prior to the commencement of work. All active nests will need to be retained until the young have fledged.</p>	<p>The installation of two bird boxes at the site will provide additional nesting habitat for birds.</p> <p>The bird boxes will be installed on scattered trees onsite.</p> <p>General purpose bird boxes should be positioned 3m above ground level where they will be sheltered from prevailing wind, rain and strong sunlight.</p> <p>Species-specific bird boxes should be installed in line with manufacturers specifications.</p>

### 3.0 Ecological Mitigation, Enhancement and Enhancement Measures

#### 3.1 Informative

The following tables detail the proposed mitigation, habitat creation and biodiversity enhancement measures for the development as well as management requirements to ensure the longevity of these measures.

#### 3.2 Persons Responsible and Lines of Communication

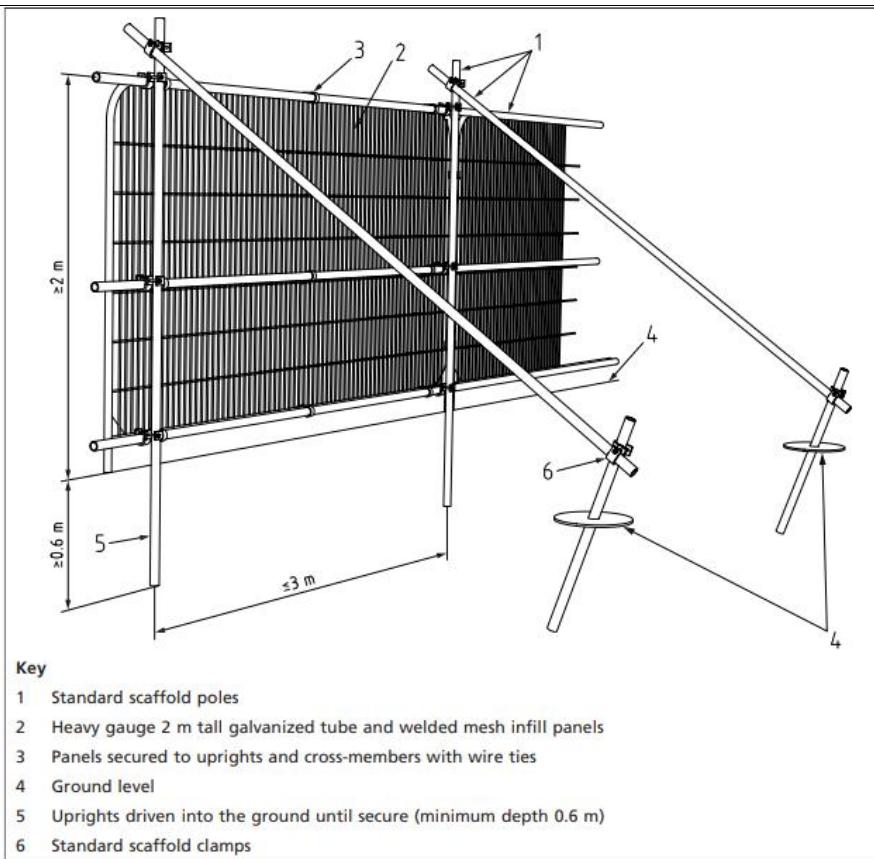
It is recommended that a Development Biodiversity Champion is selected for the construction phase of the development. The Biodiversity Champion should be someone with significant influence during construction, such as the contract or project manager. The Development Biodiversity Champion is responsible for ensuring all actions outlined in this EMEMP are implemented including the provision of a toolbox talk prior to works commencing. Any queries with regards to the mitigation prescriptions should be addressed to the project ecologist and communication should be retained between the Development Biodiversity Champion and project ecologist or a suitably qualified Ecological Clerk of Works (ECoW) throughout the construction phase of the development where necessary to ensure the mitigation is applied and impacts to adjacent ecological receptors are effectively minimised. The project ecologist's contact details are located on the title page of this report. It is recommended that the Biodiversity Champion informs the project ecologist or ECoW of the commencement of construction works and provides updates where necessary.

#### 3.3 Mitigation Measures

Table 2 details the ecological mitigation measures to be implemented at the site.

*Table 2: Mitigation Measures*

Works	Specification
<b>Tree Protection</b>	A minimum 5m buffer from retained trees will be established and protected throughout the duration of construction activity. No trenches or ground works will be completed within 5m of any trees on site. Trees will be appropriately protected in accordance with BS 5837:2012 - "Trees in relation to design, demolition and construction – Recommendations". As such, it is recommended that the trees are separated from construction works by protective fencing throughout the duration of the construction phase of the development. A fencing specification is included within <b>Figure 1</b> below.



**Figure 1:** Default protective barrier specification (British Standards Institute 2012).

<b>Pollution Prevention</b>	<p>To limit impacts of pollution resulting from the construction phase of the development, construction works must be completed in accordance with current statutory guidelines relating to pollution prevention (Environmental Agency 2016). Furthermore, although withdrawn in 2015, pollution prevention guidelines detailed within guidance document: <i>PPG6: Working at Construction and Demolition Sites</i> (Environment Agency 2010) remain applicable to the site. Considering both the relevant statutory requirements and best practice measures detailed within guidance document PPG6, the below mitigation prescriptions are considered suitable to mitigate impacts of pollution during the construction phase of the development. The allocated Biodiversity Champion will be responsible for ensuring the below mitigation recommendations are undertaken successfully during the works.</p> <p><b>Site drainage:</b></p>
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	<p>It is recommended that the Biodiversity Champion ensures that:</p> <ul style="list-style-type: none"><li>• Pollution risks are identified pre-construction.</li><li>• Pollutants are prevented from entering drains where possible.</li><li>• If any pollutant enters a drain, immediately stop the pollution with a physical block, stop the activity causing the pollution, then notify the Environment Agency for surface water drains or the local sewerage provider for foul water drains. If there's a spill, accident, or emergency, try and prevent pollutants entering the drains.</li><li>• Report all pollution incidents to site management and the Environment Agency.</li><li>• Inspect drains and protection measures frequently and maintain them during the construction activity. Well maintained drains will also reduce risks of flooding and subsequent surface water run-off.</li><li>• As a last resort, should any pollutants be required to enter the drainage system on site, permission from Environment Agency or the local sewerage provider must be sought before discharging anything other than clean uncontaminated surface water to a drain and other surface waters or groundwater. Apply for permission early, as authorisation can take up to four months.</li></ul>
	<p><b><i>Airborne particle suppression:</i></b></p> <p>It is recommended that the Biodiversity Champion ensures that:</p> <ul style="list-style-type: none"><li>• Effective water suppression is used during demolition operations. Handheld sprays are more effective than hoses attached to equipment as the water can be directed to where it is needed. In addition, high volume water suppression systems, manually controlled, can produce fine water droplets that effectively bring the dust particles to the ground.</li><li>• Avoid explosive blasting, using appropriate manual or mechanical alternatives.</li><li>• Bag and remove any biological debris or damp down such material before demolition.</li><li>• Carry out regular site inspections to monitor compliance.</li><li>• Ensure all vehicles switch off engines when stationary.</li><li>• Avoid the use of petrol- or diesel-powered generators and use mains electricity or battery power where possible.</li><li>• Only use cutting, grinding, or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction.</li><li>• Ensure an adequate water supply on the site for effective dust/ particulate matter suppression/ mitigation, using non-potable water where possible and appropriate.</li><li>• Use enclosed shuts and conveyors and covered skips.</li></ul>

***Materials storage and water run-off:***

It is recommended that the Biodiversity Champion ensures that:

- No stockpiles are created on exposed ground areas and ensure that all materials and chemicals are stored securely and safely on site in accordance with current Control of Substances Hazardous to Health (COSHH) regulations (HSE 2002).
- Contaminated materials, chemicals, and other hazardous substances must be stored on an impermeable surface, in a bunded area, within any area of the site.
- All chemicals and hazardous substances are stored away from areas where there is heightened risk of damage from impact or collision such as site traffic.
- All chemicals and hazardous substances are labelled, containers are sealed when not in use and inspected regularly and fit for purpose.
- Any damaged or old containers are replaced in line with the duty of care requirements. Note such containers may be considered hazardous waste.
- Staff are trained in use of spill kits and emergency procedures.
- Ensure there is a designated 'responsible person' on site at all times.
- Lock storage facilities when not in use.

***Implementation of the Waste Hierarchy:***

The Biodiversity Champion must ensure that all construction activity is completed in accordance with the Waste Hierarchy (Defra 2011) in an attempt to reduce the amount of waste produced during the construction phase of the development. As such, the construction phase must be completed in accordance with the below core principles:

*In the first instance:*

- Re-use products and materials where possible.
- Recycle and compost material resources where possible.
- Attempt to recover energy from waste.

*Where none of the above options offer an appropriate solution, waste disposal is the final option:*

- Only transfer controlled waste to an "authorised person" (Waste Collection Authority, the holder of an Environmental Permit, Registered Water Carrier or Waste Disposal Authority).

	<ul style="list-style-type: none"><li>• Ensure that non-hazardous waste is transferred under a Waste Transfer Note which must be retained for two years.</li><li>• Hazardous waste is moved under a waste consignment note that provides a clear description of the waste material. The consignment note must be retained for three years.</li><li>• The waste is the responsibility of the company until it has been fully recovered or finally disposed of.</li></ul> <p><b>Noise:</b></p> <p>The Biodiversity Champion must ensure that noise levels are kept to a minimum in accordance with best practice as defined in the Control of Pollution Act 1974 to avoid unacceptable levels of noise and vibrations. Further guidance can be found in British Standard 5228-1:2009. Such measures applicable to the proposed development primarily include agreed working hours limiting night work, using the quietest equipment and plant available, shutting down equipment when not in use, and completing deliveries during working hours only. Most notably, prescriptions as to limit noise of plant machinery as detailed within <b>Table B.1</b> within the code of practice for noise control (British Standards Institution, 2014) is likely to have the most significant impact during construction activity. Table B.1 is shown below.</p>
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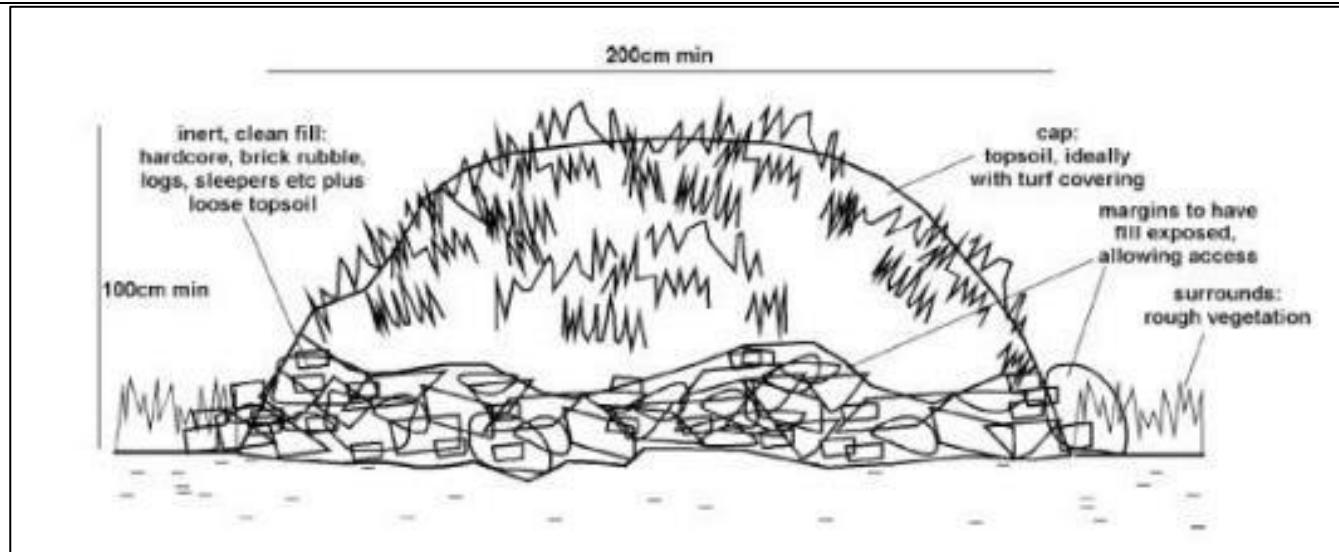
Table B.1 Methods of reducing noise levels from construction plant

Plant	Noise reduction of plant			Alternative plant
	Source of noise	Possible remedies (to be discussed with machine manufacturers)	A-weighted sound reduction dB	
Hammer drive piling equipment	Pneumatic/diesel hammer or steam winch vibrator driver	Enclose hammer head and top of pile in acoustic screen	5 to 10	Bored piling Vibratory system Drop hammer completely enclosed in box with opening at top for crane access Steel jacket completely enclosing drop hammer with dolly and polystyrene chips fed to impact surface to dissipate energy Pressed-in piling which generates its driving force from the frictional restraint of other piles
	Sheet pile	Acoustically dampen sheet steel piles to reduce levels of resonant vibration		
	Impact on pile	Use resilient pad (dolly) between pile and hammer head. Packing needs to be kept in good condition		
	Cranes cables, pile guides and attachments	Careful alignment of pile and rig		
	Power units or base machine	Fix more efficient sound reduction equipment or exhaust. Acoustically dampen panels and covers. When intended by the manufacturer, engine panels need to be kept closed. Use acoustic screens when possible		
Earth-moving plant: • bulldozer • compactor • crane • dump truck • dumper • excavator • grader • loader • scraper	Engine	Fit more efficient exhaust sound reduction equipment  Manufacturers' enclosure panels need to be kept closed	5 to 10	Alternative super silenced plant might be available. Consult manufacturers for details

Table B.1 Methods of reducing noise levels from construction plant (continued)				
Plant	Noise reduction of plant			Alternative plant
	Source of noise	Possible remedies (to be discussed with machine manufacturers)	A-weighted sound reduction dB	
Compressors and generators	Engine	Fit more efficient sound reduction equipment	Up to 10	Super silenced plant is available. Consult manufacturers for details Electric-powered compressors are available as opposed to diesel or petrol Sound-reduced compressor or generator can be used to supply several pieces of plant. Use centralized generator system
	Compressor or generator body shell	Acoustically dampen metal casing Manufacturers' enclosure panels need to be kept closed		
	Total machine	Erect acoustic screen between compressor or generator and noise-sensitive area. When possible, line of sight between top of machine and reception point needs to be obscured	Up to 10	
		Enclose compressor or generator in ventilated acoustic enclosure	Up to 20	
Pneumatic concrete breaker, rock drills and tools	Tool	Fit suitably designed muffler or sound reduction equipment to reduce noise without impairing machine efficiency	Up to 15	Hydraulic and electric tools are available For large areas of concrete, machine designed to break concrete in bending can be used Thermic lance
		Ensure all leaks in air line are sealed		
	Bit	Use damped bit to eliminate ringing		
	Total machine	Erect acoustic screen between compressor or generator and noise-sensitive area. When possible, line of sight between top of machine and reception point needs to be obscured	Up to 10	
		Enclose breaker or rock drill in portable or fixed acoustic enclosure with suitable ventilation	Up to 20	
Rotary drills, diamond drilling and boring	Drive motor and bit	Use machine inside acoustic shed with adequate ventilation	Up to 15	Thermic lance

Table B.1 Methods of reducing noise levels from construction plant				
Plant	Noise reduction of plant			Alternative plant
	Source of noise	Possible remedies (to be discussed with machine manufacturers)	A-weighted sound reduction dB	
Hammer drive piling equipment	Pneumatic/diesel hammer or steam winch vibrator driver	Enclose hammer head and top of pile in acoustic screen	5 to 10	Bored piling Vibratory system Drop hammer completely enclosed in box with opening at top for crane access Steel jacket completely enclosing drop hammer with dolly and polystyrene chips fed to impact surface to dissipate energy Pressed-in piling which generates its driving force from the frictional restraint of other piles
	Sheet pile	Acoustically dampen sheet steel piles to reduce levels of resonant vibration		
	Impact on pile	Use resilient pad (dolly) between pile and hammer head. Packing needs to be kept in good condition		
	Cranes cables, pile guides and attachments	Careful alignment of pile and rig		
	Power units or base machine	Fix more efficient sound reduction equipment or exhaust. Acoustically dampen panels and covers. When intended by the manufacturer, engine panels need to be kept closed. Use acoustic screens when possible		
Earth-moving plant: • bulldozer • compactor • crane • dump truck • dumper • excavator • grader • loader • scraper	Engine	Fit more efficient exhaust sound reduction equipment Manufacturers' enclosure panels need to be kept closed	5 to 10	Alternative super silenced plant might be available. Consult manufacturers for details
<b>Excavations</b>	Any excavations will be covered overnight, or a ramp will be installed to enable any trapped animals to escape.			
<b>Lighting</b>	<p>A low impact lighting strategy will be adopted for the site during and post-development, which will include the following measures:</p> <ul style="list-style-type: none"> <li>• Use narrow spectrum light sources to lower the range of species affected by lighting.</li> <li>• Use light sources that emit minimal ultra-violet light.</li> <li>• Avoid white and blue wavelengths of the light spectrum to reduce insect attraction and where white light sources are required in order to manage the blue shortwave length content they should be of a warm / neutral colour temperature &lt;4,200 kelvin.</li> <li>• Not use bare bulbs and any light pointing upwards. The spread of light will be kept in line with or below the horizontal.</li> <li>• Light spill will be reduced via the use of low-level lighting used in conjunction with hoods, cowls, louvers and shields. Lights will also be directional to ensure that light is directed to the intended areas only.</li> </ul>			

	<ul style="list-style-type: none"><li>• External lighting will be on PIR sensors that are sensitive to large objects only (so that they are not triggered by passing bats) and will be set to the shortest time duration to reduce the amount of time the lights are on.</li><li>• Wall lights and security lights will be 'dimmable' and set to the lowest light intensity settings. There are several products on the market that allow the control of the light intensity and the duration that the lights are on. All lighting on the developed site will make use of the most up to date technology available.</li></ul>
<b>Herpetofauna</b>	<p>Vegetation clearance works are best undertaken between April and June. During this timeframe, amphibians and reptiles are active and able to escape to adjacent areas when disturbed. If this timeframe cannot be achieved, vegetation clearance works can be undertaken between June and September. During this timeframe, all refugia present will need to be subject to detailed finger-tip searches prior to removal. Clearance works must not take place between October and March when reptiles are mostly torpid and thus highly vulnerable to injury or death.</p> <p>Vegetation removal will comprise a phased cutting method in addition to cutting in systematic patterns. The phased cutting method will be undertaken in two stages; the first cut will remove all vegetation to approximately 150mm from ground level and the second cut will be to ground level/ bare ground. Amphibians and reptiles are most likely to be present at or just below ground level; the phased technique allows any individuals present to disperse prior to reducing vegetation to ground level. The systematic vegetation cutting must be applied to both cutting phases and comprises cutting systematically towards areas of retained habitat to the south in an attempt to encourage any individual amphibians or reptiles to retreat to retained habitat unharmed. This method also prevents the creation of habitat islands during the second cutting phase which has potential to trap amphibians and reptiles in isolated pockets of habitat and thus increase the potential for injury or death during works. Two suitable systematic cutting techniques are schematically represented on <b>Figure 2</b>. Once the sensitive vegetation clearance has been completed, these areas will then be maintained at a short sward (sward length&lt;50mm) which is unsuitable to support amphibians and reptiles and is likely to prevent individuals from recolonising these areas of the site prior to construction works.</p>



**Figure 2:** A schematic representation of vegetation cutting patterns as best to eliminate terrestrial opportunities for reptiles and amphibians within the construction zone.

If a common amphibian or reptile is found then this should be allowed to move away into adjacent habitats unharmed, of their own accord or, if at immediate risk, moved by gloved hand to an undisturbed and sheltered area of the site or adjacent land.

In the unlikely event that a great crested newt is identified, works must cease and advise must be sought from a suitably qualified ecologist.

<b>Birds</b>	Vegetation clearance should be undertaken outside the core nesting period 1st March to 31st August. If this timeframe cannot be avoided, a close inspection of the vegetation should be undertaken, by the project ecologist or ECoW, within 48 hours prior to the commencement of work. All active nests will need to be retained with a species-appropriate buffer until the young have fledged (species specific but typically 4-6 weeks).
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## 4.0 Provision of New Landscaping and Species-Specific Enhancements

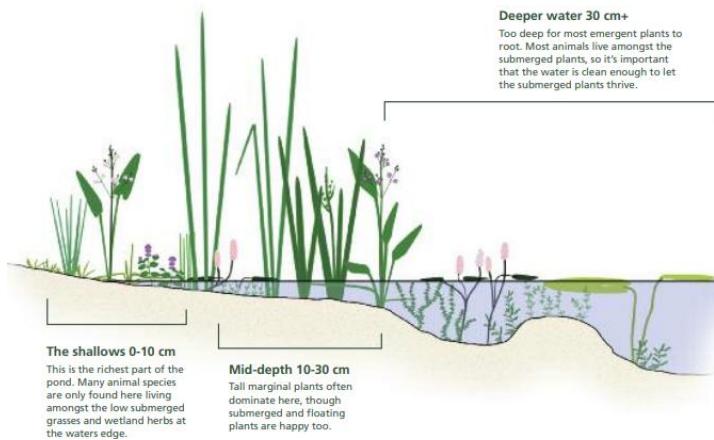
Table 3: Provision of New Landscaping and Species-Specific Enhancements

Works	Specification
<b>Persons Responsible</b>	The Biodiversity Champion will be responsible for the provision of the new landscaping and species-specific enhancements. The occupier of the proposed development (i.e. the landowner or managing agent) will be responsible for the management of these features post development.
<b>Management Term</b>	The management prescriptions outlined within this table must be implemented over a period of at least 30 years.
<b>Site Visit and Reporting</b>	The ECoW will make a final site check and sign off once the landscaping and installation of species-specific enhancements are complete.
<b>Pond creation</b>	<p><b>Overview:</b></p> <p>A pond measuring 0.0018ha will be created on site, as shown in <b>Appendix 1 &amp; 3</b>.</p> <p><b>Objectives:</b></p> <ul style="list-style-type: none"> <li>• To develop habitat suitable to support a range of protected and/ or notable species including; aquatic and terrestrial invertebrates; amphibians; and reptiles.</li> <li>• To create a pond in accordance with current guidance provided by the Freshwater Habitat Trust as detailed within the following documents: <i>Pond Creation Tool Kit Sheet 4: Pond Design</i><sup>2</sup> and <i>Creating Ponds for Amphibian and Reptiles</i><sup>3</sup>. To achieve this, the following core structural principals will be adhered to for pond creation. <b>Figures 3, 4, and 5</b> below exemplify the benefits of these key structural principles. <ul style="list-style-type: none"> <li>a. Ensure that almost all pond slopes are shallow, less than 1:5 (12°) and preferably less than 1:20 (3°);</li> <li>b. Create underwater bars and shoals to benefit aquatic plants;</li> <li>c. Ensure a clean water supply;</li> <li>d. Create variable pond depths;</li> <li>e. Plant submerged and emergent vegetation;</li> <li>f. Ensure an absence of fish; and</li> </ul> </li> </ul>

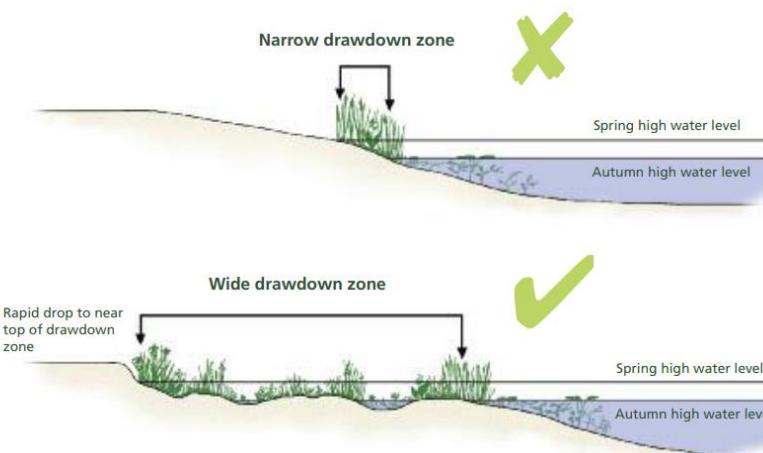
<sup>2</sup> <https://freshwaterhabitats.org.uk/wp-content/uploads/2013/09/pond-design.pdf>

<sup>3</sup> <https://freshwaterhabitats.org.uk/wp-content/uploads/2013/09/Amphibians- Common-Toad-Great-Crested-Newt-and-Grass-Snake -new-logo.pdf>

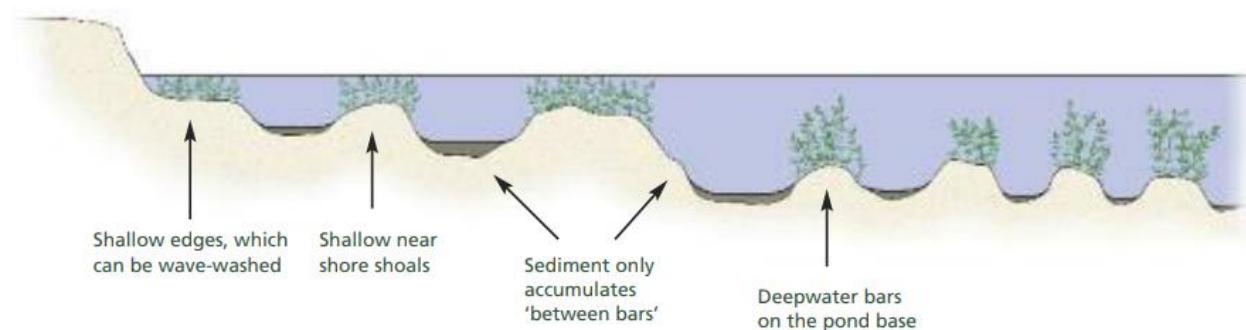
g. Attempt to deter water fowl from utilising ponds.



**Figure 3:** A schematic representation of pond characteristics that provide the best opportunities for biodiversity. Reproduced from the *Pond Creation Tool Kit Sheet 4: Pond Design* guidance document.



**Figure 4:** A schematic representation of an optimal pond drawdown zone. Reproduced from the *Pond Creation Tool Kit Sheet 4: Pond Design* guidance document.



**Figure 5:** A schematic representation of the value of internal shoals/ islands that prevent domination of sediment accumulation. Reproduced from the *Pond Creation Tool Kit Sheet 4: Pond Design* guidance document.

***Creation Method:***

- Should the underlying ground be loamy and subsequently free draining, a pond liner permeable to vegetation growth should be used to ensure effective water retention.
- The initial shape of the pond should be dug out using suitable machinery for the size of the pond, such as a small digger.
- More refined alterations to the pond structure should then be created using more refined tools; this is best done using hand tools.
- Once the shape and structural diversity of the pond has been established the pond should be planted with emergent vegetation and subsequently filled with water using a clean water source.

***Management Prescriptions:***

**Table 3.1:** Pond management prescriptions

Management	Detail	Rationale
Weed growth should be cut back regularly upon the banks and amongst emergence vegetation.	Twice annually in early March/ and in Autumn	Encourages establishment of good perennial ground cover and prevents colonisation of non-native species.
When removing vegetation, do not focus on one plant community but evenly remove	Twice annually in early March/ and in Autumn	Ensure not just one habitat within the pond is removed at the same time

	<p>from all to maintain a suitable habitat and species diversity.</p> <p>Keep approximately 90% of the water surface free of dense macrophyte coverage.</p> <p>Remove plant detritus and litter.</p> <p>Remove non-native or other unwanted plants and dispose. Where possible rinse the removed plants and replace water in the pond.</p> <p>Should the pond freeze over a hole in the ice should be created.</p> <p>Never artificially stock with fish.</p>	<p>Check annually in Autumn</p> <p>Check annually in Autumn</p> <p>Check annually in Autumn</p> <p>Check annually in Winter</p> <p>At all times</p>	<p>To prevent significant duckweed and other filamentous algae coverage; amphibians use open water for breeding display.</p> <p>Prevents organic matter and litter building up and preventing exposure to sunlight.</p> <p>Prevents organic matter building up</p> <p>Puts back wildlife in pond living within the removed plants</p> <p>Allows air breathing wildlife to gain oxygen</p> <p>Fish predate amphibians and their young.</p>
<b>Wildflower grassland creation</b>	<p><b>Overview:</b></p> <p>Areas of wildflower grassland covering a combined area of 0.022ha will be created on site, as shown in <b>Appendix 1 &amp; 3</b>.</p> <p><b>Objectives:</b></p> <ul style="list-style-type: none"> <li>• To create a successful and species rich wildflower grassland that will provide habitat for pollinating invertebrate species, that will in turn, provide foraging opportunities for notable species groups including bats, birds, badgers, and hedgehogs.</li> <li>• Ensure a healthy species diverse sward is maintained;</li> <li>• Ensure that a natural appearance is retained by utilising a seed mix alongside allowing native species of local prevenance to recolonise from the seedbank;</li> <li>• Employ techniques that use organic fertilizers and minimise the use of chemicals wherever possible.</li> </ul> <p><b>Creation Method:</b></p> <ul style="list-style-type: none"> <li>• <b>Ground preparation</b></li> </ul>		

The location of the proposed wildflower meadow creation currently comprises areas of dense vegetation and areas of hardstanding. For areas of ground currently covered by vegetation, any existing weeds should be removed through repeated cultivation and the land subsequently ploughed/ turned to bury all remaining vegetation. For areas of ground currently covered by hardstanding, the hard surface will need to be broken up and removed leaving exposed bare earth suitable for seeding. Once the land has been ploughed/ turned or cleared to bare earth, the soil should be rolled or stamped to produce a firm surface ready for seeding. It is noted that the underlying soil substrate is expected to contain a high clay content in places. Clay is generally unworkable when very wet or very dry and autumn sowings may therefore not be possible. It is often better to dig or plough the soil in the autumn, allow winter frosts to break down the clods, and prepare a seedbed in the spring.

- **Seeding**

To be undertaken in the spring between April and May. The following seed rates are recommended:

40 kg/ha of a wildflower and grass seed mix.

Inclusion of yellow rattle *Rhinanthus minor* in the seed mix will help suppress vigorous grass growth that may suppress the success of wildflowers within the sward.

- **Bedding in of seed:**

After sowing, seeds will be 'bedded' in by trampling or light rolling.

- **Seed mix:**

A combination of two seed mixes is proposed. Specifically, a 50/50 mix of Emorsgate General Purpose Seed Mix EM2 and Emorsgate Mixture for Clay Soils EM4 are proposed to be utilised. This combination of seed mixes will help create a minimum of 9 species per m<sup>2</sup> of grassland and retain a species composition consistent with the UKHabs definition of other neutral grassland. The proposed seed mix combination includes numerous grassland and wildflower species suitable for neutral and clay dominated soils. Notably, the species mix includes yellow rattle which is known to suppress dominant grass species which will allow existing grasses within the seed bank to colonise whilst preventing dominance and thus increasing species diversity per m<sup>2</sup>. For exact specifications, please refer to:

<https://wildseed.co.uk/product/mixtures/complete-mixtures/general-purpose-meadow-mixtures/standard-general-purpose-meadow-mixture/> and <https://wildseed.co.uk/product/mixtures/complete-mixtures/meadow-mixtures-for-specific-soils/meadow-mixture-for-clay-soils/>

***Management Prescriptions:***

**Table 3.2:** Wildflower meadow management prescriptions.

Management	When	Rationale
Cut meadow twice annually	Late March / early April and- late August/ early Sept	This ensures the meadow does not grow excessively long and become rank but allows wildflowers to set seed and invertebrates to breed. This will also allow a diverse sward of varying lengths to naturally occur in accordance with growth characteristics of each species. Cutting twice annually will also prevent encroachment of scrub and bracken.
Cut grass as to provide a heterogeneous habitat structure aiming to maintain at least 20% of grass <7cm and 20% >7cm. As such, each cutting phase must cut 20% of the area to ground level, 60% of the area to 15cm, and the remainder to 30cm. These areas must be rotated each year to maintain a diverse sward.	Late March / early April and- late August/ early Sept	To retain a diverse sward whilst limiting impacts to protected species potentially present at ground level and ensuring the natural germination of seeds.
Turn and dry the cut grass over 3-5 days before removing arisings off Site	Post cut	This allows the seeds to drop encouraging species diversity and invertebrates to relocate unharmed.
Do not apply chemical fertilisers	At all times.	The use of chemical fertilisers will encourage vigorous grasses and weeds to grow or cause large areas of bare ground due to inhospitable growing conditions,

<b>Tree and Shrub</b> <b>Planting</b>	<p><b>Objectives:</b></p> <ul style="list-style-type: none"> <li>• To plant native trees and shrubs that will provide pollinating, foraging, and refuge opportunities for protected and/ or notable species groups including amphibians, bats, birds, hedgehogs, invertebrates, and reptiles.</li> <li>• Ensure that good horticultural practice is employed to encourage long-term health and vitality of all trees and shrubs.</li> <li>• Ensure well-balanced crowns and/ or natural shape by preventing over competition.</li> </ul> <p><b>Creation Method:</b></p> <ul style="list-style-type: none"> <li>• <b>Ground preparation and planting</b> Each tree and shrub should be panted within a hole three times as wide of the supplied pot and of a similar depth. Root balls should be soaked thoroughly in water before planting and root balls should be loosened to expose restricted roots before planting. The planted trees and shrubs should then be backfilled ensuring there are no air pockets around roots or any roosts protruding out of the ground.</li> <li>• <b>Timing</b> It is best to prepare the land during the summer ready for planting between November and March. Planting trees and shrubs before the new year helps ensure better rooting and subsequent establishment including faster growth during the first growing season.</li> </ul> <p><b>Management Prescriptions:</b></p>
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**Table 3.3:** New tree and shrub planting.

Management	When	Rationale
At the end of each growing season all plant failures are to be 100% replaced	When required; checked annually in Autumn.	To maintain amenity and wildlife value.
If required, provision of stakes and guards. Guards to be left on for a minimum of 5 years	N/A	Protect from damage
Stakes should be checked and any broken or damaged stakes during this time would be removed (as above) and replaced with	When required; checked annually in Autumn.	Maintain protection

	<p>ties re-fixed</p> <table border="1"> <tbody> <tr> <td>Remove weeds</td><td>When required; checked twice annually in early spring and in Autumn.</td><td>Reduce competition for resources nutrients etc. by weeds</td></tr> <tr> <td>Application of bark mulch at a depth of 50 mm</td><td>Immediately after planting and then when required; checked annually in Autumn.</td><td>Reduce competition for resources nutrients etc. by weeds</td></tr> <tr> <td>Do not apply chemical fertilisers</td><td>At all times.</td><td>The use of chemical fertilisers will encourage vigorous grasses and weeds to grow</td></tr> <tr> <td>Apply a light dressing of well-rotted manure</td><td>Annually in the winter</td><td>Note the overuse of manure fertilisers will encourage vigorous grasses and weeds to grow.</td></tr> <tr> <td>Removal of spent flowers from perennial plants should be removed through 'deadheading'</td><td>Twice annually, late spring and in the Autumn.</td><td>Allows plants to place more energy into re-growth.</td></tr> <tr> <td>Watering should be undertaken before and after planting out and as necessary for the continued thriving of all planting.</td><td>When required; provide more water during periods of draught and less water during times of prolonged rain.</td><td>Ensures plants do not dry out and subsequently fail.</td></tr> <tr> <td>Check and replace any plant failures once a year</td><td>For the first 5 years</td><td>To ensure no gaps form.</td></tr> </tbody> </table>	Remove weeds	When required; checked twice annually in early spring and in Autumn.	Reduce competition for resources nutrients etc. by weeds	Application of bark mulch at a depth of 50 mm	Immediately after planting and then when required; checked annually in Autumn.	Reduce competition for resources nutrients etc. by weeds	Do not apply chemical fertilisers	At all times.	The use of chemical fertilisers will encourage vigorous grasses and weeds to grow	Apply a light dressing of well-rotted manure	Annually in the winter	Note the overuse of manure fertilisers will encourage vigorous grasses and weeds to grow.	Removal of spent flowers from perennial plants should be removed through 'deadheading'	Twice annually, late spring and in the Autumn.	Allows plants to place more energy into re-growth.	Watering should be undertaken before and after planting out and as necessary for the continued thriving of all planting.	When required; provide more water during periods of draught and less water during times of prolonged rain.	Ensures plants do not dry out and subsequently fail.	Check and replace any plant failures once a year	For the first 5 years	To ensure no gaps form.
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Check and replace any plant failures once a year	For the first 5 years	To ensure no gaps form.																				
<b>Native Hedgerow Planting</b>	<p><b>Overview:</b> It is proposed to create 0.082km of native hedgerow, as shown in <b>Appendix 1 &amp; 3</b>.</p> <p><b>Objectives:</b></p> <ul style="list-style-type: none"> <li>• To create dense hedgerows that will provide foraging, commuting, and refugia opportunities for notable species groups including bats, birds, badgers, and hedgehogs.</li> <li>• To ensure native species only are planted.</li> </ul>																					

- Ensure cultural techniques are employed which use a variety of mulches and organic fertilisers and which minimise the use of chemicals and peat wherever possible.

***Creation Method:***

- **Ground preparation**

Prepare the ground by digging over a strip approximately 60-90cm (2-3ft) wide and one spit (or spade blade) deep. Soils that become waterlogged in winter may require a permanent drainage system. Alternatively, form the soil into a ridge about 15-20cm (6-8in) high and 50-70cm (20-28in) across to plant into.

- **Planting**

Plants should be positioned set back from hardscaped boundaries to allow space for the hedgerow to develop and mature prior to requiring any significant management/ cutting back. Plant density should focus on achieving a hedgerow width >1m; as such, plants should be planted in a staggered double row approximately 45-60cm apart, where individual plants are planted 90cm apart within each row.

- **Timing**

It is best to prepare the land during the summer ready for planting between November and March. Planting before the new year helps ensure better rooting and subsequent establishment including faster growth.

***Management Prescriptions:***

**Table 3.4:** New hedgerow planting hedgerow.

<b>Management</b>	<b>When</b>	<b>Rationale</b>
At the end of each growing season all plant failures are to be 100% replaced	When required; checked annually in Autumn.	To maintain amenity and wildlife value.
If required, provision of stakes and guards. Guards to be left on for a minimum of 5 years	N/A	Protect from damage
Stakes should be checked and any broken or damaged stakes during this time would be removed (as above) and replaced with ties re-fixed	When required; checked annually in Autumn.	Maintain protection

	<p>Remove weeds</p> <p>Application of bark mulch at a depth of 50 mm</p> <p>Apply a light dressing of well-rotted manure</p> <p>Watering should be undertaken before and after planting out and as necessary for the continued thriving of all planting.</p> <p>Check and replace any plant failures once a year</p> <p>Once the hedgerow reaches an average height of 1.5m or above along the hedgerow length, this height or above must be retained.</p> <p>Once the hedgerow reaches an average width of 1.5m or above along the hedgerow length, this width or above must be retained.</p>	<p>When required; checked twice annually in early spring and in Autumn.</p> <p>Immediately after planting and then when required; checked annually in Autumn.</p> <p>Annually in the winter</p> <p>When required; provide more water during periods of draught and less water during times of prolonged rain.</p> <p>For the first 5 years</p> <p>To be checked annually once hedgerow reaches 1.5m in height.</p> <p>To be checked annually once hedgerow reaches 1.5m in width.</p>	<p>Reduce competition for resources nutrients etc. by weeds</p> <p>Reduce competition for resources nutrients etc. by weeds</p> <p>Note the overuse of manure fertilisers will encourage vigorous grasses and weeds to grow.</p> <p>Ensures plants do not dry out and subsequently fail.</p> <p>To ensure no gaps form.</p> <p>To ensure the hedgerow is not maintained at a low level of worse value to biodiversity.</p> <p>To ensure the hedgerow is not maintained at a thin density of worse value to biodiversity.</p>
<b>Bat Boxes</b>	<p>Two bat boxes are recommended to be installed on the retained tree line on the western site boundary.</p> <p><b><i>Bat boxes specification:</i></b></p> <ul style="list-style-type: none"> <li>• The recommended bat boxes will be constructed of woodcrete/ woodstone. Boxes of this construction are designed to require no maintenance and have a lifespan of 25 years plus.</li> <li>• 2x General Purpose Bat Boxes (or similar alternative brand) are recommended on the trees, as shown in <b>Figure 6</b>.</li> </ul>		

	<ul style="list-style-type: none"> <li>• Bat boxes should be positioned 3-5m above ground level facing in a south, southeast, or southwest aspect with a clear flight path to and from the entrance, away from artificial light.</li> </ul> 
<b>Bird Boxes</b>	<p><b>Recommended Management:</b></p> <p>The proposed bat boxes are designed to require no management or maintenance. Furthermore, preventing physical disturbance of bat boxes will increase the chances of occupation by roosting bats. However, it is recommended that the bat boxes are inspected annually for the first five years outside of the typical active season for bats (May to September inclusive) following installation. Bat boxes must be replaced if they are damaged, removed, or have fallen from their recommended location.</p> <p><b>Bird box specification:</b></p> <ul style="list-style-type: none"> <li>• The recommended bird boxes will be constructed of woodcrete/ woodstone. Boxes of this construction are designed to require no maintenance and a lifespan of 25 years plus.</li> <li>• 2x Woodstone Nest Boxes (or a similar alternative brand) with 28mm entrance holes are proposed on the trees, as shown in <b>Figure 7</b>.</li> <li>• 1x Vivara Pro WoodStone Swift Nest Box (or a similar alternative brand) is proposed on the building, as shown in <b>Figure 8</b>.</li> </ul>

	<ul style="list-style-type: none"><li>• Woodstone Nest Boxes should be positioned approximately 3m above ground level where they will be sheltered from prevailing wind, rain and strong sunlight.</li><li>• Vivara Pro WoodStone Swift Nest Boxes should be positioned at the eaves of the building.</li></ul>
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**Figure 7:** Woodstone Nest Box (image credit [arkwildlife.co.uk](http://arkwildlife.co.uk))



**Figure 8:** Vivara Pro WoodStone Swift Nest Box (image credit <https://www.nhbs.com/woodstone-swift-nest-box>)

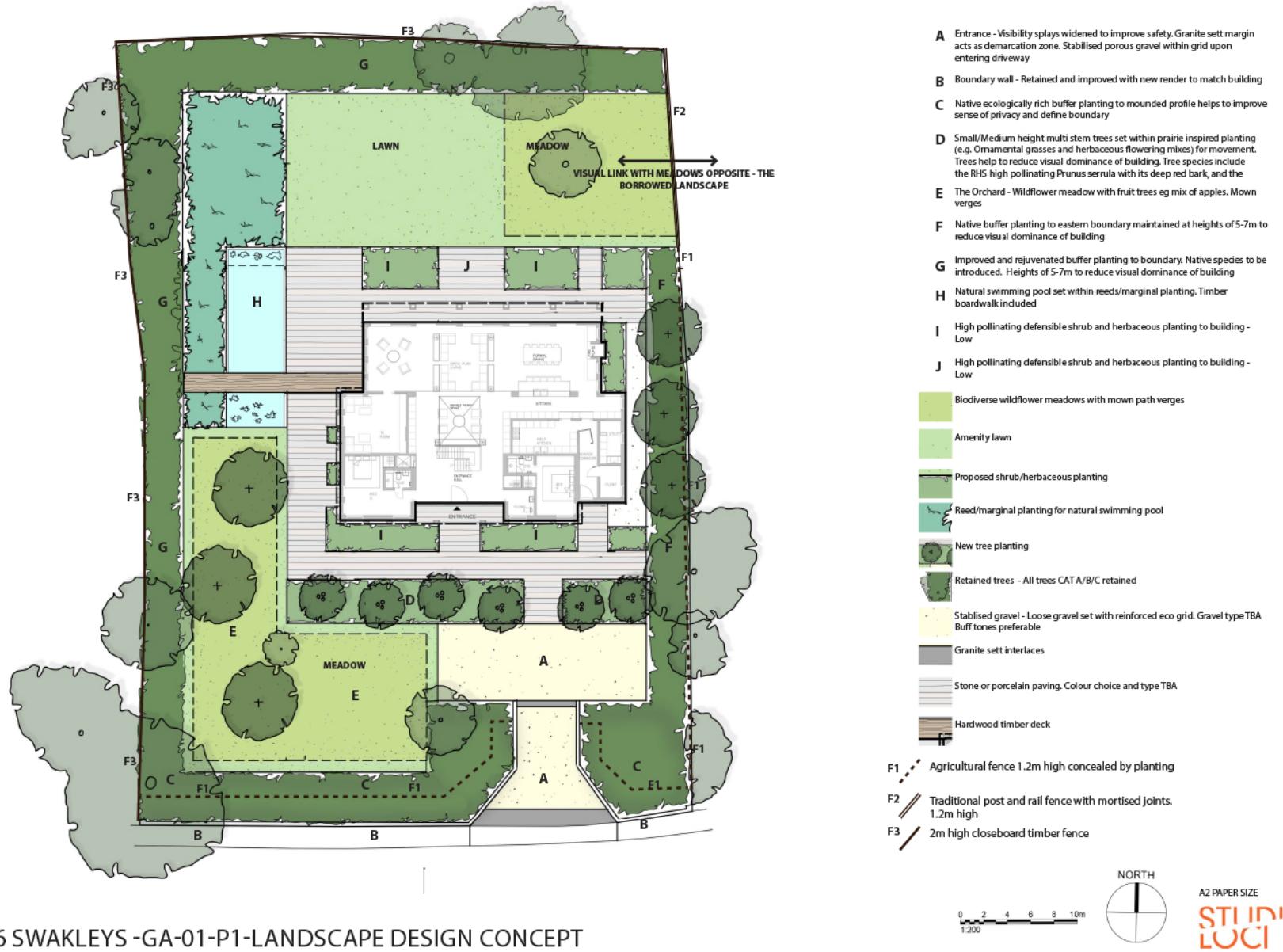
***Recommended Management:***

	<p>The proposed bird boxes are designed to require no management or maintenance. Furthermore, preventing physical disturbance of bird boxes will increase the chances of occupation by nesting birds. However, it is recommended that the bird boxes are inspected annually for the first five years outside of the typical nesting bird season (March to September inclusive) following installation. Bird boxes must be replaced if they are damaged, removed, or have fallen from their recommended location.</p>
<b>Insect Box</b>	<p>An insect box will be installed adjacent to the retained tree line on the northeast site boundary, facing the enhanced grassland (<b>Figure 9</b>). An insect box suitable for the site (or a similar alternative brand) can be found here: <a href="https://www.nhbs.com/national-trust-apex-insect-house">https://www.nhbs.com/national-trust-apex-insect-house</a></p> 
<b>Hedgehog House</b>	<p>A hedgehog house will be installed adjacent to the retained tree line on the northeast site boundary (<b>Figure 10</b>). A hedgehog house suitable for the site (or a similar alternative brand) can be found here: <a href="https://www.nhbs.com/hedgehog-house">https://www.nhbs.com/hedgehog-house</a></p>

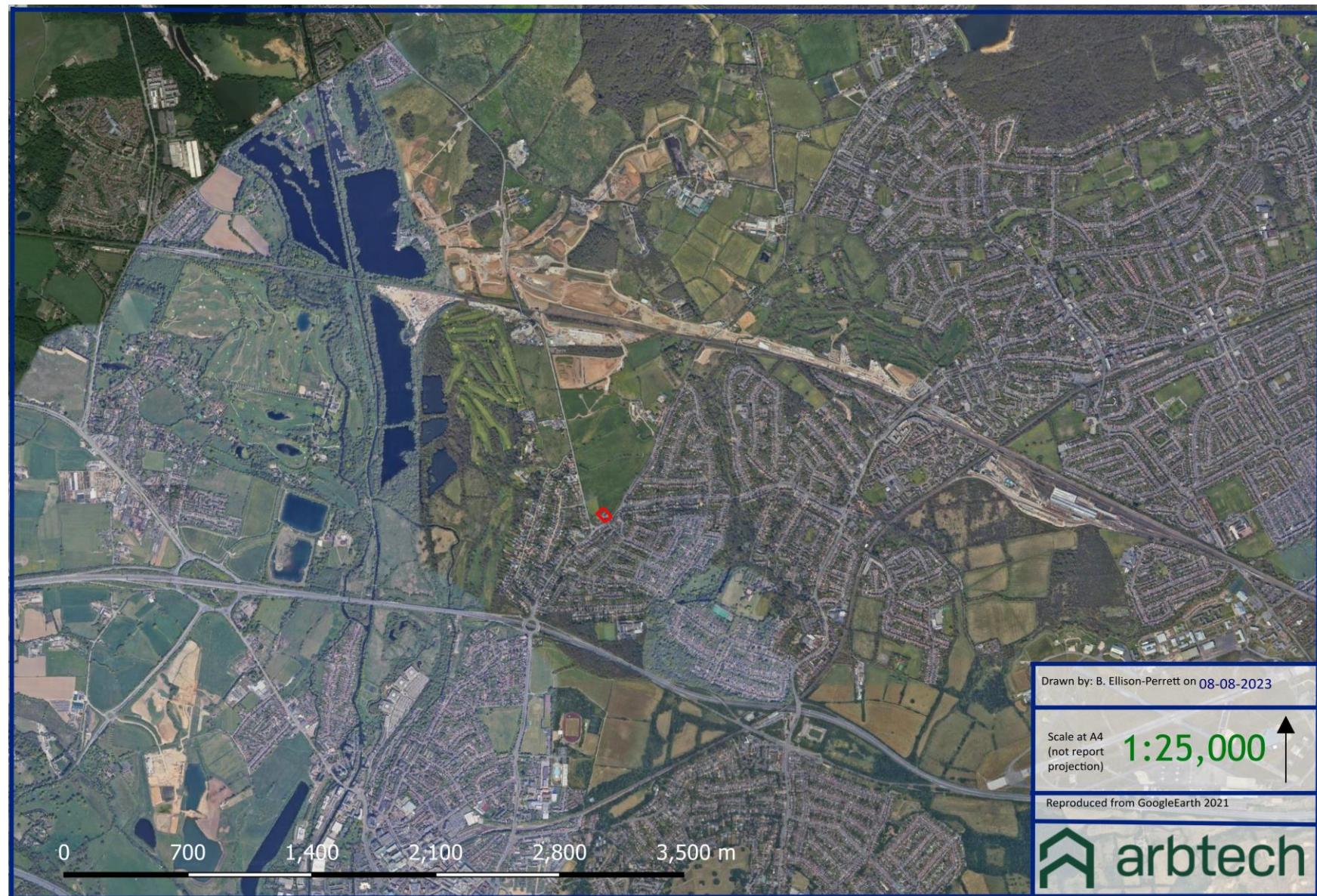


**Figure 10:** Hedgehog house (image credit <https://www.nhbs.com/hedgehog-house>)

## Appendix 1: Proposed Development Plan



## Appendix 2: Site Location Plan



## Appendix 3: Habitat Creation and Enhancement Plan

