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Technical Annex B: Background information to Biodiversity Net Gain analysis

Background to the current Biodiversity Net Gain (BNG) process in the Environment Act

The Environment Act (the Act) gained Royal Assent on the 9 November 2021 and the biodiversity gain requirements were from 12 February 2024 enshrined through secondary legislation applying the relevant developments submitted on or after this date. The Act provides a mechanism for implementing Government's ambitions for 'improving the natural environment', which were previously set out in publications including the 25 Year Environment Plan (25YEP). The Act provides recognition of the 25YEP as the first "environmental improvement plan" which, through the enactment of relevant regulations serves as the basis for the steps Government intends to take to improve the natural environment. The 25YEP has now been replaced by the Environmental Improvement Plan (also referred to as the EIP23) in January 2023.

The Act implements the ambitions for an improved natural environment, by setting out statutory or legal requirements which mandate action, under the oversight of the newly formed Office for Environmental Protection (OEP). The focus of the Act is the "…provision [of] targets, plans and policies for improving the natural environment…" and its requirements are structured around a number of broad themes. Of relevance to this report Part 6 of the Act sets out provisions for 'Biodiversity gain as condition of planning permission'.

The Act has also strengthened the duty to conserve biodiversity within the Natural Environment and Rural Communities Act 2006, such that all public authorities are required to conserve and enhance biodiversity in the exercise of their function (the 'enhanced biodiversity duty').

The relevant legislation supporting implementation of biodiversity net gain requirements is now published and includes (as at May 2024);

- The Environment Act 2021 (Commencement No. 8 and Transitional Provisions) Regulations 2024;
- SI 2024/50 - The Biodiversity Gain (Town and Country Planning) (Modifications and Amendments) (England) Regulations 2024;
- The Biodiversity Gain (Town and Country Planning) (Consequential Amendments) Regulations 2024;
- The Biodiversity Gain Requirements (Irreplaceable Habitat) Regulations 2024;
- The Biodiversity Gain Requirements (Exemptions) Regulations 2024; and
- The Biodiversity Gain Site Register Regulations 2024

NATIONAL PLANNING POLICY

The National Planning Policy Framework (Department for Levelling Up, Housing & Communities, 2023), referred to as the NPPF from this point, requires public authorities to contribute to and enhance the natural and local environment including by minimising impacts on and providing net gains for biodiversity when taking planning decisions.

Under the statutory framework for biodiversity net gain and associated Planning Practice Guidance , developments are to deliver at least a 10% increase in biodiversity value relative to the pre-development biodiversity value of the onsite habitat. This allows councils the opportunity to raise the increase in biodiversity above 10% either on an area-wide or specific allocations basis, although such policies will need to be evidenced including as to the local need for a higher percentage, local opportunities for delivering a higher percentage and any impacts on viability for development. Consideration will also need to be given to how the policy will be implemented (Department for Levelling Up, Housing & Communities 2023).

Background to Statutory BNG Metric Process

Biodiversity Net Gain – Statutory Metric Matrix

Under the current legislation the relevant percentage for Biodiversity Net Gain is a change in value attributed to a development ≥10% the pre-development value (of on-site habitats).

Natural England advise that the Metric "can be used or specified by any development project, consenting body or landowner that needs to calculate biodiversity losses and gains for terrestrial and/or intertidal habitats". It has become the standardised way of describing biodiversity change in England, noting that there are a limited number of local exceptions to its use.

METRIC CALCULATION

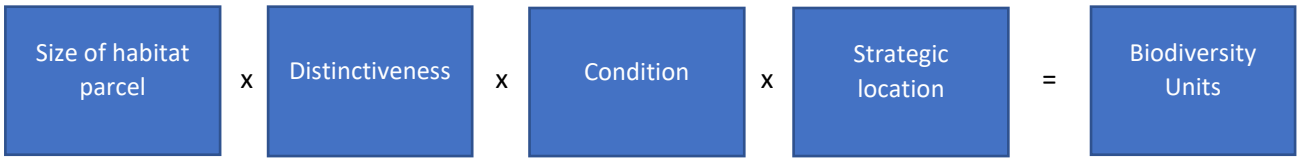
UKHab habitat survey information is used to inform the assessment of biodiversity changes. The results are then converted using the Metric G-1 All Habitats tab to the appropriate Metric Group and Metric Habitat.

The Metric uses a comparison of habitats as a proxy for biodiversity and describes these habitats using standard units referred to as Biodiversity Units (BU). There are 3 distinct types of BUs, and these are not equivalent or interchangeable, they are:

- Habitat BU – describe areas of habitat based on measurement in hectares;
- Hedgerow BU – describe linear hedgerows and lines of trees measured in kilometres; and

- Watercourse linear BU – describe linear rivers and streams measured in kilometres.

These habitats are converted into 'biodiversity units', which are calculated using the size of a parcel of habitat and its quality. The formula for the calculation of value of a habitat parcel in biodiversity units works as below:



Habitat biodiversity units are calculated by multiplying scores for:

- Distinctiveness - the rarity and importance of the habitat to biodiversity at a national scale. Distinctiveness is automatically determined by the Biodiversity Metric 3.0 Calculation Tool for different habitat types, and allocated an appropriate weighted score. Certain habitat types, such as hardstanding and buildings, are allocated a distinctiveness score of 0.
- Condition - the quality of a habitat at a point in time based on management, disturbance and other environmental factors. The condition of the habitats is calculated based on the condition assessment tables completed during the site survey, and each habitat is allocated a weighted score between 1 and 3. Different condition assessment criteria are used for each broad habitat type.
- Strategic significance – whether the location of the development and/or off-site work has been identified locally as significant for nature. Strategic importance weighted scores are between 1 and 1.15.
- Size - the extent of the habitat in hectares (ha).

This gives the Biodiversity Unit score for each habitat parcel pre-development.

- Linear habitats, including hedgerows, are assessed separately to those that represent areas. Instead of area measures, these habitats are measured in length (kilometres). The number of units are calculated in the same way to habitats areas, multiplying the length by weighted scores for distinctiveness, condition and strategic importance.

The post-development score of Biodiversity Units for proposed habitats is worked out in the same way, but also multiplying with negative multipliers to account for difficulty factors associated with habitat establishment, temporal delays and off-site risk.

Post-development units are then compared against pre-development units, and a final score given for percentage increase or decrease (net loss or net gain).

Background to typologies and habitat assumptions

For each typology to be studied and costed, a set of assumptions were made. First were the assumptions of what habitat would be on site prior to any development. Second were assumptions of what the realistic habitats were that could/would be created on site and to what extent.

Baseline habitats were assumed to be mainly those of lower biodiversity value, assuming site selection and optioneering will scope out development on Habitats of Principal Importance, designated sites or other ecologically important features.

Post-development habitats were selected on the basis of those that would be most practical habitats to would both provide habitat links and bring an environmental benefit to the area, whilst also being practical for a developer to create on site.

Selection of baseline and post-development habitats was informed by a review of previous development schemes Temple have advised on, along with comparisons with planning applications and use of professional judgement and experience of advising developers on how best to create habitats that would gain the required net gain and work with the local landscapes.

Some examples below are given of previous Temple projects that have had similar typologies to the ones used in this project to provide a comparison for the habitats assumed. These projects have been anonymised due to client confidentiality.

Small Greenfield Site – Brereton, Staffordshire	
Site Area: 0.32ha	
Pre-development habitats: • Broadleaved Woodland • Modified Grassland • Neutral Grassland • Ruderal/Ephemeral • Vacant/Derelict/Bare ground • Developed land/Sealed surface	**Post-development habitats:** • Broadleaved Woodland (retained) • Developed land/Sealed surface • Modified Grassland • Built linear structures • Trees
BNG Outcome: +0.14 Units / +30.10%	

Small Brownfield Site – Richmond, London	
Site Area: 0.31ha	
Pre-development habitats: • Developed land, sealed surface • Amenity grassland • Ruderal/ephemeral • Introduced shrub • Bramble scrub • Street Trees	**Post-development habitats:** • Native Scrub Planting • Native Tree Planting • Biodiverse Roof Installation • Native Climbers • Green Walls • Species Rich Lawn Turf

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BNG Outcome: 0.10 Units / +12.53%

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Habitat Assumptions

Assumptions and Justifications

Detailed assumptions with justifications for the habitats used for each typology, as specified in Table 4.2 of the main body text are presented in the table below.

Habitat classification	Essex Assumptions
Cropland - Cereal crops	Arable farmland – generally main habitat found on greenfield sites for development
Grassland - Modified grassland	Grazed pasture/ silage crop – secondary main habitat on greenfield sites for development.
Urban - developed land sealed surface	Buildings and hardstanding – old barns, turning circles, tracks and storage areas
Cropland - Arable field margins tussocky	Arable field margins –areas left to become slightly better habitats
Woodland and forest - Other woodland; mixed	Managed woodland within farm ownership – large greenfield sites generally contain some form of woodland either plantation or managed/unmanaged edge habitats.
Lakes - Ponds (Non- Priority Habitat)	Existing ponds – often small ponds found on farmland surrounded by scrub. Can be good habitat for newts and amphibians
Heathland and shrub - Mixed scrub	Mix of bramble, hawthorn, blackthorn at the edges of woodland and unmanaged margins. Scrub is usual on non-cropland areas of greenfield sites.
Lowland meadow – Priority habitat	Includes most forms of unimproved neutral grassland across lowland landscapes. It is assumed that this habitat will not be developed due to the priority habitat status
Coastal & Floodplain Grazing Marsh – Priority habitat	Meadows or pasture with ditches that maintain water level which is brackish or fresh water. It is assumed that this habitat will not be developed due to the priority habitat status.
Urban - Developed land; sealed surface	Existing buildings and hard standing. Potentially old offices or warehouses.
Urban - Vacant/derelict land/ bareground	Vehicle turning and storage areas. Also areas where old buildings have become derelict and ground is cracked.
Urban - Artificial unvegetated, unsealed surface	Broken hard standing and potentially rubble from old buildings
Urban - Introduced shrub	Previous landscape planting, often left to invade other areas of the site.
Urban Areas – Priority habitat for Essex County - priority for enhancement.	Priority habitat as part of Essex Local Plan - Relic natural systems, Encapsulated countryside, Managed habitats and man-made habitats. these include veteran trees, enclosed semi-natural habitats, parkland, and railways. It is assumed that this habitat will not be developed due to the priority habitat status. It is assumed no open mosaic from previously developed land will be developed on. However it is noted that this is a limitation as likely that across the county some small amounts would likely be developed. However this would have a

Habitat classification	Essex Assumptions
	significant effect on the achievability of BNG for a site so it is caveated. Assumed developments will avoid priority features within urban areas.
Grassland - Modified grassland	Previous amenity grassland, left to potentially become better habitat as no longer managed. Also includes current amenity grassland (i.e. sports pitches etc).
Sparsely vegetated land - early successional plants and ruderal/ephemeral.	Early successional plants such as found on previously developed land as well as tall ruderal vegetation, such as nettles, thistles, willowherbs and bramble. Quite usual to find in old abandoned sites that have been left for some time, especially in areas of broken ground.
Heathland and shrub - Mixed scrub	Encroaching scrub from site margins. Often bramble with additional plants from adjacent sites.
Woodland and forest - Other woodland; mixed	Shelterbelt plantations at site boundary. Often left to be in poor condition due to lack of management.
Lakes - Ponds (Non- Priority Habitat)	Existing pond, or old SUDS feature, often in poor condition with potential for old ponds to have become polluted/silted up.
Grassland - Other neutral grassland	Road verges at the edge of the site. May have been previously seeded and then left to go wild. Also includes old gardens and recreation grounds derived from older grassland and not impacted by agriculture or landscaping.

General assumptions

Assumed all development will avoid impacts on local priority habitats and priority features within urban landscapes.

Key exceptions in terms of habitat are for types that are unlikely to be chosen for development (see above table) and therefore these can be ignored within the typologies.

Sources for costs

Previous literature was reviewed to look at on-site habitat creation costs across a number of sources, these costs were then combined with the provided costs taken from direct external sources (habitat management companies) and Temple's previous experience. A summary of the documents consulted and of the costs provided and evidence from the literature review are below.

- Biodiversity Net Gain: Market Analysis study, Defra (2021)
- Habitat Target Costings to 2026, Warwickshire, Coventry and Solihull County Councils (2013)

- UK Biodiversity Action Plan: Preparing Costings for Species and Habitat Action Plans, GHK Consulting and RPS Ecology (2006)
- Higher Level Stewardship Handbook, Natural England (2010)

It should be noted that there is a wide range of suggested costs for habitat creation, not least because sources vary in whether they include management and monitoring costs or not. This is best seen in the table in Figure 1 below from the Biodiversity Market Analysis study undertaken by WSP, Balfour Beatty and Eftec, for Defra in 2020.

For off-site costs (biodiversity units) an estimate of £25,000 per unit was assumed. This cost was arrived at from looking at evidence provided by a number of external sources including:

- Environment Bank (Direct provision to LPA for planning)
- Consultation with Essex Local Nature Partnership (ELNP) and Essex County Council
- Defra Impact Assessment – uses cost of £11,000 but states existing evidence suggests range between £6-25K (Biodiversity net gain and local nature recovery strategies, Defra, 2019)
- Biodiversity Net Gain: Market Analysis study, Defra (2021) which had an estimate of £20,000 per BU rising to £25,000 per BU in areas of scarcity.
- The Delivering Environmental Net Gain webinar: Delivering Environmental Net Gain | Environment Analyst (livestorm.co) (March 2022). This provided a reiteration of research carried out by Arcadis suggesting biodiversity credits can range in cost from £4-35k per unit.
- Market rate costs for purchase of biodiversity units indicate a range of between £20,000 for low market value and £35,000 per unit for high market value putting £25,000 within the central part of this range.

Statutory Government Credit purchase costs are by design at a higher rate than costs assumed for purchasing market rate credits, so these are not considered within the decision to cost off-site purchase of units at £25,000 per biodiversity unit.

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Figure 1: Table showing costs provided from a wide range of sources for habitat creation, enhancement, management and monitoring for the 2024 Market Analysis study

Habitat	Source	Nominal cost over 30-yrs (£/ha)	(£/BU)	Included costs
All	Natural England (2019b)	14,451	6,046	Ma & Mo
All + 20% contingency	Natural England (2019b)	17,341	7,255	Ma & Mo
Grassland, Woodland and Scrub	Contractor*	195,061	81,610	C & Ma & Mo
Grassland, Woodland and Scrub (exc. Stakeholder engagement)	Contractor	156,868	65,630	C & Ma & Mo
Woodland (poor to good)	City Council**	106,167	44,796	E & Ma
Woodland (moderate to good)	City Council	53,083	22,398	E & Ma
Woodland	WCC (2020)	10,821	4,566	C & Ma & Mo
Wet woodland (from dry woodland)	City Council	66,958	28,253	E & Ma
Woodland	Confidential	37,622	15,874	C & Ma
Grassland (SI poor to UI good through grazing)	City Council	27,604	10,452	E & Ma
Grassland (SI moderate to UI good through grazing)	City Council	27,604	10,452	E & Ma
Grassland (PSI/A poor to UI moderate through mechanical intervention)	City Council	68,379	25,890	E & Ma
Scrub	Confidential	9,870	4,620	C & Ma
Meadow	WCC (2020)	13,022	4,931	C & Ma & Mo
Pond	WCC (2020)	285,973	119,645	C & Ma & Mo
Wetland	eftec et al. (2015)	21,187	29,568	C & Ma & Mo
Peat	eftec et al. (2015)	12,333	17,211	C & Ma & Mo
Linear feature				
Hedge with trees	County Council	33,664		C & Ma
Hedgerow	WCC (2020)	362,564		C & M & M
Hedgerow	Defra (2020a)	19,474		C & Ma
Hedgerow	Confidential	9,647		C & Ma
Hedgerow	Confidential	8,235		C

Costs for habitat creation from a previous Temple projects (anonymised) were looked at and costed up pro rata for approximately 1ha.

Item	Scope	Cost
Wildlife Ponds	1X80m2 wildlife pond with EDPM rubber lining and geotextile (includes materials labour and machinery)	£7,440 (per pond)
Mixed native hedge	150m@5 trees per m (includes rabbit guards and bamboo canes	£3,000 (depending on age of saplings
Wildflower Meadow	General purpose wildflower seed at 40kg per ha. Does not include after care or maintenance like annual mowing	£3-£4K per ha depended ground preparation (i.e £3k if on bare soil)
Scrub planting	400m2 (1 tree per m2 including planting, rabbit guards and bamboo canes	£3,000

Management and monitoring costs were then added on top of the creation costs to account for 30 years maintenance and monitoring as per legislation. These costs included surveys and any relevant checks for quality of habitat to ensure it reaches target condition and additional checks such as nest or bat boxes. Maintenance included costs such as mowing, pond clearance, protection against damage from wildlife/livestock, woodland management (coppicing etc.).

Costs provided by external habitat creation companies were also taken into account where provided. Below are two examples of data/costs that were provided. One for more generic habitat creation and management costs and one for costings for creation and management of green roofs.

Vegetation clearance by hand using chainsaws, brushcutters etc	£240/day/operator or hourly pro rata
Vegetation clearance using mini excavator flail	£525.00/day or hourly pro rata
Vegetation clearance using midi excavator mulcher	£640.00/day or hourly pro rata
Vegetation clearance using compact tractor mower 2m wide	£525.00/day or hourly pro rata
Destructive search with excavator (various sizes)	£640-£840.00/day
Creation of standard size hibernacula 2x1x1m Surcharge to import materials	£195.00/each +£80/each
Creation of standard size log piles 1x1m Surcharge to import materials	£80.00/each +£20.00/each

Site clearance works. Includes qualified cutting team, chipper and mini excavator flail or tractor mower.	From £1050.00/day
Forestry mulching	From £1200.00/day

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James,
Thanks for your email to Craig. He has passed this enquiry on to me as Bauder's Green Roof Product Manager.
Regarding rates.
Size and Access will have a major impact on costs.
Typically a large simple biodiverse green roof (1,000m2) with good crane access installed with a GRO compliant build up (as attached) with a native seed mix to establish the vegetation could be circa £50-55 per m2
However the same spec on a <50m2 roof with poor access might be £80-90 per m2

A seeded Biodiverse roof is relatively low cost against a wildflower blanket or plug planted solution. These could easily add £30 per m2 to the cost.

Maintenance and aftercare is obviously crucial to the establishment of these types of roofs. Typically 2 visits per year at circa £0.50/m2 for over 3,000m2 to £2/m2 for under 50m2 per visit. This does not include establishment watering and during dry conditions which we now include in all our specifications.

Bauder are very keen to promote best practice for green roofs, we are founder members of GRO and I sit on the board of the organisation. We would be happy to help with your work if you require any further information.

Regards,

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The final cost assumptions for on-site creation were compiled into the below table and used to inform the costings for each typology in the main report.

Habitat Type	Cost by area (Creation + 30 years monitoring/management)	Cost per BU (OFF-SITE ONLY)	Cost by area enhanced habitats only (30 years monitoring/management)	Cost by area retained habitats only (management)	Source	Alternative costs/Comparison with other studies.
Woodland Park Pasture	£39,500 per ha		£27,250.00 per ha	£15,000.00 per ha	UK Habitat Action Plan costs document	
Woodland/Scrub	£75,000 per ha		£45000 per ha	£15,000.00 per ha	Temple creation costs from previous project	Falls in line with mid-range of WCC and contractor feedback
Wildflower meadow	£9,000 per ha		£4,000.00 per ha	£1,500.00 per ha	Temple creation costs from previous project	Cheaper than feedback however projects would not be aiming to achieve unimproved grassland status, just good condition other neutral grassland (Semi-improved).
Hedgerow (Native species rich)	£3,500 (per linear 100m) £350,000.00 per ha		£2,300 per 100m £230,000 per ha	£1,400.00 per 100m £140,000.00 per ha	Temple creation costs from previous project	If take Defra/EA document cost of £2275 for creation +£100 pa monitoring/maintenance total is £5275 per 100m. Similar to Warwickshire County Council costs. These costs are higher than other feedback but those don't include monitoring and in some cases management costs.
Non priority Habitat pond	£10,000 per 80m2		£4000 per 80m2	£3,000 per 80m2	Temple creation costs from previous project	Lower than Warwickshire County Council costs but their costs are generally quite high.
Heath Scrub/Open Veg	£17,203.54 per ha		TBC	TBC	Defra/EA document	£11,723.00 in 2006 document so needed increasing for inflation. Biodiversity Net Gain analysis doc has £9,870 from a contractor so higher cost, but Defra is more in line with other habitat creation costs.
Orchard	£13,276.00 per ha		TBC	TBC	UK Habitat Action Plan costs document	£8623.00 in 2006 document so needed increasing for inflation.
Green Roofs	£1,049,580.00 per ha		159,000.00 per ha	150,000.00 per ha	Bauder	Costs provided by green roof company for creation, management and monitoring

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Summary cost inputs

The summary cost table below shows the costs for delivery of biodiversity compensation and enhancement measures for each of the typologies, that have been fed into the viability calculations. Costs are given for 10% and 20% onsite next gain.

	No units	Land type	Type of ur	Gross to n	Density (D	Total site	On site costs		Off site costs		Off site cost to purchase required additional BU		Total Costs to achieve 10 or 20% onsite net gain	
							On site biodiversity cost per ha		Off site biodiverity costs per bu		Total		On-site (where possible)	
							10%	*20%*	*10%*	*20%*	10%	20%	10%	20%
1	5000	Greenfield	Houses	50%	35	285.71	£8,645.13	£9,998.24	N/A	N/A	N/A	N/A	£2,470,000.00	£2,856,500.00
2	500	Greenfield	Houses	70%	35	20.41	£23,464.77	£23,464.77	N/A	£25,000.00	N/A	£135,502.50	£478,873.00	£614,376.30
3	100	Greenfield	Houses	85%	40	2.94	£10,034.00	£11,631.97	£25,000.00	£25,000.00	£44,650.00	£60,550.00	£74,150.00	£90,050.00
4	25	Greenfield	Houses	90%	20	1.39	£7,927.13	£7,927.13	£25,000.00	£25,000.00	£33,825.00	£41,525.00	£44,835.00	£52,535.00
5	500	Brownfield	Houses	90%	40	13.89	£2,754.40	£3,726.40	N/A	N/A	N/A	N/A	£38,255.60	£51,755.60
6	100	Brownfield	Flats and H	95%	55	1.91	£352.68	£822.93	N/A	N/A	N/A	N/A	£675.00	£1,575.00
7	25	Brownfield	Flats	97.5%	100	0.26	£45,027.30	£49,141.96	N/A	N/A	N/A	N/A	£11,545.00	£24,145.00
8		Commercial	Industrial			2.85	£6,600.00	£6,947.37	N/A	N/A	N/A	N/A	£18,810.00	£19,800.00
9		Commercial	Industrial			0.13	£1,980.00	£1,980.00	N/A	N/A	N/A	N/A	£247.50	£247.50
10		Commercial	Office			0.25	£600.00	£1,800.00	N/A	N/A	N/A	N/A	£150.00	£1,095.00

The summary cost table below shows offsite delivery costs for 20% and 50% net gain.

	No units	Land type	Type of units	Baseline Biodiversity unit (pre-development)	Biodiversity unit required (post-development)			Offsite biodiversity costs per bu	TOTAL costs to achieve 20% or 50% offiste net gain	
					10%	20%	50%		20%	50%
1	5000	Greenfield	Houses	756.45	861.4438813	907.74	1361.61	£ 25,000	£ 3,627,402.97	£ 8,529,875.00
2	500	Greenfield	Houses	55.32	60.96381518	66.384	99.576	£ 25,000	£ 614,378.42	£ 1,029,275.00
3	100	Greenfield	Houses	6.36	6.996	7.632	11.448	£ 25,000	£ 90,050.00	£ 137,750.00
4	25	Greenfield	Houses	3.08	3.388	3.696	5.544	£ 25,000	£ 52,535.10	£ 75,635.00
5	500	Brownfield	Houses	12.4556	13.81136419	14.94672	22.42008	£ 25,000	£ 66,639.50	£ 145,172.00
6	100	Brownfield	Flats and Houses	0.36	0.41	0.432	0.648	£ 25,000	£ 1,225.00	£ 3,925.00
7	25	Brownfield	Flats	0.06	0.07	0.072	0.108	£ 25,000	£ 11,595.00	£ 12,045.00
8		Commercial	Industrial	5.8	6.42	6.96	10.44	£ 25,000	£ 32,310.00	£ 63,300.00
9		Commercial	Industrial	0.1	0.112	0.12	0.18	£ 25,000	£ 447.50	£ 997.50
10		Commercial	Office	0.12	0.14	0.144	0.216	£ 25,000	£ 250.00	£ 1,995.00

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The following tables show the details of the habitats, biodiversity units and costs calculated for each typology that have been used to inform the summary cost information.

Large Greenfield site

Assumed Pre-Development Habitats		
Habitat	Area (ha)	Bio-Units
Cropland - Cereal crops	193.0043	387.01
Other - modified grass	50.7	101.4
Urban - developed land sealed surface	1	0
Woodland and forest - Other woodland; mixed	26	208
Lakes - Ponds (Non- Priority Habitat)	0.01	0.04
Heathland and shrub - Mixed scrub	15	60
Total	285.7143	756.45

Assumed Post-Development Habitats		+10%		
Habitat	Area (ha)	Bio-Units	Cost	
Urban - Developed land; sealed surface	85.7143	0	N/A	
Lakes - Ponds (Priority Habitat)	0.2000	1.74303	250,000	
Grassland - Other neutral grassland	40.0000	311.71	360,000	
Urban - Introduced shrub	0.2000	0.39	N/A	
Urban - Sustainable urban drainage feature	0.4571	1.10085	N/A	
Urban - Vegetated garden	57.1429	110.29	N/A	
Woodland and forest - Other woodland; mixed (created)	4	13.74	375,000	
Urban - Artificial unvegetated, unsealed surface	6.0000	0	N/A	
Grassland - Modified grassland	9.0000	31.22	N/A	
Urban - Built linear features	42.0000	0	N/A	
Woodland and forest - Other woodland; mixed (existing)	12.0000	96	180,000	
Woodland and forest - Other woodland; mixed (enhanced)	14.0000	151.22	630,000	
Heathland and shrub - Mixed scrub (enhanced)	15	144.03	675,000	
Total	285.7143	861.444	2470000	8645
Change in Units		104.994		
% change		14%		
Target change units		75.645		
Shortfall/excess units		29.3489		

Assumed Post-Development Habitats		+20%	
Habitat	Area (ha)	Bio-Units	Cost
Urban - Developed land; sealed surface	85.7143	0	N/A
Lakes - Ponds (Priority Habitat)	0.2000	1.74303	237,500
Grassland - Other neutral grassland	51.0000	397.43	459,000
Urban - Introduced shrub	0.2000	0.39	N/A
Urban - Sustainable urban drainage feature	0.4571	1.10085	N/A
Urban - Vegetated garden	57.1429	110.29	N/A
Woodland and forest - Other woodland; mixed (created)	9	24.73	675,000
Urban - Artificial unvegetated, unsealed surface	3	0	N/A
Grassland - Modified grassland	3	10.41	N/A
Urban - Built linear features	35	0	N/A
Woodland and forest - Other woodland; mixed (existing)	12	96	180,000
Woodland and forest - Other woodland; mixed (enhanced)	14	151.22	630,000
Heathland and shrub - Mixed scrub (enhanced)	15.0000	144.03	675,000
Total	285.714	937.344	2856500
Change in Units		180.894	
% change		24%	
Target change units		151.29	
Shortfall/excess units		29.6039	

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Creating sustainable futures

Medium Greenfield site

Assumed Pre-Development Habitats		
Habitat	Area (ha)	Bio-Units
Cropland - Cereal crops	14.1582	28.32
Grassland - Modified grassland	4	16
Urban - Vacant/derelict land/ bareground	0.25	0.5
Sparsely vegetated land - Ruderal/Ephemeral	0.25	0.5
Woodland and forest - Other woodland; broadleaved	1.5	9
Heathland and shrub - Bramble scrub	0.25	1
Total	20.4082	55.32

Assumed Post-Development Habitats		+10%	
Habitat	Area (ha)	Bio-Units	Cost
Urban - Developed land; sealed surface	8.5	0	N/A
Urban - Vegetated garden	5.7	11.001	N/A
Grassland - Other neutral grassland	2.2082	17.20797	£19,873.80
Woodland and forest - Other woodland; broadleaved	0.4	1.64	£30,000.00
Heathland and shrub - Mixed scrub	0.6	5.04	£45,000.00
Urban - Sustainable urban drainage feature	0.25	0.602084	N/A
Lakes - Ponds (Non- Priority Habitat)	0.25	2.510486	312,500
Woodland and forest - Other woodland; broadleaved (enhanced)	1.5	8.68813	67500
Grassland - Other neutral grassland (enhanced)	1	14.27415	4000
Total	20.4082	60.96382	478873.8
Change in Units		5.643815	
% change		10%	
Target change units		5.532	

Assumed Post-Development Habitats		+20%	
Habitat	Area (ha)	Bio-Units	Cost
Urban - Developed land; sealed surface	8.5	0	N/A
Urban - Vegetated garden	5.7	11.001	N/A
Grassland - Other neutral grassland	2.2082	17.207968	£19,873.80
Woodland and forest - Other woodland; broadleaved	0.4	1.64	£30,000.00
Heathland and shrub - Mixed scrub	0.6	5.04	£45,000.00
Urban - Sustainable urban drainage feature	0.25	0.6020835	N/A
Lakes - Ponds (Non- Priority Habitat)	0.25	2.5104861	312,500
Woodland and forest - Other woodland; broadleaved (en	1.5	8.6881304	67500
Grassland - Other neutral grassland (enhanced)	1	14.274147	4000
Total	20.4082	60.963815	478873.8
Change in Units		5.6438152	
% change		10%	
Target change units		11.064	
Additional BU's needed		5.4201	£102,980.00

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Creating sustainable futures

Small-Medium Greenfield site

Assumed Pre-Development Habitats		
Habitat	Area (ha)	Bio-Units
Cereal Crops	2.54	5.08
Grassland - modified grassland	0.18	0.36
Other woodland; mixed	0.02	0.12
Mixed scrub	0.2	0.8
Total	2.94	6.36

Assumed Post-Development Habitats		+10%		
Habitat	Area (ha)	Bio-Units	Cost	
Developed land; sealed surface	1.8	0	N/A	
Vegetated garden	0.7	1.35	N/A	
Pond (non-priority habitat)	0.02	0.2	£25,000	
Other neutral grassland	0.30	2.52	£2,700	
Other woodland; mixed (enhanced)	0.02	0.18	£300	
Mixed scrub (enhanced)	0.10	0.96	£1,500	
Total	2.94	5.21	£29,500.00	
Change in Units		-1.15		
% change		-18%		
Target change units		0.636		
Additional BU's needed offsite		1.786	£33,934.00	44650

Assumed Post-Development Habitats		+20%		
Habitat	Area (ha)	Bio-Units	Cost	
Developed land; sealed surface	1.8	0	N/A	
Vegetated garden	0.7	1.35	N/A	
Pond (non-priority habitat)	0.02	0.2	£25,000	
Other neutral grassland	0.30	2.52	£2,700	
Other woodland; mixed (enhanced)	0.02	0.18	£300	
Mixed scrub (enhanced)	0.10	0.96	£1,500	
Total	2.94	5.21	£29,500.00	
Change in Units		-1.15		
% change		-18%		
Target change units		1.272		
Additional BU's needed offsite		2.422	£46,018.00	60550

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Creating sustainable futures

Small Greenfield site

Assumed Pre-Development Habitats		
Habitat	Area (ha)	Bio-Units
Grassland - Modified grassland	1.18	2.36
Sparsely vegetated land - Ruderal/Ephemeral	0.0089	0.02
Heathland and shrub - Bramble scrub	0.05	0.2
Woodland and forest - Other woodland; mixed	0.1	0.4
Urban - Vacant/derelict land/ bareground	0.05	0.1
Total	1.3889	3.08

Assumed Post-Development Habitats		+10%	
Habitat	Area (ha)	Bio-Units	Cost
Urban - Developed land; sealed surface	0.7500	0	N/A
Urban - Vegetated garden	0.5000	0.965	N/A
Grassland - Other neutral grassland	0.0289	0.25	£260.10
Urban - Sustainable urban drainage feature	0.0050	0.02	N/A
Lakes - Ponds (Non- Priority Habitat)	0.005	0.05	£6,250.00
Woodland and forest - Other woodland; mixed	0.1000	0.75	£4,500.00
Total	1.3889	2.035	£11,010.10
Change in Units		-1.045	
% change		-34%	
Target change units		0.308	
Additional BU's needed offsite		1.353	£34,722.50

Assumed Post-Development Habitats		+20%	
Habitat	Area (ha)	Bio-Units	Cost
Urban - Developed land; sealed surface	0.7500	0	N/A
Urban - Vegetated garden	0.5000	0.965	N/A
Grassland - Other neutral grassland	0.0289	0.25	£260.10
Urban - Sustainable urban drainage feature	0.0050	0.02	N/A
Lakes - Ponds (Non- Priority Habitat)	0.005	0.05	£6,250.00
Woodland and forest - Other woodland; mixed	0.1000	0.75	£4,500.00
Total	1.3889	2.035	£11,010.10
Change in Units		-1.045	
% change		-34%	
Target change units		0.616	
Additional BU's needed offsite		1.661	£31,559.00

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Creating sustainable futures

Large Brownfield site

Assumed Pre-Development Habitats		
Habitat	Area (ha)	Bio-Units
Urban - Developed land; sealed surface	7.5	0
Urban - Vacant/derelict land/ bareground	2	4
Urban - Artificial unvegetated, unsealed surfac	2	0
Urban - Introduced shrub	0.3	0.6
Grassland - Modified grassland	0.3	1.2
Sparsely vegetated land - Ruderal/Ephemeral	0.7	2.1
Heathland and shrub - Mixed scrub	0.2	0.8
Woodland and forest - Other woodland; mixed	0.45	1.8
Lakes - Ponds (Non- Priority Habitat)	0.05	0.4
Grassland - Other neutral grassland	0.3889	1.5556
Total	13.8889	12.4556

Assumed Post-Development Habitats		+10%	
Habitat	Area (ha)	Bio-Units	Cost/ha
Urban - Developed land; sealed surface	8.5	0	N/A
Urban - Sustainable urban drainage feature	0.05	0.120416705	N/A
Grassland - Other neutral grassland	0.05	0.33473148	450
Grassland - Modified grassland	0.3	1.040616001	N/A
Urban - Vegetated garden	4	7.72	N/A
Mixed scrub	0.1000	0.84	4500
Other woodland; mixed	0.4500	1.8	6750
Lakes - Ponds (Non- Priority Habitat)	0.05	0.4	25000
Grassland - Other neutral grassland	0.3889	1.5556	1555.6
Total	13.8889	13.81136419	38255.6
Change in Units		1.355764186	
% change		11%	
Target change units		1.24556	
Shortfall/excess units		0.110204186	

Assumed Post-Development Habitats		+20%	
Habitat	Area (ha)	Bio-Units	Cost/ha
Urban - Developed land; sealed surface	8.5	0	N/A
Urban - Sustainable urban drainage feature	0.05	0.12042	N/A
Grassland - Other neutral grassland	0.05	0.33473	450
Grassland - Modified grassland	0.3	1.04062	N/A
Urban - Vegetated garden	4	7.72	N/A
Mixed scrub	0.1000	0.96023	4500
Lakes - Ponds (Non- Priority Habitat)	0.05	0.4	25000
Grassland - Other neutral grassland	0.3889	1.5556	1555.6
Other woodland; mixed	0.4500	3.06051	20250
Total	13.8889	15.1921	51755.6
Change in Units		2.7365	
% change		22%	
Target change units		2.49112	
Shortfall/excess units		0.24538	

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Creating sustainable futures

Medium Brownfield site

Assumed Pre-Development Habitats			
Habitat	Area (ha)	Bio-Units	
Vacant/derelict/ bare ground 0.1ha 0.20bu	0.1	0.2	
Developed land sealed surface 1.4ha 0bu	1.4049	0	
Built linear features 0.359ha 0bu	0.359	0	
Bramble scrub 0.03ha – 0.12bu RETAINED	0.03	0.12	
Ruderal/Ephemeral 0.02ha 0.04bu	0.02	0.04	
Total	1.9139	0.36	

Assumed Post-Development Habitats		+10%	
Habitat	Area (ha)	Bio-Units	Cost/ha
Built/hardstanding	1.8139	0	N/A
Vegetated garden	0.0300	0.06	N/A
Other neutral grassland	0.0250	0.19	£225.00
Introduced shrub	0.0100	0.02	N/A
Urban tree	0.0050	0.02	N/A
Bramble Scrub retained	0.0300	0.12	£450.00
Total	1.9139	0.41	£675.00
Change in Units		0.05	
% change		14%	
Target change units		0.036	
Shortfall/excess units		0.014	

Assumed Post-Development Habitats		+20%	
Habitat	Area (ha)	Bio-Units	Cost/ha
Built/hardstanding	1.8139	0	N/A
Vegetated garden	0.0325	0.06	N/A
Other neutral grassland	0.0225	0.18	£225.00
Introduced shrub	0.0100	0.02	N/A
Urban tree	0.0050	0.02	N/A
Bramble Scrub retained	0.0150	0.06	£225.00
Mixed Scrub	0.0150	0.1	£1,125.00
Total	1.9139	0.44	£1,575.00
Change in Units		0.08	
% change		22%	
Target change units		0.072	
Shortfall/excess units		0.008	

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Creating sustainable futures

Small Brownfield site

Assumed Pre-Development Habitats		
Habitat	Area (ha)	Bio-Units
Vacant/derelict/Bare ground	0.03	0.06
Developed land; sealed surface – 0.23ha 0bu	0.2264	0
Total	0.2564	0.06

Assumed Post-Development Habitats		+10%	
Habitat	Area (ha)	Bio-Units	Cost/ha
Buildings/ hardstanding - 0.2500	0.2390	0	N/A
Introduced shrub	0.0064	0.01	N/A
Extensive green roof	0.0110	0.06	£11,545.00
Total	0.2564	0.07	£11,545.00
Change in Units		0.01	
% change		17%	
Target change units		0.006	
Shortfall/excess units		0.004	

Assumed Post-Development Habitats		+20%	
Habitat	Area (ha)	Bio-Units	Cost/ha
Buildings/ hardstanding - C	0.2380	0	n/a
Introduced shrub	0.0064	0.01	n/a
Extensive green roof	0.0120	0.0625	£12,600.00
Total	0.2564	0.0725	£12,600.00
Change in Units		0.0125	
% change		21%	
Target change units		0.012	
Shortfall/excess units		0.0005	

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Creating sustainable futures

Large Industrial site

Assumed Pre-Development Habitats		
Habitat	Area (ha)	Bio-Units
Cropland - cereal	2.2	4.4
Urban - developed land, sealed surface	0.3	0
Woodland; broadleaved	0.2	0.8
Heathland and shrub - Mixed scrub	0.15	0.6
Total	2.85	5.8

Assumed Post-Development Habitats		+10%	
Habitat	Area (ha)	Bio-Units	Cost
Urban - Developed land; sealed surface	1.5000	0	N/A
Urban - built linear feature	0.5000	0	N/A
Grassland - Modified grassland	0.1500	0.52	N/A
Urban - SuDs	0.0100	0.02	N/A
Grassland - other neutral grassland	0.3400	2.86	£3,060.00
Woodland and forest - Other woodland; mixed (retaine	0.2000	1.58	£9,000.00
Heathland and shrub - Mixed scrub (retained & enhanc	0.1500	1.44	£6,750.00
Total	2.8500	6.42	£18,810.00
Change in Units		0.62	
% change		11%	
Target change units		0.58	
Shortfall/excess units		0.04	

Assumed Post-Development Habitats		+20%	
Habitat	Area (ha)	Bio-Units	Cost
Urban - Developed land; sealed surface	1.5000	0	N/A
Urban - built linear feature	0.5000	0	N/A
Grassland - Modified grassland	0.0400	0.14	N/A
Urban - SuDs	0.0100	0.02	N/A
Grassland - other neutral grassland	0.4500	3.78	£4,050.00
Woodland and forest - Other woodland; mixed (retained and enhar	0.2000	1.58	£9,000.00
Heathland and shrub - Mixed scrub (retained & enhanced)	0.1500	1.44	£6,750.00
Total	2.85	6.96	£19,800.00
Change in Units		1.16	
% change		20%	
Target change units		1.16	
Shortfall/excess units		0	

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Creating sustainable futures

Small Industrial site

Assumed Pre-Development Habitats		
Habitat	Area (ha)	Bio-Units
Urban - Developed land; sealed surface	0.07	0
Urban - Vacant/derelict land/ bareground	0.0245	0.05
Urban - Artificial unvegetated, unsealed surfa	0.01	0
Sparsely vegetated land - Ruderal/Ephemeral	0.015	0.03
Heathland and shrub - Mixed scrub	0.0055	0.02
Total	0.125	0.1

Assumed Post-Development Habitats		+10%	
Habitat	Area (ha)	Bio-Units	Cost
Urban - Developed land; sealed surface	0.0500	0	N/A
Urban - Built linear features	0.0350	0	N/A
Urban - Introduced shrub	0.0195	0.04	N/A
Urban - Street trees	0.0090	0.03	N/A
Mixed scrub (retained and enhanced)	0.0055	0.042	£247.50
Urban - artificial unvegetated surface	0.0060	0	N/A
Total	0.125	0.112	£247.50
Change in Units		0.012	
% change		12%	
Target change units		0.01	
Shortfall/excess units		0.002	

Assumed Post-Development Habitats		+20%	
Habitat	Area (ha)	Bio-Units	Cost/ha
Urban - Developed land; sealed surface	0.0500	0	N/A
Urban - Built linear features	0.0350	0	N/A
Mixed scrub	0.0010	0.01	N/A
Urban - Introduced shrub	0.0195	0.04	N/A
Urban - Street trees	0.0090	0.03	N/A
Mixed scrub (retained and enhanced)	0.0055	0.05	£247.50
Urban - artificial unvegetated surface	0.0050	0	N/A
Total	0.125	0.13	£247.50
Change in Units		0.03	
% change		30%	
Target change units		0.02	
Shortfall/excess units		0.01	

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Creating sustainable futures

Industrial – Office site

Assumed Pre-Development Habitats		
Habitat	Area (ha)	Bio-Units
Vacant/derelict/Bare ground	0.03	0.06
Developed land; sealed surface	0.2	0
Bramble scrub	0.01	0.04
Tall ruderal/ephemeral	0.01	0.02
Total	0.25	0.12

Assumed Post-Development Habitats		+10%	
Habitat	Area (ha)	Bio-Units	Cost
Developed land; sealed surface	0.1900	0	N/A
Urban - introduced Shrub	0.0500	0.1	N/A
Bramble scrub	0.01	0.04	£150.00
Total	0.25	0.14	£150.00
Change in Units		0.02	
% change		17%	
Target change units		0.012	
Shortfall/excess units		0.008	

Assumed Post-Development Habitats		+20%	
Habitat	Area (ha)	Bio-Units	Cost
Developed land; sealed surfa	0.1900	0	N/A
Urban - introduced Shrub	0.0500	0.1	N/A
Mixed scrub	0.01	0.07	£450.00
Total	0.25	0.17	£450.00
Change in Units		0.05	
% change		42%	
Target change units		0.024	
Shortfall/excess units		0.026	