February 2023

London Luton Airport Expansion

Planning Inspectorate Scheme Ref: TR020001

Volume 5 Environmental Statement and Related Documents

5.02 Appendix 8.5 Biodiversity Net Gain Report

The Planning Act 2008

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

London Luton Airport Expansion Development Consent Order 202x

5.02 ENVIRONMENTAL STATEMENT APPENDIX 8.5 BIODIVERSITY NET GAIN REPORT

Regulation number:	Regulation 5(2)(a)
Planning Inspectorate Scheme Reference:	TR020001
Document Reference:	TR020001/APP/5.02
Author:	Luton Rising

Version	Date	Status of Version
Issue 01	February 2023	Application issue

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1   INTRODUCTION

1.1   Background

1.1.1   This report has been prepared by Luton Rising (a trading name for London Luton Airport Limited ('the Applicant')) to inform the Environmental Impact Assessment (EIA) in support of the application for development consent for the expansion of London Luton Airport (the airport) to accommodate 32 million passengers per annum (mppa), (hereby referred to as the 'Proposed Development').

1.1.2   The Proposed Development is centred at London Luton Airport, Bedfordshire and adjacent lands, at approximate OS grid reference TL 12478 21377 and shown within **Figure 1.1** of the Environmental Statement (ES) **[TR020001/APP/5.03]**.

1.1.3   The Main Application Site (as defined in **Chapter 2** The Site and Surroundings of this ES **[TR020001/APP/5.01]** and shown on **Figure 2.2** of this ES **[TR020001/APP/5.03]**), covers approximately 428ha which in addition to the airport infrastructure comprises previously undeveloped, predominantly arable land, with hedgerows, trees and shrub-lined margins. Occasional woodland blocks, copses, tree belts, areas of scrub, rough grassland, ruderal vegetation, conservation headlands and game cover adjacent to field edges. The existing airport is dominated by hardstanding with amenity grassland and small patches of scrub. The Proposed Development also includes Off-site Highway Interventions, two Off-site Car Park works and Off-site Planting areas outside of the Main Application Site (as defined in **Chapter 2** The Site and Surroundings of this ES **[TR020001/APP/5.01]** and shown on **Figure 2.2** of this ES **[TR020001/APP/5.03]**). The Off-site Highway Interventions are restricted to within existing highway boundaries, with the exception of the construction compound at Junction 10 of the M1 which is located on fallow farmland field. The proposed Off-site Car Parks are located to the west of the existing airport within brownfield areas, comprising access roads, temporary buildings, area of ephemeral/short perennial vegetation, grassland margins and areas of landscaping comprising scrub and trees. The Off-site Planting areas are located to the north east of the Main Application Site, comprising grassland field margins and hedgerows.

1.1.4   As detailed within **Chapter 4** of this ES **[TR020001/APP/5.01]** the Proposed Development would deliver additional capacity incrementally to meet the forecast growth in demand. However, for the purposes of assessment, given the length of time over which the Proposed Development would be constructed and to understand environmental effects over the time, three assessment phases are considered and referred to a Phases, as follows:

   a. Assessment Phase 1: Expansion of existing Terminal 1 (T1) to increase capacity from 18 to 21.5 mppa. It is currently anticipated that assessment Phase 1 works would commence in 2025 and be complete by mid 2027;

   b. Assessment Phase 2a: Construction of new Terminal 2 (T2) and associated facilities to increase capacity from 21.5 mppa to 27 mppa

upon opening. It is currently anticipated that assessment Phase 2a works would commence in early 2033 ending 2036 and would enable a step up in capacity in the first quarter of 2037; and

c. Assessment Phase 2b: Expansion of T2 and associated facilities. It is currently anticipated that assessment Phase 2b works would commence in 2037, and would deliver incremental capacity increases from 27 mppa to 32 mppa. T2 will have capacity for 12 mppa. The works would be complete to enable a step up in capacity in 2041.

1.2   Purpose of this report

1.2.1   This report describes the Biodiversity Net Gain (BNG) approach taken for the Proposed Development and summarises the results of the BNG Calculation undertaken using version 3.1 of the Defra Metric (Ref. 1), hereafter referred to as the Defra Metric 3.1. This report should be read in conjunction with the two Defra Metric 3.1 spreadsheets shown within **Appendix D** of this report, and the Site Clearance Plans (provided in **Appendix 4.1** of the ES **[TR020001/APP/5.02])**.

1.3   Relevant Legislation and Planning Policy

The Environment Act 2021 (Ref. 2)

1.3.1   The Environment Act 2021 includes provisions that will mandate a requirement for new development under the Town and Country Planning Act 1990 to deliver at least 10% BNG, to be evidenced using a metric, i.e. a standardised accounting tool, although the relevant provisions are not yet in force. The Biodiversity Metric 3.1 has been developed by Defra and Natural England (NE) to provide this tool to assess changes in biodiversity value (losses or gains) during development and through any changes in land management.

1.3.2   It also makes similar provision in respect of Nationally Significant Infrastructure Projects (NSIPs) such as the Proposed Development to achieve BNG, although these provisions are also not yet in force. Notwithstanding this, Luton Rising has set a voluntary ambition of delivering at least 10% BNG.

1.3.3   This ambition has been considered throughout the design phase and influenced the landscape design and ecological mitigation.

Luton Local Plan 2011-2031 (adopted November 2017) (Ref. 3)

1.3.4   The Luton Local Plan (2011–2031) sets out a set of policies, development allocations and actions to meet the environmental, social and economic challenges facing the area over the 20-year plan period.

1.3.5   Policy LLP28 - Biodiversity and Nature Conservation states that;

1.3.6   "*The Council will work …. to positively assess, manage, and designate sites and ecological networks including giving support to development proposals that add to the net stock of wildlife habitats or where they help to deliver a net gain in the conservation and enhancement of such sites.*"

Central Bedfordshire Pre-submission Local Plan 2015- 2035 (adopted 2021) (Ref. 4).

1.3.7   The Central Bedfordshire Local Plan is the key strategic planning document for Central Bedfordshire and will guide and support the delivery of new infrastructure, homes and jobs. It sets out the long-term vision and objectives for the area, what is going to happen, where, and how this will be achieved and delivered over the next 20 years.

1.3.8   This Central Bedfordshire Local Plan adopted in July 2021 replaces the North Core Strategy and Development Management Policies Document (2009) and the majority of the remaining policies within the South Bedfordshire Local Plan (2004), the Mid Bedfordshire Local Plan (2005) and the remaining saved policies of the Bedfordshire and Luton Minerals and Waste Local Plan (2005) so far as they affect Central Bedfordshire.

1.3.9   Policy EE3: Nature Conservation states that: "*Important habitats ….. will be protected, maintained and enhanced*" It states that "*Up to date, comprehensive ecological surveys …will be required to support and inform development proposals…..demonstrating will deliver a net gain*"

North Hertfordshire District Council Local Plan for 2011-2031, November 2022 (Ref. 5).

1.3.10   The North Hertfordshire Local Plan 2011-2031 was adopted on Tuesday 8 November 2022 and replaces the saved policies of the District Plan Second Review with Alterations. Relevant policies include:

1.3.11   Policy NE5 states that "*planning permissions will be granted where they….*

    a. *incorporate an open space buffer(s) where necessary for landscape, visual, ecological or air quality reasons;*

    b. *contribute to net gains for biodiversity, ecological networks and the water environment and/or restores degraded or isolated habitats.*"

2   BNG METHODOLOGY

2.1   Approach

2.1.1   The broad approach to BNG is in accordance with the UK wide British Standards: BS 8683 - Process for designing and implementing biodiversity net gain (Ref. 6). This standard is independent and is not connected to Government policy, legislation, or the Environment Bill but provides a standard working process across the UK regardless of the metric used.

2.1.2   The BNG assessment involved the following key steps, described in further detail below:

   a. Survey baseline habitats and attribute the habitat condition.

   b. Identify irreplaceable habitat and designated sites within the Main Application Site.

   c. Calculate baseline biodiversity units of habitats within the Main Application Site using the Defra Metric 3.1.

   d. Determine whether these habitats would be lost, retained or enhanced based on the Site Clearance Plans (provided in **Appendix 4.1** of the ES **[TR020001/APP/5.02])**.

   e. Calculate potential post-development biodiversity units based on the proposed design shown on the Landscape Mitigation Plans (provided as **Figures 14.9 to 14.13** of the ES **[TR020001/APP/5.03])**.

2.1.3   All calculations for BNG have been undertaken using the Defra Metric 3.1. The baseline and post-development biodiversity unit calculation allows for the net change in biodiversity to be understood. Within the Defra Metric 3.1, the units for area-based habitats and linear based habitats such as hedgerows, are calculated separately for both the baseline and post construction phase. A net gain must be achieved in both area-based habitats and linear based habitats for a true net gain to be achieved. It is not possible to compare or trade area-based habitats and linear based habitats.

2.1.4   In assessing the BNG position for the Proposed Development, the following tools and guidance were used:

   a. Biodiversity Net Gain Good Practice Principles for development – a practical guide (2019) (Ref. 7)

   b. Biodiversity Metric 3.1 - Auditing and accounting for biodiversity calculation tool (macro enabled) otherwise known as the "Defra Metric" (version 3.1)

   c. Biodiversity Metric 3.1 - Habitat Condition Assessment Sheets with Instructions (Ref. 8)

   d. Biodiversity Metric 3.1 - Technical Supplement (Ref.9),

   e. Biodiversity Metric 3.1 - User Guide (Ref. 10)

   f. Biodiversity Metric 3.1 - Frequently Asked Questions (Ref. 11),

2.1.5   Given the size of the Main Application Site and the dominance of hardstanding within the airport, the BNG calculation has been simplified to only include the habitat shown as lost on the Site Clearance Plans or habitat that is altered by the Landscape Mitigation Plans. In combination this covers all habitats that are affected by the Proposed Development.

2.1.6   The Proposed Development has been divided into three assessment phases for the assessment reported in the ES. For the purposes of the BNG calculation this has been simplified into two assessment Phases (Phase 1 and Phase 2). Assessment Phase 2b construction activities are largely limited to areas already cleared in assessment Phase 2a; it is therefore considered practical to treat assessment Phase 2a and assessment Phase 2b as one assessment Phase (Phase 2) for this purpose, utilising delayed planting for any habitat creation that occurs in the assessment Phase 2b

2.1.7   The assessment Phase 1 BNG calculation is based on the Site Clearance Plan for assessment Phase 1 and the Landscape Mitigation Plan for assessment Phase 1. The BNG calculation for assessment Phase 2 is based on the combined clearance works for assessment Phase 1, assessment Phase 2a and assessment Phase 2b, and the Landscape Mitigation Plan for assessment Phase 2b. Delayed planting is used where that planting is not already present in the Landscape Mitigation Plan for assessment Phase 2a but exists within the Landscape Mitigation Plan for 2b. Advanced planting is used where the planting exists within the Landscape Mitigation Plan for assessment Phase 1 and is unchanged throughout assessment Phases 2a and 2b.

2.1.8   It was not considered appropriate to only produce one BNG calculation combining assessment Phase 1 and Phase 2 of the Proposed Development, as there is currently no option to add a delayed loss to the baseline habitats section of the Defra 3.1 Metric. There would be at least 6 years between the site clearance for assessment Phase 1 and Phase 2a, so combining this clearance into one date would not accurately represent the Proposed Development.

2.1.9   The off-site hedgerow enhancements are not included within these BNG calculations, as the surveys were robust for EIA purposes, but undertaken prior to the updated BNG guidance within metric 3.0. Sufficient surveys were undertaken to demonstrate a net gain in hedgerow habitats required. These off-site hedgerow enhancements would potentially provide an additional benefit over and above the BNG identified in this document. An updated survey would be undertaken pre-construction to provide the updated distinctiveness and condition of these hedgerows. This data would be added to the BNG calculations once complete.

2.1.10   River units are not considered within this BNG calculation as the Proposed Development does not impact upon any water courses. The works on New Airport Way (A1081) are restricted to within existing highway boundaries and do not affect the River Lea.

2.2 Baseline Survey

Desk Study

2.2.1 Information about non-statutory designated nature conservation sites, were obtained from Bedfordshire and Luton Biodiversity Recording and Monitoring Centre (BRMC) and Herts Environmental Records Centre in February 2018, updated in November 2020, and updated further in June 2022 within a 2km radius of the Main Application Site.

2.2.2 Information about statutory designated nature conservation sites within 2km of the Main Application Site was obtained from the government's Multi-Agency Geographic Information for the Countryside (MAGIC) database interactive mapping tool (Ref. 12), on 15 August 2022. Maps and aerial photographs were also reviewed to ascertain the location of habitats.

2.2.3 This desk study information was used to identify the location of irreplaceable habitat such as ancient woodland and statutory designated sites and to inform the strategic significance within the Defra 3.1 Metric.

Terrestrial habitat

2.2.4 Baseline habitat types within the Main Application Site were recorded during Extended Phase 1 surveys initially undertaken in 2018 and updated in 2020, then again in 2022. These surveys were in line with the method described in Joint Nature Conservation Committee (JNCC) Phase 1 Habitat survey methods handbook (Ref. 13). These were then converted to UK Habitat Classification (UKHab) as detailed within **Section 3.1** of this report.

2.2.5 Further information on the methodology and findings of these baseline surveys is provided in the Ecology Baseline Report provided as **Appendix 8.1** of this ES **[TR020001/APP/5.02]**.

Survey limitations

2.2.6 Condition scoring of hedgerows was limited to those hedgerows within the vegetation clearance areas shown within the Site Clearance Plans. A precautionary assumption of good condition has been made for all retained hedgerows.

2.3 BNG unit calculation

2.3.1 All baseline habitats were mapped using ESRI ArcMap Geographic Information System (GIS) to calculate the area/length of each habitat. These values, along with onsite condition assessments were used in the Metric to establish the baseline biodiversity units for habitats and hedgerows on site. A series of checks were undertaken to ensure the GIS data did not overlap and that there were no significant gaps within the data.

2.3.2 A minimum mappable unit of 0.01ha was used for mapping, given the size of the Proposed Development this level of detail was deemed appropriate. Any habitats present under this threshold would be subsumed into the appropriate adjacent habitat. For example, a patch of scrub 10m^2 within semi-natural neutral

grassland, would not be mapped and would be considered part of the grassland, this scrub would however be considered for the habitat condition assessment. This also means that individual trees are not considered within this BNG calculation. Veteran trees have however been considered in **Section 4** of this report.

2.4 Evidence of technical competence

2.4.1 The ecologist undertaking the BNG calculations on the Proposed Development is a full member of the Chartered Institute of Ecology and Environmental Management (MCIEEM). They have a MSc in Wildlife Conservation and Management from the University of Newcastle (2008) and have eleven years of professional ecological consultancy experience working across various sectors. They have attended several training courses, and webinars run by Natural England and CIEEM on the implementation of the Metric.

2.4.2 The technical reviewer is a Chartered Environmentalist (CEnv) and Full member of the Chartered Institute of Ecology and Environmental Management (MCIEEM). They hold a BSc and PhD from the University of Exeter. They have worked as a professional ecologist for more than 20 years, with particular focus on the assessment and mitigation of the ecological impacts of development across a wide range of sectors. This has included the review of numerous BNG schemes using different tools.

3 BASELINE CONDITIONS

3.1 Habitat distinctiveness

3.1.1 During the ground truthing undertaken in 2022 all Phase 1 habitats were converted to an appropriate UKHab habitat type which forms the basis of the habitat distinctiveness used within the Defra Metric 3.1. This conversion was based on the Phase 1 translation provided within the Defra Metric 3.1, details of any deviations from this conversion are detailed within **Table 3.1** below.

3.1.2 The Phase 1 Habitats Plan illustrates the location of the baseline habitats, this Plan forms part of the Ecology Baseline Report provided as **Appendix 8.1** of this ES **[TR020001/APP/5.02]**. A description for each row in the baseline of the Defra Metric 3.1 relates to the labelled grasslands and woodlands within this Phase 1 Habitats Plan.

Table 3.1: Table indicating Phase 1 habitat and conversion to UKHab

Phase 1 Habitat code and habitat type	UKHab habitat type used for BNG	Deviation from the suggested conversion in the Defra Metric 3.1
A1.1.1 - Broadleaved woodland - semi-natural	Woodland and forest - Other woodland; broadleaved	No
A1.1.2 - Broadleaved woodland - plantation	Woodland and forest - Other woodland; broadleaved	No
Plantation coniferous woodland	Woodland and forest - Other coniferous woodland	No
Plantation mixed woodland	Woodland and forest - Other woodland; mixed	No
A2.1 - Scrub - dense/continuous	Heathland and shrub - Mixed scrub or Heathland and shrub – Bramble scrub	Yes – bramble scrub used where the ground truthing identified this scrub to be dominated by bramble.
A2.2 - Scrub - scattered	Heathland and shrub - Mixed scrub	No
A3.1 - Broadleaved parkland/scattered trees	Grassland - Other neutral grassland	Yes – this habitat relates mainly to the trees within Wigmore Park which is amenity parkland not historic parkland.
A3.3 - Mixed parkland/scattered trees	Grassland - Other neutral grassland	Yes – this habitat relates mainly to the trees within Wigmore Park which is amenity parkland not historic parkland.

Phase 1 Habitat code and habitat type	UKHab habitat type used for BNG	Deviation from the suggested conversion in the Defra Metric 3.1
B2.2 - Neutral grassland - semi-improved	Grassland - Other neutral grassland	No
WB3.2 - Calcareous grassland - semi-improved	Grassland - Lowland calcareous grassland or Other neutral grassland	Yes – other neutral grassland used where the ground truthing identified limited calcareous species located within a larger area of other neutral grassland.
B6 - Poor semi-improved grassland	Grassland - Modified grassland	No
C1.1 - Bracken - continuous	Grassland - Bracken	No
C3.1 - Other tall herb and fern - ruderal	Sparsely vegetated land - Ruderal/Ephemeral	No
G1.1 - Standing water - eutrophic	Lakes - Ponds (Priority Habitat) or Lakes - Ponds (Non- Priority Habitat)	No
J1.1 - Cultivated/disturbed land - arable	Cropland - Cereal crops	No
J1.2 - Cultivated/disturbed land - amenity grassland	Grassland - Modified grassland	No
J1.3 - Cultivated/disturbed land - ephemeral/short perennial	Sparsely vegetated land - Ruderal/Ephemeral	No
J1.4 - Introduced shrub	Urban - Introduced shrub	No
J4 - Bare ground	Urban - Vacant/derelict land/ bare ground	No

3.1.3   The baseline units for assessment Phase 1 are calculated based on the site clearance for assessment Phase 1 and the habitat creation shown within assessment Phase 1 on the Landscape Mitigation Plans. The assessment Phase 2 baseline units include the site clearance across all phases of the Proposed Development i.e. that which has occurred within assessment Phase 1 as well as that which occurs within assessment Phase 2a and assessment Phase 2b, along with the habitat creation shown within assessment Phase 2b on the Landscape Mitigation Plans.

3.1.4   The baseline units for assessment Phase 1 are detailed within **Table 3.2** and the baseline units for assessment Phase 2 are detailed within **Table 3.3**.

Table 3.2: Table summarising the baseline broad habitat types (UKHab), and the number of habitat units attributed within assessment Phase 1.

Baseline broad habitat type	Distinctiveness	Existing area or length	BNG Value (Habitat units or hedgerow units)
Area based habitats			
Cropland - Cereal crops	Low	58.43ha	116.86
Grassland - Modified grassland	Low	17.72ha	71.84
Grassland - Other neutral grassland	Medium	47.77ha	261.04
Heathland and shrub - Bramble scrub	Medium	0.19ha	0.84
Heathland and shrub - Mixed scrub	Medium	8.46ha	76.58
Lakes - Ponds (Priority Habitat)	High	0.01ha	0.14
Sparsely vegetated land - Ruderal/Ephemeral	Low	30.32ha	60.64
Urban - Vacant/derelict land/ bare ground	Low	3.7ha	7.40
Woodland and forest - Lowland mixed deciduous woodland	High	6.21ha	83.12
Woodland and forest - Other coniferous woodland	Low	1.38ha	6.07
Woodland and forest - Other woodland; broadleaved	Medium	1.31ha	11.02
Woodland and forest - Other woodland; mixed	Medium	1.27ha	11.18
Linear hedgerow habitats			
Native Hedgerow	Low	1.43km	9.44
Native Hedgerow with trees	Medium	0.13km	1.72
Native Species Rich Hedgerow	Medium	1.35km	17.82

Baseline broad habitat type	Distinctiveness	Existing area or length	BNG Value (Habitat units or hedgerow units)
Native Species Rich Hedgerow with trees	High	4km	79.20

3.1.5   In total the baseline units for assessment Phase 1 equals 706.72 habitat units and 108.17 hedgerow units. The majority of cereal crops within the baseline relate to BNG habitat creation areas E and F as shown on the BNG Habitat Creation and Enhancement Plan, provided as **Appendix A** of this report, the areas of other neutral grassland relate to the habitats within Wigmore Park County Wildlife Site (CWS) and those arable fields which have been left fallow. One block of lowland mixed deciduous woodland and the majority of scrub habitat is present within Wigmore Park CWS, the remaining lowland mixed deciduous woodland is within isolated blocks within the Main Application Site.

Table 3.3: Table summarising the baseline broad habitat types (UKHab), and the number of habitat units attributed within assessment Phase 2.

Baseline broad habitat type	Distinctiveness	Existing area or length	BNG Value (Habitat units or hedgerow units)
Area based habitats			
Cropland - Cereal crops	Low	59.74ha	119.48
Grassland - Bracken	Low	0.62ha	1.43
Grassland - Lowland calcareous grassland	High	0.39ha	5.18
Grassland - Modified grassland	Low	36.51ha	121.97
Grassland - Other neutral grassland	Medium	49.44ha	263.13
Heathland and shrub - Bramble scrub	Medium	0.19ha	0.84
Heathland and shrub - Mixed scrub	Medium	11.64ha	105.41
Lakes - Ponds (Non-Priority Habitat)	Medium	0.05ha	0.20
Lakes - Ponds (Priority Habitat)	High	0.01ha	0.14

Baseline broad habitat type	Distinctiveness	Existing area or length	BNG Value (Habitat units or hedgerow units)
Sparsely vegetated land - Ruderal/Ephemeral	Low	31.51ha	63.20
Urban - Introduced shrub	Low	0.67ha	1.34
Urban - Vacant/derelict land/ bare ground	Low	4.15ha	8.32
Woodland and forest - Lowland mixed deciduous woodland	High	6.32ha	85.73
Woodland and forest - Other coniferous woodland	Low	1.38ha	6.07
Woodland and forest - Other woodland; broadleaved	Medium	2.76ha	24.43
Woodland and forest - Other woodland; mixed	Medium	1.27ha	11.18
Linear hedgerow habitats			
Native Hedgerow	Low	1.43km	9.44
Native Hedgerow with trees	Medium	0.13km	1.72
Native Species Rich Hedgerow	Medium	1.35km	17.82
Native Species Rich Hedgerow with trees	High	4km	79.20

3.1.6 In total the baseline units for assessment Phase 2 equals 818.04 habitat units and 108.17 hedgerow units. Differences between the two baselines are largely accounted for by the addition of works in and around Dairyborn Scarp District Wildlife Site (DWS) and the increased clearance in assessment Phase 2 of modified grassland, other neutral grassland, ruderal/ephemeral, bare ground and introduced shrub within the existing airport and associated car parks.

3.1.7 The majority of cereal crops within the baseline relate to BNG habitat creation areas E, F, H and I as shown on the BNG Habitat Creation and Enhancement Plan, provided as **Appendix A** of this report, the areas of other neutral grassland relate to the habitats within Wigmore Park CWS and those arable fields which have been left fallow. One block of lowland mixed deciduous woodland and the majority of scrub habitat is present within Wigmore Park CWS, the remaining lowland mixed deciduous woodland is spread across the

Main Application Site. The lowland calcareous grassland is mainly located within or adjacent to Dairyborn Scarp DWS.

4   BNG GOOD PRACTICE PRINCIPLES

4.1.1   The design of the Proposed Development has followed the good practice principles, detailed within the Biodiversity Net Gain Good Practice Principles for development – a practical guide 2019 (Ref. 7); these are listed below in **Table 4.1**.

Table 4.1: Good practice principles for biodiversity net gain

Principle Number	Principle	Summary
1	Apply the Mitigation Hierarchy	Do everything possible to first avoid and then minimise impacts on biodiversity. Only as a last resort, and in agreement with external decision-makers, compensate for losses that cannot be avoided. If compensating for losses within the development footprint is not possible or does not generate the most benefits for nature conservation, then offset biodiversity losses by gains elsewhere.
2	Avoid losing biodiversity that cannot be offset by gains elsewhere	Avoid impacts on irreplaceable biodiversity - these impacts cannot be offset to achieve No Net Loss or Net Gain.
3	Be inclusive and equitable	Engage stakeholders early, and involve them in designing, implementing, monitoring and evaluating the approach to Net Gain. Achieve Net Gain in partnership with stakeholders where possible, and share the benefits fairly among stakeholders.
4	Address risks	Mitigate difficulty, uncertainty and other risks to achieving Net Gain. Apply well-accepted ways to add contingency when calculating biodiversity losses and gains in order to account for any remaining risks, as well as to compensate for the time between the losses occurring and the gains being fully realised.
5	Make a measurable Net Gain contribution	Achieve a measurable, overall gain for biodiversity and the services ecosystems provide while directly contributing towards nature conservation priorities.
6	Achieve the best outcomes for biodiversity	Achieve the best outcomes for biodiversity by using robust, credible evidence and local knowledge to make clearly-justified choices when: • Delivering compensation that is ecologically

Principle Number	Principle	Summary
		equivalent in type, amount and condition, and that accounts for the location and timing of biodiversity losses. • Compensating for losses of one type of biodiversity by providing a different type that delivers greater benefits for nature conservation. • Achieving Net Gain locally to the development while also contributing towards nature conservation priorities at local, regional and national levels. • Enhancing ecological connectivity by creating more bigger, better and joined areas for biodiversity.
7	Be additional	Achieve nature conservation outcomes that demonstrably exceed existing obligations (i.e. do not deliver something that would occur anyway).
8	Create a Net Gain legacy	Ensure Net Gain generates long-term benefits by: • Engaging stakeholders and jointly agreeing practical solutions that secure Net Gain in perpetuity. • Planning for adaptive management and securing dedicated funding for long-term management. • Designing Net Gain for biodiversity to be resilient to external factors, especially climate change. • Mitigating risks from other land uses. • Avoiding displacing harmful activities from one location to another. • Supporting local-level management of Net Gain activities.
9	Optimise sustainability	Prioritise Biodiversity Net Gain and, where possible, optimise the wider environmental benefits for a sustainable society and economy.
10	Be transparent	Communicate all Net Gain activities in a transparent and timely manner, sharing the learning with all stakeholders.

4.1.2   These good practice principles of BNG which also forms part of the British standards have been applied during the initial stages of the project as follows.

4.2   Principle 1. Apply the mitigation hierarchy

4.2.1   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 the Proposed Development.

4.2.2   The designer of the Proposed Development has worked hard to avoid impacts on irreplaceable habitats during project optioneering stages and early design. For example, avoiding any loss of ancient woodland within Winch Hill Wood.

4.2.3   Discussion on minimising the construction impact, to retain as much habitat as possible and specifically those of high biodiversity value such as broadleaved woodland, mature scattered trees and veteran trees, important hedgerows and species rich grasslands has occurred collaboratively between ecologists, landscape architects, and engineers.

4.2.4   Discussions have also taken place regarding the programming of works to consider seasonality to avoid or reduce effects of the works on habitats and species. Further details of this mitigation can be found within **Chapter 8** Biodiversity of this ES **[TR020001/APP/5.01].**

4.3   Principle 2. Avoid losing biodiversity that cannot be offset by gains elsewhere (i.e. irreplaceable habitat and highly distinctive habitats)

4.3.1   The Proposed Development has largely managed to avoid the loss of irreplaceable habitat or statutorily designated sites. Impacts do occur to non-designated sites; this includes the complete loss of Wigmore Park CWS and partial loss of habitat within Dairyborn Scarp DWS and Luton Parkway Verges DWS. These non-statutory sites exist as a result of previous construction activities and as such are deemed replaceable and therefore included within the metric.

4.3.2   Nine ancient and veteran or potential veteran trees have been retained within the Main Application Site. One veteran tree cannot be retained within the Proposed Development. This tree would be re-coppiced and translocated to retain the tree. It is acknowledged that the success of translocation cannot always be guaranteed.

4.4   Principle 3. Be inclusive and equitable

4.4.1   Relevant stakeholders and statutory bodies have been involved in the project from the outset. The key stakeholders include Central Bedfordshire Council, Hertfordshire County Council, Herts & Middlesex Wildlife Trust, Luton Borough Council, Natural England and the Wildlife Trust for Beds, Cambs & Northants.

4.4.2   The integrated project team has worked closely with these stakeholders and has held numerous Technical Working Groups (TWGs) and design meetings to discuss and consult on progress and alterations to design that would minimise impacts, both direct and indirect, on protected or highly distinctive habitats and to design mitigation. Stakeholders have also had the opportunity to respond to the formal consultations throughout the project.

4.5 Principle 4. Address Risk

4.5.1 Throughout the design process, several BNG calculations were undertaken to iteratively understand the requirement to deliver BNG onsite and influence habitat retention and design of the Proposed Development.

4.5.2 Within the Defra Metric 3.1 multipliers are applied to correct for disparity, risk in delivery or uncertainty in the effectiveness of restoration or habitat creation and management techniques. These address the risks associated with the level of difficulty in restoration or creation for different habitats and the temporal risks associated with the time taken for the habitat to reach target condition.

4.5.3 Where possible habitat creation has been included in assessment Phase 1, this would allow habitats to establish at the earliest opportunity.

4.6 Principle 5. Make a measurable Net Gain contribution

4.6.1 The Proposed Development achieves a net gain in biodiversity units using the Defra Metric 3.1. For assessment Phase 1 there is a net gain of 85.17 habitat units which equates to a **12.05%** increase in BNG habitats from the baseline. By the completion of assessment Phase 2 there is an overall net gain of 88.77 habitat units which equates to a **10.85%** increase in BNG habitats from the baseline. The BNG percentage increases are not directly comparable as the area assessed within assessment Phase 2 is greater than that assessed in assessment Phase 1, therefore the change in BNG percentage does not represent a decrease in BNG delivery between assessment Phase 1 and Phase 2.

4.6.2 The landscape and ecology design for the Proposed Development has not been compromised by creating lower distinctiveness and easily created habitats that would inflate the BNG score in place of more beneficial higher distinctiveness habitats.

4.7 Principle 6. Achieve the best outcomes for biodiversity

4.7.1 The BNG principles of habitat creation on a broad "like for like" or "like for better" basis have been applied throughout the design of the Proposed Development. Where priority and high distinctive habitats are being unavoidably lost such as broadleaved woodland or lowland calcareous grassland, they are being replaced by a greater amount of the same habitat. Where lower value habitats are being lost, the aim is to replace with a higher value habitat. For instance, losses of amenity grassland are to be replaced with semi-natural grassland habitats.

4.7.2 In consideration of the Lawton Review, Making Space for Nature: A review of England's Wildlife Sites and Ecological Network (Ref. 14), the landscape planting design has maximised opportunities to connect previously isolated areas of woodland within BNG habitat creation area E, as shown on the BNG Habitat Creation and Enhancement Plan, provided as **Appendix A** of this report. The creation of grassland, scrub and woodland habitats on previously arable land provides a landscape where the semi natural habitats are interconnected over a large expanse of land. In addition, opportunities to

connect and enhance hedgerows offsite have been taken to increase connectivity of habitat. All hedgerows created and enhanced would be native species-rich hedgerows. Large meadows of lowland meadow grassland and lowland calcareous grassland have also been proposed creating habitat steppingstones to aid the dispersal of both plant and animal species.

4.7.3   The habitat creation within the Proposed Development has been designed for the benefit of protected and priority species and not solely to focus on a positive BNG score. Details of the measures proposed specifically for protected species are found within **Chapter 8** Biodiversity of this ES **[TR020001/APP/5.01].**

4.8   Principle 7. Be additional

4.8.1   The landscape design focused on creating an extensive network of high distinctiveness habitats. On completion of the Proposed Development there would be a large net gain of calcareous grassland, lowland meadow, and lowland mixed deciduous woodland. These gains far outweigh the requirements for compensation for the losses of these habitats.

4.9   Principle 8. Create a Net Gain legacy

4.9.1   The Outline Landscape and Biodiversity Management Plan (LBMP) provided as **Appendix 8.2** of this ES **[TR020001/APP/5.02]** sets out how the landscape design and ecology mitigation measures would be delivered and managed. This would be developed further following the granting of development consent, during the construction and end of construction stages. The LBMP would be developed to ensure that management actions and outcomes are sensitive and appropriate to the habitat created.

4.9.2   It is acknowledged that the habitat vision of the Proposed Development to create calcareous grassland and lowland meadow requires specialist knowledge and skills. As detailed within the LBMP, during detailed design a suitably experienced and specialist contractors and advisors would be engaged to deliver the creation of these highly distinctive habitats.

4.10   Principle 9. Optimise sustainability

4.10.1   The landscape design is based on the use of native locally sourced species and sustainable products would be used were possible.

4.10.2   Opportunities within the landscape design have been taken to allow walking routes through areas of habitat creation. This would provide wider health benefits for the local community.

4.11   Principle 10. Be transparent

4.11.1   BNG calculations have been discussed and shared with key stakeholders throughout preliminary design and assessment, during various TWGs, as summarised in **Section 8.4** of **Chapter 8** Biodiversity to the ES **[TR020001/APP/5.01].** There has been agreement with stakeholders that the BNG calculation will be undertaken using Defra Metric 3.1. The final calculations are included within the ES.

5 PROPOSED DESIGN

5.1 Habitat Creation

5.1.1 The Proposed Development has been designed, as far as practicable, to avoid effects on biodiversity through option identification, appraisal, selection and refinement. Large expanses of previously arable land would be converted into lowland mixed deciduous woodland, mixed scrub neutral meadow grassland and calcareous grassland. The landscape design for the Proposed Development has focused on creating high value ecological habitats. These areas of habitat creation would be designed and managed to ensure their target condition exceeds that of the habitats lost and thereby contributes to achieving a net gain in biodiversity.

5.1.2 The location of planting is divided into Areas as shown on the BNG Habitat Creation and Enhancement Plan, provided as **Appendix A** of this report and described below:

a. The planting in BNG habitat creation area A comprises lowland mixed deciduous woodland and other neutral grassland, within Wigmore Park.

b. The planting in BNG habitat creation area B occurs on a large field to the north east of Wigmore Park and comprises mainly of lowland mixed deciduous woodland and other neutral grassland. Amenity grassland paths would also pass through this area.

c. The planting in BNG habitat creation area C occurs on a large field to the east of Wigmore Park and comprises mainly of lowland mixed deciduous woodland and other neutral grassland. Amenity grassland paths pass through this area.

d. The planting in BNG habitat creation area D is within an area to the west of Winch Hill Road, this planting comprises mainly of lowland mixed deciduous woodland.

e. The planting within BNG habitat creation area E occurs on a large field to the east of Winch Hill Road, south of The Fox public house, the planting comprises mainly of lowland mixed deciduous woodland and other neutral grassland.

f. The planting within BNG habitat creation area F occurs on two large fields to the east of Winch Hill Road, the planting comprises mainly of lowland mixed deciduous woodland and lowland meadow. The ponds are also created within this area

g. The planting within BNG habitat creation area G occurs on a smaller field to the east of Winch Hill Road, the planting comprises mainly of lowland mixed deciduous woodland and lowland meadow.

h. The planting within BNG habitat creation area H occurs on two large fields to the east of Winch Hill Road, the planting comprises mainly of lowland meadow.

i. The planting within BNG habitat creation area I occurs on two large fields to the east and west of Winch Hill Road, the planting comprises mainly of lowland calcareous grassland.

5.1.3 The planting within the landscape design is summarised for assessment Phase 1 in **Table 5.21** and for assessment Phase 2 in **Table 5.2**.

Table 5.1: Summary of habitats created for assessment Phase 1

Description on the Landscape Mitigation Plan.	UK Habitat code	Habitat created area or length	Habitat created / Habitat units or hedgerow units
Area based habitats			
Neutral grassland – low intensity grazing	Grassland - Lowland meadows	16.14ha	82.40
Amenity grassland	Grassland - Modified grassland	9.47ha	32.85
Neutral meadow grassland	Grassland - Other neutral grassland	24.72ha	228.50
Proposed Scrub	Heathland and shrub - Mixed scrub	0.59ha	4.34
Wildlife pond	Lakes - Ponds (Priority Habitat)	0.02ha	0.22
Proposed Woodland	Woodland and forest - Lowland mixed deciduous woodland	10.45ha	14.56
Linear hedgerow habitats			
Hedgerow restoration	Native Species Rich Hedgerow with trees	3.51km	34.08

Table 5.2: Summary of habitats created for assessment Phase 2

Description on the Landscape Mitigation Plan.	UK Habitat code	Habitat created area or length	Habitat created / Habitat units or hedgerow units
Area based habitats			
Calcareous grassland – low intensity grazing	Grassland - Lowland calcareous grassland	12.83ha	29.83
Neutral grassland – low intensity grazing	Grassland - Lowland meadows	27.64ha	265.88

Description on the Landscape Mitigation Plan.	UK Habitat code	Habitat created area or length	Habitat created / Habitat units or hedgerow units
Amenity grassland	Grassland - Modified grassland	16.33ha	51.25
Neutral meadow grassland	Grassland - Other neutral grassland	28.11ha	310.18
Proposed Scrub	Heathland and shrub - Mixed scrub	0.76ha	6.44
Wildlife pond	Lakes - Ponds (Priority Habitat)	0.02ha	0.396
Proposed Woodland	Woodland and forest - Lowland mixed deciduous woodland	12.12ha	21.68
Linear hedgerow habitats			
Hedgerow restoration	Native Species Rich Hedgerow with trees	3.51km	42.20

5.2   Habitat condition for newly created habitats

5.2.1   For all habitats created a targeted habitat condition must be selected based on the guidance for condition scoring detailed within Biodiversity Metric 3.1 - Technical Supplement (Ref. 9). This condition is based on the habitat reaching maturity and not the initial condition at the time of planting. The Defra Metric 3.1 uses preselected multipliers for the standard time to target condition, and this often increases where a better condition is selected. For example, the standard time to target condition for lowland meadows in moderate condition is 10 years (multiplier of 0.70) whereas the standard time to target condition for lowland meadows in good condition is 15 years (multiplier 0.59). This mitigates some of the risk of aiming for good condition.

5.2.2   The habitat creation within the Proposed Development has been designed to maximise the biodiversity value, therefore a good condition has been chosen for all habitats where it is deemed possible to achieve the relevant criteria. Given the scale of habitat creation, the commitment for long term management and interlinking of those habitats created, this is deemed to be a realistic goal for the Proposed Development.

5.2.3   The Biodiversity Metric 3.1 - Technical Supplement (Ref. 9) details the criteria for each habitat and describes which criteria must be met to achieve good or moderate condition. A summary of the assumptions made for each criterion of the relevant habitat upon full establishment is provided below in **paragraphs 5.2.4-5.2.17**.

Grassland - Lowland calcareous grassland

5.2.4   Assumptions relating to the criteria for lowland calcareous grassland are detailed below:

a. Criterion 1 - Indicator species would be clearly visible within the sward, yellow rattle would help to ensure grasses do not become too dominant within the sward (criterion passed).

b. Criterion 2 - Sward height would be varied as aftermath grazing would occur post cut, this would create structural diversity (criterion passed).

c. Criterion 3 - Cover of bare ground would not be above 5%, remedial action would be taken if above 5% (criterion passed).

d. Criterion 4 - Cover of bracken and bramble would not be above 5%, remedial action would be taken if above 5% (criterion passed).

e. Criterion 5 - An absence of invasive non-native species would be maintained, remedial action would be taken if any are discovered (criterion passed).

f. Criterion 6 - More than 9 species per m^2, anticipated species mix, and management detailed within the Outline LBMP provided as **Appendix 8.2** of this ES **[TR020001/APP/5.02]** (criterion passed).

5.2.5   On this basis all six criteria would be passed including mandatory criterion 1, and this would result in the habitat achieving good condition.

Grassland - Lowland meadows

5.2.6   Assumptions relating to the criteria for lowland meadows are detailed below:

a. Criterion 1 - Indicator species will be clearly visible within the sward, yellow rattle will help to ensure grasses do not become too dominant within the sward (criterion passed).

b. Criterion 2 - Sward height will be varied as aftermath grazing will occur post cut, this will create structural diversity (criterion passed).

c. Criterion 3 - Cover of bare ground will not be above 5%, remedial action will be taken if above 5% (criterion passed).

d. Criterion 4 - Cover of bracken and bramble will not be above 5%, remedial action will be taken if above 5% (criterion passed).

e. Criterion 5 - An absence of invasive non-native species will be maintained, remedial action will be taken if any are discovered (criterion passed).

f. Criterion 6 - More than 9 species per m^2, anticipated species mix, and management detailed within the LBMP (criterion passed).

5.2.7   On this basis all six criteria would be passed including mandatory criterion 1, and this would result in the habitat achieving good condition.

Grassland - Modified grassland

5.2.8 Assumptions relating to the criteria for modified grassland are detailed below:

a. Criterion 1 - Regular mowing and footfall would limit the species present within this grassland (criterion failed).

b. Criterion 2 - Regular mowing would not create a varied sward height (criterion failed).

c. Criterion 3 - Regular mowing would limit any scrub (criterion passed).

d. Criterion 4 - Physical damage would not be above 5%, remedial action would be taken on any areas that are subject to physical (criterion passed).

e. Criterion 5 - Bare ground would not be above 10%, remedial action would be taken on any areas of bare ground within this habitat (criterion passed).

f. Criterion 6 - Regular mowing would limit any bracken (criterion passed).

5.2.9 On this basis four criteria will be passed, not including mandatory criterion 1, and this would result in the habitat achieving moderate condition.

Grassland - Other neutral grassland

5.2.10 Assumptions relating to the criteria for other neutral grassland are detailed below:

a. Criterion 1 - Indicator species would be clearly visible within the sward, yellow rattle would help to ensure grasses do not become too dominant within the sward (criterion passed).

b. Criterion 2 – The cutting regime would aim to create variation in sward height and structure by excluding some areas from an annual cut and only cutting every 2-3 years (criterion passed).

c. Criterion 3 - Cover of bare ground would not be above 5%, remedial action would be taken if above 5% (criterion passed).

d. Criterion 4 - Cover of bracken and bramble would not be above 5%, remedial action would be taken if above 5% (criterion passed).

e. Criterion 5 - An absence of invasive non-native species would be maintained, remedial action would be taken if any are discovered (criterion passed).

f. Criterion 6 - More than 9 species per m^2, anticipated species mix, and management detailed within the LBMP (criterion passed).

5.2.11 On this basis all six criteria would be passed including mandatory criterion 1, and this would result in the habitat achieving good condition.

Heathland and shrub - Mixed scrub

5.2.12 Assumptions relating to the criteria for mixed scrub are detailed below:

a. Criterion 1 - Species mix would contain at least three woody species (criterion passed).

b. Criterion 2 - Management would aim to retain some mature shrubs as well as providing areas for seedlings and young shrubs within cleared areas (criterion passed).

c. Criterion 3 - An absence of invasive non-native species would be maintained, remedial action would be taken if any are discovered (criterion passed).

d. Criterion 4 - A buffer strip would be left adjacent to shrub, so that a well-developed edge can be created between the grassland and scrub habitats (criterion passed).

e. Criterion 5 - Unlikely to be clearings or glades as the scrub planting is relatively small in its extent (criterion failed).

5.2.13   On this basis four criteria will be passed, and this would result in the habitat achieving moderate condition.

Lakes - Ponds (Priority Habitat)

5.2.14   Assumptions relating to the criteria for Ponds (Priority Habitat) are detailed below:

a. Criterion 1 - Water quality would be good, having been naturally filled by rainwater (criterion passed).

b. Criterion 2 - Surrounded by semi-natural habitat (criterion passed).

c. Criterion 3 - Filamentous algae or duckweed would cover no more than 10%, remedial action would be taken if pondweed or duckweed exceeds this (criterion passed).

d. Criterion 4 - Would not be connected to any other water bodies (criterion passed).

e. Criterion 5 - Would naturally fluctuate as it would be naturally filled by rainwater (criterion passed).

f. Criterion 6 - An absence of invasive non-native species would be maintained, remedial action would be taken if any are discovered (criterion passed).

g. Criterion 7 - Would not be artificially stocked with fish (criterion passed).

h. Criterion 8 - Plants would cover at least 50% of the pond, additional planting would occur if the this is not the case (criterion passed).

i. Criterion 9 - Less than 50% shade from woody species would be maintain through appropriate management of surrounding habitats (criterion passed).

5.2.15   On this basis all nine criteria would be passed and this would result in the habitat achieving good condition.

Woodland and forest - Lowland mixed deciduous woodland

5.2.16   Assumptions relating to the criteria for Lowland mixed deciduous woodland are detailed below:

a. Criterion 1 - Two ages classes present indicating some regrowth (2 points).

b. Criterion 2 - As not all areas of woodland can be fenced, they may experience some browsing pressure estimated to be below 40% (2 points).

c. Criterion 3 - An absence of invasive non-native species would be maintained, remedial action will be taken if any are discovered (3 points).

d. Criterion 4 - At least 5 native tree or shrub species would be planted in each woodland (3 points).

e. Criterion 5 - No non-native species are being planted in this woodland type (3 points).

f. Criterion 6 - Woodland being planted is less than 10ha, open space would not exceed 20%, if this this happens through failed planting, remedial action will be taken (3 points).

g. Criterion 7 - One or two classes of woodland regeneration would be present once the woodland is established indicating some regrowth (2 points).

h. Criterion 8 - Tree mortality is assumed to be less than 10%, remedial action would be taken if tree mortality increases above this threshold (3 points).

i. Criterion 9 - Recognisable NVC community should be present as the woodland establishes (2 points).

j. Criterion 10 - A canopy and shrub layer would be present as the woodland establishes (2 points).

k. Criterion 11 - No veteran trees would be present within the woodland (1 point).

l. Criterion 12 - Woodland would have standing deadwood, large trunks or branches in at least 50% of plots (deadwood would be taken from cleared areas) (3 points).

m. Criterion 13 - Woodlands are no longer adjacent arable fields so nutrient enrichment should be limited, if damage occurs to this habitat through human actives, remedial action would be taken (3 points).

5.2.17   On this basis 32 points would be scored and this would result in the habitat achieving moderate condition.

5.3   Habitat Enhancements

5.3.1   In addition to the habitat creation detailed within **Table 5.1** and **Table 5.2**, enhancements to existing habitats are also proposed. These are shown on the

BNG Habitat Creation and Enhancement Plan **Appendix A** of this report and described:

a. BNG enhancement A - unmanaged species poor semi-improved grassland east of woodland 2.

b. BNG enhancement B - a small area of amenity grassland to provide a buffer for existing woodland within BNG habitat creation area A.

c. BNG enhancement C - grassland 22 (where not impacted by site clearance works).

d. BNG enhancement D - dense scrub east of woodland 1.

e. BNG enhancement E - woodland 1.

f. BNG enhancement F - woodland 2.

g. BNG enhancement G - woodland 3.

h. BNG enhancement H - woodland 4.

i. BNG enhancement I - woodland 6.

5.3.2   The LBMP provided as **Appendix 8.2** of this ES **[TR020001/APP/5.02]**, details the management and monitoring of these habitats. It is assumed that all grassland enhancement would follow the same management as those created and a good condition would be targeted.

5.3.3   Enhancement of lowland mixed deciduous woodland within woodland 1 would include increasing the amount of deadwood present and create woodland glades to increase the structural diversity and regrowth within the woodland. This would aim to achieve good condition.

5.3.4   Enhancement of other coniferous woodland within woodland 2 and 3, would include staged felling of the coniferous species, while retaining broadleaved species present, to change the habitat type into other broadleaved woodland retaining its moderate condition.

5.3.5   Enhancement of other mixed woodland within woodland 4 would include staged felling of the coniferous species, while retaining broadleaved species present, to change the habitat type into lowland mixed deciduous woodland retaining its moderate condition.

5.3.6   Enhancement of lowland mixed deciduous woodland within woodland 6 would include increasing the amount of deadwood present, create woodland glades to increase the structural diversity and regrowth within the woodland and installing deer fencing. This would aim to achieve good condition.

5.3.7   All enhancements would occur at the earliest opportunity in assessment Phase 1, to maximise the biodiversity benefit.

6 METRIC RESULTS

6.1 Assessment Phase 1 BNG calculations

6.1.1 A summary of net gains and losses for assessment Phase 1 of the Proposed Development is provided below in **Table 6.1**. This is calculated by subtracting the post-construction Defra metric 3.1 BNG score from the pre-construction Defra metric 3.1 BNG score.

6.1.2 A more detailed breakdown of the BNG calculations for assessment Phase 1 of the Proposed Development is provided in **Appendix C** of this report. The Defra Metric 3.1 spreadsheet itself is provided as **Appendix D** of this report, comments have been left in the assessor column of this spreadsheet to indicate the location.

Table 6.1: Summary of gains and losses for assessment Phase 1

UK Habitat code	Net gain or loss / ha	Net gain or loss / Habitat units
Area based habitats		
Cropland - Cereal crops	-31.24	-62.48
Grassland - Lowland meadows	16.14	82.40
Grassland - Modified grassland	-8.25	-38.99
Grassland - Other neutral grassland	19.63	219.29
Heathland and shrub - Bramble scrub	-0.19	-0.84
Heathland and shrub - Mixed scrub	-6.87	-63.57
Lakes - Ponds (Priority Habitat)	0.01	0.08
Sparsely vegetated land - Ruderal/Ephemeral	-30.32	-60.64
Urban - Vacant/derelict land/ bare ground	-3.7	-7.40
Woodland and forest - Lowland mixed deciduous woodland	11.72	29.79
Woodland and forest - Other coniferous woodland	-1.38	-6.07
Woodland and forest - Other woodland; broadleaved	0.77	4.77

UK Habitat code	Net gain or loss / ha	Net gain or loss / Habitat units
Woodland and forest - Other woodland; mixed	-1.27	-11.18
Linear hedgerow habitats		
Native Hedgerow	0.00	0.00
Native Hedgerow with trees	0.00	0.00
Native Species Rich Hedgerow	0.00	0.00
Native Species Rich Hedgerow with trees	3.51	34.08

6.1.3   For assessment Phase 1 of the Proposed Development this produces a net gain of 85.17 habitat units and 34.08 hedgerow units. This translates to a BNG of **12.05%** for habitats and **31.51%** for hedgerows.

6.2   Assessment Phase 2 BNG calculations

Table 6.2: Summary of gains and losses for assessment Phase 2

UK Habitat code	Net gain or loss / ha	Net gain or loss / Habitat units
Area based habitats		
Cropland - Cereal crops	-56.8	-113.60
Grassland - Bracken	-0.62	-1.43
Grassland - Lowland calcareous grassland	12.44	24.65
Grassland - Lowland meadows	27.64	265.88
Grassland - Modified grassland	-20.18	-70.72
Grassland - Other neutral grassland	-9.28	163.86
Heathland and shrub - Bramble scrub	-0.19	-0.84
Heathland and shrub - Mixed scrub	-10.1	-92.10
Lakes - Ponds (Priority Habitat)	-0.05	-0.20
Lakes - Ponds (Non-Priority Habitat)	0.01	0.26

UK Habitat code	Net gain or loss / ha	Net gain or loss / Habitat units
Sparsely vegetated land - Ruderal/Ephemeral	-31.51	-63.20
Urban - Introduced shrub	-0.67	-1.34
Urban - Vacant/derelict land/ bare ground	-4.15	-8.32
Woodland and forest - Lowland mixed deciduous woodland	11.43	10.91
Woodland and forest - Other coniferous woodland	-1.38	-6.07
Woodland and forest - Other woodland; broadleaved	-0.68	-7.79
Woodland and forest - Other woodland; mixed	-1.27	-11.18
Linear hedgerow habitats		
Native Hedgerow	0.00	0.00
Native Hedgerow with trees	0.00	0.00
Native Species Rich Hedgerow	0.00	0.00
Native Species Rich Hedgerow with trees	2.39	20.03

6.2.1   For assessment Phase 2 of the Proposed Development this produces a net gain of 88.77 habitat units and 20.03 hedgerow units. This translates to a BNG of **10.85 %** for habitats and **18.51%** for hedgerows.

6.2.2   While this figure is the predicted final BNG scores for the Proposed Development, this calculation should be updated in 1-2 years in advance of any works occurring in assessment Phase 2 as detailed within the Outline LBMP (**Appendix 8.2** of this ES **[TR020001/APP/5.02]**). The baseline, condition of planting and effectiveness of any enhancements should be updated and incorporated into the updated BNG calculations. At this point further recommendations may be given to achieve maximum BNG units for assessment Phase 2 of the Proposed Development.

7   PROJECT IMPLEMENTATION AND CONSTRUCTION PLAN MANAGEMENT AND MONITORING

7.1.1   The timing and programming of these works and the protection of existing features during site set up and construction is described within **Chapter 8** Biodiversity of this ES **[TR020001/APP/5.01]** and the Code of Construction Practice provided as **Appendix 4.2** of this ES **[TR020001/APP/5.02].**

7.1.2   The LBMP provided as **Appendix 8.2** of this ES **[TR020001/APP/5.02]**, details the management and monitoring of the created and enhanced habitats. This would be updated in accordance with review periods described in the LBMP. Further recommendations or remedial actions can be made once the monitoring of created and enhanced habitats is underway.

7.1.3   With the exception of the off-site hedgerow restoration (which has been excluded from the BNG calculations and this report), the Applicant owns all land where habitat creation or enhancement occurs. They will be responsible for the funding of the creation and management actions detailed within the LBMP.

GLOSSARY AND ABBREVIATIONS

Term	Definition	Page
BNG	Biodiversity Net Gain	
CWS	County Wildlife Site	
DWS	District Wildlife Site	
EIA	Environmental Impact Assessment	
ES	Environmental Statement	
GIS	Geographic Information System	
JNCC	Joint Nature Conservation Committee	
mppa	million passengers per annum	
NSIPS	Nationally Significant Infrastructure Projects	
NHDC	North Hertfordshire District Council	
T1	Terminal 1	
T2	Terminal 2	
TWGs	Task Working Groups	
UKHab	UK Habitat Classification	

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Ref. 4 Central Bedfordshire Council. (2021) Central Bedfordshire Local Plan 2015-2035

Ref. 5 North Hertfordshire District Council. (2022) North Hertfordshire Local Plan 2011-2031

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APPENDICES

APPENDICES

APPENDIX A – BNG HABITAT CREATION AND ENHANCEMENT PLAN
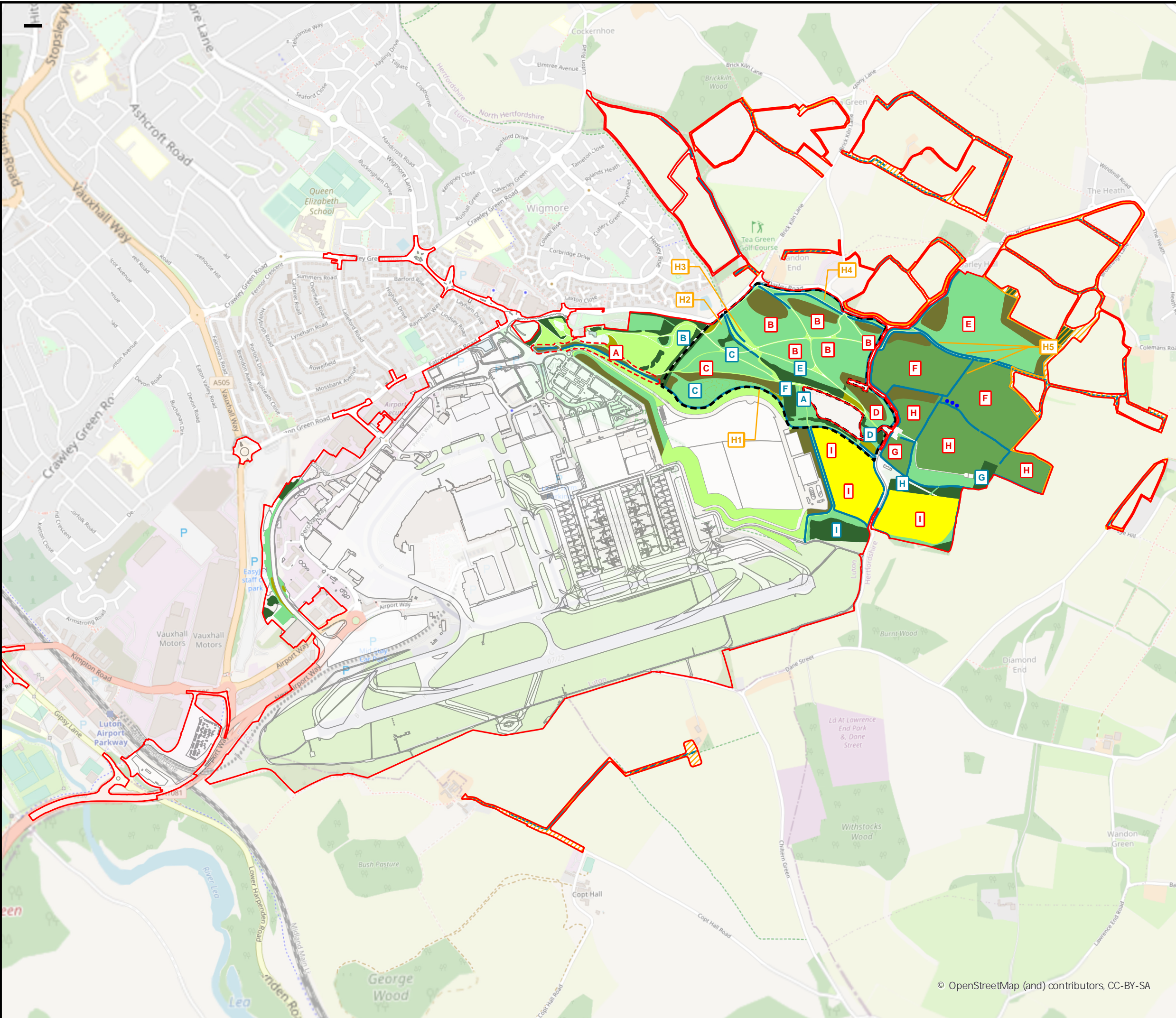
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APPENDIX A – BNG HABITAT CREATION AND ENHANCEMENT PLAN

Legend

- Order Limits
- Earth Bund
- Off-site Hedgerow Restoration and Screening
- Replacement Open Space
- Airport Infrastructure Layout - Assessment Phase 2b
- Calcareous grassland – low intensity grazing
- Arable area
- Existing vegetation
- Neutral meadow grassland
- Amenity grassland
- Wildlife pond
- Neutral grassland – low intensity grazing
- Proposed scrub
- Proposed woodland
- Hedgerow restoration
- **A** Biodiversity Net Gain (BNG) Habitat creation area
- **H1** Biodiversity Net Gain (BNG) hedgerow planting length
- **A** Biodiversity Net Gain (BNG) Habitat enhancement area

First Issue	AB	SM CS	22/02/23	P01
Revision History	Drawn	Checked Approved	Date	Rev.

Luton Rising
Hart House Business Centre
Kimpton Road, Luton, LU2 0LA
www.lutonrising.org.uk

Luton Rising
Our airport.
Our community.
Our planet.

London Luton Airport Expansion Development Consent Order

Drawing Title

Biodiversity Net Gain (BNG) Habitat Creation and Enhancement Plan

Purpose of issue		Suitability
SUITABLE FOR INFORMATION		S2

Drawn	Checked	Approved	Date	Scale	Size
AB	SM	CS	22/02/23	1:15,000	A3

DCO Application Ref.	APFP Regulation	DCO Document Ref.
TR020001	APFP 5(2)(a)	TR020001/APP/5.02

Drawing Number	Revision
LLADCO-3C-ARP-00-00-DR-YE-0250	P01

Project - Phase - Originator - Asset/Zone - Sub Asset - Type - Discp. - Number

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APPENDIX B – BASELINE CONDITION SCORING

Table B1: Condition scoring for grassland (low distinctiveness) habitats – assessment Phase 1 of the Proposed Development

Reference within the Defra Metric 3.1	Criterion 1	Criterion 2	Criterion 3	Criterion 4	Criterion 5	Criterion 6	Criterion 7	Condition
18	Pass	Fail	Fail	Pass	Pass	Pass	Pass	Moderate
19	Fail	Fail	Pass	Pass	Pass	Pass	Pass	Moderate
23	Fail	Fail	Pass	Pass	Pass	Pass	Pass	Moderate
24	Fail	Fail	Pass	Pass	Pass	Pass	Pass	Moderate
25	Fail	Fail	Pass	Pass	Pass	Pass	Pass	Moderate
34	Pass	Fail	Fail	Pass	Pass	Pass	Pass	Moderate
35	Fail	Fail	Pass	Pass	Pass	Pass	Pass	Moderate

Table B2: Condition scoring for grassland (medium, high & very high distinctiveness) habitats – assessment Phase 1 of the Proposed Development

Reference within the Defra Metric 3.1	Criterion 1	Criterion 2	Criterion 3	Criterion 4	Criterion 5	Criterion 6	Condition
9	Fail	Fail	Pass	Pass	Pass	Pass	Moderate
10	Pass	Fail	Pass	Fail	Pass	Pass	Moderate
11	Pass	Fail	Pass	Fail	Pass	Pass	Moderate
12	Pass	Fail	Pass	Fail	Pass	Pass	Moderate
13	Fail	Fail	Pass	Pass	Pass	Pass	Moderate
14	Fail	Fail	Pass	Pass	Pass	Pass	Moderate
15	Fail	Fail	Pass	Pass	Pass	Pass	Moderate
16	Pass	Fail	Pass	Fail	Pass	Pass	Moderate
17	Pass	Fail	Pass	Fail	Pass	Pass	Moderate
32	Fail	Fail	Fail	Pass	Pass	Fail	Poor

Reference within the Defra Metric 3.1	Criterion 1	Criterion 2	Criterion 3	Criterion 4	Criterion 5	Criterion 6	Condition
33	Fail	Fail	Fail	Pass	Pass	Fail	Poor
36	Fail	Fail	Fail	Pass	Pass	Fail	Poor
37	Fail	Fail	Fail	Pass	Pass	Fail	Poor
38	Fail	Fail	Fail	Pass	Pass	Fail	Poor
46	Fail	Fail	Fail	Pass	Pass	Fail	Poor
47	Fail	Fail	Pass	Pass	Pass	Pass	Moderate
48	Fail	Fail	Pass	Pass	Pass	Pass	Moderate
49	Fail	Fail	Pass	Pass	Pass	Pass	Moderate
50	Fail	Fail	Pass	Pass	Pass	Pass	Moderate
51	Pass	Fail	Pass	Fail	Pass	Pass	Moderate
52	Pass	Fail	Pass	Fail	Pass	Pass	Moderate
53	Pass	Fail	Pass	Fail	Pass	Pass	Moderate
54	Pass	Fail	Pass	Fail	Pass	Pass	Moderate
58	Pass	Fail	Pass	Fail	Pass	Pass	Moderate
60	Fail	Fail	Pass	Pass	Pass	Pass	Moderate
70	Fail	Fail	Fail	Pass	Pass	Fail	Poor

Table B3: Condition scoring for pond habitats – assessment Phase 1 of the Proposed Development

Reference within the Defra Metric 3.1	Criterion 1	Criterion 2	Criterion 3	Criterion 4	Criterion 5	Criterion 6	Criterion 7	Criterion 8	Criterion 9	Condition
22	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Fail	Pass	Moderate

Table B4: Condition scoring for scrub habitats – assessment Phase 1 of the Proposed Development

Reference within the Defra Metric 3.1	Criterion 1	Criterion 2	Criterion 3	Criterion 4	Criterion 5	Condition
6	Pass	Pass	Pass	Pass	Fail	Moderate
7	Pass	Pass	Pass	Pass	Fail	Moderate
8	Pass	Pass	Pass	Pass	Fail	Moderate
42	Pass	Pass	Pass	Pass	Fail	Moderate
63	Pass	Pass	Pass	Pass	Fail	Moderate
64	Pass	Pass	Pass	Pass	Fail	Moderate
65	Pass	Pass	Pass	Pass	Fail	Moderate
66	Pass	Pass	Pass	Pass	Fail	Moderate
67	Pass	Pass	Pass	Pass	Fail	Moderate
69	Pass	Pass	Pass	Pass	Fail	Moderate

Table B5: Condition scoring for woodland habitats – assessment Phase 1 of the Proposed Development

Reference within the Defra Metric 3.1 code	Criterion 1	Criterion 2	Criterion 3	Criterion 4	Criterion 5	Criterion 6	Criterion 7	Criterion 8	Criterion 9	Criterion 10	Criterion 11	Criterion 12	Criterion 13	Total	Condition
1	2	2	3	2	2	3	1	3	1	1	1	1	2	24	Poor
2	2	2	3	3	3	3	1	3	1	1	1	1	2	26	Moderate
3	2	2	3	3	3	3	1	3	1	1	1	1	2	26	Moderate
4	2	2	3	3	3	3	1	3	1	1	1	2	2	27	Moderate
5	2	2	3	3	3	3	1	3	1	1	1	1	2	26	Moderate
72	2	2	3	3	3	3	2	3	2	2	1	2	2	30	Moderate
73	2	2	3	3	3	3	2	3	2	2	1	2	2	30	Moderate
74	2	2	3	3	3	3	1	3	1	1	1	1	2	26	Moderate
75	2	1	3	3	3	3	2	3	2	2	1	2	2	29	Moderate
76	2	2	3	3	3	3	1	3	1	1	1	1	2	26	Moderate
77	2	1	3	3	3	3	2	3	3	2	1	2	2	30	Moderate
78	2	2	3	3	1	3	1	3	1	2	2	1	2	26	Moderate
79	2	2	3	3	2	3	1	3	1	1	1	2	2	26	Moderate
80	2	2	3	3	1	3	1	3	1	2	2	2	2	27	Moderate
81	2	2	3	3	3	3	2	3	3	2	1	2	2	31	Moderate

Table B6: Condition scoring for grassland (low distinctiveness) habitats – assessment Phase 2 of the Proposed Development

Reference within the Defra Metric 3.1	Criterion 1	Criterion 2	Criterion 3	Criterion 4	Criterion 5	Criterion 6	Criterion 7	Condition
32	Pass	Fail	Fail	Pass	Pass	Pass	Pass	Moderate
33	Fail	Fail	Pass	Pass	Pass	Pass	Pass	Moderate
34	Fail	Fail	Pass	Pass	Pass	Pass	Pass	Moderate
35	Pass	Fail	Fail	Pass	Pass	Pass	Pass	Moderate
36	Pass	Fail	Fail	Pass	Pass	Pass	Pass	Moderate
44	Fail	Fail	Pass	Fail	Fail	Pass	Pass	Poor
45	Fail	Fail	Pass	Fail	Fail	Pass	Pass	Poor
51	Pass	Fail	Fail	Pass	Pass	Pass	Pass	Moderate
52	Fail	Fail	Pass	Pass	Pass	Pass	Pass	Moderate

Table B7: Condition scoring for grassland (medium, high & very high distinctiveness) habitats – assessment Phase 2 of the Proposed Development

Reference within the Defra Metric 3.1	Criterion 1	Criterion 2	Criterion 3	Criterion 4	Criterion 5	Criterion 6	Condition
18	Fail	Fail	Pass	Pass	Pass	Pass	Moderate
19	Fail	Fail	Pass	Pass	Pass	Pass	Moderate
20	Pass	Fail	Pass	Fail	Pass	Pass	Moderate
21	Pass	Fail	Pass	Fail	Pass	Pass	Moderate
22	Fail	Fail	Fail	Pass	Pass	Fail	Poor
23	Fail	Fail	Fail	Pass	Pass	Fail	Poor
24	Pass	Fail	Pass	Fail	Pass	Pass	Moderate
25	Fail	Fail	Pass	Pass	Pass	Pass	Moderate
26	Fail	Fail	Pass	Pass	Pass	Pass	Moderate
27	Fail	Fail	Pass	Pass	Pass	Pass	Moderate

Reference within the Defra Metric 3.1	Criterion 1	Criterion 2	Criterion 3	Criterion 4	Criterion 5	Criterion 6	Condition
28	Pass	Fail	Pass	Fail	Pass	Pass	Moderate
29	Fail	Fail	Pass	Pass	Pass	Pass	Moderate
30	Pass	Fail	Pass	Fail	Pass	Pass	Moderate
31	Pass	Fail	Pass	Fail	Pass	Pass	Moderate
53	Fail	Fail	Fail	Pass	Pass	Fail	Poor
54	Fail	Fail	Fail	Pass	Pass	Fail	Poor
55	Fail	Fail	Fail	Pass	Pass	Fail	Poor
63	Fail	Fail	Pass	Pass	Pass	Pass	Moderate
64	Fail	Fail	Pass	Pass	Pass	Pass	Moderate
65	Fail	Fail	Pass	Pass	Pass	Pass	Moderate
66	Fail	Fail	Pass	Pass	Pass	Pass	Moderate
67	Pass	Fail	Pass	Fail	Pass	Pass	Moderate
68	Pass	Fail	Pass	Fail	Pass	Pass	Moderate
69	Pass	Fail	Pass	Fail	Pass	Pass	Moderate
72	Pass	Fail	Pass	Fail	Pass	Pass	Moderate
74	Fail	Fail	Pass	Pass	Pass	Pass	Moderate
83	Fail	Fail	Fail	Pass	Pass	Fail	Poor

Table B8: Condition scoring for pond habitats – assessment Phase 2 of the Proposed Development

Reference within the Defra Metric 3.1	Criterion 1	Criterion 2	Criterion 3	Criterion 4	Criterion 5	Criterion 6	Criterion 7	Criterion 8	Criterion 9	Condition
40	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Fail	Pass	Moderate
41	Fail	Fail	Fail	Fail	Fail	Pass	Pass	Fail	Pass	Poor

Table B9: Condition scoring for scrub habitats – assessment Phase 2 of the Proposed Development

Reference within the Defra Metric 3.1	Criterion 1	Criterion 2	Criterion 3	Criterion 4	Criterion 5	Condition
12	Pass	Pass	Pass	Pass	Fail	Moderate
13	Pass	Pass	Pass	Pass	Fail	Moderate
14	Pass	Pass	Pass	Pass	Fail	Moderate
15	Pass	Pass	Pass	Pass	Fail	Moderate
16	Pass	Pass	Pass	Pass	Fail	Moderate
17	Pass	Pass	Pass	Pass	Fail	Moderate
59	Pass	Pass	Pass	Pass	Fail	Moderate
77	Pass	Pass	Pass	Pass	Fail	Moderate
78	Pass	Pass	Pass	Pass	Fail	Moderate
79	Pass	Pass	Pass	Pass	Fail	Moderate
80	Pass	Pass	Pass	Pass	Fail	Moderate
82	Pass	Pass	Pass	Pass	Fail	Moderate

Table B10: Condition scoring for woodland habitats – assessment Phase 2 of the Proposed Development

Reference within the Defra Metric 3.1	Criterion 1	Criterion 2	Criterion 3	Criterion 4	Criterion 5	Criterion 6	Criterion 7	Criterion 8	Criterion 9	Criterion 10	Criterion 11	Criterion 12	Criterion 13	Total	Condition
1	2	3	3	3	3	3	2	3	2	3	1	1	2	31	Moderate
2	2	2	3	3	3	3	2	3	2	2	1	1	2	29	Moderate
3	2	2	3	3	3	3	2	3	2	2	1	1	2	29	Moderate
4	2	2	3	3	3	3	1	3	1	1	1	2	2	27	Moderate
5	2	2	3	3	3	3	1	3	1	1	1	2	2	27	Moderate
6	2	2	3	3	3	3	1	3	1	1	1	1	2	26	Moderate
7	2	2	3	3	3	3	1	3	1	1	1	2	2	27	Moderate
8	2	2	3	3	3	3	1	3	1	1	1	1	2	26	Moderate
9	2	2	3	3	3	3	1	3	1	1	1	1	2	26	Moderate
10	2	2	3	3	3	3	1	3	1	1	1	2	2	27	Moderate
11	2	2	3	3	3	3	1	3	1	1	1	1	2	26	Moderate
85	2	2	3	3	3	3	1	3	1	1	1	1	2	26	Moderate
86	2	2	3	3	3	3	1	3	1	1	1	1	2	26	Moderate
87	2	2	3	3	3	3	1	3	1	1	1	1	2	26	Moderate
89	2	2	3	3	1	3	1	3	1	2	2	1	2	26	Moderate
90	2	2	3	3	2	3	1	3	1	1	1	2	2	26	Moderate
91	2	2	3	3	1	3	1	3	1	2	2	2	2	27	Moderate
92	2	2	3	3	3	3	2	3	3	2	1	2	2	31	Moderate
93	2	1	3	3	3	3	2	3	3	2	1	2	2	30	Moderate

APPENDIX C – BNG CALCULATION, SUMMARY OF BASELINE HABITATS LOST, RETAINED, ENHANCED AND CREATED

Areas of hardstanding have been excluded from tables within this appendix, as a result the total of the area change has been left blank.

Table C11: BNG calculation, summary of baseline habitats lost, retained, enhanced and created within assessment Phase 1

UK Habitat code	Baseline area / ha	Baseline / habitat units	Area lost / ha	Area lost / habitat units	Retained area / ha	Retained / habitat units	Enhancement area / ha	Enhancement initial value / habitat units	Enhancement final value / habitat units	Creation area / ha	Creation value / habitat units	Creation, enhancement and retained summed / ha	Creation, enhancement and retained summed / habitat units	Area change / ha	Habitat unit change
Cropland - Cereal crops	58.43	116.86	31.24	62.48	27.19	54.38	0.00	0.00	0.00	0.00	0.00	27.19	54.38	**-31.24**	**-62.48**
Grassland - Lowland meadows	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	16.14	82.40	16.14	82.40	**16.14**	**82.40**
Grassland - Modified grassland	17.72	71.84	16.33	65.73	0.00	0.00	0.00	0.00	0.00	9.47	32.85	9.47	32.85	**-8.25**	**-38.99**
Grassland - Other neutral grassland	47.77	261.04	6.48	52.56	35.46	182.82	7.22	31.77	69.00	24.72	228.50	67.40	480.33	**19.63**	**219.29**
Heathland and shrub - Bramble scrub	0.19	0.84	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**-0.19**	**-0.84**
Heathland and shrub - Mixed scrub	8.46	76.58	7.65	69.45	0.81	7.13	0.19	0.84	1.54	0.59	4.34	1.59	13.01	**-6.87**	**-63.57**

UK Habitat code	Baseline area / ha	Baseline / habitat units	Area lost / ha	Area lost / habitat units	Retained area / ha	Retained / habitat units	Enhancement area / ha	Enhancement initial value / habitat units	Enhancement final value / habitat units	Creation area / ha	Creation value / habitat units	Creation, enhancement and retained summed / ha	Creation, enhancement and retained summed / habitat units	Area change / ha	Habitat unit change
Lakes - Ponds (Priority Habitat)	0.01	0.14	0.01	0.14	0.00	0.00	0.00	0.00	0.00	0.02	0.22	0.02	0.22	**0.01**	**0.08**
Sparsely vegetated land - Ruderal/Ephemeral	30.32	60.64	30.32	60.64	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**-30.32**	**-60.64**
Urban - Vacant/derelict land/ bare ground	3.70	7.40	3.70	7.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**-3.70**	**-7.40**
Woodland and forest - Lowland mixed deciduous woodland	6.21	83.12	0.00	0.00	3.05	40.26	4.43	54.04	58.10	10.45	14.56	17.93	112.92	**11.72**	**29.79**
Woodland and forest - Other coniferous woodland	1.38	6.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**-1.38**	**-6.07**
Woodland and forest - Other woodland; broadleaved	1.31	11.02	0.61	4.86	0.70	6.16	1.38	6.07	9.63	0.00	0.00	2.08	15.79	**0.77**	**4.77**
Woodland and forest - Other	1.27	11.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**-1.27**	**-11.18**

UK Habitat code	Baseline area / ha	Baseline / habitat units	Area lost / ha	Area lost / habitat units	Retained area / ha	Retained / habitat units	Enhancement area / ha	Enhancement initial value / habitat units	Enhancement final value / habitat units	Creation area / ha	Creation value / habitat units	Creation, enhancement and retained summed / ha	Creation, enhancement and retained summed / habitat units	Area change / ha	Habitat unit change
woodland; mixed															
Total	**176.77**	**706.72**	**96.34**	**323.26**	**67.21**	**290.75**	**13.22**	**92.72**	**138.27**	**61.39**	**362.88**	**141.82**	**791.89**	**-**	**85.17**

Table C12: BNG calculation, summary of baseline hedgerow lost, retained, enhanced and created within assessment Phase 1

UK Habitat code	Baseline length / km	Baseline / hedgerow units	Length lost / km	Length lost / hedgerow units	Retained Length / km	Retained / hedgerow units	Enhancement Length / km	Enhancement initial value / hedgerow units	Enhancement final value / hedgerow units	Creation Length / km	Creation value / hedgerow units	Creation, enhancement and retained summed / km	Creation, enhancement and retained summed / hedgerow units	Length change / km	Hedgerow unit change
Native Hedgerow	1.43	9.44	0.00	0.00	1.43	9.44	0.00	0.00	0.00	0.00	0.00	1.43	9.44	**0.00**	**0.00**
Native Hedgerow with trees	0.13	1.72	0.00	0.00	0.13	1.72	0.00	0.00	0.00	0.00	0.00	0.13	1.72	**0.00**	**0.00**
Native Species Rich Hedgerow	1.35	17.82	0.00	0.00	1.35	17.82	0.00	0.00	0.00	0.00	0.00	1.35	17.82	**0.00**	**0.00**
Native Species Rich	4.00	79.20	0.00	0.00	4.00	79.20	0.00	0.00	0.00	3.51	34.08	7.51	113.28	**3.51**	**34.08**

UK Habitat code	Baseline length / km	Baseline / hedgerow units	Length lost / km	Length lost / hedgerow units	Retained Length / km	Retained / hedgerow units	Enhancement Length / km	Enhancement initial value / hedgerow units	Enhancement final value / hedgerow units	Creation Length / km	Creation value / hedgerow units	Creation, enhancement and retained summed / km	Creation, enhancement and retained summed / hedgerow units	Length change / km	Hedgerow unit change
Hedgerow with trees															
Total	**6.91**	**108.17**	**0.00**	**0.00**	**6.91**	**108.17**	**0.00**	**0.00**	**0.00**	**3.51**	**34.08**	**10.42**	**142.26**	**3.51**	**34.08**

Table C13: BNG calculation, summary of baseline habitats lost, retained, enhanced and created in assessment Phase 2

UK Habitat code	Baseline area / ha	Baseline / habitat units	Area lost / ha	Area lost / habitat units	Retained area / ha	Retained / habitat units	Enhancement area / ha	Enhancement initial value / habitat units	Enhancement final value / habitat units	Creation area / ha	Creation value / habitat units	Creation, enhancement and retained summed / ha	Creation, enhancement and retained summed / habitat units	Area change / ha	Habitat unit change
Cropland - Cereal crops	59.74	119.48	56.80	113.60	2.94	5.88	0.00	0.00	0.00	0.00	0.00	2.94	5.88	**-56.80**	**-113.60**
Grassland - Bracken	0.62	1.43	0.62	1.43	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**-0.62**	**-1.43**
Grassland - Lowland calcareous grassland	0.39	5.18	0.39	5.18	0.00	0.00	0.00	0.00	0.00	12.83	29.83	12.83	29.83	**12.44**	**24.65**

UK Habitat code	Baseline area / ha	Baseline / habitat units	Area lost / ha	Area lost / habitat units	Retained area / ha	Retained / habitat units	Enhancement area / ha	Enhancement initial value / habitat units	Enhancement final value / habitat units	Creation area / ha	Creation value / habitat units	Creation, enhancement and retained summed / ha	Creation, enhancement and retained summed / habitat units	Area change / ha	Habitat unit change
Grassland - Lowland meadows	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	27.64	265.88	27.64	265.88	**27.64**	**265.88**
Grassland - Modified grassland	36.51	121.97	35.12	115.85	0.00	0.00	0.00	0.00	0.00	16.33	51.25	16.33	51.25	**-20.18**	**-70.72**
Grassland - Other neutral grassland	49.44	263.13	38.78	194.97	4.83	42.50	7.22	31.77	74.30	28.11	310.18	40.16	426.99	**-9.28**	**163.86**
Heathland and shrub - Bramble scrub	0.19	0.84	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**-0.19**	**-0.84**
Heathland and shrub - Mixed scrub	11.64	105.41	11.05	100.22	0.59	5.19	0.19	0.84	1.67	0.76	6.44	1.54	13.31	**-10.10**	**-92.10**
Lakes - Ponds (Non- Priority Habitat)	0.05	0.20	0.05	0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**-0.05**	**-0.20**
Lakes - Ponds (Priority Habitat)	0.01	0.14	0.01	0.14	0.00	0.00	0.00	0.00	0.00	0.02	0.40	0.02	0.40	**0.01**	**0.26**
Sparsely vegetated land - Ruderal/Ephemeral	31.51	63.20	31.51	63.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**-31.51**	**-63.20**

UK Habitat code	Baseline area / ha	Baseline / habitat units	Area lost / ha	Area lost / habitat units	Retained area / ha	Retained / habitat units	Enhancement area / ha	Enhancement initial value / habitat units	Enhancement final value / habitat units	Creation area / ha	Creation value / habitat units	Creation, enhancement and retained summed / ha	Creation, enhancement and retained summed / habitat units	Area change / ha	Habitat unit change
Urban - Introduced shrub	0.67	1.34	0.67	1.34	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**-0.67**	**-1.34**
Urban - Vacant/derelict land/ bare ground	4.15	8.32	4.15	8.32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**-4.15**	**-8.32**
Woodland and forest - Lowland mixed deciduous woodland	6.32	85.73	1.96	27.02	1.20	15.84	4.43	54.04	59.12	12.12	21.68	17.75	96.64	**11.43**	**10.91**
Woodland and forest - Other coniferous woodland	1.38	6.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**-1.38**	**-6.07**
Woodland and forest - Other woodland; broadleaved	2.76	24.43	2.06	18.27	0.70	6.16	1.38	6.07	10.48	0.00	0.00	2.08	16.64	**-0.68**	**-7.79**
Woodland and forest - Other woodland; mixed	1.27	11.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**-1.27**	**-11.18**
Total	**206.65**	**818.04**	**183.17**	**649.75**	**10.26**	**75.58**	**13.22**	**92.72**	**145.57**	**97.81**	**685.66**	**121.29**	**906.81**	**-**	**88.77**

Table C14: BNG calculation, summary of baseline hedgerow lost, retained, enhanced and created within assessment Phase 2

UK Habitat code	Baseline length / km	Baseline / hedgerow units	Length lost / km	Length lost / hedgerow units	Retained Length / km	Retained / hedgerow units	Enhancement Length / km	Enhancement initial value / hedgerow units	Enhancement final value / hedgerow units	Creation Length / km	Creation value / hedgerow units	Creation, enhancement and retained summed / km	Creation, enhancement and retained summed / hedgerow units	Length change / km	Hedgerow unit change
Native Hedgerow	1.43	9.44	0.00	0.00	1.43	9.44	0.00	0.00	0.00	0.00	0.00	1.43	9.44	**0.00**	**0.00**
Native Hedgerow with trees	0.13	1.72	0.00	0.00	0.13	1.72	0.00	0.00	0.00	0.00	0.00	0.13	1.72	**0.00**	**0.00**
Native Species Rich Hedgerow	1.35	17.82	0.00	0.00	1.35	17.82	0.00	0.00	0.00	0.00	0.00	1.35	17.82	**0.00**	**0.00**
Native Species Rich Hedgerow with trees	4.00	79.20	1.12	22.18	2.88	57.02	0.00	0.00	0.00	3.51	42.20	6.39	99.23	**2.39**	**20.03**
Total	**6.91**	**108.17**	**1.12**	**22.18**	**5.79**	**86.00**	**0.00**	**0.00**	**0.00**	**3.51**	**42.20**	**9.30**	**128.20**	**2.39**	**20.03**

APPENDIX D – DEFRA METRIC 3.1 SPREADSHEET

Luton Rising DCO Phase 1

Headline Results

Return to results menu

On-site baseline	*Habitat units*	706.72
	Hedgerow units	108.17
	River units	0.00

On-site post-intervention (Including habitat retention, creation & enhancement)	*Habitat units*	791.89
	Hedgerow units	142.26
	River units	0.00

On-site net % change (Including habitat retention, creation & enhancement)	*Habitat units*	12.05%
	Hedgerow units	31.51%
	River units	0.00%

Off-site baseline	*Habitat units*	0.00
	Hedgerow units	0.00
	River units	0.00

Off-site post-intervention (Including habitat retention, creation & enhancement)	*Habitat units*	0.00
	Hedgerow units	0.00
	River units	0.00

Total net unit change (including all on-site & off-site habitat retention, creation & enhancement)	*Habitat units*	85.17
	Hedgerow units	34.08
	River units	0.00

Total on-site net % change plus off-site surplus (including all on-site & off-site habitat retention, creation & enhancement)	*Habitat units*	12.05%
	Hedgerow units	31.51%
	River units	0.00%

Trading rules Satisfied?	Yes ✓

Luton Rising DCO Phase 2		
Headline Results		

Return to results menu

On-site baseline	Habitat units	818.04
	Hedgerow units	108.17
	River units	0.00

On-site post-intervention	Habitat units	906.81
(Including habitat retention, creation & enhancement)	Hedgerow units	128.20
	River units	0.00

On-site net % change	Habitat units	10.85%
(Including habitat retention, creation & enhancement)	Hedgerow units	18.51%
	River units	0.00%

Off-site baseline	Habitat units	0.00
	Hedgerow units	0.00
	River units	0.00

Off-site post-intervention	Habitat units	0.00
(Including habitat retention, creation & enhancement)	Hedgerow units	0.00
	River units	0.00

Total net unit change	Habitat units	88.77
(including all on-site & off-site habitat retention, creation & enhancement)	Hedgerow units	20.03
	River units	0.00

Total on-site net % change plus off-site surplus	Habitat units	10.85%
	Hedgerow units	18.51%
(including all on-site & off-site habitat retention, creation & enhancement)	River units	0.00%

Trading rules Satisfied?	Yes ✓