M54 to M6 Link Road

TR010054

Volume 6

6.3 Environmental Statement Appendices

Appendix 8.2 Biodiversity Metric Calculations

Regulation 5(2)(a)

Planning Act 2008

Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009

October 2020

Infrastructure Planning

Planning Act 2008

The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009

M54 to M6 Link Road

Development Consent Order 202[ ]

6.3 Environmental Statement Appendices

Appendix 8.2 Biodiversity Metric Calculations

Regulation Number	Regulation 5(2)(a)
Planning Inspectorate Scheme Reference	TR010054
Application Document Reference	6.3
Author	M54 to M6 Link Road Project Team and Highways England

Version	Date	Status of Version
3	October 2020	Update due to Proposed Scheme Changes October 2020.

Table of contents

Chapter **Pages**

List of Tables

1 Introduction

1.1 Purpose of the Report

1.1.1 This appendix (Version 3) provides ~~the~~ updated findings of the Biodiversity Metric Calculation undertaken to inform Highways England's proposed development of the M54 to M6 link road, herein referred to as 'the Scheme'.

1.1.2 During production of the Environmental Statement (ES) for the Scheme, Natural England issued version 2 of their metric tool (here on referred to as "Biodiversity Metric 2.0") (Ref 1). This updated appendix accounts for changes that have occurred when calculating losses and gain of biodiversity using Biodiversity Metric 2.0, as well as design changes detailed in Environmental Statement Addendum: Proposed Scheme Changes October 2020 [TR010054/APP/8.6].

~~1.1.1~~1.1.3 The purpose of the report is to:

- calculate the Scheme's biodiversity units, in terms of baseline and predicted future baseline; and
- determine the change in biodiversity units as a result of the Scheme.

~~1.1.2~~1.1.4 This appendix includes the following information:

- Introduction including purpose, overview and principals of biodiversity accounting.
- Methodology used to complete the calculation.
- Results of the calculation.
- Conclusions.
- References.

1.2 Biodiversity accounting

No net loss and biodiversity net gain

1.2.1 Biodiversity net gain is defined as "development that leaves biodiversity in a better state than before" and involves an approach where developers work with local governments, wildlife groups, land~~-~~owners and other stakeholders in order to support their priorities for nature conservation (Ref 1).

1.2.2 Biodiversity net gain can be achieved through the creation of new habitats or through the improvement and management of existing habitats either on-site or off-site (or through a combination of on-site and off-site measures).

1.2.3 Biodiversity net gain is achieved when measurable improvements for biodiversity are delivered in association with a development. No net loss is achieved when the impacts of a development on biodiversity are balanced by equivalent gains resulting in no overall change to biodiversity.

1.2.4 It is important that any proposed biodiversity improvement measures have appropriate arrangements in place to secure their long-term management. Where new habitats are provided, they should aim to contribute to biodiversity restoration by helping to establish more resilient and coherent ecological networks in

alignment with local nature conservation priorities and local landscape character objectives.

1.2.5 Biodiversity metrics provide a tool to assess whether a biodiversity net gain or no net loss outcome is expected to be achieved. A metric enables the calculation of losses and gains by assessing the habitats. The metric translates habitat distinctiveness, condition and extent into a score which is presented in biodiversity units. It also uses multipliers to account for risks in delivering habitat creation or ~~enhancement~~restoration. The change in biodiversity units indicates either a net loss, net gain or biodiversity neutrality.

1.2.6 It is important that evidence and rationale used to inform the calculation is underpinned by appropriate ecological expertise and local wildlife knowledge.

1.2.7 The assessment is an iterative process and can be applied during the design-development process to guide the requirements for mitigation and compensation, in terms of the type and extent of habitats to be created or improved.

1.3 Principles of biodiversity no net loss and net gain

1.3.1 The assessment of the Scheme has been undertaken in accordance with best practice principles for calculating and assessing biodiversity net gain (Ref 1), using the Biodiversity Metric 2.0.

1.3.2 The application of the mitigation hierarchy is fundamental to the achievement of no net loss and net gain. This involves adopting an approach that seeks to avoid, mitigate and (as a last resort) compensate for impacts on biodiversity through all stages of project development.

1.3.3 Habitats of high distinctiveness are generally expected to be replaced on a 'like for like' basis (i.e. the mitigation and/or compensation should involve the same habitat that is being lost).

1.3.4 Ecological mitigation and compensation measures proposed as part of a development should therefore strive to result in an improvement in the extent or condition of the ecological network. To do this, the focus of the habitat restoration or creation should be on priority habitats of medium or preferably high distinctiveness. There should not be a 'trading down', for example by replacing a habitat of high distinctiveness with creation or restoration of a habitat of medium distinctiveness.

1.3.5 Planning policy encourages the avoidance of impacts on irreplaceable habitats that are either very rare or difficult or impossible to recreate (Ref 2, Ref 3). Where it is impossible to avoid impacts on these habitats, they should not be included in the metric calculation but dealt with separately in order to develop a bespoke compensation package to address the loss.

1.3.6 Decisions on the types of habitat creation or restoration that form part of the mitigation or compensation should be taken at a local level in line with local conservation priorities.

1.3.7 Multipliers are applied to correct for disparity or risk in delivery or uncertainty in the effectiveness of restoration or habitat creation and management techniques. These address the risk associated with the level of difficulty in restoration or creation for

different habitats and the temporal risk associated with the time taken for the habitat to reach target condition.

2 Methodology

2.1 Study area and considerations

2.1.1 The area subject to the calculation comprised all land within the Scheme boundary (refer to Figure 2.8 [TR010054/APP/6.2]).

2.1.2 The following considerations have fed into the methodology:

- Only habitats within the Scheme boundary have been included within the calculation to establish the site's habitat biodiversity value.
- The habitats used in the calculation ~~have been~~ are based on those illustrated in Appendix 8.4 [TR010054/APP/6.3], and have been re-categorised to a ~~Phase 1 habitat code~~ UK Habitat Classification code by an ecologist for the purpose of the Biodiversity Metric 2.0 calculation.
- Target conditions and timescales for newly created and restored habitats have been based upon professional judgement and best practice guidance on management practices (Ref 4).
- Areas of ancient woodland impacted by the Scheme, including a 15m buffer zone, have been excluded from the calculation. Woodland planting to compensate for impacts to ancient woodland has also been excluded from the calculation. The 15 m buffer zone is considered a best practice minimum development offset for ancient woodland (Ref 5).

2.1.3 The following Target Notes (TNs) on the Phase 1 Habitat plan (see Appendix 8.4 [TR010054/APP/6.3] and Figure 8.3 [TR010054/APP/6.2]) denote areas of ancient woodland which will be impacted by the Scheme as follows. These areas have been excluded from the metric calculation as they are considered irreplaceable habitat:

- TN97: Oxden Leasow (Whitgreaves wood) – no direct loss but incursion into 15 m buffer zone resulting in an assumed loss of 0.32 ha, and a further 0.33 ha affected as a result of the change in air quality; and
- TN43: Brookfields Farm Site of Biological Importance (SBI) – ~~0.0015 ha direct loss; 0.04ha~~ 0.029 ha assumed loss due to incursion into the 15 m buffer zone and a further ~~0.078~~ 0.54 ha affected~~assumed lost~~ as a result of the change in air quality.

~~2.1.3~~2.1.4 ~~The 15 m buffer zone referred to above is considered a best practice minimum development offset for ancient woodland (Ref 5).~~ As such, it has been determined through consultation with Natural England that the provision of ~~3.08~~ 3.38 ha of broad-leaved plantation will be sufficient to compensate for the above ~~cumulative~~ losses of ancient woodland. This is set out in the Statement of Common Ground with Natural England [TR010054/APP/7.3]. Given that ancient woodland is not included in the metric as it is considered 'irreplaceable', this 3.~~03~~8 ha of broad-leaved plantation has been subtracted from the creation figure in Table 3.9 below (marked by a '*').

2.1.42.1.5 The figure for created 'buildings and hardstanding' habitat included in the metric represents the area to be occupied by hard surfaces associated with the Scheme.

2.2 Calculation

2.2.1 A biodiversity net gains assessment involves making a comparison between the biodiversity value of habitats present within the site prior to a development (i.e. the 'baseline') and the predicted biodiversity value of habitats following the completion of the development (i.e. 'post development'). The comparison is undertaken in terms of 'biodiversity units', with a 'biodiversity metric' providing the mechanism to allow biodiversity values to be calculated and compared.

2.2.2 The metric assesses and generates separate outputs for area-based habitats and linear based habitats (including hedgerows and rivers). For the purpose of the biodiversity net gains assessment, the output with the lowest value is used to determine whether the proposed development has achieved biodiversity net gains. A development cannot claim to achieve net gain until biodiversity net gains are predicted across all area-based and linear based habitats.

2.2.1 Biodiversity units have been calculated using a modification of the method published by Defra in Biodiversity Offsetting Pilots Technical Paper: the metric for the biodiversity offsetting pilot in England (Ref 6), hereafter referred to as the 'Defra Paper'.

2.2.3 The metric calculation requires the calculation of Biodiversity Units based on five factors and is calculated pre and post implementation of the Scheme, as per the following:The calculation for area-based and linear habitats calculates biodiversity units as follows:

Before Works = Distinctiveness Score x Condition Assessment x Area/Length x connectivity x strategic significance

After Works = ((Distinctiveness Score x Condition Score x Area/ Length x connectivity x strategic significance) / Time until to Target Condition) / Difficulty of Creation/Restoration

2.2.22.2.4 The five factors are determined as set out below:

- Distinctiveness Score – High, Medium or Low, based on Phase 1 UK habitat classifications (Ref 4, Ref 7).
- Condition Score – Good, Fairly good, Moderate, Fairly poor or Poor, based on habitat condition assessment (Ref 4).
- Area/Length – hectares (ha)/ length (km) of habitat type.
- Connectivity – High, Medium and Low.
- Strategic significance – High (Within area formally identified in local strategy), Medium (Location ecologically desirable but not in local strategy) and Low (Area/compensation not in local strategy/ no local strategy).
- Area – hectares (ha) of habitat type;

- Time until target condition – time period (in years) until the target condition will be achieved.
- Difficulty of creation/restoration – a score applied to account for risk associated with creating/restoring different types of habitat ~~creation/restoration~~.

River Habitats

~~2.2.3~~2.2.5 Habitat categories, associated distinctiveness and condition scores are approached differently for rivers. In line with current guidance (Ref 4), a desk study was undertaken to identify all river habitats present within the Proposed Development Site using the 'Discovering Priority Habitat in England' river data map (Ref 4). Following this, where data was available, river habitats were assigned a habitat category and distinctiveness using a combination of Section 41 (NERC Act, 2006) Priority Habitat descriptions, and River Naturalness Assessment class scores.

2.2.6 As data was not available for all river habitats present on the Site, a River Naturalness Metric Survey was undertaken for the Site based on photographs and assumptions to capture data which can determine the habitat, distinctiveness and to inform condition.

Biodiversity data

2.2.7 The Phase 1 habitat maps (hereafter referred to as 'the baseline') have been utilised to determine the baseline area-based habitats and hedgerow habitats (Refer to Figure 8.3 [TR010054/APP/6.2]). All baseline habitats defined within the Site were assigned a condition retrospectively post-survey, based on assumptions informed by baseline information available for the Site, professional judgement and application of the condition assessment criteria outlined in the Biodiversity Metric 2.0 – Technical Supplement (Ref 4). All habitats within the baseline plan were first assigned an appropriate JNCC Phase 1 habitat category (Ref 7) (see Appendix 8.4 for full details [TR0100054/APP/6.3]), before being digitised using GIS to provide area and length measurements. Habitats were converted to UK Habitat Classification habitat categories, before being inputted into the metric under one of the three broad habitat types. The data was utilised to determine the baseline biodiversity units.

2.2.8 The Environmental Masterplan prepared to inform the Scheme (Figure 2.1 to 2.7 [TR010054/APP/6.2] (hereafter referred to as 'Post-development') was used to determine the extent of habitats on site post-development in order to calculate the biodiversity units likely to be generated by those habitats retained, enhanced, created or succession accelerated as part of the Proposed Development. Before the data could be input into the metric calculator, the Environmental Masterplan was first converted into GIS where habitat area and length was calculated.

Connectivity

2.2.9 Connectivity scores for all habitats are required for Metric 2.0. Natural England's Metric Connectivity Tool 2.0 was therefore used to determine the connectivity scores for all habitats with high or very high distinctiveness. Utilising this guidance (Ref 4), all habitats with high or very high distinctiveness were attributed a

connectivity of 'medium'. Habitats with a distinctiveness of moderate to very low, were attributed low connectivity in line with current guidance.

Strategic Significance

2.2.10 The Metric 2.0 requires the strategic significance of all baseline and proposed habitats to be defined. Strategic significance refers to areas of local priority for biodiversity and nature improvement, identified within local planning policies. As part of this assessment, local planning policy document, Staffordshire Biodiversity Action Plan (Ref 6) was reviewed to determine the strategic significance of the Scheme's habitats.

~~**After works**~~

~~2.2.4 Biodiversity units for 'after works' represent the predicted future conditions, post-construction. Phase 1 habitat types for the predicted future baseline are derived from the Environmental Masterplan prepared to inform the Scheme (Figure 2.1 to 2.7 [TR010054/APP/6.2]).~~

~~**Distinctiveness score**~~

~~2.2.5 The metric assigns each Phase 1 habitat type a level of distinctiveness (Low, Moderate or High) with a corresponding distinctiveness score as set out in Table 2.1.~~

~~**Table 2.1: Distinctiveness Scores**~~

~~Distinctiveness~~	~~Score~~
~~High~~	~~6~~
~~Medium~~	~~4~~
~~Low~~	~~2~~

~~2.2.6 The distinctiveness score is independent of habitat condition and is a set value assigned to each habitat type.~~

~~**Condition criteria**~~

~~2.2.7 Each habitat type is assigned a set of condition criteria. These criteria set out specific parameters (e.g. Species diversity, vegetation cover, level of disturbance) against which each distinct habitat area can be assessed (Ref 4). The cumulative number of criteria against which each habitat area is matched is used to determine its condition and associated score. The cumulative number of criteria and associated condition scores are set out in Table 2.2.~~

~~**Table 2.2: Condition scores**~~

~~Number of condition criteria matched~~	~~Condition~~	~~Score~~
~~3~~	~~Good~~	~~3~~
~~2~~	~~Moderate~~	~~2~~
~~1~~	~~Poor~~	~~1~~
~~0~~	~~Poor~~	~~1~~

Area

2.2.8 Non-linear habitat areas are measured in hectares (ha). Linear habitat areas are measured in metres (m).

Time until target condition

2.2.9 Time until target condition for each habitat is categorised and assigned a multiplier as set out in Table 2.3.

Table 2.3: Time until Target Condition Multipliers

Years	Multiplier
5	1.2
10	1.4
15	1.7
20	2.0
25	2.4
30	2.8
32+	3

Difficulty of creation or restoration

2.2.10 The difficulty of creation or restoration proposals is assigned to one of four categories, each of which is assigned a multiplier. These are set out in Table 2.4.

Table 2.4: Difficulty of creation or restoration multipliers

Difficulty of creation or restoration	Multiplier
Very High	10
High	3
Medium	1.5
Low	1

2.3 Assumptions

2.3.1 The following assumptions have been made in relation to the pre- and post-development data when undertaking the calculations used in the assessment:

- Some retained habitats will be subject to ecological enhancements, such as Lower Pool LWS/SBI and retained watercourses. For those habitats included in the area based metric calculation, these enhancements may not result in changes to the condition of the habitat in terms of the metric and have therefore been excluded from the calculation. For retained watercourses, the condition of the habitat will be improved through enhancement, and this has therefore been included in the metric calculation. For the purposes of the metric it is assumed no retained habitats will be enhanced.
- The Study area for the biodiversity net gains calculation is all land within the Scheme boundary.

- All habitats within the Phase 1 survey plan have been included within the calculation to provide the Scheme's baseline biodiversity value.
- The habitats used in the biodiversity net gains calculations have been assumed based on the Phase 1 habitat plan and the proposed Landscape Plan. The habitats reported in these plans were not initially recorded as UK Habitat Classification types, so were subsequently fitted to the most appropriate UK Habitat Classification habitat type through professional judgement by a suitably experienced ecologist.
- Habitats stated as having importance in the area of the Scheme in the "Staffordshire Biodiversity Action Plan 1998" (Ref 6) are classed as having a high strategic significance.
- Habitats created as part of the Scheme will be subject to ongoing management to ensure the target conditions assumed in the biodiversity net gains calculation can be reached.
- Target conditions and timescales have been selected in accordance with the Natural England Biodiversity Metric 2.0 Use Guide and Technical Supplement (Ref 4).
- Retainment or loss of baseline habitats was determined by comparing the baseline and the landscape plan; habitats present within the same area in both plans indicated retainment.
- Habitats with missing descriptions and photo evidence due to lack of land access have been assigned as follows: woodland habitats (moderate), amenity grassland and poor semi-improved grassland (poor). The woodland was assigned moderate condition as a precautionary approach, and all amenity and poor semi-improved grassland within the Scheme are of poor condition, therefore, these default condition have been assigned.
- The proposed habitats illustrated in Figures 2.1 to 2.7 [TR010054/APP/6.2] would either be managed as part of Highways England's soft estate or by separate landowner agreement (where located on third party land), and would be managed over the projected timescales selected ~~for~~ to reach the target conditions.

2.4 Limitations

2.4.1 Phase 1 habitat survey was carried out prior to the instruction for a biodiversity metric calculation to be undertaken to support the application; therefore, habitat condition assessments were not carried out during the field survey. As a result, baseline condition scores have been assigned retrospectively to habitats based on informed assumptions drawn from the information collated through the Phase 1 survey and site visits in 2018 and 2019.

2.4.2 There were no constraints when carrying out the biodiversity net gains metric assessment calculation. However, the Metric 2.0 is in beta test phase, and a final version of the metric and calculation tool is expected in autumn 2020, therefore there is potential for the calculations that underpin the metric to change in the final version.

~~2.4.1 The assessment has been based on the known permanent loss and any retained habitats. This assessment does not include any calculations relating to the temporary use of land, for example, those required for compounds or services.~~

3 Results

3.1.1 The following raw data tables are presented below:

- Table 3.1: Phase 1 Habitat (area-based): Baseline.
- Table 3.2: Phase 1 Habitat (area-based): Effects.
- Table 3.3: Phase 1 Habitat (Linear): Baseline
- Table 3.4: Phase 1 Habitat (Linear): Effects.
- Table 3.5: Phase 1 Habitat (River): Baseline.
- Table 3.6: Phase 1 Habitat (River): Effects.
- Table 3.7: Phase 1 Habitat (area-based): Post-development.
- Table 3.8: Phase 1 Habitat (area-based): After Works Units.
- Table 3.9: Phase 1 Habitat (Linear): Post-development.
- Table 3.10: Phase 1 Habitat (Linear): After Works Units.
- Table 3.11: Phase 1 Habitat (River): Post-development.
- Table 3.12: Phase 1 Habitat (River): After Works Units.
- ~~Table 3.1: Phase 1 Habitat (Non-linear): Before Works Conditions.~~
- ~~Table 3.2: Phase 1 Habitat (Non-linear): Effects.~~
- ~~Table 3.3: Phase 1 Habitat (Linear): Before Works Conditions.~~
- ~~Table 3.4: Phase 1 Habitat (Linear): Effects.~~
- ~~Table 3.5: Phase 1 Habitat (Non-linear): After Works Conditions.~~
- ~~Table 3.6: Phase 1 Habitat (Non-linear): After Works Units.~~
- ~~Table 3.7: Phase 1 Habitat (Linear): After Works Conditions.~~
- ~~Table 3.8: Phase 1 Habitat (Linear): After Works Units.~~

Table 3.1: Phase 1 habitat (non-linear): Before works conditions

Phase 1 habitat category	Area (ha)	Distinctiveness		Condition		Biodiversity units
		Category	Score	Category	Score	
Broad-leaved semi-natural woodland	4.50	High	6	Good	3	80.91
Broad-leaved semi-natural woodland	0.47	High	6	Moderate	2	5.68
Broad-leaved plantation	4.85	High	6	Good	3	87.38
Broad-leaved plantation	53.78	High	6	Moderate	2	645.31
Broad-leaved plantation	2.44	High	6	Poor	1	14.64
Bare ground	0.01	Low	2	Poor	1	0.02
Mixed plantation	3.13	Medium	4	Moderate	2	25.04
Recently felled woodland	0.45	Low	2	Moderate	2	1.79
Improved grassland	35.03	Low	2	Poor	1	70.06
Poor semi-improved grassland	1.08	Medium	4	Moderate	2	8.67
Poor semi-improved grassland	7.10	Medium	4	Poor	1	28.40
Tall ruderal	0.16	Low	2	Moderate	2	0.63
Tall ruderal	0.20	Low	2	Poor	1	0.40
Standing water	1.29	High	6	Good	3	23.22
Standing water	1.02	High	6	Moderate	2	12.21
Standing water	0.005	High	6	Poor	1	0.01
Buildings or hardstanding	37.08	N/A	0	Poor	1	0.00

Phase 1 habitat category	Area (ha)	Distinctiveness		Condition		Biodiversity units
		Category	Score	Category	Score	
Arable	44.51	Low	2	Poor	1	89.02
Amenity grassland	0.94	Low	2	Poor	1	1.88

Table 3.2: Phase 1 habitat (non-linear): Effects

Phase 1 habitat category	Habitats to be retained with no change		Habitats to be lost	
	Area (ha)	Biodiversity units	Area (ha)	Biodiversity units
Broad-leaved semi-natural woodland	3.71	66.73	0.79	-14.18
Broad-leaved semi-natural woodland	0.08	0.97	0.39	-4.72
Broad-leaved plantation	2.96	53.22	1.90	-34.16
Broad-leaved plantation	39.63	475.56	14.14	-169.68
Broad-leaved plantation	1.84	11.02	0.60	-3.62
Bare ground	0.01	0.02	0.00	0.00
Mixed plantation	0.51	4.05	2.62	-20.98
Recently felled woodland	0.32	1.27	0.13	-0.52
Improved grassland	6.67	13.34	28.36	-56.72
Poor semi-improved grassland	0.34	2.72	0.74	-5.95
Poor semi-improved grassland	5.34	21.37	1.76	-7.03
Tall ruderal	0.04	0.15	0.12	-0.48
Tall ruderal	0.00	0.00	0.20	-0.40
Standing water	0.74	13.31	0.57	-10.26
Standing water	0.26	3.12	0.76	-9.12

Phase 1 habitat category	Habitats to be retained with no change		Habitats to be lost	
	Area (ha)	Biodiversity units	Area (ha)	Biodiversity units
Standing water	0.00	0.00	0.00	-0.01
Buildings or hardstanding	24.90	0.00	12.18	0.00
Arable	6.94	13.88	37.57	-75.14
Amenity grassland	0.47	0.95	0.47	-0.94

Table 3.3: Phase 1 habitat (linear): Before works conditions

Phase 1 habitat category	Length (m)	Distinctiveness		Condition		Biodiversity units
		Category	Score	Category	Score	
Hedges: linear trees	204	High	6	Moderate	2	2.45
Hedges: native species rich intact hedge	1896	High	6	Good	3	34.13
Hedges: native species rich intact hedge	660	High	6	Moderate	2	7.92
Hedges: intact hedge	1947	High	6	Moderate	2	23.36
Hedges: intact hedge	810	High	6	Poor	1	4.86
Hedges: defunct hedge	623	High	6	Good	3	11.21
Hedges: defunct hedge	1048	High	6	Moderate	2	12.57
Hedges: defunct hedge	35	High	6	Poor	1	0.21
Running water	1432	High	6	Good	3	25.77

Table 3.4: Phase 1 habitat (linear): Effects

Phase 1 habitat category	Habitats to be retained with no change		Habitats to be lost	
	Length (m)	Biodiversity units	Length (m)	Biodiversity units
Hedges: linear trees	204	2.45	0	0.00
Hedges: native species rich intact hedge	773	13.91	1124	-20.22
Hedges: native species rich intact hedge	381	4.57	279	-3.35
Hedges: intact hedge	1207	14.49	739	-8.87
Hedges: intact hedge	508	3.04	304	-1.82
Hedges: defunct hedge	262	4.72	361	-6.49
Hedges: defunct hedge	590	7.08	458	-5.49
Hedges: defunct hedge	35	0.21	0	0.00
Running water	1120	20.16	350	-6.3

Table 3.5: Phase 1 habitat (non-linear): Habitats to be created conditions

Phase 1 habitat category	Area (ha)	Distinctiveness		Target condition	
		Category	Score	Category	Score
Broad-leaved plantation	25.04	High	6	Moderate	2
Standing water	1.45	High	6	Good	3
Standing water	1.43	High	6	Moderate	2
Semi-improved grassland	42.43	Medium	4	Good	3
Marsh or marshy grassland	1.04	High	6	Good	3
Buildings or hardstanding	23.76	Low	2	Poor	1
Amenity grassland	5.27	Low	2	Poor	1

Table 3.6: Phase 1 habitat (non-linear): Habitats to be created units

Phase 1 habitat category	Time to target condition		Creation or restoration difficulty		Biodiversity units
	Years	Score	Category	Score	
Broad-leaved plantation	30	2.8	Medium	1.5	71.54
Standing water	5	1.2	Medium	1.5	14.5
Standing water	5	1.2	Medium	1.5	9.51
Semi-improved grassland	10	1.4	Medium	1.5	242.45
Marsh or marshy grassland	10	1.4	High	3.0	4.48
Buildings or hardstanding	5	1.2	Low	1.0	0.00
Amenity grassland	5	1.2	Low	1.0	8.79

Table 3.7: Phase 1 habitat (linear): Habitats to be created conditions

Phase 1 habitat category	Length (m)	Distinctiveness		Target condition	
		Category	Score	Category	Score
Native species-rich intact hedge	4616	High	6	Good	3
Running water	4450	High	6	Good	3

Table 3.8: Phase 1 habitat (linear): Habitats to be created units

Phase 1 habitat category	Time to target condition		Creation or restoration difficulty		Biodiversity units
	Years	Score	Category	Score	
Native species-rich intact hedge	15	1.7	Low	1.0	48.89
Running water	5	1.2	Medium	1.5	4.5

Table 3.1: Phase 1 habitat (area-based): Baseline

Phase 1 habitat category (UK Habs)	Area (ha)	Distinctiveness		Condition		Connectivity	Strategic significance	Biodiversity units
		Category	Score	Category	Score	Score	Score	
Broad-leaved semi-natural woodland (Woodland and forest – Lowland mixed deciduous woodland)	1.16	High	6	Moderate	2	Medium	Location ecologically desirable but not in local strategy	16.84
Broad-leaved semi-natural woodland (Woodland and forest – Lowland mixed deciduous woodland)	1.9	High	6	Moderate	2	Medium	Area/compensation not in local strategy/ no local strategy	25.08
Broad-leaved plantation (Woodland and forest – other woodland; broadleaved)	3.65	High	6	Good	3	Medium	Area/compensation not in local strategy/ no local strategy	43.8
Broad-leaved plantation (Woodland and forest – other woodland; broadleaved)	35.25	High	6	Moderate	2	Medium	Location ecologically desirable but not in local strategy	311.20
Broad-leaved plantation (Woodland and forest – other woodland; broadleaved)	22.18	High	6	Moderate	2	Medium	Area/compensation not in local strategy/ no local strategy	139.84
Bare ground (Urban – Vacant/derelict land / bareground)	0.01	Low	2	Poor	1	Low	Area/compensation not in local strategy/ no local strategy	0.02
Mixed plantation (Woodland and forest – other woodland; mixed)	0.74	Medium	4	Moderate	2	Low	Area/compensation not in local strategy/ no local strategy	5.92
Mixed plantation (Woodland and forest – other woodland; mixed)	2.39	Medium	4	Poor	1	Low	Area/compensation not in local strategy/ no local strategy	9.56

Phase 1 habitat category (UK Habs)	Area (ha)	Distinctiveness		Condition		Connectivity	Strategic significance	Biodiversity units
		Category	Score	Category	Score	Score	Score	
Recently felled woodland (Woodland and forest – felled)	0.45	Medium	4	Poor	1	Low	Area/compensation not in local strategy/ no local strategy	1.8
Improved grassland (Grassland – modified grassland)	35.05	Low	2	Poor	1	Low	Area/compensation not in local strategy/ no local strategy	70.10
Poor semi-improved grassland (Grassland – modified grassland)	8.4	Low	2	Poor	1	Low	Area/compensation not in local strategy/ no local strategy	16.8
Tall ruderal (Sparsely vegetated land – Ruderal/Ephemeral)	0.16	Low	2	Moderate	2	Low	Area/compensation not in local strategy/ no local strategy	0.64
Tall ruderal (Sparsely vegetated land – Ruderal/Ephemeral)	0.2	Low	2	Poor	1	Low	Area/compensation not in local strategy/ no local strategy	0.4
Standing water (Lakes – ponds (Non-priority habitat)	0.03	High	6	Moderate	2	Medium	Area/compensation not in local strategy/ no local strategy	0.40
Standing water (Lakes – ponds (Non-priority habitat)	2.29	High	6	Poor	1	Medium	Area/compensation not in local strategy/ no local strategy	15.11
Buildings or hardstanding (Urban – Developed land; sealed surface)	37.58	V.Low	0	N/A - other	1	Low	Area/compensation not in local strategy/ no local strategy	0.00
Arable (Crops – cereal crops)	44.53	Low	2	N/A - agricultural	1	Low	Area/compensation not in local strategy/ no local strategy	89.06

Phase 1 habitat category (UK Habs)	Area (ha)	Distinctiveness		Condition		Connectivity	Strategic significance	Biodiversity units
		Category	Score	Category	Score	Score	Score	
Amenity grassland (Grassland – modified grassland)	0.94	Low	2	Poor	1	Low	Area/compensation not in local strategy/ no local strategy	1.9
Total	196.92	-	-	-	-	-	-	785.07

Table 3.2: Phase 1 habitat (area-based): Effects

Phase 1 habitat category (UK Habs)	Habitats to be retained with no change		Habitats to be lost	
	Area (ha)	Biodiversity units	Area (ha)	Biodiversity units
Broad-leaved semi-natural woodland (Woodland and forest – Lowland mixed deciduous woodland)	1.88	25.82	1.18	-16.1
Broad-leaved plantation (Good condition) (Woodland and forest – other woodland; broadleaved)	1.6	19.20	2.05	-24.60
Broad-leaved plantation (Moderate condition) (Woodland and forest – other woodland; broadleaved)	42.88	365.98	14.55	-121.66
Bare ground (Urban – Vacant/derelict land / bareground)	0.01	0.02	0	0
Mixed plantation (Moderate condition) (Woodland and forest – other woodland; mixed)	0.39	3.12	0.35	-2.8
Mixed plantation (Poor condition) (Woodland and forest – other woodland; mixed)	0	0	2.39	-9.56

Phase 1 habitat category (UK Habs)	Habitats to be retained with no change		Habitats to be lost	
	Area (ha)	Biodiversity units	Area (ha)	Biodiversity units
Recently felled woodland (Woodland and forest – felled)	0.32	1.28	0.13	-0.52
Improved grassland (Grassland – modified grassland)	10.09	20.18	24.96	-49.92
Poor semi-improved grassland (Grassland – modified grassland)	5.86	11.72	2.54	-5.08
Tall ruderal (moderate condition) (Sparsely vegetated land – Ruderal/Ephemeral)	0	0	0.16	-0.64
Tall ruderal (poor condition) (Sparsely vegetated land – Ruderal/Ephemeral)	0	0	0.2	-0.4
Standing water (moderate condition) (Lakes – ponds (Non-priority habitat)	0	0	0.03	-0.39
Standing water (poor condition) (Lakes – ponds (Non-priority habitat)	1.1	7.26	1.19	-7.85
Buildings or hardstanding (Urban – Developed land; sealed surface)	24.7	0	12.88	0
Arable (Crops – cereal crops)	13.78	27.56	30.75	-61.5
Amenity grassland (Grassland – modified grassland)	0.5	1	0.45	-0.9
Total	103.11	483.14	93.81	-301.02

Table 3.3: Phase 1 habitat (linear): Baseline

Phase 1 habitat category (UK Habs)	Length (km)	Distinctiveness		Condition		Connectivity	Strategic significance	Biodiversity units
		Category	Score	Score	Score	Score	Score	
Hedges: native species rich intact hedge (Native Species Rich Hedgerow)	1.28	Medium	6	Good	3	Low	Within area formally identified in local strategy	17.664
Hedges: native species rich intact hedge (Native Species Rich Hedgerow)	0.19	Medium	6	Moderate	2	Low	Within area formally identified in local strategy	1.748
Hedges: native species rich intact hedge (Native Species Rich Hedgerow)	0.23	Medium	6	Moderate	2	Low	Within area formally identified in local strategy	2.116
Hedges: native species rich intact hedge (Native Species Rich Hedgerow)	0.09	Medium	6	Moderate	2	Low	Within area formally identified in local strategy	0.828
Hedges: intact hedge (Native Hedgerow)	0.78	Low	6	Good	3	Low	Within area formally identified in local strategy	5.382
Hedges: intact hedge (Native Hedgerow)	0.38	Low	6	Moderate	2	Low	Within area formally identified in local strategy	1.748

Phase 1 habitat category (UK Habs)	Length (km)	Distinctiveness		Condition		Connectivity	Strategic significance	Biodiversity units
		Category	Score	Score	Score	Score	Score	
Hedges: intact hedge (Native Hedgerow)	0.24	Low	6	Poor	1	Low	Within area formally identified in local strategy	0.55
Hedges: defunct hedge (Native Hedgerow)	0.17	Low	6	Good	3	Low	Within area formally identified in local strategy	1.173
Total	3.36	-	-	-	-	-	-	31.21

Table 3.4: Phase 1 habitat (linear): Effects

Phase 1 habitat category	Habitats to be retained with no change		Habitats to be lost	
	Length (km)	Biodiversity units	Length (km)	Biodiversity units
Hedges: native species rich intact hedge (Good condition)	0	-17.664	0	+3.02
Hedges: native species rich intact hedge (Moderate condition)	0.32	2.944	0.19	-1.748
Hedges: intact hedge	0	-5.382	0.78	-5.382
Hedges: intact hedge	0	-1.748	0.38	-1.748
Hedges: intact hedge	0	-0.55	0.24	-0.55
Hedges: defunct hedge	0	-1.173	0.17	-1.173
Total	0.32	23.573	1.679	-6.408

Table 3.5:Phase 1 habitat (River): Baseline

Phase 1 habitat category	Length (km)	Distinctiveness		Condition		Strategic significance	Biodiversity units
		Category	Score	Score	Score	Score	
Running water	1.24	Medium	4	Moderate	3	Low potential/ action not identified in any plan	14.88
Total	1.24	-	-	-	-	-	14.88

Table 3.6: Phase 1 habitat (River): Effects

Phase 1 habitat category	Habitats to be retained with no change		Habitats to be lost	
	Length (km)	Biodiversity units	Length (km)	Biodiversity units
Running water	1.24	14.88	0	0
Total	1.24	14.88	0	0

Table 3.7: Phase 1 habitat (area-based): Post-development created conditions

Phase 1 habitat category	Area (ha)	Distinctiveness		Target condition		Connectivity	Strategic significance
		Category	Score	Category	Score	Score	Score
Broad-leaved plantation	15.72	Medium	4	Moderate	2	Low	Location ecologically desirable but not in local strategy
Broad-leaved plantation for screening	6.56	Medium	4	Moderate	2	Low	Area/compensation not in local strategy/ no local strategy

Phase 1 habitat category	Area (ha)	Distinctiveness		Target condition		Connectivity	Strategic significance
		Category	Score	Category	Score	Score	Score
Standing water	1.23	High	6	Good	3	Medium	Location ecologically desirable but not in local strategy
Standing water	1.17	High	6	Poor	1	Medium	Area/compensation not in local strategy/ no local strategy
Semi-improved grassland	38.2	Medium	4	Moderate	2	Low	Location ecologically desirable but not in local strategy
Buildings or hardstanding	22.69	V.Low	0	N/a - other	0	Low	Area/compensation not in local strategy/ no local strategy
Amenity grassland	5.22	Low	2	Poor	1	Low	Area/compensation not in local strategy/ no local strategy
Total	90.79	-	-	-	-	-	-

Table 3.8: Phase 1 habitat (area-based): Post-development created units

Phase 1 habitat category	Time to target condition		Creation or restoration difficulty		Biodiversity units
	Years	Score	Category	Score	
Broad-leaved plantation	30	0.343	Medium	0.67	31.83
Broad-leaved plantation for screening	30	0.343	Medium	0.67	12.08
Standing water (good condition)	5	0.837	Low	1	22.42
Standing water (Poor condition)	1	0.965	Low	1	7.45
Semi-improved grassland	10	0.7	Low	1	235.41
Buildings or hardstanding	0	1	Low	1	0.00
Amenity grassland	1	0.965	Low	1.0	10.07
Total	-	-	-	-	319.26

Table 3.9: Phase 1 habitat (linear): Post-development created conditions

Phase 1 habitat category	Length (m)	Distinctiveness		Target condition		Connectivity	Strategic Significance	Biodiversity Units
		Category	Score	Category	Score	Score	Score	Score
Native species-rich intact hedge	4.3	Medium	4	Good	3	Low	Within area formally identified in local strategy	27.84
Native species-rich intact hedge	2.9	Medium	4	Poor	1	Low	Within area formally identified in local strategy	8.62
Total	7.2	-	-	-	-	-	-	36.46

Table 3.10: Phase 1 habitat (linear): Post-development created units

Phase 1 habitat category	Time to target condition		Biodiversity units
	Years	Score	
Native species-rich intact hedge (Good condition)	10	0.7	27.84
Native species-rich intact hedge (Poor condition)	1	0.965	8.62
Total	-	-	36.46

Table 3.11: Phase 1 habitat (river): Post-development created conditions

Phase 1 habitat category	Length (m)	Distinctiveness		Target condition		Strategic Significance	Biodiversity Units
		Category	Score	Category	Score	Score	Score
Running water[1]	0.2	Medium		Fairly Good	4	Low	2.85

Table 3.12: Phase 1 habitat (linear): Post-development created units

Phase 1 habitat category	Time to target condition		Creation or restoration difficulty	Biodiversity units
	Years	Score	Score	
Running water[1]	N/A	N/A	N/A	N/A

[1] No river-based habitats are to be created.

3.1.2 A summary of the area and linear measurements of each habitat before and after works are set out in Tables 3.139 and 3.10 below.

Table 3.133.9: Phase 1 habitat areas

Phase 1 habitat category	Area (ha)			Percentage change
	Before works	After works (Retained)	After works (Created)	
Broad-leaved semi-natural woodland	4.973.06	3.791.88	0-	-23.74-1.18
Broad-leaved plantation (good condition)	61.073.65	44.431.6	25.04*0	+13.75-2.05
Broad-leaved plantation (moderate condition)	57.43	42.88	22.28*	+7.73
Bare ground	0.01	0.01	0-	0
Mixed plantation (moderate condition)	3.130.74	0.510.39	0-	-83.71
Mixed plantation (poor condition)	2.39	0	0	-2.39
Recently felled woodland	0.45	0.32	0-	-28.89 -0.13
Improved grassland	35.035	6.6710.09	0-	-80.99 -24.96
Poor semi-improved grassland	8.418	5.8668	0-	-30.56 -2.54
Tall ruderal (moderate condition)	0.136	0.04	0-	-88.89 -0.16
Tall ruderal (Poor condition)	0.2	0	0	-0.2
Standing water (good condition)	2.310	1.000	2.881.23	+1.2367.97
Standing water (moderate condition)	0.03	0	0	-0.03
Standing water (poor condition)	2.29	1.1	1.17	-0.02
Buildings or hardstanding	37.508	24.790	23.6222.69	+30.85 +9.81
Arable	44.531	6.9413.78	0-	-84.81 -30.75
Amenity grassland	0.954	0.547	5.227	+510.63 -4.77
Semi-improved neutral grassland	0-	0-	38.242.43	100 +38.2
Marsh or marshy grassland	-	-	1.04	100
Total	198.04196.92	94.76103.11	100.2890.79	N/A
* 3.3808 ha creation of broadleaved plantation to compensate for direct and indirect effects on ancient woodland is not included in the metric as ancient woodland is considered 'irreplaceable'				

Table 3.10: Phase 1 linear habitats

Phase 1 habitat category	Length (m)			Percentage change
	Before works	After works (Retained)	After works (Created)	
Linear trees	204	204	-	0
Native species-rich intact hedge	2556	1154	4616	+80.59
Intact hedge	2757	1208	-	-56.18
Defunct hedge	1706	887	-	-48.01
Running water	1432	1120	450	+9.63
Total	8655	4573	4833	N/A

3.1.3 The summary of the results of the metric calculation are presented in Tables 3.11 and 3.12.

Table 3.11: Metric calculation results (non-linear)

Condition	Phase 1 habitat category	Biodiversity units			
		Before works	After works (Retained)	After works (Created)	Difference
Good	Broad-leaved semi-natural woodland	80.91	66.73	-	-14.18
	Broad-leaved plantation	87.38	53.22	-	-34.16
	Standing Water	23.57	13.31	14.50	4.24
	Semi-improved Grassland	-	-	242.45	242.45
	Marsh/Marshy Grassland	-	-	4.48	4.48
Moderate	Broad-leaved semi-natural woodland	5.68	0.97	-	-4.72
	Broad-leaved plantation	645.31	475.56	71.54	- 98.28
	Mixed Plantation	25.04	4.05	-	-20.99
	Recently Felled Woodland	1.79	1.27	-	-0.52
	Poor Semi-improved Grassland	8.67	2.72	-	-5.95
	Tall Ruderal	0.63	0.15	-	-0.48
	Standing Water	12.21	3.12	9.51	+ 0.42
Poor	Broad-leaved plantation	14.64	11.02	-	-3.62
	Bare Ground	0.02	0.02	-	0
	Improved Grassland	70.06	13.34	-	-56.72
	Poor Semi-improved Grassland	28.40	21.37	-	-7.03

Condition	Phase 1 habitat category	Biodiversity units			
		Before works	After works (Retained)	After works (Created)	Difference
	Tall Ruderal	0.40	0.005	-	-0.395
	Standing Water	0.01	0.00	-	-0.01
	Buildings/Hardstanding	0.00	0.00	-	0
	Arable	89.02	13.88	-	-75.14
	Amenity Grassland	1.88	0.95	8.79	7.86
Total		1095.62	681.685	351.27	-62.74

Table 3.12: Metric calculation results (linear)

Condition	Phase 1 Habitat Category	Biodiversity units			
		Before works	After works (Retained)	After works (Created)	Difference
Good	Native species-rich intact hedge	34.13	13.91	48.89	+28.67
	Defunct hedge	11.21	4.72	-	-6.49
	Running water	26.46	20.16	4.5	-1.8
Moderate	Linear trees	2.45	2.45	-	0
	Native species-rich intact hedge	7.92	4.57	-	-3.35
	Intact hedge	23.36	14.49	-	-8.87
	Defunct hedge	12.57	7.08	-	-5.49
Poor	Intact hedge	4.86	3.04	-	-1.82
	Defunct hedge	0.21	0.21	-	0
Total		123.17	70.63	53.39	+0.85

In summary, the results show an overall biodiversity unit loss of 4.99%, which is considered to be no net loss (Ref 1).

Table 3.14: Phase 1 linear habitats

Phase 1 habitat category	Length (km)			Percentage change
	Before works	After works (Retained)	After works (Created)	
Hedges: native species rich intact hedge (Good Condition)	1.28	0	4.3	+336
Hedges: native species rich intact hedge (Moderate Condition)	0.19	0.32	-	-100

Phase 1 habitat category	Length (km)			Percentage change
	Before works	After works (Retained)	After works (Created)	
Hedges: native species rich intact hedge (Poor Condition)	0	0	2.9	+100
Hedges: intact hedge	0.78	0	-	-100
Hedges: intact hedge	0.38	0	-	-100
Hedges: intact hedge	0.24	0	-	-100
Hedges: defunct hedge	0.17	0	-	-100
Total	3.04	0.32	7.20	N/A

Table 3.15: Phase 1 river habitats

Phase 1 habitat category	Length (km)			Percentage change
	Before works	After works (Retained)	After works (Created)	
Running Water	1.24	1.24	0	0
Total	1.24	1.24	0	0

Table 3.16: Metric calculation results (area-based)

Condition	Phase 1 habitat category	Biodiversity units			
		Before works	After works (Retained)	After works (Created)	Difference
Good	Broad-leaved plantation	43.8	19.20	0	-24.6
	Standing Water	0	0	22.42	+22.42
Moderate	Broad-leaved semi-natural woodland	41.92	25.82	0	-16.1
	Broad-leaved plantation	487.64	365.97	43.91	-77.76
	Mixed Plantation	5.92	3.12	0	-2.8
	Tall Ruderal	0.64	0	0	-0.64
	Standing Water	0.40	0	0	-0.4
	Semi-improved Neutral Grassland	0	0	235.41	+235.41
Poor	Mixed plantation	9.56	0	0	-9.56
	Bare Ground	0.02	0.02	0	0
	Recently Felled Woodland	1.8	1.28	0	-0.52
	Poor Semi-improved Grassland	16.8	11.72	0	-5.08
	Improved grassland	70.10	20.18	0	-49.92

Condition	Phase 1 habitat category	Biodiversity units			
		Before works	After works (Retained)	After works (Created)	Difference
	Standing Water	15.11	7.26	7.45	-0.4
	Tall ruderal	0.4	0	0	-0.4
	Amenity Grassland	1.9	1	10.07	+9.17
N/A – Agricultural	Arable	89.06	27.56	0	-61.5
N/A - Other	Buildings or hand standing	0	0	0	0
Total		785.07	483.13	319.26	+17.32

Table 3.17: Metric calculation results (linear)

Condition	Phase 1 Habitat Category	Biodiversity units			
		Before works	After works (Retained)	After works (Created)	Difference
Good	Native species-rich intact hedge	17.664	0	27.84	+10.176
	Intact hedge	5.382	0	0	-5.382
	Defunct hedge	1.173	0	0	-1.173
Moderate	Native species-rich intact hedge	4.692	2.9	0	-4.372
	Intact hedge	1.15	0	0	-1.15
Poor	Native species-rich intact hedge	0	0	8.62	+8.62
	Intact hedge	1.15	0	0	-1.15
Total		31.21	2.94	36.46	+8.2

Table 3.18: Metric calculations results (river habitats)

Phase 1 habitat category	Biodiversity Units			Percentage change
	Before works	After works (Retained)	After works (Created)	
Running Water	14.88	12.26	2.85	2.23
Total	14.88	12.36	2.85	2.23

3.1.3 In summary, the results show an overall increase in biodiversity units results are shown in Table 3.19:

Table 3.19: Summary of biodiversity metric calculation

Calculation	Percentage change
Area-based habitats	+2.21%
Linear based habitats	+26.27%
Running Water	2.23%

4 Conclusions

4.1.1 The Scheme would result in a Biodiversity Net Gain of 2.21% (17.32 units) of-area based habitats and 26.27% (8.20 units) in linear habitats and 2.23% (0.33 units) of river habitats.

4.1.2 The Scheme is within the range -5 % to +5 % for river and area based habitats (woodland, grassland etc.) which can be classed as no net loss in accordance with Table 11.9 of CIRIA C776a Good practice principles for development (Ref 8), and can be classed as achieving a net gain in linear (hedgerow) habitats.

~~4.1.1 Biodiversity units would be marginally lower as a result of the Scheme, with a -4.99% net loss in biodiversity units. This considered to be an overall no net loss of biodiversity (Ref 1).~~

~~4.1.2 However, it should be noted that although there will be a loss in terms of the metric, the retained/created habitats that will be present in quanta over and above what is existing (broad-leaved plantation, standing water, semi-improved grassland, running water and most notably native species-rich intact hedgerow, which will increase in quantum by 80.59% as a result of the Scheme) are those of highest ecological value that are considered in the metric (aside from broad-leaved woodland).~~

5 References

Ref 1 Biodiversity Net Gain – Good practice principles for development. CIRIA, CIEEM and IEMA (2016). https://cieem.net/wp-content/uploads/2019/02/Biodiversity-Net-Gain-Principles.pdf

Ref 2 National Policy Statement for National Networks, Department for Transport (2014).https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/387223/npsnn-web.pdf

Ref 3 National Planning Policy Framework. Ministry of Housing, Communities & Local Government (2019).https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/810197/NPPF_Feb_2019_revised.pdf

Ref 4 Chief Highway Engineer Memorandum 422/18: Chief Highway Engineer Memorandum 422/18: Supporting Transparency around our Biodiversity Performance

Ref 5 Forestry Commission and Natural England (2018). Ancient woodland, ancient trees and veteran trees: protecting them from development. https://www.gov.uk/guidance/ancient-woodland-and-veteran-trees-protection-surveys-licences

Ref 6 Defra (2012) *Biodiversity Offsetting Pilots Technical Paper: The Metric for the Biodiversity Offsetting Pilot in England.* https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/69531/pb13745-bio-technical-paper.pdf

Ref 7 Joint Nature Conservation Committee (2010). Handbook for Phase 1 Habitat Survey – a Technique for Environmental Audit. JNCC: Peterborough

Ref 8 Baker, J., Hoskin, R, Butterworth, T (2019) Biodiversity net gain. Good practice principles for development. Part A: A practical guide. CIRIA. Available online at: https://cieem.net/wp-content/uploads/2019/02/C776a-Biodiversity-net-gain.-Good-practice-principles-for-development.-A-practical-guide-web.pdf