GORDON BARKER & LAURA DOUGHTY

West Oxfordshire Local Plan 2043 Nature Recovery and Biodiversity Net Gain (BNG) evidence

June 2026

Contact details

tverc@oxfordshire.gov.uk

www.tverc.org

Call us on 01865 815 451

Facebook

Instagram

Bluesky

LinkedIn

Quality Management

Author	Laura Doughty & Gordon Barker	19/06/2026
Data Analysis & interpretation	Gordon Barker	18/06/26
Checked By	Gordon Barker & Laura Doughty	16/07/2026
Sent to Client	Claire Bromley & Melanie Dodd	23/06/2026

Liability

This report has been prepared for use by West Oxfordshire District Council, and no other party may rely on the contents of the report. No liability is accepted by Thames Valley Environmental Records Centre for any use of this report, other than for the purposes for which it was originally prepared and provided. No warranty, express or implied, is made as to the advice in this report. The content of this report is partly based on information provided by third parties, which unless otherwise stated, has not been independently verified by TVERC.

Feedback

If you have any feedback on this project, please email tverc@oxfordshire.gov.uk

Executive Summary

I. This report presents the findings of the West Oxfordshire Local Plan 2043 Nature Recovery and Biodiversity Net Gain (BNG) evidence project. The study provides a strategic, scenario-based assessment of how potential development sites could contribute to Biodiversity Net Gain (BNG), Local Nature Recovery Strategy (LNRS) delivery and wider ecosystem benefits. The outputs are intended to inform Local Plan policy and site allocation evidence; they do not represent final site layouts, confirmed BNG calculations or detailed ecological design proposals.

II. Baseline assessments were completed for 23 potential sites using available habitat, linear feature and policy data. With an assumption of a 60% developed/40% green infrastructure split, three green infrastructure scenarios were tested: a simple green infrastructure approach; an LNRS-led approach that prioritised mapped nature recovery measures; and a maximum biodiversity approach that enhanced medium to high distinctiveness habitats, buffered protected sites and considered wider ecosystem benefits. The analysis shows that BNG outcomes vary considerably between sites and are strongly influenced by baseline biodiversity value, site size, the amount of land available for green infrastructure, existing medium and high distinctiveness habitats, and alignment with LNRS priorities.

III. A key finding is that sites with lower baseline biodiversity, in units per hectare, generally have greater capacity to achieve higher percentage gains, while sites with higher baseline value may show lower gains or losses because there is less scope for numerical uplift. This means that the highest BNG percentage is not always the strongest ecological outcome, particularly where a site already supports valuable habitats that should be retained, buffered and enhanced.

IV. The simple model demonstrates that a relatively simple on-site approach can deliver positive gains on some sites, especially where baseline biodiversity value is low and sufficient land is available for habitat creation. The LNRS-based model is the strongest overall performer, producing the highest modelled BNG return for the greatest number of sites and demonstrating the value of using LNRS priorities to guide habitat retention, enhancement and creation. The maximising biodiversity model does not always produce the highest numerical BNG return, because the statutory metric applies risk factors for higher distinctiveness habitats that are harder or slower to establish, but it remains important because it illustrates the potential for higher-quality habitat outcomes and wider ecosystem benefits.

V. The further analysis confirms that development assumptions have a material effect on BNG delivery. Employment-led assumptions, with a higher proportion of sealed surface, generally constrain on-site BNG potential, with one site retaining positive gains, one site showing losses across all three scenarios, and the third producing mixed results. Conversely, increasing the green infrastructure proportion from a 60:40 developed to non-developed split to a 50:50 split can improve outcomes and, in some cases, move sites from a loss or marginal gain to meeting or exceeding the 10% threshold.

VI. The ecosystem benefits evidence adds an important dimension to the BNG analysis. The Ecosystem Benefits calculator identifies opportunities for nature recovery and nature-based solutions that are not fully captured by the statutory biodiversity metric, including carbon storage and sequestration, water management, flood mitigation, recreation, pollination, ecological connectivity and landscape resilience. This supports a policy approach that considers BNG alongside multifunctional green infrastructure and wider environmental benefits, rather than treating the headline BNG percentage as the sole measure of success.

VII. The report recommends that the Local Plan could embed LNRS alignment as a core expectation for BNG and green infrastructure design, support an aspirational 20% BNG target where site-specific evidence indicates this is achievable, and use baseline biodiversity value to inform site-specific policy expectations. It also recommends securing sufficient green infrastructure land early in site planning, differentiating expectations for employment-led development, prioritising ecological quality as well as metric performance, using ecosystem benefits to guide multifunctional green infrastructure, requiring robust site-specific ecological evidence, and providing a flexible route for off-site delivery where on-site delivery is constrained.

VIII. Overall, the evidence supports an ambitious but proportionate policy approach. WODC can use the Local Plan to encourage higher-quality BNG outcomes, strengthen alignment with the LNRS, secure multifunctional green infrastructure and recognise ecosystem benefits beyond the statutory metric. The key implication is that BNG should be treated not only as a numerical compliance requirement, but as a mechanism for shaping site design, spatial planning, long-term nature recovery and wider environmental resilience.

Contents

List of Tables

List of Figures

1. Introduction

1.1. This project was commissioned to provide an evidence base to inform the pre-submission draft (Regulation 19) West Oxfordshire Local Plan 2043, with a particular focus on strengthening policy support for nature recovery and BNG. The work assesses the potential for allocated and strategic development sites across the district to contribute to enhanced biodiversity outcomes. It also considers how habitat creation and enhancement opportunities can be aligned with the emerging Local Nature Recovery Strategy (LNRS), green infrastructure priorities, and wider ecosystem benefits.

1.2. The study uses a desk-based approach to review 23 potential allocation sites, comprising 11 strategic and 12 non-strategic sites. It draws on site boundary data, existing BNG information and relevant ecological datasets. Baseline BNG calculations and scenario modelling are used to explore potential outcomes and develop delivery scenarios, with specific attention given to medium to high-distinctiveness habitats, priority habitat types and opportunities that could deliver strategic nature recovery benefits. The assessment also integrates green infrastructure and ecosystem benefit considerations, including benefits to people and climate mitigation.

1.3. The findings are intended to support WODC in developing clear, evidence-led policy options for the Local Plan, including consideration of where enhanced BNG requirements, targeted nature recovery zones or flexible off-site delivery mechanisms may be most appropriate. This final report sets out the methodology, key assumptions, scenario-based results and recommendations for achieving the best biodiversity and wider environmental outcomes through planned growth in West Oxfordshire.

1.4. Calculations were undertaken for three scenarios. All scenarios operate under the assumption of maintaining a 60:40 split between developed and non-developed areas across all sites.

1.5. The first scenario applies a simple approach prioritising the retention of medium to high-distinctiveness habitats and establishes buffers around existing hedgerows and watercourses to safeguard ecological connectivity.

1.6. The second scenario integrates Oxfordshire's LNRS by prioritising identified measures within each site. These prioritised habitat areas have been incorporated into the BNG metric calculations, ensuring alignment with county-wide nature recovery objectives and maximising the ecological value delivered through site allocation.

1.7. The third scenario was developed to further enhance biodiversity benefits. This approach targeted habitats beyond those mapped in the LNRS network (which includes habitats across 40% of the county). The scenario also considers buffering neighbouring priority habitats and designated sites, aiming to extend nature recovery and connectivity across West Oxfordshire.

Scenario Based Study to Inform WODC's Local Plan

1.8. This is a scenario-based study, and the results should be understood as conceptual, modelled outputs rather than ground-truthed site survey findings. While the data presented have been generated using real examples of proposed development sites and their best-known baseline habitats, the scenarios are based on GIS mapping, available spatial data layers and desk-based interpretation, rather than detailed site surveys. The outputs should therefore not be interpreted as spatially explicit site designs, confirmed habitat prescriptions or final target habitats and areas. All sites will ultimately require formal ecological baseline assessments, detailed site designs and comprehensive metric calculations before any BNG proposals can be confirmed. The scenarios provided here have been developed specifically to inform policy development and to test potential approaches at a strategic level.

Biodiversity Net Gain

1.9. Biodiversity Net Gain (BNG) is a way of creating and improving natural habitats. The use of BNG ensures development has a measurably positive impact ('net gain') on biodiversity, compared to what was there before development. In England, BNG has been mandatory for major development from 12 February 2024, and for small sites from 2 April 2024, under Schedule 7A of the Town and Country Planning Act 1990 (as inserted by Schedule 14 of the Environment Act 2021). Developers must deliver an increase in measured biodiversity of at least 10%. This means a development will result in more or better-quality natural habitat than there was before development[1].

1.10. In summary, BNG is an approach to development and/or land management that leaves the natural environment in a measurably better state than beforehand. It consists of the following key principles:

a. It uses changes in the type, extent, and quality of habitats as a proxy for biodiversity and compares the habitat found on a site before and after development.
b. It does not change existing environmental protections or legal requirements and is not applicable to irreplaceable habitats.

c. BNG requires the use of the latest version of the Statutory Biodiversity Metric Calculation Tool (BNG calculator) published in February 2024.
d. The Biodiversity Metric is a habitat-based approach to determining a proxy biodiversity value, developed by Natural England. There are three categories of biodiversity units in the metric, area habitat units, hedgerow units and watercourse units. Baseline biodiversity units are calculated for each category present.
e. Developments must deliver 110% of the Baseline Biodiversity at a minimum. The 10% gain requirement applies for each category of unit present on a site (area habitats and linear features such as hedgerows and watercourses if present).
f. Baseline biodiversity units are primarily determined by habitat distinctiveness and condition[1].
g. The Biodiversity Metric automatically applies two risk multipliers in calculating the future biodiversity value of habitats to be created. These relate to the difficulty of creation of a habitat and the time it would take to achieve the target condition.
h. Developers are required to factor into the metric any period between the loss of habitats due to extraction commencement and the creation of new post-development habitats through restoration. This is referred to as “Delay” within the BNG process and reduces the unit value of created post-development habitats by 3.5% per year.
i. BNG can be delivered on-site or off-site. An additional spatial risk multiplier would also be applicable for delivery of off-site BNG, but this can vary depending on the locations of the off-site provision and is not included in this assessment.
j. Strategic significance, where there is a local importance attached to a particular habitat in a particular location, can increase the biodiversity score for habitats by 15%. Following the publication of the Oxfordshire LNRS, this uplift is only applied to areas covered by the LNRS.
k. BNG trading rules generally require that any loss of baseline habitat units is replaced by new habitats of the same type and the same, or higher, distinctiveness[2].

[1] Habitat Distinctiveness is classified as V. High, High, Medium, Low or V. Low. Condition is classified as Good, Moderate or Poor. These score respectively as 5,4,3,2,1 and 3,2,1 in the metric. See Appendix 1 for example figures.

[2] This is a slight simplification. For full details on trading rules see The Statutory Biodiversity Metric

Local Nature Recovery Strategy

1.11. Oxfordshire's Local Nature Recovery Strategy (LNRS) was published in November 2025 and sets out the areas within the county that require targeted resources to build a resilient network for nature. The primary objective of the LNRS is to restore biodiversity across the landscape, achieved through both habitat enhancement and creation, alongside species-specific and countywide initiatives. The LNRS is structured in four distinct parts: the Description of Strategy Area, Statement of Biodiversity Priorities, the Species Priorities List, and the Local Habitat Map. All these components can be accessed online via the Local Nature Recovery Strategy (LNRS) | Oxfordshire County Council . Comprehensive guidance has been issued to clarify the relationship between planning processes and the LNRS, which can be found here (LNRS user guides: Planners and public bodies | Oxfordshire County Council).

1.12. Section 40 of the Natural Environment and Rural Communities Act, as amended by the Environment Act 2021, places a statutory duty on all public authorities operating in England to consider their role in conserving and enhancing biodiversity. In fulfilling this obligation, public authorities must "have regard" to any relevant Local Nature Recovery Strategy.

1.13. Local Planning Authorities are collaborating to develop approaches for integrating the LNRS into emerging Local Plans, in alignment with Planning Practice Guidance (Natural environment - GOV.UK). Typically, these authorities are expected to introduce policies that facilitate delivery of the LNRS by identifying, mapping, and safeguarding areas earmarked for habitat management, enhancement, restoration, and creation. While this transition is underway, some Local Plan policies instead reference Conservation Target Areas which, while still relevant, have largely been superseded by the LNRS for purposes of nature recovery and delivery.

1.14. Where a development boundary overlaps with mapped areas on the LNRS Local Habitat Map, this presents a positive opportunity for the delivery of identified measures via on-site BNG. This can be achieved by integrating these measures within green infrastructure networks and landscaping schemes, with the aim of linking and connecting habitats where ecologically feasible.

1.15. While on-site BNG delivery is preferred, off-site delivery can be generally advantageous when it aligns with the priorities and locations highlighted in the LNRS. The LNRS is therefore a strategic tool for informing and maximising the effectiveness of BNG, by identifying the most beneficial actions and locations to advance local nature recovery throughout Oxfordshire. As such, the LNRS can be used to guide the most suitable approach to BNG within the county. Notably, this forms the basis for scenario 2 within this study.

2. Methodology

2.1. The methodology for assessing BNG begins with defining clear site boundaries to ensure consistency in calculations and analysis. The approach relies on accurately identifying baseline habitats using the UKHab Classification and quantifying both area-based and linear habitats. Emphasis is placed on retaining habitats of high distinctiveness and simultaneously enhancing those of lower value, aiming for measurable biodiversity improvements throughout the assessment process.

Data Sources

Table 1. Data sources

Dataset	Source
TVERC habitats database 2025	TVERC
OS Mastermap	Ordnance Survey (OS)
OS Open Watercourses	Ordnance Survey (OS)
Oxfordshire Local Nature Recovery Strategy 2025	Oxfordshire County Council (OCC)
Oxfordshire Field Boundaries	Oxfordshire County Council (OCC)
Biodiversity Net Gain Statutory Metric 1.0.4	DEFRA
West Oxfordshire Preferred Development Sites	West Oxfordshire District Council (WODC)
West Oxfordshire Preferred Spatial Options October 2025	West Oxfordshire District Council (WODC)
Agile Initiative Opportunity Areas	Oxford University

All data was accessed for the project in March 2026

Agile Opportunity Maps: Ecosystem Services and Nature Recovery

2.2. The Agile Opportunity Maps dataset[4] is designed to support decision-making and to optimise biodiversity benefits while factoring in a wide array of ecosystem services, many of which go beyond those measured in BNG assessments.

Constraint and Opportunity Layers: features agricultural land classification, statutory and non-statutory designations, public access, flood risk areas, slope, soil composition, and peat status. This integrated approach makes it possible to quickly evaluate both limitations and opportunities for interventions.

Ecosystem Service Scores: this dataset provides a more comprehensive perspective than standard BNG measurements with scores covering 18 unique ecosystem services plus an exclusive biodiversity score. These scores which range from 0 to 10 enable detailed evaluations of environmental functions such as carbon sequestration, water management, recreation, pollination, and more.

Carbon Storage and Sequestration Estimates: modelled estimations are available on the amount of carbon stored and sequestered per hectare to help assess climate mitigation potential across various landscapes.

Nature Recovery and Nature-based Solution (NbS) Opportunities: this dataset maps locations suited for diverse nature recovery initiatives and nature-based solutions beyond the LNRS mapped network. These include areas for woodland and scrub establishment, grassland and heathland restoration, wetland and pond creation, peatland rehabilitation, agroforestry, community orchards, erosion control, and natural flood management.

2.3. All ecosystem service and biodiversity scores can be exported for deeper analysis, supporting the review of different intervention scenarios and their impacts on biodiversity and ecosystem services. TVERC will use these data to inform the development of the third scenario, which is designed to maximise benefits for biodiversity as well as people.

Data Processing

Sites

2.4. For this study, the first step involved agreeing a set of site boundaries within which calculations could be undertaken. This ensured that all subsequent data processing and analysis were completed within clearly defined spatial limits, providing consistency and accuracy in the assessment of BNG. An initial set of 23 sites was included in the study, selected by combining boundary data provided for two types of site: Preferred Development Sites (PDS); site boundaries as submitted to the Council's HELAA Call for Sites, and Preferred Spatial Options (PSO); broader areas consulted on during the Reg 18 consultation.

- The Preferred Development Sites (PDS) layer aligns with OS layers and boundaries but includes some overlaps between sites.
- The Preferred Spatial Options (PSO) layer has better differentiation between sites but has more generalised boundaries.
- The PDS boundaries layer was combined/split based on conformity with the PSO layer to produce the final sites layer used for this analysis.

2.5. This approach ensured that the final sites layer captured the most relevant locations for assessment within the scenario-based study, supporting the evaluation of BNG and informing local planning policy. Most of the sites were predominantly greenfield, with one exception: Site W, a small, largely developed site in Witney, which was not included in all analyses. At different points during the project's data processing phase, it was decided at WODC not to take two sites forward for allocation in the Local Plan (Areas S and Q). Area Q was removed from the analysis after the preliminary processing, but Area S's analysis had already been completed so it was retained as it may provide a useful example of a particular combination of factors.

Further details of the sites including WODC planning references are provided in Appendix 2. Maps showing locations of sites around the Carterton/Witney area are shown in Appendix 1.

Developed land & Green infrastructure Split

2.6. The modelling also applies an assumed split between developed and undeveloped areas within each site. This reflects the emerging policy approach in the draft Local Plan, which seeks to guide the overall balance between built development and retained or enhanced green infrastructure on strategic development sites. For the purposes of this study, a 60:40 split has therefore been used as a consistent scenario assumption, with 60% of each site treated as the developed area and 40% treated as the undeveloped area available for habitat retention, enhancement or creation. The developed area is assumed to comprise mainly residential development, with limited opportunities for integrated green spaces or green infrastructure features apart from residential gardens. This provides a standardised basis for testing the potential biodiversity outcomes of different development scenarios across the sites, while recognising that the precise distribution of built form, open space and habitat provision would need to be determined through detailed planning, ecological design and site-specific assessment.

2.7. In some cases, an alternative 50:50 split was also explored, with half of the site treated as developed land and half retained or made available for habitat-related interventions. This additional scenario was tested for the strategic sites, and for some non-strategic sites where the initial 60:40 scenario did not achieve the mandatory 10% BNG requirement. The purpose of this additional testing was to understand whether increasing the proportion of undeveloped land could provide greater scope for habitat retention, enhancement or creation, and therefore improve the likelihood of meeting or exceeding the 10% BNG threshold within the site boundary. As some sites still appeared likely to fail to meet 10% gain on a 50:50 split, an additional calculation was carried out to determine at what level of development 10% net gain could be achieved.

2.8. For three sites, an additional developed/undeveloped split was also applied to reflect the emerging policy approach for sites expected to come forward primarily for employment use, rather than residential development. In these cases, within the 60% development area, a employment development mix was applied, with 90% of the development area treated as developed land and 10% allocated to modified grassland/introduced shrub . This reflects the different land-use assumptions associated with employment-led development, where a higher proportion of the site may be required for built development, hardstanding, access, servicing and operational areas, and where the scope for green spaces in these areas may therefore be more constrained than for residential-led scenarios where a proportion of the residential areas is given over to vegetated gardens or more vegetated public areas.

Biodiversity Unit Types

2.9. The statutory biodiversity metric reports biodiversity value through three separate types of biodiversity unit: area habitat units, hedgerow units and watercourse units. This distinction is a standard element of the statutory metric and is important because these unit types are calculated and reported separately, rather than being combined into a single overall biodiversity score. Area habitat units relate to habitats measured by area, such as grassland, woodland, scrub, cropland or other mapped habitat parcels. Hedgerow and watercourse units relate to linear features and are measured by length, reflecting the ecological value of features such as hedgerows, lines of trees, ditches, streams and rivers.

2.10. Because the three different unit types are treated separately within the metric, gains in one category cannot be used to directly compensate for losses in another. For example, the creation or enhancement of hedgerows cannot be used to offset the loss of area-based habitat units, and watercourse improvements are accounted for separately from both area habitats and hedgerows. The results presented in this study therefore distinguish between area habitat, hedgerow and watercourse outputs, in line with the structure of the statutory biodiversity metric.

Habitats – area units

2.11. To accurately calculate BNG scores, it is essential to have data on the current habitats present and their condition on each site, the baseline. Key information required includes the identification of baseline habitats using the UK Habitat Classification (UKHab), as well as the area of each distinct habitat parcel. This forms the basis for both pre- and post-development calculations, ensuring a robust assessment of changes in biodiversity.

2.12. The principal aim is to retain habitats that have significant value for nature where they already exist on site. In this context, this means habitats of higher distinctiveness, including medium, high and very high distinctiveness habitats. Medium distinctiveness habitats can make an important contribution to site-level biodiversity, ecological connectivity and local nature recovery objectives, and should not be overlooked through an over-emphasis on only high or very high distinctiveness habitats. They should therefore be retained where possible, particularly where they form part of a wider habitat network or provide opportunities for enhancement. Conversely, in areas characterised by low distinctiveness habitats, there is an opportunity to target the creation or enhancement of habitats with higher distinctiveness than the baseline, thereby achieving a measurable biodiversity gain while also supporting better-quality outcomes for nature.

2.13. Pre-development data were available for some sites, including partial surveys that provided baseline habitat data. These were digitised and reclassified to the UKHab Classification from the survey report maps. Where survey data were not available, habitat data following the UKHab Classification were extracted from the TVERC habitats database. Any remaining gaps were filled using OS data by allocating broad UKHab categories such as grassland, woodland or cropland.

2.14. The presence of individual trees on a site is also accounted for in the normal BNG process, however this has not been included in the assessments for this project. The presence of existing individual trees on a site would increase its baseline score and planting of new individual trees would increase outcome scores.

A map showing distinctiveness categories, along with linear features, for the sites around Carterton and Witney is shown in Appendix 1.

Linear Habitats and Features

2.15. Linear habitats, such as hedgerows, hedgerows with trees, lines of trees, ditches and watercourses, including streams and rivers, are considered separately within BNG calculations. These features should be classified according to the UKHab classification scheme, but unlike area-based habitats, linear habitats are measured by length rather than area. Hedgerows were identified using Oxfordshire County Council's (OCC) field boundary layer, based on Ordnance Survey mapping and LIDAR data, identifying canopy height and classifying boundary features into sections of hedge and tree canopy. Where sections of both hedgerow and tree canopy occurred along the length of an OS linear feature, this was defined as a hedgerow with trees.

2.16. The linear habitat type 'ditches associated with hedges' was identified where a linear feature within the OS Watercourse data layer fell within a 5m buffer of another linear feature identified as a hedgerow. Linear features in the 'Other' category were assumed not to be hedgerows or lines of trees, presumably fences or walls.

2.17. Watercourses were identified from the TVERC habitat database and OS Water layer. Features identified as 'ditch' within a 5-metre buffer of any hedgerows identified above were assessed as part of the hedgerow feature, in line with BNG guidance, and were therefore not included in the watercourse assessment. Classification as a river or stream was taken from the TVERC database where available. Features not classified by habitat data were classified as streams or ditches based on their sinuosity index. This measures the ratio between the mapped length of a watercourse and the direct length between its start and end points, and reflects whether the stream follows a natural, meandering/sinuous course or a more direct, man-made course, typical of ditches (Sinuosity Index >1.2: classified as streams; SI <1.2: classified as ditches; borderline cases checked by eye).

Ecosystem Benefit Analysis

2.18. To determine the wider contribution of the scenarios to ecosystem and societal benefits, the Environmental Benefits from Nature (EBN) Tool[3] was used to assess potential outcomes beyond those captured by the statutory biodiversity metric. The EBN Tool is a voluntary assessment tool produced by Natural England and the University of Oxford, working with Defra, the Forestry Commission and the Environment Agency.

2.19. It is intended to be used alongside, rather than as part of, the Statutory Biodiversity Metric. Its role is to give an indication of the wider environmental benefits that may result from changes in habitat type, extent and condition.

2.20. The tool is habitat based and scores changes across 18 ecosystem services, including flood regulation, recreation, water quality, air quality and other natural capital benefits.

2.21. The beta version used for this work has been updated to better reflect the habitat categories and approach used in the Statutory Biodiversity Metric. In this assessment, the tool was used to provide an indicative comparison of how ecosystem benefits may vary across the three modelled scenarios: Simple, LNRS and Maximum Biodiversity (Max BD).

[3] Environmental Benefits from Nature Tool

3. Preliminary data analysis

Area available for development

3.1. The first stage of the analysis was to determine whether the assumption of a 60:40 ratio of development to green infrastructure would be feasible. This involved reducing the potential for loss of baseline BNG units by assuming the retention of existing high distinctiveness habitats (those with a distinctiveness score of 4 or higher) and the application of ten-metre buffers around hedgerows, watercourses and these retained habitats. These retained and buffered features were treated as potentially forming part of the non-developed or green infrastructure area, providing an initial indication of how much land could remain available for development once initial key ecological constraints and retention requirements had been applied. Areas that already contain developed features, such as buildings within 10 metres of a hedgerow or watercourse, were excluded from these green infrastructure zones.

3.2. Preliminary results indicate that, with these restrictions, across all sites, an average of 85% of the total area remains available for development. When considered on a site-by-site, the proportion of land suitable for development ranges from 66% to 99% across the 23 sites (Table 2). In every case, it would be feasible to develop at least 60% of the site area while retaining undeveloped buffers around important features, ensuring an opportunity for development while adhering to initial ecological constraints.

Table 2. Site areas available for development after application of non-development buffers

Site	Available area (ha)	Site area (ha)	Percentage available
A	60.4	84.6	71%
B	27.1	33.2	82%
C	89.1	107.1	83%
D	44.6	51.4	87%
E	100.2	115.3	87%
F	216.4	255.2	85%
G	71.6	85.4	84%
H	258.4	305.4	85%
I	103.3	125.3	82%
J	3.3	4.0	83%
K	28.9	34.8	83%
L	26.4	28.7	92%
M	0.4	0.6	66%
N	2.8	3.3	83%
O	1.5	2.0	74%
P	3.6	5.4	66%
Q	1.4	1.9	74%
R	7.2	8.4	86%
S	26.8	29.9	90%
T	40.4	45.7	88%
U	2.7	2.9	93%
V	25.7	36.8	70%
W	1.7	1.7	99%

Retained Area Habitats & Remaining Green Infrastructure Area

3.3. Table 3 shows the retained areas, which include both high and moderate distinctiveness habitats, along with the buffer zones detailed in Table 2. The green infrastructure areas listed in Table 3 represent the portion of the site not planned for development (assumed to be 40% of the total site), after subtracting the retained areas.

Table 3. Retained site areas and remaining green infrastructure areas

Site	Available area (ha)	Site area (ha)	% available	% retained habitat	% Green Infrastructure
A	60.4	84.6	71%	15%	25%
B	27.1	33.2	82%	4%	36%
C	89.1	107.1	83%	4%	36%
D	44.6	51.4	87%	0%	40%
E	100.2	115.3	87%	2%	38%
F	216.4	255.2	85%	1%	39%
G	71.6	85.4	84%	1%	39%
H	258.4	305.4	85%	3%	37%
I	103.3	125.3	82%	5%	35%
J	3.3	4.0	83%	0%	40%
K	28.9	34.8	83%	2%	38%
L	26.4	28.7	92%	0%	40%
M	0.4	0.6	66%	34%	6%
N	2.8	3.3	83%	0%	40%
O	1.5	2.0	74%	11%	29%
P	3.6	5.4	66%	0%	40%
Q	1.4	1.9	74%	0%	40%
R	7.2	8.4	86%	0%	40%
S	26.8	29.9	90%	29%	11%
T	40.4	45.7	88%	2%	38%
U	2.7	2.9	93%	0%	40%
V	25.7	36.8	70%	25%	15%
W	1.7	1.7	99%	0%	40%
Total	1143.4	1368.4	99%	4%	36%

4. Scenario Design

4.1. Three scenarios have been developed for analysis. Each scenario is based on a 60:40 split between development and non-development/green infrastructure areas. The scenarios differ in their approach to habitat retention and enhancement, and the mix of habitats included in the output design. Exact replication of the scenario habitat outputs may not be possible on each site, but each scenario is designed to provide an example of the potential output. 22 sites were assessed for the scenarios, with site Q having been dropped as confirmed above.

4.2. In all scenarios, the developed areas (60% of the site) are given a standard residential mix, in which 50% of that area (i.e. 30% of the total area) is allocated to developed sealed surfaces, 30% to vegetated garden and 20% to built linear features. For scenarios 1 and 2, in the non-developed portions of the sites (40%), and where other habitats were not specified by the scenario design, i.e. outside of retained or enhanced areas, the interventions are assumed to be the creation of habitats in a standard habitat mix[4] of 30% modified grassland, 50% other neutral grassland, 10% mixed scrub and 10% other broadleaved woodland. Scenario 3 involved an enhanced habitat mix with a wider variety of habitats an including more high-distinctiveness habitats, detailed in section 7.

Below is a brief introduction to each scenario and more detail is provided in sections 5, 6 and 7.

- **Scenario 1 - Simple Green Infrastructure Plan**: Focuses on retaining all high and medium distinctiveness habitats, applying 10 metre buffer zones to key ecological features (as agreed with WODC) and allocating the standard residential mix, as above, within development areas and the rest of the site outside of the development area to a standard habitat mix, as above. All new habitats are considered to be created rather than enhanced, and the developed area is assumed to be residential. All new habitats are assumed to be created with zero delay.
- **Scenario 2 - Maximising Local Nature Recovery Strategy**: Prioritises habitats identified by Oxfordshire's Local Nature Recovery Strategy (LNRS). As in scenario 1, high and medium distinctiveness habitats are allocated to non-development areas for retention and enhancement. In addition, areas coincident with mapped LNRS measures are allocated to non-development areas up to

[4] Standard habitat mix is a simplified version of BNG metric output habitats from a study of green infrastructure on recent developments in the neighbouring districts of South Oxfordshire and Vale of White Horse

a maximum of 40% of the total site area. Output habitats in these areas were determined using a prioritisation process developed for this project, based on LNRS proposed measures (see Methodology section) and on existing habitats onsite. Standard ten-metre buffer zones are applied to hedges, watercourses, and high-value habitats. BNG could be delivered through either the creation of higher distinctiveness habitats or improvement in condition of existing habitats depending on the relevant LNRS measure. All new habitats are assumed to be created with zero delay. As in scenario 1, the residential development mix is used for 60% of the site and any remaining non-development areas are allocated to the standard mix of habitats.

- **Scenario 3 - Maximum Biodiversity Plan**: This scenario explores the potential to maximise biodiversity value by prioritising the creation and enhancement of habitats of the highest distinctiveness (potentially a combination of medium, high and very high distinctiveness habitats), and by seeking to optimise both habitat type and condition. It represents a deliberately ambitious, quality-led approach, intended to demonstrate what could theoretically be achieved where biodiversity enhancement is given a high priority within the undeveloped parts of a site. This scenario may not always generate the highest *quantitative* outcome in terms of the BNG percentage achieved, because the metric generally gives simpler or more readily deliverable habitat changes a greater numerical score (biodiversity units). However, Scenario 3 may still represent the strongest option in terms of delivering a higher-quality habitat composition, particularly where it supports the creation, enhancement or retention of habitats with greater ecological value and stronger alignment with nature recovery objectives. In practice, some of the habitat types or management approaches modelled under this scenario may not always be fully compatible with the likely post-development use of a site, particularly on residential schemes where recreational use, access requirements, edge effects and other anthropogenic pressures can affect the long-term viability of more sensitive habitats. The scenario should therefore be understood as a conceptual test of maximum biodiversity potential rather than a prescriptive design outcome. In reality, a more balanced approach would be expected, with higher distinctiveness habitats targeted in locations where they could be appropriately protected, buffered, managed and maintained over the long term. Generally speaking, in this scenario existing higher distinctiveness habitats are enhanced rather than just retained, important features such as ancient woodlands and protected areas, including those adjacent to the site, are protected by habitat buffers and the output habitat mix includes a wider variety of higher distinctiveness habitats. Zero-delay is assumed in creation of habitats. The development area retains the residential mix used in the other scenarios.

4.3. All scenarios should be interpreted as conceptual modelling outputs developed to test the potential relationship between development assumptions, habitat retention, habitat creation and BNG outcomes.

They are not intended to represent final site designs or preferred development options, and therefore do not take account of other likely constraints that may affect eventual outcomes for these developments. The scenarios provide a strategic indication of how different approaches could influence biodiversity outcomes, but the final balance between development, green infrastructure and habitat provision would need to be determined through site-specific ecological survey and assessment, detailed design and comprehensive biodiversity metric calculations.

BNG Calculations and Interpretation of BNG Return

4.4. The BNG calculations in this study have been undertaken in accordance with the principles and protocols of the statutory biodiversity metric. The statutory metric is the standard mechanism for measuring biodiversity value for BNG purposes and converts habitat information into biodiversity units using a series of defined inputs and multipliers. For area habitats, these include the size of the habitat parcel, habitat type and distinctiveness, condition and strategic significance. For created or enhanced habitats, the metric also accounts for factors such as the difficulty of creating or enhancing the habitat and the time required for the habitat to reach its target condition. These factors are important because they reflect the ecological risk associated with delivering new or improved habitats in practice.

4.5. Within this report, references to the “highest BNG return” should therefore be understood as referring to the highest numerical biodiversity unit outcome generated by the modelled scenario, rather than necessarily the best ecological outcome in qualitative terms. A scenario may produce a higher BNG percentage or unit score because it uses habitat interventions that perform efficiently within the metric, for example because they are easier to create, have shorter timeframes to reach target condition, or involve lower delivery risk. Conversely, the creation or enhancement of higher distinctiveness habitats may not always generate the highest quantitative score, particularly where the statutory metric applies risk multipliers to reflect greater difficulty of establishment, longer time to target condition, or the need for more specialist long-term management.

4.6. This can create an apparent disincentive, within a purely numerical interpretation of the metric, to create or enhance more complex habitats of higher distinctiveness where those habitats take longer to establish or are more difficult to deliver successfully. This does not mean that such habitats are less valuable for nature. Rather, it reflects the way in which the statutory metric incorporates ecological delivery risk into the calculation. For this reason, the outputs of this study should be interpreted with regard to both quantitative BNG return and the quality, appropriateness and long-term deliverability of the habitat composition proposed. A lower numerical return may still represent a better biodiversity outcome where it supports the retention, creation or enhancement of habitats that are more ecologically valuable, better aligned with local nature recovery priorities, and capable of being protected and managed appropriately over the long term.

4.7. It must be appreciated that the biodiversity metric is only one part of the wider BNG package and that there are other requirements, such as the well-regarded industry-led BNG principles (CIEEM, 2016), that set a higher bar for the BNG approach than just targeting the easiest way to get 10% net gain, which is the **minimum** amount set in the legislation.

4.8. The phrase "highest BNG return" has therefore been used carefully in this report to describe the scenario that produces the greatest modelled uplift in biodiversity units under the assumptions applied. It should not be read as implying that the highest-scoring scenario is automatically the most appropriate ecological solution for a site. Policy interpretation should consider whether a scenario delivers a balanced and resilient habitat strategy, including the protection of existing higher distinctiveness habitats, the creation or enhancement of habitats that are suitable for the post-development context, and the likelihood that those habitats can be secured, managed and maintained over the required long-term period.

4.9. This distinction is one of the reasons why three scenarios have been developed for this study. Scenario 1 represents, in broad terms, the simplest or most readily achievable route to meeting the required 10% BNG threshold under the assumptions applied, using a standardised approach to habitat retention, creation and green infrastructure provision. Scenarios 2 and 3 then introduce a greater emphasis on ecological considerations, including the role of LNRS priorities, the retention and enhancement of habitats of medium to high distinctiveness, and the selection of target habitats that may deliver higher-quality outcomes for nature. It is not the intention of the study simply to maximise the numerical BNG return, but to explore how different habitat choices and spatial priorities could support a more ecologically meaningful and policy-relevant approach to BNG delivery.

Application of the Statutory Metric in the Study Analysis

4.10. The calculations for each scenario were initially conducted using a data model developed with parameters and multipliers consistent with those used by the statutory biodiversity metric calculation tool, referred to in this report as the statutory BNG calculator. Key factors such as habitat size, condition, strategic significance, habitat type, difficulty of creation or enhancement, and the output multipliers for other factors, such as the time required for the habitat to mature, were extracted and incorporated into the model to ensure that calculations reflected the statutory metric calculator as closely as possible within the constraints of a strategic, GIS-based study.

4.11. This process enabled the standardised processing of multiple sites, facilitating the extraction of spatial data from a geographical information system (GIS) and the calculation of habitat areas and gains based on habitat classification and area or length, in line with the BNG calculator spreadsheet methodology. Once the three scenarios had been developed using the data model, the outputs were then checked and validated using the statutory BNG calculator. This provided a verification step for the modelled outputs, helping to confirm that the data model was producing results consistent with the statutory metric approach. Differences between the modelled outputs and the metric calculations were negligible and attributable to rounding differences and/or minor adjustments that were required to ensure balancing of the baseline and output area figures within the metric.

4.12. The validation process also allowed a set of statutory BNG calculators to be produced for the study, with one metric calculator prepared for each site and scenario. These calculators provide an additional evidence base to support the outputs presented in this report and create a transparent record of how the modelled biodiversity unit results were translated into the statutory metric format.

4.13. Note that in the BNG calculator figures, areas for some baseline and output habitats were rounded or adjusted from the modelled values to ensure that the figures within the calculator met the BNG metric requirements. Some habitats with figures of less than 0.1 hectares will have been omitted from the calculations. These changes will not have had significant effects on the calculator outputs.

4.14. The “BNG calculator” approach outlined above differentiates from the statutory biodiversity metric, which is actually a package of documents – the spreadsheet/calculator and the set of habitat condition assessment sheets that should accompany it. As site surveys have not been carried out to inform this scenario-based study and habitat condition is assumed to be ‘moderate’, habitat condition assessment sheets are not applicable, therefore the use of the term biodiversity metric would be inappropriate.

5. Scenario 1: Simple Green Infrastructure Plan

5.1. This scenario applies a straightforward green infrastructure approach, retaining all habitats of medium and high distinctiveness and incorporating 10 metre buffers to key ecological features in line with the approach agreed with WODC. Land outside the assumed development area is assigned to the standard habitat mix, while the developed area is assigned to the standard residential mix (mixes as defined in section 4 and as shown in Figure 1). For the purposes of the modelling, all new habitats are treated as created habitats rather than enhanced habitats, and the developed area is assumed to be primarily residential in character.

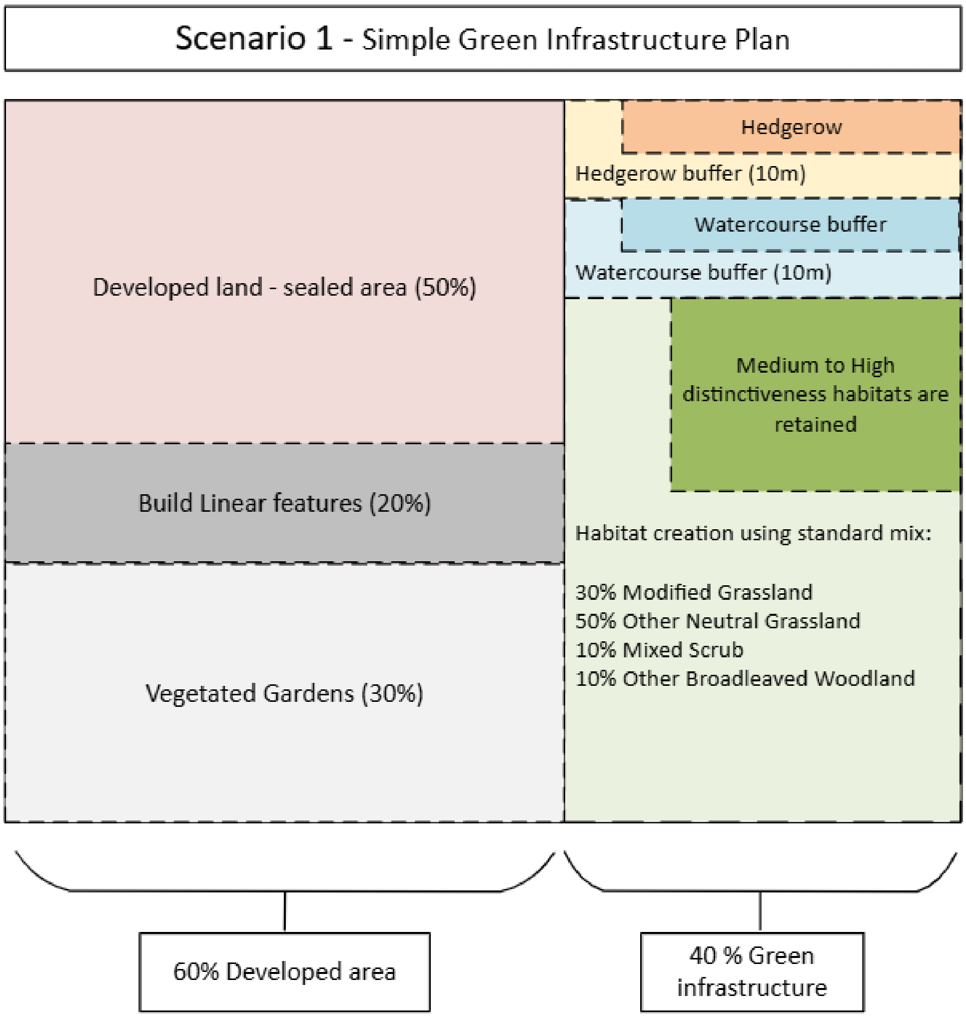
Rationale and assumptions

a) A simple plan targeting habitats that give the highest BNG return
b) Focused on retaining all high and medium distinctiveness habitats. Including buffer zones for hedges, watercourses and high/medium distinctiveness habitats which are allocated to the standard habitat mix (point f)
c) All non-retained habitats are assumed to be lost and all new habitats assumed to be created rather than enhanced
d) Outside of retained/buffer zones, 60% of total site area is allocated to development, the remaining area allocated to green infrastructure standard habitat mix
e) Developed area is assumed to be residential development and allocated to BNG habitats as 50% ‘Developed land, sealed surface’, 20% ‘Built linear features’ and 30% ‘Vegetated garden’ (the “standard residential mix”)
f) The “standard habitat mix” is divided into 30% ‘Modified grassland’, 50% ‘Other neutral grassland’, 10% ‘Mixed scrub’, 10% ‘Other broadleaved woodland’. This mix was informed by knowledge of the typical habitat types that have been included in real-world BNG proposals submitted as part of planning applications in Oxfordshire.
g) An alternative scenario of employment development was calculated for three sites with the development area allocated to 90% ‘Developed land, sealed surface’, 5% ‘Modified grassland’, 5% ‘Introduced shrub’
h) Condition of all habitats, in both baseline and outputs, is assumed as Moderate (scoring 2 in the BNG metric), unless this was not available as an option, in which case the standard option for those habitats were used (scoring 1 or 0 for condition)

i) All areas are assumed as not having strategic significance under the BNG metric so not qualifying for the significance score multiplier.

j) All habitats created are assumed to have zero delay in creation for BNG metric calculation purposes and to not suffer further penalties in terms of time-to-condition that would be associated with delay.

Figure 1. Scenario 1 model



Scenario 1: Results

5.2. In this scenario, 7 of the 22 sites show a potential net gain of over 10% in area habitat biodiversity units, ranging from 16-26%[5] (Table 4). Four sites show small gains, below the 10% threshold, or small losses, from 6% loss to 8% gain. Nine sites show high losses of 14% or more. Across all sites the overall change in biodiversity units is a net gain of less than 1%.

Table 4. Scenario 1 site BNG figures: residential development

Site	Baseline Units	Area	Baseline Units/Ha	Simple Unit Output	Simple Gain
A	305.6	84.6	3.61	296.5	-3.0%
B	64.6	32.7	1.98	95.5	47.8%
C	346.0	106.7	3.24	281.6	-18.6%
D	103.8	51.3	2.02	131.3	26.5%
E	254.8	115.3	2.21	309.6	21.5%
F	709.0	255.1	2.78	668.9	-5.5%
G	169.2	84.4	2.00	210.3	24.3%
H	716.0	305.4	2.34	774.1	8.1%
I	339.0	125.3	2.71	356.6	5.2%
J	8.0	4.0	2.00	10.1	26.9%
K	103.6	31.2	3.32	85.5	-17.4%
L	84.8	28.6	2.97	72.9	-14.1%
M	2.4	0.6	4.00	1.5	-38.1%
N	13.2	3.3	4.00	8.4	-36.6%
O	7.6	2.0	3.80	4.8	-36.3%
P	21.6	5.4	4.00	13.7	-36.8%
R	16.0	4.0	4.00	10.1	-36.6%
S	153.6	29.7	5.17	97.5	-36.5%
T	97.4	45.6	2.14	120.3	23.6%
U	5.8	2.9	2.00	7.2	23.5%
V	120.8	36.3	3.33	117.5	-2.7%
W	1.0	1.7	0.59	4.4	341.9%
Overall	3642.8	1354.4	2.69	3674.0	0.9%

5.3. The results from this scenario demonstrate the extent to which a relatively simple green infrastructure approach can deliver the mandatory 10% BNG requirement across the assessed sites. Overall, the

[5] Site W, as a previously-developed, urban site, is an outlier with a very low baseline and potential gain of over 300%, effectively 40% of the site would go from developed to not developed, resulting in large gains in biodiversity score.

outputs show that this approach is most effective where the baseline biodiversity value of a site is relatively low, as there is greater scope for habitat creation to generate a measurable uplift in biodiversity units. Conversely, where sites already support habitats of medium or high distinctiveness, the potential to achieve larger percentage gains is more constrained because the baseline value is already higher and the area available for biodiversity gains is limited by retained habitats as well as the development area.

5.4. The results also indicate that achieving 10% BNG may be more difficult on smaller sites, where there is less undeveloped land available to accommodate habitat creation, enhancement, buffers and green infrastructure alongside the assumed development footprint. Smaller sites may also have less flexibility to retain existing habitats while still providing sufficient developable area, meaning that any habitat losses can have a proportionately greater effect on the overall BNG calculation.

5.5. These results reflect a common pattern in the application of BNG, where the greatest percentage gains are often most readily achieved on sites with a relatively low baseline biodiversity value. Where existing habitats are of low distinctiveness or poor condition, there is generally greater scope for the metric to show a substantial uplift through habitat creation or enhancement. By contrast, where the baseline habitat composition already includes medium or high distinctiveness habitats, it is more difficult to generate large percentage gains, particularly as the retention of those habitats as part of the non-development area results in less area being available for habitat improvement. In these cases, the opportunity to maximise BNG values may be more constrained, even where the site already supports habitats of greater ecological value. This means that lower modelled BNG returns should not necessarily be interpreted as poorer ecological outcomes, as they may reflect the presence of more valuable baseline habitats and the reduced scope for numerical uplift within the metric on-site. This approach would result in a higher likelihood of off-site biodiversity units being required and it is unlikely that this would meet the BNG Hierarchy due to the limited consideration of other qualitative factors.

6. Scenario 2: Maximising the Local Nature Recovery Strategy

6.1. This scenario takes the LNRS as the main basis for identifying where habitat retention, enhancement and creation should be prioritised within the site. Habitats of medium and high distinctiveness are placed within the non-developed part of the site, where they can be retained or enhanced, using the LNRS proposed measure prioritisation process developed for this project. Areas that fall within mapped LNRS measures are also assigned to the non-developed area, up to a maximum of 40% of the total site area. Standard buffer zones are included around hedgerows, watercourses and higher value habitats. Habitat enhancement is assumed to take place where the baseline and outcome habitats are of the same type, e.g. grassland. Enhancement may be by either an increase in habitat distinctiveness or, if habitat change is not appropriate, improvement in condition. New habitats are assumed to be created with no delay. The same residential development mix is assumed to be delivered across the 60% developed area, with any remaining non-developed land allocated to the same standard habitat mix used in Scenario 1.

Rationale and assumptions

6.2. The following assumptions were made about the area habitats to allow consistency in the model:

a) The model consists of a more complex plan aiming to maximise outputs of habitats targeted by Oxfordshire LNRS in the local habitat map (as part of the priority network).

b) All areas of high and medium distinctiveness habitats are allocated to non-development areas and would be either treated as enhanced if in alignment with LNRS measures, or as retained if not aligned with LNRS.

c) Buffer zones for hedges, watercourses and high/medium distinctiveness habitats are allocated to non-development areas and could be treated as enhanced if in alignment with LNRS measures, or if not aligned with LNRS, treated as retained or replaced by alternative green infrastructure options, depending on existing habitat.

d) Sections of sites intersecting with LNRS measure areas are allocated to non-development areas up to a maximum of 40% of the total site area. If more than 40% of the site would be in non-development areas, the LNRS measure areas are added in order of pre-determined priority until reaching the 40% limit. Output habitats in these areas, and whether they constitute enhancement, retention or newly created habitats depends on depends on the existing habitat and the intersecting LNRS measures.

e) Where an area appears in more than one LNRS measure it is allocated to the highest priority measure as shown in the LNRS prioritisation section below. Habitat changes are based on baseline habitat and the highest priority LNRS measure overlapping with it.

f) Habitats are considered as 'enhanced' if this is an allowable enhancement in the BNG metric, e.g. changing modified grassland to lowland meadows, but not grassland to woodland or cropland to grassland/woodland (to meet BNG trading rules).

g) 60% of each site is allocated to development. This should fall outside the LNRS measure areas wherever possible. If the LNRS measure area would exceed the 40% GI area, some of the LNRS area would be developed. In this case the lowest priority measures should be 'dropped' until the non-development area falls to 40% of the site.

h) If less than 40% of the site can be allocated to non-development areas, in an instance where LNRS measures are not extensive enough, these are allocated from the remaining area to bring the non-development area up to 40% and assumes baseline habitats are lost and new habitats created according to the standard mix used in scenario 1.

i) The developed area is assumed to be residential development and allocated to the standard residential mix as in scenario 1.

j) Habitat outputs where LNRS measures are not specific about the outcome habitats use the standard habitat mix as used in scenario 1, except for the 'create grassland/woodland mosaic' potential measure, which is divided into 75% other neutral grassland and 25% other broadleaved woodland.

k) Any green infrastructure areas outside of LNRS measures are allocated to the standard habitat mix used in scenario 1.

l) Condition of all habitats assumed as Moderate (scoring 2 in the BNG metric), unless this was not available as an option, in which cases the standard option for those habitats were used (scoring 1 or 0 for condition)

m) Habitats in both baseline and outcome considered to have strategic significance if they match the prioritised LNRS measure target habitat. All other areas are assumed not to have strategic significance under BNG metric and not qualifying for the score multiplier.

n) All habitats created are assumed to have zero delay in creation for BNG metric calculation purposes and not to suffer further penalties, in terms of time-to-condition, that would be associated with delay.

Figure 2. Scenario 2 model 1: LNRS area greater than or equal to 40%

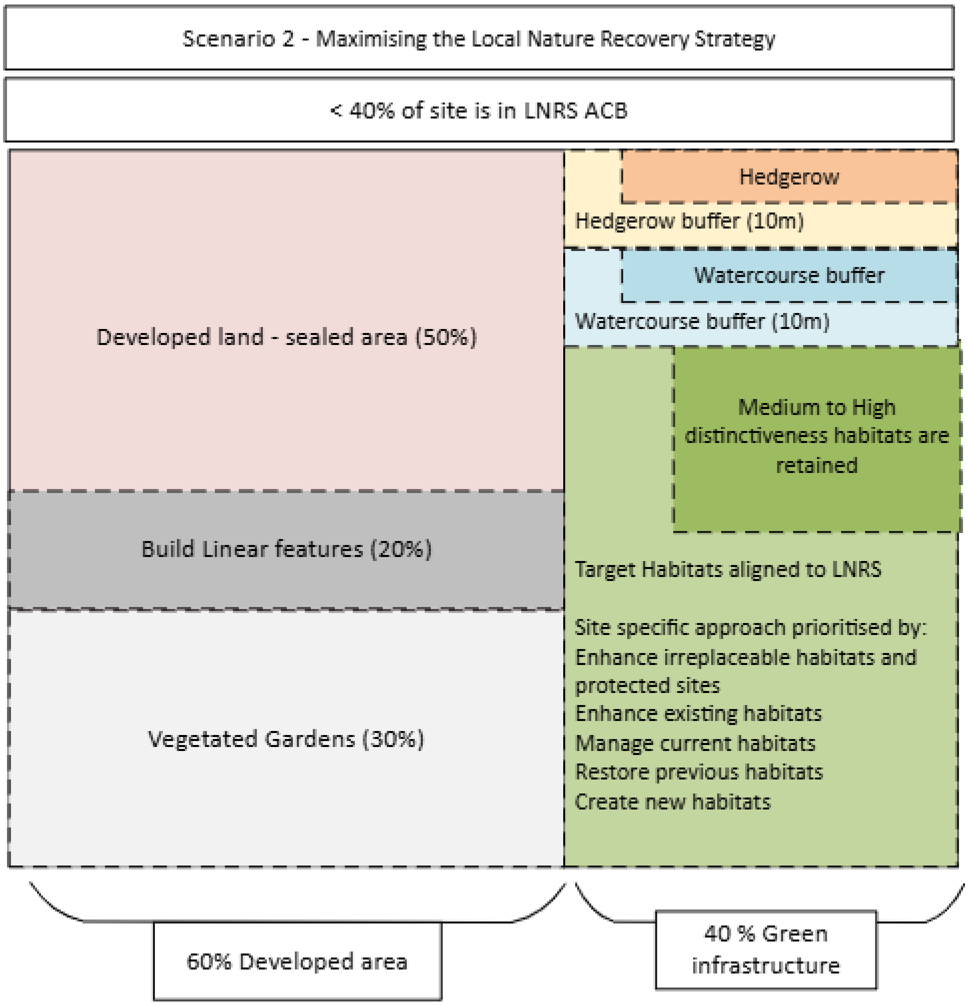
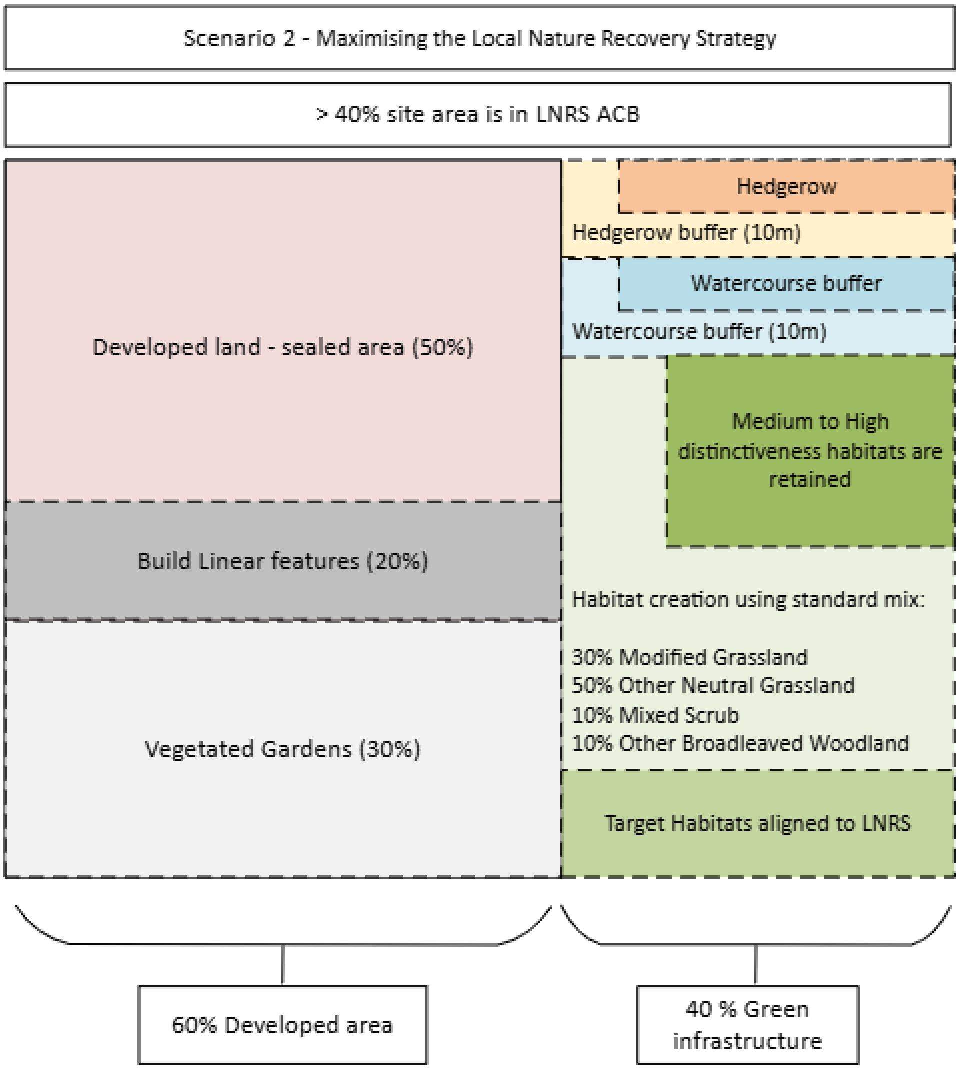


Figure 3. Scenario 2 model 2: LNRS area less than 40%



Scenario 2: LNRS Measure prioritisation

6.3. The process by which the LNRS was prepared placed an emphasis on identifying a range of potential measures or actions that could be applied to a single location. This was determined by assessing the existing baseline, considering neighbouring habitats, and modelling what interventions might be beneficial. As a result, it is common for one location to have several recommended measures, reflecting the possibilities rather than a definitive prescription.

6.4. The LNRS itself does not prioritise or prescribe which measure is most suitable; rather, it serves as a tool to suggest what could be undertaken. The ultimate decision on which actions to implement should be informed by detailed ecological baseline studies, the nature of the intended interventions (such as residential, commercial, or habitat banking), local knowledge, and the specific conditions of areas immediately adjacent to the site.

6.5. For the purposes of this study, we are utilising the LNRS as the best available indicator of actions likely to benefit nature. In collaboration with WODC, a scheme has been developed to prioritise LNRS measures in areas where multiple options have been mapped, ensuring a structured approach to nature positive interventions. This scheme operates according to a hierarchy, placing priority first on enhancing existing habitats, followed by managing existing habitats, then restoring previous or reduced quality habitats, and finally creating new habitats. This approach ensures that the most effective and sustainable interventions are considered before progressing to more transformative actions.

6.6. This prioritisation scheme aligns closely with the biodiversity gain hierarchy[6] as set out by CIEEM in its Good Practice Requirements for Delivering Biodiversity Net Gain (On- and Off-Site) [7] and required in the BNG legislation for onsite and offsite approaches. The scheme reflects the biodiversity gain hierarchy by prioritising the retention, careful management and restoration of existing habitats before resorting to the creation of new habitat as a later-stage measure. CIEEM sets out the sequence as avoid, minimise, restore, and then offset or compensate, with any additional actions used only to secure the required level of net gain. In the scheme developed to prioritise the LNRS measures for this study, enhancing existing habitats reflects the earlier stages of the hierarchy because it prioritises retaining habitats of higher ecological value and improving what is already present rather than replacing it elsewhere. Managing habitats also sits within this lower-impact end of the hierarchy, as it supports the maintenance and improvement of existing ecological function. Restoring habitats corresponds directly with the restore stage, where damaged or degraded habitats are improved on site. Finally, creating new habitats is most analogous to the offset or compensate stage, because it involves more transformative intervention and is generally considered only after opportunities to retain, manage and restore existing habitats have been exhausted.

6.7.

[6] The Biodiversity Gain (Town and Country Planning) (Modifications and Amendments) (England) Regulations 2024 Part 7A, para 37A

Scenario 2: Prioritisation Process

6.8. The Oxfordshire LNRS Potential Measures data was specifically assessed within the boundary of the West Oxfordshire District. This process enabled the identification and mapping of potential nature recovery actions relevant to the district.

6.9. The prioritisation process is solely to deal with the overlaps of multiple measures at the same location, and for the purposes of determining a single measure at any given location for this study and does not represent an ecological assessment of the relative benefits of each measure.

6.10. For site analysis, the Oxfordshire LNRS Potential Measure data was clipped to the boundaries of the Sites layer as defined in section 2. This step ensured that the measures were only considered where they overlapped with the sites, making the analysis site-specific and directly relevant to the locations under consideration.

6.11. The mapping process considered the number of overlapping measures present at each site. On some sites, up to eight LNRS measures were found to apply at the same location, demonstrating the complexity and richness of possible interventions across the district. Other sites had zero overlap with LNRS measures.

6.12. To facilitate prioritisation, the LNRS Potential Measures in West Oxfordshire were ranked according to their area within the district, progressing from low to high values. This ranking reflects their representation at the district level, ensuring the measures are considered in relation to their spatial extent within the local context.

6.13. The principal hierarchy of interventions used in this scenario (whilst accounting for the rarity of each measure within West Oxfordshire) are as follows:

- Enhance irreplaceable habitats and protected sites
- Enhance existing habitats
- Manage current habitats
- Restore previous/degraded habitats
- Create new habitats

6.14. This hierarchy ensures that the most valuable and sustainable interventions are considered first, with particular emphasis on retaining and improving existing ecological assets before progressing to restoration or creation of new habitats.

6.15. Differentiation between measures at the same level in the hierarchy was based on the rarity of each measure within West Oxfordshire, supporting the protection and delivery of actions that are less widely represented across the district. The ranking used of this prioritisation, based on both factors, is set out in Table 5. This district-level approach was used, rather than assessing rarity only within the individual sites, because the purpose of the analysis is to inform strategic policy development across the district, not simply to identify the least common measures within a small sample of proposed development locations. If rarity were assessed only at site level, the ranking could be skewed by the combination of measures present within the sites included in this study, rather than reflecting their wider significance across West Oxfordshire. Using district-level rarity therefore provides a more robust and policy-relevant basis for prioritisation, helping to ensure that measures which are uncommon or spatially limited across the district are appropriately recognised when considering opportunities for nature recovery within development sites.

Table 5. LNRS measure prioritisation

Rank	Potential Measure Description
1	Enhance existing ancient woodland to improve structural diversity, woodland condition, and benefit local species
2	Enhance and maintain existing areas that are particularly important for biodiversity in Oxfordshire
3	Manage fen buffer areas to create and enhance areas of rough vegetation that help to enhance the condition of the fen habitat
4	Improve (or maintain a good condition of) existing orchards for biodiversity
5	Enhance existing ponds by undertaking sensitive management and restoration of ponds and pond complexes to improve biodiversity and water quality
6	Enhance existing woodlands to achieve a diverse structure and good ecological condition, suitable for the woodland type, age, and nearby species
7	Enhance (or maintain a good condition of) existing neutral species-rich grasslands
8	Restore river diversity and manage rivers and their riparian (riverside) habitats to achieve good ecological condition that supports species
9	Manage existing areas of scrub to create a varied age and physical structure including glades and scalloped edges
10	Create or enhance a mosaic of habitats in a manner and size that complements the current use of the land by the local community
11	Create and/or manage greenspaces and habitats in urban areas to enhance their condition to benefit wildlife, improve connectivity, and provide wider benefits
12	Create areas of neutral species-rich grasslands in suitable locations
13	Create (and manage) areas of new parkland and wood pasture, planning to produce future ancient and veteran trees

14	Create areas of new good quality grazing marsh and enhance (or maintain a good condition) of existing floodplain grazing marsh
15	Create new areas of wet woodland along rivers, river corridors, and riparian land as appropriate
16	Create new areas of lowland meadow by creating and restoring meadows in suitable locations (particularly on floodplains)
17	Create new woodland by planting trees (or enabling their natural regeneration) using species that are suited to the soil type and site conditions
18	Create wetland habitats that contain a matrix of various habitat types suitable for the site (e.g. wet grassland, ponds, ditches, hedgerows, trees, or wet woodland)
19	Create new areas of habitat that contain a matrix of habitat types including small woodland patches, scattered trees, scrub, and grassland
20	Create areas of calcareous species-rich grasslands in suitable locations, particularly slopes
21	Create new, varied ponds in suitable locations across all habitat types to increase biodiversity and create more clean water habitats

6.16. Measures 3, 9, 10 and 13 (Manage fen buffers; Manage existing scrub; Create community habitat mosaic and Create new parkland/wood pasture) were excluded from the process at this stage, because they covered negligible areas within the assessed sites.

6.17. Following the prioritisation process there are 267.6 hectares of LNRS mapped measure across the sites as shown in table 6.

6.18. A map showing the prioritised LNRS measures around Carterton and Witney is shown in Appendix 1.

Table 6. Post-prioritisation measure areas

LNRS habitat measure	Rank	Hectares
Enhance existing ancient woodland to improve structural diversity, woodland condition, and benefit local species	1	3.2
Enhance and maintain existing areas that are particularly important for biodiversity in Oxfordshire	2	1.4
Improve (or maintain a good condition of) existing orchards for biodiversity	4	0.4
Enhance existing ponds by undertaking sensitive management and restoration of ponds and pond complexes to improve biodiversity and water quality	5	0.4
Enhance existing woodlands to achieve a diverse structure and good ecological condition, suitable for the woodland type, age, and nearby species	6	10.6
Enhance (or maintain a good condition of) existing neutral species-rich grasslands	7	32.5
Restore river diversity and manage rivers and their riparian (riverside) habitats to achieve good ecological condition that supports species	8	73.7
Create and/or manage greenspaces and habitats in urban areas to enhance their condition to benefit wildlife, improve connectivity, and provide wider benefits	11	12.6
Create areas of neutral species-rich grasslands in suitable locations	12	45.1

Create new areas of wet woodland along rivers, river corridors, and riparian land as appropriate	15	1.9
Create new areas of lowland meadow by creating and restoring meadows in suitable locations (particularly on floodplains)	16	9.4
Create new woodland by planting trees (or enabling their natural regeneration) using species that are suited to the soil type and site conditions	17	20.0
Create wetland habitats that contain a matrix of various habitat types suitable for the site (e.g. wet grassland, ponds, ditches, hedgerows, trees, or wet woodland)	18	12.8
Create new areas of habitat that contain a matrix of habitat types including small woodland patches, scattered trees, scrub, and grassland	19	0.4
Create areas of calcareous species-rich grasslands in suitable locations, particularly slopes	20	41.3
Create new, varied ponds in suitable locations across all habitat types to increase biodiversity and create more clean water habitats	21	1.8
All measures		**267.6**

6.19. Note that pond creation, as the lowest priority measure in this scenario, comes out with a relatively small area despite being the measure with the highest area across West Oxfordshire. This is likely to be due, at least in part, to it being superseded by higher priority measures, including measure 18 - 'Create wetland habitat' - which includes an element of pond creation. It may also be the case that the sites assessed here do not coincide with the areas of this measure across the district and it is more suited elsewhere.

Scenario 2: Results

6.20. In this scenario, non-development or green infrastructure areas were allocated a target habitat based on the LNRS measures specified for that area. Where more than one potential LNRS measure was present, the highest-priority measure in West Oxfordshire was selected (see previous section for details).

6.21. Not all sites had areas that overlapped with LNRS measures, although those that did overlap had up to eight measures mapped within their boundaries.

6.22. Where LNRS measures plus retained areas cover more than the 40% limit for non-development area within a site, the areas allocated to the lowest-priority LNRS measures are removed or reduced to bring this area back within the 40% threshold. If the area covered by LNRS measures amounts to less than 40%, additional area following the standard mix used in Scenario 1 is added to bring the total green infrastructure area up to 40%.

6.23. In this scenario, the loss and creation of habitats is not assumed automatically. Instead, an assessment is made of whether an LNRS measure applied to a baseline habitat represents enhancement, for example modified grassland to lowland meadow, or creation, for example cropland to woodland. This affects the output BNG units through changes to the difficulty and time-to-condition multipliers, with enhancement interventions generally attracting less significant penalties and potentially generating higher scores.

6.24. Based on the hierarchy of LNRS habitat measures and the listed assumptions, Scenario 2 results in five sites achieving a BNG uplift of more than 20%. A further four sites achieve an uplift of more than 10%, four sites achieve a gain of less than 10%, three sites showing small losses (<10%) and the remaining six sites show higher losses (as outlined in Table 7).

Table 7. Scenario 2 BNG outputs: maximised LNRS approach

Site**[7]	Baseline Units	Area (ha)	Baseline Units/ha	LNRS Unit Output	LNRS Gain
	3642.8	1354.4	2.69	3842.4	5.5%
A	305.6	84.6	3.61	322.1	5.4%
B	64.6	32.7	1.98	87.1	34.8%
C	346	106.7	3.24	401.0	15.9%
D	103.8	51.3	2.02	132.2	27.4%
E	254.8	115.3	2.21	291.0	14.2%
F	709.0	255.1	2.78	670.1	-5.5%
G	169.2	84.4	2.00	190.2	12.4%
H	716.0	305.4	2.34	832.4	16.3%
I	339.0	125.3	2.71	342.4	1.0%
J	8.0	4.0	2.00	10.1	26.9%
K	103.6	31.2	3.32	78.6	-24.1%
L	84.8	28.6	2.97	73.5	-13.4%
M	2.4	0.6	4.00	1.5	-38.1%
N	13.2	3.3	4.00	12.9	-2.6%
O	7.6	2.0	3.80	5.4	-29.5%
P	21.6	5.4	4.00	14.6	-32.4%
R	16.0	4.0	4.00	14.8	-7.5%
S	153.6	29.7	5.17	113.1	-26.4%
T	97.4	45.6	2.14	119.8	23.0%
U	5.8	2.9	2.00	7.2	23.5%
V	120.8	36.3	3.33	122.6	1.5%

6.25. Strategic significance is treated differently in scenario 2. Unlike scenario 1, strategic significance is considered for outcome calculations where it aligns with LNRS measures, giving a strategic uplift of 15% to BNG output scores for habitat outcomes that. This gives a 15% uplift to BNG scores aligning with LNRS

[7] Site W, is not included due to its urban status and zero overlap with LNRS, but would have the same issues as Scenario1

measures. Where the baseline habitat and LNRS measure result in an improvement in condition of an existing habitat, the strategic uplift also applies to the baseline habitat. Where this is not the case, no strategic significance is assigned to baseline habitats. This illustrates an important point for interpreting the results below: the Scenario 2 outputs are influenced not only by the type and extent of habitat interventions, but also by how strategic significance is applied within the metric. The results should therefore be read as a modelled indication of the potential effect of aligning BNG delivery with LNRS priorities, rather than as a final site-specific calculation.

6.26. Overall, the Scenario 2 results show that using LNRS measures to guide habitat retention, enhancement and creation can improve modelled BNG outcomes for some sites, particularly where the mapped measures align with habitats that can be enhanced or created within the available green infrastructure area. However, the results also demonstrate that an LNRS-led approach does not automatically result in a higher numerical BNG return for every site. Outcomes vary according to baseline habitat value, the extent of retained habitats, the proportion of the site available for non-development uses, and whether the relevant LNRS measures can be delivered as enhancement of existing habitats or require new habitat creation.

6.27. Sites with low baseline value and clear opportunities for LNRS-aligned habitat creation or enhancement are more likely to show substantial percentage gains, while sites with higher baseline biodiversity value, smaller available green infrastructure areas or more constrained habitat opportunities may show limited gains or losses. These results should therefore be interpreted as evidence of the potential benefits of aligning BNG delivery with local nature recovery priorities, while recognising that the highest-quality ecological outcome may not always correspond with the highest numerical BNG percentage.

6.28. Given the overlap between potential LNRS measures at some sites and the prioritisation method used to select one measure over another, it is possible that some measures of lower priority are excluded from the outputs. In particular, pond creation is the lowest priority measure and consequently has a relatively small footprint. With a more detailed, site-specific analysis it may be possible to design a GI plan that accounts for this and, as a result, includes a wider variety of lower-priority LNRS measures. This could result in a higher (or lower) BNG unit output, depending on the choices made, and may more closely represent a combination of scenarios 2 and 3, with a wider diversity of habitats included in the GI outputs. The wide variety of possible options meant that it was too complex to attempt an analysis of these options across the range of sites.

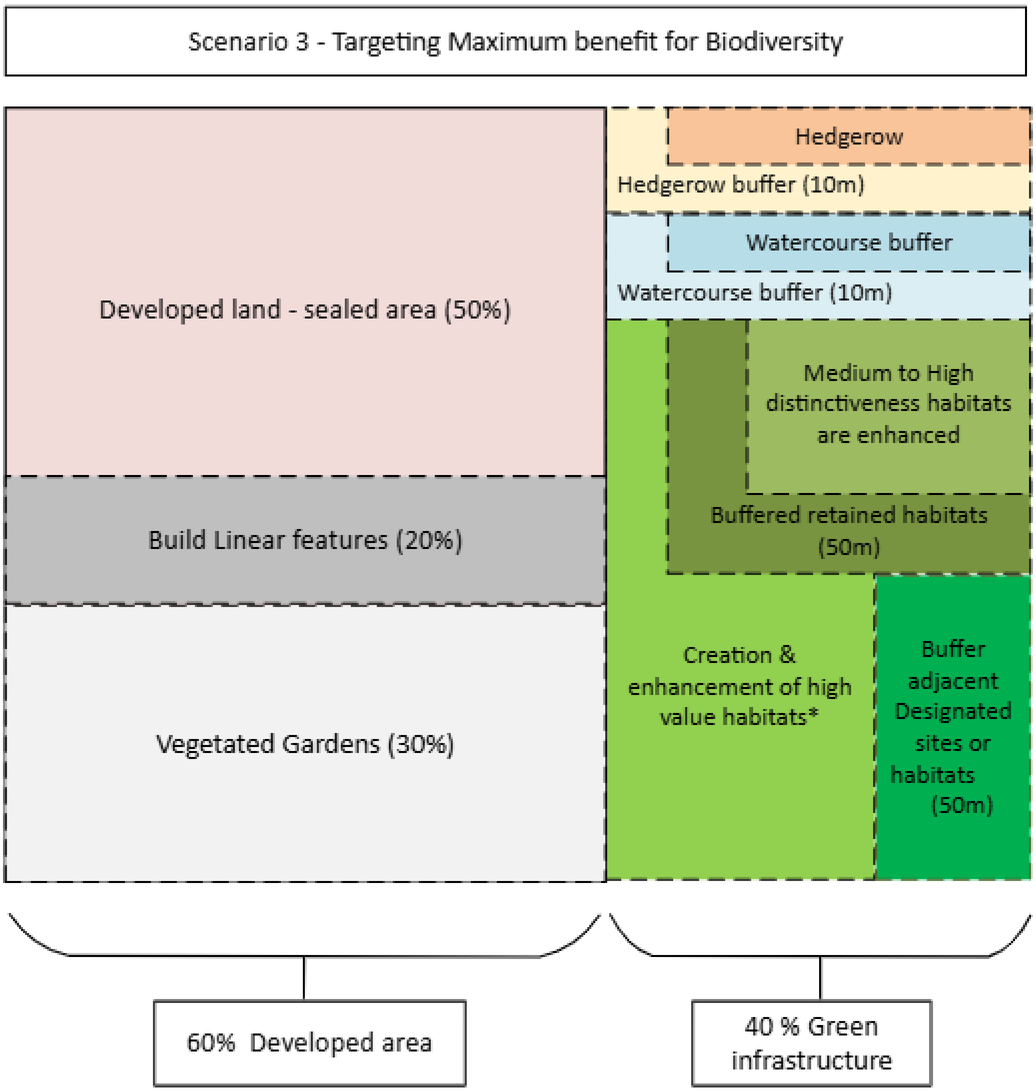
7. Scenario 3: Maximising Biodiversity

7.1. Scenario 3 aims to achieve the highest possible biodiversity benefits. This expands beyond simple retention of medium to high distinctiveness habitat by focusing on optimising both habitat type and condition, increasing the extent and quality of high-value habitats.

Rationale and assumptions

- **Optimising Habitat Type and Condition:** This scenario prioritises the creation, enhancement, and restoration of habitats with the highest distinctiveness and ecological value.
- **Maximising Ecosystem Services:** Aims to maximise ecosystem services including carbon sequestration, water purification, pollination, and flood mitigation. Habitat creation and enhancement are strategically located to optimise these services and benefit both biodiversity and local communities.
- **Buffering Priority and Irreplaceable Habitats:** The scenario establishes buffers around priority and irreplaceable habitats that are present in areas adjacent to sites. These buffers reduce edge effects, protect core areas, and facilitate species movement, contributing to overall landscape connectivity and resilience.
- **Buffering Statutory and Non-Statutory Sites:** the impacts of buffers for nearby statutory and non-statutory conservation sites will also be investigated.

Figure 4. Scenario 3 model



*Medium to High distinctiveness and increased diversity habitat mix: 25% other neutral grassland; 15% modified grassland; 10% mixed scrub; 10% lowland mixed deciduous woodland or wet woodland; 10% other broadleaved woodland; 10% lowland calcareous grassland or lowland meadows; 10% floodplain grazing marsh (if appropriate, otherwise other neutral grassland); 5% ponds; 5% traditional orchards.

Protected sites and medium to higher distinctiveness habitat assumptions

7.2. For this scenario, a variety of nationally and locally protected sites and ecologically important features were buffered by 50m. These included Local Wildlife Sites, Sites of Special Scientific Interest, Local Geological Sites, Road Verge Nature Reserves and Ancient Woodland. Appropriate target habitats were then allocated to these buffer zones, reflecting the ecological interest of the adjacent protected site or feature. For example, Lowland Calcareous Grassland was allocated adjacent to a limestone grassland Road Verge Nature Reserve, while Lowland Mixed Deciduous Woodland was allocated adjacent to Ancient Woodland. These buffered areas contribute to the overall green infrastructure total for the site.

7.3. Any existing medium or high distinctiveness habitats were treated as being enhanced rather than simply retained. This enhancement could be achieved either by changing the habitat to a higher distinctiveness habitat type, such as changing other broadleaved woodland to Lowland Mixed Deciduous Woodland, or by improving habitat condition, for example from moderate condition to good condition.

7.4. Remaining green infrastructure areas, up to the 40% limit, were allocated to an enhanced habitat mix. This mix includes a wider range of higher distinctiveness habitats than the simple model, including Priority Habitat grasslands, traditional orchards and ponds instead of relying primarily on lower distinctiveness grasslands. The resulting output mix was as follows:

- 25% other neutral grassland
- 15% modified grassland
- 10% mixed scrub
- 10% lowland mixed deciduous woodland or wet woodland
- 10% other broadleaved woodland
- 10% lowland calcareous grassland or lowland meadows
- 10% floodplain grazing marsh
- 5% ponds
- 5% traditional orchards

7.5. These habitat types may not be appropriate for every site. Where this is the case, site-specific substitutions could be made for alternative habitats that are more suitable to the local context, provided they would deliver broadly similar BNG outputs and support the same overall objective of increasing habitat diversity and distinctiveness.

7.6. This scenario does not account for LNRS measures, and because the outputs are not mapped to those measures, no strategic significance uplift has been included in the scores. However, it is possible that, at some sites, there could be a match between the output habitats modelled under this scenario and mapped LNRS measures that would qualify for this uplift. A full site-specific design and BNG assessment would be able to account for this situation and apply strategic significance where appropriate.

Scenario 3: results

7.7. The Scenario 3 results show that a maximum biodiversity approach does not necessarily generate the highest numerical BNG return across all sites. Although this scenario is designed to test a more ambitious, quality-led habitat composition, the overall result across all sites is a small net loss of 0.8% in area habitat biodiversity units. This reflects the way the statutory metric accounts for habitat creation and enhancement risk, including the difficulty of establishing higher distinctiveness habitats and the time required for those habitats to reach target condition. It also reflects the influence of the baseline position: where sites already support habitats with a relatively high baseline value, there may be limited scope to generate additional numerical uplift, even where the proposed habitat composition would represent a more ecologically valuable or strategically appropriate outcome.

7.8. The results vary substantially between sites. Several sites show strong gains under this scenario, including Sites A, B, D and E, where the modelled approach appears to provide sufficient opportunity for higher distinctiveness habitat creation or enhancement within the available green infrastructure area. Other sites show more limited gains or losses, particularly where the baseline biodiversity value is already high, the site is small, or the assumed undeveloped area is insufficient to accommodate the more ambitious habitat mix without a reduction in overall metric performance. The losses shown for some smaller sites should therefore be interpreted with caution, as they may reflect the interaction between site size, baseline units per hectare, habitat delivery risk and the assumptions applied within the model, rather than indicating that a higher-quality ecological approach would be inappropriate in principle.

Table 8. Scenario 3 area habitat BNG outputs and gains

Site	Baseline units	Area	Baseline units/ha	Max BD unit output	Max BD gain
A	305.6	84.6	3.61	360.9	18.1%
B	64.6	32.7	1.98	80.2	24.1%
C	346	106.7	3.24	284.1	-17.9%
D	103.8	51.3	2.02	129.7	25.0%
E	254.8	115.3	2.21	309.3	21.4%
F	709	255.1	2.78	584.2	-16.0%
G	169.2	84.4	2.00	187.0	10.5%

H	716	305.4	2.34	786.7	9.9%
I	339	125.3	2.71	331.0	-2.4%
J	8	4	2.00	9.1	13.2%
K	103.6	31.2	3.32	77.4	-25.3%
L	84.8	28.6	2.97	64.5	-24.0%
M	2.4	0.6	4.00	1.3	-44.5%
N	13.2	3.3	4.00	7.3	-44.6%
O	7.6	2	3.80	5.2	-31.6%
P	21.6	5.4	4.00	12.1	-44.0%
R	16	4	4.00	9.1	-43.4%
S	153.6	29.7	5.17	132.0	-14.1%
T	97.4	45.6	2.14	108.4	11.3%
U	5.8	2.9	2.00	6.2	7.3%
V	120.8	36.3	3.33	127.8	5.8%
All sites	3642.8	1354.4	2.69	3613.4	-0.8%

7.9. Under this scenario site H shows a net gain of 9.9%, falling just short of the statutory minimum of 10%. However, a minor change to the calculator to adjust the target condition of the lowland mixed deciduous woodland from moderate to poor means that, the output net gain increases to 10.1%, meeting the statutory requirements. Although this reduces the number of units generated in one part of the calculation, it is more than offset by reducing the time-to condition penalty associated with this habitat. However, it is unlikely that changes like this at other sites would make enough difference to bring gain at any other sites up to 10%, as the degree of change required would be at least an order of magnitude higher than shown in this example.

7.10. These results reinforce the distinction between maximising biodiversity quality and maximising the quantitative BNG score. Scenario 3 is intended to illustrate what could be achieved where greater emphasis is placed on higher distinctiveness habitats, protected site buffers, habitat diversity and long-term ecological value. In some cases, this may produce a lower modelled BNG percentage than a simpler habitat mix, because higher distinctiveness habitats can be more difficult and slower to establish within the metric. However, where these habitats can be appropriately located, protected, buffered and managed, they may still provide a stronger outcome for nature than a higher-scoring but less ecologically ambitious option. The results should therefore be used to inform policy interpretation and site-specific decision-making, rather than to identify a single preferred numerical scenario for all sites.

8. Comparison of scenarios

8.1. The comparison across scenarios shows that no single approach performs best across all sites. However, the LNRS model, Scenario 2, is the most frequent top-scoring scenario, producing the highest modelled BNG return for 10 of the 21 sites (see tables 9 & 10). It appears to produce higher returns across the whole range of baseline distinctiveness encountered in this process, whereas the simple and maximum biodiversity models return higher outputs at sites with lower and higher baseline distinctiveness levels respectively. At three sites where there is no overlap with mapped LNRS measures, there is no difference between the scores for Scenarios 1 and 2, reflecting the fact that the LNRS-led assumptions could not be applied in those locations.

Table 9. Top-scoring scenarios by site group

Top scoring scenario	Sites	Total area	Average area	Min baseline units/ha	Max baseline units/ha	Average gain
Scenario 1 (Simple)	5	401.8	80.4	2.00	3.32	11%
Scenario 2 (LNRS)	10	794.6	79.5	1.98	4.00	0%
Scenario 3 (Max BD)	3	150.8	50.3	3.33	3.99	3%
Scenarios 1 & 2 equal	3	7.5	2.5	2.00	4.00	4%
All sites	**21**	**1354.7**	**64.5**	**1.98**	**4.00**	**4%**

8.2. Generally, across all sites, the higher the baseline distinctiveness of a site, expressed as BNG units per hectare, the more difficult it is to achieve the statutory net gain of 10% across all three scenarios. This is in line with previous analyses in neighbouring districts. Sites with lower baseline units per hectare generally have greater scope to achieve higher percentage gains because the starting biodiversity value is lower and the metric has more opportunity to register uplift from habitat creation or enhancement (Figure 5).

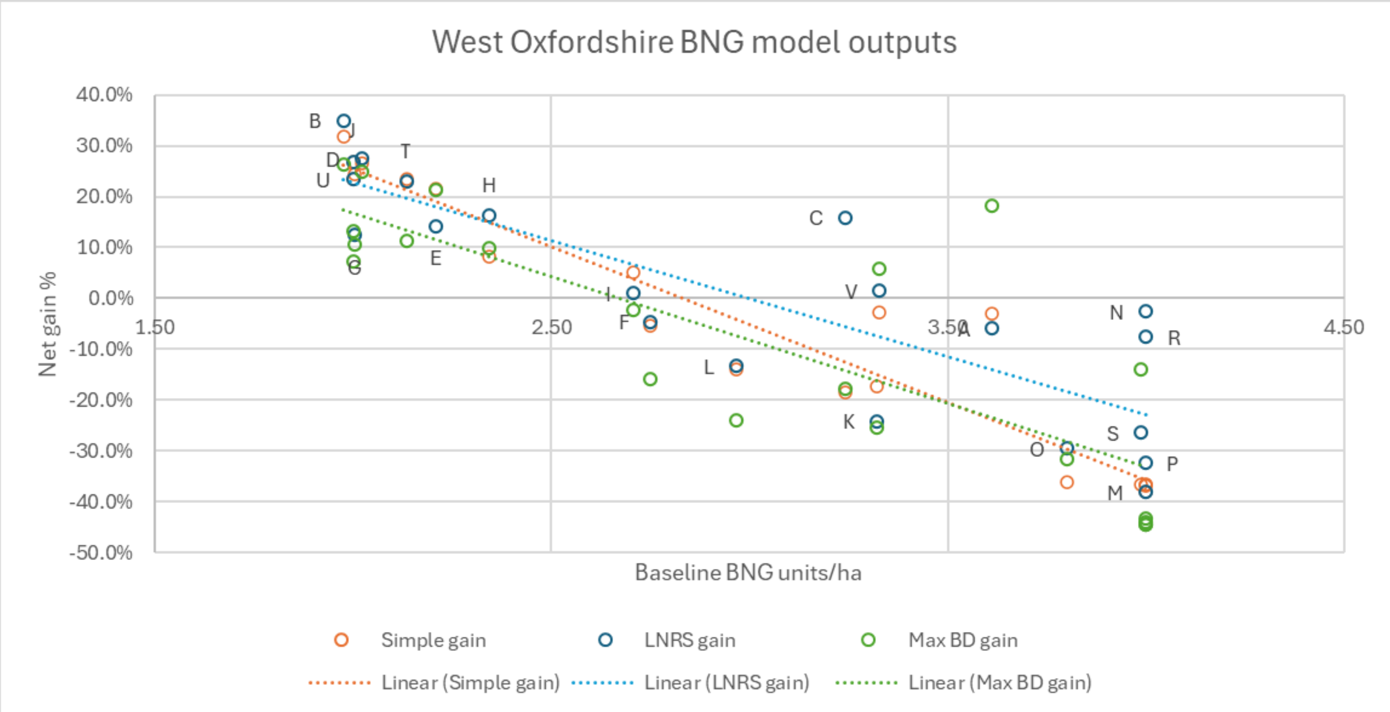
8.3. Conversely, sites with higher baseline units per hectare already support habitats of greater biodiversity value, meaning there is less scope to generate a large additional percentage gain, particularly where the retention, protection or enhancement of existing high-value habitats reduces the area available for improvement of lower distinctiveness habitats.

Table 10. Site BNG outputs for each scenario

Site	Baseline units	Area (ha)	Baseline units/ha	Scenario 1	Scenario 2	Scenario 3
A	305.6	84.6	3.61	-3.0%	5.4%	18.1%
B	64.6	32.7	1.98	47.8%	34.8%	24.1%
C	346.0	106.7	3.24	-18.6%	15.9%	-17.9%
D	103.8	51.3	2.02	26.5%	27.4%	25.0%
E	254.8	115.3	2.21	21.5%	14.2%	21.4%
F	709.0	255.1	2.78	-5.7%	-5.5%	-17.6%

G	169.2	84.4	2.00	24.3%	12.4%	10.5%
H	716.0	305.4	2.34	8.1%	16.3%	9.9%
I	339.0	125.3	2.71	5.2%	1.0%	-2.4%
J	8.0	4.0	2.00	26.9%	26.9%	13.2%
K	103.6	31.2	3.32	-17.4%	-24.1%	-25.3%
L	84.8	28.6	2.97	-14.1%	-13.4%	-24.0%
M	2.4	0.6	4.00	-38.1%	-38.1%	-44.5%
N	13.2	3.3	4.00	-36.6%	-2.6%	-44.6%
O	7.6	2.0	3.80	-36.3%	-29.5%	-31.6%
P	21.6	5.4	4.00	-36.8%	-32.4%	-44.0%
R	16.0	4.0	4.00	-36.6%	-7.5%	-43.4%
S	153.6	29.7	5.17	-36.5%	-26.4%	-14.1%
T	97.4	45.6	2.14	23.6%	23.0%	11.3%
U	5.8	2.9	2.00	23.5%	23.5%	7.3%
V	120.8	36.3	3.33	-2.7%	1.5%	5.8%
Overall	3642.8	1354.4	2.69	0.9%	5.5%	-0.8%

Figure 5. Relationship between baseline habitat units and net gain under each scenario



8.4. The LNRS model appears to perform better across the range of distinctiveness values encountered in this process, with an overall return around 10% higher than the maximum biodiversity model. This may be due , in part, to the scoring bonus available to output habitats that align with strategic priorities such as the LNRS. This strategic significance uplift was included in Scenario 2 where outputs aligned with mapped LNRS measures, but it was not possible to calculate an equivalent uplift for Scenarios 1 or 3, because those outputs were not mapped to LNRS measures in the same way. The stronger performance of Scenario 2 should therefore be interpreted as reflecting both the ecological value of aligning habitat interventions with local nature recovery priorities and the way in which strategic significance is recognised within the statutory metric.

8.5. The comparison also highlights the influence of baseline condition assumptions on the modelled outputs. The analysis applied an assumed moderate condition where detailed field survey data were not available. This affects the results because arable farmland only has a poor-condition scoring equivalent within the metric and consequently scores lower than agricultural grassland, which is assumed to be in moderate condition. This distinction can influence the baseline units assigned to a site and therefore the apparent scope for achieving uplift. It reinforces the importance of full field survey and site-specific baseline assessment, as these may identify areas as being in poor condition or confirm variation in habitat condition that cannot be reliably determined from a desk-based study.

8.6. The comparison therefore supports a flexible and evidence-led policy approach. Scenario 1 demonstrates the type of outcome that may be achievable through a relatively simple and conventional on-site BNG strategy, particularly where baseline biodiversity value is low. Scenario 2 shows the added value of using LNRS priorities to guide biodiversity delivery and is the strongest overall performer in the modelled comparison. Scenario 3 illustrates the potential benefits and limitations of pursuing a more ambitious habitat composition focused on higher distinctiveness habitats and ecological quality, recognising that this may not always produce the highest numerical BNG return. Taken together, the scenarios demonstrate that policy should not rely solely on the highest modelled BNG percentage, but should also consider baseline habitat value, site size, habitat condition, strategic significance, ecological appropriateness, deliverability and the ability to secure long-term management.

9. Additional analysis

Employment development

9.1. For three sites, an additional employment-led development scenario was tested to reflect the emerging policy approach for sites expected to come forward primarily for employment use rather than residential development.

9.2. For these three employment sites, the developed area was modelled as 90% sealed surface, 5% modified grassland and 5% introduced shrub. This employment land-use mix was applied across all three scenarios to test how this would affect the modelled BNG outcomes. The results show that the employment assumption generally reduces potential gains and increases losses when compared with the residential-led assumptions, as the employment development area scores lower than the equivalent area of residential development.

Table 11. Employment-led development BNG outcomes by scenario

Site	Scenario 1 gain/loss	Scenario 2 gain/loss	Scenario 3 gain/loss
V emp	-13.1%	-5.4%	-1.1%
B emp	22.5%	24.6%	16.0%
G emp	16.0%	-4.5%	1.6%

9.3. The results indicate that the ability to achieve a positive BNG outcome under an employment-led assumption varies considerably between sites. Site B performs most strongly, with gains under all three scenarios and a maximum gain of 24.6% under Scenario 2. This suggests that, despite the more constrained employment land-use assumption, there remains sufficient scope at this site for the modelled interventions to generate a net gain. Site G shows a more mixed outcome, with a 16.0% gain under Scenario 1, a 4.5% loss under Scenario 2, and a small 1.6% gain under Scenario 3.

9.4. Site V shows losses under all three scenarios, although the scale of loss reduces from 13.1% under Scenario 1 to 5.4% under Scenario 2 and 1.1% under Scenario 3. This suggests that more ecologically targeted approaches may help to reduce the scale of biodiversity loss on more constrained employment-led sites, even where they do not achieve a full net gain within the site boundary.

9.5.

Reduced Development Option

9.6. A reduced development option was tested for selected sites to explore whether increasing the proportion of land available for green infrastructure could improve the likelihood of achieving the statutory 10% BNG requirement. This assessment applied an equal 50:50 split between developed land and non-developed land or green infrastructure. The approach was applied to a selection of sites that did not achieve a 10% net gain under one or more of the initial scenarios, to understand whether a larger green infrastructure allocation could materially change the modelled BNG outcome.

Table 12. Reduced development option BNG outcomes by scenario and change from previous assessments

Site	Scenario 1 gain/loss	Scenario 2 gain/loss	Scenario 3 gain/loss	Scenario 1 change	Scenario 2 change	Scenario 3 change
A	11.6%	9.5%	31.4%	+14.6%	+15.3%	+13.3%
C	-3.8%	31.2%	-11.1%	+14.8%	+15.3%	+6.8%
F	12.5%	13.4%	5.3%	+18.0%	+18.0%	+21.3%
I	23.5%	19.3%	13.0%	+18.3%	+18.3%	+15.3%
K	-1.7%	-8.6%	-17.4%	+15.7%	+15.5%	+8.0%

9.7. The results show that increasing the green infrastructure proportion to 50% improved the modelled BNG outcome for all five sites assessed, with increases in output area habitat units across all three scenarios when compared with the original 60:40 assumption. The scale of improvement ranged from a minimum of 6.8% to a maximum of 21.3%, depending on the site and scenario. In some cases, this was sufficient to bring at least one scenario above the statutory 10% net gain threshold. However, the results also show that a 50:50 split is not sufficient in every case, particularly where the original 60:40 modelling showed substantial losses. This indicates that increasing the green infrastructure proportion can improve BNG performance but may not fully overcome constraints associated with baseline habitat value, site size, retained habitats or the type of habitat interventions modelled.

9.8. A further calculation was then undertaken to estimate the proportion of each site that could be developed while still allowing a 10% net gain to be achieved under Scenario 1, the simple green infrastructure model. This provides an indicative assessment of how much land may need to be retained or allocated to green infrastructure to meet the statutory BNG requirement on-site, under the assumptions used in this study.

9.9. The results indicate that eight sites have potential to achieve a 10% net gain with a development percentage of approximately 60% under Scenario 1. These are the sites where the 60:40 development to green infrastructure assumption appears broadly capable of supporting on-site BNG delivery. A further seven sites appear to require a lower development proportion, with the 10% threshold being reached where development occupies between 40% and 60% of the site. For these sites, achieving 10% BNG on-site may still be possible, but is likely to depend on a more generous green infrastructure allocation than the main 60:40 assumption.

Table 13. Indicative development percentage required to deliver 10% BNG under Scenario 1

Site	Baseline units/ha	Retained area (ha)	Retained units	Retained percentage	Non retained area (ha)	NR Units for 10%	Development % for 10% gain	GI % to meet 10% gain
A	3.61	12.8	155.8	15%	71.8	180.4	52%	48%
B	1.98	0.8	6.4	2%	31.9	64.7	69%	31%
C	3.24	3.5	28.0	3%	103.2	352.6	41%	59%
D	2.02	0.2	1.6	0%	51.1	112.6	67%	33%
E	2.21	2.3	27.6	2%	113.0	252.7	65%	35%
F	2.75	2.0	19.6	1%	253.2	752.6	51%	49%
G	2.00	0	0	0%	84.4	186.1	67%	33%
H	2.34	5.0	5.6	2%	300.4	782.0	58%	42%
I	2.71	6.8	73.6	5%	118.5	299.3	57%	43%
J	2.00	0	0	0%	4.0	8.8	67%	33%
K	3.32	0.6	6.8	2%	30.6	107.2	40%	60%
L	2.97	0	0	0%	28.6	93.3	46%	54%
M	4.00	0	0	0%	0.6	2.6	23%	77%
N	4.00	0	0	0%	3.3	14.5	23%	77%
O	3.80	0.2	0.8	10%	1.8	7.6	24%	76%
P	4.00	0	0	0%	5.4	23.8	23%	77%
R	4.00	0	0	0%	4.0	17.6	23%	77%
S	3.99	0	0	0%	29.9	131.1	23%	77%
T	2.14	0.6	7.2	1%	45.0	99.9	66%	34%
U	2.00	0	0	0%	2.9	6.4	67%	33%
V	3.33	8.8	72.8	24%	27.5	60.1	51%	49%

9.10. Six sites appear to require development to occupy less than a quarter of the site in order to achieve the 10% threshold under Scenario 1. This suggests that, for these sites, on-site delivery of 10% BNG may be particularly challenging if conventional development assumptions are applied. This appears to be mostly due to the higher baseline units per hectare on these sites, although the small size and limited flexibility of the sites may result in a more limited opportunity for additional uplift.

9.11. These findings should be interpreted as indicative rather than prescriptive. The calculations are based on Scenario 1 only, and the development percentages required to achieve 10% BNG could be different under Scenarios 2 or 3, particularly where LNRS-aligned habitat interventions or higher distinctiveness habitat creation and enhancement could be incorporated effectively. However, due to the complexity of the calculations, those options have not been undertaken as part of this project and would need to be assessed on a site-by-site basis through detailed ecological design and full statutory metric calculations. Overall, the reduced development option analysis demonstrates that the proportion of land available for green infrastructure is a key driver of whether 10% BNG can be achieved on-site, and that some sites may require either a reduced development footprint, a more ecologically targeted design approach, or off-site BNG delivery to meet the statutory requirement.

Hedgerows & Other Woody Linear Features

9.12. The hedgerow and other woody linear feature assessment provides an interpreted indication of the scale of additional hedgerow provision that would be required to deliver the statutory minimum 10% gain in hedgerow units. For the purposes of this analysis, all hedgerows and comparable woody linear features are assumed to be retained across the sites. This assumption minimises modelled biodiversity losses and reflects the important role of hedgerows in maintaining ecological connectivity, landscape structure and habitat function. Existing hedgerows and comparable linear features were also considered during the initial assessment of available land, where they were treated as retained features and buffered accordingly.

9.13. Because hedgerow units are calculated separately from area habitat units, a 10% gain in hedgerow biodiversity value must be achieved through hedgerow-specific measures. This can be delivered either through the creation of new hedgerows or through enhancement of existing hedgerows, for example by gap filling, increasing species diversity, improving structural condition, or applying appropriate long-term management. Where hedgerow losses occur as part of development, those losses would need to be compensated for through replacement planting or other hedgerow unit gains. The replacement length required will normally be greater than the length lost where the new hedgerow is of equivalent distinctiveness, because the metric accounts for factors such as creation risk and time to target condition.

9.14. The results in table 14 show that hedgerows or similar woody linear features are present on or adjacent to 20 of the assessed sites. These include hedgerows, hedgerows with trees and lines of trees, with some features also associated with ditches.

9.15. For the purposes of this strategic analysis, hedgerows were assumed not to fall into the BNG definition of ‘species-rich’, and lines of trees were assumed not to fall into the BNG definition of ‘ecologically valuable’ which are categories of higher distinctiveness. These assumptions are precautionary in the sense that features meeting those higher-value categories would score more highly within the metric and would increase the number of units required to meet BNG of 10%. All hedgerows and lines of trees were also assumed to be in moderate condition.

Table 14. Hedgerow creation to meet 10% gain requirement

Site	Sum of baseline BNG hedgerow units	Metres of new Native hedgerow required to reach 10% BNG
A	14.18	423
B	8.36	250
C	8.87	265
D	10.67	319
E	11.62	347
F	33.80	1009
G	16.20	484
H	36.90	1101
I	12.12	362
J	0.78	23
K	7.45	222
L	2.64	79
M	0.43	13
N	1.02	30
O	0.90	27
P	3.09	92
Q	0.58	17
S	5.27	157
T	4.64	139
V	5.64	168
Grand Total	**291.67**	8707

9.16. Table 14 presents the indicative length of new native hedgerow, not species-rich and in moderate condition, that would be required to achieve a 10% gain in hedgerow units for each site with baseline hedgerow units. Across all assessed sites, the modelled requirement is approximately 8.7km of new native hedgerow. The length required varies substantially between sites because it is directly related to the existing baseline hedgerow value. Sites with a larger existing hedgerow resource, such as Sites F and H, require the greatest additional lengths to achieve a 10% gain, while sites with a relatively small baseline hedgerow resource require much shorter lengths. These figures should therefore be interpreted as indicative requirements based on the assumptions applied, rather than as fixed planting prescriptions. In practice, site-specific hedgerow surveys, condition assessments and design proposals would be needed to confirm whether gains are best delivered through new planting, enhancement of existing hedgerows, or a combination of both.

Watercourses

9.17. The watercourse assessment provides an interpreted indication of the additional watercourse biodiversity units required to deliver the statutory minimum 10% gain for sites where watercourses are present. For the purposes of this analysis, all watercourses are assumed to be retained across the sites. The design and creation of new watercourses would be highly site-specific, so is not considered to be feasible within the scope of this strategic study, so the assessment focuses on the existing watercourse resource and the potential for enhancement. Existing watercourses were also considered during the initial assessment of available land, where they were treated as retained features and buffered accordingly.

9.18. Unlike hedgerows, watercourse net gain is not readily expressed as a simple length of new habitat to be created. Instead, gains are more likely to be achieved through targeted improvements to the condition and ecological function of existing watercourses. This may include restoring more natural flow regimes, increasing structural diversity, improving riparian vegetation, enhancing adjacent habitats, reducing pressures on the channel and improving the wider ecological connectivity of the watercourse corridor. These types of intervention would need to be developed through site-specific assessment and detailed design, taking account of the existing condition, constraints and opportunities associated with each watercourse.

9.19. Watercourses are present on eleven of the assessed sites and include stretches of Priority Habitat rivers, other rivers and streams, and ditches. Table 15 presents the baseline watercourse units and the additional watercourse units required to deliver a 10% net gain. Across the sites assessed, the total baseline watercourse value is 34.45 units, meaning that 3.445 additional watercourse units would be required to achieve the statutory minimum 10% gain. The greatest additional requirement is associated with Site H, reflecting its higher baseline watercourse unit value, while sites with smaller baseline watercourse resources require proportionately smaller uplifts. As with the hedgerow assessment, these outputs should be interpreted as indicative strategic requirements. A full site-specific watercourse assessment would be needed to confirm the feasibility, scale and type of enhancement required to deliver these units in practice.

Table 15. Existing and required watercourse units

Site	Sum of BNG watercourse units	Watercourse units required to deliver 10% net gain
A	3.12	0.312
B	1.02	0.102
C	8.78	0.878
D	0.07	0.007
E	0.96	0.096
F	2.54	0.254
H	12.27	1.227
I	3.34	0.334
K	0.46	0.046
L	0.17	0.017
T	1.72	0.172
Grand Total	**34.45**	**3.445**

9.20. Care will need to be taken to ensure that any plans to improve watercourse condition by improving riparian habitat (within 10m of the watercourse) are not double counted as changes in the area habitat calculations.

10. Ecosystem Benefits

10.1. A subset of sites, comprising Sites A, C, F, H and I, was used for the assessment using the Ecosystem Benefits from Nature Tool. For each site, the BNG baseline habitat data were entered into the EBN Tool, alongside the target habitat areas developed for each scenario. These target habitats were entered as the proposed habitat position, allowing the tool to estimate the relative change in ecosystem service provision under each scenario. An average score across the assessed sites was then calculated for each ecosystem benefit, providing a consistent basis for comparing the modelled scenarios.

10.2. Default settings were applied throughout, except in relation to access. No public access was assumed in the baseline scenario, while public access, recreation and educational values were assumed for the post-intervention green infrastructure areas.

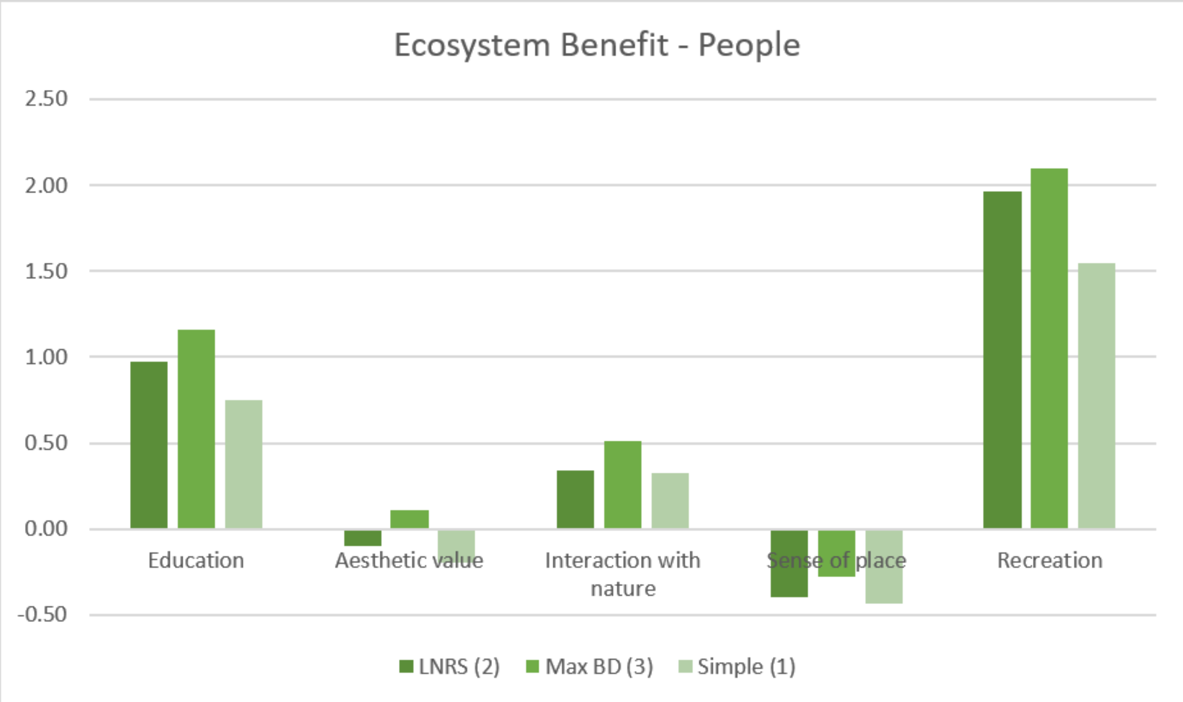
Ecosystem Benefits to People

10.3. The results show that the scenarios generally increase ecosystem benefits associated with public access, recreation, educational value and value for nature. This reflects the assumption that the post-development green infrastructure areas would provide public access and associated recreational and educational opportunities, whereas no public access was assumed in the baseline position.

10.4. Scenario 3 (Maximised for biodiversity benefit) produced the greatest average increase in these public access-related benefits, followed by the Scenario 2 (aligned to LNRS). This is consistent with the more diverse and higher distinctiveness habitat mixes modelled under Scenario 3, which provides a stronger basis for both nature value and experiential benefits where those habitats can be appropriately accommodated and managed.

10.5. The results for aesthetic value and sense of place require more careful interpretation. These benefits are influenced not only by the quality of the green infrastructure or habitat mix, but also by the scale of change across the site. Under the main modelling assumption, 60% of each site is treated as developed land. This represents a substantial change from the baseline condition for many sites, particularly where existing open, rural or semi-natural character would be replaced by built development, gardens, roads or other urban features. Any reduction in sense of place or aesthetic value is therefore likely to be linked to the assumed extent of developed land and the overall level of change on the site, rather than indicating that the green infrastructure component itself has limited value. In practice, detailed planning, landscape design, retention of existing features and the quality of green infrastructure integration would all influence the final effect on these benefits.

Figure 6. Average Ecosystem Benefit score per scenario - People

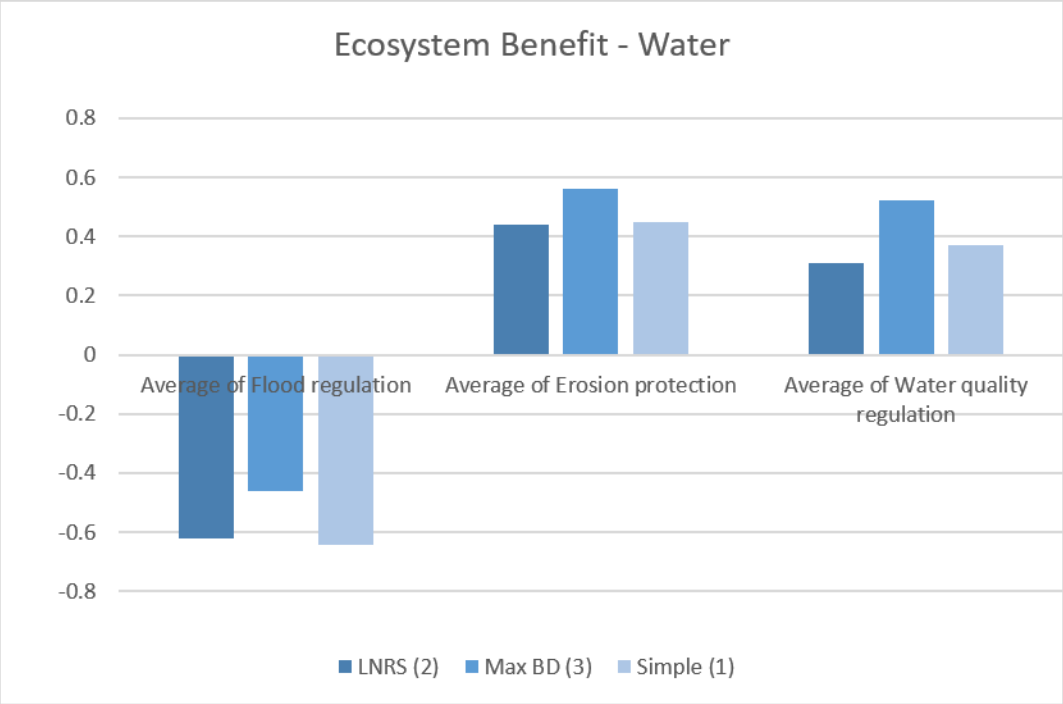


Water-related ecosystem benefits

10.6. Water-related ecosystem benefits follow a broadly similar pattern, with the Max Biodiversity scenario (3) producing the greatest average increases in both erosion protection and water quality regulation. This is likely to reflect the greater emphasis placed in this scenario on more varied and structurally diverse habitats, which can support improved soil stability, vegetation cover and filtration functions.

10.7. The overall reduction in flood regulation should be interpreted with caution, as this is likely to be strongly influenced by gaps in the input data and the need to rely on default settings within the calculator. However, the Max Biodiversity scenario (3) produced the smallest reduction in flood regulation compared with the other two scenarios, followed by the LNRS scenario (2), suggesting that more habitat-diverse and ecologically targeted approaches may help to reduce potential losses in some water-related functions.

Figure 7. Average Ecosystem Benefit score per scenario - Water



Climate mitigation and food and commodity production

10.8. The ecosystem benefit results for food and commodity production were negative across all scenarios. This is not unexpected, as the modelled scenarios involve the conversion of agricultural land, and other land with potential productive value, to a combination of developed land and green infrastructure. Food and commodity production are not priorities for the green infrastructure areas modelled in this study and were not expected to form a significant part of their function. The negative results should therefore be interpreted as an expected consequence of changing land use away from agricultural or commodity-producing uses, rather than as a weakness of the green infrastructure proposals.

10.9. Similarly, reductions in climate mitigation-related benefits, including cooling and temperature regulation, carbon sequestration and noise reduction, are also expected where 50–60% of the total site area is assumed to be developed and a substantial proportion is converted to buildings, roads and other hard surfaces. These outputs reflect the scale of land-use change assumed in the scenarios and the limited role assigned to the developed area in the modelling, rather than the full range of mitigation measures that could be incorporated through detailed design. Additional measures could be used to reduce these effects, including tree and shrub planting within the developed area, street trees, landscape planting, green roofs, green walls and other urban greening measures. Individual trees and planting within the developed area were not included in the modelled assumptions, so the results may under-represent the potential climate mitigation benefits that could be achieved through a more integrated landscape and green infrastructure design.

The Urban Greening Factor

10.10. The Urban Greening Factor is one of the outputs available from the EBN tool. It was not a focus of this assessment because the sites considered are largely rural or peri-urban in character. In a more urban context, however, this output could provide a helpful way to identify and quantify opportunities for green infrastructure within the developed parts of a site. Used in this way, it could help give greater prominence to features that deliver ecosystem benefits linked to climate mitigation and water regulation, such as cooling, noise reduction and surface water management. Relevant measures could include green walls and roofs, roadside verges, street trees, pocket parks and other forms of urban greening.

11. Summary discussion

11.1. The results of this study demonstrate that there is considerable variation in the ability of the assessed sites to deliver BNG under the modelled assumptions. Across the scenarios, outcomes are strongly influenced by baseline biodiversity value, site size, the proportion of land assumed to be available for green infrastructure, the presence of medium and high distinctiveness habitats (that are retained and buffered), and the extent to which proposed habitat interventions align with mapped nature recovery priorities. The analysis therefore indicates that BNG potential cannot be assessed solely by reference to site area or development typology; it requires an understanding of the ecological starting point and the realistic opportunities for habitat retention, enhancement and creation within each site.

11.2. A clear pattern emerges across the results: sites with lower baseline biodiversity units per hectare generally have greater capacity to achieve higher percentage gains, while sites with higher baseline biodiversity value are more constrained. This reflects the structure of the statutory metric, where large percentage uplifts are more readily generated from lower-value starting conditions. Conversely, sites that already contain habitats of greater ecological value may show lower modelled gains, or even losses, because the metric provides less scope for numerical uplift where valuable habitats are present and retained and protected. This is an important interpretive point for policy: a lower BNG percentage does not necessarily indicate a poorer ecological outcome, and a higher BNG percentage does not automatically equate to the best outcome for nature.

11.3. Scenario 1 shows that a relatively simple green infrastructure model can deliver positive outcomes on some sites, particularly where baseline value is low and sufficient undeveloped land is available for habitat creation. However, it is less reliable where baseline units are high, where sites are small, or where a substantial proportion of the baseline value is associated with retained habitats. Scenario 2 generally performs most strongly overall, indicating that alignment with the LNRS can improve modelled BNG outcomes, particularly where LNRS measures correspond with feasible habitat enhancement or creation opportunities. Scenario 3 demonstrates that a more ambitious habitat composition, focused on higher distinctiveness habitats and ecological quality, may not always deliver the highest numerical BNG return because the metric applies risk factors relating to habitat creation difficulty and time to target condition.

11.4. The comparison of scenarios therefore supports a nuanced interpretation of the results. The LNRS-led approach provides the strongest strategic basis for policy because it links development-led habitat delivery with locally identified nature recovery priorities and can also benefit from the strategic significance mechanism within the statutory metric where applicable. However, the maximum biodiversity scenario remains important because it illustrates the potential for higher-quality habitat outcomes that may not be fully reflected by the headline BNG percentage. The most appropriate approach for individual sites is therefore likely to be one that combines the policy direction of Scenario 2 with the ecological ambition of Scenario 3, while retaining the practicality and deliverability considerations reflected in Scenario 1.

11.5. The further analysis shows that land-use and green infrastructure assumptions have a significant effect on the ability of sites to deliver BNG. Under the employment-led assumptions, the three tested sites performed very differently: Site B continued to show positive gains across all three scenarios, with the strongest result under the LNRS-led approach; Site G produced a mixed outcome, with positive results under some assumptions but a loss under Scenario 2; and Site V showed losses under all three scenarios, although the scale of loss reduced under the more ecologically targeted approaches. This indicates that employment-led development, with a higher proportion of sealed surface and the absence of vegetated gardens, is more likely to constrain on-site BNG delivery. It also shows that site context remains critical: even where the same employment assumptions are applied, baseline biodiversity value, site size, retained habitats and available green infrastructure can produce markedly different outcomes.

11.6. The reduced development option further demonstrates the importance of securing sufficient land for green infrastructure at an early stage. Moving from a 60:40 developed to non-developed split to a 50:50 split improved the modelled outcomes for the selected sites across most scenarios, and in several cases changed a site from a loss or marginal gain to a result that met or exceeded the 10% threshold. However, the improvement was not uniform across all sites or scenarios, and some constraints remained where baseline biodiversity value was high or where more ambitious habitat creation carried higher metric risk. This reinforces the need for policy to encourage early planning that identifies ecological constraints and opportunities before the developable area is fixed, rather than treating green infrastructure as residual land after development capacity has been established.

11.7. The ecosystem benefits evidence adds an important wider context to the BNG results. The ecosystem benefit opportunities for nature recovery and nature-based solutions that are not fully captured by the statutory biodiversity metric, including carbon storage and sequestration, water management, flood mitigation, recreation, pollination and wider landscape resilience, are an important consideration in the wider context of the development, particularly in relation to climate change and place-making policies. This is particularly relevant to Scenario 3, which was designed to test a more ambitious habitat composition approach with buffers to priority habitats, protected sites and wider ecological networks. Although Scenario 3 did not always produce the highest numerical BNG return, it may offer stronger multifunctional benefits where higher distinctiveness habitats, wetlands, woodland, scrub, species-rich grassland, ponds or orchards can be located in places that also support climate mitigation, flood risk reduction, public access to nature and ecological connectivity.

11.8. The study also reinforces the limitations of strategic desk-based modelling. The outputs provide a useful evidence base for Local Plan policy development, but they should not be interpreted as final site-specific BNG calculations or design solutions. All sites will require detailed ecological baseline surveys, habitat condition assessments, constraints analysis, design iterations and full statutory metric calculations to inform the preparation of a planning application. Baseline condition assumptions, the treatment of strategic significance, habitat trading rules, long-term management requirements and the deliverability of higher distinctiveness habitats will need to be tested through site-specific assessment.

12. Policy interpretation and recommendations

12.1. The findings provide a strong basis for an evidence-led policy approach that seeks to secure biodiversity outcomes beyond minimum compliance while recognising site-specific constraints. National BNG policy requires development to deliver at least a 10% increase in biodiversity value, but the scenario results and further analysis indicate that some sites have potential to exceed this threshold while others may struggle to achieve it on-site under the assumptions tested. Policy could therefore set a clear expectation that development must maximise on-site BNG, align with LNRS priorities and contribute to wider ecosystem benefits, while allowing flexibility in how this is achieved where on-site delivery is constrained.

Recommendation 1: Embed LNRS alignment as a core policy requirement

The Local Plan should require development proposals to demonstrate how BNG, green infrastructure and landscape design have had regard to the Oxfordshire LNRS and how they contribute to mapped nature recovery priorities where relevant. Scenario 2 was the strongest overall performer in the modelled comparison, suggesting that LNRS alignment can improve both the strategic value and, in many cases, the numerical performance of BNG outputs. Policy could therefore direct applicants to use the LNRS proactively at an early design stage to inform habitat selection, not simply as a post-design metric adjustment.

Recommendation 2: Support an aspirational 20% BNG target where evidence indicates it is achievable

The results show that a 20% BNG outcome may be achievable on some sites, particularly where baseline biodiversity value is relatively low, sufficient green infrastructure land is available, and LNRS-aligned habitat creation or enhancement can be delivered. The Local Plan could therefore include an aspirational or targeted policy expectation for 20% BNG, supported by viability, feasibility and ecological deliverability tests. This would avoid applying a uniform requirement in a way that may be unrealistic on more constrained sites, while still encouraging higher performance where the evidence shows this is achievable. However, this must be within the context that setting a higher percentage does not mean that the quality of habitats being provided is also not important. A balanced combination of quality and quantity must be incorporated into the BNG design.

Recommendation 3: Use baseline biodiversity value to inform site-specific policy expectations

Policy could recognise that sites with higher baseline biodiversity units per hectare may be less able to generate large percentage gains, even where they contain more valuable habitats and deliver better ecological outcomes through retention and enhancement. Site-specific policy wording, allocation criteria or supporting text should therefore avoid treating percentage gain as the only measure of performance. Applicants should be required to demonstrate how existing medium and high distinctiveness habitats will be avoided, retained, buffered, enhanced and managed, and LNRS priorities implemented, alongside the numerical BNG calculation.

Recommendation 4: Secure sufficient green infrastructure land early in site design

The reduced development testing indicates that increasing the proportion of land available for green infrastructure can materially improve BNG outcomes. For larger strategic allocations, policy could therefore require early planning to identify habitat retention areas, buffers, ecological corridors, watercourse and hedgerow networks, LNRS-aligned habitat creation areas and areas capable of delivering wider ecosystem benefits before the developable area is fixed. Where initial modelling suggests that a 60:40 developed to non-developed split is insufficient to deliver the required BNG, a higher green infrastructure proportion, such as the tested 50:50 approach, or an alternative delivery mechanism should be considered.

Recommendation 5: Differentiate policy expectations for employment-led development

The employment-led sensitivity testing shows that higher levels of sealed surface can constrain on-site BNG delivery. Site B retained positive gains under the employment assumptions, whereas Site V showed losses across all three scenarios and Site G produced mixed results. Policy could therefore require employment sites to demonstrate at an early stage how BNG will be delivered through site layout, boundary habitats, sustainable drainage, multifunctional green infrastructure, off-site provision where necessary, and long-term management. Where on-site delivery is unlikely to achieve the required outcome, policy could direct off-site delivery towards locations that support the LNRS and deliver strategic nature recovery and ecosystem service benefits, such as local habitat banks.

Recommendation 6: Prioritise ecological quality as well as metric performance

The policy framework should make clear that the highest numerical BNG score is not always the preferred ecological outcome. Scenario 3 demonstrates that higher distinctiveness habitats and more ambitious ecological interventions may score less favourably where the metric applies time-to-condition and difficulty multipliers. However, the ecosystem benefits assessment indicates that these more ambitious interventions may deliver additional value for carbon storage and sequestration, water management, pollination, flood mitigation, recreation, habitat connectivity and landscape resilience. Planning policy and development management decisions could therefore consider habitat distinctiveness, connectivity, ecosystem service value, long-term management feasibility, compatibility with future land use, and contribution to LNRS priorities alongside the headline BNG percentage. Policy should focus on the qualitative approach to designing BNG outputs rather than focussing on the quantity of BNG provided as measured by the metric. A “quality first” approach could be advocated that would need to be justified as part of the proposals submitted for planning permission.

Recommendation 7: Use ecosystem benefits to guide multifunctional green infrastructure

Policy could require strategic sites to demonstrate how proposed green infrastructure will deliver multifunctional ecosystem benefits in addition to BNG. The Agile Opportunity Maps evidence shows that habitat interventions can support a wider range of outcomes, including climate mitigation, natural flood management, water quality, pollination, public access to nature and ecological connectivity. This could be reflected in site allocation policy, planning requirements and supporting guidance so that habitat creation and enhancement are located where they provide the greatest combined benefit for biodiversity, people and climate resilience.

Recommendation 8: Establish clear expectations for site-specific evidence

The Local Plan should require applicants to submit robust ecological baseline information, condition assessments and statutory metric calculations at the appropriate planning stage. This should include clear justification for habitat condition, strategic significance, habitat trading compliance, assumptions about habitat creation or enhancement, management prescriptions and monitoring arrangements, particularly in relation to their alignment with the mapped potential measures in the LNRS. For strategic sites, this evidence should be integrated with site planning and infrastructure planning so that biodiversity requirements shape site layout rather than being addressed after design decisions have been made.

Recommendation 9: Provide a flexible route for off-site delivery where on-site delivery is constrained

Where site-specific assessment demonstrates that on-site BNG cannot achieve the required or preferred outcome without compromising other planning objectives or ecological quality, policy could support off-site delivery in appropriate circumstances. Off-site delivery could be directed first to locations that align with the LNRS, strengthen ecological networks, buffer existing priority habitats or designated sites, and provide wider ecosystem service benefits such as carbon sequestration, natural flood management and improved public access to nature. This would help ensure that unavoidable constraints at individual development sites still contribute to strategic nature recovery across West Oxfordshire.

Recommendation 10: Use the Urban Greening Factor to strengthen green infrastructure expectations in more urban contexts.

The Urban Greening Factor may be particularly helpful on more urban sites, where buildings, hardstanding, streets and other developed areas make up a larger proportion of the site. In these situations, it can provide a way of quantifying the green infrastructure value of the developed parts of a scheme, as well as the larger areas of open space or retained habitat. This would help ensure that green infrastructure is addressed across the whole site, including in places where it can otherwise be overlooked during design. It could also support more explicit consideration of features that contribute to climate mitigation and water regulation, such as cooling, noise reduction and surface water management. Examples might include green roofs and walls, roadside verges, street trees, pocket parks and other forms of urban greening.

Taken together, these recommendations support a policy approach that is ambitious but proportionate. The evidence indicates that WODC can use the Local Plan to encourage better ecological outcomes through BNG, strengthening alignment with the LNRS, securing better-quality and multifunctional green infrastructure, and recognising the value of ecosystem benefits that sit beyond the statutory biodiversity metric. The key policy implication is that BNG should be treated not only as a statutory metric requirement, but as a mechanism for shaping spatial planning, site design, long-term nature recovery and wider environmental resilience.

13. Potential Next Steps

TVERC could undertake a further phase of work to strengthen the evidence base and translate the strategic modelling into more detailed site-specific guidance. The key next steps would be to:

A. **Ground-truth priority sites** through targeted habitat surveys and condition assessments, focusing on sites where results are uncertain, policy-relevant or highly sensitive to assumptions.

B. **Refine baseline BNG assumptions**, particularly habitat condition, strategic significance, habitat distinctiveness and the treatment of retained habitats.

C. **Prepare site-specific opportunity maps** combining BNG results, LNRS measures, Agile Opportunity Maps, protected site buffers, priority habitats, watercourses, hedgerows and access-to-nature opportunities.

D. **Test additional development and green infrastructure assumptions**, including alternative residential, employment-led and mixed-use layouts, and different developed/non-developed land splits.

E. **Apply the statutory BNG metric in full to selected case-study sites** to validate the strategic model and identify any issues with habitat trading rules, strategic significance and deliverability.

F. **Integrate ecosystem service scoring more directly** into the scenario comparison, so that BNG outcomes can be assessed alongside carbon, flood mitigation, water management, pollination, recreation and ecological connectivity.

G. **Identify multifunctional green infrastructure priorities** where habitat creation or enhancement would deliver the greatest combined benefits for biodiversity, nature recovery, climate resilience and people.

H. **Assess off-site delivery opportunities** for sites unlikely to achieve the required or preferred BNG outcome on-site, prioritising locations that align with the LNRS and wider ecosystem benefits.

I. **Develop site typologies or risk categories** to support policy interpretation, such as sites likely to achieve 20% BNG on-site, sites requiring enhanced green infrastructure, and sites likely to need off-site provision.

J. **Prepare monitoring indicators** to help WODC embed the findings in the Local Plan and track delivery over time.

14. About TVERC

Thames Valley Environmental Records Centre (TVERC) are a not-for-profit organisation covering Berkshire and Oxfordshire. We are run by a partnership and are one of a national network of local records centres. We are a member of the Association of Local Records Centres (ALERC) and the National Biodiversity Network (NBN). Our funding partners include all the local authorities in Oxfordshire & Berkshire plus the Environment Agency. We also work closely with the Berkshire, Buckinghamshire and Oxfordshire Wildlife Trust.

What we do

We provide our funding partners with annually updated species and sites information and undertake surveys of local wildlife sites. We also carry out data analysis for the monitoring of local authority Local Plans. We provide information to parish councils, local people, conservation bodies, land-owners, students and commercial organisations such as ecological consultants and utilities companies via data searches, data licensing and data exchanges. We provide other services such as ecological surveys, data analysis & presentation and training.

Our records

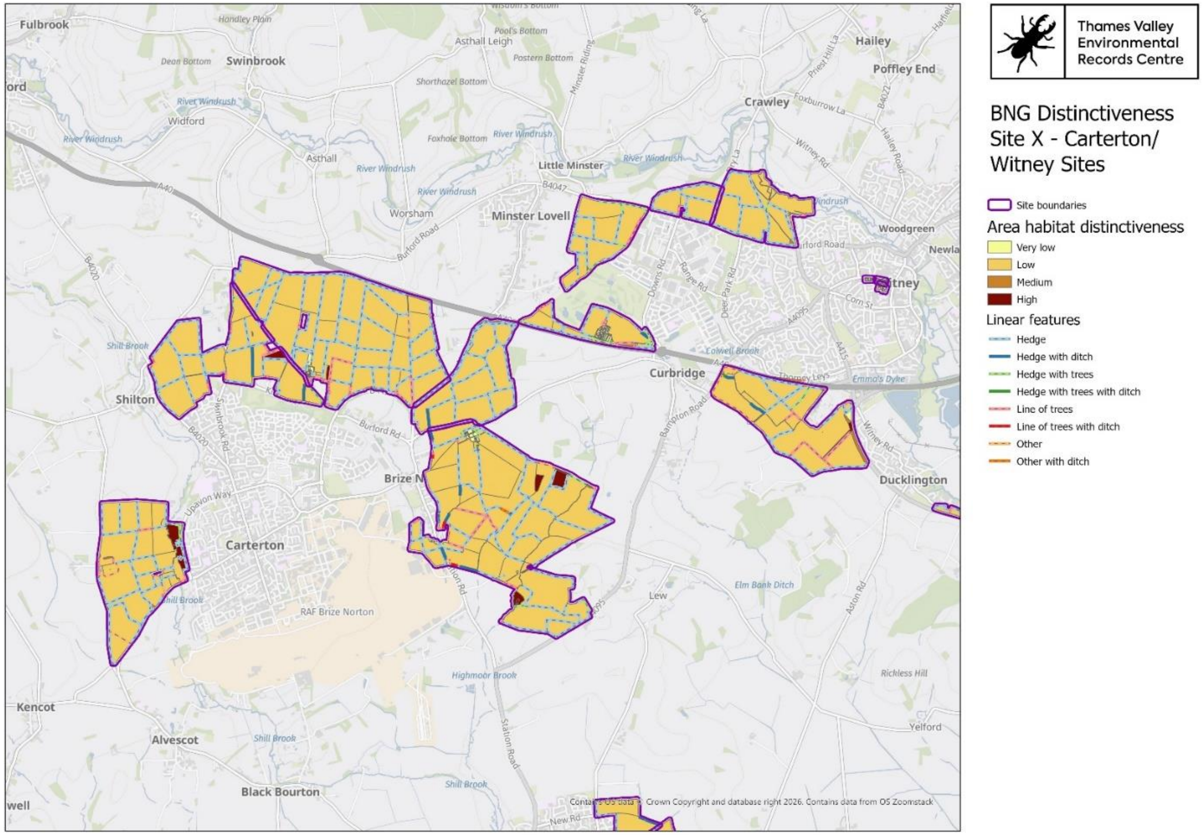
We hold over 5 million records of flora and fauna in Berkshire and Oxfordshire plus information about Local Wildlife and Geological Sites, NERC Act S41 Habitats of Principal Importance (previously called UK Biodiversity Action Plan (BAP) habitats) and Ecological Networks (Conservation Target Areas and Biodiversity Opportunity Areas). We collect this data from the general public, skilled volunteer /amateur recorders, professionals working for wildlife charities (BBOWT and RSPB), professionals working for government agencies (the Environment Agency & local authorities) and ecological consultants. This information is used: by planning authorities and developers to make informed decisions on the design and location of sustainable development to help farmers, landowners and conservation organisations manage land in the best way to enhance biodiversity by nature, partnerships to direct wildlife conservation work by teachers, students and scientists for education and scientific research.

For more information, please visit our website: www.tverc.org

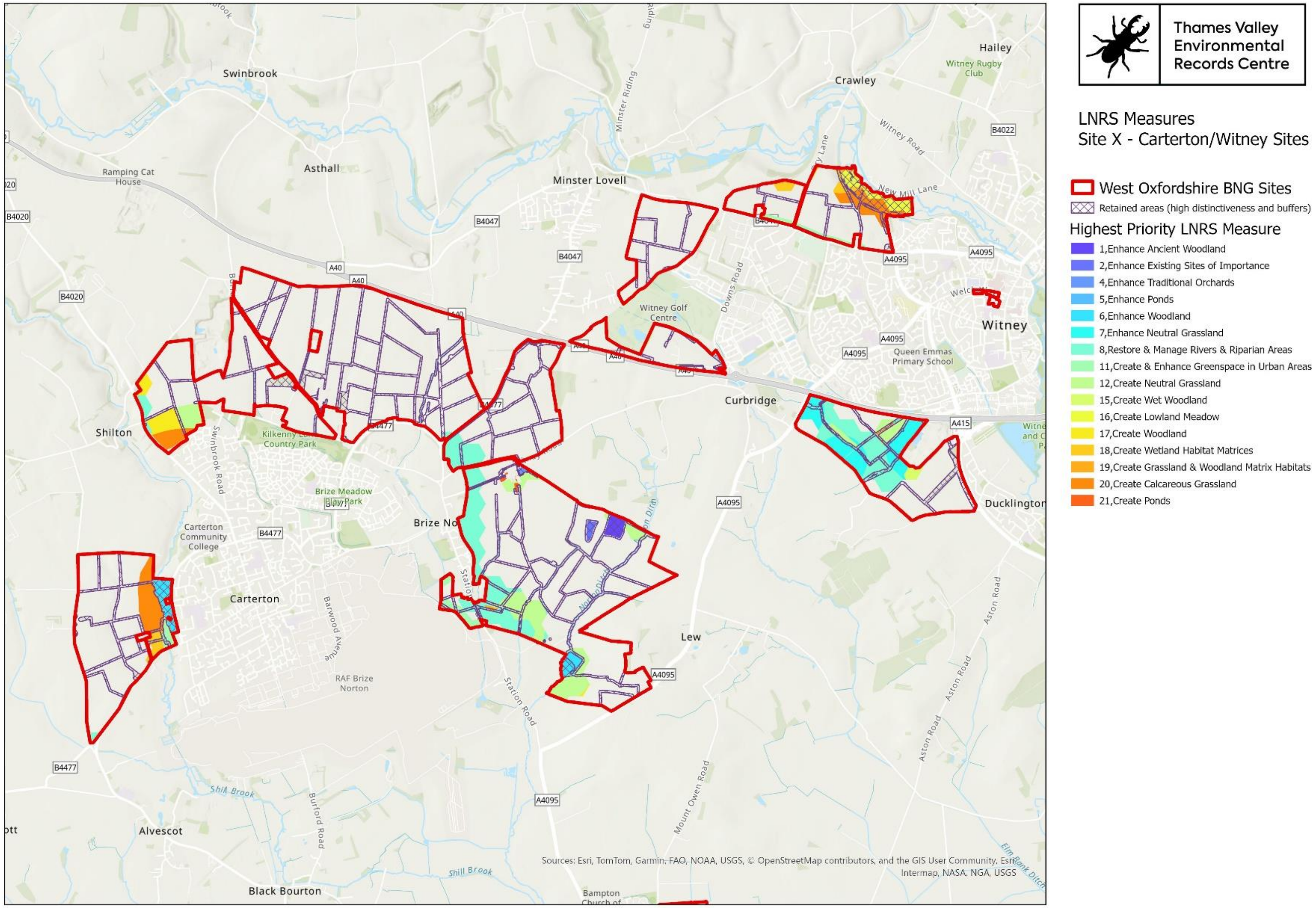
15. Appendices

Appendix 1 - Maps

Map 1 Habitat Distinctiveness Carterton & Witney Sites



Map 2 LNRS Measures Carterton & Witney Sites



Appendix 2 – Sites

Site codes used in the report

Local Plan Broad Area (Preferred Spatial Options) (REG 18)	Related HELAA Sites (Preferred Development Sites)	Local Plan Reference (REG 19)
A	CUR 003 (West) WIT 006 (East)	WIT7 – Land north of Burford Road SLG
C	WIT 001	WIT5 – Land south of Witney SLG
B / D	CUR 008 MIN 006	WIT6 – Land west of Witney SLG
E	BN 001a (East) BN 001 (Central) SHIL 003 (West)	CA6 – North of Carterton SLG
F	BN 003	CA7 – Land north east of Carterton SLG
G / H	BN 006	CA8 – Land east of Brize Norton SLG
I	ALV 002	CA5 - Land west of Carterton SLG
J	CHIP 005 (West) CHIP 018 (West) CHIP 006 (East)	CN3 Land east of Chipping Norton at London Road SLG
K	HAN 001	LH3 – Land west of Hanborough Station
L	BAM 005 BAM 007	BA2 – Land east of Bampton
M	AST 004	RA3 – Land North of Bampton
N	BUR 002a	BU3 – Land south of Sheep Street
O	CHAR 004	CH2 – Land at Jeffersons Piece
P	CHAR 006	CH3 – Land South of Hydac
Q	DUCK 002	Not allocated
R	KING 005	RA4 – Land at Kingham Station
S	MB 001 (West) MB 004 (East)	Not allocated
T	STAN 001 STAN 005	RA5 – Land at the Downs, Standlake
U	TACK 003	RA6 – Rousham Road, Tackley
V	ENS 001	RA2 – Enstone Airfield Area of Regeneration Opportunity
W	WIT 010 WIT 011 LP ALLOCATION WIT 3 (Woodford Way Car Park)	WIT4 – Land at Welch Way Area of Regeneration Opportunity