MAYDENCROFT

BIODIVERSITY APPRAISAL
AND
NET GAIN STRATEGY

The Harefield Academy

Completed on behalf of
Chadwick Dryer Clarke.

August 2022

Contents

1.0 INTRODUCTION

1.1 Project overview

Maydencroft Limited was commissioned by Chadwick Dryer Clarke to undertake a Biodiversity Net Gain Appraisal of The Harefield Academy proposed car park site. Utilising baseline habitat data, recommendations have been made for habitat enhancement opportunities to deliver an increase in Biodiversity Units on the site to offset any biodiversity loss from the development on site.

1.2 Background to biodiversity net gain

1.2.1 The net gain concept

Biodiversity net gain is distinguished from other forms of ecological compensation by the requirement for providing measurable outcomes. Losses from development and gains from an 'offset' are calculated using a biodiversity metric, which quantifies habitats against fixed units of biodiversity. On any given site, the baseline units are calculated initially. Net gain is the result of an increase in Biodiversity Units from the baseline value once the incurred habitat loss and subsequent offset has been taken into account. The amount of net gain (number of units gained) is calculated as a percentage.

Biodiversity offsets can be both on-site and off-site, and can involve creation, enhancement or accelerated succession of habitats. The amount of biodiversity units for an offset must exceed the amount of Biodiversity Units that will be lost as a result of development. Calculation of Biodiversity Units is determined by a number of factors, as detailed in *Table 1 (Section 2.1.2)*.

Use of a metric to calculate biodiversity units and offsetting does not take into account wildlife or protected species on a site, therefore these must be considered separately and in conjunction with the mitigation hierarchy.

1.2.2 Legislative context

The new Environmental Bill introduces a legal obligation for Local Authorities to seek the delivery of biodiversity net gain in the determination of planning applications. This requires developers to ensure habitats for wildlife are enhanced, with a 10% increase in habitat value for wildlife compared with the pre-development baseline.

1.2.3 Biodiversity Metric 3.1

Biodiversity Metric 3.1, produced by Natural England is the current 'best practice' metric used to calculate biodiversity units. The metric quantifies habitats by assigning numeric value as proxy for a categorical qualitative assessment of each influencing factor described in more detail in *Section 2.1.3*.

The current metric is compatible with the UK Habitat Classification Hierarchy, which recognises five levels of classification. Classification Levels 3 (Broad Habitat Type) and 4 (Habitat including UK BAP Priority Habitats) apply to Biodiversity Metric 3.1.

1.3 Aims of the study

The aim of this study is to complete a biodiversity appraisal of the site, and identify a strategy for ecological enhancements to achieve a net gain in biodiversity. This report aims to:

- Provide a baseline assessment and enhancement strategy for the site;
- Carry out a qualitative assessment of the site to determine the baseline habitat characteristics;
- Quantify the baseline of the site in terms of its biodiversity unit value using *Biodiversity Metric 3.1*;
- Identify opportunities for habitat creation, enhancement or accelerated succession which will deliver a minimum 10% net gain margin in response to the proposed development on site.

1.4 Site information

1.4.1 Site background

The section of land concerned in the report (referred to as the "Site" from hereafter) covers an area of approximately 0.7ha, and lies within Harefield, which is a village in the London Borough of Hillingdon. The Site is located on an existing school site which is generally bordered by residential areas to the south and east, and fields, mature hedgerows, and a large residential garden to the north and west. The Site itself comprises of an existing school building, tennis court and hard standing with small landscaped areas and boundary vegetation.

It is proposed to build an extension to the existing school, with new car parking facilities and access point to the south.

2.0 METHODOLOGY

2.1 Data collection

2.1.1 *Site survey*

A Site survey was carried out to record habitats present using the UK Habitat Classification System, and assess their condition qualitatively against the criteria presented in Habitat Condition Assessment sheets for Biodiversity Metric 3.1

The survey was undertaken on 4th May 2022 by Senior Ecologist, Alison Hood of Maydencroft Limited. The survey was updated digitally by Alice Webb, Ecologist of Maydencroft Limited on 15th August 2022.

2.1.2 Net gain calculation

Natural England's Biodiversity Metric 3.1 was used to provide a quantitative assessment of the habitats through a calculation of baseline units and prospective net gain. This tool is the most widely used version for best practice working, and so the outcomes will be comparative to other projects and sites.

As detailed in *Table 1,* the first five factors are used to calculate the baseline on Site. Area habitats (such as woodland), linear features (such as hedgerows) and rivers are each measured using a separate calculation. Further constraining factors for habitat creation, enhancement or succession are subsequently incorporated into the post-intervention unit calculation; these include time to target condition, difficulty of creation and spatial risk.

For the purposes of this report, all habitat unit calculations have been rounded to the closest two decimal places.

Table 1: A description of factors influencing the biodiversity unit value of a site and a proposed offset.

Factor	Explanation
Area or length	Area of a habitat is measured in hectares. Length of a linear habitat is measured in kilometres.
Distinctiveness	The relative value of a habitat type before any other factors have been considered; includes parameters such as species richness, diversity, rarity and the degree to which a habitat supports species rarely found in other habitats. Each habitat type has a pre-set value of distinctiveness and is assigned as **very high**, **high**, **medium or low**.
Condition/target condition	The condition of the baseline habitat/expected condition of the habitat following completion of the offset. Condition is assessed against a set of criteria for that specific broad habitat type and can be **good**, **moderate**

Factor	Explanation
	or **poor** (fairly good and fairly poor can also be used but must be justified).
Strategic significance	The significance of the site location in relation to local/regional biodiversity, including designated sites or conservation areas listed in local plans. The site can be assigned as one of the following; **High** - (High potential & within area formally identified in local policy; **Medium** - (Good potential but not in area defined in local policy); **Low** - (Low potential and not in area defined in local policy).
Time to target condition	The predicted length of time for completion of the offset, normally given in years. These values are predefined.
Difficulty of creation	The relative difficulty of implementing the offset. These values are predefined.
Spatial risk	The risk involved with changing the location of the habitat resource. These values are predefined.

2.1.3 Surveyor qualifications

- Alison Hood – BSc (Hons), MSc, MCIEEM

  Alison has over eight years' experience of carrying out a wide variety of ecological surveys and producing ecological reports.

- Alice Webb – Ecologist, BSc (Hons), MSc, ACIEEM

  Alice has four years' experience of carrying out a wide variety of ecological surveys and producing ecological reports.

The surveyors have attended CIEEM accredited training courses relating to biodiversity net gain and using the Biodiversity Metric.

2.2 Limitations

2.2.1 Use of the Metric

The assessment of habitats and recommendations for enhancement to achieve net gain are formulated from the Ecologist's knowledge and experience. The Metric can be used as a tool, with units providing a quantification of net gain; however, it does not replace qualitative assessment from an experienced Ecologist and so should not be used for projects without guidance and assessment from a suitably qualified Ecologist.

The habitat sizes (area and linear) features were measured using Google Earth and so a level of inaccuracy in the measurements may occur.

2.3 Supporting documents

A baseline habitat map is shown in *Appendix A.* The breakdown of biodiversity unit calculations for each habitat parcel is presented in *Appendix B*. A map detailing the removed habitats is shown in *Appendix C.*

For specific information on the habitat creation on site the drawings outlined by Hyland Edgar Driver, Landscape Architects and Urban Designers should be utilised.

3.0 BASELINE

3.1 Habitats on site

3.1.1 Overview

Habitats recorded on Site during the survey include; modified grassland, mixed scrub, single species hedgerows and species rich hedgerows. These are detailed further in the following sections and details of the factors included for the metric calculation are provided for each.

3.1.2 Modified grassland

There are several patches of grassland present on Site, each patch of grassland is given an identifier number below and within *Appendix A.*

The patches of grassland are all similar in species abundance and diversity. The grassland areas are part of the existing landscaped areas of the school and are currently unmanaged. The sward is dominated by fescue sp., doves foot cranesbill (*Geranium molle*) and mouse ear (*Cerastium fontanum*) with other common species present in small numbers. However, it is considered generally species poor with only common and widespread species present.

Map reference 1 – grassland to the north east of the tennis courts

Area: 0.049ha

Distinctiveness: Low

Condition: Moderate – There is a relatively small number of floral species present all of which are common and widespread, species per m^2 does not exceed 6. The sward height is fairly uniform reducing the likelihood of microclimates forming. There is no scattered scrub or bare ground present within the patch. There is no evidence of physical damage. There are no INNS or bracken present within the patch.

Strategic significance: Location ecologically desirable but not in local strategy – The area does not fall under any statutory or non-statutory designations relating to biodiversity, nor is it recognised in the local plan as a site of wildlife value. The land at Harefield Academy does however, lie within a generally ecologically desirable area. It provides suitable edge habitat between the rural environment to the north and east and the residential habitat to the south and west.

Habitat units: 0.22

Map reference 2 – grassland on eastern boundary

Area: 0.012ha

Distinctiveness: Low

Condition: Moderate – There is a relatively small number of floral species present all of which are common and widespread, species per m^2 does not exceed 6. The sward height is fairly uniform reducing the likelihood of microclimates forming. There is no scattered scrub or bare ground present within the patch. There is no evidence of physical damage. There are no INNS or bracken present within the patch.

Strategic significance: Location ecologically desirable but not in local strategy – The area does not fall under any statutory or non-statutory designations relating to biodiversity, nor is it recognised in the local plan as a site of wildlife value. The land at Harefield Academy does however, lie within a generally ecologically desirable area. It provides suitable edge habitat between the rural environment to the north and east and the residential habitat to the south and west.

Habitat units: 0.05

Map reference 3 – grassland to south of site

Area: 0.007ha

Distinctiveness: Low

Condition: Moderate – There is a relatively small number of floral species present all of which are common and widespread, species per m^2 does not exceed 6. The sward height is fairly uniform reducing the likelihood of microclimates forming. There is no scattered scrub or bare ground present within the patch. There is no evidence of physical damage. There are no INNS or bracken present within the patch.

Strategic significance: Location ecologically desirable but not in local strategy – The area does not fall under any statutory or non-statutory designations relating to biodiversity, nor is it recognised in the local plan as a site of wildlife value. The land at Harefield Academy does however, lie within a generally ecologically desirable area. It provides suitable edge habitat between the rural environment to the north and east and the residential habitat to the south and west.

Habitat units: 0.03

Map reference 4 – grassland adjacent existing building (east)

Area: 0.013ha

Distinctiveness: Low

Condition: Good – There is a relatively small number of floral species present, all of which are common and widespread. The sward height differs throughout with some areas of bare ground and some areas of taller coarser vegetation. The is no evidence of physical damage, INNS or bracken within the patch.

Strategic significance: Location ecologically desirable but not in local strategy – The area does not fall under any statutory or non-statutory designations relating to biodiversity, nor is it recognised in the local plan as a site of wildlife value. The land at Harefield Academy does however, lie within a generally ecologically desirable area. It provides suitable edge habitat between the rural environment to the north and east and the residential habitat to the south and west.

Habitat units: 0.09

Map reference 5 – grassland adjacent existing building (west)

Area: 0.036ha

Distinctiveness: Low

Condition: Good – There is a relatively small number of floral species present, all of which are common and widespread. The sward height differs throughout with some areas of bare ground and some areas of taller coarser vegetation. The is no evidence of physical damage, INNS or bracken within the patch.

Strategic significance: Location ecologically desirable but not in local strategy – The area does not fall under any statutory or non-statutory designations relating to biodiversity, nor is it recognised in the local plan as a site of wildlife value. The land at Harefield Academy does however, lie within a generally ecologically desirable area. It provides suitable edge habitat between the rural environment to the north and east and the residential habitat to the south and west.

Habitat units: 0.24

Map reference 6 – grassland surrounding car park south of building

Area: 0.042ha

Distinctiveness: Low

Condition: Moderate – There is a relatively small number of floral species present all of which are common and widespread, species per m^2 does not exceed 6. The sward height is fairly uniform reducing the likelihood of microclimates forming. There is no scattered scrub or bare ground present within the patch. There is no evidence of physical damage. There are no INNS or bracken present within the patch.

Strategic significance: Location ecologically desirable but not in local strategy – The area does not fall under any statutory or non-statutory designations relating to biodiversity, nor is it recognised in the local plan as a site of wildlife value. The land at Harefield Academy does however, lie within a generally ecologically desirable area. It provides suitable edge habitat between the rural environment to the north and east and the residential habitat to the south and west.

Habitat units: 0.18

Map reference 7 – Mixed scrub (southern boundary)

Area: 0.116ha

Distinctiveness: Medium

Condition: Poor – The vegetation is mature and comprises hawthorn (Crataegus monogyna), goat willow (Salix caprea), blackthorn (Prunus spinosa), field maple (Acer campestre), oak (Quercus robur), alder (Alnus glutinosa), dogwood (Cornus sanguinea) and lime (Tilla x europaea). The scrub is fairly uniform and does not have a diverse age range. No INNS are present. The scrub has a limited edge habitat with only a very small diversity of grassland species. There are no clearings, glades or rides present within the scrub.

Strategic significance: Location ecologically desirable but not in local strategy – The area does not fall under any statutory or non-statutory designations relating to biodiversity, nor is it recognised in the local plan as a site of wildlife value. The land at Harefield Academy does however, lie within a generally ecologically desirable area. It provides suitable edge habitat between the rural environment to the north and east and the residential habitat to the south and west.

Map reference 8 – Mixed scrub (walled area)

Area: 0.028ha

Distinctiveness: Medium

Condition: Moderate: Area of scrub within a walled courtyard within the existing building footprint. The scrub consists of oak, buddleia (Buddleja davidii) and hornbeam (Carpinus betulus) and is currently unmanaged and overgrown. There is not a diverse age range or a well-developed edge habitat. There are no INNS present. There are a few clearings present within the habitat.

Strategic significance: Location ecologically desirable but not in local strategy – The area does not fall under any statutory or non-statutory designations relating to biodiversity, nor is it recognised in the local plan as a site of wildlife value. The land at Harefield Academy does however, lie within a generally ecologically desirable area. It provides suitable edge habitat between the rural environment to the north and east and the residential habitat to the south and west.

Habitat units: 0.25

Map reference 9 – Native species rich hedgerow (south/south east boundary)

Length: 0.243

Distinctiveness: Medium

Condition: Moderate – The hedgerow is comprised of blackthorn, hawthorn, goat willow, field maple, oak, alder, dogwood and lime. Height and width of the hedgerow is average >1.5m along the length, the gap between the ground and the base of the canopy is <0.5m for >90% of its length. There are limited canopy gaps within the hedgerow. There is no perennial vegetation as the hedgerow is surrounded by scrub habitat. INNS are absent and there are no mature standards within the hedgerow.

Strategic significance: Location ecologically desirable but not in local strategy.

Hedgerow units: 2.14

Map reference 10 – Native hedgerow (adjacent building)

Length: 0.123

Distinctiveness: Low

Condition: Poor – Hornbeam only hedges on either side of the road towards the existing building. The hedges are approximately 1.2m wide and 1.2m tall, they are well managed and surrounded by modified grassland. There are no gaps in the canopy and no basal gaps. No INNS present and no evidence of current damage.

Strategic significance: Location ecologically desirable but not in local strategy.

Hedgerow units: 0.06

Map reference 11 – Scattered trees

Area: 1.2819

Distinctiveness: Medium

Condition: Moderate – Scattered trees are present within areas of modified grassland and within the car park on site. All trees are young or semi-mature and native. The trees do not currently appear impacted by human activities. There is no ivy, minimal deadwood and no loose bark.

Strategic significance: Location ecologically desirable but not in local strategy – The area does not fall under any statutory or non-statutory designations relating to biodiversity, nor is it recognised in the local plan as a site of wildlife value. The land at Harefield Academy does however, lie within a generally ecologically desirable area. It provides suitable edge habitat between the rural environment to the north and east and the residential habitat to the south and west.

Habitat units: 11.28

Map reference 12 – Line of trees

Length: 0.053

Distinctiveness: Low

Condition: Moderate: All trees within the line are oak trees, the canopy is continuous, a small number of the trees are mature. A small strip of vegetation is present however, it is <6m wide. Trees appear healthy.

Strategic significance: Location ecologically desirable but not in local strategy.

Hedgerow units: 0.23

3.2 Biodiversity unit value

The Site's ecological baseline for habitats as calculated by the Biodiversity Metric 3.1 is worth a total of **12.84 habitat units** and **2.44 hedgerow units**.

Some habitats on site will be removed to facilitate the development. This includes:

- Removal of 0.105ha of modified grassland
- Removal of 21 scattered trees
- Removal of 0.028ha of scrub
- Removal of 0.029km of native hedgerow.

This will result in a loss of **7.6 habitat units** and **0.06 hedgerow units.**

3.2.1 Potential for protected species

The Preliminary Ecological Appraisal identified the habitats on Site have the potential to support protected and important species/species group including great crested newt, foraging/commuting bats, badgers, nesting birds, reptiles and hedgehog.

4.0 NET GAIN ON SITE

4.1 Achieving net gain

To achieve net gain in biodiversity, enhancements of existing retained habitats and creation of new habitats are recommended. The enhancements detailed in *Section 4.2* and the creation detailed in *Section 4.3* will result in a **13.91%** increase in habitat units and a **42.95%** increase in hedgerow units.

Proposed enhancement or creation of habitats are detailed in the sections below with the following information provided for each:

- The method for achieving net gain (e.g. enhancement, creation or accelerated succession), along with proposed target condition of enhanced habitat type, which is considered achievable (based on condition assessments used in the Metric);
- The time to achieve target condition (calculated in the Metric) – this indicates the lag time until the full gain is achieved - *It should be noted that all biodiversity metric calculations for this project have been made under the default assumption that there will be no delay or advance in the implementation of interventions in relation to the development being offset, which would impact on the number of habitat units delivered*;
- The number of Biodiversity Units gained is given, with a figure for percentage in net gain that can be achieved from that enhancement.

4.2 Enhancement of existing habitats

4.2.1 Modified grassland (map reference 2)

The grassland will be sown with a species-rich grassland/meadow mix which will enhance the botanical diversity on Site and increase the supply of nectar and seeds for wildlife.

Capital works:

1. Remove weeds (docks, thistles and ragwort) using repeated cultivation or herbicide;
2. Prepare the ground for sowing in late summer by cutting intensively and create gaps either with harrows or by raking (aiming to create around 50% bare soil);
3. Sow in the autumn using a **EL1 Flowering Lawn Mix.** Bulk up the seed with an inert carrier such as sand to make distribution easier. The seed must be surface-sown by machine or broadcast by hand. The seed should be spread at 5g per m^2.

Wild Flowers	***Grasses***
Lady's Bedstraw	*Common Bent*
Rough Hawkbit	*Crested Dogstail*
Oxeye Daisy	*Slender-creeping Red-fescue*
Birdsfoot Trefoil	*Smaller Cat's-tail*
Cowslip	
Selfheal	
Meadow Buttercup	
Common Sorrel	
Wild Red Clover	

4. Tread in seed to produce a firm surface.

Management:

First year: The wildflower and grass species within the mix are perennial and will not usually flower in their first growing season. There will often be a flush of annual weeds from the soil in the first growing season. Mow the grassland regularly throughout the first year of establishment, this will help to develop a good sward structure and help maintain balance between grasses and wildflower.

Long-term: Continue management of undesirable weeds where present and mow regularly to 25-40mm height. To permit flowering, mowing should be relaxed from late June.

Monitoring: Monitor using quadrat along a fixed transect to record species presence and relative abundance. Make recommendations as required.

Biodiversity net gain:

Target condition: Moderate

Time to achieve target condition: 10 years

Number of biodiversity units delivered: 0.09

4.2.2 Mixed scrub (map reference 7)

The scrub habitat on site should be managed to improve its condition. The scrub at present is mostly one age class and has limited structural diversity.

Capital works: In order to provide some structural diversity within the scrub habitat, small areas of the scrub should be coppiced and selective thinning should be undertaken to encourage regeneration. In addition, a well-developed edge should be established.

1. Three small coups should be outlined within the scrub habitat (approx.1.5m x 1.5m), within these coups the scrub should be cut by chainsaw or bow saw to the stump and allowed to regenerate. This will provide a good area of bare ground for a short period of time and then improve structural diversity.
2. Selective removal of individual specimens should be undertaken to reduce the density of the scrub stand and create improved light condition and structural diversity.
3. The northern boundary of the scrub should be cut to base, the roots pulled out and all arisings taken off site (approximately 1m wide). The scrub should be removed in October-November to reduce disturbance to wildlife.
4. The northern boundary should be sown with a **Hedgerow Mixture EH1.** Bulk up the seed with an inert carrier such as sand to make distribution easier. The seed must be surface-sown by machine or broadcast by hand. The seed should be spread at 4g per m^2.

Wild Flowers	***Grasses***
Agrimony	*Common bent*
Garlic mustard	*Sweet vernal-grass*
Lesser burdock	*False brome*
Cow parsley	*Crested Dog's-tail*
Star sedge	*Tufted hair-grass*
Common knapweed	*Red fescue*
Rough chervil	*Wood meadow-grass*
Crosswort	
Wild carrot	
Wild teasel	
Meadowsweet	
Hedge bedstraw	
Meadow crane's-bill	
Moon daisy	
Wild marjoram	
Cowslip	
Common sorrel	
Soapwort	
Red campion	
Bladder campion	
Upright hedge-parsley	
Tufted vetch	

5. Tread in seed to produce a firm surface.

Management:

First year: The wildflower and grass species within the mix are perennial and will not usually flower in their first growing season. There will often be a flush of annual weeds from the soil in the first growing season. Mow the grassland regularly throughout the first year of establishment, this will help to develop a good sward structure and help maintain balance between grasses and wildflower.

Long-term: Cut edge habitat every two years between October and February. The cut should be undertaken on a rotational basis with no more than half being cut each year. Three new small coups should be cut to base and a small amount of selective thinning should be undertaken every three years to continue to develop a good structural diversity within the scrub habitat.

Monitoring: Monitor the habitat in year three and year six. Change prescriptions as necessary.

Biodiversity net gain:

Target condition: Good

Time to achieve target condition: 10 years

Number of biodiversity units delivered: 1.23

4.2.3 Species-rich hedgerow (map reference 9)

The hedgerow is currently in moderate condition due to a lack of a perennial vegetation buffer strip. These strips need to be approximately 1.5m wide and present on at least one side of the hedgerow. It is considered appropriate that the buffer be present on the south boundary (roadside) of the hedgerow.

Capital works:

1. Remove any weeds within the area to be sown
2. Sow with a **Hedgerow Mixture EH1.** Bulk up the seed with an inert carrier such as sand to make distribution easier. The seed must be surface-sown by machine or broadcast by hand. The seed should be spread at 4g per m^2.

Wild Flowers	***Grasses***
Agrimony	*Common bent*
Garlic mustard	*Sweet vernal-grass*
Lesser burdock	*False brome*
Cow parsley	*Crested Dog's-tail*
Star sedge	*Tufted hair-grass*
Common knapweed	*Red fescue*
Rough chervil	*Wood meadow-grass*
Crosswort	
Wild carrot	
Wild teasel	
Meadowsweet	
Hedge bedstraw	
Meadow crane's-bill	
Moon daisy	

Wild marjoram
Cowslip
Common sorrel
Soapwort
Red campion
Bladder campion
Upright hedge-parsley
Tufted vetch

3. Tread in seed to produce a firm surface.

Management:

First year: The wildflower and grass species within the mix are perennial and will not usually flower in their first growing season. There will often be a flush of annual weeds from the soil in the first growing season. Mow the grassland regularly throughout the first year of establishment, this will help to develop a good sward structure and help maintain balance between grasses and wildflower.

Long-term: Cut edge habitat every two years between October and February. The cut should be undertaken on a rotational basis with no more than half being cut each year.

Monitoring: Monitor the habitat in year three and year six. Change prescriptions as necessary.

Biodiversity net gain:

Target condition: Good

Time to achieve target condition: 2 years

Number of biodiversity units delivered: 3.13

4.3 Creation of new habitats

The development includes a number of soft and hard landscaping including ones which will benefit biodiversity in the locality. These are listed below with species lists and suggested management of the habitats. Further information on the proposed habitat creation within HED Landscape Architects and Urban Designers drawings and reports.

4.3.1 Ornamental shrubs

338 square metres of ornamental shrubs will be planted across the site, to see exact locations please view **1468-HFD-HED-ZZ-XX-DR-L-3000 (Planting Plan).**

Capital works:

Purchase and plant the following species mix. Well-rotted bark mulch to be spread around the base of each plant to a depth of 100mm to aid with suppressing weed growth and retaining moisture. Planting should take place between November and March when conditions are considered suitable.

Species	Specification	Size	Density
Lavandula × intermedia 'Grosso'	3L CG	300mm	6/m2
Buxus sempervirens	3L CG	300mm	6/m2
Geranium x oxonianum 'Wargrave Pink'	3L CG	300-450mm	4/m2
Geranium macrorrhizum 'Mount Olympus White'	3L CG	300-450mm	4/m2
Vinca major 'variegata'	3L CG	300mm	6/m2
Pachysandra terminalis	3L CG	300-450mm	4/m2
Dryopteris filix-mas	2L CG	300mm	4/m2
Stachys byzantina	3L CG	300mm	6/m2
Stipa tennuissima	2L. CG	300mm	8/m2
Verbena bonariensis	3L CG	300mm	as shown
Daphne odora 'Aureomarginata' E	2L. CG	400-600mm	6/m2
Camellia 'Sparkling Burgundy' E	3L. CG	400-600mm	6/m2
Potentilla fruticosa marian red robin	3L. CG	400-600mm	6/m2
Magnolia liliiflora 'Nigra'	3L. CG		as shown
Hibiscus syriacus magenta chiffon	3L. CG		as shown
Exochorda × macrantha 'The Bride'	3L. CG		as shown

Management:

First year: All plants to be watered as required throughout dry spells. Bark mulch to be topped up as required, weeds to be removed by hand and litter to be picked.

Long-term: All plants to be inspected yearly with any dead or dying plants to be removed and replaced. Establishment of planted areas to be closely monitored in order to determine the need for future management operations.

Biodiversity net gain:

Target condition: N/A no assessment necessary

Time to achieve target condition: 1 year

Number of biodiversity units delivered: 0.07

4.3.2 Native shrubs (infill and new)

751 square metres of native shrubs will be planted across the site, to see exact locations please view **1468-HFD-HED-ZZ-XX-DR-L-3000 (Planting Plan).**

Capital works:

Purchase and plant the following species mix. Well-rotted bark mulch to be spread around the base of each plant to a depth of 100mm to aid with suppressing weed growth and retaining moisture. Planting should take place between November and March when conditions are considered suitable.

Species	Specification	Size	Density
Cornus alba 'Sibirica'	1+1 BR	400-600cm	2/m2
Acer campestre	1+2 BR	175-200cm	2/m2

Hedera hibernica	1L CG	450-600mm	6/m2
Rosa canina	1+1 BR	450-600mm	3/m2
Corylus avellana 'Cosford'	1+2 BR	125-150cm	2/m2
Ilex aquifolia (shrub form)	3L CG	300-450mm	1/m2
Euonymus europaea	3L CG	300-450mm	1/m2
Viburnum opulus	1+2 BR	300-450cm	2/m2
Sorbus Acuparia	1+2 BR	125-150cm	2/m2
Lonicera henryi	3L CG	600-900mm	1/m2
Crataegus monogyna	1+2 BR	125-150cm	2/m2
Quercus robur	1+2 BR	125-150cm	2/m2

Management:

First year: All plants to be watered as required throughout dry spells. Bark mulch to be topped up as required, weeds to be removed by hand and litter to be picked.

Long-term: All plants to be inspected yearly with any dead or dying plants to be removed and replaced. Establishment of planted areas to be closely monitored in order to determine the need for future management operations.

Biodiversity net gain:

Target condition: Moderate

Time to achieve target condition: 5 years

Number of biodiversity units delivered: 0.55

4.3.3 Groundcover planting

218 square metres of groundcover planting will be conducted across the site, to see exact locations please view **1468-HFD-HED-ZZ-XX-DR-L-3000 (Planting Plan).**

Capital works:

Purchase and plant the following species mix. Well-rotted bark mulch to be spread around the base of each plant to a depth of 100mm to aid with suppressing weed growth and retaining moisture. Planting should take place between November and March when conditions are considered suitable.

Species	Specification	Mix species density	No.
Buxus sempervirens	C	5.5/m^2	161
Dryopteris filix-mas	Full pot	7/m^2	260
Geranium macrorrhizum 'Mount Olympus White	C: Full pot	5.5/m^2	144
Geranium oxonianum 'Wargrave Pink'	C: Full pot	5.5/m^2	174
Lavandula intermedia 'Grosso'	C	5.5/m^2	161
Pachysandra terminalis 'Green Carpet'	C	7/m^2	241
Stachys byzantina	Full pot	7/m^2	66
Stipa tenuissima	Ful pot: C	7/m^2	141
Verbena bonariensis	C: Full pot	3/m^2	60
Vinca major 'Variegata'	C	5.5/m^2	115
Vinca minor 'Alba'	C	9/m^2	308

Management:

First year: All plants to be watered as required throughout dry spells. Bark mulch to be topped up as required, weeds to be removed by hand and litter to be picked.

Long-term: All plants to be inspected yearly with any dead or dying plants to be removed and replaced. Establishment of planted areas to be closely monitored in order to determine the need for future management operations.

Biodiversity net gain:

Target condition: Poor

Time to achieve target condition: 2 years

Number of biodiversity units delivered: 0.931

4.3.4 Lawn

55 square metres of lawn/grass bed will be created on site, to see exact locations please view **1468-HFD-HED-ZZ-XX-DR-L-3000 (Planting Plan).**

Capital works:

Prepare the ground for sowing by creating a fine friable seedbed down to 150mm depth. Sow between March – October to 10mm depth at 50g/m^2. Broadcast manually, rake, level and roll to ensure good seed to soil contact. Sow **A24 (Wear and Tear) germinal amenity** mix:

Species	Percentage (%)
Festuca rubra liitoralis	35
Lolium perenne	30
Festuca Rubra Commutata	10
Lolium perenne	20
Agrostis capillaris	5

Management:

Long-term: Cut at least 10 times a year down to 10mm height. If necessary, oversow seed at a rate of 20g/m^2.

Biodiversity net gain:

Target condition: Poor

Time to achieve target condition: 1 year

Number of biodiversity units delivered: 0.01

4.3.5 Wildflower mix

399 square metres of wildflower meadow will be created on site, to see exact locations please view **1468-HFD-HED-ZZ-XX-DR-L-3000 (Planting Plan).**

Capital works:

1. Prepare the ground for sowing by creating a fine friable seedbed
2. Sow in the autumn using a **EL1 Flowering Lawn Mix.** Bulk up the seed with an inert carrier such as sand to make distribution easier. The seed must be surface-sown by machine or broadcast by hand. The seed should be spread at 5g per m^2.

Wild Flowers	***Grasses***
Lady's Bedstraw	*Common Bent*
Rough Hawkbit	*Crested Dogstail*
Oxeye Daisy	*Slender-creeping Red-fescue*
Birdsfoot Trefoil	*Smaller Cat's-tail*
Cowslip	
Selfheal	
Meadow Buttercup	
Common Sorrel	
Wild Red Clover	

3. Tread in seed to produce a firm surface.

Management:

First year: The wildflower and grass species within the mix are perennial and will not usually flower in their first growing season. There will often be a flush of annual weeds from the soil in the first growing season. Mow the grassland regularly throughout the first year of establishment, this will help to develop a good sward structure and help maintain balance between grasses and wildflower.

Long-term: Continue management of undesirable weeds where present and mow regularly to 25-40mm height. To permit flowering, mowing should be relaxed from late June.

Monitoring: Monitor using quadrat along a fixed transect to record species presence and relative abundance. Make recommendations as required.

Biodiversity net gain:

Target condition: Moderate

Time to achieve target condition: 5 years

Number of biodiversity units delivered: 0.29

4.3.6 Tree planting

Approximately 47 trees will be planted across the site, to see exact locations please view **1468-HFD-HED-ZZ-XX-DR-L-3000 (Planting Plan).**

Capital works:

1. Planting to be carried out during November to March in suitable weather conditions. All planting operations shall be carried out in accordance with BS 4438 and good horticultural practice.

2. Tree pits to be dug at least 1.5 times wider than the size of the root ball but no deeper
3. Remove any material from the pit which may inhibit root development and loosen the bottom and sides of the pit to encourage root establishment
4. Ensure new trees are only lifted by the root ball to avoid damage to stem and crown
5. Follow any specific instructions provided by the nursery for planting the trees
6. Carefully position the root ball in the pit, ensuring that the top of the ball is raised at least 5cm above the level of the surrounding soil. Species list below:

Species	Form	Specification	Size
Magnolia x brooklynensis Yellow Bird	Clear stem specimen	4xtr. RB	125-150cm
Pyrus calleryana 'Chanticleer'	Clear stem specimen	3xtr. RB	20-30cm girth
Betula Jacquemontii	Multi stem	3xtr. RB	20-25cm girth
Betula Pendula	Multi stem	3xtr. RB	20-25cm girth
Prunus sargentii	Clear stem specimen	4xtr. RB	25-30cm girth
Acer rubrum October Glory	Clear stem specimen	3xtr. RB	20-30cm girth
Quercus robur	Clear stem specimen	4xtr. RB	30-40cm girth
Amelanchier lamarckii	Multi stem	4xtr. RB	20-25cm girth
Carpinus fastigiata	Clear stem specimen	4xtr. RB	30-40cm girth

7. Prepare a mix of imported top soil with peat-free compost (30% compost, 70% soil) and backfill the hole, firming around to ensure the tree is not loose in the ground
8. Trees are to be fitted with a supporting system comprising two softwood machine-rounded timber stakes (approx. 2.4m x 60mm) with rubber ties and spacers; multi-stemmed trees to be fitted with underground anchoring system
9. Water the tree and ensure the root ball is well saturated
10. Cover the planting pit with well-rotted bark mulch to a minimum depth of 100mm and a diameter of 1m; leave a hollow in the centre of the mulch around the stem of the tree to avoid the base of the tree rotting.

Management:

First year: Plants are to be watered between April and September as required by climatic conditions to ensure that the soil doesn't get too dry. Mulch to be topped up and weeds removed/killed as required.

Long-term: Trees need to be monitored for death, deformation, dieback or disease. In the future, tree safety inspections should be carried out every three years and routine pruning may be necessary.

Biodiversity net gain:

Target condition: Good

Time to achieve target condition: 30+ years

Number of biodiversity units delivered: 7.42

4.3.7 Hedge planting

31 linear metres of hedgerow will be planted on site, to see exact locations please view **1468-HFD-HED-ZZ-XX-DR-L-3000 (Planting Plan).**

Capital works:

Hedgerow plants to be planted in a double staggered row at a rate of two plants per m^2 with 600mm spiral plastic rabbit guards supported by bamboo canes. Well-rotted bark mulch to be spread across the base of the hedgerow to a minimum depth of 100mm to aid with suppressing weed growth and retaining moisture. Hedgerow planting to take place between November and March when conditions are suitable.

Species	Size	Density
Acer campestre	800-1000mm	2/m^2
Corylus avellana	800-1000mm	2/m^2
Carpinus betulus	800-1000mm	2/m^2
Malus sylvestris	800-1000mm	2/m^2
Sorbus aurcuparia	800-1000mm	2/m^2

Management:

First year: All plants to be watered as required throughout dry spells and bark mulch to be topped up as required. Weeds to be removed by hand and litter to be picked.

Long term: All plants to be inspected at the end of the first year with any dead or dying

plants to be removed and replaced. Once established, hedgerows to be cut biennially and on a rotational basis between November and February, with half one year and half the next. This regime will encourage dense growth and continual fruiting/flowering of plants.

Biodiversity net gain:

Target condition: Moderate

Time to achieve target condition: 5 years

Number of biodiversity units delivered: 0.11

4.3.8 Green roof

It is proposed to create a green roof on the new building on site. The green roof will be a roll-out green roof which is low maintenance with a sedum green roof system planted with a wildflower mix. Specifications will be determined post-development. However, the mix must be drought and saline tolerant and aim to provide year-round coverage of vegetation.

Biodiversity net gain:

Target condition: Moderate

Time to achieve target condition: 5 years

Number of biodiversity units delivered: 0.18

5.0 EVALUATION OF NET GAIN

Prior to development, the site had a baseline of **12.84** habitat units and **2.44** hedgerow units. Post-development and intervention including habitat enhancements and creation, the site will have **14.63** habitat units and **3.48** hedgerow units. Therefore, the proposed habitat enhancements and creation result in a **13.91%** increase in habitat units and a **42.95%** increase in hedgerow units.

6.0 REFERENCES

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7.0 APPENDICES

Key

Site boundary

Habitats

- g4 - Modified grassland
- w1g6 - Line of trees
- h2b - Other hedgerows
- h3 - Dense scrub
- u1b5 - Buildings
- u1b6 - Other developed land
- h2b - Other hedegrow
- h2a - Hedgerow (priority habitat)
- Scattered trees (map reference 11)

Client: Chadwick Dryer Clarke

Project: The Harefield Academy Biodiversity Net Gain

Title: Baseline Habitat Map

Drawn	Checked	Date
EC	AW	18.08.2022

Drawing No.: Appendix A

Revision: Issue

Scale: 1:1250

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Orientation: N

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Appendix B. Harefield Academy Net Gain Calculations

On Site Baseline (Habitat)

Ref Number	Habitat Type	Area (ha)	Distinctiveness	Condition	Strategic Significance	Suggested Action to Address Habitat Losses	Total Habitat Units
1	Modified grassland	0.049	Low	Moderate	Location ecologically desirable but not in local strategy	Same distinctiveness or better habitat required	0.22
2	Modified grassland	0.012	Low	Moderate	Location ecologically desirable but not in local strategy	Same distinctiveness or better habitat required	0.05
3	Modified grassland	0.007	Low	Moderate	Location ecologically desirable but not in local strategy	Same distinctiveness or better habitat required	0.03
4	Modified grassland	0.013	Low	Good	Location ecologically desirable but not in local strategy	Same distinctiveness or better habitat required	0.09
5	Modified grassland	0.036	Low	Good	Location ecologically desirable but not in local strategy	Same distinctiveness or better habitat required	0.24
6	Modified grassland	0.042	Low	Moderate	Location ecologically desirable but not in local strategy	Same distinctiveness or better habitat required	0.18
7	Mixed scrub	0.116	Medium	Poor	Location ecologically desirable but not in local strategy	Same broad habitat or a higher distinctveness habitat required	0.51
8	Mixed scrub	0.028	Medium	Moderate	Location ecologically desirable but not in local strategy	Same broad habitat or a higher distinctveness habitat required	0.25
11	Scattered trees	1.2819	Medium	Moderate	Location ecologically desirable but not in local strategy	Same broad habitat or a higher distinctveness habitat required	11.28
						Total:	12.84

On Site Baseline (Hedge)

Hedgerow Number	Hedgerow Type	Length (km)	Distinctiveness	Condition	Strategic Significance	Suggested Action to Address Habitat Losses	Total Hedgerow Units
9	Native species rich hedgerow	0.243	Medium	Moderate	Location ecologically desirable but not in local strategy	Like for like or better	2.14
10	Native hedgerow	0.029	Low	Poor	Location ecologically desirable but not in local strategy	Same distintiveness or better	0.06
12	Line of trees	0.053	Low	Moderate	Location ecologically desirable but not in local strategy	Same distintiveness or better	0.23
						Total:	2.44

On Site Habitat Enhancements

Proposed Habitat		Distinctiveness	Condition	Strategic significance	Time to Target Condition (Yrs)	Difficulty of Creation	Habitat Units Delivered
Habitat Type	Area (ha)						
Other neutral grassland	0.012	Medium	Moderate	Location ecologically desirable but not in local strategy	10	Low	0.09
Mixed scrub	0.116	Medium	Good	Location ecologically desirable but not in local strategy	10	Low	1.23
						Total:	1.32

On Site Hedgerow enhancements

Proposed Habitat		Distinctiveness	Condition	Strategic significance	Time to Target Condition (Yrs)	Difficulty of Creation	Hedgerow Units Delivered
Habitat Type	Length (km)						
Native Species-rich Hedgerow	0.243	Medium	Good	Medium	2	Low	3.13
						Total:	3.13

On Site Habitat Creation

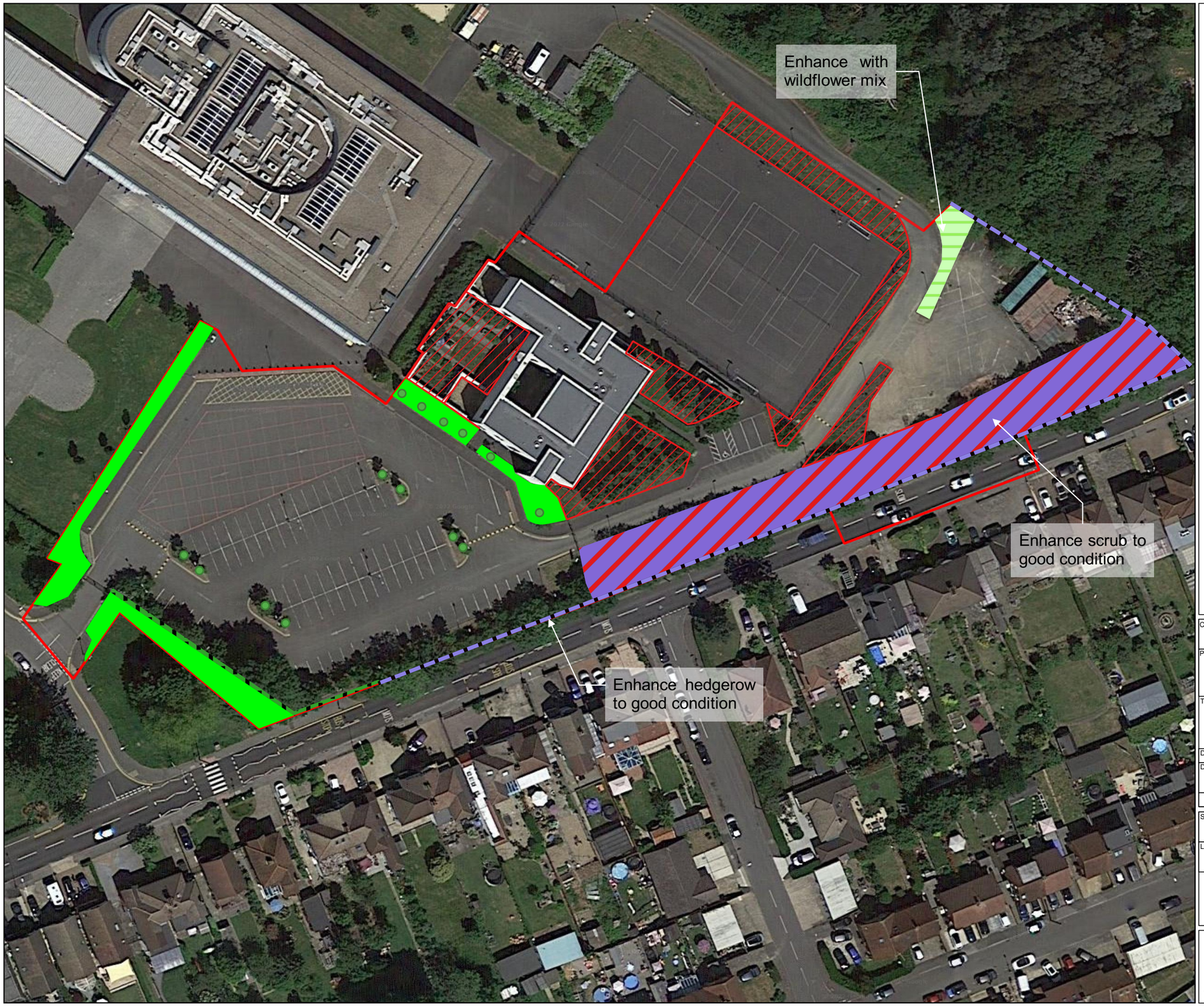
Report ref	Proposed Habitat		Distinctiveness	Condition	Strategic significance	Time to Target Condition (Yrs)	Difficulty of Creation	Habitat Units Delivered
	Habitat Type	Area (ha)						
4.3.1	Introduced shrub	0.0338	Low	N/A	Location ecologically desirable but not in local strategy	1	Low	0.07
4.3.6	Urban Tree	1.7580	Medium	Good	Location ecologically desirable but not in local strategy	30+	Low	7.42
4.3.2	Mixed scrub	0.0751	Medium	Moderate	Location ecologically desirable but not in local strategy	5	Low	0.55
4.3.4	Modified grassland	0.0055	Low	Poor	Location ecologically desirable but not in local strategy	1	Low	0.01
4.3.5	Other neutral grassland	0.399	Medium	Moderate	Location ecologically desirable but not in local strategy	5	Low	0.29
4.3.8	Biodiverse green roof	0.0362	Medium	Moderate	Location ecologically desirable but not in local strategy	5	Medium	0.18
4.3.3	Other neutral grassland	0.0218	Medium	Poor	Location ecologically desirable but not in local strategy	2	Low	0.09
							Total:	8.61

On Site Hedge Creation

Report ref	Proposed Habitat		Distinctiveness	Condition	Strategic significance	Time to Target Condition (Yrs)	Difficulty of Creation	Hedgerow Units Delivered
	Habitat Type	Length (km)						
4.3.7	Native hedgerow	0.031	Low	Moderate	Medium	5	Low	0.11
							Total:	0.11

Summary

On-site baseline	Habitat units	12.84
	Hedgerow units	2.44
On-site post intervention	Habitat units	14.63
	Hedgerow units	3.48
Total net-unit change	Habitat units	3.59
	Hedgerow units	1.04
Total net % change	Habitat units	13.91%
	Hedgerow units	42.95%



Key

- Site boundary
- g3c - other neutral grassland
- g4 - modified grassland
- w1g6 - line of trees
- h3 - dense scrub
- Removed for development
- h2a - Hedgerow (priority habitat)
- Scattered trees

Client: Chadwick Dryer Clarke

Project: The Harefield Academy Biodiversity Net Gain

Title: Habitat Loss and Site Enhancements

Drawn	Checked	Date
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