



**Barwell Medical Centre
Leicester**

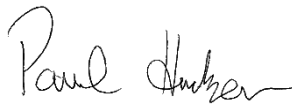
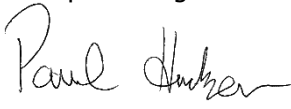
Landscape and Ecological Management Plan

April 2021

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DOCUMENT CONTROL

Barwell Medical Centre, Leicester Landscape and Environmental Management Plan				
Revision	Date	Prepared by	Checked by	Approved by
1.0	23 April 2021	Rory Jones MCIEEM Senior Ecologist 	Paul Hudson MCIEEM Principal Ecologist 	Paul Hudson MCIEEM Principal Ecologist 

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1. Introduction

1.1. Brief

This report presents a Landscape and Environmental Management Plan (LEMP) for a site known as 'Barwell Medical Centre', High Street, Barwell, LE9 8HR within the boundary of Leicestershire County Council (Ordnance Survey Grid Reference centred at: SP 4435 9668)¹.

The site location is displayed in Plan 1.

1.2. Proposed Works

The site will be completely redeveloped to accommodate a single GP practice, with associated driveway and parking. The development will require the complete demolition of the building on site.

The design proposals include native species-rich landscaping, with a variety of grassland, shrub and tree species compositions. The peripheral conifers will be removed and replaced with a native species-rich hedgerow.

Site Description

The site proposed for development measures approximately 0.18ha and mainly comprises an area of hard standing and a large derelict industrial building, lined by conifer trees on its northern, eastern and southern boundaries. The site is situated within the conurbation of Barwell, with moderate density urban development to the north, south and west. A large playing field and various adjoining residential gardens lie adjacent to the east.

1.3. Associated Documents and Reports

The LEMP builds on and complements, without attempting to duplicate the following documents which should be read in conjunction with the LEMP:

Acer Ecology Ltd. – P1806_Barwell Medical Centre_PEA and PRA_080321.

1.4. Aims

This report sets out how the valuable ecological features of the site will be protected during the construction phase and how, during the operational phase of the site, ecological enhancements can be managed to increase the value of the site for wildlife. Subsequent management and monitoring measures will be put in place to ensure the benefits are long-lasting.

The overall aim of this report is to ensure that certain features of biodiversity value on the site are protected during construction and that the potential biodiversity value of the operational site is realised.

¹ Latitude and Longitude: 52.566151, -1.347040

1.5. Reporting

In accordance with BS42020:2013 and the requested work from Leicestershire County Council, the management plan includes the following elements:

- a) Description and evaluation of features to be managed;
- b) Ecological trends and constraints on site that could influence management;
- c) Aims and objectives of management;
- d) Appropriate management options for achieving aims and objectives and prescriptions for management actions;
- e) Prescriptions for management actions;
- f) Preparation of a work schedule (including an annual work plan capable of being rolled forward over a five-year period);
- g) Body or organisation personnel responsible for implementation of the plan;
- h) Monitoring, contingencies and remedial measures; and
- i) Legal and funding resources and mechanisms to ensure sustainable long-term management delivery.

2. Description and Evaluation of Features to be Created and Managed

2.1. Description of Features

No features on site will be retained.

The following habitats on site will be created and managed:

- Intact Species-Rich Hedgerow;
- Native Species-Rich Wildflower Grassland;
- Native Species-Rich Shade Tolerant Grassland;
- Native Shrubs and Herbaceous Species;
- Native Bulbs;
- Ecologically Valuable Ornamental Tree;
- Bird Boxes (exact numbers and locations to be confirmed pending completion of further bat surveys); and
- Bat Boxes (exact numbers and locations to be confirmed pending completion of further bat surveys).

Detailed descriptions of the existing habitats on site are contained within the Acer Ecology (2021) Preliminary Ecological Appraisal report.

2.2. Newly Created Features

2.2.1. Native Species-Rich Hedgerow

An area of the existing hard standing in the north-eastern corner of the site will be managed to create and maintain species-rich grassland (see Appendix 1). This area of enhanced grassland will serve to enhance the overall ecological value of the site, which is minimal pre-development.

Ecological connectivity on site will be enhanced by the planting of a native species-rich hedgerow along the northern, eastern and western boundary (see Appendix 1). This will compensate for the loss of the existing peripheral conifers, which provide limited ecological value on site.

The hedgerow will be of value to foraging and nesting birds, foraging and commuting bats, hedgehogs and invertebrates.

Photo 1: Native species-rich hedgerow



2.2.2. Native Species-Rich Wildflower Grassland

An area of the existing hard standing in the north-eastern corner of the site will be managed to create and maintain species-rich grassland (see Appendix 1). This area of grassland will serve to enhance the overall ecological value of the site, which is minimal pre-development.

Photo 2: Species-rich wildflower grassland



2.2.3. Native Species-Rich Shade-Tolerant Grassland

A strip of the existing hard standing along the southern and eastern boundary of the site will be managed to create and maintain species-rich shade-tolerant grassland (see Appendix 1). This area of grassland will serve to enhance the overall ecological value of the site, which is minimal pre-development.

Photo 3: Species-rich shade-tolerant wildflower grassland



2.2.4. Native Shrubs and Herbaceous Species

Three areas of native shrubs and herbaceous species will border the proposed site access at the north-western corner of the site.

2.2.5. Native Bulbs

Two small areas of native bulb planting will take place in the north-eastern corner of the site, creating an additional number of floristic species in the wildflower area.

2.2.6. Ecologically Valuable Ornamental Trees

Several ornamental trees will be planted on site as part of the landscaping scheme. Though not all native, the species chosen provide high value ecological features for invertebrates and to a lesser degree foraging birds.

2.2.7. Nesting Bird Enhancement

The site will be enhanced for nesting birds by the erection of several bird boxes on suitable features, either at the perimeter of the site, on the newly planted trees (if of a sufficient size), or on the external elevations of the surgery itself. A variety of durable, woodcrete bird boxes, including maintenance free boxes suitable for trees or buildings will be erected. Exact numbers and locations to be confirmed pending completion of further bat surveys.

Photo 4: Example bird box



2.2.8. Roosting Bat Enhancement

Bat roosting opportunities on site will be enhanced by the installation of bat boxes on suitable features around the perimeter of the site. Boxes will be located with different aspects, creating a variety of micro-climates that bats can utilise. Exact numbers and locations to be confirmed pending completion of further bat surveys.

Photo 5: Example bat box



3. Ecological Trends and Constraints On-site That Could Influence Management

3.1. Natural

3.1.1. Native Species-Rich Hedgerows

Without management, the hedgerows would become overgrown and leggy, resulting in a lack of vigorous and bushy growth that is most valuable to wildlife. Furthermore, failure to monitor the development of the hedgerow may result in failed planting proliferating, ultimately resulting in a low-quality hedgerow.

3.1.2. Wildflower and Shrub Plantings

Without management, the newly created species-rich grassland and shrub borders would not realise an increase in floristic diversity which would otherwise benefit invertebrates. The grassland would develop into a rank condition and eventually be overcome with scrub.

3.1.3. Ecologically Valuable Ornamental Trees

Without management, weeds may compete with the ornamental trees for water and nutrients, accompanied with a lack of watering when required, will lead to poor growth, smaller and fewer fruit or in the worst cases death of the tree.

3.1.4. Bird and Bat Boxes

Gradual weathering or storm damage could result in the failure of the boxes. A degree of monitoring will ensure that any damaged, destroyed or lost boxes are replaced and remain viable.

3.2. Artificial

Due to the relatively small scale of the development and the nature of the compensation and enhancement measures, there are considered to be limited artificial constraints that may influence management.

3.2.1. Inappropriate Management and Construction Practices

Inappropriate or insensitive management of ecological features has potential to reduce the biodiversity value of the site. For example, damage to trees and hedges via careless activities during construction such as driving over roots or collisions. During the operation phase of the surgery, insensitive or excessive mowing of the grassland, unnecessary use of fertilisers, or inappropriate hedgerow management will all serve to reduce the ecological value of the site. Newly planted hedgerows could also be subject to inappropriate management and/ or intentional clearance, significantly reducing their ecological value.

3.2.2. Gradual Habitat Loss/ Encroachment

Possible gradual habitat loss of retained landscaping may occur, either by inappropriate management practices or intentional clearance by site owners. Habitat degradation may also occur via littering and increased fertilisation of peripheral habitat features by visitors. The dumping of litter within hedgerows may produce a surge of nutrients that can lead to the dominance of ruderal species such as nettles which thrive under such conditions. Native ground plants get smothered and non-native invasive species can be introduced.

3.2.3. Light Spill

Certain areas of the site have significantly higher value for foraging and commuting bats. Uncontrolled light spill may impact upon foraging bats and other nocturnal wildlife. Increased levels of excessive artificial lighting as a result of construction works and incidental light levels emanating from the surgery is likely to reduce the suitability of the retained peripheral habitats of the site for foraging bats.

A sensitive lighting strategy will therefore ensure that these areas remain dark at night. Essentially, this lighting zone should cover as much of the periphery of the site to the east in particular as is practically possible in line with Health and Safety. The lighting design for the site will be of a 'bat-friendly' specification and kept to the minimum level which meets the needs of security and health and safety.

4. Aims and Objectives of Management

The following objectives have been identified which, when achieved, will ensure the overarching aims of the LEMP are achieved.

No works on site will commence until the completion of the further surveys for bats.

4.1. Management Objective – MO1: Creation and Management of Native Species-Rich Hedgerow

The northern, eastern and southern boundaries of the site will be planted with a hedgerow consisting of seven native species. New whips will require a degree of protection, to ensure that they are not accidentally damaged during construction/ general maintenance and/ or the first years of establishment.

A sensitive management strategy will be implemented to ensure their long-term viability.

4.2. Management Objective – MO2: Creation and Management of Species-Rich Wildflower and Shade-Tolerant Grassland

The areas proposed for species rich grassland, bulb and shrub planting be created once the existing hard standing habitat has been cleared. Soil will be prepared to sow the various native species-rich seed mix suitable for the soil type and degree of shade.

Planting will aim to create permanent wildflower meadows, generating enhancement and boosting the floristic diversity of the site.

4.3. Management Objective – MO3: Enhancement for Nesting Birds

To compensate for the loss of bird nesting habitat, bird nesting opportunities will be provided. Specialised bird boxes will be incorporated onto suitable locations, in secluded positions and at minimum height of 3m. Exact numbers and locations to be confirmed pending completion of further bat surveys.

4.4. Management Objective MO4: Enhancement for Roosting Bats

The site will be enhanced for roosting bats with the provision of bat roosting opportunities. Bat boxes will be erected on suitable features within the site, in sunny spots between 3 and 6m above ground level. This will provide compensatory roosting habitat for bats. Exact numbers and locations to be confirmed pending completion of further bat surveys.

4.5. Management Objective MO5: Planting and Management of Ornamental Trees

The ecologically valuable ornamental trees will benefit invertebrate species, and the fruiting trees will provide rich blossoms in the spring and fruits in the autumn for birds, bats and invertebrates.

4.6. Management Objective M06: Reduce Impacts of Increased Artificial Lighting

The lighting strategy for the site will be designed so that it minimised adverse impacts to foraging and/ or commuting bats along the eastern end of the site. This will be achieved via the implementation of a sensitive lighting strategy, both during construction and over the lifespan of the surgery unit.

5. Appropriate Management Options and Prescriptions for Achieving Aims and Objectives

5.1. Construction Phase Management Prescriptions

Full details of how the management objectives will be achieved during the construction phase of the development will be determined following the completion of the further bat surveys.

There are no other ecological features of value proposed for retention on site. Therefore, the majority of management prescriptions relate to the operation phase of the development, as detailed in Section 5.2.

5.1.1. Management Prescription 1: Protection of Potential Bat Roosts Within Building

TBC.

5.1.2. Management Prescription 2: Creation of Native Species-Rich Hedgerows

Contributes to Management MO1.

Hedging plants are usually supplied bare-rooted. This restricts the planting season to the winter months, when the roots are dormant. Whips will be planted in a double, staggered row (individual rows c. 40cm apart) with 4 - 6 plants per meter. Double staggered rows tend to be better for wildlife as they are wider and provide more shelter and habitat.

Whips will be fitted with spiral guards to prevent damage from accidental strimming and planted in a staggered row.

Whips will be mulched using wood chips to at least 3cm deep to prevent competition from weed species. The mulch will be maintained (topped up if necessary) for at least the first three years to aid establishment.

A mixture of native species will be planted to provide visual variety as well as to maximise biodiversity. Tree whips will also be planted at intervals along the hedge-line (see overleaf). A mix of local species will include:

Hawthorn (*Crataegus monogyna*) – 55%;

Holly (*Ilex aquifolium*) – 10%;

Wild Privet (*Ligustrum vulgare*) – 9%;

Hazel (*Corylus avellana*) – 9%;

Field Maple (*Acer campestre*) – 9%;

Dogwood (*Cornus sanguinea*) – 4%; and

Elder (*Sambucus nigra*) – 4%.

All plants will be watered in at the end of each day of planting.

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Any plants which die in the first three years will be replaced to prevent gaps developing.

The hedgerow plants provided will be expected to comply with and be planted in accordance with the requirements of:

- British Standard 39336 Specification for Nursery Stock;
- British Standard 5236 Cultivation and Planting of Trees in the Advanced Nursery Stock Category; and
- British Standard 4428 (1989) Code of Practice for General Landscape Operations (excluding Hard Surfaces), as appropriate.

When nursery stock is obtained from the supplier the contractor will confirm that the stock meets the British Standard specifications.

They will be planted with an approximate density of 1 plant per meter squared. They will be mulched using wood chips to at least 3cm deep to prevent competition from weed species. The mulch will be maintained (topped up if necessary) for at least the first three years to aid establishment.

The new planted hedgerows will be managed as follows:

Year 1	All failed whips replaced	Whips cut back to 1/3 of height	Mulch inspected and topped up if necessary
Year 2	All failed whips replaced	Whips cut back to 1/2 of height	Mulch inspected and topped up if necessary
Year 3	All failed whips replaced	Whips cut outward side of hedgerow only	Mulch inspected and topped up if necessary
Years 4 - 10	Hedgerow cut on side only - not on top.		
Year 11 Onwards	Hedgerow cut on a minimum 2-3-year rotation and layered every 20-30 years.		

Any failed planting will be identified and replaced. Replacement planting will take place annually for the first 5 years from initial planting. Up to 5% failure rate will be tolerated, but if more than 5% failure occurs, replacement planting of the same species will be provided with an aim of attaining an 85% success rate after 5 years.

All newly planted trees should be maintained in accordance with the requirements of British Standard 4428 (1989) Code of Practice for General Landscape Operations (excluding Hard Surfaces) and British Standard 8545 (2014) Trees from nursery to independence in the landscape.

Trunk distortion, damage and constriction can be caused by tree guards and stakes, leading to structural weakness developing in the trunks. Removal of tree protection will therefore be undertaken promptly once specimens have successfully established.

Timing of the removal of protection will vary according to tree growth rate and the original size of the specimen(s) concerned. This will range from three to seven years following planting or selection and once specimens are of a reasonable height (1 - 2m). This will be undertaken by the operator in accordance with BS 7370 Part 1 (1991): Grounds maintenance.

5.1.3. Management Prescription 2: Creation of Species-Rich Wildflower Grassland

Contributes to MO2

Seed Mix Selection

Soils across the receptor site allocated as slowly permeable, seasonally wet, slightly acidic but base-rich loamy and clayey soils with impeded drainage (Soilscape 18).

The WFT Landscape 34 mix will therefore be utilised. This mix contains 34 UK Native wildflower and grass species. This mixture contains mainly perennial species, to create a permanent wildflower meadow which establishes in the first year and flowers from the second year onwards – therefore ensuring the long-term productivity of the new habitat.

*Please note – the shade-tolerant grassland planting will utilise the Shade Tolerant Turf *WFT-Shade-41 mix, which contains 38 UK Native wildflower and grass species.*

Pre-Planting

Ground preparation and sowing will ideally take place in October, though April is also permissible. The most successful way to establish wildflowers and grasses from seed is to sow into a clean seedbed that has been first cleared of all weeds and other vegetation and then cultivated to produce optimum conditions for germination. The precise measurements of areas allocated to grass and flower planting is yet to be finalised. However, the sowing rate is 2-4g/m². This should be used as a guide when purchasing the seed mixture.

Planting

To ensure the success of the seedlings, planting will be carried out manually and carefully. Planting is recommended to be undertaken during the autumn (October) to allow seedling roots to establish over the winter and have a greater chance of competing with the existing sward in the spring and summer, by allowing their roots to establish over winter.

The following species are included within the WFT Landscape 34 species mix:

Species	Latin Name
Autumn Hawkbit	<i>Leontodon autumnalis</i>
Betony	<i>Stachys officinalis</i>
Bird's foot Trefoil	<i>Lotus corniculatus</i>
Bladder Campion	<i>Silene vulgaris</i>
Cat's ear	<i>Hypochaeris radicata</i>
Common Knapweed	<i>Centaurea nigra</i>
Common Sorrel	<i>Rumex acetosa</i>

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Common Toadflax	<i>Linaria vulgaris</i>
Common Vetch	<i>Vicia sativa</i>
Cowslip	<i>Primula veris</i>
Field Scabious	<i>Knautia arvensis</i>
Kidney Vetch	<i>Anthyllis vulneraria</i>
Lady's Bedstraw	<i>Galium verum</i>
Meadow Buttercup	<i>Ranunculus acris</i>
Meadow Cranesbill	<i>Geranium pratense</i>
Meadowsweet	<i>Filipendula ulmaria</i>
Musk Mallow	<i>Malva moschata</i>
Ox Eye Daisy	<i>Leucanthemum vulgare</i>
Perforate St John's Wort	<i>Hypericum perforatum</i>
Ragged Robin	<i>Lychnis flos-cuculi</i>
Red Campion	<i>Silene dioica</i>
Wild Carrot	<i>Daucus carota</i>
Wild Marjoram	<i>Origanum vulgare</i>
Wild Red Clover	<i>Trifolium pratense</i>
Yarrow	<i>Achillea millefolium</i>
Yellow Rattle	<i>Rhinanthus minor</i>
Sheep's Fescue	<i>Festuca ovina</i>
Crested Dog's tail	<i>Cynosurus cristatus</i>

The following species are included within the WFT-Shade-41 species mix:

Species	Latin Name
Autumn Hawkbit	<i>Leontodon autumnalis</i>
Betony	<i>Stachys officinalis</i>
Bird's foot Trefoil	<i>Lotus corniculatus</i>
Cat's ear	<i>Hypochaeris radicata</i>
Common Knapweed	<i>Centaurea nigra</i>
Common Sorrel	<i>Rumex acetosa</i>
Common Toadflax	<i>Linaria vulgaris</i>
Common Vetch	<i>Vicia sativa</i>
Cowslip	<i>Primula veris</i>
Dames Violet	<i>Hesperis matronalis</i>
Field Scabious	<i>Knautia arvensis</i>
Kidney Vetch	<i>Anthyllis vulneraria</i>
Lady's Bedstraw	<i>Galium verum</i>
Meadow Buttercup	<i>Ranunculus acris</i>
Meadow Cranesbill	<i>Geranium pratense</i>
Meadow Vetchling	<i>Lathyrus pratensis</i>
Meadowsweet	<i>Filipendula ulmaria</i>
Musk Mallow	<i>Malva moschata</i>
Nettle Leaved Bellflower	<i>Campanula trachelium</i>
Ox Eye Daisy	<i>Leucanthemum vulgare</i>
Perforate St John's Wort	<i>Hypericum perforatum</i>
Ragged Robin	<i>Lychnis flos-cuculi</i>
Red Campion	<i>Silene dioica</i>
Ribwort Plantain	<i>Plantago lanceolata</i>
Rough Hawkbit	<i>Leontodon hispidu</i>
Sainfoin	<i>Onobrychis vicifolia</i>
Salad Burnet	<i>Sanguisorba minor</i>
Self-heal	<i>Prunella vulgaris</i>

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Sweet Cicely	<i>Myrrhis odorata</i>
Water Avens	<i>Geum rivale</i>
White Campion	<i>Silene latifolia</i>
Wild Carrot	<i>Daucus carota</i>
Wild Marjoram	<i>Origanum vulgare</i>
Wild Mignonette	<i>Reseda lutea</i>
Wild Red Clover	<i>Trifolium pratense</i>
Wood Sage	<i>Teucrium scorodonia</i>
Yarrow	<i>Achillea millefolium</i>
Yellow Rattle	<i>Rhinanthus minor</i>
Sheep's Fescue	<i>Festuca ovina</i>
Crested Dog's tail	<i>Cynosurus cristatus</i>
Yellow Oatgrass	<i>Trisetum flavescens</i>

5.1.4. Management Prescription 3: Nesting Bird Boxes

Contributes to MO3

Bird nesting opportunities within the proposed development site will be compensated for and enhanced by the erection of bird boxes on suitable features on site, or on the external elevations of the surgery building.

Placement

The bird boxes will be placed on in secluded positions, ideally within dense cover and at a minimum height of 3m from ground level. Exact numbers and locations to be confirmed pending completion of further bat surveys.

5.1.5. Management Prescription 4: Enhancement of Roosting Bat Opportunities

Contributes to MO4

To enhance the site, and provide compensatory alternative roosting habitats for bats, bat boxes will be erected on suitable features within the site.

Placement

The bat boxes should ideally be positioned to face either south-east, south or south-west and located as high as possible (between 3 and 6m above ground level), ideally located in a sunny position. The boxes can be either placed on different aspects, or on different suitable sides of the same feature, creating a variety of micro-climates suitable for multiple species. A flight path clear from any obstructions should be maintained around the bat box once in situ. The bat box should be positioned away from horizontal branches directly below or above the bat box which could easily be accessed by cats.

Exact numbers and locations to be confirmed pending completion of further bat surveys.

5.1.6. Management Prescription 5: Ornamental Tree

Contributes to MO5

Once acquired, new plantings should be kept in a shady place out of sunlight and frost. If they can't be planted straight away, the roots should be watered thoroughly and wrapped with a plastic sheet to prevent them drying out. The fine root fibres must be kept moist at all times as bare roots can be killed by even a few minutes of exposure to air.

Planting will take place between November and March inclusive, before they come into leaf. The time of planting should avoid any hard frosts or droughts, or particularly cold, windy periods.

Generally, it is best to plant in late autumn/ early winter, while the soil still has some warmth. This allows the trees to become established before spring. In wet areas, early spring planting may be preferable to minimise the risk of compaction, waterlogging and uprooting in winter-gales.

For the small specimens to be planted (between one to three years old), it should be sufficient to cut a 'T' or 'X'-shaped notch into the ground with a spade, insert the tree and then firm the soil back around the roots.

Considering the relatively small size of trees to be planted, staking is not considered essential. However, the addition of a stake will protect the root collar and grafting union from excessive shaking until the root system becomes established. A low stake, no more than 30cm high, will allow the whole tree to sway in the wind. This stimulates the entire stem to thicken from the root collar upwards and encourages the roots to spread out and anchor the tree. Over time this will create a stout trunk that tapers evenly from base to crown and can flex under the force of wind or vandalism. For this reason, a low stake with a maximum height of 30cm will be used.

The stake should be fastened to the tree above the grafting union with a suitably flexible tie that holds the tree firmly upright but allows some movement. If the tie does not have a separate piece to prevent rubbing, it can be passed around the tree to form a 'figure of eight'.

Spiral guards could be fitted to all new plantings, to protect them from rabbit browsing.

5.1.7. Management Prescription 6: Artificial Lighting

Contributes to MO6

The specifics for new lighting provision within the development site is currently unknown. Nevertheless, certain areas of the site have significantly higher value for foraging and commuting bats. A sensitive lighting strategy is therefore recommended to ensure that these areas remain dark at night. Essentially, this lighting zone will encompass the eastern of the site.

The lighting design for the periphery of the site (during both construction and post-development stages) will be of a 'bat friendly' specification and kept to the minimum level which meets the needs of security and health and safety.

Lighting along the eastern boundary of the site (if required) will be installed at low-level only (i.e. no higher than eaves level and lower than 2.4m) and directed downward (i.e. below the horizontal plane). Front and side hoods/ shields or cowls will be installed to prevent upwards and horizontal light spill. Where practical on health and safety/ security grounds, lighting will not be located in the vicinity of, or pointing towards, the peripheral areas of the site. This will help to ensure that a 'dark corridor' is maintained and disturbance to foraging and commuting bats is avoided/ minimised. Light levels along the site boundaries will have a lux level of less than 0.5, and ideally less than 0.3.

Any security lights used will operate off a passive infrared (PIR) motion sensor sensitive to large objects only, to avoid constant triggers by bat passes and with timers set on a short duration (i.e. a maximum 'on' time of one minute (ideally less) to reduce the amount of 'lit time'. The bulbs in the lights will ideally be low intensity (i.e. circa 11 watts), glass-glazed and the light source will either be compact fluorescent light sources fitted with appropriate UV filters, low pressure sodium bulbs, or warm light LED bulbs. White lighting sources including mercury or metal halide, CPO and CDO (ceramic discharge metal-halide) bulbs which have a significant effect on bats will be avoided throughout the perimeter of the site.

5.2. Operational Phase Management Prescriptions

The following prescriptions lay out in detail how the management objectives will be achieved during the operation phase of the development (i.e the period following completion of all site work).

5.2.1. Management Prescription 7: Management and Enhancement of Hedgerows

Contributes to Management MO1.

Light regular trimming of the hedgerows is recommended in the early years to encourage dense, bushy growth which is favourable to wildlife.

Some weed control may be needed in the first two to three years. Regular checks for weed growth are essential in the growing season, as weed growth is likely to be prolific at this site if not kept in check by the use of a mulch and, if necessary, weeding. Failing to do this will result in poor establishment of the young plants. The most common ways of controlling weeds are mulches, herbicides and cutting. A mulch is a layer of material laid over the surface of the ground to suppress weed growth and retain moisture. Planting will be mulched using a biodegradable mulch, such as well rotted Farmyard Manure (FYM), in order to suppress weeds and maintain soil moisture.

Natural regeneration of other hedgerow species will be accepted (e.g. gorse, wild rose and elder).

A small application of a high-nitrogen fertilizer can help new hedges establish. However, newly planted hedges suffer from shock and stress, and should be allowed to adjust to their new environment before encouraging new growth by applying fertilizer. Bare root hedge plants take an especially long time to establish. The newly planted hedgerow therefore shouldn't be fertilized in the first season unless the soil quality is poor.

Once established, the hedgerow will be cut every 2-3 years. Cutting will be undertaken during October to February (outside of the bird nesting season). The hedge will not be flailed during this time.

Additional watering may be necessary if in the first two summers after planting there are sustained dry conditions.

Any plants which die in the first few years must be replaced to prevent gaps developing and to maintain the continuity of the hedge line.

At year 7, consideration could be given to laying the hedge to encourage thick future growth.

5.2.2. Management Prescription 8: Management of Species-Rich Wildflower Grassland

Contributes to MO2

Future Management

Subsequent aftercare and site management of the newly planted species-rich grassland will be required. The species-rich grassland will be mown in late summer/ early autumn (September), as this timing allows plants to flower and set seed which will not only increase the floristic diversity of the site, but will also benefit invertebrates that require nectar sources and roosting locations during the spring and summer.

Once established, the mowing regime and pattern will be adopted for the species-rich wildflower meadow. Ideally, the area will be cut by hand or with small-scale mowing machine (only half of grassland area will be cut each year). The uncut areas will be cut the following year so that the grassland areas are cut at least once every two years. Arisings should then be collected and removed from site.

The use of herbicides, pesticides and artificial fertilisers on site should generally be avoided, although pernicious weeds may need to be spot-treated with herbicide.

5.2.3. Management Prescription 9: Nesting Bird Box and Bat Box Management

Contributes to MO3 and MO4

The bird boxes will be monitored annually in years 0, 1, 2, 3, 4 and 5 following installation, to check that they remain in a useable condition. They will be checked once a year in the Autumn (October to November inclusive), once the bird breeding season has finished. Any old nest debris will be removed from the boxes.

The condition of the bat boxes will be checked externally only. Please note that site contractors are legally prohibited from physically inspecting the bat boxes.

5.2.4. Management Prescription 10: Ornamental Tree Management

Contributes to MO5

Future Management

Good tree aftercare and management in the first few years after planting is crucial to ensure their survival and long-term health.

Newly planted trees require watering when planted and regularly in the first weeks after, with the ground thoroughly wetted to ensure the water reaches the roots. Depending on soil and weather conditions, further watering may be necessary during the first few summers. Failure to water may lead to poor growth, smaller and fewer fruit or even the death of the tree.

Weeds will be controlled to prevent competition until the trees have established. To reduce competition for water and nutrients while the tree is establishing itself, a 1m diameter circle should be kept clear of all vegetation and maintained for at least the first 3 years after planting. This can be achieved by using weed suppressing membranes or mats, by mulching, or careful strimming (taking care to avoid the trunk). Use of an appropriate herbicide should be avoided if possible.

Mulching (again avoiding the trunk) is preferable. As well as suppressing weeds it helps retain soil moisture, raises soil temperature in the spring and breaks down to provide a slow release of nutrients. Straw, wood chippings or well-rotted farmyard manure can be used. Previously composted mulch is preferable as fresh wood chippings or straw will temporarily lock up nitrogen as they start to decay. This can be alleviated by applying the mulch in the autumn so it begins to break down while the tree is dormant. Mulch should be replenished as necessary maintaining a layer 5cm deep.

If required, replacement trees should not be planted in exactly the same place as the (dead) tree that is being replaced, unless more than 10-20 years has elapsed since the original tree was removed. This is because the roots of the original tree will have left the ground impoverished and potentially affected by plant-borne disease.

If this cannot be achieved, then new plantings can be planted 1m from the original stump location. Failing this, the original stump can be removed and fresh soil added. Planting stone fruits where apple/ pear was previously located (and vice-versa) will also serve to reduce the likelihood of failure.

5.2.5. Management Prescription 11: Ecological Monitoring and Assessment of Management

Contributes to Management MO8.

To deliver the proposed ecological objectives, monitoring of the effects of management prescriptions will be required to ensure that these are effective, and to inform any necessary refinement of the site management strategy.

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The condition and extent of works to the habitats on the site (detailed in management prescriptions 1-10) will be assessed annually in years 1, 3, 5 and 10, and amendments to the management plan made as required. The monitoring will determine if the following works are required:

- Amendments to management of grassland and hedgerows (determined by monitoring of sward of grassland and other habitats for the degree of scrub encroachment);
- Replacement hedgerow planting (determining if any re-fixing/replacing of spiral/net guards on whips is required; determine if removal of tree guards is required; determining if any whip replacement is required; determine if trimming of the whips is required; and determine if any thinning of whips is required);
- The requirement for repairs to bird and bat boxes; and
- Determine if any spot treatment of pernicious weeds is required.

Monitoring Reports

At the end of the management plan, a report detailing the work undertaken, the results of the monitoring reviews in years 1, 3, 5 and 10 will be produced and submitted to the council.

6. Work Schedule (Including an Annual Work Plan Capable of Being Rolled Forward Over a Five-year period);

6.1. Management Diary

The management tasks required on the site will be repeated for each year. There is therefore considered to be no requirement to produce a five-year plan and instead the annual plan adequately defines the work.

The months highlighted green indicate the optimum time for undertaking the relevant management prescriptions. Months highlighted in red are unsuitable for management:

Management Prescription	Year	Activity Summary	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	0	Ground Preparation and Species-Rich Seed Sowing												
	Half of grassland, every other year	Mowing												
	1, 3, 5 and 10	Botanical Monitoring												
	0	New Compensatory Hedgerow Planting												
	2 and 3	Pruning												
	2 and 3	Weed treatment												
	2 and 3	Cutting hedge												
	Every 2 to 3 years	Replacement of failed plants												
	7	Laying of hedge												
	1, 3, 5 and 7	Hedgerow Monitoring												
Bird Boxes	0	Bird Box Installation												
	Annually	Bird Box Monitoring and Cleaning												
Bat Boxes	0	Bat Box Installation												
	Annually	Bat Box Monitoring (External Inspection Only)												

7. Responsibilities for Implementation of the Plan

7.1. Construction Phase Responsibilities

The construction phase of the development will be undertaken by a contractor of the owner's choosing, with input from Acer Ecology Ltd. It is considered that there is no need to specify the identity of any particular contractor as the work is not specialist and it would be inappropriate to prejudice future owner's decision making in regard to choice of contractor.

All ecological queries will be directed to Acer Ecology Ltd.

7.2. Operational Phase Responsibilities

The long-term management of the site is a relatively straight forward and low-cost process that will be undertaken by a contractor of the owner's choosing, or by the owner themselves. It is considered that there is no need to specify the identity of any particular contractor as the work is not specialist and it would be inappropriate to prejudice future owner's decision making in regard to choice of contractor.

The plan is also the subject of a condition which obliges performance. Ultimately that creates a responsibility for the owner to fund the management plan requirements.

Ecological queries will be directed to Acer Ecology Ltd, or another specialist ecological consultancy.

8. Monitoring, Contingencies and Remedial Measures

8.1. Monitoring of Effectiveness

In order to deliver the proposed ecological objectives, monitoring of the effects of management prescriptions will be required in to ensure that the objectives of the management plan are being met; to inform any necessary refinement of the site management and identify if contingencies and/ or remedial action will be implemented.

8.1.1. Summary of Predicted Losses and Gains for Biodiversity

A report detailing the results of the monitoring will be prepared following each year of monitoring and issued to the council. The annual report will give a summary of the outcomes of the losses and gains of biodiversity.

8.1.2. Aims of Monitoring the Construction Phase Objectives

The success of the construction phase objectives (MP1 – MP10) will be assessed by the ecologist during and upon completion of all works within this phase. They will form an integral component of the development and will undertake a 'sign off' site visit upon completion of this phase to inspect all mitigation features.

8.1.3. Aims of Monitoring the Operational Phase Objectives

The condition and extent of works to the habitats on the site will be assessed over the course of at least five years, and amendments to the management plan made as required. The monitoring will determine if the works prescribed are being implemented successfully and if any modifications are required.

8.1.4 Success Criteria and Targets

The condition of the site will be appraised against the aims and objectives of the management prescriptions detailed in Section 4.

As the ecological management of the site is relatively straightforward and does not require close scientific monitoring, the success criteria can be relatively simple.

If the newly planted species-rich grassland, hedgerows and ornamental trees have established after 5 years and are in good condition this will be regarded as a success. If these habitats have not established after 5 years and are in poor condition, then this will be regarded as a failure.

If the bird/ bat boxes do not remain in good condition (i.e damaged or not cleaned) or are not present after the 5-year period, then this will be regarded as a failure. If the bird/ bat box remains in good condition/ is replaced when damaged over the 5-year period, then this will be regarded as a success. If the bird/ bat box is used by nesting birds/ roosting bats, then this will be regarded as a great success.

8.1.5 Methods for Data Gathering and Analysis

Gathering of scientific data is not necessary as only a photographic record of the features to be managed on site is required.

A degree of update botanical survey will be required to determine the extent of success for the species-rich grassland, the retained poor semi-improved grassland and the marginal planting.

8.1.6 Timing and Duration of Monitoring

Monitoring of the construction phase objectives (MP1 – MP9) will be undertaken during and immediately after the completion of the development and aims to ensure that the objectives have been correctly implemented.

Monitoring of the operational phase objectives (MP10 – MP17) will be undertaken as per the timings details in Section 6.

8.1.4. Responsible Persons and Lines of Communication

Ecological monitoring will be undertaken by Acer Ecology Ltd., or another specialist ecological consultancy.

Grounds maintenance will be undertaken by the owner or contracted workers.

9. Legal and Funding Resources and Mechanisms to Ensure Sustainable Long-term Management Delivery

The long-term management of the site is relatively low-cost and it is felt that there is no need to provide this details within the plan. The plan is also the subject of a condition which obliges performance. Ultimately that creates a responsibility for the owner to fund the management plan requirements.

