



**Colnbrook By-Pass
Harmondsworth
West Drayton
UB7 0FX**

51.483918, -0.485311

Biodiversity Net Gain

**S25-240/BNG
May 2026**

Prepared by :

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On behalf of :

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Apuldram
Chichester
PO20 7EG**



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0.0 Summary

- Southwest Environmental Limited have been commissioned to prepare a Biodiversity Net Gain Report for the proposed development at Colnbrook By-Pass, West Drayton.
- The project exceeds the required $\geq 10\%$ net gain above baseline.
- The baseline biodiversity value has been established through analysis from The Statutory Biodiversity Metric Calculation Tool (Defra, 2025, version 1.0.4). The Baseline habitat units total 7.47 and the Hedgerow units are 0.71.
- The proposed development will achieve 15.20% Habitat units, and 11.66% Hedgerow units. The biodiversity net gain units are above the mandatory 10% requirement, delivering 1.14 habitat units and 0.08 hedgerow units against a requirement of 0.747 and 0.071 respectively.
- The trading rules have been satisfied through Lowland Meadows, an increase in Very High Distinctiveness, and Other Neutral Grassland and Mixed Woodland being beneficial increases of Medium Distinctiveness despite the loss of Modified Grassland, Mixed Scrub, and Individual Trees.
- Key enhancements include Other Neutral Grassland, Lowland Meadows, Mixed Scrub, and Mixed Woodland. The project demonstrates compliance with all 10 BNG Good Practice Principles.

1.0 Introduction

This document is a Biodiversity Net Gain Report for the proposed development at Colnbrook By-Pass, West Drayton.

Site Address	Colnbrook By-Pass Harmondsworth West Drayton UB7 0FX
Grid Reference	51.483918, -0.485311
Site Area	2.44 ha Approx.

Boundaries are as marked on the site location plan. Approximate description is provided below.

Boundaries	North	Metal fence
	East	Buildings, No physical boundary
	South	Line of trees
	West	Mixed Woodland

The below table shows adjoining land uses.

Land Use	Adjoining		Proximal
	North	Grassland and Waterways	Grassland, Waterways, Woodland, Residential
	East	Urban, Grassland	Urban, Agricultural
	South	Road Network, Urban, Scrub	Road Network, Urban, Scrub
	West	Woodland, Grassland, Waterways	Grassland, Urban

1.1 Commissioning

Southwest Environmental Limited have been commissioned to prepare a Biodiversity Net Gain for the proposed development at Colnbrook By-Pass, West Drayton.

1.2 Project Background

The site is currently Developed Land; Sealed Surface, Modified Grassland, Mixed Scrub, Mixed Woodland, Individual Trees, Non-Native and Ornamental Hedgerow, and Line of Trees. The proposed development would see the expansion of the tarmac car park, providing more spaces for users. The plans can be seen in **Appendix 1**. No demolition of buildings are anticipated to be affected by this development. Vegetation, however, is predicted to be affected.

1.3 Scope

The scope of this document is to inform Hillingdon Council of the Baseline Habitat onsite, and how the Landscape Plan plans to achieve the mandatory 10% BNG onsite.

1.4 Limitations

The assessment incorporates baseline data from the Preliminary Ecological Appraisal - Southwest Environmental Limited undertaken on October 27th 2025 by Christopher Canevali (BSc (Hons), Principal Ecologist) and second visit on April 30th 2026 by Eliza Levitt (MSc, Project Ecologist).

There were no limitations to the survey work. All areas of habitat were accessible and the surveys took place at a suitable time of year to adequately assess the habitats present.

2.0 Methodology

The site visits revealed that the site holds low botanical value, does not contain nationally protected habitat, is of no regional or local importance and has a very limited potential, if any, to connect habitats for protected species. This being said, the northern section of the site is part of a green belt, preventing the encroachment of urban development in the area.

Plans for the Proposed Plan for the developments are shown in **Appendix 1**.

Current evaluation has revealed a limited importance of the site to the local ecology of the area. However, with the development of the site and the proposed mitigation measures a positive contribution can be made to the local ecology.

2.1 Desk Study Methods

Historical baseline analysis was conducted using:

- PEA assessment Preliminary Ecological Appraisal - Southwest Environmental Limited on November 12th 2025
- Site visit on April 30th 2026

2.2 Field Survey Methods

Site visits were undertaken on November 12th 2025 by Christopher Canevali (BSc (Hons), Principal Ecologist) and April 30th 2026 by Eliza Levitt (MSc, Project Ecologist). This is considered to be representative of the habitats on the site as the survey was undertaken at a suitable time of year to adequately assess the habitats present. Methods followed CIEEM best practice and UKHab survey methodology.

2.3 BNG Metric Application

The assessment utilises the Statutory Biodiversity Metric Calculation Tool (Defra, 2025, version 1.0.4). Habitat classification follows UK Hab survey methodology.

2.4 Technical Competence

Assessment undertaken by Eliza Levitt, MSc, Project Ecologist.

2.5 Limitations

No limitations are expected whilst producing this document.

3.0 Baseline Ecological Conditions

3.1 Site Description

Current site conditions comprise **Urban** – Developed Land; Sealed Surface, **Grassland** - Modified Grassland, **Heathland and Shrub** - Mixed Scrub, **Woodland and Forest** - Other Woodland; Mixed, **Individual Trees**, **Non-Native and Ornamental Hedgerow**, and **Line of Trees**.

3.1.1 Urban – Developed Land: Sealed Surface

The majority of the Site area is a tarmac or concrete hardstanding, used as a car park.



Plate 1: The tarmac car park.



Plate 2: The tarmac car park.

3.1.2 Grassland - Modified Grassland

The site has areas of modified grassland within the grassland, often being parked on. There is also a large area of modified grassland to the north of the site. This is also parked on by cars. Both areas of grassland are of poor condition. Species observed included; Grasses *Poaceae*, Red Campion *Silene dioica*, Common Yarrow *Achillea millefolium*, Dandelion *Taraxacum officinale*, Creeping Thistle *Cirsium arvense*, Ribwort Plantain *Plantago lanceolata*, Broadleaved Dock *Rumex obtusifolius*.



Plate 3: Modified Grassland onsite



Plate 4: Modified Grassland



Plate 5: Modified Grassland

3.1.3 Heathland and Shrub - Mixed Scrub

The site has areas of mixed scrub throughout the site, with areas of both poor and moderate condition.



Plate 6: Mixed Scrub



Plate 7: Mixed Scrub



Plate 8: Mixed Scrub

3.1.4 Woodland and Forest - Other Woodland: Mixed

Along the western border of the site is Mixed Woodland. It is in moderate condition. Species include Willows *Salix spp.*, Sycamore *Acer pseudoplatanus*, Birch *Betula spp.*, Hawthorn *Crataegus spp.*, Ash *Fraxinus excelsior*.



Plate 9: Mixed Woodland



Plate 10: Mixed Woodland

3.1.5 Individual Trees

There are a total of 33 trees onsite. These include Silver Birch *Betula pendula*, European Beech *Fagus sylvatica*, Rowan *Sorbus spp.*, and Goat Willow *Salix caprea*.



Plate 11: Small birch tree onsite



Plate 12: Small birch tree onsite

3.1.6 Non-Native and Ornamental Hedgerow

Between parking areas within the site, non-native, ornamental hedgerows are observed on the areas modified grassland. These can be seen in **Plates 11** and **12**. The following species were observed Common Snowberry *Symphoricarpos albus*, Dogwood *Cornus sanguinea*, Privet *Ligustrum vulgare*, Hazel *Corylus avellana*, Oregon Grape *Mahonia aquifolium*, Red Campion *Silene dioica* and Bramble *Rubus fruticosus*.

3.1.7 Line of Trees

There are three separate lines of trees onsite. One is located in the south of the site and is in moderate condition. The other two lines of trees are located in the north section of the site. Species include Hawthorn *Crataegus spp.*, Willows *Salix spp.*, Buddleja *Buddleja davidii*, Birch *Betula spp.* and Sycamore *Acer pseudoplatanus*.



Plate 13: Line of trees



Plate 14: Line of trees

3.2 Current Habitat Assessment

Table 1 - Summary of Habitats

Description	Priority Habitat	Condition Assessment
Developed Land; Sealed Surface	No	N/A
Modified Grassland	No	Poor
Mixed Scrub	No	Poor/Moderate
Mixed Woodland	No	Moderate
Individual Trees	No	Moderate/Good
Non-Native and Ornamental Hedgerow	No	Poor
Line of trees	No	Moderate/Good

Baseline Habitat Survey can be seen in **Appendix 2**.

3.3 Designated Sites and Protected Species

There are no designated sites noted within 2km of the site boundary. The site is located within the Zone of Influence for two SSSI's.

Table 2 - Summary of Designated Sites

Site Name	Designation	Reason for Designation
Wraysbury Reservoir	SSSI	Supports nationally significant populations of cormorants, great crested grebes, shovelers, and gadwells. Part of the South West London Waterbodies RAMSA and SPA.
Staines Moor SSSI	SSSI	Designated for the extensive alluvial flood meadows representing the largest area of unimproved neutral grassland in Surrey. Supports nationally important floral communities and internationally important populations of wintering wildfowl.

SSSI: Site of Special Scientific Interest
SPA: Special Protection Area

4.0 BNG Principles

The following outlines how the proposed development at Colnbrook By-Pass adheres to the ten good practice principles for Biodiversity Net Gain (BNG), as established by CIEEM, CIRIA and IEMA. These principles are applied collectively to ensure the project delivers a measurable and lasting net gain for biodiversity, in line with current best practice.

4.1 Mitigation Hierarchy

1. Apply the Mitigation Hierarchy
Impacts on biodiversity have been avoided where possible, minimised through design and construction methods, and any unavoidable losses are compensated for via habitat creation and enhancement.
2. Avoid Losing Irreplaceable Biodiversity
No irreplaceable habitats, such as ancient woodland or veteran trees, are present or affected by the development.
3. Be Inclusive and Equitable
Stakeholder engagement has been undertaken through consultation with the Local Plan and relevant consultees, ensuring local priorities are considered.
4. Address Risks
Risks to achieving net gain have been identified and addressed through the use of metric risk multipliers and a long-term management plan.
5. Make a Measurable Net Gain Contribution
The Statutory Biodiversity Metric has been used to demonstrate a measurable net gain of at least 10% above baseline, with all calculations provided.
6. Achieve the Best Outcomes for Biodiversity
Habitat creation and enhancement measures focus on native and locally appropriate species, supporting ecological connectivity and local conservation priorities.
7. Be Additional
All biodiversity gains are additional to existing obligations and would not occur without this development.

8. Create a Net Gain Legacy

Long-term management and monitoring are secured for a minimum of 30 years, with clear objectives and adaptive management measures.

9. Optimise Sustainability

BNG measures are designed to deliver wider environmental and community benefits, including climate resilience and amenity value.

10. Be Transparent

All BNG calculations, management plans, and monitoring outcomes are documented in this report and made available to stakeholders.

Summary:

The project at Colnbrook By-Pass has been developed in accordance with the ten BNG good practice principles, ensuring that biodiversity is left in a measurably better state than before development.

5.0 Proposed Habitats Plan

The proposed habitats plan has been developed to deliver measurable biodiversity net gain in accordance with statutory and best practice guidance. The plan details the retention, enhancement, and creation of habitats across the site, referencing the UK Habitat Classification and the Biodiversity Metric. Existing features of ecological value are retained where feasible, while areas of lower value are targeted for enhancement through native planting and habitat diversification. New habitats are selected to reflect local character and ecological priorities, with the layout designed to maximise connectivity and support a range of species. The plan is illustrated in the accompanying landscape drawings and is supported by a schedule of proposed habitats, areas, and condition targets.

The Proposed Landscape Plan can be seen in **Appendix 3**.

More in-depth guidance to the proposals below can be found within **Appendix 5**.

5.1 Enhancement of Modified Grassland to Other Neutral Grassland - “Moderate” condition;

Transition existing modified grassland to species-rich neutral grassland through targeted intervention. This is achieved by reducing nutrient status through cutting management with removal of cuttings to export nutrients, coupled with introduction of native neutral grassland species via plug plants or targeted seeding into areas of reduced competition. An appropriate cutting regime should be established, with cutting occurring post-flowering (typically July/August) and arisings removed to further reduce nutrient availability. Perennial Rye-grass competition is reduced through selective suppression techniques, and management should continue for 3 or more years to consolidate changes and allow species composition to stabilise toward the moderate condition target.

- **2,367m² of Other Neutral Grassland enhancement is required.**



Protection Requirements: Temporary fencing during establishment (12 months) if herbivory risk is present.

Annual botanical surveys will track species composition changes and confirm condition improvement trajectory throughout the management period.

5.2 Enhancement of Modified Grassland to Lowland Meadows - “Moderate” condition

Transition existing modified grassland to species-rich lowland meadow through targeted intervention. This is achieved by reducing nutrient status through cutting management with removal of cuttings to export nutrients, coupled with introduction of native meadow indicator species via plug plants or targeted seeding into areas of reduced competition. An appropriate cutting regime should be established, with cutting occurring post-flowering (typically July/August) and arisings removed to further reduce nutrient availability. Perennial Rye-grass and White Clover competition is reduced through selective suppression techniques, and management should continue for 3 or more years to consolidate changes and allow species composition to stabilise toward the moderate condition target.

- **2,250m² of Lowland Meadows enhancement is required.**

Protection Requirements: Temporary fencing during establishment (12 months) if herbivory risk is present.

Annual botanical surveys will track species composition changes and confirm condition improvement trajectory throughout the management period.

5.3 Enhancement of Mixed Scrub to “Moderate” condition

Improve the areas of mixed scrub in poor condition to increase botanical diversity and invertebrate habitat value. Site preparation involves retaining the areas of scrub onsite, ensuring no single species makes up more than 75% of the cover, planting seedlings of native species to ensure age and structural diversity, and creating clearings in the wider areas of scrub.

- **1,516m² of Mixed Scrub enhancement is required.**

Protection Requirements: Temporary fencing during establishment (12 months) if herbivore risk is present.

Monitoring through botanical surveys in years 1, 3, and 5 post-establishment will confirm species establishment and condition progression toward the target good condition state outcomes.

5.4 Enhancement of Mixed Woodland to “Good” condition

Improve retained woodland areas supporting woodland indicator species to increase botanical diversity and invertebrate habitat value. Site preparation involves retaining the trees onsite and



allowing them to grow to maturity, to move deadwood retained within the scrub into the woodland areas, provide protection to new planted saplings, provide open areas within the woodland, and remove the scrub pressure (brambles).

- **594m² of Mixed Woodland; Other enhancement is required.**

Protection Requirements: Temporary fencing during establishment (12 months) if herbivore risk is present.

Monitoring through botanical surveys in years 1, 3, and 5 post-establishment will confirm species establishment and condition progression toward the target good condition state outcomes.

5.5 Enhancement of Line of Trees to “Good” condition

Improve the condition of the trees onsite. This will be achieved by improving the scrub layer below the trees, allowing the trees to grow to maturity and protecting the trees from adverse impact of human activities.

- **Enhancement of the line of trees in the south section is required (~65m)**

Protection Requirements: Protection from adverse impact of human activities

Monitoring through visual identification, simply introducing vegetation below will improve the BNG scoring.

5.6 Tree Planting

A line of trees that extends 30m is required. The small saplings must be of a native mix, prioritising the species of greatest benefit to the ecology of the area. Saplings should be planted in appropriate conditions depending on the species requirements, and will require protection from rabbits and deer, depending on the maturity of the saplings acquired. Infrequent maintenance and observation of the saplings is needed to maintain herbivore protection as well as to act upon potential changes of health and adverse growth.

The established trees onsite are moderately beneficial species for the biodiversity of the site, therefore additional planting would prove more beneficial with a mix of different native species.

- **30m of small trees (Small - DBH (Diameter at Breast Height) < 30cm) are required.**

The planting of native tree species would require moderate preparation and protection, followed by low maintenance (depending on the age of the sapling planted). Following the Royal Horticultural Society's guide is highly recommended. Careful attention should be made to the soil onsite and the drainage available, and the appropriate species selected and planted.

6.0 Additional Suggestions

6.1 Bat Boxes

Installing bat boxes requires them to be at least three metres above the ground, with a clear flight path to and from the entrance, and a location away from windows and other artificial light sources. The boxes should ideally face south, south-west, or south-east.

It should be noted that for both bird boxes and bat boxes, preventative measures should be taken for the protection of the species against predation, especially against pets such as cats.

Visiting the Bat Conservation Trusts website pertaining to Bat Boxes is highly recommended, the explanation of different bat boxes and their suitabilities as well as their continued maintenance is included.

6.2 Bird Boxes

Different bird boxes can cater for different species, ideally the most appropriate bird species for the local area and habitat should be acquired. However, if the client desires other native species then this is also acceptable and the relevant bird boxes should be sought after. Making a connection to the local biodiversity can be more advantageous to the ecology as further actions to the environment will have a greater awareness of positive or negative changes.

In order to protect against direct sunshine, wind, and rain the nest boxes should be positioned between North and East. The box will need to be at least three metres above the ground. A clear fly route to and from the boxes is required for the nesting birds.

The RSPB website has a guide regarding their bird boxes, species suitability, installation and maintenance.

6.4 Invertebrate Habitat

As the global invertebrate population is decreasing by 45%¹, it is paramount with biodiversity net gain to identify areas of a development and to promote invertebrate population growth. This can be achieved by obtaining and retaining deadwood and log piles onsite, and arranging them vertically. Other invertebrate hibernaculum should also be implemented to increase the potential species habitat. This can include deadwood, or “insect hotels”. Additionally, the introduction of the aforementioned plant pollinator supporting shrubs, trees and native wildflower mixes can have a positive impact on the invertebrate populations.

6.5 Hedgehog Houses

With a decline in hedgehog populations in the UK by 30% – 75% across different areas of the countryside since 2000² increasing the habitat connectivity as well as providing hedgehog houses will be most beneficial to the species.

Implementing several access points in the back garden, one in the North and Western borders will allow hedgehogs to connect to different gardens, increasing their available range.

¹ Rodolfo Dirzo et al., Defaunation in the Anthropocene. *Science* **345**

² NBN, The State of Britain's Hedgehogs, 2022

Introduction of a hedgehog garden following BHPS's Guidelines (The British Hedgehog Preservation Society) will be the best option.

6.6 Lighting

It is highly recommended that the proposal should follow lighting guidelines set by Voigt in the Guidelines for Consideration of Bats in Lighting Projects on light fixtures outside of the proposal or lighting which could affect spill outside the proposal. Similar guidelines should be followed from Bruce-White & Shardlow's A Review of the Impact of Artificial Light on Invertebrates. Following these two studies is paramount in allowing the property to not adversely affect local invertebrate populations, as the light directly promotes nocturnal or diurnal foraging activity³ which is highly detrimental to invertebrate species.

7.0 BNG Metric Calculations

The full metric can be observed in the associated Excel file named - **ColnbrookByPass_BNG_Matrix**.

A Proposed Landscape Plan is available in **Appendix 3**. Therefore the development as proposed will satisfy the mandatory 10% biodiversity gain and achieve **1.14 units or 15.20% Habitat units** and **0.08 units or 11.66% Hedgerow units**.

7.1 Baseline Units

Using the Statutory Biodiversity Metric Calculation Tool (Defra, 2025, version 1.0.4), incorporating baseline data, the biodiversity value of the site has been calculated as **7.47 Habitat units and 0.71 Hedgerow units**.

7.2 Post-Development Units

The proposed development will deliver **1.14 Habitat units and 0.08 Hedgerow units** through the following implementation:

- Enhancement of Modified Grassland to Other Neutral Grassland - "Moderate" condition;
- Enhancement of Modified Grassland to Lowland Meadows - "Moderate" condition;
- Enhancement of Mixed Scrub to "Moderate" condition;
- Enhancement of Mixed Woodland to "Good" condition;
- Enhancement of Line of Trees to "Good" condition and;
- Line of Trees planting

7.3 Trading Rules Compliance

All trading rules have been satisfied.

³ Avalon C.S. Owens, *et al.*, Light pollution is a driver of insect declines, Biological Conservation, Volume 241, 2020



In terms of Habitat Trading (see full metric), the scheme results in acceptable habitat trades with Lowland Meadows having Very High Distinctiveness, and Other Neutral Grassland and Mixed Woodland being a beneficial increase of Medium Distinctiveness habitat despite the loss of Mixed Scrub, Modified Grassland, and Individual Trees.

7.4 Net Gain Achievement

Required units (10% above baseline): **0.747 Habitat units and 0.071 Hedgerow units.**

Delivered units : **1.14 Habitat units and 0.08 Hedgerow units.**

Net gain achieved: **15.20% Habitat units and 11.66% Hedgerow units.**

8.0 Proposal Implementation & Construction Plan

All biodiversity measures will be implemented in line with the approved habitats plan and relevant ecological guidance. Habitat creation and enhancement works, including planting and installation of ecological features, will be scheduled to occur at appropriate times of year to maximise establishment success. Contractors will be briefed on ecological protection requirements, and sensitive working practices will be adopted to avoid damage to retained habitats. The implementation plan will include a clear timetable, assign responsibilities, and detail any required supervision by a qualified ecologist. Progress will be monitored throughout construction to ensure all measures are delivered as specified.

The following areas will need to be achieved with the site development -

- Other Neutral Grassland enhancement - “Moderate” condition - **Total Area = 0.2367 ha or 2,367m²**
- Lowland Meadows enhancement - “Moderate” condition - **Total Area = 0.225 ha or 2,250m²**
- Mixed Scrub enhancement - “Moderate” condition - **Total Area = 0.1516 ha or 1,516m²**
- Mixed Woodland enhancement - “Good” condition - **Total Area = 0.0594 ha or 594m²**
- Line of Trees enhancement - “Good” condition - **Total Area = 65m**
- Line of Trees planting - **Total length required = 30m**

9.0 BNG Management & Monitoring Plan

A long-term management and monitoring plan will be established to secure the condition and persistence of all new and enhanced habitats for a minimum of 30 years. The plan will set out management objectives, prescribe maintenance and monitoring actions, and identify performance indicators for habitat quality and biodiversity value. Regular inspections will be undertaken to assess habitat establishment, species composition, and the effectiveness of ecological features. Any failures or deficiencies will be addressed through adaptive management. Monitoring results will be recorded and reported to the Local Planning Authority as required, ensuring ongoing compliance with BNG commitments. More information can be found in **Appendix 5.**

10.0 Conclusion



The approach outlined in this document demonstrates that the proposals have been developed in accordance with CIEEM good practice and statutory requirements for biodiversity net gain. The baseline assessment, proposed habitats plan, and management strategy collectively ensure that the site will deliver a measurable and lasting improvement in biodiversity. All mitigation, enhancement, and monitoring measures are designed to be robust, achievable, and responsive to local ecological priorities. The scheme is expected to achieve or exceed the required net gain, providing benefits for both wildlife and the wider community.

11.0 Certification

It should be noted that whilst every effort has been made to provide a comprehensive assessment of the Site's biodiversity baseline and projected net gain, no investigation can ensure the complete characterisation and prediction of the natural environment. This report represents findings from site visits conducted on 27th October 2025 and 30th May 2026.

The Phase 1 habitat survey does not constitute a full botanical survey or Phase 2 pre-construction survey that would include accurate GIS mapping for invasive or protected plant species. The Biodiversity Metric calculations are based on habitat data collected during the survey period. Any changes to habitat extent, composition, or condition should be notified to the ecological consultant for reassessment.

The protected species and habitats assessment provides a preliminary view of the likelihood of protected species occurring on the Site, based on habitat suitability, known species distribution, and any direct evidence observed. It should not be taken as providing a full and definitive survey of any protected species group. It is only valid at the time the survey was carried out. Additional surveys may be recommended if it is considered reasonably likely that protected species may be present.

Before any development or changes are made to the site, it is imperative to check with the associated ecologist first, especially if changes are to be made prior to planning permission or prior to the Local Planning Authority's response. Always consult Natural England's standing advice before commencing works.

This assessment has been calculated using the Statutory Biodiversity Metric Calculation Tool (Defra, 2025, v1.0.4) in accordance with statutory biodiversity metric requirements and is valid for 2 years from the survey date.



Appendix 1

Planned Development



1
PROPOSED FLOOR PLAN - AREA D
SCALE 1:500



2
KEY PLAN
NTS

Parking Type	Outside Greenbelt			Within Greenbelt		
	Regular Parking Spaces	Disabled Parking Spaces	Total	Regular Parking Spaces	Disabled Parking Spaces	Total
Staff	53	0	53	0	0	0
Visitors	54	2	56	0	0	0
Authorised	15	0	15	0	0	0
Overflow	158	11	169	62	0	62
Total				365		

GENERAL NOTES

This drawing must not be reproduced in part or whole or used for the execution of works without their permission.

All dimensions to be checked on the prior to commencement of any construction works.

No deviation from this drawing will be permitted without the express consent of Project Manager.

All works are to comply with the current edition of the Building Regulations and British Standards.

It is the contractor's responsibility to check all dimensions and quantities on the prior to starting the work.

Construction Design and Management (CDM) REGULATIONS 2015. RISK ASSESSMENT.

To building regulations and British Standards. Requirements in all respects.

The Building Contractor must include for all works requiring the Health & Safety.

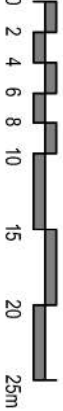
Refer to Design Risk Assessment and P3 documentation.

STATUS: PRELIMINARY ISSUE

STAGE: RIBA 2

STATUS:	PRELIMINARY ISSUE
STAGE:	RIBA 2

SCALE 1:500



Key:

- Land Ownership Boundary
- Green Belt Boundary
- Existing Tarmac
- Proposed Tarmac
- Proposed Parking Space
- Adjusted Existing Parking Space

REV	DESCRIPTION	BY	DATE	CHK
P01	PRELIMINARY ISSUE	FHW	04/12/25	MF

PROJECT DETAILS

PROJECT		CLIENT	
Heathrow IMM Center Car Park		Knightsbridge PS	
DRAWN BY	FHW	DATE	26/11/2025
CHECKED BY	MF	DATE	
SCALE	1:500 @ A3		
DRAWING TITLE	Proposed Plan - Area D		
PROJECT NO.	300776	ORIGINATOR	360DS
DRAWING TYPE	DR	DISCIPLINE	A
REVISION	00	REVISION	00
REVISION	01	REVISION	01

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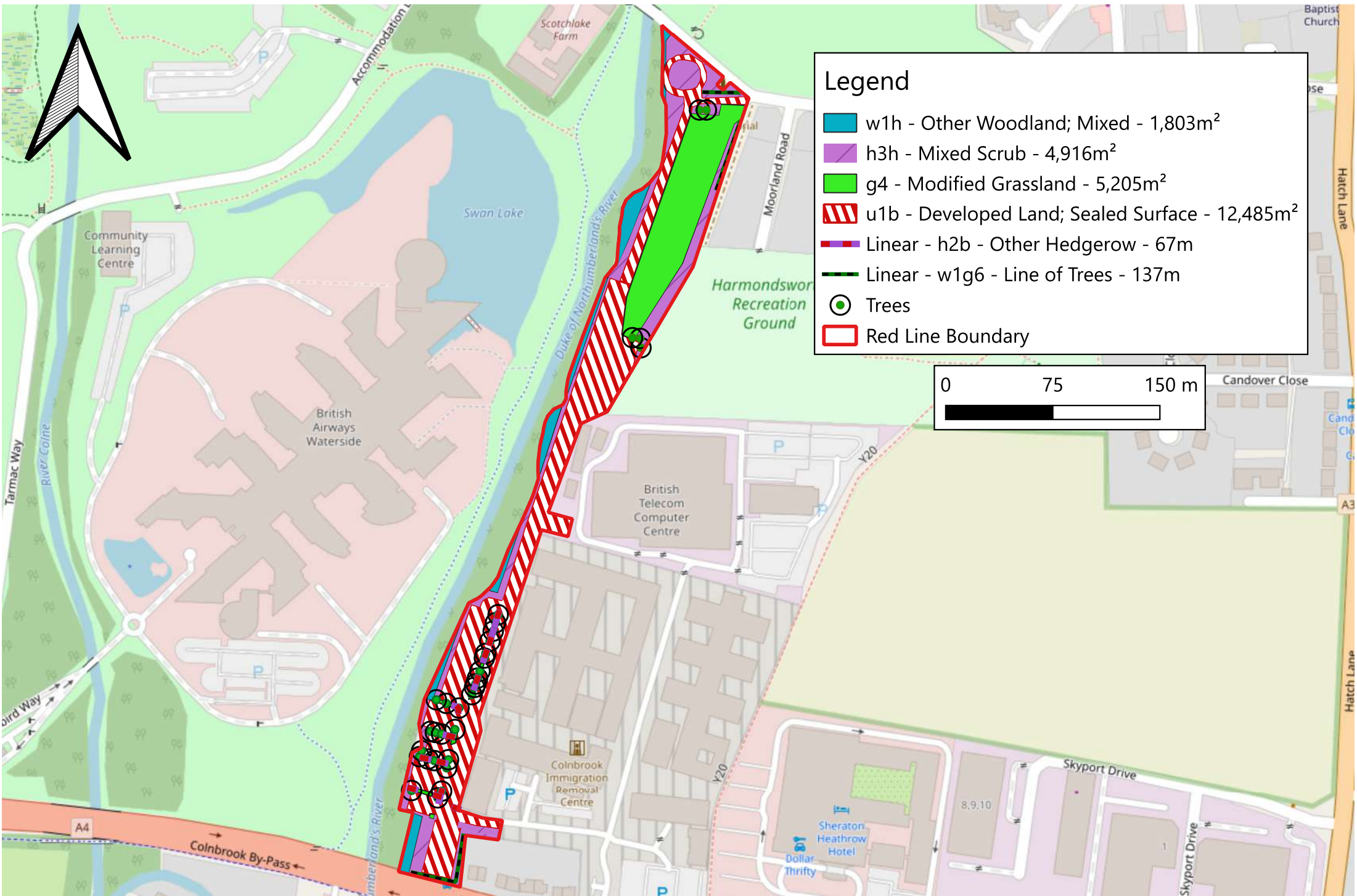


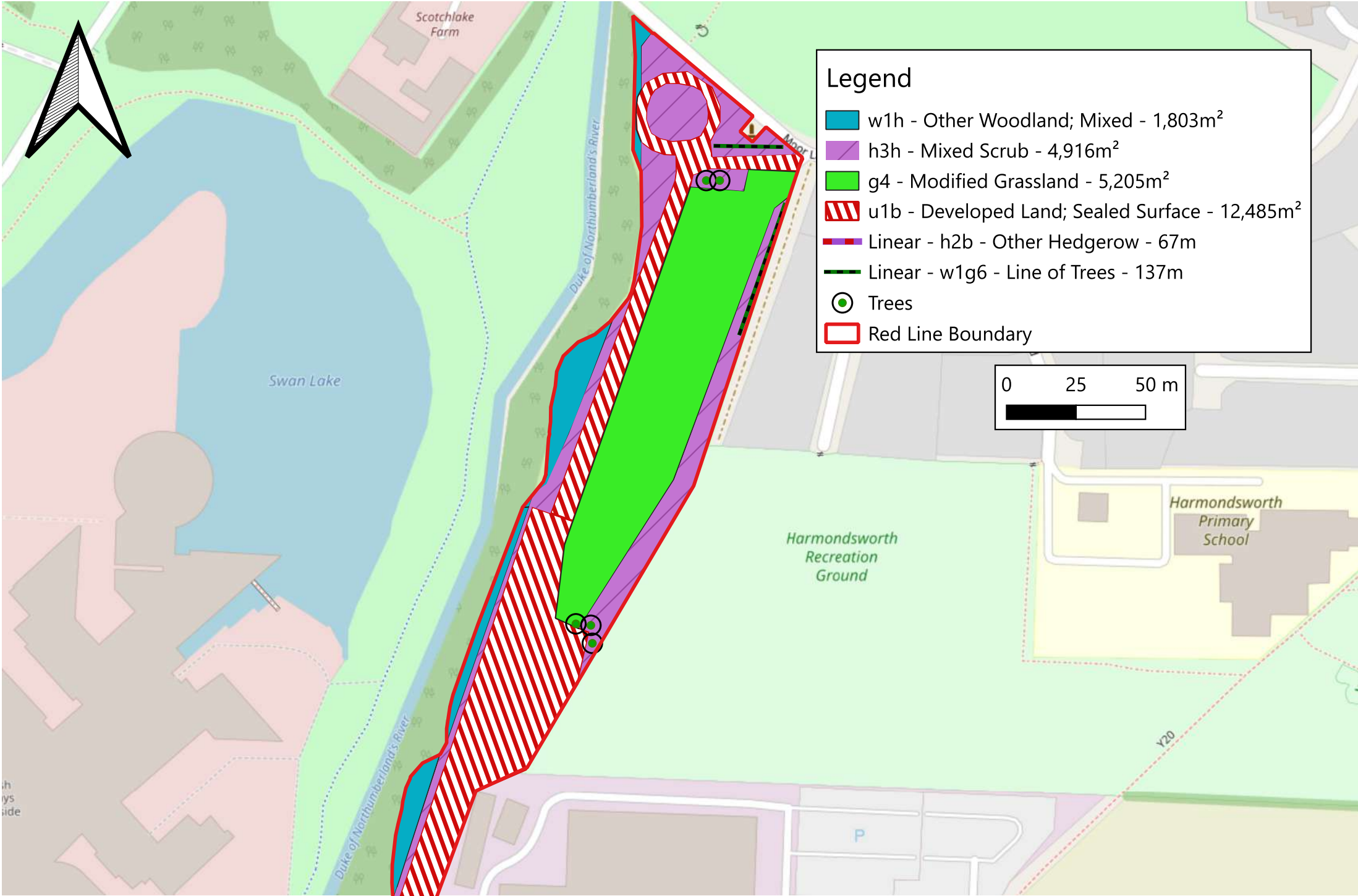
DEFINE. DESIGN. DELIVER.



Appendix 2

Habitat Survey







Legend

w1h - Other Woodland; Mixed - 1,803m²

h3h - Mixed Scrub - 4,916m²

g4 - Modified Grassland - 5,205m²

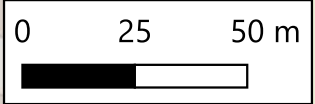
u1b - Developed Land; Sealed Surface - 12,485m²

Linear - h2b - Other Hedgerow - 67m

Linear - w1g6 - Line of Trees - 137m

Trees

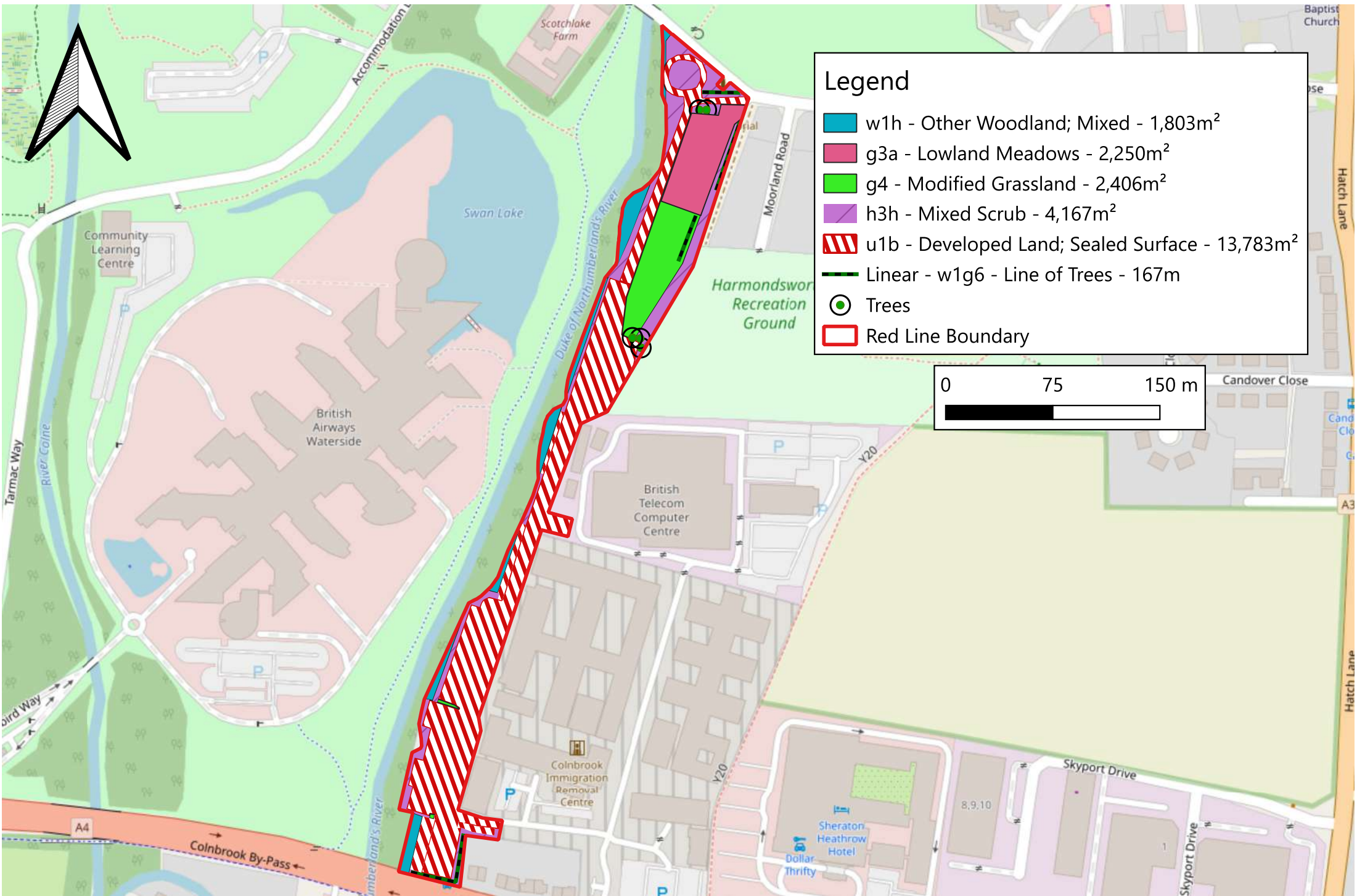
Red Line Boundary





Appendix 3

Landscape Plan



Legend

w1h - Other Woodland; Mixed - 1,803m²

g3a - Lowland Meadows - 2,250m²

g4 - Modified Grassland - 2,406m²

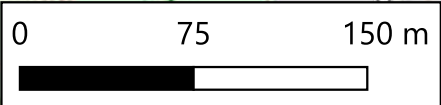
h3h - Mixed Scrub - 4,167m²

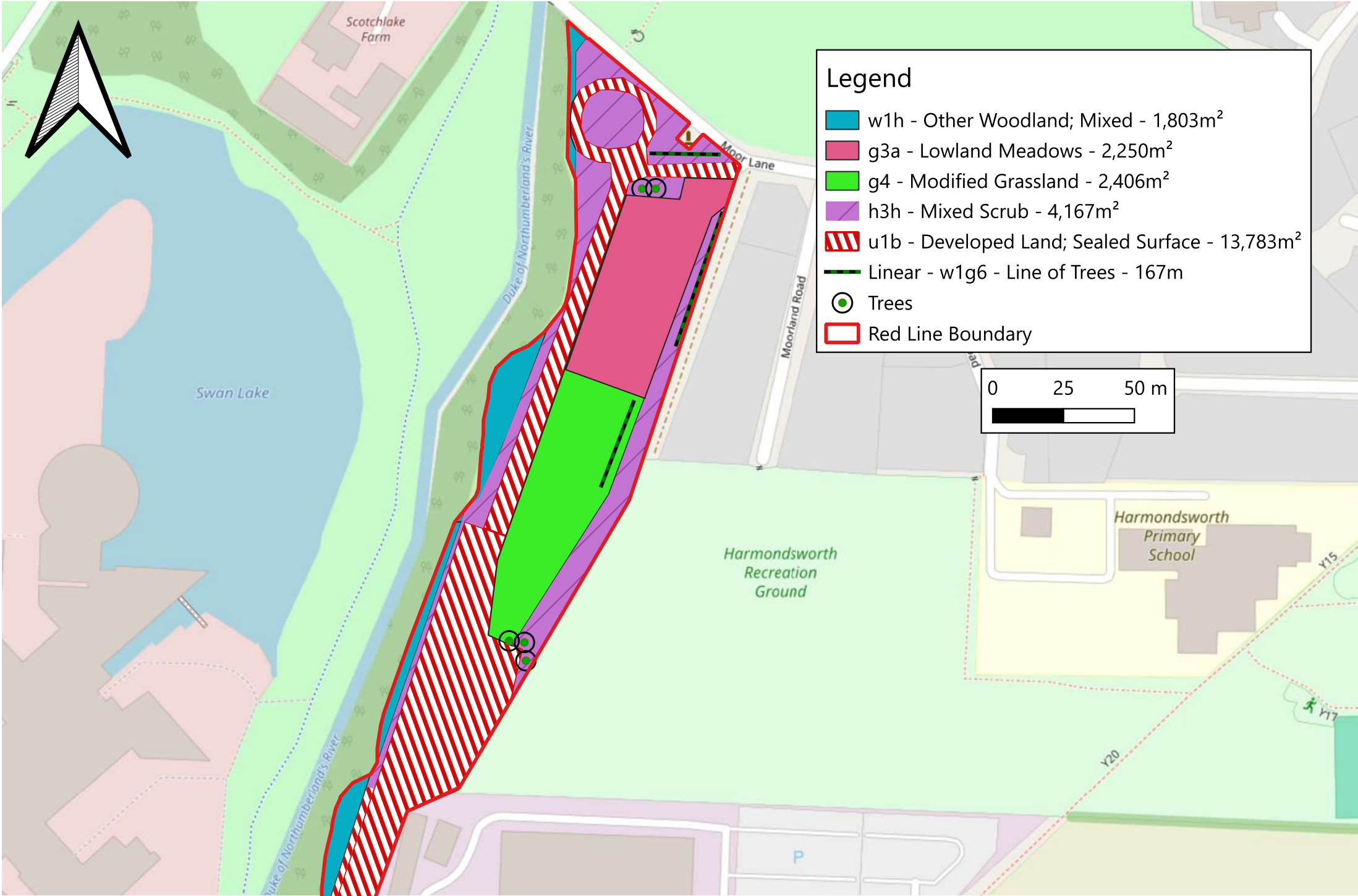
u1b - Developed Land; Sealed Surface - 13,783m²

Linear - w1g6 - Line of Trees - 167m

Trees

Red Line Boundary







Legend

w1h - Other Woodland; Mixed - 1,803m²

g3a - Lowland Meadows - 2,250m²

g4 - Modified Grassland - 2,406m²

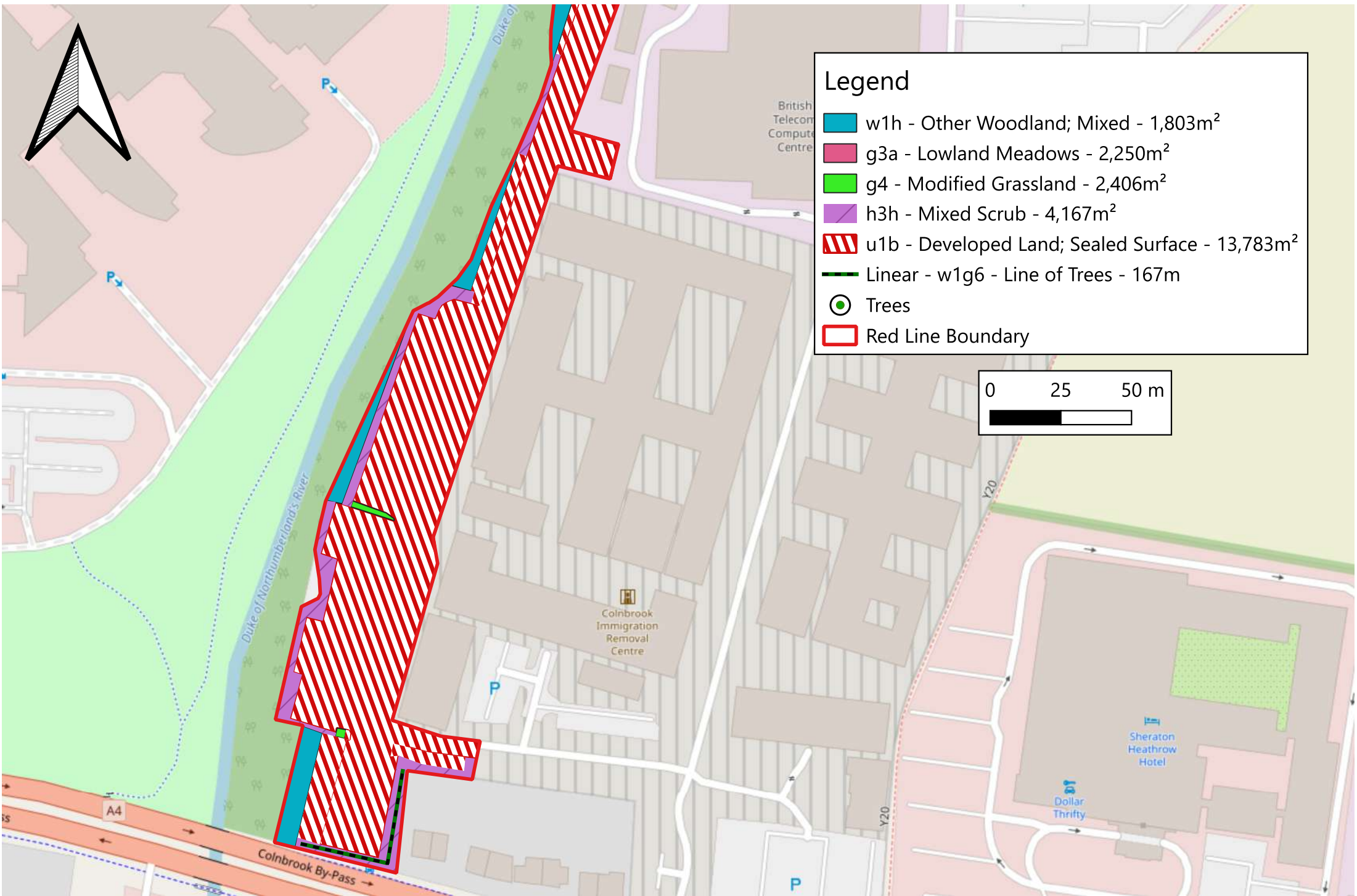
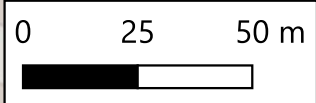
h3h - Mixed Scrub - 4,167m²

u1b - Developed Land; Sealed Surface - 13,783m²

Linear - w1g6 - Line of Trees - 167m

Trees

Red Line Boundary





Appendix 4

Photos



1 - South of the Site facing South, depicting the line of trees - LT1.



2 - South of the Site facing East.



3 - Southern section of the Site facing West.



4 - Southern section of the Site facing West.



5 - South of the Site facing East.



6 -South of the Site facing North, depicting H11 and H9.



7 - South Central of the Site facing North-West, depicting H9.



8 - South Central of the Site facing North-West, depicting H10.



9 - A closer view of H10.



10 - Hedgerow H11 in the South of the Site.



11 - The Eastern section of the Site facing North.



12 - Central western section of the Site facing North.



13 - Central western section of the Site facing North.



14 - Central western section of the Site facing South.



15 - Central western section of the Site facing South West.



16 - Central western section of the Site facing South West. Showing H6.



17 - Central western section of the Site facing West. Showing H5.



18 - Central section of the site facing North. Showing H4.



19 - Central section of the site facing West.



20 - Central section of the site facing North.



21 - Central section of the site facing North-East. Showing H3.



22 - Central section of the site facing North.



23 - Central section of the site facing South-East.



24 - Central Northern section of the site facing West.



25 - Central Northern section of the site facing North-West.



26 - Central Northern section of the site facing South. Showing H1



27 - Central section of the site facing South-East.



28 - Northern section of the site facing South-West.



29 - Northern section of the site facing South-West.



30 - Northern section of the site facing East.



31 - Northern section of the site facing South-West.



32 - Northern section of the site facing East.



33 - Northern section of the site facing South-West.



34 - Northern section of the site facing South-West.



35 - Northern section of the site facing South.



36 - Northern section of the site facing South-West.



37 - Northern section of the site facing South-East.



38 - Northern section of the site facing South-East.



39 - Northern section of the site facing South-West.



40 - Northern section of the site facing West.



41 - Northern section of the site facing South.



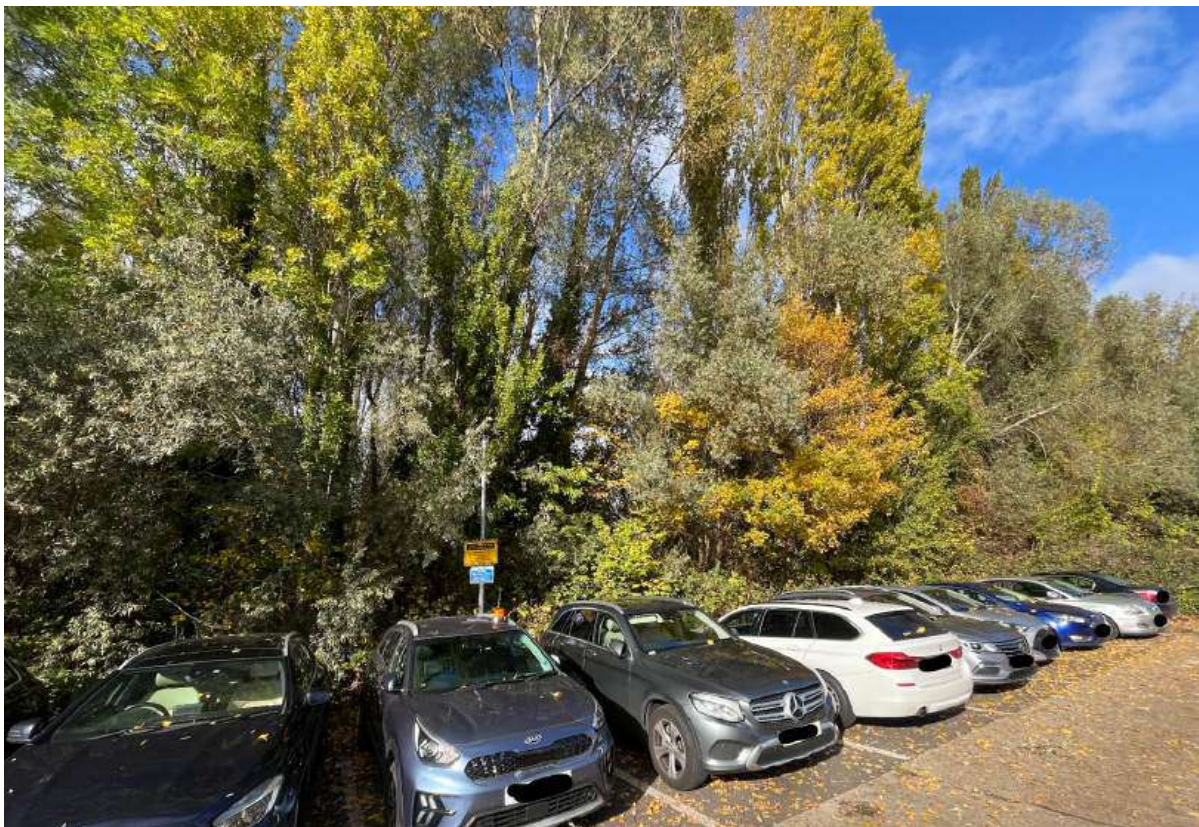
42 - Northern section of the site facing East.



43 - Northern section of the site facing South-West.



44 - Northern section of the site facing West.



45 - Northern section of the site facing North-West.



46 - Northern section of the site facing North.



47 - Northern section of the site facing North.



48 - Northern section of the site facing North



49 - Northern section of the site facing Southwest



50 - Northern section of the site facing East



51 - Northern section of the site facing south



52 - Northern section of the site facing North



53 - Northern section of the site facing North



54 - Northern section of the site facing Southeast



55 - Northern section of the site facing East



56 - Northern section of the site, at turning circle, facing Northwest



57 - Northern section of the site facing Northwest



Appendix 5

Guidance

BNG Guidance

Enhancement of Modified Grassland to Other Neutral Grassland

Site Evaluation & Constraints

Soil & Drainage

- Conduct comprehensive soil testing for pH (target 5.5-6.5), nutrient content, and organic matter levels to determine species suitability and soil amendments required.
- Assess if there is appropriate drainage - avoiding waterlogged areas while ensuring adequate moisture retention during establishment. The ground may need to be altered if not suitable.

Enhancement Methodologies and Techniques

Sward height 20% of area below 7cm and 20% above 7cm. Cuttings are NEVER cut below 5cm.

Annual cutting regime:

- Primary cut: Late August to early September after wildflower seed set
- Optional second cut: March-April for establishment phase only
- Remove all arisings to maintain low fertility conditions essential for wildflower persistence

Rotational management:

- Cut different areas at different times to maintain 20% variation in sward height
- Leave 10-20% of area uncut annually as wildlife refuges

Traditional Orchard - Floor Management

Annual cutting obligation:

- Cut at least once annually to prevent scrub establishment
- Failure to cut annually will result in conversion to scrub habitat, losing traditional orchard classification

Essential arisings removal:

- Dry cuttings on site first to allow seed dispersal
- Remove all cuttings to prevent soil enrichment which reduces plant diversity

Phase 1: Problem Species Control (Years 1-2)

Creeping Thistle Management

- Implement targeted cutting regime at rosette stage before flower buds turn purple.
- Cut twice annually for several years to exhaust root reserves.
- Apply selective herbicide treatment using weed-wiper technique to avoid damage to beneficial species.

Ragwort Control (Critical - Legal Requirement)

- Never top ragwort as this increases palatability and toxicity risk.
- Hand-pull during rosette stage when soil is moist, ensuring complete root removal.
- Apply spot herbicide treatment in spring/early summer before flowering.
- Remove stock for a minimum 14 days after herbicide treatment.

Bracken Suppression

- Implement a cutting regime twice yearly (end of June and end of July) for 5+ years.
- Cut when fronds reach maximum height but before spore release.
- Expect 10+ years for complete control and grassland restoration.

Dock and Nettle Management

- Hand-pull docks during rosette stage when soil is soft.
- Cut nettles repeatedly during the growing season to weaken root systems.
- Target areas around gateways and feeding sites where these species typically establish.

Phase 2: Enhancement of Beneficial Species (Years 2-4)

Bird's-foot Trefoil Enhancement

- Protect existing stands during problem species control operations.
- Allow natural spreading through stolon development and seed set.
- Supplement with additional seeding in areas where population is sparse.
- Target 5-10% coverage in final enhanced grassland.

White Clover Management

- Reduce nitrogen inputs to encourage clover establishment and persistence.
- Maintain appropriate grazing pressure (4cm residual height) to favor clover over grasses.
- Allow clover content to reach 20-25% for optimal nitrogen fixation benefits.

Yarrow and Native Wildflower

- Protect existing yarrow populations through selective management timing.
- Allow seed set before cutting operations in late August/September.
- Introduce companion species through overseeding: knapweed, ribwort plantain, and lady's bedstraw.

Phase 3: Species Introduction and Diversification (Years 3-5)

Overseeding

Building on the existing beneficial baseline, introduce complementary neutral grassland species:

- Common knapweed (*Centaurea nigra*): Key neutral grassland indicator supporting diverse invertebrates.
- Ribwort plantain (*Plantago lanceolata*): Valuable for pollinators and rapid establishment.
- Lady's bedstraw (*Galium verum*): Traditional meadow indicator supporting specialist invertebrates.
- Field scabious (*Knautia arvensis*): Excellent pollinator plant for diverse grassland.
- Meadow buttercup (*Ranunculus acris*): Traditional hay meadow species (to replace problematic creeping buttercup).

Grass Enhancement:

- Crested dog's-tail (*Cynosurus cristatus*): Structural foundation grass.
- Sheep's fescue (*Festuca ovina*): Fine-leaved, drought-tolerant complement to existing red fescue.
- Sweet vernal grass (*Anthoxanthum odoratum*): Early flowering neutral grassland grass.

Modified Establishment Techniques

Selective Enhancement Method

Given the mixed baseline with beneficial species present, use a selective enhancement approach rather than full soil disturbance:

Targeted Slot Seeding (Recommended)

- Use slot seeding machinery to introduce new species without damaging existing bird's-foot trefoil and yarrow populations.
- Apply selective herbicide bands along slot lines targeting Yorkshire-fog dominance while protecting broadleaved species.
- Seed rate: 2-3g/m² due to reduced competition from selective weed control.

Area-Specific Treatment Zones

- Zone A (Heavy Bracken/Thistle): Intensive cutting and possible cultivation after control measures.
- Zone B (Good Baseline Species): Light oversowing and selective weed control only.
- Zone C (Yorkshire-fog Dominated): Slot seeding with companion species introduction.

Enhanced Success Criteria

Target Species Composition for "Fairly Good" Condition

Building on existing beneficial species to achieve enhanced neutral grassland:

Retain and Expand (Target: 30-40% total cover):

- Bird's-foot trefoil: 5-10% cover (existing baseline advantage).
- White clover: 10-15% cover (existing baseline advantage).
- Yarrow: 2-5% cover (existing baseline advantage).

Introduce and Establish (Target: 20-30% total cover):

- Common knapweed: 5-8% cover.
- Ribwort plantain: 3-5% cover.
- Lady's bedstraw: 2-4% cover.
- Field scabious: 2-3% cover.

Grass Management (Target: 40-50% total cover):

- Reduce Yorkshire-fog from dominant to 15-20% maximum.
- Enhance red fescue to 10-15% cover.
- Introduce crested dog's-tail to 10-15% cover.
- Add sheep's fescue and sweet vernal grass to 5-10% combined.

Modified Timeline Reflecting Baseline Advantages

Years 1-2: Problem Species Control Phase

- Achieve 90% reduction in creeping thistle, ragwort, dock, and nettle coverage.
- Protect and maintain existing bird's-foot trefoil and yarrow populations.
- Begin Yorkshire-fog suppression through targeted cutting regimes.

Years 3-5: Enhancement and Introduction Phase

- Introduce new wildflower species through overseeding.
- Achieve target species diversity of 12+ species per m².
- Develop varied sward structure with 20% below 7cm and 20% above 7cm.

Years 6-8: Maturation and Fine-tuning

- Achieve "fairly good" condition with 15+ species per m² including characteristic forbs.
- Maintain appropriate balance between existing beneficial species and new introductions.
- Establish a sustainable management regime maintaining enhanced condition.

Site-Specific Management Recommendations

Adaptive Management Based on Existing Species

- Use established bird's-foot trefoil patches as "nurse areas" for introducing other legumes and wildflowers.
- Protect yarrow populations during all management operations as these are valuable established perennials.
- Gradually reduce white clover dominance to optimal levels rather than eliminating.

Specific Challenges:

- Yorkshire-fog Management: Implement late-season cutting (August) when this species is most vulnerable.
- Creeping Buttercup Control: Improve drainage and increase competition through overseeding rather than herbicide use where possible.
- Bracken Areas: Develop 5-year intensive cutting plan with annual monitoring of frond density.

Seasonal Timing

- Primary establishment window: **September-October** for autumn germination.
- Secondary window: **March-April** for spring establishment, though generally less successful than autumn sowing.
- Management cutting: **Late August/early September** timing critical for seed set while preventing scrub establishment.
- Avoid operations during bird nesting season: **March-August** except for essential establishment activities.

Enhancement of Modified Grassland to Lowland Meadow

Site Evaluation & Constraints

Soil & Drainage

- Conduct comprehensive soil testing for pH (target 5.5-6.5), nutrient content, and organic matter levels to determine species suitability and soil amendments required.
- Assess if there is appropriate drainage - avoiding waterlogged areas while ensuring adequate moisture retention during establishment. The ground may need to be altered if not suitable.

Enhancement Methodologies and Techniques

Sward height 20% of area below 7cm and 20% above 7cm. Cuttings are NEVER cut below 5cm.

Annual cutting regime:

- Primary cut: Late July to early September after wildflower seed set
- Optional second cut: March-April for establishment phase only
- Remove all arisings to maintain low fertility conditions essential for wildflower persistence

Rotational management:

- Cut different areas at different times to maintain 20% variation in sward height
- Leave 10-20% of area uncut annually as wildlife refuges

Essential arisings removal:

- Dry cuttings on site first to allow seed dispersal
- Remove all cuttings to prevent soil enrichment

Phase 1: Problem Species Control (Years 1-2)

Creeping Thistle Management

- Implement targeted cutting regime at rosette stage before flower buds turn purple.
- Cut twice annually for several years to exhaust root reserves.
- Apply selective herbicide treatment using weed-wiper technique to avoid damage to beneficial species.

Ragwort Control (Critical - Legal Requirement)

- Never top ragwort as this increases palatability and toxicity risk.
- Hand-pull during rosette stage when soil is moist, ensuring complete root removal.

- Apply spot herbicide treatment in spring/early summer before flowering.
- Remove stock for a minimum 14 days after herbicide treatment.

Bracken Suppression if present

- Implement a cutting regime twice yearly (end of June and end of July) for 5+ years.
- Cut when fronds reach maximum height but before spore release.
- Expect 10+ years for complete control and grassland restoration.

Dock and Nettle Management

- Hand-pull docks during rosette stage when soil is soft.
- Cut nettles repeatedly during the growing season to weaken root systems.
- Target areas around gateways and feeding sites where these species typically establish.

Phase 2: Enhancement of Beneficial Species (Years 2-4)

Bird's-foot Trefoil Enhancement

- Protect existing stands during problem species control operations.
- Allow natural spreading through stolon development and seed set.
- Supplement with additional seeding in areas where population is sparse.
- Target 5-10% coverage in final enhanced grassland.

Native Wildflower

- Protect existing native wildflower populations through selective management timing.
- Allow seed set before cutting operations in late July/August.
- Introduce companion species through overseeding: yellow rattle, bird's foot trefoil, lady's bedstraw.

Phase 3: Species Introduction and Diversification (Years 3-5)

Overseeding

Building on the existing beneficial baseline, introduce complementary neutral grassland species:

- Common knapweed (*Centaurea nigra*): Key neutral grassland indicator supporting diverse invertebrates.
- Ribwort plantain (*Plantago lanceolata*): Valuable for pollinators and rapid establishment.
- Lady's bedstraw (*Galium verum*): Traditional meadow indicator supporting specialist invertebrates.
- Field scabious (*Knautia arvensis*): Excellent pollinator plant for diverse grassland.
- Meadow buttercup (*Ranunculus acris*): Traditional hay meadow species (to replace problematic creeping buttercup).
- Yellow rattle (*Rhinanthus minor*): Weakens strong grasses from dominating.

Grass Enhancement:

- Crested dog's-tail (*Cynosurus cristatus*): Structural foundation grass.
- Sheep's fescue (*Festuca ovina*): Fine-leaved, drought-tolerant complement to existing red fescue.
- Sweet vernal grass (*Anthoxanthum odoratum*): Early flowering neutral grassland grass.

Modified Establishment Techniques

Selective Enhancement Method

Given the mixed baseline with beneficial species present, use a selective enhancement approach rather than full soil disturbance:

Targeted Slot Seeding (Recommended)

- Use slot seeding machinery to introduce new species without damaging existing bird's-foot trefoil and yarrow populations.
- Apply selective herbicide bands along slot lines targeting Yorkshire-fog dominance while protecting broadleaved species.
- Seed rate: 2-3g/m² due to reduced competition from selective weed control.

Enhanced Success Criteria

Target Species Composition for "Fairly Good" Condition

Building on existing beneficial species to achieve enhanced neutral grassland:

Retain and Expand (Target: 30-40% total cover):

- Bird's-foot trefoil: 5-10% cover (existing baseline advantage).
- Yarrow: 2-5% cover (existing baseline advantage).
- Reduce white clover to 5-10% maximum

Introduce and Establish (Target: 20-30% total cover):

- Common knapweed: 5-8% cover.
- Ribwort plantain: 3-5% cover.
- Lady's bedstraw: 2-4% cover.
- Burnet saxifrage: 2-3% cover.
- Yellow rattle: 3-5% cover.
- Meadow vetchling: 3-4% cover.

Grass Management (Target: 40-50% total cover):

- Reduce Yorkshire-fog from dominant to 15-20% maximum.
- Enhance red fescue to 10-15% cover.
- Introduce crested dog's-tail to 10-15% cover.
- Add sheep's fescue and sweet vernal grass to 5-10% combined.

Modified Timeline Reflecting Baseline Advantages

Years 1-2: Problem Species Control Phase

- Achieve 90% reduction in creeping thistle, ragwort, dock, and nettle coverage.
- Protect and maintain existing bird's-foot trefoil and yarrow populations.
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Years 3-5: Enhancement and Introduction Phase

- Introduce new wildflower species through overseeding.
- Achieve target species diversity of 15+ species per m².
- Develop varied sward structure with 20% below 7cm and 20% above 7cm.

Years 6-8: Maturation and Fine-tuning

- Achieve "fairly good" condition with 15+ species per m² including characteristic forbs and broadleaved herbs.
- Maintain appropriate balance between existing beneficial species and new introductions.
- Establish a sustainable management regime maintaining enhanced condition.

Site-Specific Management Recommendations

Adaptive Management Based on Existing Species

- Use established bird's-foot trefoil patches as "nurse areas" for introducing other legumes and wildflowers.
- Protect yarrow populations during all management operations as these are valuable established perennials.
- Gradually reduce white clover dominance to optimal levels rather than eliminating.

Specific Challenges:

- Yorkshire-fog Management: Implement late-season cutting (August) when this species is most vulnerable.
- Creeping Buttercup Control: Improve drainage and increase competition through overseeding rather than herbicide use where possible.
- Bracken Areas: Develop 5-year intensive cutting plan with annual monitoring of frond density.

Seasonal Timing

- Primary establishment window: **September-October** for autumn germination.
- Secondary window: **March-April** for spring establishment, though generally less successful than autumn sowing.
- Management cutting: **Late July/early September** timing critical for seed set while preventing scrub establishment.
- Avoid operations during bird nesting season: **March-August** except for essential establishment activities.

Enhancement of Mixed Scrub to “Moderate Condition”

Step 1: Enhancing Composition (Criterion A)

Inter-plant with native "gap-fillers" such as Guelder Rose, Spindle, or Wayfaring Tree to increase woody species composition. Selectively thin the area to reduce species dominance. Cut back any dominant species to create space for the less common native species to expand or be planted. Ensure at least 80% of the scrub is native and that you have at least 3 distinct native species.

Step 2: Structural Diversification (Criterion B)

Create variation in age or height but dividing the scrub into sections and coppicing 10–15% of the area every 3 years. This introduces the "young shrub/sapling" age class that is often missing. Create scalloped edges instead of a straight edge. Cut "bays" or "scallops" into the scrub to increase the surface area of the edge and encourage new seedlings to establish in the sheltered light. Leave some cut brash in small, tidy piles to mimic the "veteran" structural elements (providing habitat for invertebrates and fungi).

Step 3: Invasive & Weed Control (Criterion C)

Manually pull or spot-treat invasive species (e.g., Himalayan Balsam) before they set seed. If the scrub is "choked" by nettles, it usually indicates high soil nutrients. Remove all cut material to gradually lower the nutrient levels and favor a more diverse understorey. Reduce the cover of suboptimal species and invasive non-natives to **under 5%**.

Step 4: Creating the "Soft Edge" Mosaic (Criterion D)

Establish a minimum 5-meter wide "ecotone" (transition zone) between the dense scrub and the adjacent habitat. Stop mowing the grass right up to the scrub, allowing a belt of tall grassland and forbs to develop. This creates the "well-developed edge" required by the criteria. Allow (or plant) individual shrubs to "bleed" out into this tall grassland, creating a graduation of height rather than a hard wall.

Monitoring & Timescale

- Year 1-2: Invasive species survey and cutting back/thinning dominant species, creating space.
- Year 1-3: Planting native gap-fillers and coppicing one section of the scrub. Plant some species to create scalloped edges.
- Years 3-10: Develop structural complexity through thinning and coppicing management. Create the soft edges through reducing mowing and expansion of scrub species.
- Year 10-15: Expect significant improvement in age and structural diversity
- Years 15+: Structural diversity and composition of the scrub is improved.

Enhancement of Mixed Woodland to “Good Condition”

Step 1: Add Deadwood (Criterion L)

Import deadwood from the adjacent grassland habitat and distribute strategically across the woodland. Aim to achieve $\geq 50\%$ of plots with deadwood (standing wood, large branches, stumps, cavities). This is achievable within 1-2 years and immediately improves habitat for invertebrates and birds.

Step 2: Install Herbivore Protection (Criterion B)

Implement fencing or exclosure measures to prevent wild, domestic, and feral herbivore damage. Reduce browsing pressure to achieve "no significant browsing damage evident in woodland." This removes a key barrier to regeneration and ground flora recovery.

Step 3: Restrict Human Disturbance (Criterion M)

Establish protective buffers to eliminate nutrient enrichment and ground damage from human activities. Restrict access to vulnerable areas through signage or path management. Target achieving zero nutrient enrichment and $< 20\%$ damaged ground.

Step 4: Establish Veteran Tree Recruitment (Criterion K)

Begin long-term retention protocol for selected trees to develop veteran features. While achieving "two or more veteran trees per hectare" takes decades, initiate the process by protecting candidate trees and allowing natural development of cavities and standing deadwood.

Step 5: Allow Natural Maturation (Criteria A & F)

Manage the woodland to develop multiple age-classes of trees through selective thinning rather than uniform management. Create structural complexity (canopy gaps, layering) to achieve three age-classes and improved woodland vertical structure. This is a longer-term process requiring 10-15 years.

Monitoring & Timescale

- Year 1-2: Complete deadwood recruitment (L) and herbivore protection (B) installation.
- Year 1-3: Control disturbance sources (M).
- Years 3-10: Develop structural complexity and ground flora through thinning and canopy management.
- Year 10-15: Expect significant improvement in age-class diversity (A) and woodland structure (F).
- Years 15+: Veteran tree development (K) begins to show measurable progress.

Enhancement of Trees to “Good Condition”

Step 1: Reduce Human Impact & Damage (Criterion D)

- Eliminate adverse impacts on tree health by human activities.
- Remove vandalism and repair any damage to bark or crown.
- Cease or modify any regular pruning regime - allow trees to retain >75% of expected canopy for their age/height.
- Eliminate detrimental agricultural or management practices (e.g., herbicide drift, machinery contact).

Step 2: Establish Understorey Vegetation (Criterion F)

- Ensure >20% of tree canopy area has oversailing vegetation beneath (shrubs, climbing plants, young woodland plants).
- Encourage or establish understory vegetation - allow natural regeneration of shrubs and climbing plants beneath the canopy. Ensure native species are established
- Manage grass/groundcover beneath canopy - allow development of shade-tolerant woodland herbs and shrubs.
- Avoid ground disturbance that prevents vegetation establishment.

Tree Planting Guidance - BS 8545:2014 - UK Native Species ONLY

Site Evaluation & Constraints

Soil & Drainage

- Conduct soil texture and pH tests to inform species selection and amendment needs.
- **Identify areas prone to waterlogging or compaction and improve subsoil drainage if required.**

Microclimate & Exposure

- Be aware of sunlight, prevailing winds, and frost pockets to select suitable species and planting positions.
- Avoid planting under overhead cables or too close to footways without mitigation barriers.

Existing Features

- Protect adjacent trees, hedgerows, and utility apparatus when positioning new pits.
- Install root-directing barriers where roots may threaten pavements or underground services.

Planting Density

Trees will either be planted in rows at regular intervals, in curved lines or randomly spaced. Planting in rows simplifies future maintenance, especially if a mower is to be used to control vegetation. Planting of species can be in single species groups or mixed. Planting in groups encourages species to grow straight and tall and encourages self-pruning. To quantify the total number of plants required per hectare the following formula will be used:

Area (Metres)

No. trees = -----

Spacing between rows (m) x spacing between plants (m)

Recommended tree spacing is between **2 and 3 metres when planting in blocks**. Spacing can be increased for random planting.

Nursery Stock Procurement

BS 8545:2014 sets standards for nursery quality and stock handling.

- Root System - Trees must have a well-developed, fibrous root system free of circling roots.
- Labelling - Each tree to be labelled with species, provenance, and nursery details.
- Storage - Store stock on site for the minimum possible time in shaded, well-ventilated areas; keep roots moist.

Handling, Transport & Storage

Careful handling reduces transplant shock and mechanical damage .

- Transport - Use tree crates or rootball supports; avoid desiccation with wet hessian or protective wrapping.
- Short-Term Storage - Heel-in bare-root stock in a sheltered trench with roots covered by soil.

Planting Methodology

Plant during dormancy (October–March) to maximise root establishment.

Pit Preparation

- Excavate pits at least 1.2 × the rootball diameter and to the same depth as the root collar.
- Loosen pit sides to prevent root girdling; remove sharp stones.
- Positioning & Planting.
- Position tree centrally with the root collar flush with finished ground level.
- Backfill with excavated soil; firm gently by foot to eliminate air pockets.

Staking & Tying

- Stake only if necessary for wind-firmness; use flexible ties at two points.
- Remove stakes after one full growing season to encourage trunk strength.

Mulching

- Apply 75 mm of organic mulch (e.g., bark chips) in a 1.5 m radius, keeping mulch away from the trunk base.

Protection & Maintenance

Long-term aftercare is critical for tree independence.

Tree Guards - Install guards or guards with mesh to protect against rodent damage and mechanical impacts.

Watering

First year - Weekly watering during dry spells (10 L per tree).

Years 2–3 - Fortnightly watering in prolonged droughts.

Inspection & Pruning

Annual health inspections by a competent arboriculturist.

Formative pruning to establish a single leader and remove deadwood outside nesting season (March–August).

Monitoring & Reporting

- Documentation - Document tree performance and remedial actions to ensure compliance with local requirements.
- Establishment Monitoring Record survival rates, shoot growth, and canopy condition annually for three years.
- Failure Replacement - Replace any losses within the next planting season at a 1:1 ratio.