Biodiversity Net Gain Assessment

Land at Engine Lane, Grimethorpe, Barnsley, South Yorkshire, S72 7BN

Enviromena

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Industry Guidelines and Standards

This report has been written with due consideration to:

- British Standard 42020 (2013). Biodiversity – Code of Practice for Planning and Development.
- British Standard 8683:2021 (2021). Process for Designing and Implementing Biodiversity Net Gain.
- Chartered Institute of Ecology and Environmental Management (2017). Guidelines for Preliminary Ecological Appraisal. 2nd edition. Chartered Institute of Ecology and Environmental Management, Winchester.
- Chartered Institute of Ecology and Environmental Management (2017). Guidelines on Ecological Report Writing. Chartered Institute of Ecology and Environmental Management, Winchester.
- Chartered Institute of Ecology and Environmental Management (2018). Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine. Version 1.1. Chartered Institute of Ecology and Environmental Management, Winchester.
- Chartered Institute of Ecology and Environmental Management (2020). Guidelines for Accessing, Using and Sharing Biodiversity Data in the UK. 2nd Edition. Chartered Institute of Ecology and Environmental Management, Winchester.
- Chartered Institute of Ecology and Environmental Management, Construction Industry Research and Information Association & Institute of Environmental Management and Assessment (2019). Biodiversity Net Gain – Good Practice Principles for Development.

Proportionality

> The survey results and recommendations contained within this report are valid for 18 months. An updated site visit may be required if the report is to be used any longer than 18 months after completion. The work involved in preparing and implementing all ecological surveys, impact assessments and measures for avoidance, mitigation, compensation and enhancement should be proportionate to the predicted degree of risk to biodiversity and to the nature and scale of the proposed development. Consequently, the decision-maker should only request supporting information and conservation measures that are relevant, necessary and material to the application in question. Similarly, the decision-maker and their consultees should ensure that any comments and advice made over an application are also proportionate.
>
> The desk studies and field surveys undertaken to provide a Preliminary Ecological Appraisal (PEA) might in some cases be all that is necessary.
>
> (BS 42020, 2013)

Executive Summary

Arbtech Consulting Limited was instructed by Enviromena to undertake a Biodiversity Net Gain (BNG) Assessment at Land at Engine Lane, Grimethorpe, Barnsley, South Yorkshire, S72 7BN (hereafter referred to as "the site"). The assessment was required to inform a planning application for the construction of a temporary solar farm providing 49.9MW (AC) output, to include the installation of ground-mounted solar panels together with associated works, equipment and necessary infrastructure (hereafter referred to as "the proposed development").

- The baseline habitat is 186.11 units; comprised of 144.59 cereal crop units, 41.43 modified grassland units, 0.10 bramble scrub units, and developed land, sealed surface units (no value). The baseline hedgerow value is 71.01 units; comprised of 71.01 units of native hedgerow with trees. The baseline watercourse value is 0.79 units, comprised of 0.79 units of drainage ditches.
- The post-development habitat is 207.71 units. The post-development hedgerow value is 87.75 units. The post-development watercourse value is 11.17 units.
- The development results in a 11.61% net gain in habitat units. The development results in a 11.57% net gain in hedgerow units. The development results in an 86.72% net gain in watercourse units.

Contents

1.0 Introduction and Context

1.1 Background

Arbtech Consulting Limited was instructed by Enviromena to undertake a Biodiversity Net Gain (BNG) Assessment at Land at Engine Lane, Grimethorpe, Barnsley, South Yorkshire, S72 7BN (hereafter referred to as "the site"). The assessment was required to inform a planning application for the construction of a temporary solar farm providing 49.9MW (AC) output, to include the installation of ground-mounted solar panels together with associated works, equipment and necessary infrastructure (hereafter referred to as "the proposed development").

A plan showing the proposed development is provided in **Appendix 1**.

This report should be read in conjunction with the following documents:

- Statutory Metric: BNG Metric – Land at Engine Lane V7, Arbtech Consulting Ltd, 2026.
- Preliminary Ecological Appraisal (PEA), Arbtech Consulting Ltd, 2023.

1.2 Site Location

The site is located at National Grid Reference SE 40243 09215. A site location plan is provided in **Appendix 2**.

1.3 BNG Informative

BNG is a specific, measurable outcome of project activities that deliver demonstrable and quantifiable benefits to biodiversity compared to the baseline situation. In order to achieve BNG, a project must be able to demonstrate that it has followed all 10 of the Principles of Biodiversity Net Gain (as outlined in the *British Standard 8683:2021 Process for Designing and Implementing Biodiversity Net Gain*).

The legalised Environment Act (2021) requires developments in England to demonstrate a measurable net gain in biodiversity and sets a target of a minimum of 10% BNG for all developments. It also stipulates that a management plan with a minimum 30-year term, should be adopted to ensure biodiversity net gain can be delivered. The Environment Act (2021) is mandatory as of February 2024. The requirement for biodiversity net gain is also enshrined within the National Planning Policy Framework (NPPF, 2021). Furthermore, BNG is a requirement of Barnsley Metropolitan Borough Council Local Policy.

The Statutory Metric is the widely accepted tool used to calculate BNG. It enables the calculation of habitat value pre- and post-development to determine the overall change in biodiversity value because of the proposed development. The Statutory Metric has separate BNG assessments for areas of habitat, hedgerows, and watercourses.

The biodiversity value of a site should be maximised. However, it may not always be possible to achieve a 10% biodiversity net gain within a site and therefore the Statutory Metric can also account for offsite habitat creation, where land is available. Alternatively, developers can seek to provide an agreed financial contribution to an appropriate third party (such as the Local Authority, the UK Government, or another landowner) to deliver the required biodiversity net gain elsewhere on their behalf.

2.0 Methodology

2.1 Baseline Biodiversity Value

The baseline BNG Calculation was informed by the PEA (Arbtech Consulting Ltd, 2023). A baseline habitat plan is provided in **Appendix 3**.

Habitat Classification

The PEA/PRA classified the habitats on site according to The UK Habitat Classification Habitat Definitions Version 2.0 (The UK Habitat Classification Working Group, July 2023).

Habitat Area/Length

The area or length of each habitat was calculated using qGIS software. In calculating the area or length of each habitat, habitats which occur as two or more isolated parcels across the site were combined, where they were deemed to be of a similar composition and condition. Distinctions were made between habitats to be retained (i.e. left as found in baseline), enhanced (i.e. improved condition) or lost (i.e. destroyed by proposed development).
Areas of scattered trees were calculated using the Tree Helper tool within the Statutory Metric.

Habitat Condition

Habitat condition was assessed using the relevant condition assessment sheets found in the Statutory Metric (Natural England, 2023).

Strategic Significance

Strategic significance was assigned for each habitat based upon a review of the following:

- Ecological value
- Function within the landscape
- Any site or habitat allocations under the Barnsley Metropolitan Borough Council Local Policy

2.2 Post Development Biodiversity Value

The post development BNG Calculation was informed by Proposed Site Plan which is included in **Appendix 1**. A post development habitat plan is provided in **Appendix 4**.

Habitat Classification

Proposed habitats were translated to their equivalents in the UK Habitat Classification using The UK Habitat Classification Habitat Definitions Version 2.0 (The UK Habitat Classification Working Group, July 2023) and the information provided within the Proposed Site Plan.

Habitat Area/Length

The area or length of each proposed habitat was calculated using qGIS software. In calculating the area or length of each habitat, habitats which occur as two or more isolated parcels across the site were combined, where they were deemed to be of similar composition and condition. Distinctions were made between habitats to be retained (i.e. left as found in baseline), enhanced (i.e. improved condition) or newly created.

Habitat Condition

Target habitat condition for each proposed habitat was determined assessed using the Temporal Multipliers Tool and the Enhancement Temporal Multipliers Tool included in the Statutory Metric spreadsheet as well as the relevant condition assessment sheets found in the Statutory Metric User Guide (Natural England, 2023). This is based on the assumption that a 30-year management plan will be adopted for the site.

Strategic Significance

Strategic significance was assigned for each proposed habitat based upon a review of the following:

- Likely ecological value
- Function within the landscape
- Any site or habitat allocations under the Barnsley Metropolitan Borough Council Local Policy

2.3 Limitations

No known limitations.

3.0 Results

3.1 Baseline Habitats

Table 1 details the baseline habitats present within the site along with their area/length, condition, and strategic significance. An assessment of the actual condition for each habitat (where relevant) is provided in Appendix 5 (where necessary).

Table 1: Baseline Biodiversity Value

Habitat	Area / Length	Description	Condition Assessment	Strategic Significance
Cropland	72.2935 ha	Cereal crops	N/A	Low strategic significance
Grassland	10.356566 ha	Modified grassland	Moderate – see Appendix 5	
Urban	0.6407 ha	Developed land; sealed surface (buildings and access roads) and artificial unnegated, unsealed surface	N/A	
Heathland and shrub	0.0244 ha	Bramble scrub	N/A	
Hedgerow	8.876km	Native hedgerow with trees	Moderate – see Appendix 5	
Ditches	0.198km	Drainage ditch	Poor – see Appendix 5	

3.2 Post Development Habitats

Table 2 details the post development habitats present within the site along with their area/length, condition, and strategic significance.

Table 2: Post Development Biodiversity Value

Habitat	Area / Length	Description		Condition Assessment	Strategic Significance
Urban – **retained**	0.6407 ha	Developed land; sealed surface (buildings and access roads) and artificial unvegetated, unsealed surface		N/A	Low strategic significance
Hedgerow – **retained**	8.876km	Native hedgerow with trees		Moderate – see Appendix 5	
Ditches – **retained & enhanced**	0.198km	Drainage ditch		Moderate – Habitat Management and Monitoring Plan (HMMP) required	
Urban	26.61048 ha	**90%** of solar panel area	**Total area under the solar panels 29.5672ha**	N/A	
Grassland	2.95672 ha	**10%** of solar panel area		Poor – anticipated as below solar panels	
Grassland – **retained**	0.074266 ha	Modified grassland retained – two horizontal cable corridor areas.		Moderate – see Appendix 5	
Grassland	1.976 ha	Other neutral grassland creation		Moderate – Habitat Management and Monitoring Plan (HMMP) required	

Heathland and shrub	3.3461 ha	Mixed scrub planting	Moderate – Habitat Management and Monitoring Plan (HMMP) required	
Grassland	47.711 ha	Grassland around solar panels	Moderate – Habitat Management and Monitoring Plan (HMMP) required	Low strategic significance
Trees	0.1914	Proposed planting of 47 new trees	Moderate – Habitat Management and Monitoring Plan (HMMP) required	Low strategic significance
Hedgerow	2.1km	Native hedgerow planting	Good – Habitat Management and Monitoring Plan (HMMP) required	Low strategic significance

3.3 Change in Biodiversity Value of the Site

Full details are provided in the Statutory Metric. The headline results are presented in **Appendix 6**.

Areas of Habitat

The baseline habitat value of the site is 186.11, comprising 144.59 units of cropland, 41.43 units of grassland, 0.10 units of scrub, and developed land; sealed surface (no value).

The post development habitat value of the site is 207.71 units, comprising the creation of new grasslands, planting of new trees, planting of scrub, loss of arable land and erection of solar panels.

This results in a net change in biodiversity of 11.61% (i.e. a net gain).

Hedgerows

The baseline hedgerow value of the site is 71.01 units, comprising 71.01 units of native hedgerow with trees.

The post development habitat value of the site is 87.75 units, comprising the retention of the existing hedgerow and the additional planting of native hedgerow.

This results in a net change in biodiversity of 11.57% (i.e. a net gain).

Watercourses

The baseline habitat value of the site is 0.79 units, comprising a drainage ditch.

The post development habitat value of the site is 11.17 units, comprising the retention and enhancement of the drainage ditch.

This results in a net change in biodiversity of 86.72% (i.e. a net gain).

4.0 Recommendations to Deliver BNG

4.1 Discussion

The current proposed plan results in a 11.61% net gain in habitat units, a 11.57% net gain in hedgerow units, and an 86.72% net gain in watercourse units. This is more than the 10% target of biodiversity net gain.

4.2 Post Development

A Biodiversity Net Gain (BNG) Management Plan must be produced for the site. This should include recommendations for the implementation, management and monitoring of the site for at least 30 years.

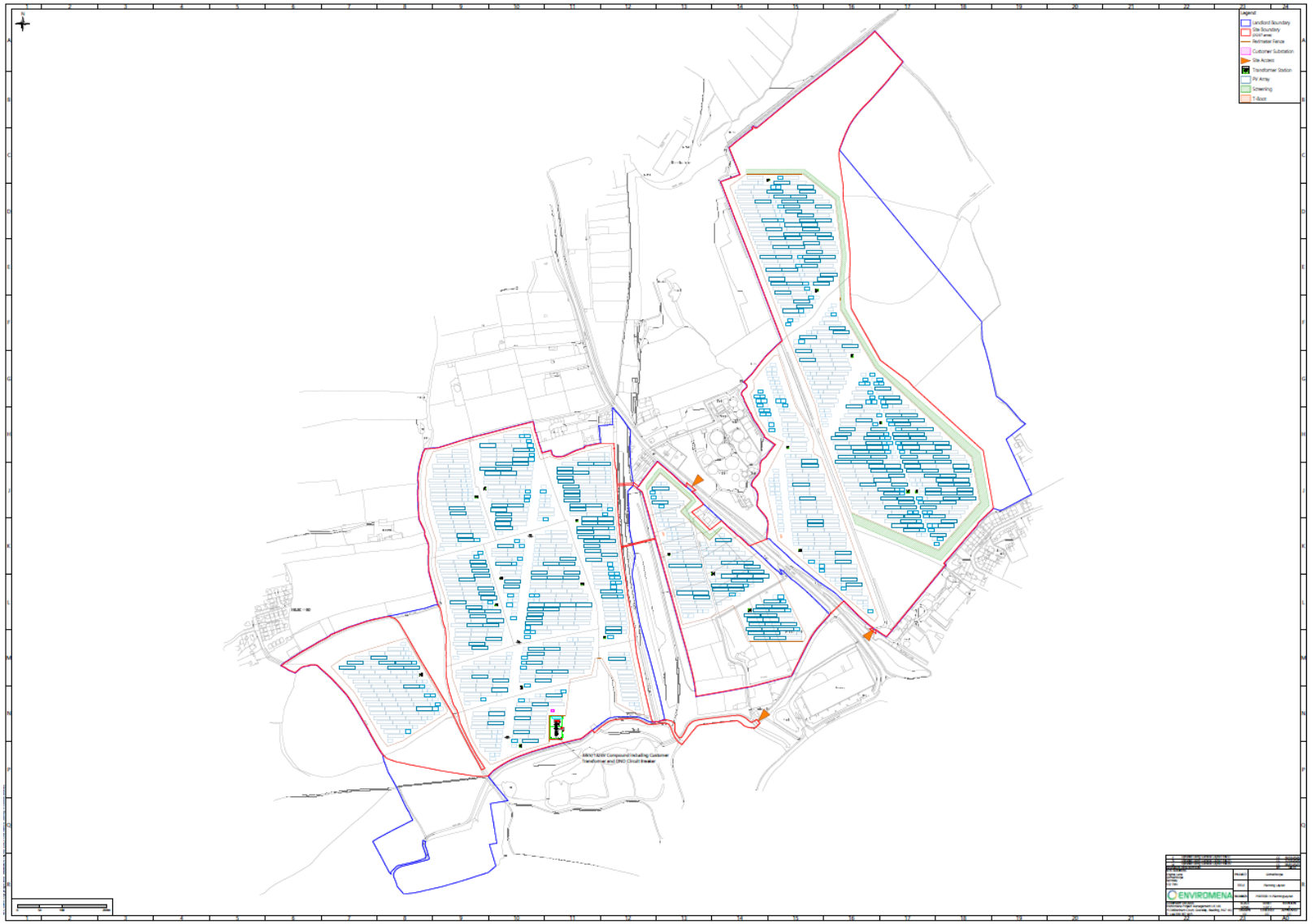
The landscape strategy plan (FPCR Environment and Design Ltd, 2024) shows proposed species lists for meadow grasslands, shaded areas, native hedgerow, shrub and tree mixes. This should be incorporated into the BNG Management Plan (BNG MP).

The watercourse units can achieve an enhancement in condition through planting of aquatic marginal vegetation along the ditch using a seed mix such as EP1 Pond Edge Mixture or similar, and subsequent management of the marginal vegetation which will be detailed in the BNG MP. Water quality is likely to improve following the land use change of the adjacent fields from arable to grassland, resulting in a reduction in nutrient leeching and thus a natural improvement in the range of emergent, submergent and floating-leaved vegetation present.

5.0 Bibliography

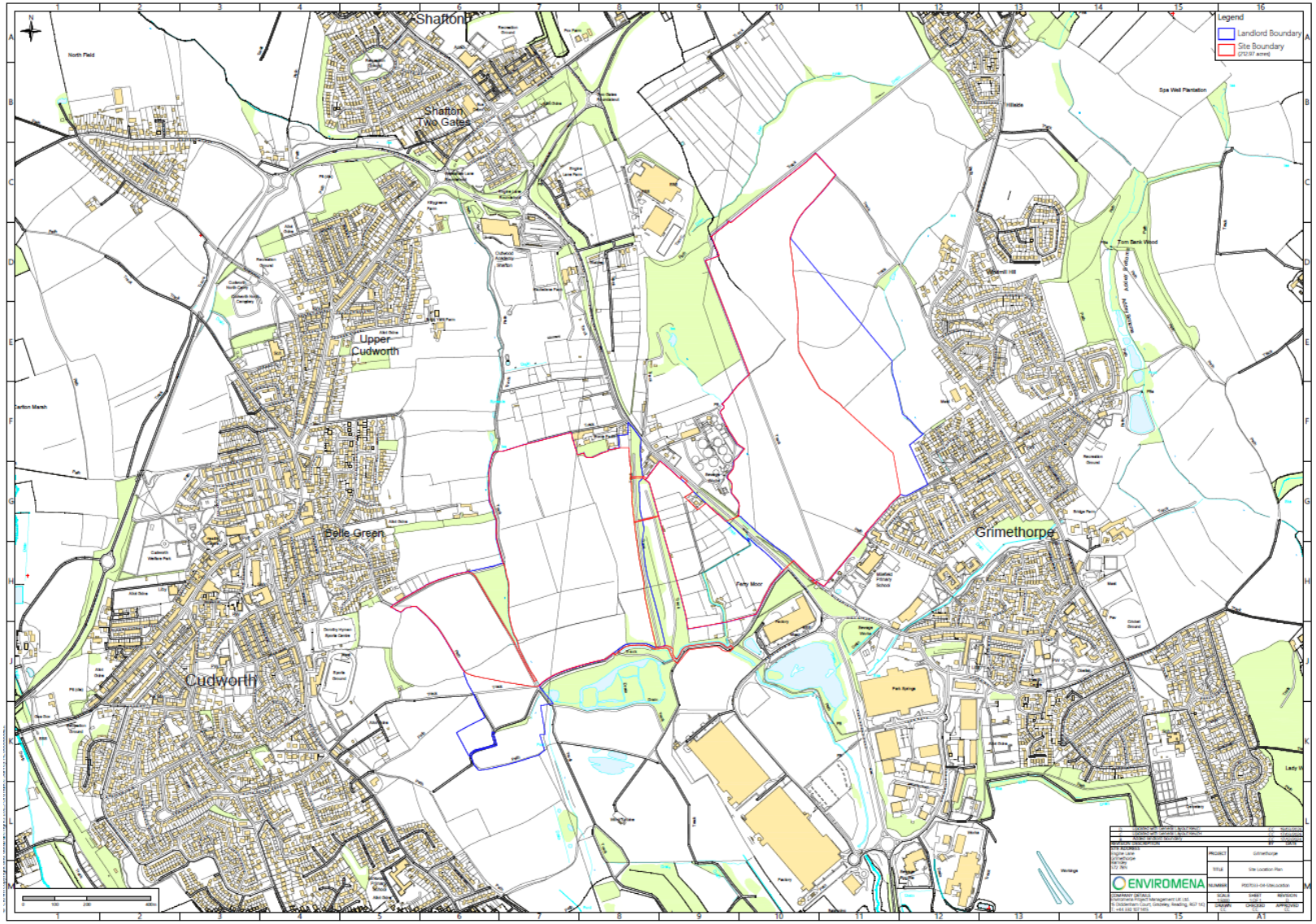
- British Standard 8683:2021 (2021). Process for Designing and Implementing Biodiversity Net Gain.
- CIEEM-CIRIA-IEMA (2019) Biodiversity Net Gain – Good Practice Principles for Development.
- Joint Nature Conservation Committee (2010). Handbook for Phase 1 habitat survey a technique for environmental audit. http://jncc.defra.gov.uk/PDF/pub10_handbookforphase1habitatsurvey.pdf
- Natural England (2023). The Biodiversity Metric 4.0 (JP039).
- Natural England (2023). The Biodiversity Metric 4.0 User Guide (JP039).
- Natural England (2023). The Biodiversity Metric 4.0 Technical Annex 1 - Condition Assessment Sheets and Methodology (JP039).
- Natural England (2023). The Biodiversity Metric 4.0 Technical Annex 2 – Technical Information (JP039).
- The UK Habitat Classification Habitat Definitions Version 2.0 (The UK Habitat Classification Working Group, July 2023)

Appendix 1: Proposed Development Plan

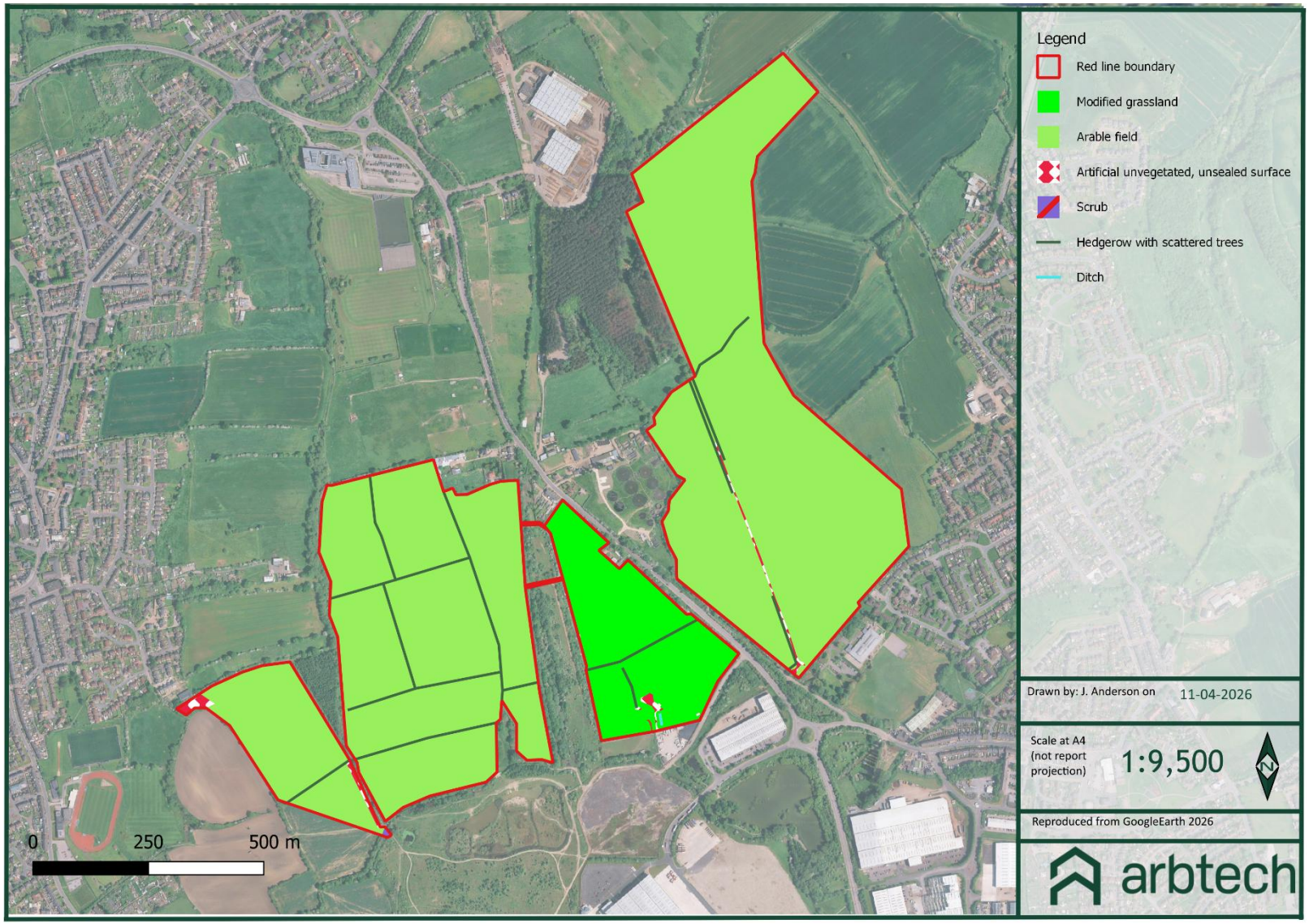



KEY
Site Boundary
Landlord Boundary
Proposed Fenceline
EXISTING LANDSCAPE FRAMEWORK
Existing Tree
Existing Vegetation (Trees & Hedgerow)
LANDSCAPE MITIGATION
Proposed Meadow Grassland
Amenity Grassland
Proposed Shade/Semi Shade Tolerant Meadow
Proposed Tree
Proposed Native Hedgerow
Proposed Native Shrub/Tree Mix
Landscape Strategy 1 of 2
Landscape Strategy 2 of 2

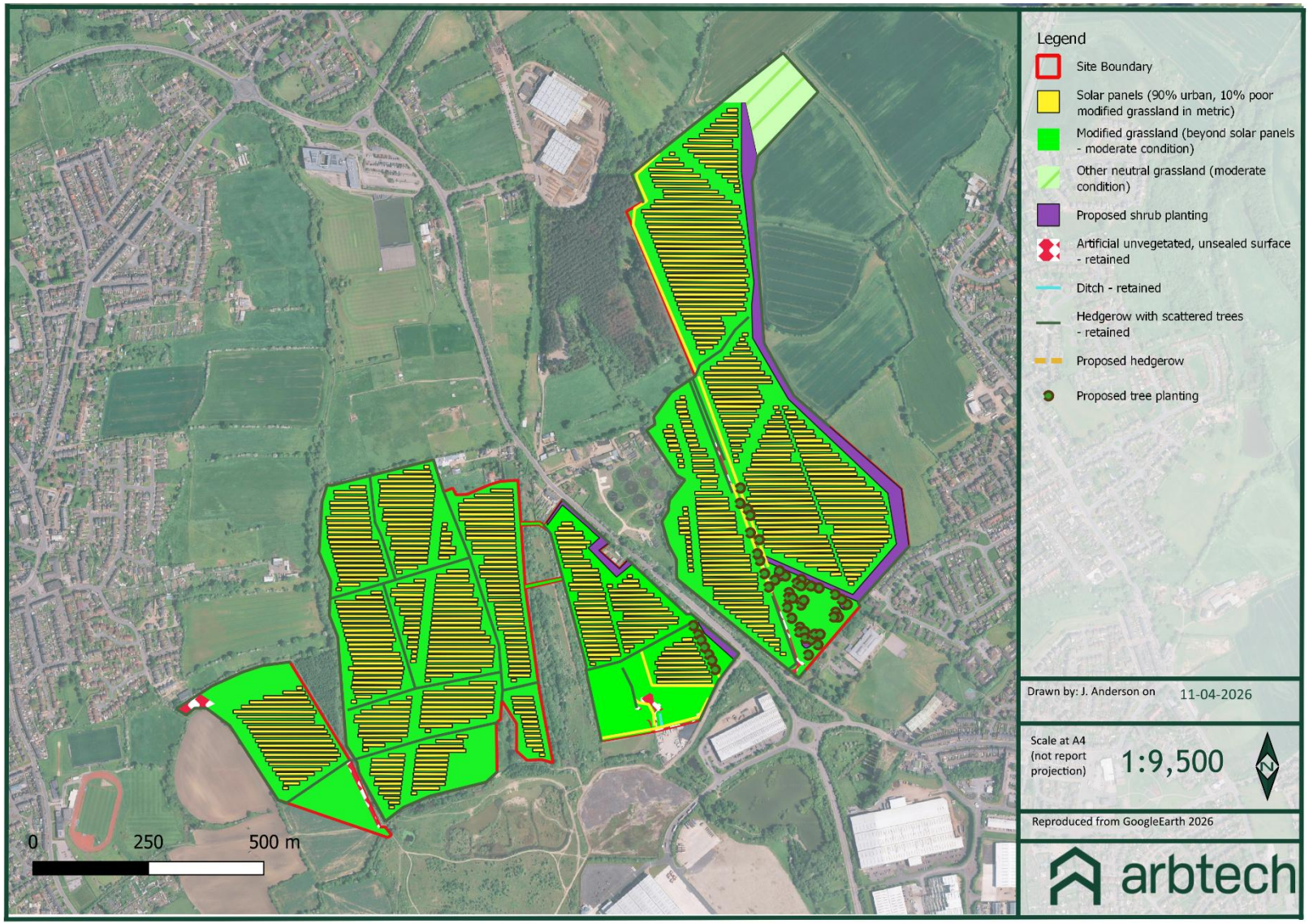
Appendix 2: Site Location Plan



Appendix 3: Baseline Habitat Plan



Appendix 4: Post Development Habitat Plan



Appendix 5: Habitat Condition Assessment Sheets – Baseline

Condition Sheet: GRASSLAND Habitat Type (low distinctiveness)

UKHab - UK Habitat Classification

	Condition Assessment Criteria	Criterion passed (Yes or No)
A	There are 6–8 vascular plant species per m^2 present, including at least 2 forbs (these may include those listed in Footnote 1). **Note – this criterion is essential for achieving Moderate or Good condition.** Where the vascular plant species present are characteristic of medium, high or very high distinctiveness grassland, or there are 9 or more of these characteristic species per m^2 (excluding those listed in Footnote 1), please review the full UKHab description to assess whether the grassland should instead be classified as a higher distinctiveness grassland. Where a grassland is classed as medium, high, or very high distinctiveness, please use the relevant condition sheet.	No
B	Sward height is varied (at least 20% of the sward is less than 7 cm and at least 20% is more than 7 cm) creating microclimates which provide opportunities for vertebrates and invertebrates to live and breed.	Yes
C	Any scrub present accounts for less than 20% of the total grassland area. (Some scattered scrub such as bramble *Rubus fruticosus* agg. may be present). Note – patches of scrub with continuous (more than 90%) cover should be classified as the relevant scrub habitat type.	Yes
D	Physical damage is evident in less than 5% of total grassland area. Examples of physical damage include excessive poaching, damage from machinery use or storage, erosion caused by high levels of access, or any other damaging management activities.	No
E	Cover of bare ground is between 1% and 10%, including localised areas (for example, a concentration of rabbit warrens)[2].	No
F	Cover of bracken *Pteridium aquilinum* is less than 20%.	Yes
G	There is an absence of invasive non-native plant species[3] (as listed on Schedule 9 of WCA[4]).	Yes
	Essential criterion achieved (Yes or No)	
	Number of criteria passed	

Condition Assessment Result (out of 7 criteria)	Condition Assessment Score	Score Achieved ×/✓
Passes 6 or 7 criteria including passing essential criterion A	Good (3)	
Passes 4 or 5 criteria including passing essential criterion A	Moderate (2)	MODERATE

Condition sheet: HEDGEROW Habitat Types

A1.	Height	>1.5 m average along length	The average height of woody growth estimated from base of stem to the top of the shoots, excluding any bank beneath the hedgerow, any gaps or isolated trees. Newly laid or coppiced hedgerows are indicative of good management and pass this criterion for up to a maximum of four years (if undertaken according to good practice). A newly planted hedgerow does not pass this criterion (unless it is >1.5 m height).	No
A2.	Width	>1.5 m average along length	The average width of woody growth estimated at the widest point of the canopy, excluding gaps and isolated trees. Outgrowths (such as blackthorn *Prunus spinosa* suckers) are only included in the width estimate when they are >0.5 m in height. Laid, coppiced, cut and newly planted hedgerows are indicative of good management and pass this criterion for up to a maximum of four years (if undertaken according to good practice).	No
B1.	Gap - hedge base	Gap between ground and base of canopy <0.5 m for >90% of length	This is the vertical 'gappiness' of the woody component of the hedgerow, and its distance from the ground to the lowest leafy growth. Certain exceptions to this criterion are acceptable (see page 65 of the Hedgerow Survey Handbook).	No
B2.	Gap - hedge canopy continuity	Gaps make up <10% of total length; and No canopy gaps >5 m	This is the horizontal 'gappiness' of the woody component of the hedgerow. Gaps are complete breaks in the woody canopy (no matter how small). Access points and gates contribute to the overall 'gappiness' but are not subject to the >5 m criterion (as this is the typical size of a gate).	Yes

Condition sheet: HEDGEROW Habitat Types

C1.	Undisturbed ground and perennial vegetation	>1 m width of undisturbed ground with perennial herbaceous vegetation for >90% of length: · Measured from outer edge of hedgerow; and · Is present on one side of the hedgerow (at least).	This is the level of disturbance (excluding wildlife disturbance) at the base of the hedgerow. Undisturbed ground is present for at least 90% of the hedgerow length, greater than 1 m in width and must be present along at least one side of the hedgerow. This criterion recognises the value of the hedgerow base as a boundary habitat with the capacity to support a wide range of species. Cultivation, heavily trodden footpaths, poached ground etc. can limit available habitat niches.	Yes
C2.	Nutrient-enriched perennial vegetation	Plant species indicative of nutrient enrichment of soils dominate <20% cover of the area of undisturbed ground.	The indicator species used are nettles *Urtica* spp., cleavers *Galium aparine* and docks *Rumex* spp. Their presence, either singly or together, does not exceed the 20% cover threshold.	Yes
D1.	Invasive and neophyte species	>90% of the hedgerow and undisturbed ground is free of invasive non-native plant species (including those listed on Schedule 9 of WCA[3]) and recently introduced species.	Recently introduced species refer to plants that have naturalised in the UK since AD 1500 (neophytes). Archaeophytes count as natives. For information on archaeophytes and neophytes see the JNCC website[4], as well as the BSBI website[5] where the 'Online Atlas of the British and Irish Flora'[6] contains an up-to-date list of the status of species. For information on invasive non-native species see the GB Non-Native Secretariat website[7].	Yes
D2.	Current damage	>90% of the hedgerow or undisturbed ground is free of damage caused by human activities.	This criterion addresses damaging activities that may have led to or lead to deterioration in other attributes. This could include evidence of pollution, piles of manure or rubble, or inappropriate management practices (for example, excessive hedgerow cutting).	Yes
Additional group - applicable to hedgerows with trees only				
E1.	Tree class	There is more than one age-class (or morphology) of tree present (for example: young, mature, veteran and or ancient[8]), and there is on average at least one mature, ancient or veteran tree present per 20 - 50m of hedgerow.	This criterion addresses if there are a range of age-classes or morphologies which allow for replacement of trees and provide opportunities for different species.	Yes
E2.	Tree health	At least 95% of hedgerow trees are in a healthy condition (excluding veteran features valuable for wildlife). There is little or no evidence of an adverse impact on tree health by damage from livestock or wild animals, pests or diseases, or human activity.	This criterion identifies if the trees are subject to damage which compromises the survival and health of the individual specimens.	Yes

Condition Sheet: DITCH Habitat Type

	Condition Assessment Criteria	Criterion passed (Yes or No)
A	The ditch is of good water quality, with clear water (low turbidity) indicating no obvious signs of pollution.	No
B	A range of emergent, submerged and floating-leaved plants are present. As a guide >10 species of emergent, floating or submerged plants present in a 20 m ditch length.	No
C	There is less than 10% cover of filamentous algae and or duckweed *Lemna* spp. (these are signs of eutrophication).	Yes
D	A fringe of aquatic marginal vegetation is present along more than 75% of the ditch.	Yes
E	Physical damage is evident along less than 5% of the ditch, with examples of damage including: excessive poaching, damage from machinery use or storage, or any other damaging management activities.	Yes
F	Sufficient water levels are maintained - as a guide a minimum summer depth of approximately 50 cm in minor ditches and 1 m in main drains.	No
G	Less than 10% of the ditch is heavily shaded.	No
H	There is an absence of non-native plant and animal species[1].	Yes
	Number of criteria passed	

Condition Assessment Result (out of 8 criteria)	Condition Assessment Score	Score Achieved ×/✓
Passes 8 criteria	Good (3)	
Passes 6 or 7 criteria	Moderate (2)	
Passes 5 or fewer criteria	Poor (1)	Poor

Appendix 6: Headline BNG Results

The Statutory Metric is provided as a separate excel spreadsheet.

FINAL RESULTS		
Total net unit change (Including all on-site & off-site habitat retention, creation & enhancement)	*Habitat units*	21.60
	Hedgerow units	8.22
	Watercourse units	0.69
Total net % change (Including all on-site & off-site habitat retention, creation & enhancement)	*Habitat units*	11.61%
	Hedgerow units	11.57%
	Watercourse units	86.72%
Trading rules satisfied?	Yes ✓	

Unit Type	Target	Baseline Units	Units Required	Unit Deficit	
Habitat units	10.00%	186.11	204.72	0.00	No additional area habitat units required to meet target ✓
Hedgerow units	10.00%	71.01	78.11	0.00	No additional hedgerow units required to meet target ✓
Watercourse units	10.00%	0.79	0.87	0.00	No additional watercourse units required to meet target ✓