Officers' Meadow,
Shenfield

Biodiversity Net Gain Assessment

September 2023

Quality Management	
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Project:	Officers' Meadow, Shenfield
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Legal Guidance

The information set out within this report in no way constitutes a legal opinion on the relevant legislation (refer to the relevant Appendix for the main provisions of the legislation). The opinion of a legal professional should be sought if further advice is required.

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1 Introduction

1.1 Background and Proposals

1.1.1 Aspect Ecology is advising Croudace Homes Ltd in respect of ecological issues relating to land at Officers' Meadow, Shenfield, Essex, centred at grid reference TQ 61881 96146, hereafter referred to as 'the site'. The proposals are for redevelopment of the site to provide up to 344 new residential units and safeguarded land for an educational facility (primary school and early years facility), with associated public open space, landscaping, drainage and highways infrastructure. The proposals will also incorporate a number of attenuation basins.

1.1.2 To inform the planning application, Aspect Ecology has undertaken a Biodiversity Net Gain (BNG) assessment to determine the level of biodiversity net gain that could be achieved under the scheme. This work is based on the Biodiversity Metric 4.0 tool developed by Natural England and informed by biodiversity net gain guidance developed by CIRIA, CIEEM and IEMA. This report sets out the results of the assessment.

1.2 Biodiversity Net Gain

Environment Act

1.2.1 The Environment Act establishes a comprehensive legal framework for environmental improvement within the UK, forming one of the key measures to deliver the vision set out under the 25 Year Environment Plan.

1.2.2 The Environment Act is intended to establish the structure for long-term environmental governance and accountability and includes key measures to drive improvements for nature. In particular, it lays the foundation for a Nature Recovery Network, and introduces a mandatory requirement for biodiversity net gain in the planning system, to ensure that new developments enhance biodiversity and create new green spaces for local communities to enjoy. This will require developments to deliver a 10% improvement in biodiversity value, albeit this will not be a legal requirement until the legislation is finalised, currently anticipated to be autumn 2023.

Good Practice Principles for Development

1.2.3 CIRIA, CIEEM and IEMA have developed a set of principles on good practice to achieve Biodiversity Net Gain[1], accompanied by a practical guide[2]. These principles provide a framework that helps improve the UK's biodiversity by contributing towards strategic priorities to conserve and enhance nature while progressing with sustainable development. They also provide a way for industry to show that projects follow good practice. Ten key principles are identified:

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 where possible, 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.

[1] CIEEM, CIRIA, IEMA (2016) *Biodiversity Net Gain: Good practice principles for development.*
[2] CIEEM, CIRIA, IEMA (2019) *Biodiversity Net Gain: Good practice principles for development. A practical guide.*

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 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 existing or creating new habitat
   - 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.

2 Methodology

2.1 Habitat Survey

2.1.1 The site was originally surveyed in August 2016, with update survey work conducted in September and October 2018, as well as December 2021 and most recently in April and July 2023 in order to ascertain the general ecological value of the land contained within the boundaries of the site and to identify the main habitats and ecological features present. The site was surveyed based on standard Phase 1 Habitat Survey methodology[3], whereby the habitat types present are identified and mapped, together with an assessment of the species composition of each habitat. The site was classified into areas of similar botanical community types, with a representative species list compiled for each habitat identified. The nomenclature used for plant species is based on the Botanical Society for the British Isles (BSBI) Checklist.

2.1.2 An assessment of the condition of the existing habitats within the site was also undertaken during which the condition of each habitat type was assessed in accordance with the Metric user guidance.

2.1.3 In addition, a specific survey was undertaken of the on-site watercourse in July 2023 using the Modular River Physical (MoRPh) Survey method[4]. Specifically a MultiMoRPh5 survey was undertaken comprising a desktop and field survey. The desktop survey assessed the reach of the watercourse to determine the indicative river type. This was combined with a field survey using 5 equally spaced sample sections of some 25 metres in length.

2.1.4 Thirty-two Condition Indicator scores are estimated from the MoRPh field survey data. The Condition Indicators score a series of 'natural' (positive) and human-impacted (negative) properties of the bank tops, bank faces and river bed within each MoRPh5 subreach. The Condition Indicators are assigned scores ranging from 0 to +4 (positive indicators) or 0 to -4 (negative indicators) based on a numerical synthesis of subsets of survey observations. The average positive and average negative Condition Indicator scores for each MoRPh5 subreach are added together to generate a Preliminary Condition score. A Final Condition assessment is then assigned to each MoRPh5 subreach based on the Preliminary Condition score and the River Type being assessed.

2.2 Survey Constraints and Limitations

2.2.1 All of the species that occur in each habitat would not necessarily be detectable during survey work carried out at any given time of the year, since different species are apparent during different seasons. The condition assessment survey was undertaken within the optimal season (especially for grassland surveys) and therefore a robust assessment of the habitats and botanical interest across the site could be made.

2.2.2 A MoRPh survey can be undertaken at any time of year[4], with the optimal survey months being May and September. Hence the survey was satisfactory in nature and undertaken during the optimal survey period.

[3] Joint Nature Conservation Committee (2010, as amended) *'Handbook for Phase 1 habitat survey: A technique for environmental audit.'*

[4] The MoRPh Survey – Technical Reference Manual 2020 Version. Modular River Survey. Gurnell *et al*.

2.3 Biodiversity Net Gain Assessment

2.3.1 To quantify the level of biodiversity net gain that can be delivered under the proposed development, the change in biodiversity value resulting from the scheme has been calculated using the Metric 4.0 calculation tool and associated User Guide[5]. This takes account of the size, distinctiveness and ecological condition of existing and proposed habitat areas to provide a proxy measure of the present and forecast biodiversity value of a site, and therefore determine the overall change in biodiversity value.

2.3.2 To establish the habitat baseline, broad habitat areas have been identified based on the survey work undertaken at the site, with habitat condition assigned based on the guidance set out in the User Guide Technical Annex 1[6] and User Guide Technical Annex 2[7] and professional judgement. Multiple quadrats were sampled within the grassland areas, in order to assess the number of species present.

2.3.3 The post-development habitat creation and enhancement is based on Stantec's BNG Plan (ref: BNG Plan LN-LD-113 Rev A) and Planting Schedule (ref: LN-LD-21). A number of assumptions have been made in terms of the detailed landscaping and management proposals, based on comparative developments and what is realistic and feasible under the proposed land uses and landscape space types. Further details of assumptions made in populating the Metric are provided in Chapter 4 below.

[5] Natural England (March 2023) *Natural England Joint Publication JP039. The Biodiversity Metric 4.0: User Guide.*

[6] Natural England (March 2023) *Natural England Joint Publication JP039. The Biodiversity Metric 4.0: User Guide – Technical Annex 1: Condition Assessment Sheets and Methodology.*

[7] Natural England (March 2023) *Natural England Joint Publication JP039. The Biodiversity Metric 4.0: User Guide - Technical Annex 2.*

3 Habitats and Ecological Features

3.1 Overview

3.1.1 The site predominantly comprises vacant land bound by mixed scrub, hedgerows and lowland mixed deciduous woodland to the east. Additional woodland parcels are present within and adjacent to the site, along with areas of tall ruderal, grassland, ditches and a watercourse along the western boundary. The locations of these habitat types and features are illustrated on Plan 5014/BNGA1 and described below.

3.2 Cropland (Condition N/A)

3.2.1 The site primarily comprises vacant / uncropped fields and a review of historic aerial images shows the site has had a varied agricultural management regime over the years, including a mix of arable and pasture. The fields are subject to intensive agricultural management, including twice annual herbicide spraying and ploughing, resulting in large areas of bare ground. Therefore, although not currently under active cropping, the management and appearance of the fields is akin to cropland and hence it has been classified as such (cropland; non-cereal crops).

3.3 Modified Grassland (Moderate Condition)

3.3.1 There are areas grassland verge at the north and south-west of the site, located adjacent to the road, which are classified as modified grassland. These grassland areas were not subject to condition assessment, as they were included within the redline boundary following the condition survey. As such, a conservative approach has been employed and it is assumed the grassland passes at least five of the condition assessment criteria, including essential Criterion A, and is therefore assessed as being in moderate condition (see Condition Assessment sheet at Appendix 1 for details).

3.4 Modified Grassland (Good Condition)

3.4.1 There are small areas of grassland within the site which are classified as modified grassland which exhibit a tussocky sward of 10-15cm. The grassland passes at least six of the condition assessment criteria, including essential Criterion A, and is therefore assessed as being in good condition (see Condition Assessment sheet at Appendix 1 for details).

3.5 Other Woodland, Broadleaved (Moderate Condition)

3.5.1 The woodland parcel located at the north-west of the site, and the wooded belts (WB1 and WB2) are classified within the Metric as Other Woodland; broadleaved. The woodland parcels scored at least 26 points on the condition assessment, and are therefore assessed as being in moderate condition in accordance with the Technical Supplement (see Condition Assessment Sheet at Appendix 1 for details).

3.6 Lowland Mixed Deciduous Woodland (Good Condition)

3.6.1 Woodland W2 located within the site forms part of Arnold's Wood Complex Local Wildlife Site / ancient woodland, and is therefore classified within the Metric as Lowland Mixed Deciduous Woodland. The woodland scored at least 37 points on the condition assessment, and is therefore assessed as being in good condition in accordance with the Technical Supplement (see Condition Assessment Sheet at Appendix 1 for details).

3.7 Bramble Scrub (Condition N/A)

3.7.1 Areas of Bramble scrub are present within the site. In accordance with the Technical Supplement, no condition assessment is required for this habitat.

3.8 Mixed Scrub (Poor/Moderate Condition)

3.8.1 The majority of the scrub within the site comprises a limited diversity of common and widespread species, albeit the majority of the species recorded are native. The scrub along the woodland edge and small areas of the scrub pass up to four of the condition criteria, and are therefore assessed as moderate condition. Spanish Bluebell, Hybrid Bluebell and Buddleia were recorded within some of the areas of scrub, and as such, these areas are assessed as poor condition (see Condition Assessment Sheets at Appendix 1 for details).

3.9 Ruderal/Ephemeral (Poor Condition)

3.9.1 The areas dominated by tall ruderal / ephemeral comprise a limited diversity of common and widespread species. No Schedule 9 invasive species were recorded within the ruderal/ephemeral areas, and as such, however overall the ruderal/ephemeral is assessed as being in poor condition (see Condition Assessment Sheet at Appendix 1 for details).

3.10 Ponds Non-priority (Poor/Moderate Condition)

3.10.1 Three ponds are present within the site, all of which are likely to be ephemeral waterbodies. Two of the ponds (P1 and P3) pass up to seven of the condition criteria, and are therefore assessed as moderate condition. Pond P2 passes up to five of the condition criteria, and as such, is assessed as poor condition (see Condition Assessment Sheet at Appendix 1 for details).

3.11 Ditches (Poor Condition)

3.11.1 A total of five ditches are present within the site, albeit one of the ditches is associated with a hedgerow and is assessed as part of this feature. Ditch D1 was previously noted to hold water, however, all of the ditches are likely to be predominantly dry. The ditches pass up to four of the condition criteria, and are therefore assessed as poor condition (see Condition Assessment Sheet at Appendix 1 for details).

3.12 Developed Land; Sealed Surface (Condition N/A)

3.12.1 Areas of hardstanding within the site are limited to the short sections of road at the north and south-west of the site. In accordance with the Technical Supplement, no condition assessment is required for this habitat.

3.13 Individual Tree (Good Condition)

3.13.1 A single mature native tree is present within the site located outside an area of woodland, scrub or hedgerow. The tree meets up to six of the condition assessment criteria and is assessed as being in good condition (see Condition Assessment sheet at Appendix 1 for details).

3.14 Other Rivers and Streams (Poor/Fairly Poor Condition)

3.14.1 A stream / watercourse runs along the site boundary, starting in the south and flows north with a slow flow within a channel of around 1-2m in width. Water quality appeared good at the time of survey and was of a shallow depth. The channel sits within banks varying from steep to shallow in nature, although most are of a low height for the most part. The banks support typically tall ruderal (including the non-native Himalayan Balsam) and scrub species.

3.14.2 A modular river survey using standard MoRPh methodology has been undertaken so as to assess the condition of the watercourse. The watercourse is divided into a western and eastern reach, with the desktop study determining that the western reach is River Type classified as 'K' and the eastern reach is classified as 'F'. The field parameters assessed are shown in Appendix 2 with an average score of the positive and negative indicators generating a preliminary condition score of 0.5668 for the western reach and -1.79352 for the eastern reach. Combining this score with the River Type records a final condition assessment of 'fairly poor' condition for the western reach and 'poor' for the eastern reach of the watercourse.

3.15 Native Species-rich Hedgerow with Trees (Moderate Condition)

3.15.1 Hedgerow H1 is located at the south of the site and comprises at least five native species per 30m. Hedgerow H1 has no more than two failures in total, however, it fails two criteria within a single functional group. Therefore, H2 is assessed as moderate condition (see Condition Assessment Sheet at Appendix 1 for details).

3.16 Native Species-rich Hedgerow with Trees – Associated with a Bank or Ditch (Good Condition)

3.16.1 Hedgerow H2 is located along the northern boundary of the southern-most parcel, and comprises at least five native species per 30m. Hedgerow H2 has no more than two failures in total and does not fail two criteria within a single functional group. Therefore, H2 is assessed as good condition (see Condition Assessment Sheet at Appendix 1 for details).

3.17 Native Species-rich Hedgerow with Trees (Good Condition)

3.17.1 Hedgerow H3 is located along the south-western site boundary and comprises at least five native species per 30m. Hedgerow H3 has no more than two failures in total and does not fail two criteria within a single functional group. Therefore, H3 is assessed as good condition (see Condition Assessment Sheet at Appendix 1 for details).

3.18 Line of Trees (Moderate Condition)

3.18.1 Hedgerow H4 is located at the east of the site, adjacent to woodland W2. The hedgerow comprises a line of trees and fails only one of the five assessment criteria. Therefore, in accordance with the User Guidelines, H4 is assessed as being moderate condition.

3.19 Native Species-rich Hedgerow with Trees – Associated with a Bank or Ditch (Good Condition)

3.19.1 Hedgerow H5 is located at the northern boundary of the site and comprises at least five native species per 30m. Hedgerow H5 has no more than two failures in total and does not fail two criteria within a single functional group. Therefore, H5 is assessed as good condition (see Condition Assessment Sheet at Appendix 1 for details).

3.20 Native Species-rich Hedgerow (Moderate Condition)

3.20.1 Hedgerow H6 is located at the north of the site and comprises at least five native species per 30m. Hedgerow H6 has no more than four failures in total and does not fail both attributes in a single functional group. Therefore, H6 is assessed as moderate condition (see Condition Assessment Sheet at Appendix 1 for details).

4 Post-development Habitats

4.1 Assumptions

4.1.1 When inputting the post-development habitat areas and condition into the Metric 4.0, the following assumptions have been made:

- Newly created habitat under the proposals will be managed appropriately to reach the assigned target condition (anticipated to be defined by a future management plan).
- A flowering lawn mix can be used within the areas of amenity (modified) grassland to maximise biodiversity benefits whilst providing an amenity habitat.
- Future management prescriptions at the site within areas of created 'other neutral' grassland within the site will be subject to a traditional meadow management regime, in order to maintain the presence of a minimum 9 species per m^2 necessary to qualify as this habitat type.
- New attenuation basins will be sown with a wetland wildflower seed mix to create 'other neutral' grassland within these areas.
- New tree planting has been provided as indicated by the proposals. Additional trees are assumed to be small and of moderate condition.
- It is anticipated that hedgerows H2 and H4 will be fully retained, with sections of H1, H3 and H6 retained following the construction of access and parking such that they are cut back and not fully removed. Areas of new hedgerow planting have been indicated in order to show the extent required to achieve a net gain, though the final detailed design may require some changes to their location.
- The location of the new ditches is based on the location of areas of wet grassland adjacent to a footpath at the south-west of the site.
- Additional 'species-rich native hedgerow – associated with a bank or ditch' is proposed within the site. The proposed location is indicated on the BNG2 plan (see Plan 5014/BNG2), however the exact location of the hedgerow planting is to be determined.

4.2 Good Practice Principles for Development

4.2.1 Provided below is a summary of how biodiversity net gain good practice principles will be applied at the site:

1) **Apply the Mitigation Hierarchy.** The mitigation hierarchy has been followed with the retention of medium distinctiveness grassland at the south-east of the site. Some areas of this habitat are unavoidably lost to the development footprint, which are compensated for by new planting at the site.

2) **Avoid losing biodiversity that cannot be offset by gains elsewhere.** No irreplaceable habitats are lost. Where medium distinctiveness habitat is lost this is somewhat offset by new areas of medium distinctiveness habitat creation.

3) **Be inclusive and equitable.** Pre-application discussions have been held with the Council, in order to maximise the ecological benefit under the detailed landscape design.

4) **Address risks.** The Metric 4.0 has an inbuilt difficulty multiplier which allows for the time between losses and the gains to be incorporated into the final score.

5) **Make a measurable Net Gain contribution.** A measurable net gain is demonstrated by the Metric. In addition, faunal specific benefits will be provided by the scheme, which are not included within the metric.

6) **Achieve the best outcomes for biodiversity.** As far as practicable, the areas of medium distinctiveness habitat will be retained at the site periphery, whilst the site will in general benefit from the provision of generous new tree planting, far above the existing situation where trees are largely absent from the centre of the site.

7) **Be additional.** The provision of new tree planting at the site will create an ecologically valuable habitat and improve connectivity for wildlife at the site, which would not otherwise occur without significant intervention.

8) **Create a Net Gain legacy.** The retained grassland at the site periphery, in combination with the new tree planting, will be managed for the benefit of nature conservation for the lifetime of the development (likely to be secured by a planning condition).

9) **Optimise sustainability.** Overall the new habitats will provide an enhanced biodiversity network compared to the existing situation.

10) **Be transparent.** This report ensures the proposals are well communicated to stakeholders.

4.3 Strategic Significance

4.3.1 Strategic significance in the metric is assigned to give extra value to habitats that are located in optimal locations, or are of a type that meet local objectives for biodiversity. No strategic significance has been applied to the habitats pre or post-development of the site.

4.4 Habitat Type and Condition

4.4.1 A summary of post-development habitat creation and enhancement is set out in Table 4.1 below. Post-development habitats are shown at Plan 5014/BNG2.

Table 4.1. Post-development Habitat Creation

Habitat	Target Condition	Condition Rationale
Urban – Developed land; sealed surface	N/A	This habitat is used for all new buildings, car parking and access. In accordance with the guidelines no assessment of condition is required for this habitat type.
Urban – Vegetated garden	N/A	This habitat is used for all new residential gardens. In accordance with the guidelines no assessment of condition is required for this habitat type.

Urban – Introduced Shrub	N/A	This habitat is used for proposed ornamental shrub planting. In accordance with the guidelines no assessment of condition is required for this habitat type.
Grassland – Modified grassland	Poor	Area of amenity grassland to be created within the area identified to be an educational facility. These grass areas are assumed to be intensively managed and species-poor, resulting in a poor condition.
Woodland and Forest – Other Woodland; Broadleaved	Moderate	Areas of woodland planting to be created adjacent to the off-site woodland. The woodland will be planted with native species and will be managed for the benefit of biodiversity, resulting in a moderate condition after fifteen years.
Individual Trees – Urban Tree	Poor – Moderate	A total of 313 urban trees will be planted, of which 166 are small and 91 are medium size. A large proportion of these trees will be within the built-up areas, e.g. street trees, and on a conservative basis all 313 trees are assumed to achieve poor condition in ten years.
Individual Trees – Urban Tree	Moderate	An addition to the above, a further 56 small trees will be planted within open space and are assumed to achieve moderate condition in twenty-seven years.
Grassland – Modified grassland	Moderate	Areas of amenity grassland to be created will be sown with a flowering lawn mix (Flowering Lawn Mixture) containing species tolerant of regular management. These areas will support a diverse range of flowering species for the benefit of biodiversity, and the wildflower mixture areas in particular will be subject to ecologically sensitive management prescriptions in order to maximise their floristic diversity and value for wildlife, resulting in a moderate condition achieved after four years.
Grassland – Other Neutral Grassland	Moderate	Areas of other neutral grassland will be created throughout the site, in particular within the areas of open space. Separate areas of the grassland will be sown with various wildflower mixes, including those suitable for loamy soil (Emorsgate EM5 Wildflower Mix for Loamy Soil), for wetland (Emorsgate EM8 Meadow Mix for Wetlands) and tussocky grass (Emorsgate EM10 Tussock Mix for Wetlands). These areas will support a diverse range of flowering species for the benefit of biodiversity, and the wildflower mixture areas in particular will be subject to ecologically sensitive management prescriptions in order to maximise their floristic diversity and value for wildlife, resulting in a moderate condition achieved after five years.
Heathland and Shrub – Mixed Scrub	Moderate	New mixed scrub will comprise a number of native tree and shrub species. With appropriate management prescriptions, the Metric calculates this habitat can achieve moderate condition after 5 years.
Lakes – Ponds (Non-priority Habitat)	Moderate	Two new ponds will be created within the site which will be subject to ecologically sensitive management prescriptions in order to

		maximise their value for wildlife, resulting in a moderate condition achieved after three years.
Sparsely Vegetated Land – Ruderal / Ephemeral	Moderate	Areas of new marginal planting will be created adjacent to the ponds and will be planted with native water edge species to enhance biodiversity. The marginal planting will be subject to ecologically sensitive management prescriptions in order to maximise its floristic diversity and value for wildlife, resulting in a moderate condition achieved after three years.
Wetland - Reedbed	Moderate	Areas of new reedbed planting will be created adjacent to the ponds and will be planted with native species to enhance biodiversity. The reedbed planting will be subject to ecologically sensitive management prescriptions in order to maximise its floristic diversity and value for wildlife, resulting in a good condition achieved after seven years.
Hedgerows – Species-rich Native Hedgerow	Good	The newly planted native hedgerows within the site will comprise native species and, subject to ecologically sensitive management prescriptions, will achieve good condition within 12 years.
Hedgerows – Non-native and Ornamental Hedgerow	Poor	The newly planted ornamental hedge planting within the site will comprise non-native and ornamental species and will achieve poor condition within a single year.
Hedgerows – Species-rich Native Hedgerow – Associated with a Bank or Ditch	Good	Newly planted native hedgerows proposed within the site will comprise native species and, subject to ecologically sensitive management prescriptions, will achieve good condition within 12 years. The location of the hedgerow planting on plan 5014/BNG2 is indicative, with the exact location of the hedgerow planting is to be confirmed.
Ditches	Moderate	Two new sections of ditch will be created within an area of damp grassland at the south-west of the site, and will be planted with native species to enhance biodiversity. The ditches will be subject to ecologically sensitive management prescriptions in order to maximise floristic diversity and value for wildlife, resulting in a moderate condition achieved after five years.

5 Biodiversity Net Gain Assessment Results

5.1 Metric calculation

5.1.1 The data from the baseline habitat survey work and the proposed habitat enhancement and creation works have been coded into the Metric.

5.1.2 In summary, the Metric calculates that the development will result in a net gain of 13.50 habitat units (16.33%) for habitat units, a net gain of 0.11 in hedgerow units (0.49%) and net gain of 0.57 watercourse units (22.35%) at the site.

5.1.3 The results are broken down in Table 5.1 below:

Table 5.1 Net gain results

	Change in Units	% Change
Habitats	13.50	16.33%
Hedgerows	0.11	0.49%
Watercourse	0.57	22.35%

5.1.4 The trading summary indicates that the rules are satisfied for habitats and the watercourse, albeit the hedgerow trading summary is not satisfied due to the loss of the very high and high distinctiveness hedgerows.

5.2 Additional faunal benefits not captured by the Metric

5.2.1 Further biodiversity benefits will be provided by faunal enhancements, for example through the provision of new bat and bird boxes (which can be secured via suitably worded planning conditions). Such faunal enhancements are not quantified under the Metric as this deals with habitats alone and does not address faunal benefits.

6 Summary and Conclusions

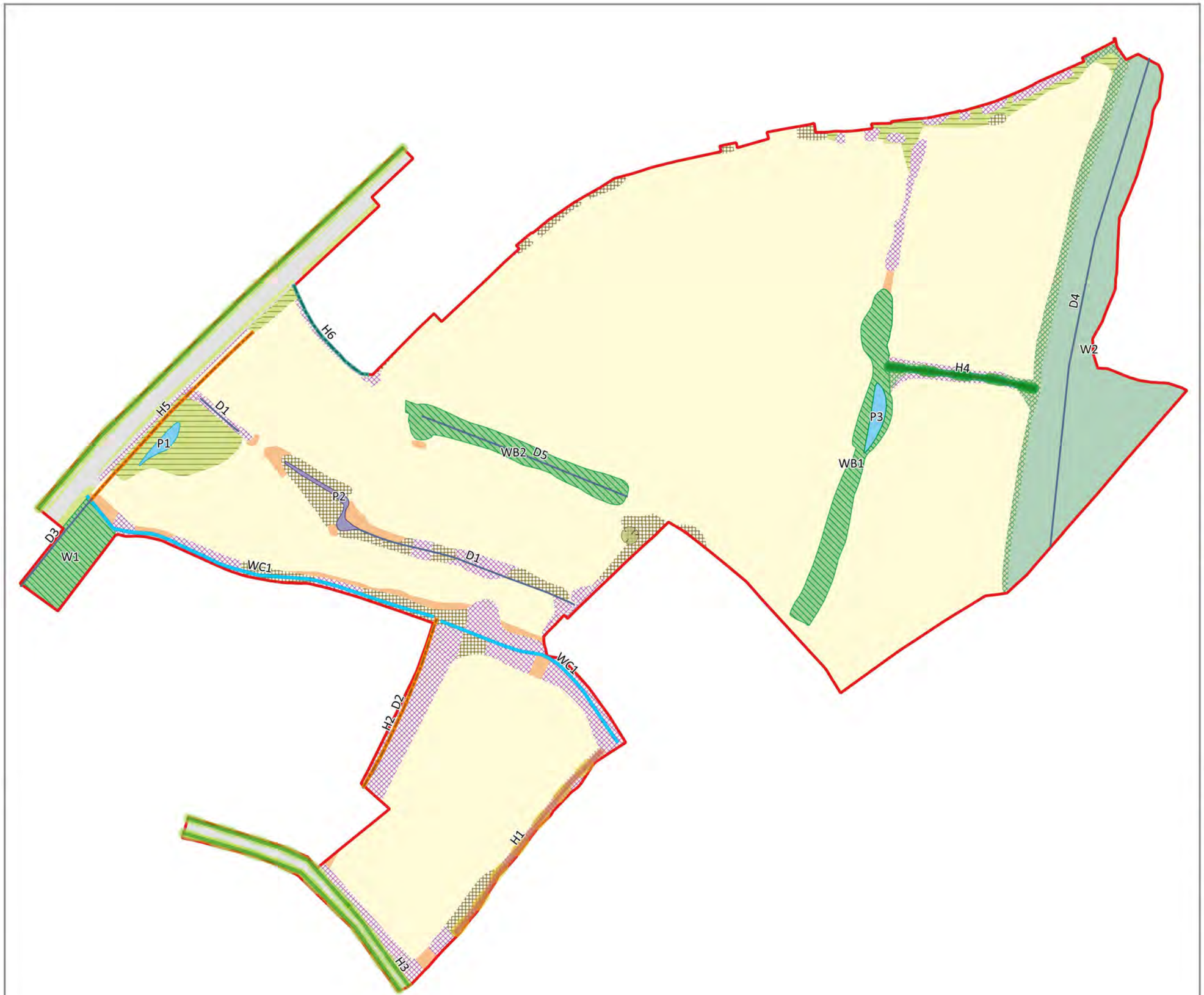
6.1.1 Aspect Ecology is advising Croudace Homes in respect of ecological issues relating to land at Chelmsford Road, Shenfield, proposed for new residential development.

6.1.2 To inform the application, Aspect Ecology has undertaken a BNG assessment to determine the level of biodiversity net gain that could be achieved under the scheme, based on the Metric 4.0 calculation tool.

6.1.3 The metric demonstrates that a 16.33% biodiversity net gain is achieved in habitat units, a 0.49% net gain in hedgerow units and a 22.35% net gain in watercourse units.

Plan 5014/BNGA1:

Existing Habitats



Key:

- Site Boundary
- Non-cereal crops (15.5775ha)
- Lowland mixed deciduous woodland - Good Condition (1.5075ha)
- Bramble scrub (1.1100ha)
- Other woodland; broadleaved - Moderate Condition (0.7950ha)
- Mixed scrub - Poor Condition (0.5300ha)
- Developed land; sealed surface: Hardstanding (0.5100ha)
- Modified grassland - Moderate Condition (0.3450ha)
- Mixed scrub - Moderate Condition (0.2625ha)
- Ruderal/Ephemeral (0.1925ha)
- Modified grassland - Good Condition (0.4175ha)
- Ponds (Non-Priority Habitat) - Moderate Condition (0.0550ha)
- Ponds (Non-Priority Habitat) - Poor Condition (0.0250ha)
- Native Species Rich Hedgerow with trees - Associated with bank or ditch - Good Condition (0.28km)
- Line of Trees - Moderate Condition (0.1km)
- Native Species Rich Hedgerow with trees - Moderate Condition (0.155km)
- Ditches (0.855km)
- Other Rivers and Streams (0.405km)
- Native Species Rich Hedgerow with trees - Good Condition (0.73km)
- Native Hedgerow - Moderate Condition (0.08km)
- Tree [1]

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Land at Chelmsford Road, Shenfield	PROJECT
Pre-development Habitat Measurements	TITLE
5014/BNG1	DRAWING NO.
B/IK	REV
August 2023	DATE

Plan 5014/BNGA2:

Post-development Habitats

Key:

- Site Boundary
- Proposed Developed land; sealed surface: Hardstanding (4.6100ha)
- Proposed Vegetated garden (3.1050ha)
- Proposed Other neutral grassland (2.3250ha)
- Proposed School Site – 60:40 Buildings and Hardstanding: Modified Grassland split (2.0775ha)
- Proposed Developed land; sealed surface: Building (1.9700ha)
- Retained Lowland mixed deciduous woodland - Good Condition (1.5075ha)
- Proposed Mixed scrub (1.4550ha)
- Proposed Introduced shrub (1.3175ha)
- Proposed Modified grassland (0.7725ha)
- Retained Other woodland; broadleaved - Moderate Condition (0.5375ha)
- Proposed Other woodland; broadleaved (0.4275ha)
- Retained Developed land; sealed surface: Hardstanding (0.4000ha)
- Retained Mixed scrub - Moderate Condition (0.2250ha)
- Retained Modified grassland - Moderate Condition (0.1650ha)
- Retained Bramble scrub (0.1450ha)
- Retained Mixed scrub - Poor Condition (0.1375ha)
- Retained Ruderal/Ephemeral (0.0325ha)
- Proposed Reedbeds (0.0300ha)
- Retained Ponds (Non-Priority Habitat) - Moderate Condition (0.0275ha)
- Proposed Ponds (Non-Priority Habitat) (0.0200ha)
- Proposed Ruderal/Ephemeral (0.0200ha)
- Retained Ponds (Non-Priority Habitat) - Poor Condition (0.0175ha)
- Retained Ditches (0.575km)
- Retained Other Rivers and Streams (0.39km)
- Retained Native Species Rich Hedgerow with trees - Good Condition (0.365km)
- Proposed Native Hedgerow (0.165km)
- Proposed Ditches (0.16km)
- Retained Native Species Rich Hedgerow with trees - Associated with bank or ditch - Good Condition (0.15km)
- Retained Native Hedgerow - Moderate Condition (0.08km)
- Retained Native Species Rich Hedgerow with trees - Moderate Condition (0.08km)
- Retained Line of Trees - Moderate Condition (0.07km)
- Proposed Hedge Ornamental Non Native
- Proposed Tree [313]

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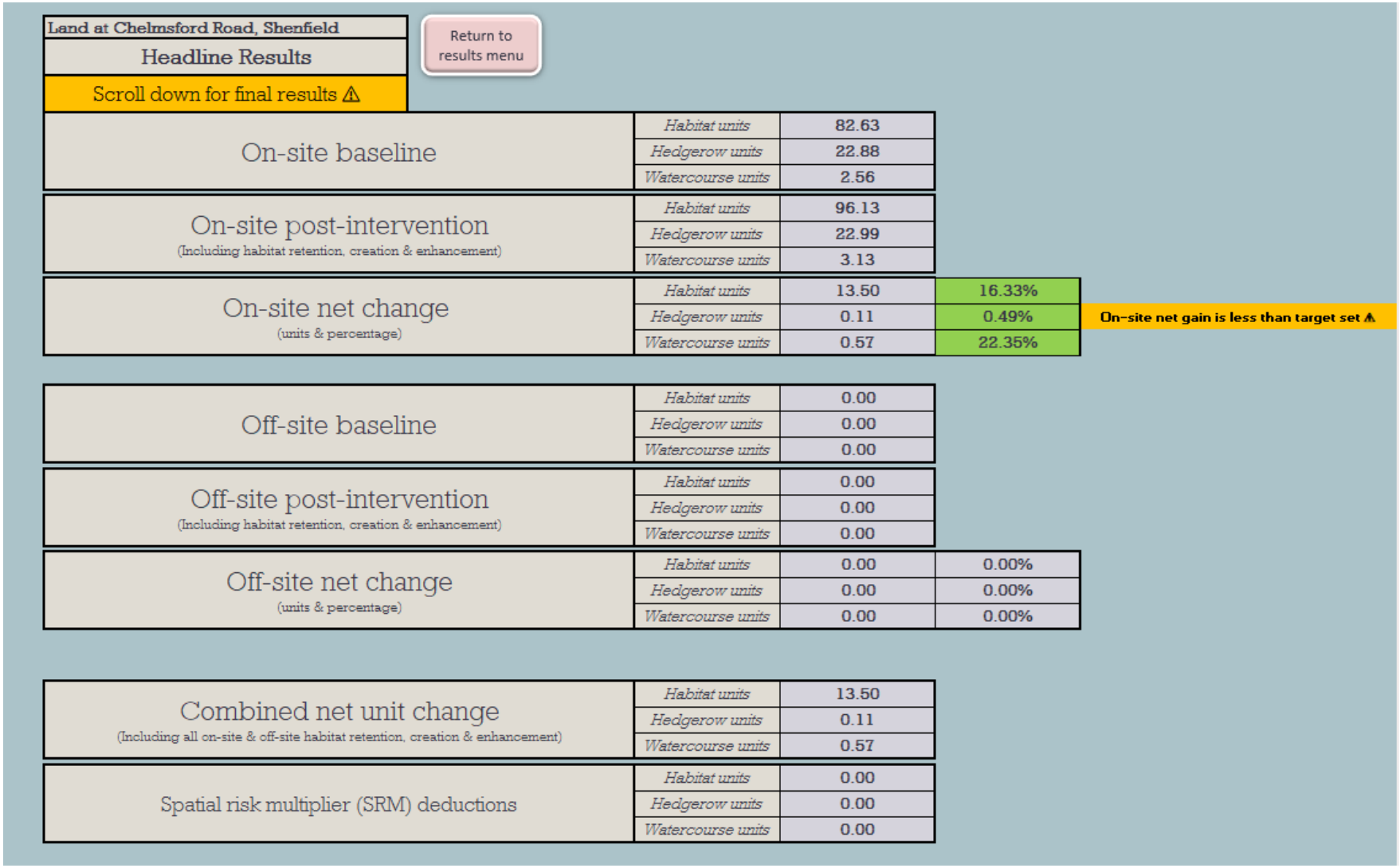
Land at Chelmsford Road, Shenfield	PROJECT
Post-development Habitat Measurements	TITLE
5014/BNG2	DRAWING NO.
B/BG	REV
September 2023	DATE

Appendix 5014/1:

Habitat Condition Summary



Land at Chelmsford Road, Shenfield

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Headline Results

Scroll down for final results ⚠

On-site baseline	*Habitat units*	82.63		
	Hedgerow units	22.88		
	Watercourse units	2.56		
On-site post-intervention (Including habitat retention, creation & enhancement)	*Habitat units*	96.13		
	Hedgerow units	22.99		
	Watercourse units	3.13		
On-site net change (units & percentage)	*Habitat units*	13.50	16.33%	
	Hedgerow units	0.11	0.49%	On-site net gain is less than target set ⚠
	Watercourse units	0.57	22.35%	
Off-site baseline	*Habitat units*	0.00		
	Hedgerow units	0.00		
	Watercourse units	0.00		
Off-site post-intervention (Including habitat retention, creation & enhancement)	*Habitat units*	0.00		
	Hedgerow units	0.00		
	Watercourse units	0.00		
Off-site net change (units & percentage)	*Habitat units*	0.00	0.00%	
	Hedgerow units	0.00	0.00%	
	Watercourse units	0.00	0.00%	
Combined net unit change (Including all on-site & off-site habitat retention, creation & enhancement)	*Habitat units*	13.50		
	Hedgerow units	0.11		
	Watercourse units	0.57		
Spatial risk multiplier (SRM) deductions	*Habitat units*	0.00		
	Hedgerow units	0.00		
	Watercourse units	0.00		

Project Name: Land at Chelmsford Road, Shenfield Map Reference:

A-1 On-Site Habitat Baseline

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Area habitat summary	
Total Net Unit Change	13.50
Total Net % Change	16.33%
Trading Rules Satisfied	Yes ✓

	Existing area habitats			Distinctiveness		Condition		Strategic significance			Required Action to Meet Trading Rules	Ecological baseline	Rete	
Ref	Broad Habitat	Habitat Type	Area (hectares)	Distinctiveness	Score	Condition	Score	Strategic significance	Strategic significance	Strategic Significance multiplier		Total habitat units	Area retained	Area enhanced
1	Cropland	Non-cereal crops	15.5775	Low	2	Condition Assessment N/A	1	Area/compensation not in local strategy/ no local strategy	Low Strategic Significance	1	Same distinctiveness or better habitat required≥	31.16		
2	Lakes	Ponds (non-priority habitat)	0.055	Medium	4	Moderate	2	Area/compensation not in local strategy/ no local strategy	Low Strategic Significance	1	Same broad habitat or a higher distinctiveness habitat required (≥)	0.44	0.0275	
3	Lakes	Ponds (non-priority habitat)	0.025	Medium	4	Poor	1	Area/compensation not in local strategy/ no local strategy	Low Strategic Significance	1	Same broad habitat or a higher distinctiveness habitat required (≥)	0.10		0.0175
4	Heathland and shrub	Bramble scrub	1.11	Medium	4	Condition Assessment N/A	1	Area/compensation not in local strategy/ no local strategy	Low Strategic Significance	1	Same broad habitat or a higher distinctiveness habitat required (≥)	4.44	0.145	
5	Heathland and shrub	Mixed scrub	0.53	Medium	4	Poor	1	Area/compensation not in local strategy/ no local strategy	Low Strategic Significance	1	Same broad habitat or a higher distinctiveness habitat required (≥)	2.12	0.1375	
6	Heathland and shrub	Mixed scrub	0.2625	Medium	4	Moderate	2	Area/compensation not in local strategy/ no local strategy	Low Strategic Significance	1	Same broad habitat or a higher distinctiveness habitat required (≥)	2.10	0.225	
7	Sparsely vegetated land	Ruderal/Ephemeral	0.1925	Low	2	Poor	1	Area/compensation not in local strategy/ no local strategy	Low Strategic Significance	1	Same distinctiveness or better habitat required≥	0.39	0.0325	
8	Woodland and forest	Other woodland; broadleaved	0.795	Medium	4	Moderate	2	Area/compensation not in local strategy/ no local strategy	Low Strategic Significance	1	Same broad habitat or a higher distinctiveness habitat required (≥)	6.36		0.5375
9	Woodland and forest	Lowland mixed deciduous woodland	1.5075	High	6	Good	3	Formally identified in local strategy	High strategic significance	1.15	Same habitat required =	31.21	1.5075	
10	Grassland	Modified grassland	0.4175	Low	2	Good	3	Area/compensation not in local strategy/ no local strategy	Low Strategic Significance	1	Same distinctiveness or better habitat required≥	2.51		
11	Grassland	Modified grassland	0.345	Low	2	Moderate	2	Area/compensation not in local strategy/ no local strategy	Low Strategic Significance	1	Same distinctiveness or better habitat required≥	1.38	0.165	
12	Urban	Developed land; sealed surface	0.51	V.Low	0	N/A - Other	0	Area/compensation not in local strategy/ no local strategy	Low Strategic Significance	1	Compensation Not Required	0.00	0.4	
13	Individual trees	Rural tree	0.0366	Medium	4	Good	3	Area/compensation not in local strategy/ no local strategy	Low Strategic Significance	1	Same broad habitat or a higher distinctiveness habitat required (≥)	0.44	0.0366	
14														
15														
16														
17														
		Total habitat area	21.36									82.63	2.68	0.56
		Site Area (Excluding area of Individual trees and Green walls)	21.33											

Project Name: Land at Chelmsford Road, Shenfield	Map Reference:
A-2 On-Site Habitat Creation	

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Area habitat summary	
Total Net Unit Change	13.50
Total Net % Change	16.33%
Trading Rules Satisfied	Yes ✓
Area Check (excluding individual trees and green walls)	Area Acceptable ✓

Post development/ post intervention habitats

Broad Habitat	Proposed habitat	Area (hectares)	Distinctiveness	Condition	Strategic significance	Temporal multiplier		Difficulty	Habitat units delivered	User comments
			Distinctiveness	Condition	Strategic significance	Standard or adjusted time to target condition	Final time to target condition (years)	Final difficulty of creation		
Woodland and forest	Other woodland; broadleaved	0.4275	Medium	Moderate	Area/compensation not in local strategy/ no local strategy	Standard time to target condition applied	15	Low	2.00	New woodland planting
Urban	Vegetated garden	3.105	Low	Condition Assessment N/A	Area/compensation not in local strategy/ no local strategy	Standard time to target condition applied	1	Low	5.99	
Heathland and shrub	Mixed scrub	1.455	Medium	Moderate	Area/compensation not in local strategy/ no local strategy	Standard time to target condition applied	5	Low	9.74	Mixed scrub and tree planting
Urban	Introduced shrub	1.3175	Low	Condition Assessment N/A	Area/compensation not in local strategy/ no local strategy	Standard time to target condition applied	1	Low	2.54	Amenity planting
Lakes	Ponds (non-priority habitat)	0.02	Medium	Moderate	Area/compensation not in local strategy/ no local strategy	Standard time to target condition applied	3	Low	0.14	Two new ponds
Grassland	Other neutral grassland	2.325	Medium	Moderate	Area/compensation not in local strategy/ no local strategy	Standard time to target condition applied	5	Low	15.57	EM5 wildflower mix for loamy soil, EM10 tussock mix for wetlands and EM8 meadow mix for wetlands
Wetland	Reedbeds	0.03	High	Moderate	Area/compensation not in local strategy/ no local strategy	Standard time to target condition applied	7	Medium	0.19	Reedbed planting
Sparsely vegetated land	Ruderal/Ephemeral	0.02	Low	Moderate	Area/compensation not in local strategy/ no local strategy	Standard time to target condition applied	3	Low	0.07	Marginal planting
Grassland	Modified grassland	0.7725	Low	Moderate	Area/compensation not in local strategy/ no local strategy	Standard time to target condition applied	4	Low	2.68	Flowering lawn
Grassland	Modified grassland	0.8325	Low	Poor	Area/compensation not in local strategy/ no local strategy	Standard time to target condition applied	1	Low	1.61	Amenity grassland for school
Urban	Developed land; sealed surface	1.2475	V.Low	N/A - Other	Area/compensation not in local strategy/ no local strategy	Standard time to target condition applied	0	Medium	0.00	Buildings and hardstanding for school
Urban	Developed land; sealed surface	6.58	V.Low	N/A - Other	Area/compensation not in local strategy/ no local strategy	Standard time to target condition applied	0	Medium	0.00	Residential buildings and hardstanding
Individual trees	Urban tree	4.8044	Medium	Poor	Area/compensation not in local strategy/ no local strategy	Standard time to target condition applied	10	Low	13.46	Street trees, etc. likley in tree pits
Individual trees	Urban tree	0.228	Medium	Moderate	Area/compensation not in local strategy/ no local strategy	Standard time to target condition applied	27	Low	0.70	Trees in open space
	Total habitat area	23.16							54.69	

ject Name: Land at Chelmsford Road, Shenfield Map Referen

A-3 On-Site Habitat Enhancement

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	Baseline habitats										Proposed
Baseline ref	Baseline habitat	Total habitat area (hectares)	Baseline distinctiveness band	Baseline distinctiveness score	Baseline condition category	Baseline condition score	Baseline strategic significance category	Baseline strategic significance score	Baseline habitat units	Required Action to Meet Trading Rules	Proposed Broad Habitat
3	Lakes - Ponds (non-priority habitat)	0.025	Medium	4	Poor	1	Low Strategic Significance	1	0.10	Same broad habitat or a higher distinctiveness habitat required (≥)	Lakes
8	Woodland and forest - Other woodland; broadleaved	0.795	Medium	4	Moderate	2	Low Strategic Significance	1	6.36	Same broad habitat or a higher distinctiveness habitat required (≥)	Woodland and forest

Area habitat summary	
Total Net Unit Change	13.50
Total Net % Change	16.33%
Trading Rules Satisfied	Yes ✓

				Post development/ post intervention habitats							
Proposed Habitat (Pre-populated but can be overridden)		Change in distinctiveness and condition		Area (hectares)	Distinctiveness	Score	Condition	Score	Strategic significance		
Proposed Broad Habitat	Proposed habitat	Distinctiveness change	Condition change						Strategic significance	Strategic significance	Strategic position multiplier
Lakes	Ponds (non-priority habitat)	Medium - Medium	Poor - Moderate	0.0175	Medium	4	Moderate	2	Area/compensation not in local strategy/ no local strategy	Low Strategic Significance	1
Woodland and forest	Other woodland; broadleaved	Medium - Medium	Moderate - Good	0.5375	Medium	4	Good	3	Area/compensation not in local strategy/ no local strategy	Low Strategic Significance	1

oject Name: Land at Chelmsford Road, Shenfield Map Reference

B-1 On-Site Hedge Baseline

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Hedgerow summary	
Total Net Unit Change	0.11
Total Net % Change	0.49%
Trading Rules Satisfied	No - check trading summary ▲

	Existing hedgerow habitats			Distinctiveness	Condition	Strategic significance	Required Action to Meet Trading Rules	Ecological baseline	Retention category biodiversity value					
Baseline ref	Hedge number	Hedgerow type	Length (km)	Distinctiveness	Condition	Strategic significance		Total hedgerow units	Length retained	Length enhanced	Units retained	Units enhanced	Length lost	Units lost
1	H1	Species-rich native hedgerow with trees	0.155	High	Moderate	Area/compensation not in local strategy/ no local strategy	Like for like or better	1.86	0.08		0.96	0.00	0.08	0.90
2	H2	Species-rich native hedgerow with trees - associated with bank or ditch	0.125	V.High	Good	Area/compensation not in local strategy/ no local strategy	Like for like	3.00	0.125		3.00	0.00	0.00	0.00
3	H3	Species-rich native hedgerow with trees	0.73	High	Good	Area/compensation not in local strategy/ no local strategy	Like for like or better	13.14	0.385		6.93	0.00	0.35	6.21
4	H4	Line of trees - associated with bank or ditch	0.1	Low	Moderate	Area/compensation not in local strategy/ no local strategy	Same distinctiveness band or better	0.40	0.07		0.28	0.00	0.03	0.12
5	H5	Species-rich native hedgerow with trees - associated with bank or ditch	0.16	V.High	Good	Area/compensation not in local strategy/ no local strategy	Like for like	3.84	0.025		0.60	0.00	0.14	3.24
6	H6	Species-rich native hedgerow	0.08	Medium	Moderate	Area/compensation not in local strategy/ no local strategy	Same distinctiveness band or better	0.64	0.08		0.64	0.00	0.00	0.00
7														
8														
9														
10														
11														
			1.35					22.88	0.77	0.00	12.41	0.00	0.59	10.47

oject Name: Land at Chelmsford Road, Shenfield Map Reference

B-2 On-Site Hedge Creation

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Hedgerow summary	
Total Net Unit Change	0.11
Total Net % Change	0.49%
Trading Rules Satisfied	No - check trading summary ▲

	Proposed habitats			Distinctiveness		Condition		Strategic significance			Temp		
Baseline ref	New hedge number	Habitat type	Length (km)	Distinctiveness	Score	Condition	Score	Strategic significance	Strategic significance	Strategic position multiplier	Standard Time to target condition (years)	Habitat created in advance	Delay in starting habitat creation (years)
1		Species-rich native hedgerow	0.165	Medium	4	Good	3	Area/compensation not in local strategy/ no local strategy	Low Strategic Significance	1	12		
2		Non-native and ornamental hedgerow	1.637	V.Low	1	Poor	1	Area/compensation not in local strategy/ no local strategy	Low Strategic Significance	1	1		
3		Species-rich native hedgerow - associated with bank or ditch	0.657	High	6	Good	3	Area/compensation not in local strategy/ no local strategy	Low Strategic Significance	1	12		
4													

Project Name: Land at Chelmsford Road, Sheffield

C-1 On-Site WaterC' Baseline

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Watercourse summary	
Total Net Unit Change	0.57
Total Net % Change	22.35%
Trading Rules Satisfied	Yes ✓

A 'Fairly' Category has been used – check evidence to ensure this is appropriate ⚠

Existing watercourse type			Distinctiveness		Condition		Strategic significance			Watercourse encroachment		Riparian encroachment		Required Action to Meet Trading Rules	Ecological baseline	Retention category biodiversity value				
Baseline ref	Watercourse type	Length (km)	Distinctiveness	Score	Condition	Score	Strategic significance	Strategic significance	Strategic significance multiplier	Extent of encroachment	Multiplier	Extent of encroachment for both banks	Multiplier		Total watercourse units	Length retained	Length enhanced	Units retained	Units enhanced	Length Lost
1	Other rivers and streams	0.255	High	6	Fairly Poor	1.5	Area/compensation not in local strategy/ no local strategy	Low Strategic Significance	1	Major	0.5	Major/Major	0.75	Same habitat required =	0.86		0.255	0.00	0.86	0.00
2	Ditches	0.605	Medium	4	Poor	1	Area/compensation not in local strategy/ no local strategy	Low Strategic Significance	1	Major	0.5	Major/Major	0.75	Same habitat required =	0.91	0.55		0.83	0.00	0.05
3	Ditches	0.15	Medium	4	Poor	1	Area/compensation not in local strategy/ no local strategy	Low Strategic Significance	1	No Encroachment	1	Major/Major	0.75	Same habitat required =	0.45	0.025		0.08	0.00	0.13
4	Other rivers and streams	0.15	High	6	Poor	1	Area/compensation not in local strategy/ no local strategy	Low Strategic Significance	1	Major	0.5	Major/Major	0.75	Same habitat required =	0.34	0.135		0.30	0.00	0.02
5																				

Project Name: Land at Chelmsford Road, Sheffield Map Reference:

C-2 On-Site WaterC' Creation

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Watercourse summary	
Total Net Unit Change	0.57
Total Net % Change	22.35%
Trading Rules Satisfied	Yes ✓

	Proposed habitats		Distinctiveness		Condition		Strategic significance			Temporal multiplier					
Baseline ref	Watercourse type	Length (km)	Distinctiveness	Score	Condition	Score	Strategic significance	Strategic significance	Strategic position multiplier	Standard Time to target condition (years)	Habitat created in advance (years)	Delay in starting habitat creation (years)	Standard or adjusted time to target condition	Final time to target condition (years)	Final Time to target multiplier
1	Ditches	0.16	Medium	4	Moderate	2	Area/compensation not in local strategy/ no local strategy	Low Strategic Significance	1	5	0	0	Standard time to target condition applied	5	0.837
2															
3															

l multiplier			Difficulty multipliers				Watercourse encroachment		Riparian encroachment		Watercourse units delivered	Comments		
Standard or adjusted time to target condition	Final time to target condition (years)	Final Time to target multiplier	Standard difficulty of creation	Applied difficulty multiplier	Final difficulty of creation	Difficulty multiplier applied	Extent of encroachment	Multiplier	Extent of encroachment for both banks	Multiplier		User comments	Consenting body comments	GIS reference number
Standard time to target condition applied	5	0.837	Low	Standard difficulty applied	Low	1	Minor	0.8	Minor/ Minor	0.95	0.81			

ect Name: Land at Chelmsford Road, Shenfield Map Refere

C-3 On-Site WaterC' Enhancement

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Watercourse summary	
Total Net Unit Change	0.57
Total Net % Change	22.35%
Trading Rules Satisfied	Yes ✓

Baseline habitats												Proposed Watercourse Type (Pre-populated can be overridden)	Change in distinctiveness and condition	
Baseline ref	Baseline habitat	Length (km)	Baseline distinctiveness band	Baseline distinctiveness score	Baseline condition category	Baseline condition score	Baseline strategic significance category	Strategic significance	Baseline strategic significance Score	Required Action to Meet Trading Rules	Total units		Distinctiveness movement	Condition movement
1	Other rivers and streams	0.255	High	6	Fairly Poor	1.5	Area/compensation not in local strategy/ no local strategy	Low Strategic Significance	1	Same habitat required =	0.860625	Other rivers and streams	High - High	Fairly Poor - Moderate

Post development/ post intervention habitats																			
Length (km)	Habitat distinctiveness		Habitat condition		Strategic significance			Temporal multiplier						Difficulty multipliers				Watercourse encroachment	
	Distinctiveness	Score	Condition	Score	Strategic significance	Strategic significance	Strategic position multiplier	Standard Time to target condition (years)	Habitat enhanced in advance (years)	Delay in starting habitat enhancement (years)	Standard or adjusted time to target condition	Final time to target condition (years)	Final Time to target multiplier	Standard difficulty of enhancement	Applied difficulty multiplier	Final difficulty of enhancement	Difficulty multiplier applied	Extent of encroachment	Multiplier
0.255	High	6	Moderate	2	Area/compensation not in local strategy/ no local strategy	Low Strategic Significance	1	2			Standard time to target condition applied	2	0.931	Medium	Standard difficulty applied	Medium	0.67	Major	0.5

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