M42 Junction 6 Development Consent Order

Scheme Number TR010027

8.74 Outline Biodiversity Management Plan

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Outline Biodiversity Management Plan

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1 Outline Biodiversity Management Plan

1.1 Background to the plan

1.1.1 This Outline Management Plan sets out the short and long-term measures and practices that will be implemented by the Principal Contractor (PC) and Highways England to establish, monitor and manage biodiversity measures (comprising landscaping, ecological habitats and measures, and elements of the water environment) incorporated into the design of the M42 Junction 6 Scheme (the Scheme).

1.1.2 This plan is a live document, the content of which will continue to be updated, refined and (where necessary) added to based on ongoing discussions between Highways England and the following statutory bodies and organisations: Natural England; Warwickshire Wildlife Trust; and Solihull Metropolitan Borough Council. This plan does not constitute a final version of the plan at this stage of its preparation.

1.1.3 This latest version of the plan will be updated by the PC into a final Biodiversity Management Plan (BMP) prior to the commencement of works in accordance with the Requirements contained in Schedule 2 of the draft Development Consent Order (dDCO) [**REP5-002/Volume 3.1(b)**].

1.2 Responsibilities

1.2.1 In relation to the management and monitoring of biodiversity measures, the PC will establish the appropriate roles and responsibilities for site staff in accordance with the roles and responsibilities set out in Section 2 of the Outline Environmental Management Plan (OEMP) [**APP-172/Volume 6.11**].

1.2.2 The effective delivery and implementation of the BMP will require the PC to establish the roles identified in **Table 1-1**.

Table 1-1: Environmental Management – Key Site Personnel

Role	Contact	Organisation
Environmental Manager	TBC	PC
Environmental Clerk of Works (ECoW)	TBC	HIGHWAYS ENGLAND/PC
Environmental Specialists	TBC	PC
Environmental Manager	TBC	HIGHWAYS ENGLAND

1.2.3 The ECoW will be responsible for ensuring construction environmental mitigation measures are correctly deployed, monitored and maintained. These measures will include, but not be limited to, vegetation clearance, species exclusion and spot finds of species (protected or otherwise).

1.2.4 The ECoW's role will extend to inputting into activities that have the potential to impact biodiversity, for example by advising on methods and techniques to minimise light pollution and prevent accidental pollution, and the delivery of Toolbox Talks prior to the start of works that could potentially affect ecological habitats and species.

1.2.5 The PC will be responsible for establishing, managing and monitoring landscaping, ecological habitats and elements of the water environment within the five year contract period.

1.2.6 After the contract period, the long term biodiversity monitoring and management requirements will be set out by the PC in a Handover Environmental Management Plan (HEMP) in accordance with Requirement 4 contained in Schedule 2 of the dDCO [**REP5-002/Volume 3.1(b)**], the responsibility for which will then transfer to Highways England to ensure they achieve their intended long term environmental functions and objectives.

1.2.7 The HEMP will be subject to a process of ongoing review and amendment by Highways England during the lifetime of the Scheme to ensure it remains relevant.

1.3 Scope and purpose

1.3.1 As biodiversity conservation and improvement are key elements of the Scheme, this plan has been developed to:

a. facilitate the creation, integration and maintenance of habitats;

b. encourage greater biodiversity; and

c. assist the successful integration of the Scheme into the receiving environment.

1.3.2 This plan accordingly outlines:

a. the landscape, ecological and hydrological context of the Scheme;

b. the design rationale and objectives which have informed the identification of the environmental measures incorporated into the Scheme; and

c. monitoring and management prescriptions for: retained habitats and features; wildlife structures; safeguarding flora and fauna; new habitats; landscaping; and water features (covering ground preparation and initial establishment / aftercare through to longer term monitoring and management).

1.3.3 Reference is made within this plan to the outline measures contained within the OEMP [**APP-172 / Volume 6.11**] and the following secondary management plans contained within it:

a. Appendix C – Outline Environmental Control Plan: Invasive Species;

b. Appendix D – Outline Environmental Control Plan: General Ecology;

c. Appendix E – Outline Soil Management Plan; and

d. Appendix F – Outline Surface Water Management Plan.

1.3.4 Schedule 2, Part 1 of the dDCO [**REP5-002/Volume 3.1(b)**] includes the following Requirements which are relevant to, and inform, this plan:

a. Requirement 4 ’Outline Environment Management Plan’ – concerning the responsibilities of the PC in relation to the development of the Construction Environmental Management Plan (CEMP) and HEMP, which must substantially in accordance with the content of the OEMP [**APP-172/Volume 6.11**];

b. Requirement 5 ‘Landscaping’ – concerning the development of a landscaping scheme and its aftercare within the five-year contract period;

c. Requirement 7 ‘Protected Species’ – concerning licencing following the unexpected discovery for protected species and the supervision of construction works;

d. Requirement 12 ‘Fencing’ – concerning the construction and installation of temporary and permanent fencing; and

e. Requirement 13 ‘Bickenhill Meadows Site of Special Scientific Interest (SSSI)’ – concerning the monitoring and management of Bickenhill Meadows SSSI.

1.3.5 These Requirements have been used to inform the outline monitoring and management measures contained within this plan; these measures will be subject to further development and refinement during the detailed design stage of the Scheme, prior to the commencement of construction.

2 Background and approach

2.1 Environmental context

2.1.1 The conservation and improvement of existing landscape (including arboriculture), ecological and hydrological assets within the receiving environment has been a key consideration in the development of the Scheme.

Landscape overview

2.1.2 The Scheme is located within an area heavily influenced by existing infrastructure corridors and commercial development, namely the M42, A45, the West Coast Main Line railway and the Birmingham National Exhibition Centre to the north. To the south, a combination of the gentle topography resulting in a rolling landform, broad network of lanes and strong vegetation framework are the defining landscape features.

2.1.3 The settlements of Bickenhill and Hampton in Arden contain conservation areas which are relatively well contained by existing woodland and vegetation.

2.1.4 The visual environment is largely defined by the settled rural character of the landscape. The combination of the gentle topography, broad network of lanes and strong vegetation framework introduces a sense of enclosure to views from within lower lying areas, with views from the local road network frequently lined and contained by roadside vegetation.

2.1.5 The Arboricultural Survey report contained within Appendix 8.2 of Volume 3 of the Environmental Statement [**APP-128/Volume 6.3**] provides information on indicative tree groups, species and root protection areas within and in proximity to the Scheme.

2.1.6 The Arboricultural survey recorded a number of individual trees, tree groups, hedgerow groups and woodland areas relevant to the Scheme, and identified that many high value or mature trees are located along existing field boundaries which have cultural links to the history of the landscape. The survey also identified that some tree and woodland groups support a range of habitats and provide wildlife corridors in built up areas of the landscape.

Ecology overview

2.1.7 A number of statutory national nature conservation designations, and non-statutory nature conservation designations are present either within or in proximity to the Scheme.

2.1.8 Existing habitats are mainly rural, comprising mostly arable fields with a scatter of improved grass fields and a few semi-improved or unimproved neutral grasslands interwoven with relatively intact hedgerows and mature trees, some of which are designated ancient woodland (specifically Aspbury's Copse and Barber's Coppice).

2.1.9 Protected and notable species of flora and fauna include badger, bats, birds, polecat, great crested newt, invertebrates, slowworm, fungi and lichen.

Hydrological overview

2.1.10 A number of watercourses and standing water features including Hollywell Brook, Shadow Brook, the River Blythe and Low Brook are either crossed by, or lie in proximity to, the Scheme.

2.1.11 Bickenhill Meadows SSSI, a nationally designated ecological site which holds rare wetland habitat, is located adjacent to the Scheme.

2.1.12 The majority of the Scheme is located in an area considered to have a low risk of flooding.

2.2 Design Rationale and Objectives

2.2.1 The outline environmental design of the Scheme is presented on Figure 8.8 within Volume 2 of the Environmental Statement [**APP-095/Volume 6.2**].

2.2.2 The design rationale has been to ensure that the Scheme responds sympathetically to the existing character and context of the area surrounding Junction 6 of the M42, whilst accommodating environmental measures required to mitigate and compensate for the adverse environmental effects of the Scheme.

2.2.3 The design rationale has been informed by: the form, nature and condition of the existing environment; the need to successfully integrate the Scheme into the receiving environment; the need for the protection and retention of existing habitats of value and protected/important species; and the creation of new habitats for terrestrial and aquatic biodiversity interest.

2.2.4 In line with the design rationale, the environmental design objectives for the Scheme have been to:

a. promote the conservation, protection and improvement of the physical, natural and historic environment within the Scheme and its setting;

b. ensure the Scheme is appropriately softened and integrated into the receiving landscape pattern;

c. diversify the ecological features through the retention, so far as is reasonably practicable, of existing hedgerows and trees and to enhance these through the creation of new habitats offering botanical and faunal interest;

d. maintain the landscape and biodiversity components within the Scheme to preserve the character of the local and regional landscape;

e. establish structural planting that links with existing habitats;

f. create species-rich grassland habitats that can support a range of species.

g. use native indigenous species of local provenance, where appropriate; and

h. provide foraging, nesting and/or roosting opportunities for protected and notable species known to occur locally.

2.2.5 The PC will develop detailed landscape and ecology designs and specifications for all works during the detailed design stage of the Scheme, based on the outline schedules contained within Section 3 of this plan.

2.3 Monitoring and management prescriptions

2.3.1 The outline monitoring and management actions and prescriptions contained within this plan have been developed to:

a. maintain the conservation status of key habitats and their associated species, including the local resource of woodland and grassland habitats;

b. facilitate an efficient and sustainable landscape management and maintenance regime;

c. ensure that new landscaping and habitats develop in a manner commensurate with the original design intentions;

d. ensure the successful establishment and continued growth through to maturity of trees and other types of planting;

e. secure a long-term future for new trees, shrubs and grassland with emphasis on achieving landscape integration and providing visual screening where required; and

f. manage the landscape in a manner which ensures the safety of site users, for example maintaining visibility splays and good surveillance, and the removal of dead, dying or diseased trees and plants.

3 Surveys, monitoring and management during the contract period

3.1 Protected and invasive species

3.1.1 In relation to protected species, the general ecological control measures to be employed by the PC during construction are detailed within Appendix D – Outline Environmental Control Plan: General Ecology within the OEMP [**APP-172/ Volume 6.11**].

3.1.2 The PC will monitor and manage invasive species to prevent the spread of species listed on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended) [**REF 1**] in accordance with control measures set out within Appendix C – Outline Environmental Control Plan: Invasive Species within the OEMP.

3.1.3 Both of these outline control plans will be developed by the PC into detailed plans as part of the production of the CEMP.

3.1.4 Requirement 7 of the dDCO [**REP5-002/Volume 3.1(b)**] sets out the requirements placed on the PC in relation to licencing following the unexpected discovery of protected species and the supervision of construction works.

3.1.5 The PC will undertake pre-construction surveys to validate existing ecological survey data in advance of construction activities including, but not limited to, vegetation clearance and building demolition. These surveys will be undertaken in accordance with standard practice and within appropriate seasonal windows.

3.1.6 The PC will implement measures for the protection of bats, badgers and great crested newts prior to, and during, construction in accordance with the relevant prescriptions and requirements contained within the respective Natural England Protected Species Licences.

3.1.7 The PC will undertake monitoring of mitigation measures for bats and badgers in accordance with the requirements of the relevant Natural England Protected Species Licences.

3.1.8 Monitoring of the usage of enhancement measures for bats and birds will be undertaken by the PC on an annual basis and during the winter period. The inspection of bat boxes will be completed by an ecologist who holds an appropriate survey licence from Natural England.

3.1.9 Following installation, mammal tunnels will be checked by the PC annually to confirm that the entrances are draining appropriately, with clearance works undertaken should the tunnels become impassably overgrown or be deliberately blocked. Monitoring to identify levels of usage will also be undertaken using appropriate techniques – for example camera traps or during the annual check to look for evidence of mammal tracks, footprints, latrines/spraints and other field signs.

3.1.10 The PC will document the results of the monitoring within annual reports, which will provide evidence to inform the implementation of any remedial measures requiring implementation during or after the contract period.

3.2 Bird control and management measures

3.2.1 To manage potential risks to the operations of air traffic associated with Birmingham Airport, the PC will implement the bird control and management measures detailed within the Outline Bird Strike Management Plan [**REP5-006/ Volume 8.25(a)**] within the OEMP [**APP-172/Volume 6.11**], which will, in turn, itself inform the production of the Bird Strike Management Plan within the CEMP.

3.2.2 These measures place constraints on the planting of trees that have the potential to cause collision risk to aircraft ascending or descending Birmingham Airport's aerodrome safeguarding area, and also limit the planting of seed and fruit-bearing species of trees and shrubs and the creation of wetland habitats which have the potential to attract birds to the area and cause collision risk.

3.3 Habitats

3.3.1 The form, location and extent of new habitats (comprising grassland, planting and hedgerows) to be created and established by the PC during construction of the Scheme are illustrated on Figure 8.8 within Volume 2 of the Environmental Statement [**APP-095/Volume 6.2**].

Grassland

3.3.2 Requirement 5 of the dDCO [**REP5-002/Volume 3.1(b)**] sets out the requirements placed on the PC in relation to the development of a landscaping scheme, which includes grassland measures and their aftercare within the contract period.

Amenity and species-rich grassland

3.3.3 Amenity grassland will be established by the PC on highway verges. These will be appropriate to the location and intended maintenance regime of that area of the Scheme and will be established to achieve an even grade award that is uniformly coloured to cover at least 95% of the relevant area with no scrub.

3.3.4 Areas of species-rich grassland will be established by the PC on earthwork cutting and embankment slopes as part of the Scheme, the objective being to establish a diverse sward of grass and herb species that are similar in character to those found locally (including those associated with Castle Hill Farm Meadows Local Wildlife Site (LWS)).

3.3.5 The proposed locations for amenity and species-rich grasslands are illustrated on Figure 8.8 within Volume 2 of the Environmental Statement [**APP-095/Volume 6.2**].

3.3.6 The PC will develop a specification for both grassland types based on the indicative species and percentages presented in **Table 6-1** and **Table 6-2**.

Table 3-1: Indicative Amenity Grassland Mix

Species name	Latin	Percentage
Perennial Rye-grass	*Lolium perenne*	25%
Creeping Red Fescue	*Festuca rubra*	20%
Hard Fescue	*Festuca longifolia*	30%
Smooth-stalked Meadow-grass	*Poa pratensis*	10%
Brown Top Bent	*Agrostis tenuis*	10%
White Clover	*Trifolium repens*	5%

Table 3-2: Indicative Species-rich Grassland Mix (Neutral Grasslands)

Species	Latin	Percentage
Herb Species		**75%**
Common Knapweed*	*Centaurea nigra*	-
Ox - eye daisy*	*Leucanthemum vulgare*	-
Bird's - foot trefoil*	*Lotus corniculatus*	-
Lady's Bedstraw*	*Galium verum*	-
Common Sorrel	*Rumex acetosa*	-
Yellow Meadow Vetchling*	*Lathyrus pratensis*	-
Meadow Buttercup	*Ranunculus acris*	-
Ribwort Plantain	*Plantago lanceolata*	-
Cowslip*	*Primula veris*	-
Common Cat's Ear	*Hypochaeris radicata*	-
Tufted Vetch*	*Vicia cracca*	-
Ragged robin*	*Lychnis flos-cuculi*	-
Common centaury	*Centaureum erythraea*	-
Lesser stitchwort*	*Stellaria graminea*	-
Grass Species		**25%**
Crested Dog's - Tail	*Cynosurus cristatus*	-
Quaking Grass*	*Briza media*	-
Sweet Vernal Grass	*Anthoxanthum odoratum*	-
Yellow Oat – Grass*	*Trisetum flavescens*	-
Red Fescue	*Festuca rubra*	-
Common Bent	*Agrostis capillaris*	-
* species that are considered typical of neutral grasslands		

3.3.7 The following steps and working methods will be undertaken by the PC as part of grassland seeding:

a. where practicable, the seeds will be obtained from a local source for the purpose of maintaining continuity with the existing grasslands; and

b. seeding will be completed in either autumn or spring periods, and only once the receiving soils have been tilled and adequately prepared.

3.3.8 The PC will develop the above methods and agree the final grassland mixes with relevant stakeholders as part of the landscaping scheme.

Monitoring and management of grassland within the contract period

3.3.9 A detailed plan for the establishment and management of amenity grassland within the contract period will be developed by the PC based on the following principles and outline prescriptions:

a. amenity seeded areas will be allowed to establish to a minimum height before the first cut, and maintained to an appropriate height through regular cutting;

b. all litter (including fallen leaves) will be removed from grassed areas prior to mowing;

c. mowers and strimmers will not be used within 100mm of any tree stems to prevent damage;

d. arisings from cuts will be collected and either placed in dedicated 'habitat piles' or removed from site;

e. the application of slow-release fertiliser twice yearly (in the spring and the autumn);

f. the use of a selective herbicide to suppress injurious weeds, or other plants that are considered to be detrimental to the establishment of the grassland, using appropriate application techniques to achieve die-back followed by removal off site; and

g. bare areas and areas of dead grass where establishment is considered to have failed will be rectified by over-seeding and/or turf re-installation within the soonest available planting season.

3.3.10 A detailed plan for the establishment and management of species-rich grassland within the contract period will be developed by the PC to encourage the development biodiversity interest over time, based on the following principles and outline prescriptions:

a. immediately after sowing, the ground will be left undisturbed and un-watered to allow the grassland to establish naturally;

b. mowing between two and four times through the growing season to control competitive species and allow newly sown, less competitive species to establish;

c. visual inspections during the growing season;

d. cut vegetation will be removed from grassland areas and taken to a composting location; and

e. control of injurious weeds and any volunteer (self-sown) cereals, as required, to prevent colonisation and domination of the grassland through the use of a selective herbicide using appropriate application techniques to achieve die-back followed by removal off site.

3.3.11 Monitoring will be undertaken to confirm that the species-rich grassland has been successful in achieving its intended aims and objectives. Spot checks will be undertaken at locations within each grassland area by a suitably qualified ecologist during years 1, 3 and 5, the purpose being to record plant species and their condition, and any other relevant indicators relating to the sward that may require remedial action during the contract period or in the future.

3.3.12 The PC will be responsible for developing a set of criteria against which the success of grassland establishment can be measured during the contract period.

Planting

3.3.13 Requirement 5 of the dDCO [**REP5-002/Volume 3.1(b)**] sets out the requirements placed on the PC in relation to the development of a landscaping scheme, which includes planting measures, and their aftercare within the contract period.

3.3.14 Requirement 12 of the dDCO [**REP5-002/Volume 3.1(b)**] sets out the requirements placed on the PC in relation to the installation of temporary and permanent fencing, which will be used to protect planting.

Woodland, woodland edge, trees, scrub and shrubs

3.3.15 Woodland, woodland edge, individual and grouped trees, scrub and shrubs will be established by the PC across the Scheme for the purposes of landscape integration, visual screening and as mitigation / compensation for habitats and vegetation lost.

3.3.16 The proposed locations for planting are illustrated on Figure 8.8 within Volume 2 of the Environmental Statement [**APP-095/Volume 6.2**], the objectives of which are to:

a. ensure successful establishment and long-term maintenance of trees and scrub planted for the compensation of habitats;

b. provide effective protection of translocated ancient woodland soils from the affected areas of Aspbury's Copse by creating the required cover and associated conditions within the receptor site to permit the persistence of woodland flora;

c. integrate the Scheme into the receiving landscape pattern and provide visual screening of elements of the Scheme through the creation of wooded areas and ground cover;

d. mitigating the loss of local woodland habitats by delivering an overall increase in woodland coverage which will form a functional element of local ecological networks; and

e. achieve and retain a balance of species reflective of adjoining woodland and other vegetation.

3.3.17 The PC will develop a specification for planting mixes, based on the indicative species, sizes and percentages presented in **Tables 6-3 to 6-6**. These species

are appropriate to minimise the encouragement of aggregations of birds and are reflective of the species present in existing woodlands in the local area.

Table 3-3: Indicative woodland mix (75% trees - 25% shrubs)

Latin Name	Common Name	Form and Girth/CM	Size/MM	Root***	Percentage
Acer campestre	Field maple	Transplant	400–600	BR	20%
Betula pendula	Silver birch	Transplant	400–600	BR	25%
Betula pendula	Silver birch	Extra Heavy Standard** 14–16cm	3,000–4,000	BR	As located in detailed design
Betula pendula	Silver birch	Heavy Standard** 12–14cm	2,500–3,000	BR	As located in detailed design
Quercus robur	Oak	Transplant	400-600	BR	25%
Quercus robur	Oak	Extra Heavy Standard** 14–16cm	3,000–4,000	BR	As located in detailed design
Quercus robur	Oak	Heavy Standard** 12–14cm	2,500–3,000	BR	As located in detailed design
*Populus tremula**	Aspen	Transplant	400–600	BR	5%
Corylus avellana	Hazel	Transplant	400–600	BR	10%
Rosa canina	Dog rose	Transplant	400–600	BR	10%
*Sorbus aria**	Whitebeam	Transplant	400–600	BR	5%
* Species not to be used in area of ancient woodland compensation ** Extra heavy and heavy standards are only to be used in ancient woodland compensation areas *** BR, bare root					

Table 3-4: Indicative woodland edge mix (60% trees - 40% shrubs)

Latin Name	Common Name	Form and Girth CM	Size MM	Root**	Percentage
Ligustrum vulgare	Wild privet	Transplant	400–600	BR	15%
Sorbus aucuparia	Rowen	Transplant	400–600	BR	10%
*Salix cinerea**	Grey willow	Transplant	400–600	BR	10%
Rosa canina	Dog rose	Transplant	400–600	BR	10%

Latin Name	Common Name	Form and Girth CM	Size MM	Root**	Percentage
Prunus spinosa	Blackthorn	Transplant	400–600	BR	10%
*Alnus glutinosa**	Common alder	Transplant	400–600	BR	10%
Crataegus monogyna	Hawthorn	Transplant	400–600	BR	15%
Betual pendula	Silver birch	Transplant	400–600	BR	15%
* Species not to be used in area of ancient woodland compensation ** BR, bare root					

Table 3-5: Indicative shrub and scattered trees mix (35% feathered trees - 65% shrubs)

Latin Name	Common Name	Form and Girth CM	Size MM	Root*	Percentage
Ligustrum vulgare	Wild privet	Transplant	400–600	BR	15%
Corylus avellana	Hazel	Transplant	400–600	BR	15%
Alnus glutinosa	Common alder	Transplant	400–600	BR	15%
Rosa canina	Dog rose	Transplant	400–600	BR	10%
Fagus sylvatica	Beech	Transplant	400–600	BR	10%
Acer campestre	Field maple	Transplant	400–600	BR	10%
Sorbus aucuparia	Rowan	Transplant	400–600	BR	10%
Quercus robur	English oak	Transplant	400–600	BR	15%
* BR, bare root					

Table 3-6: Indicative scrub mix

Latin Name	Common Name	Form and Girth CM	Size MM	Root*	Percentage
Ulex Europaeus	European gorse	Transplant	400–600	BR	10%
Prunus spinosa	Blackthorn	Transplant	400–600	BR	10%
Rosa canina	Dog rose	Transplant	400–600	BR	15%
Acer campestre	Field maple	Transplant	400–600	BR	10%
Corylus avellana	Hazel	Transplant	400–600	BR	20%
Ligustrum vulgare	Wild privet	Transplant	400–600	BR	15%
Salix caprea	Goat willow	Transplant	400–600	BR	10%
Salix cinerea	Grey willow	Transplant	400–600	BR	10%

Latin Name	Common Name	Form and Girth CM	Size MM	Root*	Percentage
* BR, bare root					

3.3.18 The following steps and working methods will be undertaken by the PC to establish new planting:

a. areas identified for planting will be clearly marked out in advance;

b. with the exception of the translocated ancient woodland soils, all remaining soils will be de-compacted, graded, top-soiled and cultivated in preparation to receive planting;

c. planting will take place in the first available planting season and at a time of the year appropriate to the species being planted, and be timed to avoid periods of frost, drought or other inclement climatic conditions;

d. planted areas will be fenced during the establishment period to protect trees and individual specimens from browsing rabbits and deer;

e. native woodland species will be planted over and around the ancient woodland receptor area (i.e. the area identified to receive translocated ancient woodland soils); and

f. native species will be inspected for signs of disease prior to planting, and be of local provenance where possible.

Monitoring and management of planting within the contract period

3.3.19 A detailed plan for the establishment of planting will be developed by the PC, based on the following principles and outline prescriptions:

a. regular watering of new plants, particularly during the summer months and during dry periods, to aid their establishment;

b. the application of mulch (outside areas identified for ancient woodland soil translocation) in strips and in diameter rings, as appropriate, around new plants;

c. the use of tree spats around trees and shrubs planting within translocated ancient woodland soils;

d. the fitting of individual recycled plastic spiral or mesh guards around trees, shrubs and hedgerow plants to protect them from strimming activities and damage from animals, with fitted guards regularly checked and straightened to avoid impeding natural movement and growth; and

e. establishing a weed free area around new plants from the start of the growing season through the application of spot treatments and hand weeding.

3.3.20 A detailed plan for the management of planting within the contract period will be developed by the PC and incorporated into the CEMP, based on the following principles and outline prescriptions:

a. quarterly checking of plants to record their growth and condition, including checks, adjustments and replacement of tree guards and stakes as necessary;

b. maintenance of a weed free diameter around the bases of planting through the application of herbicide and spot weeding techniques to achieve die-back, with all arisings removed from site;

c. removal of non-desirable woody species and the cutting of scrub growth to avoid suppression of newly planted material;

d. replacement of any dead, damaged or diseased plants with matching species of the same size during the next planting season after failure;

e. watering as necessary to ensure plants thrive, particularly during dry weather conditions;

f. removal of litter and debris from planted areas (fallen branches and leaf litter to be retained); and

g. re-firming of soil around roots to ensure plants are supported and upright.

3.3.21 Monitoring of newly planted woodland areas will be undertaken during the contract period by a suitably qualified ecologist or landscape architect to ensure the successful establishment of the planting and to record the health and condition of plants.

3.3.22 Woodland and scrub monitoring will involve walk-overs through each woodland parcel and the recording of field notes. The frequency of monitoring visits will be determined by the success of the establishment of planting and any requirements for follow up operations.

3.3.23 Monitoring of the ancient woodland within Aspbury's Copse and the ancient woodland receptor area will be undertaken using comparable methods applied within woodland and scrub areas, with the purpose of establishing the composition and extent of ancient woodland indicator plant species and confirming the presence and extent of associated fungi and lichen species, including the abundance of deadwood material.

3.3.24 The PC will be responsible for developing a set of criteria against which the success of planting can be measured during the contract period.

Hedgerows

3.3.25 Requirement 5 of the dDCO [**REP5-002/Volume 3.1(b)**] sets out the requirements placed on the PC in relation to the development of a landscaping scheme, which includes hedgerow measures and their aftercare within the contract period.

Hedgerow planting

3.3.26 Hedgerows will be established, retained and translocated by the PC across the Scheme, the objectives of which are to:

a. maintain and improve the existing resource of hedgerows through translocation or replacement planting, to preserve their associated plant, fungi and invertebrate biodiversity;

b. optimise connectivity with retained hedgerows or other habitats, for example woodland and ponds;

c. integrate the Scheme into the receiving landscape pattern and provide visual screening of elements of the Scheme by establishing new native species hedgerows.

d. ensure the successful establishment and long-term management of hedgerows by achieving and retaining a balance of species reflective of adjoining woodland and other vegetation, and maximising their structural diversity for the benefit of wildlife; and

e. mitigating and/or compensating for hedgerow loss by using species that reflect the composition of existing hedgerows as far as practicable, and accounting for the restrictions of Birmingham Airport by avoiding the planting of additional seed and fruit-bearing tree and shrub species.

Retained hedgerows

3.3.27 The PC will protect existing hedgerows to be retained during construction.

3.3.28 Measures to be employed during the contract period will include, but not be limited to, the use of clearly defined stand-offs, managing the structure and integrity of retained hedgerows, and undertaking any trimming undertaken outside of the bird breeding season.

Hedgerow translocation

3.3.29 Impacts on hedgerows of highest biodiversity importance, and for which there is evidence of them being established for a long period of time, will be mitigated by the PC through their translocation into retained habitats elsewhere within the Scheme.

3.3.30 Hedgerows to be translocated by the PC are identified within Section 9.9 of Chapter 9 Biodiversity within Volume 1 of the Environmental Statement [**APP-054/Volume 6.1**].

3.3.31 The following steps and working methods will be undertaken by the PC as part of the translocation of hedgerows:

a. hedgerows selected for translocation will be protected as per the retained hedgerows until they are translocated;

b. translocation will be completed under the supervision of an ECoW;

c. translocation will take place during the autumn/winter (mid-September to early-March, inclusive) and avoid periods when ground conditions are unsuitable;

d. receptor sites for translocated hedgerows will be identified and clearly marked out;

e. donor hedgerows will be flailed and cut to a height of approximately 0.5m prior to translocation;

f. lifting plants and moving and placing directly into prepared trench at the receptor sites; and

g. in-filling gaps between and around plants with soil.

Native species hedgerow planting

3.3.32 The proposed locations for new hedgerows are illustrated on Figure 8.8 within Volume 2 of the Environmental Statement [**APP-095/Volume 6.2**].

3.3.33 The PC will develop a specification for hedgerows, based on the indicative species, sizes and percentages presented in **Table 6-7**.

Table 3-7: Indicative hedge planting mix

Latin Name	Common name	Form and Girth/CM	Size/MM	Root*	Percentage
Ligustrum vulgare	Wild privet	Transplant	400–600	BR	20%
Prunus spinosa	Blackthorn	Transplant	400–600	BR	25%
Corylus avellana	Hazel	Transplant	400–600	BR	20%
Sambucus nigra	Elder	Transplant	400–600	BR	5%
Acer campestre	Field maple	Transplant	400–600	BR	10%
Fraxinus excelsior	Ash	Transplant	400–600	BR	5%
Quercus robur	English oak	Transplant	400–600	BR	5%
Fagus sylvatica	Beech	Transplant	400–600	BR	10
* BR, bare root					

3.3.34 The PC will plant native species hedgerows of local provenance, where possible, and will inspect these for signs of disease prior to planting. These will be planted by the PC using standard horticultural techniques to achieve rapid early growth, for example through the planting of both hedgerows and hedgerow trees in autumn.

Monitoring and management of hedgerows within the contract period

3.3.35 A detailed plan for the establishment and management of hedgerows will be developed by the PC, based on the principles and outline prescriptions identified above for other types of planting (i.e. trees, shrubs and scrub) within the contract period.

3.3.36 Addition measures specific to hedgerows that will be developed and incorporated into the plan include the maintenance of new hedgerows in a comparable manner to adjoining hedgerows to maintain landscape structure, and the seeding of bare

ground areas around new hedgerows after the third year of planting with a low-vigour wildflower mix.

3.3.37 The PC will be responsible for developing a set of criteria against which the success of hedgerows can be measured during the contract period.

Soil protection, handling and storage

3.3.38 Requirement 12 of the dDCO [**REP5-002/Volume 3.1(b)**] sets out the requirements placed on the PC in relation to the installation of temporary and permanent fencing, which will be used to protect translocated soils.

3.3.39 The PC will implement the methods and techniques prescribed within Appendix E – Outline Soil Management Plan within the OEMP [**APP-172/Volume 6.11**] to ensure soils are appropriately protected, handled and stored during construction.

3.3.40 In addition to these methods and techniques, the PC will undertake the following site-specific soil translocation activities to minimise the impact of the Scheme on habitats associated with Aspbury's Copse ancient woodland and Castle Hill Farm Meadows LWS.

Aspbury's Copse ancient woodland: soil translocation

3.3.41 Soils and their associated seedbank will be translocated by the PC from the 'donor' sites within Aspbury's Copse (the areas affected by the Scheme) to the defined receptor site (the ancient woodland compensation area), the location of which is illustrated on Figure 8.8 within Volume 2 of the Environmental Statement [**APP-095/Volume 6.2**].

3.3.42 The following soil translocation steps and working methods will be undertaken by the PC as part of the soil translocation:

a. translocation will be completed under the supervision of an ECoW;

b. translocation will take place during the autumn/winter period (i.e. mid-September to early-March inclusive) and be planned to avoid periods when ground conditions are unsuitable (i.e. too wet and/or during extreme weather conditions);

c. the extent of the donor and receptor sites will be identified and marked out, and protected with fencing and signage;

d. coppice stools, saplings and deadwood from the donor site will be retained and translocated with the soils to the receptor site;

e. controlled access routes and low ground-pressure vehicles will be used to minimise soil compaction;

f. soils will be stripped from the receptor area using an excavator with an untoothed bucket and then loose tipped onto the prepared receptor surface and spread by an excavator fitted with a toothed bucket; and

g. no overnight storage of soils obtained from the donor site will be permitted.

3.3.43 The PC will develop the above methods and agree the final soil translocation strategy with relevant stakeholders.

Castle Hill Farm Meadows LWS: soil translocation

3.3.44 Soils and their associated seedbank from selected donor areas within Castle Hill Meadows LWS will be translocated by the PC to a receptor site, the objective being to mitigate the loss of soils through the retention of the site's species-rich grasslands.

3.3.45 The following soil translocation steps and working methods will be undertaken by the PC as part of the soil translocation process:

a. translocation will be completed under the supervision of an ECoW;

b. translocation will take place during the autumn/winter period (i.e. mid-September to early-March inclusive) and be planned to avoid periods when ground conditions are unsuitable (i.e. too wet and/or during extreme weather conditions);

c. the extent of the donor and receptor sites will be identified and marked out, and protected with fencing and signage;

d. controlled access routes and low ground-pressure vehicles will be used to minimise soil compaction;

e. topsoil and, where necessary, sub-soil will be stripped from the receptor site;

f. no overnight storage of soils obtained from the donor site will be permitted; and

g. where ground conditions allow, the re-laid soil at the end of each day will be rolled.

3.3.46 The PC will develop the above methods and agree the final soil translocation strategy with relevant stakeholders.

3.4 Water features

3.4.1 The PC will implement the methods and techniques prescribed within Appendix F – Outline Surface Water Management Plan appended to the OEMP [**APP-172/ Volume 6.11**] to protect existing water features of biodiversity value from potential construction-related pollution.

3.4.2 The design of the Scheme incorporates sustainable drainage and attenuation features to control and treat road runoff prior to its discharge. The form, type and location of these features are illustrated on Figure 8.8 within Volume 2 of the Environmental Statement [**APP-095/Volume 6.2**] [, the objectives of which are to:

a. control the rate of discharge of runoff from the road to receiving watercourses containing habitats;

b. provide treatment for pollutants to prevent adverse impacts on habitats; and

c. deliver biodiversity benefits (while taking account of the restrictions of Birmingham Airport in minimising bird attractants).

Planting and management

3.4.3 The PC will develop planting specifications and management measures for water features incorporated into the Scheme, based on the following outline prescriptions and techniques.

Swales

3.4.4 The PC will establish swales in a manner that achieves a dense and even sward using species including perennial ryegrass (*Lolium perenne*), creeping bent (*Agrostis stolonifera*) and Rush (*Juncus* spp.) which are tolerant to salt, wet conditions and periodic inundation.

3.4.5 Seeding to establish vegetation will be carried out by the PC early in the construction period as soon as soils are ready and within appropriate season – ideally late summer (August – September).

3.4.6 Where required, the PC will employ geotextiles to prevent erosion or as a temporary measure in advance of seeding.

Wetland Areas

3.4.7 The PC will establish wetlands to an appropriate density that prevents any standing water being visible to birds from above.

3.4.8 Wetland species will include reed mace (*Typha latifolia*), reed canary grass (*Phalaris arundinacae*), amphibious bistort (*Persicaria amphibia*) and rush (*Juncus* spp.).

3.4.9 Bankside species will include perennial ryegrass (*Lolium perenne*), creeping bent (*Agrostis stolonifera*) and rush (*Juncus* spp.) species. Wetland banksides will also be planted with scrub to break up the potential sight lines of bird species, based on the outline species presented in **Table 6-6**.

3.4.10 The sowing of grass and rush species will be undertaken by the PC, ideally in the late summer, and wetland habitats will be netted from the outset and fixed to a height that ensures inaccessibility to bird species.

Monitoring and management of planting within the contract period

3.4.11 Vegetated drainage systems require frequent inspection as the growth of aquatic planting will need to be controlled and managed to ensure they continue to operate as designed.

3.4.12 A detailed plan for the establishment and management of planting within swales and wetland areas will be developed by the PC , based on the following principles and outline prescriptions:

a. vegetation height at the base of swales to be managed to approximately twice the depth of the water to be treated;

b. removal of scrub, injurious weeds and other unwanted plants from reed beds that may adversely affect or impede drainage function, as required;

c. banksides of wetland features to be cut at least twice per year in ensure the flow of water is not restricted and becomes a potential bird attractant;

d. arisings from grass cuts to be disposed of off-site or in dedicated habitat piles beyond the swales;

e. sediments excavated from wetlands annually and from swales every six months, with arisings safely disposed of in accordance with current waste management legislation;

f. periodic clearance of rubbish and debris to be undertaken with additional checks made after any major storm event; and

g. removal and disposal of oils or petrol residues to be carried out as required, following safe standard practices.

3.4.13 Monitoring of wetland areas will be undertaken during the contract period to ensure the successful establishment of the planting and to record the health and condition of plants. This will involve regular inspections up to the second year after establishment, followed by periodic inspections of the inflows and outfalls for blockages, and the integrity of features such as netting and side slopes where erosion may occur.

3.4.14 Monitoring inspections will inform the need for any remedial measures to be implemented during the contract period, for example slope reinforcement and the reseeding of bare ground.

3.4.15 The PC will be responsible for developing a set of criteria against which the success of planting established within swales and wetland areas can be measured during the contract period.

Bickenhill Meadows SSSI

3.4.16 Bickenhill Meadows SSSI comprises a notable mix of floodplain meadow and dry grassland habitat spread over two sites comprising a north-west unit and south-east unit.

3.4.17 The Scheme incorporates a swale feature as part of a design-based passive solution to mitigate for the potential loss of the surface water catchment to the south-east unit of the SSSI. This feature will collect road drainage from the realigned Catherine-de-Barnes Lane and greenfield runoff from adjacent land. This water will then be delivered by gravity to a carrier pipe and then onto a swale along Shadowbrook Lane.

3.4.18 The swale will then pass into the Shadow Brook Nature Reserve adjacent to the south-east unit of the SSSI, where the water will be discharged into an existing ditch. From this ditch, the water will infiltrate into the adjacent sand and gravel layers forming the upper substrata within the SSSI, thereby allowing the supply of water to be maintained to the south-east unit.

3.4.19 No physical works will be undertaken within this SSSI.

3.4.20 The PC will undertake planting and management of the swale feature incorporated into this passive solution in line with the general outline prescriptions for swales described earlier in this plan.

3.4.21 Requirement 13 in the dDCO [**REP5-002/Volume 3.1(b)**] sets out the requirements placed on the PC in relation to the development of a detailed monitoring and management plan for this SSSI. The outline prescriptions, actions and protocols contained within the Outline Bickenhill Meadows SSSI Monitoring and Mitigation Plan will be used by the PC to develop a detailed botanical and

hydrological monitoring plan for the site, in line with Requirement 13, to monitor the success of the mitigation solution for this SSSI.

3.4.22 In summary:

a. the hydrological monitoring will involve regular checks of dipwells which will provide data on groundwater levels, supplemented with recording of pH, electrical conductivity and temperature with data loggers;

b. the botanical monitoring of 1m^2 quadrats which will provide information on vegetation community, plant species diversity and abundance, with the extent of the key MG4 (wetter) and MG5 (drier) grassland habitat types[1] recorded; and

c. information will be gathered on management activities (i.e. grazing type, timing and stocking density), soil nutrient data and site condition (using fixed-point photography).

3.4.23 The botanical monitoring will evaluate shifts away from the prevailing vegetation community at specific locations or across the site, and reductions in species richness at specific locations or across the site. It will also evaluate reductions in the extent of key vegetation communities, and changes in the abundance of key indicator species (both positive and negative).

3.4.24 Hydrological change will be evaluated against defined guidance and criteria relating to appropriate groundwater levels of MG4 grasslands.

3.4.25 The PC will be required to undertake this monitoring during construction of the Scheme, continuing for a period of five years, commencing from the date on which that part of the Scheme affecting the Bickenhill Meadows SSSI unit is first opened for use.

3.4.26 The results of monitoring will be reviewed by a Steering Group that will comprise key stakeholders in the responsibility, ownership and management of this SSSI. The group will review the monitoring data to evaluate if any change in hydrology or the extent or condition of the SSSI's interest features can be attributed to the Scheme, and whether any further measures are required – for example additional monitoring or adaptive management measures to address changes to the interest features of this SSSI.

3.4.27 Upon completion of the five years of operational monitoring, the necessity of continued monitoring beyond this point will be reviewed based on the data collected.

[1] Grassland types are defined within the National Vegetation Classification [**REF 2**].

4 Long term biodiversity monitoring and management

4.1 Handover Environmental Management Plan

4.1.1 Towards the end of the contract period, the long term monitoring and management requirements for habitats, protected species, landscaping and water features will be identified between the PC and Highways England and recorded within the HEMP.

4.1.2 The HEMP will provide relevant information on existing and future environmental commitments and objectives that need to be implemented, any ongoing actions, and any risks that need to continue to be managed.

4.1.3 The long term operational and management responsibility for these elements of the Scheme will transfer from the PC to Highways England, in line with the actions and protocols contained within the HEMP and the requirements of the dDCO [**REP5-002/Volume 3.1(b)**].

4.1.4 The frequency of monitoring and management interventions will decrease after the contract period for the majority of habitats and features, except for more complex or sensitive habitats which will require long term and regular interventions to ensure the measures successfully establish.

4.1.5 The HEMP shall incorporate, where appropriate, the detailed requirements set out in Highway England's Manual of Contract Documents for Highways Works [**REF 3**], and its accompanying appendices, and will be subjected to ongoing review and amendment by Highways England during the lifetime of the Scheme.

4.2 Habitats

4.2.1 The following indicative measures for habitats will form the basis of detailed monitoring and management prescriptions within the HEMP, for implementation by Highways England on land under their control after the contract period ends.

4.2.2 Where required, the implementation of measures on land not under the control of Highways England will be subject to separate agreement with the relevant landowners. It is expected that the associated monitoring and management prescriptions will reflect the prescriptions contained within this plan, as described in the following sections.

Grassland

Amenity grassland

4.2.3 Maintenance of amenity grassland areas will vary depending on the time of year and available budgets.

4.2.4 Measures will be developed to ensure road verges are appropriately maintained to preserve sight lines to signage and along the road length, for road user safety.

Species-rich grassland

4.2.5 Management will be undertaken to maintain a relatively stable grassland community for the long-term, and to avoid areas naturally progressing into tall, dense, grass-dominated areas.

4.2.6 Measures will focus on a forward regime of:

a. preventing domination of the sward by scrub or aggressive grass species through cutting and/or grazing – for example through a hay cut in mid-July followed by grazing or mowing, where appropriate, until late autumn;

b. mowing only under appropriate conditions – for example when the ground is dry to prevent poaching of the grassland, and once a diverse sward has established;

c. allowing arisings to be left in-situ for a short period to encourage seed drop, prior to their removal for composting; and

d. periodic litter picking of grassland areas.

4.2.7 Areas of grassland along the meadow margins adjacent to woodland and hedgerows may be left for a year or more between cuts to provide dense ground level cover for fauna, including amphibians, small mammals and invertebrates.

Planting

Woodland, woodland edge, trees, scrub and shrubs

4.2.8 The long term management of planting outside of the ancient woodland compensation area will focus on the following interventions:

a. from year 5 onwards, trees guards and stakes will be removed from plants;

b. between years 7 and 10, planted areas will be reviewed and thinned out as necessary to remove any poor or weak specimens, which will facilitate other specimens to flourish and provide space for trees to further establish;

c. the understorey of new woodland areas will be coppiced in stages to minimise disturbance to wildlife, as required, as part of good woodland management;

d. arisings from thinning or other woodland management functions will be retained on site in the form of dedicated brash and wood piles or wind-rows, for the benefit for fungi, lichen and invertebrates;

e. where necessary, arisings from woodland management will be chipped and placed in dedicated habitat piles; and

f. trees adjacent to public rights of way will be actively maintained and monitored on health and safety grounds, and to maintain access.

Ancient woodland compensation area

4.2.9 Within the ancient woodland compensation area, the need for additional planting to diversify the age range of trees establishing within the woodland will be established.

4.2.10 Long term monitoring within the ancient woodland soil translocation and compensation areas will reflect the length of time likely to be necessary for woodland conditions to establish for ancient woodland indicator species.

4.2.11 The objective of the detailed monitoring will be to detect major changes in the coverage of the woodland ground flora. This will be achieved by surveying at a minimum of three yearly intervals from the end of year 5 when some degree of canopy closure is expected to have been achieved.

4.2.12 The recording of ground flora will be undertaken using replicate quadrats, supplemented by fungi and lichen surveys, an assessment of deadwood coverage, fixed point photography and the use of aerial photography.

4.2.13 Similar monitoring of the ground flora, fungi and lichens will also be undertaken within the retained areas of Aspbury's Copse to inform its future management, and to maintain the current conservation status of this woodland.

Hedgerows

4.2.14 The long term management of hedgerows will focus on the following interventions:

a. where trimmed, and only where practicable, hedgerows will be managed on a three-year rotation with only one side of the hedgerow cut in any one year to help develop the hedgerow structure;

b. cutting will be carried out at the end of the winter in February, thereby retaining berries through the winter months for wildlife and avoiding the bird breeding season;

c. if managed by traditional techniques such as hedgerow laying, this will be carried out on a rotational basis to retain the structural integrity of hedgerows and maintain connections with other habitats;

d. overgrowing or overhanging branches will be removed from any pathways to keep them unobstructed; and

e. dead, over-mature or dying hedgerow trees will be subject to removal where they are considered dangerous on health and safety grounds, and in accordance with any protected species constraints.

4.2.15 Monitoring will be undertaken to detect any significant changes in hedgerow health and condition. After year 5, checks will be made every three years, using fixed-point photography if necessary.

4.3 Water features

4.3.1 The long term monitoring and management of swales and wetland features will be carried out in line with the interventions to be implemented during the contract period, with the following additional measures also implemented:

a. where required, dredging will be undertaken on a cyclical basis during winter months, involving only a third or half of the system at a time to ensure that there is mature vegetation to promote sedimentation while any newly planted areas are establishing; and

b. consideration will be given to the rotational cutting of reed bed habitat during winter months, with a minimum three year period between cuts, to increase the structural diversity of this habitat and benefit associated fauna.

5 References

REF 1	Wildlife and Countryside Act 1981. The Stationary Office (1981). http://www.legislation.gov.uk/ukpga/1981/69/pdfs/ukpga_19810069_en.pdf
REF 2	Rodwell, J. S. (2006) National Vegetation Classification; Users' Handbook. Joint Nature Conservation Committee, Peterborough.
REF 3	Manual of Contract Documents for Highways Works: Volume 1 Specification for Highways Works – Series 3000 Landscape and Ecology. Highways Agency (2001). http://www.standardsforhighways.co.uk/ha/standards/mchw/vol1/pdfs/series_3000.pdf