LEMP



Padbury Solar

Landscape and Ecological Management Plan

Submitted to: JBM Solar Projects 8 Ltd.

Prepared by: RSK ADAS Ltd, 11D Park House, Milton Park, Abingdon, Oxfordshire, OX14 4RS. Tel. no: 01235 355630 ADAS ref: 1120007-L-02 (02)

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Quality Assurance

Author	Checked	Approved
A E		Daniel Haigh
Amy Furness B.Sc., MLA	Michael Berwick B.Sc., MLA, CMLI	B.Sc. (Hons), GradDip, PgDip,
D.SC., WILA		CMLI

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Where field investigations have been carried out, these have been restricted to a level of detail required to achieve the stated objectives of the work.

Issue	Date	Amendments
01	23/11/2022	First Issue
02	10/02/2023	Appendix 2 added
03	16/02/2023	Amendment to management duration
04	16/02/2023	Minor amendment to text
05	05/05/2023	Updates following landscape officer review

This work has been undertaken in accordance with the quality management system of RSK ADAS Ltd.



1. Introduction

- 1.1. A Landscape and Ecological Management Plan (LEMP) has been undertaken by ADAS for the proposed 44 MW Solar PV Array land near Stratton Audley, Cherwell District, Oxfordshire, England (OX27 9AL) (hereafter referred to as 'the site'). This report has been prepared in relation to support a planning application on behalf of the applicants, JBM Solar Projects 8 Ltd.
- 1.2. The LEMP should be read in conjunction with the following documents submitted as part of the planning application:
 - RSK ADAS Ltd. (2022) 'Site Layout Plans' 1051745-ADAS-XX-XX-DR-PL-8000 1051745-ADAS-XX-XX-DR-PL-8004
 - Padbury Brook Landscape Visual Appraisal, November 2022. ADAS ref: 1051765-L-RP-01 (01)
 - Arboricultural Planning Statement, November 2022. ADAS Reference: 1051745
 - Preliminary Ecological Appraisal, July 2022. Report no:WOR-2672
- 1.3. The LEMP provides maintenance and management details of the landscape associated with the site only. It does <u>not</u> provide details for the ongoing management of the solar arrays and associated infrastructure.

Objectives of the report

- 1.4. The LEMP provides details of mitigation and enhancement requirements during the construction and operational phases of the project. The report also includes a management framework during the operational phase. The LEMP will cover the period of the lifetime of the project, although this would be reviewed every 5 years as part of the audit and monitoring process, after which management would be reviewed against the current site conditions.
- 1.5. The LEMP has been produced in accordance with the British Standard (BS) for Biodiversity Code of practice for planning and development, BS42020:2013.
- 1.6. The main objectives of this LEMP are as follows:
 - 1. Identify roles and responsibilities of the management of the site.
 - 2. Establish procedures for communication, monitoring, audit mechanisms and reporting of control measures.
 - 3. Provide clear and concise information that states why the habitats will be created.
 - 4. Maximise the biodiversity value of any existing retained habitats in and adjacent to the site.
 - 5. Outline how the newly created and existing habitats are maintained sufficiently to support successful establishment and provide biodiversity benefits in in the long term.



Author of the report

1.7. This report was written by an Associate Member of the Landscape Institute, guided by a Chartered Member of the Landscape Institute (CMLI) who is trained and experienced in undertaking landscape and ecological management plans. ADAS is a Landscape Institute registered practice and all work is prepared and reviewed internally by senior highly experienced landscape architects.



2. Management responsibilities and procedures

- 2.1. JBM Solar Projects 8 Ltd will appoint a suitably qualified principal contractor / management company to undertake the landscape maintenance and management in line with this LEMP. As a minimum, the landscape contractor / management company will be a registered member of the British Association of Landscape Industries (BALI) or similar approved governing body / institute.
- 2.2. It is the responsibility of the JBM Solar Projects 8 Ltd (or those legally responsible for the proposed development site) to ensure that the measures within this report are adopted, or that the Local Planning Authority (LPA) are notified where there is to be any deviation from what is proposed in this report. They will be responsible for all communication, monitoring, audit mechanisms and reporting of control measures outlined in this report, with the support of the appointed landscape contractor / management company. This document will be passed on to all relevant parties at project hand-over. The appointed contractor will be legally obligated to provide a detailed site-specific method statement, and any task-specific risk assessments, including Control of Substances Hazardous to Health Regulations (COSHH) assessments.
- 2.3. The site will be managed to comply with all relevant health and safety legislation, best practice standards, approved codes of practice (ACOP's) and Health and Safety Executive (HSE) guidance, including CDM 2015. It will be the responsibility of the appointed landscape contractor / management company to fulfil the role of JBM Solar Projects 8 Ltd. This places an obligation on the landscape management company to ensure that any contractor understands and fulfils their health and safety role and any work undertaken on the site will follow the guidelines of the HSE.
- 2.4. A recording and monitoring programme will be implemented for all landscape maintenance and management operations and will be recorded including the following details.
 - Weather.
 - Date the operation took place.
 - Who carried out the operation.
 - Success of the operation.
 - Necessary alterations that affected the operation (e.g. to prevent disturbance).
 - Any disturbance caused.
 - Photographic records capable of showing operations and seasonal comparisons of vegetation composition and the success of management taken starting from year 0.
 - Suggestions for the future that may improve success next time the operation is carried out.



3. Rationale of habitat creation

Design rationale

- 3.1. The landscape proposals are designed to improve the overall biodiversity value of the site by increasing habitat and species diversity, improving the condition of existing habitats and creating new habitats to compliment those existing habitats and enhance the current site. The habitat creation will include:
 - Creation of a new native hedgerows across the site to screen the development.
 - Infilling of hedgerow gaps with new native hedgerows to strengthen corridors and screen the development.
 - Creation of grazing meadow and species rich grassland across the entire site.
 - Enhancement of existing grassland to increase diversity and quality of the habitats.

Native specimen tree planting (including trees within proposed hedgerows)

Long term design objectives

3.2. The proposed tree planting will help screen the development from the local landscape and improve the connectivity between field boundaries, whilst enhancing the existing green infrastructure. The proposed planting will enhance the local landscape character and increase the variety of habitats, enhancing the overall biodiversity of the surrounding landscape. The proposed planting will consist of native species, with fruiting and nut producing species where appropriate to provide additional foraging habitat.

Proposals

3.3. Tree species will consist of rootball plant material where possible, planted at locations shown on the detailed landscape masterplan. The tree species proposed are species found in the existing vegetation around the site and local landscape.

Tree Species										
Latin name	Common name									
Acer campestre	Field maple									
Betula pendula	Silver birch									
Malus sylvestris	Crab Apple									
Malus cultivars	Apple									
llex aquifolium	Holly									
Populus nigra 'Italica'	Lombardy poplar									
Pinus sylvestris	Scot's pine									
Prunus avium	Wild cherry									
Quercus robur	Oak									
Sorbus aucuparia	Rowan									

Table 1. Composition of individual tree planting



Tree Species								
Latin name Common name								
Tilia x europaea	Lime							

Native hedgerow planting (Native species-rich hedgerows and hedgerows with trees)

Long term design objectives

3.4. The proposed native hedgerow planting will help screen the development from the local landscape and improve the connectivity between field boundaries. The proposed planting will enhance the local landscape character and increase the variety of habitats, enhancing the overall biodiversity of the surrounding landscape. The proposed planting will consist of native species, with fruiting and nut producing species where appropriate to provide additional foraging habitat.

Proposals

3.5. Hedgerow species will comprise bareroot plant material where possible, planted as a double staggered row at 0.33m centres. The hedgerow species proposed are species found in the existing vegetation around the site and local landscape.

Native hedgerow planting species mix											
Latin name	Common name	%									
Acer campestre	Field maple	5									
Cornus sanguinea	Dogwood	5									
Corylus avellana	Hazel	5									
Crataegus monogyna	Hawthorn	50									
Euonymus europaeus	Spindle	5									
llex aquifolium	Holly	8									
Ligustrum vulgare	Wild privet	10									
Prunus spinosa	Blackthorn	5									
Rhamnus catherticus	Buckthorn	5									
Viburnum opulus	Guelder rose	2									

Table 2. Composition of native hedgerows

Species rich grassland

Long term design objectives

3.6. New species-rich grassland is proposed across the site to provide a suitable alternative habitat to the current arable habitat found on site. The grassland will provide habitat and foraging opportunities for local wildlife such as badgers, birds, bats and numerous invertebrates. It would also provide a source of pollen and nectar for pollinators.

Proposals



3.7. Species-rich grassland is proposed across the entire site but will be separated into different mixes. The grassland proposed within the fence line amongst the solar arrays (*grazing meadow grassland*) will need to be suitable for low density grazing. Hay cuts are not suitable around solar arrays due to the additional shading impacts on the cut grassland piles, which prevents the grassland from drying out sufficiently to drop seed and be collected. Therefore, low density grazing will be implemented to provide a suitable management solution whilst creating a species-rich habitat across the site. The grassland within the fence line will be seeded with Habitat Aid '*Grazing Meadow Seed Mix*' or similar approved. This mix is deemed suitable for creating a species-rich grassland with wildflowers that is suitable for low density grazing. The full species composition is provided in table 3 below.

Habitat Aid - 'Grazing Meadow Seed Mix'												
Latin name	Common name	%										
Achillea millefolium	Yarrow	1										
Plantago lanceolata	Ribgrass	1										
Cichorium intybus	Chicory	4										
Sanguisorba Minor	Sheep's Burnet	1.5										
Petroselenium crispum	Sheep's Parsley	1.5										
Onobrychis	Sainfoin	1										
Festuca pratensis	Meadow Fescue	10										
Poa pratensis	Smooth Stalked Meadow Grass	7										
Cynosurus cristatus	Crested Dogstail	10										
Phleum bertolonii	Smaller Cat's Tail	5										
Festuca rubra	Creeping Red Fescue	10										
Lolium perenne	Perennial Ryegrass	29										
Dactylis glomerata	Cocksfoot	7										
Trifolium pratense	Red Clover	2										

Unbitat Aid (Grazing Mandow Soud Miv)

Table 3. Composition of proposed grazing meadow grassland within the fence line

3.8. The remaining areas of proposed grassland (*meadow grassland*), predominantly located along the base of existing vegetation and outside of the fence line, will be managed to provide suitable shelter and foraging opportunities along the base of existing vegetation and areas that will experience little human input. The meadow grassland will be seeded with Emorsgate 'EM2 – General Purpose Meadow Mixture' or similar approved. This mix is deemed suitable for more traditional meadows for a range of uses. The full species composition is provided in table 4 below.



Emorsgate EM2 - 'General Purposed Meadow Mixture'								
Latin name	Common name	%						
Achillea millefolium	Yarrow	0.50						
Centurea nigra	Common Knapweed	1.70						
Cruciata laevipes	Crosswort	1.50						
Daucus carota	Wild Carrot	0.50						
Knautia arvensis	Field Scabious	0.50						
Leucanthemum vulgare	Oxeye Daisy	1.50						
Malva moschata	Musk Mallow	2.00						
Medicago lupulina	Black Medick	0.20						
Plantago lanceolata	Ribwort Plantain	3.00						
Poterium sanguisorba ssp sanguisorba	Salad Burnet	1.50						
Primula veris	Cowslip	0.09						
Ranunculus acris	Meadow Buttercup	0.30						
Rhinanthus minor	Yellow Rattle	0.99						
Silene dioica	Red Campion	0.49						
Silene vulgaris	Bladder Campion	0.19						
Agrostis capillaris	Common Bent	8.50						
Cynosurus cristatus	Crested Dogstail	29.7						
Festuca rubra	Red Fescue	25.50						
Phleum bertolonii	Smaller Cat's-tail	4.25						
Poa pratensis	Smooth-stalked Meadow-grass	17.00						

Table 4. Composition of proposed meadow grassland outside of the fence line



4. Delivery of habitat creation

Native tree planting

- 4.1. The proposed tree stock will be rootballed. Trees will be of local provenance (if available) and sourced from a supplier in county to minimise transportation distance and costs where possible. The initial planting and any re-stocking operations will be carried out between November and the end of March, avoiding periods of frost, extreme cold and waterlogged conditions. All tree planting is to be in accordance with BS8545:2014. Plants should be inspected on delivery and.
- 4.2. Time of planting will be as follows:
 - Rootballed deciduous trees and shrubs: Late October to late March.
 - Rootballed Conifers and evergreens: September/ October or April/ May
 - Container grown stock: At any time if ground and weather conditions are favourable.
- 4.3. The following approach and methods will be followed for all tree planting:
 - All plant stock to be preferably from a local supplier. The initial planting and any re-stocking operations will be carried out between November and the end of March, avoiding periods of frost, extreme cold and waterlogged conditions.
 - All tree planting is to be in accordance with BS8545:2014.
 - Trees should be inspected on delivery and insecticide dipped trees should be ventilated by loosening the bag seal.
 - Tree pit sides should not have compacted, glazed or smeared sides from digging. Sides of a planting pit that have been smeared or smoothed during excavation should be scarified.
 - Tree pits should have a radius of at least 75mm greater than that of the root system.
 - During excavation of the tree pit, the soil should be placed to one side separating topsoil and subsoil as far as possible.
 - Planting depth is critical to transplanting success. Planting too deep is a common cause of failure. The root flare of the newly planted plant should be clearly visible at the soil surface and it should not be buried by excess soil. The root ball or stem-root transition should be level with the existing host soil.
 - All backfill applied should, as far as practicable, replicated the horizons within the original soil profile. Topsoil should not be used below the depth of the original topsoil layer.
 - The final layer of backfilling should not be consolidated but should be of a sufficient depth to allow for settlement.
 - Heavy standard and extra heavy standard trees are to be secured using a double stake and tree ties.
 - Immediately after planting, the tree pit should be saturated to field capacity.



• Irrigation of newly planted trees is to be carried out as per BS 8545-2014. It is recommended that water is applied slowly by a hose until field capacity of the tree pit is reached. Allow for a minimum of 50 litres per tree on each separate occasion. In line with BS 8545-2014, the frequency of irrigation should take in to account the wind conditions, daily temperature and moisture holding capacity of the soil. Water should only be applied if the soil moisture values indicate that it would be appropriate to do so. However, watering requirements are subject to change and any deviation from the above will be agreed between the management company and the local authority.

Native hedgerow planting (Native species-rich hedgerows and hedgerows with trees)

- 4.4. The proposed hedgerow stock will be bare root. Hedgerow planting will be of local provenance (if available) and sourced from a supplier in county to minimise transportation distance and costs where possible. The initial planting and any re-stocking operations will be carried out between November and the end of March, avoiding periods of frost, extreme cold and waterlogged conditions. Plants should be inspected on delivery.
- 4.5. Time of planting:
 - Bare root species: Late October to late February.
 - Conifers and evergreens: September/ October or April/ May
 - Container grown Holly and Scots Pine: At any time if ground and weather conditions are favourable.
- 4.6. The following approach and methods will be followed for all hedgerow planting:
 - The area to be planted as a hedgerow will be rotovated to a width of 350mm and a depth of 250mm.
 - All shrubs will conform to either the 'British Standard 3936-1:1992 Nursery Stock Part 1: Specification for Trees and Shrubs' (BS3936) or the 'National Plant Specification' (NPS) produced by the Horticultural Trades Association and be 60-80cm bare root transplants or equivalent cell grown stock.
 - The proposed hedgerow species will be planted at 300mm centres in a double staggered row. Whips are to be planted in random single-species groups of 2 to 5 plants in double staggered rows with six plants per linear metre.
 - The planting area is to be kept weed free using a broad-spectrum systemic herbicide if necessary. Alternatively, the hedgerow gaps will be planted through a weed suppressant geotextile or mulching to control weeds and reduce moisture loss.
 - The plants will be notch planted with the open notch heeled-in.
 - Hedgerow plants will be protected by a 0.6m bio-degradable shelter supported with a 0.75m long, treated softwood stake. The shelters will protect the plants from browsing deer or rabbits and facilitate spot-treatment with herbicide to control the annual growth of weeds.

Species rich grassland

Ground preparation

4.7. Ground preparation is essential for the successful establishment of all proposed grasslands. Existing vegetation associated with the arable land and arable field margins should be fully removed prior to any seeding to minimise impacts from undesired species. Cultivation along the bases of existing vegetation should take care to not dig too deep to avoid impact on roots and advise should be sought from the arboriculture consultant. The manufacturer has provided the following information on weed control and seed bed cultivation:

'In open ground, control of 'weeds' can be achieved by repeated cultivation to exhaust weeds (fallowing). Recently cultivated land with annual weeds can be cleared for sowing in a few weeks.

Cultivate the soil to sufficient depth to bury remaining trash and to alleviate compaction, then rake or harrow and roll to produce a fairly fine, firm surface.

The finished seedbed should be firm enough to walk on without leaving impressions. As the area will be mown at a later stage the finished surface should be free of obstructions such as large stones or bricks, and free of deep ruts or ridges.' (Emorsgate Seeds Ltd)

Sowing

4.8. Once the ground is prepared appropriately, the area will be suitable for sowing. The manufacturer has provided the following information on sowing:

'Seed is best sown in the autumn or spring but can be sown at other times of the year if there is sufficient warmth and moisture. The seed must be surface sown and can be applied by machine or broadcast by hand. To get an even distribution and avoid running out divide the seed into two or more parts and sow in overlapping sections. Do not incorporate or cover the seed, but firm in with a roll, or by treading, to give good soil/seed contact.

Seeds need both warmth and moisture to grow and may be sown at any time of year when these conditions are met. August-September and March-April usually produce the best conditions for sowing outside in most parts of the UK. Late autumn sowings should be avoided on sites prone to water-logging in winter and late spring and summer sowings should be avoided on droughty sites.

Our recommended sowing rates for wild seed mixtures are much lower than conventional lawn and amenity grass rates (2-4g/m2 compared with 25-50g/m2). This is deliberate, as rather than aiming for rapid ground cover to suppress all weeds, wild seeding aims to allow an extended period of establishment with room for both fast growing grasses and slower germinating flower seeds. There is some scope for increasing or reducing rates to suit circumstances or budget. Be careful not to sow a standard mixture too heavily as even on difficult sites this can lead to overcrowding or an imbalance in the establishing sward - they are designed to work optimally at their specified rate.' (Emorsgate Seeds Ltd)

Initial aftercare

4.9. Once the grassland has been sown, the establishment aftercare is important to maximise the successful establishment of the grassland swards. The aftercare varies depending on if the meadow is sown in freshly prepared ground or in existing grassland. The manufacturer has provided the following information on initial aftercare for freshly prepared ground:



Most of the sown meadow species are perennial and are slow to establish. Soon after sowing there will be a flush of annual weeds, arising from the soil seed bank. These weeds can look unsightly, but they will offer shelter to the sown seedlings, are great for bugs, and they will die before the year is out.

In good growing conditions (warm soils and adequate rainfall) the grass will establish and need its first management around 6-10 weeks from sowing, by which time grass will have reached around 10cm height.

Light grazing with livestock can be introduced at this stage. Sheep are to be preferred as they have lighter feet and nibble grass back neatly and so encourage the grass to thicken up by tillering at the base. Cattle are likely to damage a young sward by tugging at the grass, and from their heavy hooves. Graze for short periods initially to avoid over grazing and allow time for the grass to recover. Avoid grazing if the soil is saturated with water.

Alternatively, top initial growth (sown species and weeds) to encourage the sward to thicken up and restrict any weed growth. Remove or disperse cuttings so as not to leave mulched patches which will kill young grass.' (Emorsgate Seeds Ltd)



5. Protection of existing habitats

- 5.1. The boundaries of the site comprise mature trees, hedgerows scrub and woodland. The existing vegetation is assessed to be of ecological value in the context of the site. These areas of existing vegetation will be retained as part of the landscape proposals and will require regular inspection and monitoring to check for condition and pests and diseases.
- 5.2. To avoid compaction, there should be no vehicle or plant access within root protection areas. Where appropriate, protective fencing should be used and located as directed by the arboricultural consultant, highlighted in the arboricultural assessment. Where accidental compaction has occurred, advice should be sought from an arboricultural consultant.
- 5.3. Care should be taken when planning site operations to ensure that wide or tall loads, or plant with booms, jibs and counterweights can operate without encountering retained trees. Such contact can result in serious damage to trees and might make their safe retention impossible. Material which will contaminate the soil, e.g. diesel oil and vehicle washings, should not be discharged on the site.



6. Habitat maintenance

General principles

- 6.1. After completion, maintenance operations would be covered by the requirements set out in the defect's liability period specification. Management objectives are focussed on achieving the landscape objectives listed in the introduction.
- 6.2. Replacement of planting losses during the defect's liability period will be covered by the contract requirements. Planting that dies or is damaged because of environmental factors in the longer term will be addressed by replacement as appropriate to achieve complete vegetation cover.
- 6.3. The details for maintenance and management operations in-perpetuity are set out in the LandscapeMaintenance and Management Programme in Appendix 2.
- 6.4. This management plan has proposed:
 - Management and maintenance of new and existing vegetation and habitats over a 10 year period.
 - Longer term management and maintenance in-perpetuity with monitoring and opportunity to review management procedures on an annual basis.
 - A programme to ensure successful planting operations, establishment and continued growth through to maturity of trees, shrubs and grassland for the benefits of the users and wildlife.
- 6.5. Maintenance operations can be defined as short-term regular operations that are required on a week-to-week basis, such as weeding, mowing, watering, etc. The nature of these maintenance operations will typically be carried through subsequent years, the frequency of such operations remains flexible in order that response can be made to any change in circumstances. The maintenance schedule will therefore need to be reviewed on an annual basis to determine the exact requirements to suit the longer-term management objectives.
- 6.6. Management operations can be defined as longer-term cyclical operations over several years, such as the establishment of woodland structure, hedgerow structure and tree and shrub form to planting areas.
- 6.7. The proposed management regime draws on the sequence of maintenance operations to achieve longer-term objectives and is detailed in the Landscape Maintenance and Management Programme, following practical completion of the works (refer to Appendix 2).



Establishment (up to year 10)

Native tree planting

- 6.8. For the purpose of this report, ongoing maintenance and management of existing trees during the first 10 years will be covered in the 'long term management (after year 10)' section of the report.
- 6.9. For the establishment of the proposed new trees, the planting bases should be kept clear of weeds by a combination of herbicides and hand control methods. A weed free area of 800mm diameter or the surface of the original planting pit should be maintained around the trees.
 - Newly planted trees should be inspected annually.
 - Check base of tree for 'rocking' or 'socketing'. Straighten and re-stake tree if required.
 - Check tree stakes and ties.
 - Check tree for signs of damage. Cut back broken branches and prune to shape if necessary.
 - Stakes should be replaced if broken, loose or decayed. Loose or defective ties should be adjusted, refitted and replaced to allow for growth and prevent chafing. The ties should be removed and the stakes removed or cut down to ground level 5 years after planting or if the tree is deemed established.
 - Re-firming will be undertaken after strong winds, frost heave, and other disturbances. Pruning is to be undertaken in accordance with good horticultural and arboricultural practice and in accordance with BS 3998-2010.
 - Application of slow-release fertiliser is to be made if deemed necessary to the tree at the end of the planting season until the tree has successfully established.
 - Applications of herbicide will be made as necessary up to two times during the growing season for the first 5 years, or until the tree has successfully established. Treatment of all herbaceous growth within an 800mm of the tree should be removed.
 - Irrigation of newly planted trees is to be carried out as per BS 8545-2014. It is recommended that water is applied slowly by a hose until field capacity of the tree pit is reached. Allow for a minimum of 50 litres per tree on each separate occasion. In line with BS 8545-2014, the frequency of irrigation should take in to account the wind conditions, daily temperature and moisture holding capacity of the soil.
- 6.10. Any trees which have died as a result of the contractor's maintenance operations or omissions shall be replaced by the maintenance contractor at their own expense during the next planting season.

Native hedgerows (All hedgerows)

6.11. For the purpose of this report, ongoing maintenance and management of existing hedgerows during the first 10 years will be covered in the 'long term management (after year 10)' section of the report.



- 6.12. Establishment of new hedgerow planting will require the following maintenance during the first 10 years of establishment:
 - In the first 10 years after planting, hedgerows bases should be kept clear of weeds by a combination of herbicides and hand control methods. A weed free area of 1.5m (0.5m either side of hedgerow planting) should be maintained around the planting. Where herbicide application is needed, it is recommended that an appropriate herbicide is applied in July August in small, controlled areas around the plant base.
 - In the interests of wildlife, hand weeding, where feasible, should take precedence over the use of herbicides in hedgerows. However, in certain instances, herbicide may be the most effective measure to take against unwanted species.
 - For the first 10 years after planting, any plants that have died or become diseased will be marked for replacement, then replaced during the next planting season.
 - Maintenance of adequate levels of soil moisture which may require irrigation during dry periods. A 5-7.5cm mulch for 1m around the base of each plant will increase retention of soil moisture if drought becomes an issue.
 - If the hedgerow reaches a height of approximately 2m in the first 5 years, this should be cut back annually between October and February (Inclusive) to the previous years growth, by hand tools. Otherwise, from 5 to 10 years after planting, lightly prune back the establishing hedgerow to the previous year's growth, using hand tools.
 - At the end of year 5, if the hedgerow has sufficiently established to a point where browsing would not significantly harm the species the guards can be removed.

Species rich grassland

- 6.13. Species-rich grassland is proposed across the site to provide a suitable habitat for shelter and foraging opportunities for local wildlife such as badgers, birds, bats and invertebrates. It would also provide a source of pollen and nectar for pollinators. The grassland across the site has been split into different mixes due to the nature of the maintenance required within the fence line amongst the solar arrays, compared to the requirements outside of the fence line.
- 6.14. The *grazing meadow grassland* area located within the fence line of the development will comprise the specified seed mix 'Habitat Aid Grazing Meadow Mix' or similar approved. Due to the potential issues with hay cuts around solar arrays, this grassland has been proposed to suit a low intensity grazing regime. The grazing meadow grassland should be kept to a height of approximately 100mm in its first year of establishment (between March and October) via cutting or grazing. During the first year of establishment, the grazing meadow grassland will be maintained in line with the manufacturer's recommendations, which are as follows:

First Year (See paragraph 4.10 for initial establishment aftercare)

'Light grazing with livestock can be introduced at this stage. Sheep are to be preferred as they have lighter feet and nibble grass back neatly and so encourage the grass to thicken up by tillering at the base. Cattle are likely to damage a young sward by tugging at the grass, and



from their heavy hooves. Graze for short periods initially to avoid over grazing and allow time for the grass to recover. Avoid grazing if the soil is saturated with water.

Alternatively, top initial growth (sown species and weeds) to encourage the sward to thicken up and restrict any weed growth. Remove or disperse cuttings so as not to leave mulched patches which will kill young grass.' (Emorsgate Seeds Ltd)

- 6.15. From years' 2-10, once the *grazing meadow grassland* has established, a grazing or cutting regime can be implemented.
 - If growth is vigorous and weather permits, lightly graze or cut and collect the grassland in March/early April. (Grazing/cutting timings can be varied across the fields to encourage sward height variation through the season).
 - No grazing or cutting to occur between April and July to allow the meadow to flower and set seed.
 - Introduce grazing from late July/early August to cut back the meadow grassland.
 - Continue grazing throughout the rest of the season until signs of poaching occur or the ground becomes too wet.
 - Weed treatment to occur throughout the season, even when no grazing is taking place. Weeds are to be treated with herbicide or strimmed back if in large stands. Treatment is to occur before weeds flower.
- 6.16. The *meadow grassland* located outside of the fence line will comprise the specified seed mix 'EM2

– Standard General-Purpose Meadow Mixture' or similar approved. The meadow grassland should be kept to a height of approximately 50-100mm in its first year of establishment (between March and October) via cutting or grazing. During the first year of establishment, the meadow grassland will be maintained in line with the manufacturer's recommendations, which are as follows:

- Meadow grassland will be cut to a minimum height of 50-100mm and shall not be allowed to grow beyond a height 200mm in year 1.
- Cut and collects will be carried out during the growing season (March-October) as necessary to prevent the sward establishing beyond a height of 200mm. This is to prevent weeds and grasses outcompeting the perennial growth of the wildflowers.
- If grazing is possible, then light grazing can be instructed and replace mowing during the growing season.
- Perennial weed treatment to occur throughout the season across all meadow grassland. Weeds are to be treated with herbicide or strimmed back if in large stands. Treatment is to occur before weeds flower.
- 6.17. From years' 2-10, once the *meadow grassland* has established, a long-term grazing or cutting regime can be implemented.
 - Areas of meadow grassland will be cut and collected in March/early April. If grazing is available at this time, then a cut will not be necessary.



- No further cutting or grazing will occur between April to July to allow the meadow grassland to flower and set seed.
- A cut and drop will be carried out in late July/early August to allow the grass to dry and seed to disperse. The arisings should then be collected and either used for hay or composting.
- Aftermath grazing is to be carried out after the summer cut until the end of the growing season or if the ground becomes poached or too wet. If aftermath grazing doesn't occur, the meadow grassland should be chain harrowed to remove the thatch.
- Perennial weed treatment to occur throughout the season across all meadow grassland, even when no cutting or grazing is taking place. Weeds are to be treated with herbicide or strimmed back if in large stands. Treatment is to occur before weeds flower.
- Woody species and bramble should be cut back annually.

Public Rights of Way (PRoW)

6.18. For the purpose of this report, ongoing maintenance and management of PRoW during the first 10 years will be covered in the 'long term management (after year 10)' section of the report.

Long term management (after year 10)

Established trees (including existing trees)

- 6.19. All trees and woodland should be inspected every 5 years as part of other routine maintenance activities to ensure that they are in good health and are not hazardous to the users of the site. Trees should also be inspected immediately after periods of high winds and storms.
- 6.20. All work to mature trees that cannot be carried out by an operator standing on the ground shall be excluded from general maintenance activities and carried out by an arboricultural contractor. If any general pruning or removal works occur, arisings should be used to create log and brash piles across the woodland and at the base of hedgerows. In some circumstances, whole trees can be left standing or as felled in the woodland if it does not affect the growth of other trees.
- 6.21. Routine inspection and pruning should include the following operations.
 - The removal of dead, diseased and dying branches.
 - Inspection for and reporting of any incidence of pests and disease.
 - Presence of invasive and non-native species.
 - General woodland form i.e., if canopy closure reaches 100%, lack of ground flora etc.
 - Occasionally, the inspection may result in a recommendation for specialist pruning of which crown thinning and reduction are likely to be the most needed.
 - All tree works should be carried out in a safe manner complying with all relevant legislation.

Hedgerows (Including existing retained hedgerows)

6.22. Once established, the hedgerows will be managed to a minimum height of 3m, which is optimal for wildlife. Hedgerows will be cut back between late September and February (inclusive), with the



long-term aim to create tall, thick hedgerows, with a strong, bushy base. Hedgerows will be allowed to grow to a width of approximately 2m and will <u>not</u> be management less than 1.5m.

- 6.23. Hedgerows will be cut on 3-year rotational basis across the site to ensure there is suitable hedgerow habitat on site at any one point. 1/3 of the hedgerows on site will be cut back each year, resulting in a hedgerow being cut back every 2 years.
- 6.24. In the longer term, once the hedgerows start to become 'leggy', a programme of hedge laying may become necessary, which should be done in sections on an annual basis and undertaken subsequently for each section every 10 to 15 years. Hedgerow cutting should only be recommenced 2 years after laying.

Species-rich grassland

6.25. Grassland areas should be managed on a rotational basis to provide a variation in sward height across the entire site, which will benefit biodiversity and provide continuous shelter and foraging opportunities for wildlife.

Grazing meadow grassland

- 6.26. For the *grazing meadow grassland* areas within the fence line, the following management should be undertaken:
 - Low density grazing should be carried out on 3-year rotational basis across the site where possible and across the appropriate season. 1/3 of the *grazing meadow grassland* will be grazed each year, resulting in an area of grassland being managed once every three years. This will encourage sward height variation across the site to benefit biodiversity requirements and reduce management requirements.
 - Grazing is to occur in March to early April and then again in Late July/early August to October or until there are signs of poaching or the conditions become too wet. If the grassland can't be grazed, then the grassland should be cut and collected in March/April and again in late summer (late July/early August) to avoid monocultures forming.
 - Control invasive perennial weeds (docks, thistles) across the entire site through herbicide and mechanical methods, ensuring that weeds are removed before they set seed. It is the contractor's responsibility to manage and control weed growth within the grass swards. This shall normally be achieved by the regular cutting operation and where necessary the application of appropriate contact or residual herbicides, although it remains the responsibility of the contractor to adopt other methods where herbicide application is unsuccessful or impractical.
 - Control scrub and bramble invasion into the grassland via mechanical methods. Works to be undertaken outside of the bird nesting season (September February inclusive).
 - Prior to any works on the grassland, it shall be cleared of litter and debris.
 - All operations shall be carried out using machinery appropriate to the task, cylinder, rotary or mulch mowers and when weather and ground conditions are suitable.



- Operations shall be suspended where ground conditions prevent the use of machinery or grazing without damage to the ground surface. Where operations are suspended due to unsuitable conditions, additional maintenance visits may be required to maintain the sward within acceptable growth limits.
- Monitor grass erosion and regularly reinstate damaged or worn areas as required using the seed mix 'Habitat Aid Grazing Meadow Mix' or similar approved. Works should be carried out in accordance with the manufacturer's recommendations.

General meadow grassland

- 6.27. For the *meadow grassland* areas outside of the fence line, the following management should be undertaken:
 - The first 2-3m of meadow grassland from the base of any vegetation will be left as permanent 'rough' grassland. Where persistent weeds occur, these should be removed mechanically by cutting back the section of grassland affected. If species diversity reduces within the permanent rough grassland, then this section should be cut back and over sown with 'EM2 – Standard general purpose meadow mix' or similar approved.
 - The remaining area of meadow grassland beyond the 2-3m from the base of vegetation should be cut back on a 3-year rotational basis across the site. Approximately 1/3 of the meadow grassland across the site should be cut back annually, resulting in each section of grassland being cut back every three years.
 - Meadow grassland is to be cut and collected in March/April and again in late summer (late July/early August) to avoid monocultures forming and allow the meadow to flower and drop seed.
 - Control invasive perennial weeds (docks, thistles) across the entire site through herbicide and mechanical methods, ensuring that weeds are removed before they set seed. It is the contractor's responsibility to manage and control weed growth within the grass swards.
 - Control scrub and bramble invasion into the grassland via mechanical methods. Works to be undertaken outside of the bird nesting season (September February inclusive).
 - Prior to any works on the grassland, it shall be cleared of litter and debris.
 - All operations shall be carried out using machinery appropriate to the task and when weather and ground conditions are suitable.
 - Operations shall be suspended where ground conditions prevent the use of machinery without damage to the ground surface. Where operations are suspended due to unsuitable conditions additional maintenance visits may be required to maintain the sward within acceptable growth limits.
 - Monitor grass erosion and regularly reinstate damaged or worn areas as required using the seed mix 'EM2 Standard general purpose meadow mix' or similar approved. Works should be carried out in accordance with the manufacturer's recommendations.

Public Rights of Way (PRoW)

6.28. The PRoW running through the site will be managed in line with the above management items. Hedgerows adjacent to PRoW will be cut back annually on the PRoW side to avoid encroachment.



Grassland management along the PRoW will be carried out on a 3-year rotational cut as part of the grassland management programme detailed above.

- 6.29. Control of invasive perennial weeds (docks, thistles) along the PRoW will be via mechanical methods only, ensuring that weeds are removed before they set seed. Herbicide application will <u>not</u> be permitted along PRoW due to the potential risk of contact with the public and animals. It is the contractor's responsibility to manage and control weed growth within the grass swards.
- 6.30. Control of woody species and bramble invasion across the PRoW will be via mechanical methods only. Works are to be undertaken outside of bird nesting season (September February inclusive).



Appendix 1: Supporting Plans





	isting troop and yogo	tation	
	isting trees and veget howing canopy exten		
	OPOSED TREES	Common Namo	_
	ecies er campestre	Common Name Field Maple	_
Be	tula pendula	Silver Birch	_
	alus sylvestris alus cultivars	Crab Apple Apple	_
lle	x aquifolium	Holly	_
<u>Pir</u> Po	nus sylvestris pulus nigra 'Italica'	Scots Pine Lombardy Poplar	_
	unus avium	Wild Cherry	_
	iercus robur	Oak	_
	rbus aucuparia ia x europaea	Rowan Lime	_
	oposed Hedgerow pla be maintained at a r		3m
<u>s</u>	pecies	Common name	Mix %
	cer campestre fornus sanguinea	Field Maple Dogwood	5
C	orylus avellana	Hazel	5
C	rataegus monogyna	Hawthorn Spindle	50 5
	uonymus europaeus ex aquifolium	Holly	8
L	igustrum vulgare	Wild Privet	10
	runus spinosa hamnus catherticus	Blackthorn Buckthorn	5 5
	iburnum opulus	Guelder Rose	2
M Sp Pu	razing Meadow Mix - eadow Seed Mix' or s becies Rich Grassland <i>Irposed Meadow Xix'</i> RP Membrane Overhead	imilar approved 4g - Emorsgate EM2 ' - Sown at 4g/m ²	/m2
M Sp Pu	leadow Seed Mix' or s becies Rich Grassland urposed Meadow Xix'	imilar approved 4g - Emorsgate EM2 ' - Sown at 4g/m ² Line	/m2
M Sr Pl TF	leadow Seed Mix' or s secies Rich Grassland urposed Meadow Xix' RP Membrane Overhead Solar Pane For details please see	imilar approved 4g - Emorsgate EM2 ' - Sown at 4g/m ² Line	/m2 <i>General</i> t and lay
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	leadow Seed Mix' or s species Rich Grassland irposed Meadow Xix' RP Membrane Overhead Solar Pane For details please see CTV verter care Container ubstation verter Containers	imilar approved 4g - Emorsgate EM2 ' - Sown at 4g/m ² Line els o f solar equipmen	/m2 <i>General</i> t and lay
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Existing vegetation to be enhanced and strengthened. Exact locations/specifications of planting will be agreed via planning condition / the final conditioned LEMP. Please Note: Some of the layers show in the key above may not appear within each layout

13 Rev.	lssue Details.	23/05/2023 Date.
Client:		
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Project:		
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Appendix 2: Maintenance schedules



APPENDIX 2



= Item of maintenance to be carried out during this window

Programme of Annual Establishment Landscape Maintenance (Years 1-10)

-	•				-									
Maintenance Item	Number Per Annum	March	April	May	June	July	August	September	October	November	December	January	February	Comments
/eeding Maintenance														
Spot weed control of all grassland areas (not within 1m of existing vegetation) with agreed herbicide treatment.	2	х	x	x	x	x	x	х						Weed treatment to occur between March and September. Treatment includes all persistent and noxious weeds.
Spot weed control of herbaceous growth around all new woodland planting areas, with herbicide treatment. Shrubs treated at 600mm diameter.	2	x	x	x	x	x	x	x						Weed treatment to occur between March and September. Treatment includes all herbaceous growth.
Spot weed control of herbaceous growth around all new specimen trees, with herbicide treatment. Trees treated at 800mm diameter.	2	x	x	x	x	x	x	x						Weed treatment to occur between March and September.
Spot weed control of herbaceous growth along new lengths of hedgerow planting. Treatment of 1.5m spread along length.	2	x	x	x	x	x	x	x						Treatment includes all herbaceous growth. Weed treatment to occur between March and September. Treatment includes all herbaceous growth.
Strim weed control within 1m of existing vegetation, waterbodies and across the winter cover crops.	2	х	x	x	x	x	x	x						Treatment includes all persistent and noxious weeds.
Remove all litter and debris from site.	12	х	x	x	x	х	x	x	x	x	x	x	х	To be carried out during other routine maintenance visits.
Planting Maintenance														
Annual inspection of all planting. Including, checking of planting guards, stakes and ties as scheduled and immediately after strong winds.	1			x	x	x	x	х						Carried out when in full leaf. General inspection when on site for other activities.
Adjust, refix or replace to original specification any loose or defective plant guards, ties and stakes.	1	x	x	x	x	х	x	x	x	x	x	x	х	Replace to the same specification.
Maintain existing hedgerow with tractor flail, cutting back the year's growth and up to 3m in height on one side only.	1							х	x	х	х	х	x	Works carried out from late September onwards to avoid bird nesting season. Cut on a rotation, with 1/3 of existing hedgerows across the site cut annually.
Replace any failed, diseased or damaged planting.	1								x	x	x	x	х	Species should be like for like where possible.
Apply slow release fertiliser to all new planting as required. Spread evenly.	1	х												Based on assessment of current condition of the species.
Water new planting as required during spells of hot, dry weather.	1			x	x	х	x							

Maintenance Item	Number Per Annum	March	April	May	June	July	August	September	October	November	December	January	February	Comments
Grassland Maintenance														
Grazing Meadow Grassland Area Year 1 Only - Maintain year 1 establishing grassland to a minimum height of 100mm by topping off the grassland with a cut and collect throughout the growing season.	10	x	x	x	x	x	x	x	x					Maintenance item not instructed if appropriate grazing regime is implemented. Additional cuts may be needed during peak growing season (July to August).
Grazing Meadow Grassland Area Year 2 Onwards - Maintain established grassland to a minimum height of 50mm with a cut & collect in March/April and late July/early August.	2	х	х			х	x							Maintenance item not instructed if appropriate grazing regime is implemented.
<i>Meadow Grassland</i> Area Year 1 Only - Maintain year 1 establishing grassland to a minimum height of 50- 100mm by topping off the grassland with a cut and collect from mid-July onwards.	10	x	х	х	x	х	х	х	х					Maintenance item not instructed if appropriate grazing regime is implemented. Additional cuts may be needed during peak growing season (July to August).
<i>Meadow Grassland</i> Area Year 2 Onwards - Maintain established grassland to a minimum height of 50mm with a cut & collect in March/April and late July/early August.	2	х	x			x	x							Maintenance item not instructed if appropriate grazing regime is implemented. First 2-3m of meadow grassland from the base of vegetation to be left uncut.
Winter Cover Crop Area Year 1 Onwards - Prepare ground and sow seed in Spring. Allow crop to seed and remain in-situ over winter. Plough and re-seed following spring.	1	х	x											Ground preparation to occur in spring if conditions allow. If grounds too wet then delay.
Chain harrow grassland areas in late summer to remove dead grass and revigorate the sward.	1							х						Maintenance item not instructed if appropriate grazing regime is implemented. Carry out once the ground is dry enough.
Re-seed any large bare patches or failed areas within the grassland.	1	х	x	х				x						Seed mix to match the specification of the grassland area.
Ditch Maintenance														
Removal of debris incl. decaying vegetation and weed control of ponds via hand/netting.	1							х	х	х	х	x	x	Material left adjacent to pond for minimum 24 hours before removal. Late September onwards.
Removal of any invasive species.	1	x	x	x	x	x	x	x						Material left adjacent to pond for minimum 24 hours before removal. Carried out before going to flower and setting seed
Removal of Typha species (if present) and thinning of marginal and submerged vegetation.	1							X	x	Х	x	x	x	Material left adjacent to pond for minimum 24 hours before removal. Late September onwards. Carried out every three years.

Maintenance Item	Number Per Annum	March	April	May	June	ylut	August	September	October	November	December	January	February	Comments
Maintain vegetation and grass in existing ditches with machine or suitable alternative to a minimum height of 150mm.	1							х	х	х				Works carried out from late September onwards, the same time as hedge cutting. Cut on a rotation, with 1/3 of existing ditches across the site cut annually.
Year 5 Only Maintenance Item	Number Per Annum	March	April	May	June	ylut	August	September	October	November	December	January	February	Comments
Maintain establishing hedgerows with a light prune to all sides and top of planting.	1								х	х	X	x	x	Hand tools only.
Remove all guards and stakes from planting.	1												Х	Remove from site.

APPENDIX 2

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Programme of Landscape Management (Year 11 onwards)

		Yea	ars					
Item	Timings	Annually Every Years		Every 3 Years	Every 5 Years	Every 10 Years	Comments	
Weed management								
Spot weed control of all grassland areas (not within 1m of existing vegetation or waterbodies) with agreed herbicide treatment.	March - September After grassland cuts	х					Treatment carried out before weeds go to flower and set seed. Maintain weed coverage below 5% overall.	
Strim weed control within areas of grassland that can not be treated chemically.	March - September	x					Treatment carried out before weeds go to flower and set seed. Maintain weed coverage below 5% overall. Includes encroachment of scrub into grassland areas and the winter	
							cover crop.	
Planting Management								
Inspection of all planting including trees, woodland, scrub and hedgerows.	March - September				x		Inspections carried out when vegetation is in leaf.	
Tree works following inspections. E.g. removal of dead branch flagged as a health and safety risk.	November - February inclusive	Х						
Removal of 20% of woodland scrub to create woodland diversity and encourage light encroachment.	November - February inclusive				x		Arisings that are not saleable crop will be used to create small log piles and deadwood features in the woodland. Removal to be spread across the woodland.	
Thinning of woodland trees to create more space for the more desirable trees and species.	November - February inclusive					x	Arisings that are not saleable crop will be used to create small log piles and deadwood features in the woodland. Removal to be spread across the woodland, with diseased or poor healt trees prioritised.	
Maintain hedgerows with tractor flail, cutting back the previous growth and maintaining to a height of 2-3m or if matured beyond that height, maintain up to 3m in height.	Late September - February inclusive	x	x				Hedgerows will be cut annually, but on a rotation of sides. One side per annum and remaining top and side the following year. Hedgerows across the site will be cut on a 3-year rotation, with 1.3 of hedgerows cut annually.	
Hedge laying of over-matured 'leggy' hedgerows.	Late September - February inclusive					x	Cutting of the hedgerow will commence two years after laying.	
Grassland Management					•		·	
Grazing Meadow Grassland Area - Maintain established grassland to a minimum height of 50mm with a cut & collect in March/April and late July/early August if grazing is <u>not</u> undertaken.	Spring cut = March/April Summer cut = Late July/Early August	х		х			Grazing and grass cutting carried out on rotation to provide sward variation across the site. If grazed, meadow grassland shall be grazed until October unless poaching occurs or ground becomes too wet. 1/3 of the grazing meadow grassland will be cut/grazed each year.	

Item	Timings	Annually	Every 2 Years	Every 3 Years	Every 5 Years	Every 10 Years	C
Meadow Grassland Area - Maintain established grassland to a minimum height of 50mm with a cut & collect in March/April and late July/early August if grazing is <u>not</u> undertaken.	Spring cut = March/April Summer cut = Late July/Early August	X		х			Grazing and grass cutting carrievariation across the site. If graze until October unless poaching o 1/3 of the meadow grassland w First 2-3m of grassland adjacent weeds are dominant.
Winter Cover Crop Area - Prepare ground and sow seed in Spring. Allow crop to seed and remain in-situ over winter. Plough and re- seed following spring.	Spring ground preparation and sowing	х					Crop left in-situ over winter.
Ditch Management							
Removal of debris incl. decaying vegetation and weed control of ponds via hand/netting.	November - February inclusive	х					Arisings left on pond edge for m
Removal of invasive species.	March - September	Х					Arisings left on pond edge for m
Removal of Typha species (if present) and thinning of marginal and submerged vegetation.	November - February inclusive			X			Arisings left on pond edge for m
Maintain vegetation and grass in existing ditches with machine or suitable alternative to a minimum height of 150mm.	Late September - February inclusive			Х			Ditches across the site will be cu ditches cut annually.
Adaptive Management - All items site specific in specifie	d year						
Reinstatement of unsuccessfully established grassland.	April/ May or September	N/A					Seed mix should match original Maintenance following reseedir maintenance of grassland in the
Removal of litter and debris.	all year as required	N/A					

Comments
ied out on rotation to provide sward azed, meadow grassland shall be grazed g occurs or ground becomes too wet.
will be cut/grazed each year.
nt to vegetation will <u>not</u> be cut unless
minimum 24 hours before removal.
minimum 24 hours before removal.
minimum 24 hours before removal.
cut on a 3-year rotation, with 1/3 of

nal mix.

eding to match year 1 establishment the first 12 months.