TECHNICAL APPENDIX 8.4:
BIODIVERSITY METRIC ASSESSMENT TECHNICAL NOTE

RETFORD CIRCULAR ECONOMY PROJECT

LOUND HIVE LIMITED

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1 SUMMARY

This Biodiversity Metrics Assessment (BMA) Technical Note is to support a planning application for the proposed extraction of pulverised fuel ash (PFA) from former disposal lagoons (the 'Proposed Development'), on land to the south of Lound, Nottinghamshire, centred on National Grid Reference (NGR) SK 69231 84761, hereafter referred to as 'the Site'.

The Natural England Biodiversity Metric 3.1[1] (hereafter the Metric 3.1) has been used to quantify the biodiversity value of baseline habitats within the Site (based on the 2022 baseline habitat areas and conditions) and those proposed under the restoration design for the Site (shown in Appendix C to this document). All restoration design and subsequent net gain calculations provided within this document are indicative and may be subject to change as the project progresses (including baseline values which would be updated by Phase 1 Habitat surveys to be completed prior to the commencement of each phase, as necessary).

Due to the development timescale (cumulatively the phases total over 22 years) requirements and constraints may change and the required design would need to be adapted accordingly. This document provides an indicative overview of development net gain, however more accurate calculations may need to be undertaken per stage when landscaping and restoration works are finalised, and all requirements are known.

The Proposed Development, as assessed by the BMA, has achieved the following change in biodiversity units:

Table 1: Quantifiable change in biodiversity units achieved by the Development

Biodiversity Units	Baseline Value	Post-Development Value	Change in Units	Outcome
Area-based Habitat Units	542.17	610.83	68.66	12.66%
Hedgerow Units	0.92	9.4	8.47	917.12%
River Units	0.00	29.18	29.18	100.00%

[1] Natural England (2022) Biodiversity Metric 3.1 – Calculation Tool, [Online] Available at: http://publications.naturalengland.org.uk/publication/6049804846366720 (Accessed February 2022)

2 INTRODUCTION

Arcus Consultancy Services Ltd (Arcus) has been instructed by Lound Hive Limited (the 'Applicant') to undertake a Biodiversity Metric Assessment (BMA) of the Retford Circular Economy Project (the 'Proposed Development'), centred on British National Grid Reference SK 69231 84761 (the 'Site'). The Proposed Development entails the extraction of pulverised fuel ash (PFA) from former disposal lagoons, followed by infilling and restoration.

This document has been prepared to support a planning application for the Proposed Development

For the purposes of this BMA, the Site is defined as the extent of the main operational site (the Development Area) which is 'on-site'. The main operational site boundary used for this assessment is shown in Figure 1, Appendix A to this document. Presently, no off-site habitat creation or enhancement is proposed or required.

All landscape design and subsequent net gain calculations provided within this document are indicative and subject to change as the project progresses. Due to the development timescale (cumulatively the phases total over 22 years) requirements and constraints may change and design would be required to adapt accordingly. This document provides an indicative overview of the net gain resulting from the Proposed Development, revised calculations would be undertaken per stage when landscaping is finalised, and all requirements are known. The Outline Monitoring and Mitigation plan[2] details the phased approach and all ongoing survey requirements.

Current proposals are based on significant stakeholder consultation, they would enhance the biodiversity of the Site in cohesion with the neighbouring SSSI, LWS, woodland and wetland. The restoration scheme has been carefully considered to deliver as much Local Biodiversity Action Plan[6] priority habitat as possible proposed habitats include: open water; reedbeds; ditches; wet grassland; species rich grassland; ruderal vegetation; and semi-improved grassland (required to maintain grazing opportunities for the long-standing local tenant farmer). A variety of common and protected species would benefit from this habitat creation, as development progresses species specific amendments may be made to phase landscaping design as required.

The Site defined for the purposes of the BMA represents the maximum extent of all the Main Operational Site (Figure 1, Appendix A). The Main Operational Site encompasses all permanent works within the red line boundary. Due to the phased nature of the Proposed Development, areas of temporary works to accommodate the haul road and optimisation works are not included within this overarching net gain assessment. The BMA Site, measuring 105.84 ha in extent, at the time of this assessment is shown on Figure 1, Appendix A.

All terms referenced throughout this report are defined in the Environmental Statement.

[2] Arcus (2023) Outline Monitoring and Mitigation Plan. Retford Circular Economy Project, Lound Hive Limited, February 2023.

3 BIODIVERSITY NET GAIN

In accordance with CIEEM's guidance[3] biodiversity net gain (BNG) is a '*Development that leaves biodiversity in a better state than before, and an approach where developers work with local governments, wildlife groups, landowners and other stakeholders in order to support their priorities for nature conservation'*.

BNG ensures a positive outcome for biodiversity, following a mitigation hierarchy which sets out that everything possible must be done to firstly avoid, then minimise or finally restore losses of biodiversity on Site. As a last resort, losses may be compensated for using off Site mitigation. This accounts for biodiversity losses which were otherwise not fully assessed within legal and planning systems, allowing stakeholders to demonstrate adherence to national legislation and local policy through a quantifiable means.

This report uses the Department for Environment, Food & Rural Affairs (DEFRA) Biodiversity Metric 3.1 Calculation Tool Beta Test[1] (republished April 2022) to produce a quantifiable amount of biodiversity units produced post-construction, and compare them to the baseline biodiversity unit's pre-construction to determine if the Development would result in a net gain or net loss in biodiversity.

[3] Biodiversity Net Gain: Good practice principles for development, a practical guide [Online] Available at: https://cieem.net/resource/biodiversity-net-gain-good-practice-principles-for-development-a-practical-guide/ (Accessed February 2023)

4 POLICY AND LEGISLATION BACKGROUND

4.1 National Biodiversity Net Gain Policy

The updated National Planning Policy Framework[4] (NPPF) published in July 2021 states (Paragraph 174) that:

"Net gain in planning describes an approach to development that leaves the natural environment in a measurably better state than it was beforehand."

The updated PPG provides examples of how biodiversity net gain can be achieved. Suggested measures include "creating new habitats" and "enhancing existing habitats".

Biodiversity net gain is also reflected within the Government's 25 Year Plan to Improve the Environment[5]:

Policy 1 *'Embedding an 'environmental net gain' principle for development, including housing and infrastructure.' 'Current policy is that the planning system should provide biodiversity net gains where possible. We will explore strengthening this requirement for planning authorities to ensure environmental net gains across their areas, and will consult on making this mandatory.*

4.2 Local Biodiversity Net Gain Policy

Policy SP2 of the Nottinghamshire Minerals Local Plan, Adopted March 2021[6] concludes that restoration should be biodiversity led and should seek to '*maximise biodiversity gains and achieve a net gain in biodiversity, in accordance with the targets and opportunities identified within the Nottinghamshire Local Biodiversity Action Plan'.*

In line with the Nottinghamshire Biodiversity Action Plan (LBAP) priority habitats that should be created or restored/enhanced in the Trent and Idle Valleys are:

- Floodplain and Grazing Marsh;
- Reedbed;
- Marsh and Swamp;
- Lowland Fen;
- Wet Woodland;
- Other habitats such as Lowland Neutral Grassland and Mixed Ash-dominated Woodland may also be appropriate in some cases, and there are also potential opportunities for Lowland Dry Acid Grassland and Oak-birch Woodland in some eastern areas of the Trent Valley.

4.3 Proposed Mandatory Biodiversity Net Gain Legislation

The Environment Bill received Royal Assent in November 2021 to become the Environment Act 2021[7], which mandates biodiversity net gain with it. The key measures relating to Biodiversity Net Gain are set out within Schedule 14:

- The submission by the developer of a 'biodiversity gain plan';

[4] Ministry of Housing, Communities and Local Government (2021) National Planning Policy Framework [Online] Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1004408/NPPF_JULY_2021.pdf (Accessed February 2023)

[5] Gov.uk (2021) 25 Year Environment Plan [Online] Available at: https://www.gov.uk/government/publications/25-year-environment-plan (Accessed February 2023)

[6] Nottinghamshire Local Mineral Plan Policy SP2, Available at: Minerals Local Plan | Nottinghamshire County Council (Accessed February 2023)

[7] Environment Act (2021) Available at: https://www.legislation.gov.uk/ukpga/2021/30/contents/enacted (Accessed February 2023)

- Achievement of a biodiversity net gain of 10%;
- Application of a biodiversity metric produced and published by the Secretary of State;
- Fixing the pre-development biodiversity value to a pre-determined reference date of 30 January 2020; and
- Maintenance of the biodiversity enhancements for at least 30 years after the development is completed.

Following Royal Assent, there is a two-year transition period before the full biodiversity net gain requirements of the Act come into effect.

5 METHODOLOGY

5.1 Overview

This report has been produced in accordance with the methodology set out in the following guidance documents:

- The Biodiversity Metric 3.1 – User Guide[8]; and
- The Biodiversity Metric 3.1 – Technical Supplement[9].

Appendix B shows the inputs and results produced by the metrics, also included is the completed Metric 3.1 workbook. The baseline pre-construction biodiversity units were based on the Phase 1 Habitat surveys undertaken by Arcus, which are detailed in the Ecology Survey Report[10]. The post-construction biodiversity units are based on the Indicative Restoration Landscape Masterplan (provided in Appendix C).

5.2 Good Practice Principles

CIEEM sets out a series of good practice principled for biodiversity net gain (BNG)[11]. Table 2 describes compliance with these principles throughout the Development process.

Table 2: CIEEM's UK good practice principles for biodiversity net gain and evidence of compliance.

Principle	In Practice	Justification
1. Apply the mitigation hierarchy	Do everything possible to first avoid and then minimise impacts on biodiversity. Only as a last resort, and in agreement with external decision-makers where possible, compensate for losses that cannot be avoided. If compensating for losses within the development footprint is not possible or does not generate the most benefits for nature conservation, then offset biodiversity losses by gains elsewhere.	Due to the nature of the Proposed Development, limited habitat can be retained, habitats to be lost include those of high, medium and low distinctiveness. Where possible boundary woodland is retained. All losses have been compensated for within the Proposed Development footprint as demonstrated by the BMA calculation. A variety of higher value habitats have been incorporated within landscape plans, including: woodland, standing water and reedbeds. A variety of external bodies have been engaged throughout this process to ensure the best outcomes for nature, these include: Natural England, Nottinghamshire Wildlife Trust and Nottinghamshire County Council.
2. Avoid losing biodiversity that cannot be offset by gains elsewhere	Avoid impacts on irreplaceable biodiversity - these impacts cannot be offset to achieve No Net Loss or Net Gain.	A majority of habitats are to be lost in line with the Proposed Development, including those of moderate distinctiveness (broadleaved woodland, mixed woodland, scrub and gorse scrub) and high distinctiveness (felled woodland). Retained habitat is limited to boundary woodland which would be enhanced in line with the Proposed Development. All losses are replaced with habitat of a comparable category with equal or higher distinctiveness and ecological value. Equality of offsets are demonstrated within the trading rules section of the net gain calculator; currently this is not

[8] Natural England (2022) The Biodiversity Metric 3.1 – User Guide [Online] Available at: http://publications.naturalengland.org.uk/publication/6049804846366720 (Accessed February 2023)

[9] Natural England (2022) The Biodiversity Metric 3.1 – Technical Supplement – Beta Edition [Online] Available at: http://publications.naturalengland.org.uk/publication/6049804846366720 (February 2023)

[10] Arcus (2023) Environmental Statement Technical Appendix 8.1. Ecology Survey Report. Retford Circular Economy Project. Lound Hive Limited. February 2023.

[11] Baker et al (2016) Biodiversity net gain. Good practice principles for development, A practical guide. CIEEM, IEMA, CIRIA, UK. ISBN 978-0-86017-791-3.

		satisfied for high distinctiveness habitats (only felled woodland remains to be satisfactorily offset). Prior to the commencement of each phase individual biodiversity net gain assessments would be undertaken as necessary and (if identified) deficits would be addressed where possible at that time. The design aims to provide post-construction pastoral land required by the landowner for agricultural land use, whilst adjacent habitats are to be developed to align with local planning policies, local guidance and meeting the biodiversity-led expectations of stakeholders. Currently this is not achieved, as trading rules within the metric are not satisfied, however with biodiversity led development per phase, net gain in line with local objectives is attainable.
3. Be inclusive and equitable	Engage stakeholders early, and involve them in designing, implementing, monitoring, and evaluating the approach to Net Gain. Achieve Net Gain in partnership with stakeholders where possible and share the benefits fairly among stakeholders.	A variety of stakeholders were engaged early in the planning process, this includes consultation regarding landscape design and restoration with Natural England in July 2021, Nottinghamshire Wildlife trust in August 2021 and January 2022 and Nottinghamshire County Council in March 2022 (scoping response received in October 2022). The Applicant also held a public consultation. All responses are detailed within the Outline Restoration Strategy[12]. The approach of seeking reinstatement of the current agricultural land use and the existing footpath also accords with this principle.
4. Address Risk	Mitigate difficulty, uncertainty and other risks to achieving Net Gain. Apply well-accepted ways to add contingency when calculating biodiversity losses and gains in order to account for any remaining risks, as well as to compensate for the time between the losses occurring and the gains being fully realised.	The restoration design includes for gains in condition for each proposed habitat type to provide a realistically achievable net gain outcome that exceeds 10%. The restoration strategy details anticipated habitat management and monitoring. The restoration will be subject to a suitable aftercare period, in accordance with the Environment Act[7] (including the as yet unpublished results of consultation[13]), and will be agreed with the LPA. Due to the phased nature of the Proposed Development, on-going baseline survey and BNG re-assessment per phase is required to mitigate risk associated with natural temporal changes in the baseline, currently unforeseen design changes and potential amendments in legislation. For this reason, individual per phase BMA would also be undertaken to minimise risk, this overarching BMA is for indicative purposes only.
5. Make a measurable net gain contribution.	Achieve a measurable, overall gain for biodiversity and the services ecosystems provide while directly contributing towards nature conservation priorities.	Measurable net gain demonstrated through the Defra biodiversity metric, with a net gain on all assessed metrics (area habitats, rivers and hedgerows) in excess of the 10% net gain that would be required under the Environment Act 2021[7]. Habitat types proposed for creation/enhancement reflect those that are typically present in the local landscape to provide improved habitat connectivity and quality of habitats within the local landscape. The Outline Restoration Strategy[12] details each

[12] Arcus (2023) Outline Restoration Strategy. Retford Circular Economy Project. Lound Hive Limited. February 2023.

		proposed habitat, species specific benefits and contributions toward local nature conservation priorities[12.]
6. Achieve the best outcomes for biodiversity	Achieve the best outcomes for biodiversity by using robust, credible evidence and local knowledge to make clearly-justified choices when: Delivering compensation that is ecologically equivalent in type, amount and condition, and that accounts for the location and timing of biodiversity losses; Compensating for losses of one type of biodiversity by providing a different type that delivers greater benefits for nature conservation; Achieving Net Gain locally to the development while also contributing towards nature conservation priorities at local, regional and national levels; Enhancing existing or creating new habitat; and Enhancing ecological connectivity by creating more, bigger, better and joined areas for biodiversity.	Full details of habitat creation are provided within the biodiversity net gain calculation. The calculation and associated baseline assessment would also be updated on a phase-by-phase basis to reduce risks and provide a timeline accurate assessment as detailed within the Outline Monitoring and Mitigation Plan[2]. The Outline Restoration Strategy[12] details all proposed habitats, justification for their inclusion and contribution towards broader nature conservation priorities.
7. Be additional	Achieve nature conservation outcomes that demonstrably exceed existing obligations (i.e., do not deliver something that would occur anyway).	Without development the Site would be retained at its current predominantly pastoral baseline. In line with the Proposed Development, significant habitat creation would occur providing enhancements both on Site and in the local area due to increased connectivity. Creation includes habitats targeted in the Nottinghamshire Minerals Local Plan[6], not currently present on Site.
8. Create a Net Gain legacy	Ensure Net Gain generates long-term benefits by: Engaging stakeholders and jointly agreeing practical solutions that secure Net Gain in perpetuity; Planning for adaptive management and securing dedicated funding for long-term management; Designing Net Gain for biodiversity to be resilient to external factors, especially climate change; Mitigating risks from other land uses; Avoiding displacing harmful activities from one location to another; and	Net gain would be achieved in phases for the longevity of the Development process (22 years) and for the required aftercare period (the longevity of which will be agreed with the LPA in accordance with the Environment Act[7],including the as yet unpublished results of consultation[13]). An outline of all required habitat management measures is provided within the Outline Restoration Strategy[12], this also details the requirement for an agreed aftercare plan and monitoring for each phase. Audit reports of this activity should be submitted to the local authority and remedial actions implemented as appropriate, with replacement alternative planting of more resilient plant species where required. The Applicant/site operator would provide funding for the long-term management of the Site where applicable. It is not anticipated that there would be risks from other land uses or that there would be displacement of harmful

	Supporting local-level management of Net Gain activities.	activities from one location to another. However, this would be monitored over the longevity of the Proposed Development.
9. Optimise sustainability	Prioritise Biodiversity Net Gain and, where possible, optimise the wider environmental benefits for a sustainable society and economy.	The Proposed Development is for the extraction of PFA, a sustainable secondary aggregate and cement substitute, from former disposal lagoons. The Proposed Development would contribute very significantly towards the government Net Zero Strategy. A key component of the strategy is to encourage the adoption of circular economy practices whereby resource utilisation and productivity is maximised. This includes schemes for end-of-life recycling of goods and materials, for reuse as lower carbon inputs for new products. A key component of the strategy also includes reducing carbon emissions from the most polluting industries, which the Proposed Development would facilitate. Further detail is provided in ES Chapter 15, Climate Change.
10. Be transparent	Communicate all Net Gain activities in a transparent and timely manner, sharing the learning with all stakeholders.	All biodiversity net gain calculations, this BMA report, the outline restoration strategy, the outline monitoring and mitigation plan, all survey results and an Environmental Statement, including Ecology Chapter (ES Chapter 8), have been submitted in line with this application. Combined, these provide significant detail on the baseline, potential impacts, mitigation, and enhancement opportunities. Stakeholders have been engaged throughout the planning process and encouraged to provide feedback, which has been implemented into assessment and design as appropriate.

5.3 Assumptions

5.3.1 Outline Strategy

The DEFRA consultation on biodiversity net gain[13], which closed in April 2022, stated that phased developments, such as this, will require flexibility to accommodate changes over time, particularly where development is delivered over a long period. The Proposed Development is phased over an approximate 22-year period, with site establishment followed by phased extraction and restoration.

An indicative net gain calculation has been produced to give an indication of net gain feasibility for the Main Operational Site. Prior to the commencement of each phase, update baseline assessments and surveys would be undertaken as required. This information would be used to calculate an accurate net gain score per phase. This net gain calculation provides an overview of how 10% net gain could be achieved on site, intermediate phase calculations would be undertaken to provide a net gain value accurate to conditions at the time of phase commencement. This would reflect any required design changes, currently unknown due to the longevity of the construction phase.

Currently, a one-year delay in habitat creation has been incorporated into the overarching net gain calculation to account for the phased approach as delays are not currently defined within the methodology. This delay assumes there is no more than one year between the completion of PFA removal and habitat creation; it is recognised that this will not be

[13] Defra (2022) Consultation on Biodiversity Net Gain Regulations and Implementation. January 2022. Available at: Consultation on Biodiversity Net Gain Regulations and Implementation - Defra - Citizen Space (Accessed February 2023)

possible for all phases, any variation would be captured in the intermediary phase net gain calculations. The individual phase net gain assessments would provide a more accurate representation of baseline habitats, creation delays and therefore results; it is these figures the client would be held legally accountable for (not the indicative results presented within this report).

5.3.2 Baseline

The baseline areas included in the BMA were assessed by qualified; Arcus Ecologists and the conditions and areas have been verified and are known to be true. All habitat categories are allocated in line with the UK Habitat Classification System (UKHab)/ Phase 1 translation provided within the Metric 3.1 calculator.

5.3.3 Post-Development

The Development footprint for the purposes of the BMA is shown on the figure in Appendix C and referred to as the Site boundary.

The proposed wet grassland has been attributed to 'other neutral grassland' in the BMA as it does not comply with conditions required for 'wetland – purple moor grass and rush pastures' or 'wetland – reedbeds'. Other neutral grassland was considered the most appropriate designation.

Whilst mixed ash-dominated woodland was identified within the Nottignhamshire LBAP, this was not considered suitable for the woodland proposed on Site due to the risk of ash die back leading to condition failure. Instead, a mixed species native woodland mix is proposed.

5.4 On-Site Assessment

5.4.1 Baseline, Pre-construction Biodiversity Units

Baseline habitat information was taken from the most recent Phase 1 Habitat Survey undertaken by a professional Ecologist in February 2021 and a walkover to determine any changes in conditions in August 2021[10].

Identified baseline habitats within the Site include:

- Broadleaved woodland – plantation;
- Recently felled woodland - broadleaved;
- Scrub - dense/continuous;
- Scattered scrub;
- Scattered trees – Coniferous;
- Improved grassland;
- Poor semi-improved grassland;
- Other tall herb and fern – tall ruderal
- Intact hedge – species-poor; and
- Bare ground.

The list of habitats provided in the Metric 3.1 calculator are not all directly comparable with the habitats identified within the Site. As a result, professional judgement has been used to best match habitat types to those available within the Metric 3.1 calculator. This follows the approach set out in the applicable guidance documents.

The condition of the habitats has been determined by a professional Ecologist and the area or length of habitats have been estimated using online mapping.

Justification of habitat allocation and condition assessments are detailed in Table 3 overleaf using Natural England's Biodiversity Metric 3.1[1] and the UK Habitat Classification, Habitat Definitions Version 1.0.

Table 3: Baseline Habitat Translations and Condition Assessments

JNCC	UKHab	UKHab Note	Condition	Condition Note
Bare ground	Vacant/derelict land/ bare ground	Tracks are bare ground rather than developed sealed surface.	Poor	No variance in vegetation as vegetation not present, no provision for insects, birds or bats. No diverse range of flowering plant species. No invasive non-native species present.
Broadleaved woodland – plantation	Other woodland; broadleaved	Most appropriate class of woodland. Plantation.	Moderate	Limited number of age classes present, clear similar age of trees, limited understorey. No significant browsing damage evident in woodland, no invasive species present in woodland, limited tree mortality evident.
Broadleaved woodland– Recently felled	Woodland and forest – felled	Most appropriate class of woodland.	Good	No assessment required – condition fixed at good. Original category of woodland undetermined.
Coniferous scattered trees	Woodland and forest – other coniferous woodland	Most appropriate class of woodland.	Poor	Mature conifers of uniform structure and age.
Improved grassland	Grassland – modified grassland	Most appropriate class of grassland.	Moderate	Absence of invasive non-native species, cover of bracken is less than 20%, cover of bare ground is between 1% and 10%, scrub accounts for less than 20% of total area and there are between 6-8 species per m^2.
Other tall herb and fern - ruderal	Sparsely vegetated land – Ruderal/ ephemeral	Most appropriate class of sparsely vegetated land.	Poor	Cover of bracken, scrub and trees less than 25% and absence of invasive non-native species.
Poor semi-improved grassland	Grassland – modified grassland	As grassland was species poor semi-improved it was closer to modified grassland rather than other neutral grassland.	Poor	Short non-varied sward with bare earth covering more than 10%.
Dense scrub	Heathland and shrub – gorse scrub	Most appropriate class of heathland and shrub.	Moderate	Gorse scrub is dominant along the northern and southern boundaries, this is dense with some clearings, contained by post and wire fencing.
Dense and scattered scrub	Heathland and shrub – mixed scrub	Most appropriate class of heathland and shrub.	Moderate	Scrub is present on field margins throughout the Site, largely contained by post and wire fencing although in some locations

				more of an ecotone is present between woodland, scrub and grassland.

5.4.2 Post Construction Biodiversity Units

Following construction, new habitats as stipulated in the Indicative Restoration Landscape Masterplan (Appendix C) would be created. The masterplan provides an outline of the Site landscaping upon completion of the approximate 22 year phased approach. Habitats include:

- Native species woodland mix;
- Pasture;
- Species rich verge;
- Wet meadow mix;
- Reedbeds;
- Scattered trees;
- Access tracks;
- Ditches;
- Open water; and
- Native hedgerows with trees.

Habitat to be enhanced includes:

- Poor condition native hedgerow would be retained and supplemented with tree planting, condition would remain unchanged, however the hedgerow type is enhanced to a higher distinctiveness; and
- Moderate condition broadleaved woodland which would be improved to good condition through appropriate management and coppicing.

Justification of habitat allocation and condition assessments are detailed in Tables 4 and 5 overleaf. Proposed habitat creation and enhancement as described in section 5.3.2 and defined in Tables 4 and 5 would be delivered through the Proposed Development and would be managed and monitored with reference to a management plan specific to each phase.

Table 4: Post Development Habitat Translations and Condition Assessments

Landscape reference	UKHab	Condition	Condition Note
Native Species Woodland Mix	Woodland and forest: Other woodland; broadleaved	Moderate	Species to include: field maple, alder, birch, hazel, crab apple, wild cherry, oak, goat willow, small-leaved lime, common oak, sessile oak, hazel, and hawthorn. The woodland should be managed through natural regeneration through thinning scarification and planting. The woodland would be protected from invasive grazing (including deer). Haloing would be undertaken to release potential future veteran trees, further detail is provided within the Restoration Strategy[12].
Pasture	Grassland: Modified grassland	Moderate	A bespoke mix of native grasses and red and white clover. Management through seasonal grazing at appropriate stocking rates and manual removal of pernicious weeds as required (further detail provided in the Restoration Strategy[12]).
Species Rich Verge	Grassland: Other neutral grassland	Moderate	Strip or inoculation seeding of typical hedgerow verge species. Using local provenance seed or 'Green Hay' transfers in either linear swathes or large scrapes (approximately 3 to 5 m^2). Manual removal of pernicious weeds as required, further detail on management is provided within the Restoration Strategy[12].
Wet Meadow Mix	Grassland: Other neutral grassland	Moderate	Appropriate species selection to be confirmed after a soil test to ensure success. Wet grassland would be subject to appropriately managed grazing. Further detail on management is provided within the Restoration Strategy[12].
Reedbeds	Wetland: reedbeds	Moderate	Reedbeds present around open waterbodies. Reedbeds would either be sown with locally sourced reed species seeds into saturated soil or directly planted into submerged soil. Reedbeds should be cut on a 5-year rotation with management of scrub to ensure an open structure is retained. Reedbed habitat creation is identified in the Nottinghamshire Minerals Local Plan[6]. An outline management approach is provided within the Restoration Strategy[12].
Waterbody	Lakes: Reservoirs	Moderate	Open water with islands, surrounded by reedbeds and wet meadow mix. Monitoring and management are required to maintain water quality. Vegetation on the water's edge should also be managed to prevent excessive shading. Further detail on management is provided within the Restoration Strategy[12].
Scattered Trees	Woodland and forest: wood-pasture and parkland.	Poor	40 scattered trees (a mixture of whips and standards) to be planted on the species rich verge adjacent woodland in the west of the Site. Species to include: common oak, sessile oak, hawthorn, hazel, holly, and alder. It is unlikely mature trees would have established within the 11-year time target condition therefore condition is set at poor. This is attainable with suitable grassland management and tree protection measures. Further detail on management is provided within the Restoration Strategy[12].

Ditches	Ditches	Moderate	Water levels to be managed to ensure ditches do not dry out, an open aspect should also be maintained throughout habitat management and the watercourse should not be overshaded. Further detail on management is provided within the Restoration Strategy[12].
Tracks and footpaths	Urban: Developed land; sealed surface	N/A	Proposed tracks and footpaths throughout the Proposed Development.
Native Hedgerow with trees	Native species rich hedgerow with trees	Moderate	Species to include: field maple, hawthorn, hazel, spindle, holly, honeysuckle, wild cherry, and dog rose. Hedgerows should be managed in winter months and protected from browsing. Hedgerow trees would be planted as standards. Further detail on management is provided within the Restoration Strategy[12].

All other habitats are low or very low value and are automatically assigned poor condition (introduced shrub, vegetated garden or hardstanding for example) or do not require a condition.

Table 5: Post Development Enhancements and Condition Assessments

Baseline Habitat	**Change in Habitat**	**Condition Change**	**Condition Note**
Other woodland; broadleaved	N/A	Moderate-Good	Coppicing regime to enhance woodland and provide a range of habitats and a variety of open glades. Haloing would be undertaken to promote establishment and growth of potential veteran trees.
Native Hedgerow	Native Hedgerow-Native Hedgerow With Trees	Poor-Poor	Hedgerow enhancement limited to tree planting across entirety of length and associated appropriate management.

6 RESULTS

6.1 Summary

Full results produced by the Metric 3.1 calculator can be found in Appendix B of this report.

The metric has shown there to be an 12.66% net gain in biodiversity habitat units on-Site. The number of habitat units on-Site has increased from 542.17 to 610.83. There is also a 917.12% net gain in hedgerow units within the Site which have increased from 0.92 to 9.4. Whilst 917.12% net gain in hedgerows appears to be an inordinate increase, this figure is reflective of the low baseline hedgerow score, all hedgerow proposed creation is proportionate to the size of the Site and achievable. River units have also increased from 0 to 29.18. Due to the baseline river value of zero percentage net gain value of 100% is automatically attributed.

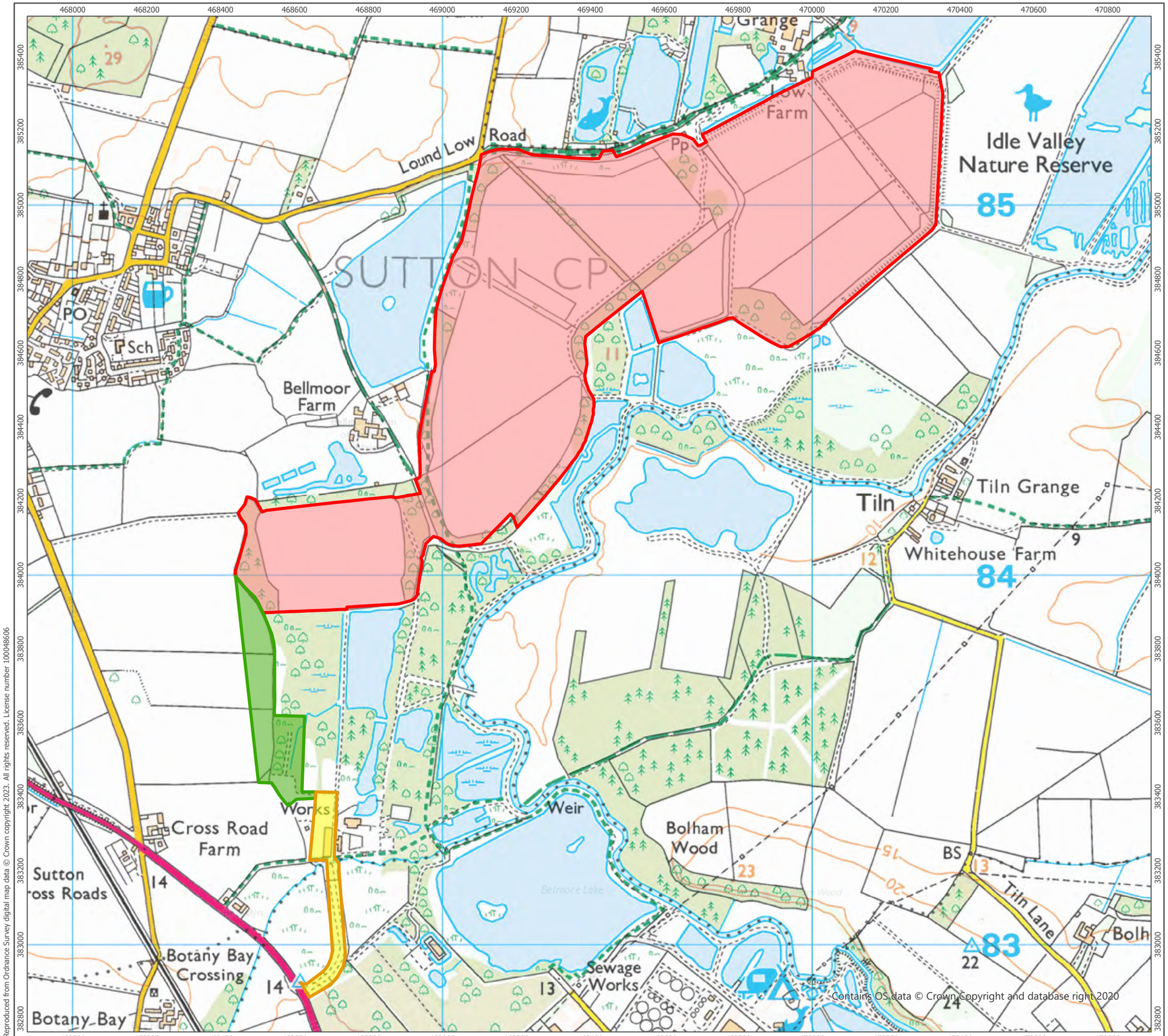
Version 3.1 of the metric contains a trading metric, that supports the delivery of LPA policy to protect priority habitats, through requiring 'like for like' habitat replacement for all high distinctiveness habitat types. Rule 3 of the metric is: *"'Trading down' must be avoided. Losses of habitat are to be compensated for on a "like for like" or "like for better" basis. New or restored habitats should aim to achieve a higher distinctiveness and/or condition than those lost. Losses of irreplaceable or very high distinctiveness habitat cannot adequately be accounted for through the metric."* Currently trading rules are not met, this relates solely to the loss of felled woodland (a high distinctiveness habitat) within the Site; however, other local priority habitat types would be created, including reedbeds and grazed wet grassland suited to the Site conditions and in line with the Restoration Strategy.

The proposed development would secure measurable biodiversity net gain which broadly accords with national planning policy as set out in Paragraph 170 of the NPPF and Local Planning policy. This conclusion has been reached based on the Indicative Restoration Landscape Masterplan (Appendix C). As discussed, due to the phased approach to Development, individual net gain calculations would be completed prior to the commencement of each phase, as necessary. These would accurately depict delays in habitat creation and additional species-specific habitat creation requirements, neither of which can be confirmed currently due to the timescale of development.

7 CONCLUSION

Through habitat creation and enhancement detailed in the EcIA, and the Indicative Restoration Landscape Masterplan (Appendix C), the Proposed Development would deliver an overall net gain of 12.66%. This exceeds the statutory requirement to provide a minimum 10% biodiversity net gain as stipulated by the Environment Bill 2021. Individual calculations will be undertaken prior to the commencement of each Phase 1 Habitat survey to corroborate this value and provide updates when development design and potential additional constraints are more clearly defined.

APPENDIX A – FIGURES



ARCUS

- A - Main Operational Site (BMA Site)
- B - Conveyor and Link Road
- C - Temporary Optimisation Site / Main Processing Site

1:10,000 Scale @ A3

0 230 460 m

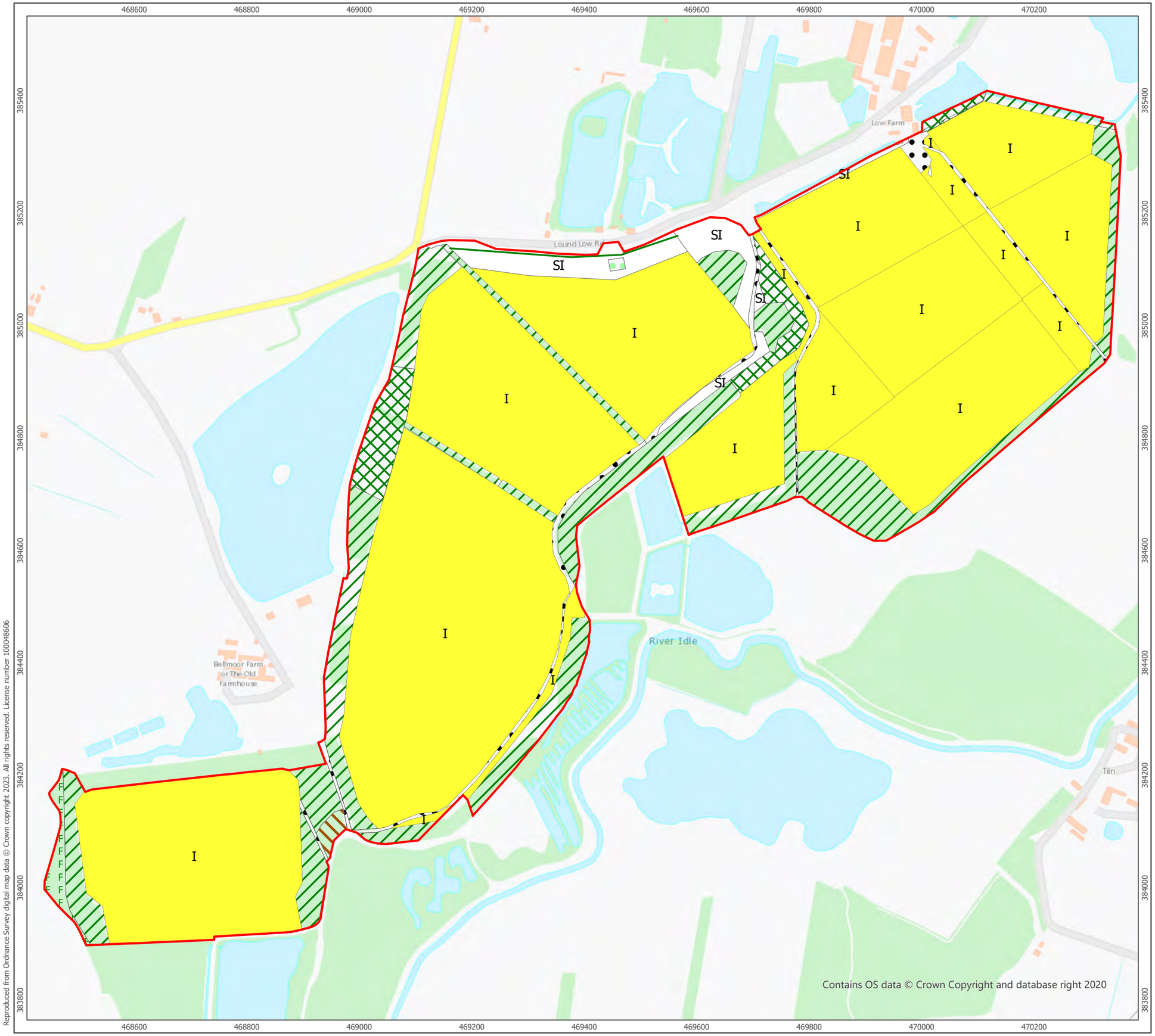
NORTH

Produced By: HS	Ref: 4092-REP-057
Checked By: DH/ DN	Date: 02/02/2023

BMA Assessment Area
Figure 1

Retford Circular Economy Project
TA 8.4: Biodiversity Net Gain Assessment

Y:\GIS\Ecology\Projects\4092 Lound Ash Extraction\4092 Lound Ash Extraction.aprx\4092-REP-057 Fig 1 BMA Assessment Area



ARCUS

- A - Main Operational Site (BMA Site)
- Urban: Bare Ground
- Woodland: Other Woodland - Broadleaved - plantation
- Woodland: Felled
- Woodland: Other Coniferous Woodland
- I — Grassland: Modified Grassland (Improved)
- Sparsely Vegetated Land: Ruderal
- SI — Grassland: Modified Grassland (Poor Semi-Improved)
- Heathalnd and Shrub: Gorse Scrub
- Heathalnd and Shrub: Mixed Scrub
- Native Hedgerow

1:6,500 Scale @ A3

0 150 300 m

NORTH

Produced By: HS	Ref: 4092-REP-058
Checked By: DH/DN	Date: 02/02/2023

Baseline Habitat Map
Figure 2

Retford Circular Economy Project TA 8.4: Biodiversity Net Gain Assessment

Y:\GIS\Ecology\Projects\4092 Lound Ash Extraction\4092 Lound Ash Extraction.aprx\4092-REP-058 Fig 2 Baseline Habitat Map

APPENDIX B – BMA CALCULATIONS

On-site baseline	*Habitat units*	542.17
	Hedgerow units	0.92
	River units	0.00
On-site post-intervention (Including habitat retention, creation & enhancement)	*Habitat units*	610.83
	Hedgerow units	9.40
	River units	29.18
On-site net % change (Including habitat retention, creation & enhancement)	*Habitat units*	12.66%
	Hedgerow units	917.12%
	River units	0.00%
Off-site baseline	*Habitat units*	0.00
	Hedgerow units	0.00
	River units	0.00
Off-site post-intervention (Including habitat retention, creation & enhancement)	*Habitat units*	0.00
	Hedgerow units	0.00
	River units	0.00
Total net unit change (including all on-site & off-site habitat retention, creation & enhancement)	*Habitat units*	68.66
	Hedgerow units	8.47
	River units	29.18
Total on-site net % change plus off-site surplus (including all on-site & off-site habitat retention, creation & enhancement)	*Habitat units*	12.66%
	Hedgerow units	917.12%
	River units	100.00%
Trading rules Satisfied?	No - Check Trading Summary ▲	

Lound PFA Extraction

A-1 Site Habitat Baseline

Condense / Show Columns | Condense / Show Rows | Main Menu | Instructions

	Habitats and areas			Distinctiveness		Condition		Strategic significance			Suggested action to address habitat losses	Ecological baseline
Ref	Broad Habitat	Habitat Type	Area (hectares)	Distinctiveness	Score	Condition	Score	Strategic significance	Strategic significance	Strategic Significance multiplier		Total habitat units
1	Urban	Vacant/derelict land/ bareground	1.82	Low	2	Poor	1	Location ecologically desirable but not in local strategy	Medium strategic significance	1.1	Same distinctiveness or better habitat required ≥	4.00
2	Woodland and forest	Other woodland, broadleaved	15.78	Medium	4	Moderate	2	Location ecologically desirable but not in local strategy	Medium strategic significance	1.1	Same broad habitat or a higher distinctiveness habitat required (≥)	138.86
3	Woodland and forest	Felled	0.53	High	6	Good	3	Location ecologically desirable but not in local strategy	Medium strategic significance	1.1	Same habitat required =	10.49
4	Woodland and forest	Other coniferous woodland	0.06	Low	2	Poor	1	Location ecologically desirable but not in local strategy	Medium strategic significance	1.1	Same distinctiveness or better habitat required ≥	0.13
5	Grassland	Modified grassland	81.49	Low	2	Moderate	2	Location ecologically desirable but not in local strategy	Medium strategic significance	1.1	Same distinctiveness or better habitat required ≥	358.56
6	Heathland and shrub	Gorse scrub	2.47	Medium	4	Moderate	2	Location ecologically desirable but not in local strategy	Medium strategic significance	1.1	Same broad habitat or a higher distinctiveness habitat required (≥)	21.74

	Habitats and areas			Distinctiveness		Condition		Strategic significance			Suggested action to address habitat losses	Ecological baseline
Ref	Broad Habitat	Habitat Type	Area (hectares)	Distinctiveness	Score	Condition	Score	Strategic significance	Strategic significance	Strategic Significance multiplier		Total habitat units
7	Heathland and shrub	Mixed scrub	0.04	Medium	4	Moderate	2	Location ecologically desirable but not in local strategy	Medium strategic significance	1.1	Same broad habitat or a higher distinctiveness habitat required (≥)	0.35
8	Sparsely vegetated land	Ruderal/Ephemeral	0.23	Low	2	Poor	1	Location ecologically desirable but not in local strategy	Medium strategic significance	1.1	Same distinctiveness or better habitat required ≥	0.51
9	Grassland	Modified grassland	3.42	Low	2	Poor	1	Location ecologically desirable but not in local strategy	Medium strategic significance	1.1	Same distinctiveness or better habitat required ≥	7.52
10												
11												
12												
13												
14												
		Total habitat area	105.84									542.17

Retention category biodiversity value						Bespoke compensation agreed for unacceptable losses	Comments	
Area retained	Area enhanced	Baseline units retained	Baseline units enhanced	Area habitat lost	Units lost		Assessor comments	Reviewer comments
0	0	0.00	0.00	1.82	4.00		Bare ground. Several unmetalled access tracks were present throughout the Site. Strategic significance score allocated due to location in proximity to LWS	As per assessor comments.
0	4.6	0.00	40.48	11.18	98.38		Broadleaved woodland - plantation. Present along the western, southern, eastern and north-western boundary of the Site. Largely surrounded by post and wire fencing with trees still in guards. Strategic significance score allocated due to location in	As per assessor comments.
0	0	0.00	0.00	0.53	10.49		Broadleaved woodland - recently felled. Felled broadleaved woodland under power lines. To be cleared in line with the development. Strategic significance score allocated due to location in	As per assessor comments.
0	0	0.00	0.00	0.06	0.13		Coniferous Parkland/scattered trees. Mature conifers of uniform structure and age. Strategic significance score allocated due to location in proximity to LWS	As per assessor comments.
0	0	0.00	0.00	81.49	358.56		Improved grassland, sheep grazed, short sward. Strategic significance score allocated due to location in proximity to LWS and SSSI.	As per assessor comments.
0	0	0.00	0.00	2.47	21.74		Dense gorse scrub, largely within post and wire fencing, some areas with clearings/ scattered gorse are present. Strategic significance score allocated due to location in proximity to LWS and SSSI.	As per assessor comments.

Retention category biodiversity value						Bespoke compensation agreed for unacceptable losses	Comments	
Area retained	Area enhanced	Baseline units retained	Baseline units enhanced	Area habitat lost	Units lost		Assessor comments	Reviewer comments
0	0	0.00	0.00	0.04	0.35		Scattered scrub throuhgout boudaries of site, forms ecotone in places. Strategic significance score allocated due to location in proximity to LWS and SSSI.	As per assessor comments.
0	0	0.00	0.00	0.23	0.51		Other tall herb and fern - ruderal. Tall ruderal vegetation scattered in the west of the Site, poor species diversity. Strategic significance score allocated due to location in proximity to LWS and SSSI.	As per assessor comments.
0	0	0.00	0.00	3.42	7.52		Poor semi-improved grassland. Short sward with bare earth patches. Strategic significance score allocated due to location in proximity to LWS and SSSI.	As per assessor comments.
0.00	4.60	0.00	40.48	101.24	501.69			

Total area lost (excluding area of Urban trees and Green walls)	101.24

Lound PFA Extraction

A-2 Site Habitat Creation

Condense / Show Columns | Condense / Show Rows | Main Menu | Instructions

Broad Habitat	Proposed habitat	Area (hectares)	Distinctiveness		Condition		Strategic significance		
			Distinctiveness	Score	Condition	Score	Strategic significance	Strategic significance	Strategic position multiplier
Urban	Developed land; sealed surface	1.31	V.Low	0	N/A - Other	0	Location ecologically desirable but not in local strategy	Medium strategic significance	1.1
Grassland	Modified grassland	31.94	Low	2	Moderate	2	Location ecologically desirable but not in local strategy	Medium strategic significance	1.1
Wetland	Reedbeds	8.56	High	6	Moderate	2	Location ecologically desirable but not in local strategy	Medium strategic significance	1.1
Woodland and forest	Other woodland; broadleaved	6.42	Medium	4	Moderate	2	Location ecologically desirable but not in local strategy	Medium strategic significance	1.1
Grassland	Other neutral grassland	10.47	Medium	4	Moderate	2	Location ecologically desirable but not in local strategy	Medium strategic significance	1.1
Lakes	Reservoirs	8.2	Medium	4	Moderate	2	Location ecologically desirable but not in local strategy	Medium strategic significance	1.1
Grassland	Other neutral grassland	33.22	Medium	4	Moderate	2	Location ecologically desirable but not in local strategy	Medium strategic significance	1.1

Broad Habitat	Proposed habitat	Area (hectares)	Distinctiveness		Condition		Strategic significance		
			Distinctiveness	Score	Condition	Score	Strategic significance	Strategic significance	Strategic position multiplier
Woodland and forest	Wood-pasture and parkland	1.12	V.High	8	Poor	1	Location ecologically desirable but not in local strategy	Medium strategic significance	1.1
	Total habitat area	101.24							
	Site Area (Excluding area of Urban trees and Green walls)	101.24							

Post development/ post intervention habitats

Temporal multiplier						Difficulty multipliers				Habitat units delivered	Comments	
Standard time to target condition/year	Habitat created in advance/years	Delay in starting habitat	Standard or adjusted time to target condition	Final time to target condition/year	Final time to target multiplier	Standard difficulty of creation	Applied difficulty multiplier	Final difficulty of creation	Difficulty multiplier applied		Assessor comments	Reviewer comments
0		1	Standard time to target condition applied	1	0.965	Low	Standard difficulty applied	Medium	0.67	0.00	Access tracks, footpaths through development and animal holding area.	As guided by Outline Restoration Plan.
4		1	Check details- Delay in starting habitat in required condition? ⚠	5	0.837	Low	Standard difficulty applied	Low	1	117.60	Pasture. Bespoke mix of native grasses and red and white clover. Sheep grazed.	As guided by the Outline Monitoring and Mitigation Plan and Outline Restoration Plan.
7		1	Check details- Delay in starting habitat in required condition? ⚠	8	0.752	Medium	Standard difficulty applied	Medium	0.67	56.93	Reedbeds around open waterbodies, either sown or directly planted into submerged soil. Reedbed habitat is targeted for creation in the	As guided by the Outline Monitoring and Mitigation Plan and Outline Restoration Plan.
15		1	Check details- Delay in starting habitat in required condition? ⚠	16	0.566	Low	Standard difficulty applied	Low	1	31.95	Woodland planting. Species rich woodland managed through natural regeneration and protected from grazing.	As guided by the Outline Monitoring and Mitigation Plan and Outline Restoration Plan.
5		1	Check details- Delay in starting habitat in required condition? ⚠	6	0.808	Low	Standard difficulty applied	Low	1	74.40	Species rich verge and species rich island grassland. Seeded using local provenance mix or green hay transfers.	As guided by the Outline Monitoring and Mitigation Plan and Outline Restoration Plan.
5		1	Check details- Delay in starting habitat in required condition? ⚠	6	0.808	Medium	Standard difficulty applied	Medium	0.67	39.04	Open water, to be surrounded by reedbeds and wet meadow mix. Water quality will be managed/ monitored.	Planting, management and monitoring of habitat to be confirmed from supporting documents, such as the Outline Monitoring and Mitigation Plan and Outline
5		1	Check details- Delay in starting habitat in required condition? ⚠	6	0.808	Low	Standard difficulty applied	Low	1	236.07	Wet meadow grassland. Appropriate seed mix to be selected after soil testing to give best chance of success.	Selected seed mix to comply with medium distinctiveness and to enable acheievment of moderate condition.
10		1	Check details- Delay in starting habitat in required condition? ⚠	11	0.676	Very High	Standard difficulty applied	Very High	0.1	0.67	Scattered trees (40 total) on species rich grassland verge to be created using seeds of local provenance or hay transfer.	Age of individual trees to be planted to be confirmed prior to habitat creation/ as per landscape management and prescriptions (i.e. standards or whips). As guided by Outline Monitoring and Mitigation Plan and Outline Restoration Plan.

Lound PFA Extraction

A-3 Site Habitat Enhancement

Condense / Show Columns | Condense / Show Rows | Main Menu | Instructions

Baseline habitats

Baseline ref	Baseline habitat	Total habitat area (hectares)	Baseline distinctiveness band	Baseline distinctiveness score	Baseline condition category	Baseline condition score	Baseline strategic significance	Baseline strategic significance score	Baseline habitat units	Suggested action to address habitat losses
2	Woodland and forest - Other woodland; broadleaved	15.78	Medium	4	Moderate	2	Medium strategic significance	1.1	138.86	Same broad habitat or a higher distinctiveness habitat required (≥)

Proposed

Proposed Broad Habitat
Woodland and forest

Habitat (Pre-populated but can be overridden)

Post development/ post intervention habitats

Proposed habitat	Change in distinctiveness and condition: Distinctiveness change	Change in distinctiveness and condition: Condition change	Area (hectares)	Distinctiveness	Score	Condition	Score	Strategic significance: Strategic significance	Strategic significance: Strategic significance	Strategic significance: Strategic position multiplier
Other woodland; broadleaved	Medium - Medium	Moderate - Good	4.6	Medium	4	Good	3	Location ecologically desirable but not in local strategy	Medium strategic significance	1.1
			4.60							

Temporal risk multiplier / Difficulty risk multipliers / Habitat units delivered / Comments

Temporal risk multiplier: Standard time to target condition/years	Habitat enhanced in advance/years	Delay in starting habitat enhancement/years	Standard or adjusted time to target condition	Final time to target condition/years	Final time to target multiplier	Difficulty risk multipliers: Standard difficulty of enhancement	Applied difficulty multiplier	Final difficulty of enhancement	Difficulty multiplier applied	Habitat units delivered	Comments: Assessor comments	Comments: Reviewer comments
10	0	1	Check details- Delay in starting habitat in required condition? ⚠	11	0.676	Low	Standard difficulty applied	Low	1	54.16	Coppicing regime to enhance woodland and provide a range of habitats and a variety of open glades.	As guided by the Outline Monitoring and Mitigation Plan and Outline Restoration Plan.
										54.16		

B-1 Site Hedge Baseline

Condense / Show Columns | Condense / Show Rows | Main Menu | Instructions

	UK Habitats - existing habitats			Habitat distinctiveness		Habitat condition		Strategic significance			Suggested action to address habitat losses	Ecological baseline
Baseline ref	Hedge number	Hedgerow type	Length (km)	Distinctiveness	Score	Condition	Score	Strategic significance	Strategic significance	Strategic position multiplier		Total hedgerow units
1		Native Hedgerow	0.42	Low	2	Poor	1	Location ecologically desirable but not in local strategy	Medium strategic significance	1.1	Same distinctiveness band or better	0.92

Retention category biodiversity value						Comments	
Length retained	Length enhanced	Units retained	Units enhanced	Length lost	Units lost	Assessor comments	Reviewer comments
	0.42	0.00	0.92	0.00	0.00	Comprises hawthorn only, frequent gaps in woody component, ground flora undesirable showing nutrient enrichment.	Poor condition confirmed through Habitat Condition Assessment with Phase 1 Habitat survey

B-2 Site Hedge Creation

Condense / Show Columns | Condense / Show Rows

Main Menu | Instructions

		Proposed habitats		Habitat distinctiveness		Habitat condition		Strategic significance			Temp		
Baseline ref	New hedge number	Habitat type	Length (km)	Distinctiveness	Score	Condition	Score	Strategic significance	Strategic significance	Strategic position multiplier	Standard Time to target condition/years	Habitat created in advance/years	Delay in starting habitat creation/years
1		Native Species Rich Hedgerow with trees	0.88	High	6	Moderate	2	Location ecologically desirable but not in local strategy	Medium strategic significance	1.1	10		1

Temporal multiplier					Difficulty risk multipliers				Hedge units delivered	Comments	
Habitat created in advance/years	Delay in starting habitat creation/years	Standard or adjusted time to target condition	Final time to target condition/years	Final time to target multiplier	Standard difficulty of creation	Applied difficullty multiplier	Final difficulty of creation	Difficulty multiplier applied		Assessor comments	Reviewer comments
	1	Check details- Delay in starting habitat in required condition? ⚠	11	0.676	Low	Standard difficulty applied	Low	1	7.85	Hedgerow with trees.	As guided by the Outline Monitoring and Mitigation Plan and Outline Restoration Plan.

Lound PFA Extraction

B-3 Site Hedge Enhancement

Condense / Show Columns | Condense / Show Rows | Main Menu | Instructions

Baseline Habitats											Proposed (Pre-populated but can be overridden)
Baseline ref	Baseline habitat	Length (km)	Baseline distinctiveness band	Baseline distinctiveness score	Baseline condition category	Baseline condition score	Baseline strategic significance category	Baseline strategic significance score	Baseline habitat units	Suggested action	
1	Native Hedgerow	0.42	Low	2	Poor	1	Medium strategic significance	1.1	0.924	Same distinctiveness band or better	Native Hedgerow with trees

Post development/ post intervention habitats												
Change in distincitiveness and condition		Length (km)	Distinctiveness		Condition		Strategic significance			Temporal multiplier		
Distinctiveness movement	Condition movement		Distinctiveness	Score	Condition	Score	Strategic significance	Strategic significance	Strategic position multiplier	Standard Time to target condition/years	Habitat enhanced in advance/years	Delay in starting habitat enhancement/years	Standard or adjusted time to target condition
Low - Medium	Lower Distinctiveness Habitat - Poor	0.42	Medium	4	Poor	1	Location ecologically desirable but not in local strategy	Medium strategic significance	1.1	10	0	1	Check details- Delay in starting habitat in required condition? ⚠

		Difficulty risk multipliers				Hedge units delivered	Comments	
Final time to target condition/years	Final Time to target multiplier	Standard difficulty of enhancement	Applied difficulty multiplier	Final difficulty of enhancement	Difficulty multiplier applied		Assessor comments	Reviewer comments
11	0.676	Low	Standard difficulty applied	Low	1	1.55	Enhancement limited to tree planting along length	As guided by the Outline Monitoring and Mitigation Plan and Outline Restoration Plan

C-2 Site River Creation

Condense / Show Columns | Condense / Show Rows | Main Menu | Instructions

	Proposed habitats		Habitat distinctiveness		Habitat condition		Strategic significance			Temporal multiplier				
Baseline ref	River type	Length (km)	Distinctiveness	Score	Condition	Score	Strategic significance	Strategic significance	Strategic position multiplier	Standard Time to target condition/years	Habitat created in advance/years	Delay in starting habitat creation/years	Standard or adjusted time to target condition	Final time to target condition/years
1	Ditches	3.927	Medium	4	Moderate	2	Delivery within Priority Habitats for Restoration	High strategic significance	1.15	5		1	Check details- Delay in starting habitat in required condition? ⚠	6

		Difficulty multipliers				Watercourse encroachment		Riparian encroachment		River units delivered	Comments	
Final time to target condition/years	Final Time to target multiplier	Standard difficulty	Applied difficullty multiplier	Final difficulty of creation	Difficulty multiplier applied	Extent of encroachment	Multiplier	Extent of encroachment	Multiplier		Assessor comments	Reviewer comments
6	0.808	Low	Standard difficulty applied	Low	1	No Encroachment	1	No Encroachment	1	29.18	Water levels to be managed to ensure ditches do not dry out, an open aspect should also be maintained throughout habitat management and the watercourse should not be overshaded. As	Habitat to be created as per assessor comments

APPENDIX C – INDICATIVE RESTORATION LANDSCAPE MASTERPLAN

N

Existing hedgerow retained and supplemented with tree planting

Sutton/BOAT7

Wet grassland to include parcels restored at a lower level than surrounding land, bounded by ditches and waterbodies, and created with an undulating profile to provide varying degrees of saturation. Other measures to encourage seasonal inundation may include scrapes and foot drains to provide some standing water and muddy edges to enhance foraging opportunities for bird species into spring. Ongoing groundwater monitoring and modelling would be carried out to inform the detailed design of landform features and management of the habitat.

Naturalistic slopes and gradients would be created throughout. Backfilling of the lake voids would enable a 50mm to 1 m deep edge with a gentle slope profile of 1:10 to 1:40 for wetland vegetation to establish. Subtly varied land levels and channels where lake edge backfilling is to occur would produce variations in water depth and create micro habitats and increase biodiversity potential. Water depths in excess of 1.5 m in the centre of the water body would prevent reed bed dominance and maintain open water.

Livestock Handling Area

Landform graded to provide fall from pasture and species-rich grassland areas to the lower level wet grassland areas.

Grassland habitats would be subject to specific management measures, including a suitable grazing regime.

Significant area of woodland planting provided along the north western boundary to replace trees currently situated on the lagoon embankments. This would include UK grown and certified plant stock comprised of, for example, locally appropriate species such as common and sessile oak, hawthorn, hazel, holly, alder, and wild roses. With a preference for plants with nectar, nuts, and berries for foraging by wildlife.

Sutton/FP1

Sutton/BW4

Sutton/FP5

Landform graded to provide fall from pasture and species-rich grassland areas to the lower level wet grassland areas.

New reed bed fringes would be planted where conditions are suitable at the restored lakeside fringes and along ditches. Reed beds would either be sown with locally sourced reed seed in saturated soil or directly planted into submerged soil with cut reed stalks from an approved donor site. Reed bed areas would vary in depth and include deeper channels and pools, to ensure patches of open water remains within the habitat. Reed beds would be managed through an annual rotational cut with at least one quarter or one seventh of the reeds cut each year and removal of saplings to minimise succession.

Log piles and hibernacula would be provided along the woodland and hedgerow planting and adjoining the wetland areas for reptiles and invertebrates. Suitable retained trees would be selected for a number of bat and bird boxes.

Graded edges to be established adjacent to woodland areas and along hedgerows. Strip or inoculation seeding or the use of local provenance 'Green Hay' transfers in either linear swathes or large scrapes (approximately 3 to 5 m2) would be used. This would enable floristically diverse areas to be established and spread out naturally.

An interpretation board with information on the habitats on site and the wildlife to be seen would be provided to the side of the footpath here. It is envisaged that the content, style, and location of the interpretation board would be agreed upon with the local planning authority and the local community.

Sutton/FP5

Trees and scrub lost during operation to facilitate soil storage, the conveyor corridor and embankment removal would be replaced with perimeter tree planting and species-rich grassland.

Sutton/FP1

0 50 100 150 200 250m

SCALE 1:2500

KEY

- **Planning Application Boundary**
- **Existing Track to be Retained**
- **Existing Public Rights of Way**
- **Existing Vegetation to be Retained** — To be thinned and coppiced as appropriate to improve tree health and the range of habitats provided
- **Existing Tree and Vegetation to be Removed**
- **Existing Watercourse**
- **Sutton and Lound Gravel Pits SSSI**
- **Proposed Native Species Tree** — Species include: Common Oak, Sessile Oak, Hawthorn, Hazel, Holly and Alder
- **Proposed Native Species Hedgerow with Tree** — Species include: Field Maple, Hawthorn, Hazel, Spindle, Holly, Honeysuckle, Wild Cherry, Dog Rose To be scattered or group planted within species rich grassland areas.
- **Proposed Native Species Woodland Mix** — Species include: Field Maple, Alder, Birch, Hazel, Crab Apple, Wild Cherry, Oak, Goat Willow, Small-leaved Lime, Common Oak, Sessile Oak, Hazel and Hawthorn.
- **Proposed Pasture** — Bespoke mix of native grasses and red and white clover (9B:2)
- **Proposed Species Rich Verge** — Strip or inoculation seeding of typical hedgerow verge species. Using local provenance seed or 'Green Hay' transfers in either linear swathes or large scrapes (approximately 3 to 5 m2).
- **Proposed Wet Meadow Mix** — Species selection would be confirmed after soil test.
- **Proposed Reed Beds** — Reed beds would either be sown with locally sourced reed seed in saturated soil or directly planted into submerged soil with cut reed stalks from an approved donor site.
- **Proposed Track**
- **Footpath Section within the Site**
- **Proposed Ditch**
- **Proposed Waterbody**
- **Proposed Interpretation Board Location**
- **Indicative Access Point**

NOTES:
Existing woodland around perimeter of the site to be thinned as appropriate and suitable species coppiced (on a 7 to 12 year rotational cycle) to provide a range of habitats and open glades.

REVISION SCHEDULE

Rev	Date	Description
A	01.02.23	Revised following client comments (WM)
B	02.02.23	Revised following client comments (WM)
C	07.02.23	Revised following client comments (WM)

STATUS: **FOR PLANNING**

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GRID REFERENCE: SK 692 847

PROJECT: Retford Circular Economy

TITLE: Indicative Landscape Restoration Masterplan

CLIENT: Lound Hive Limited

DATE: 26.01.23 SCALE: 1:2,500@A0

DRAWN: WM DRAWING NO.: 4092_DR_LAN_101

CHECKED: JH REVISION: C

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