BIODIVERSITY & ENVIRONMENTAL
NET GAIN GROUP
part of Green Construction Board

HOW TO ADDRESS **OPEN MOSAIC HABITAT** WHEN DELIVERING BIODIVERSITY NET GAIN

A practice note for developers, ecologists and planners

FOREWORD

Open Mosaic Habitat on Previously Developed Land (OMH) is highly valued within the Biodiversity Net Gain (BNG) framework and the Statutory Biodiversity Metric (SBM). While this can present a delivery challenge for ecologists, developers and planners, it is not a barrier to achieving BNG, nor to creating successful outcomes for business and communities.

This document will help the reader to determine:

- Is it OMH or other habitats on brownfield sites?
- If it is OMH, how is it avoided and/or mitigated?
- If mitigation is not sufficient, how to offset it?
- If offsetting is not possible, is there another option?

In this document, we outline the steps in the process of managing OMH in development, from identification through to design for avoidance, enhancement and offsetting if there are no other alternatives. We present varying approaches and case studies (in line with BNG guidance) to deliver meaningful benefits for nature, business and people. As this document is for ecologists as well as planners and developers, there are some technical elements around OMH habitat classification.

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DEFINITIONS

The Government defines **"Brownfield land"** in the National Planning Policy Framework (NPPF) as being "**Previously Developed Land**", or being "**Land which is or was occupied by a permanent structure**" and planning policy prioritises brownfield development over greenfield.

Within this brownfield land there are a range of habitat types ranging from widespread and abundant to the less common.

Open Mosaic Habitat on Previously Developed Land (OMH) is a rare habitat, but not **all** habitats **on brownfield sites** are OMH (see **Table 1**). OMH is a priority habitat under Section 41 (NERC Act 2006), which requires material consideration in planning and generates a large amount of Biodiversity Units (BUs) due to its high distinctiveness in the Statutory Biodiversity Metric (SBM).

OMH's value is largely due to the combination of habitats that have developed over time due to the unusual underlying substrates present, this in turn has allowed rare and uncommon plants and animals to populate these areas.

OMH's distinctiveness and diversity warrant the priority habitat status. It is usually characterised by a mix of soil types and drainage patterns, often with artificial substrate which provides a wide variety of conditions, even contamination. All of these traits often inhibit the usual succession process and provide an unusual combination of microhabitats, with diverse topography and microniches.

NB All 5 of the criteria in **Table 1** should be fulfilled for OMH.

Table 1: OMH criteria and site status from DEFRA and UK Habitat Classification categories (UKHabs)

Criterion No.	Description
1	Area must be greater than 0.25ha
2	Known history of disturbance or evidence that the soil has been removed or severely modified by previous use/s. Extraneous materials/substrates such as industrial spoil may have been added. *NB: Disturbance related to that resulting from major historical industrial land use or development, Extraneous materials refer to extensive additions of spoil rather than incidental dumping of litter, broken glass etc., there might be evidence of heavy metals contamination but extensive stands or Calaminarian grassland are specifically excluded as that is a distinct Priority Habitat.*
3	Site contains some vegetation, this will comprise early successional communities* consisting mainly of stress tolerant species (indicative or low nutrient status or drought). Early successional communities are composed of a) annuals, b) mosses/liverworts, or c) lichens, or d) ruderals or e) inundation species or f) open grassland or g) flower rich grassland, or h) heathland.
4	Contains unvegetated loose bare substrate and pools may be present.
5	The site shows spatial variation within 0.25ha forming a mosaic of one or more early successional communities (a to h, Criterion 3 a to h above) plus bare substrate within 0.25ha.

*It should be noted that the early successional communities of OMH are different than early successional communities in other habitats, the value of OMH is that the habitat is "arrested" in an early successional state due to underlying substrate conditions and/or land use, rather than progressing to scrub and woodland, and therefore naturally develops multiple complex niche habitats and rare species over time.

DEVELOPING ON BROWNFIELD

To support our national and global nature targets, **10% Biodiversity Net Gain (BNG) is mandatory for most new developments in England.** This is a positive and necessary move towards nature restoration, however, with regards to brownfield development, this can present specific challenges.

Brownfield development, as per the Government definition, is the preferred land use strategy over greenfield. Many habitat types within this land use category have a low distinctiveness within the SBM, however, OMH is a priority brownfield habitat and has a high distinctiveness.

Table 2 uses UK Habitat Classification categories (UKHabs) within the SBM to demonstrate BUs. For 1ha of OMH in poor condition returns 6 BUs, with strict trading rules, that is, it must be replaced with the same habitat. Other broad habitat types that could occur within brownfield land have a much lower score with more flexible trading requirements, that is, the habitat can be replaced by different habitat, if it has the same or better distinctiveness.

Due to the unique nature of the habitat and the BUs it generates, OMH often requires off-site offsetting, although there are opportunities to avoid, retain, and recreate on site.

Early identification of OMH is critical to management within the development context. Conversely, this habitat is sometimes misidentified. For example, sites that have been demolished and are exhibiting early successional habitats that would naturally move onto grassland and scrub are sometimes mistaken for the priority OMH.

This is increasingly a problem for developers and communities, opportunities to retain can be missed, the cost of BNG can make development on brownfield unviable, potentially driving development onto greenfield habitats, which is an unintended consequence.

If it is OMH, then there are a variety of approaches that can deliver enhanced biodiversity on site before moving to offsetting.

Table 2: BUs for 1ha of different habitats in poor condition following the UKHabs criteria and the SBM.

Broad Habitat	Habitat Type	Distinctiveness	Trading Rules	Biodiversity Units
Urban	OMH	✓✓✓ High	Same habitat required	**6**
Heathland and Shrub	Lowland Heathland	✓✓✓ High	Same habitat required	**6**
Woodland and Forest	Broadleaved Woodland	✓✓ Medium	Same broad habitat or a higher distinctiveness habitat	**4**
Grassland	Other Neutral Grassland	✓✓ Medium	Same broad habitat or a higher distinctiveness habitat	**4**
Sparsely Vegetated Land	*Ruderal / Ephemeral	✓ Low	Same distinctiveness or better habitat required	**2**
Urban	*Vacant or Derelict Land	✓ Low	Same distinctiveness or better habitat required	**2**
Urban	*Bare Earth	✓ Low	Same distinctiveness or better habitat required	**2**

*Ruderal / Ephemeral, Vacant or Derelict Land and/or Bare Earth can be misidentified as OMH.

IS THIS ACTUALLY OMH?

Site surveys should preferably be undertaken at RIBA Stage 0 to determine the feasibility of the project and prior to the design process. This will categorise the habitat "distinctiveness" and "condition". OMH is defined by UKHabs (classification system used for the SBM) by criteria presented in **Table 1** and **Image 1**. However, expert judgement does need to be applied in categorising these habitats as they may be misidentified.

The following UKHabs categories (also presented in **Table 2**), are habitats with a much lower assigned BNG Unit value and they can be easily mistaken for OMH. Conversely, a habitat that is OMH may be misidentified as one of these habitats.

- **Ruderal/Ephemeral:** Short patchy plant associations typical of unmanaged areas in arable landscape, derelict urban sites, quarries and railway ballast.
- **Bare Earth:** Can be recently cleared or recently introduced aggregate.
- **Vacant or Derelict Land:** Land which has been disturbed by previous development or use.

OMH usually has a complex mosaic of areas of bare earth, with early successional species, and/or those typically found on calcareous or very well drained habitats, such as sandy substrate, this can also include seasonally wet areas with impeded drainage, with complex topographies and substrate, that over time, have developed to support rare and diverse species assemblages, particularly plants and invertebrates (see pages 5, 6, 7, 8, 9 and 10 for more information).

A good guide to assess if it genuinely is quality OMH is that it has likely been there for years and succession hasn't occurred or has been curtailed due to an intrinsic underlying substrate complexity, rather than, as is often misidentified, land in early stages of succession due to a recent site clearance. OMH will often support rare and notable plant species and invertebrates alongside common early successional species.

Additional supporting data to confirm OMH:

Aerial imagery is often available over time, this can show if the site has been recently vacated or if it has been that way for some time. It may also show the historical use of the site which may give clues about current substrate conditions.

Multi quadrat data, should be collected, suggest a minimum of 10 x 1m^2 data points using percentage cover in the quadrats to support the UKHabs distinctiveness and condition assessment.

MAGIC mapping is a great open-source data resource, but some of the data, particularly the Priority Habitat Layers may be unverified, this can lead to misattribution of the habitat.

Look for records of rare and notable species from your **local records centre and National Biodiversity Network (NBN) Atlas to** support the desk study attribution.

Natural England Open Mosaic Habitat Spatial Data (draft) holds over 8,000 records of verified OMH sites across England.

Use online resources - several websites (listed on Page 10) have valuable resources, guides and case studies.

The results of Ground Investigation (GI) surveys can provide an insight into the ground and soil conditions of the site and whether they provide the soil and substrate conditions required to support OMH.

OMH is a complex habitat type, if in doubt, ask for a second expert opinion. The ecology community is happy to offer advice and help to correctly identify habitats.

TYPICAL FEATURES OF OPEN MOSAIC HABITAT

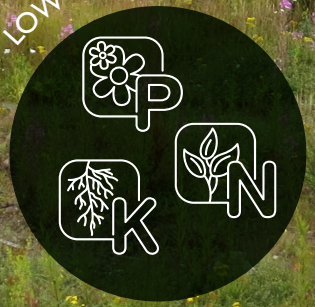
LOTS OF SMALL DIFFERENT HABITAT PATCHES

RARE FLORAL SPECIES LOTS OF ANNUALS

VARIATION IN SUBSTRATES AND TOPOGRAPHY

MOSSES, LIVERWORTS, LICHENS AND SEDUMS

LOW NUTRIENTS



RARE INVERTEBRATES

BARE GROUND

Photo Credit: Suzanne Burgess (info@buglife.org.uk)

TYPICAL BOTANICAL SPECIES

Below is a list of examples of the typical species as outlined in criterion 3:

A) **ANNUAL COMMUNITIES:** dominated by species that grow from seed each year or persist for up to two years and are typically stress-tolerant ruderal plants that colonise disturbed or bare substrates. Typical species include: Thyme-leaved Sandwort *(Arenaria serpyllifolia)*, Common Centaury *(Centaurium erythraea)*, Fairy Flax *(Linum catharticum)*, and Hare's-foot Clover *(Trifolium arvense)*.

B) **MOSS & LIVERWORT COMMUNITIES:** bryophyte-dominated and commonly occur on thin soils, compacted ground, or hard substrates. Typical species include Rough-stalked Feather-moss *(Brachythecium rutabulum)*, Cypress-leaved Plait-moss *(Hypnum cupressiforme)*, Variable Featherwort *(Lophocolea heterophylla)*, Broom Fork-moss *(Dicranum scoparium)*, and Heath Star-moss *(Ptilidium ciliare)*. Succulent vascular plants such as Stonecrops *(Sedum spp.)* are often associated with these communities.

C) **LICHEN COMMUNITIES:** likely to occur in extensive patches or interspersed with other habitats such as open grassland or heathland. A range of lichen growth forms may be present, including foliose (leaf-like), crustose (crust-forming), and fruticose (shrubby or branched) lichens, depending on substrate and exposure.


Hare's-foot Clover


Thyme-leaved Sandwort


Cypress-leaved Plait-moss


Stonecrop


Fairy Flax


Foliose and Crustose Lichen

Common Redshank

Common Knapweed

Heather

Common Toadflax

Wild Carrot

Common Bird's-foot Trefoil

TYPICAL BOTANICAL SPECIES

(continued)

D) **RUDERAL COMMUNITIES:** associated with disturbed ground and nutrient-rich soils and are typically composed of fast-growing, opportunistic species. Typical species include: Wild Carrot *(Daucus carota)*, Common Toadflax *(Linaria vulgaris)*, Black Medick *(Medicago lupulina)*, and Weld *(Reseda luteola)*.

E) **INUNDATION COMMUNITIES:** develop in areas subject to seasonal flooding or periodic waterlogging. Typical species include: Marsh Foxtail *(Alopecurus geniculatus)*, Toad Rush *(Juncus bufonius)*, Common Redshank *(Persicaria maculosa)*, and Lesser Spearwort *(Ranunculus flammula)*.

F) **OPEN GRASSLAND COMMUNITIES:** characteristic of dry, nutrient-poor soils and low-intensity management. Typical species include: Sheep's Fescue *(Festuca ovina)*, Cat's-ear *(Hypochaeris radicata)*, and Sheep's Sorrel *(Rumex acetosella)*.

G) **FLOWER RICH GRASSLAND:** supports a high diversity of forbs and is often associated with traditional management regimes. Typical species include: Common Knapweed *(Centaurea nigra)*, Common Bird's-foot Trefoil *(Lotus corniculatus)*, Meadow Buttercup *(Ranunculus acris)*, and Red Clover *(Trifolium pratense)*.

H) **HEATHLAND:** occurs on acidic, nutrient-poor soils and is dominated by dwarf shrubs and fine grasses. Typical species include: Heather (Ling) *(Calluna vulgaris)*, Wavy Hair-grass *(Deschampsia flexuosa)*, and Sheep's Fescue *(Festuca ovina)*.

TYPICAL INVERTEBRATE SPECIES

Invertebrates are often used as key indicators of OMH because their diverse ecological requirements and sensitivity to subtle changes in habitat structure make them excellent measures of habitat quality and continuity. As pollinators, decomposers, predators, and prey, these invertebrates drive nutrient cycling, support plant regeneration, and sustain complex food webs. Their presence not only reflects the ecological richness of OMH but also highlights the need to maintain the dynamic, disturbance-driven processes that create and sustain these rare and valuable habitats.

OMH supports a patchwork of bare ground, early-successional vegetation, and varied microclimates, all of which are essential for many specialist species.

Characteristic invertebrates include a wide range of specialist species such as solitary bees and wasps such as the Black-headed Mason Wasp *(Odynerus melanocephalus)*, along with striking predators like the Hornet Robberfly *(Asilus crabroniformis),* which relies on sun-exposed, structurally varied terrain.

Ground-active hunters such as the Ant-eating Spider *(Zodarion italicum)* and the Distinguished Jumping Spider *(Attulus distinguendus)*. Beetles such as the Green Tiger Beetle *(Cicindela campestris)* favour similarly disturbed bare ground for hunting, with species-rich patches to support prey, while butterflies like the Dingy Skipper *(Erynnis tages)* depend on specific host plants found only in early-successional vegetation.

Green Tiger Beetle

Distinguished Jumping Spider

Dingy Skipper

Hornet Robberfly

DESIGNING TO THE MITIGATION HIERARCHY

If you have been through the identification stages and have confirmed that you do have priority OMH, then there are a few options to meet the legal BNG requirements. By following the mitigation hierarchy, **Avoid, Minimise, Mitigate, Offset**, you will have the best value outcome for biodiversity and development. See **Table 3** overleaf which presents the Mitigation Hierarchy Approach for OMH (see page 11).

However, sometimes offsetting may require alternative compensation, that is replace OMH with a different habitat type.

Remember the trading rules presented in **Table 2**. Whereby to meet the BNG requirements, it must be the same habitat required to be offset. Sometimes even after following the mitigation hierarchy there is not sufficient opportunity to recreate all the OMH to meet the trading criteria, or the area may already have a lot of high quality OMH locally and other habitats may be more beneficial to that location. If this is the case, there is another option, BNG Rule 4.

The application of Rule 4, whereby "In exceptional ecological circumstances, deviation from this biodiversity metric methodology may be permitted by the relevant planning authority". If this is to be applied, early consultation with the LPAs is essential with evidence of the proposed deviation delivering an overall greater positive outcome for biodiversity. We present detailed case studies on the mitigation hierarchy and Rule 4 overleaf. This approach has been approved by LPAs.

ADDITIONAL RESOURCES

Invertebrates conservation charity **Buglife** has excellent resources for identifying OMH and general advice on brownfield development.

WWW

The West Midlands and Combined Authority **Brownfield Habitat Guide** has both design and economic evaluation advice.

PDF

The **Amphibian and Reptile Conservation** has guidance on brownfield habitat creation and enhancements.

PDF

The independent organisation **Living Roof Org** has some excellent open source advice.

WWW

Table 3: Mitigation Hierarchy Approach

	01. AVOID	02. MINIMISE	03. MITIGATE	04. OFFSET	05. RULE 4
	Preventing impact through early design decisions to avoid delivery risk entirely	Reducing the scale and intensity of impact	Creating and enhancing OMH on-site	Creating and enhancing OMH off-site	Strategic deviation to deliver greater ecological function
Design approach	Change site selection or amend the design and retain OMH habitat on original site.	Retain and enhance habitat where possible with integration into landscape design.	Create habitat via bunds, scrapes, banks, "brown" roofs with substrate translocation and increased microtopography.	Look for opportunities in the wider area (e.g. former quarries, landfill sites, spoil heap or disused airfields).	Use Rule 4 to deliver other mosaic habitats on or off-site that align with the local habitats and species needs.
Project Implications	– Requires early ecological input at concept stage RIBA 0 - 1and may constrain developable area. – Minimal long-term management liability.	– Suitable for low-intensity land uses. – Potential low management option.	– There are a range of differing weight options available but light industrial buildings may not have any capacity. – Check the loading of the roofs.	– May affect project viability due to cost and availability of OMH BUs. – Habitat creation in advance of loss, could reduce required offset area.	– Requires close work with local stakeholders and early LPA engagement. – Subject to regulatory scrutiny. – Robust justification with exceptional circumstances demonstration.
Benefits	– Zero BNG replacement cost and no BUs purchase requirement. – Swift planning permitting. – Positive stakeholder and regulator perception.	– Reduces BUs requirements. – Retains site character and may be compatible with recreational use. – Lower management costs.	– Reuse of materials increasing sustainability. – Can contribute to wider environmental benefits (SuDS, thermal performance). – Can have synergies with remediation.	– Low-quality existing biodiversity but offer large, undeveloped areas for restoring OMH. – Can be used to enhance and restore areas of poor quality OMH. – Can support urban enhancement with engagement with local communities.	– Rule 4 is often more economically viable than OMH BUs. – Greater ecological functionality when strategically applied.
Costs & Risks	– Potential reduction in site yield. – Requires upfront survey investment.	– Requires long-term monitoring (30 years) and specialist design input. – Some residual BNG deficit likely.	– Requires long-term monitoring (30 years). – Requires detailed design with specialist input.	– Cost high, feasibility often low due to lack of available suitable land.	– Not universally applicable and requires strong evidence base. – Dependent on LPA appetite and governance.
Summary	– Best ecological outcome. – Lowest financial cost with highest strategic value. – No additional management costs.	– Good ecological return. – Low to moderate cost. – Minimises management.	– Good ecological return. – Moderate technical input required.	– Good ecological return. – High technical input required.	– Best outcome when OMH replacement is impractical. – Should be used after following the mitigation hierarchy and as a last resort.

CASE STUDY 1:

CAMBOIS DATA CENTRE CAMPUS

Client: Quality Technology Services Realty Trust (QTS)

Local Planning Authority: Northumberland County Council (NCC)

Metric Version: Statutory Biodiversity Metric

Ecology Lead: Sian Jones

Project Description

The proposed development is for a data centre campus that comprises up to 10 data centre buildings used to house computer systems and associated components, such as telecommunications and storage systems, to store and manage digital data. It includes a substation as well as site access, landscaping, and other infrastructure works. It will be a flagship project and one of the largest data centre campuses in Europe.

The site is located on the former Blyth Power Station coal storage area at Cambois, Northumberland. Historically, the site was home to the Blyth Power Station during the late 1950s to the early 2000s. The site was used for the storage of coal and was cleared in 2003, following the power station's closure in 2001, and is currently a vacant brownfield site.

Natural England Open Data initially mapped the entire site (102ha) as OMH. Site surveys confirmed that the true extent of OMH was overestimated, prompting a refined assessment informed by habitat definition, field data and historical evidence.

As a result of the refined assessment, the OMH extent was reduced from 102ha to 17.47ha, reflecting a more accurate baseline. This methodology was agreed through consultation with Natural England and NCC.

Evidence For Open Mosaic Habitat on Previously Developed Land (OMH)

1. **Habitat definition** (UK DEFRA and UKHabs), specifies that OMH is characterised by severely limiting edaphic conditions (e.g. extreme pH, nutrient deficiency, or drought), typically arising from previous disturbance or the addition of extraneous substrates such as industrial spoil.
2. **Historical aerial photography** was reviewed to identify areas of former coal stockpiling and associated ground disturbance.
3. **Ground Investigation (GI) data**, which identified areas of extreme pH indicative of historic anthropogenic modification. Areas lacking evidence of such disturbance or limiting soil conditions were excluded from OMH classification.

Retention, Enhancement and Habitat Creation on Site

Presence of a large OMH area (17.47ha) remained a key challenge amplified by the central location within the site, where long-term retention was uncertain. Given the outline planning stage and uncertainty around construction methods, a worst-case scenario (no habitat retention) was applied within the Biodiversity Metric to ensure a robust net gain assessment. Landscape design iterations sought to maximise OMH retention and creation on site. OMH is difficult to recreate due to its reliance on specific edaphic conditions; however, given the site's existing ground conditions, some re-creation was considered feasible. The outline landscape design demonstrated a net increase of 1.7ha of OMH compared with baseline. Despite this, the statutory metric applied a high delivery risk score, resulting in a net loss of Biodiversity Units (BUs) for OMH.

Biodiversity Units Shortfall

The overall shortfall against the +10% Biodiversity Net Gain requirement was –408.76 habitat area BUs, largely driven by the delivery risk associated with OMH. Alternative on-site options, including brown roofs, were explored but discounted due to fire risk constraints and their limited contribution to addressing the BUs deficit.

Off-site Compensation and Use of BNG Rule 4

An off-site location was identified to compensate for on-site losses. OMH is nationally recognised as difficult to replace on a like-for-like basis due to its reliance on historic disturbance and highly specific ground conditions. BNG Rule 4 allows deviation from metric trading rules in exceptional circumstances, including complex landscape-scale habitat change, provided there is a clear ecological justification. Early engagement with NCC confirmed support for the application of Rule 4 in this case.

While statutory rules do not permit direct replacement of OMH with other habitat types, the proposed off-site mosaic of species-rich grassland, scrub and ponds provides comparable ecological function, particularly for plants and invertebrates. Habitat creation and management techniques for these habitats are well established and carry a lower delivery risk than OMH creation.

The off-site area (c.300ha) represents a landscape-scale intervention within the local context. Initial calculations indicate approximately +690 BUs could be delivered through habitat creation and enhancement.

Benefits of the Adopted Approach

Key challenges included the scale and location of OMH within the Site and limited availability of viable off-site OMH replacement. These resulted in high delivery risk assigned to OMH by the metric influenced by high cost and uncertainty of OMH creation and long-term management.

By contrast, using BNG Rule 4 to create a mosaic of grassland, scrub and ponds provided similar ecological function with a greater certainty of delivery and reduced long-term ecological and financial risk. Purchasing statutory credits (£48,000 per unit, typically two per BU) would have rendered the scheme financially unviable.

Alignment with Emerging Guidance

Subsequent DEFRA guidance now reflects this approach, supporting the use of ecologically equivalent habitat mosaics where OMH replacement is impractical or high risk. This provides reassurance for schemes with significant OMH deficits and limited realistic alternatives.

Further Information

The project was shortlisted for the Brownfield Awards. NCC's ecologist has written a blog which was shared by Natural England's BNG leadership as an example of best practice use of Rule 4.

Visit the blog

CASE STUDY 2:

TREBOR DEVELOPMENTS

(FORMER MARS PETCARE SITE)

Client: Trebor Developments

Local Planning Authority: Peterborough County Council (PCC)

Metric Version: Natural England Biodiversity Metric 2.0

Ecology Lead: Brandon Murray

Project Description

Arcadis was appointed to provide ecological advice in relation to the proposed redevelopment of the former Mars Petcare site at Shrewsbury Avenue, Peterborough (planning application reference 20/01674/FUL). The site lies within an established industrial area, bounded by industrial land to the north, Stillwells Nature Reserve to the east, and dual carriageways with hedgerow and treeline road verges to the south (A1139) and west (A1260).

The proposed development comprises two large Class B2/B8 industrial and warehousing units, with ancillary office accommodation, parking and associated landscape works, including sustainable drainage features. The proposals are consistent with the site's allocation for employment uses within the PCC's Local Plan.

As part of the planning process, as the project was delivered before Biodiversity Net Gain (BNG) became mandatory, the development was required to deliver a minimum 10% BNG. The site was identified at an early stage as supporting areas of OMH, based on evidence of historic disturbance, including soil removal, severe modification and the presence of made ground, resulting in spatial variation in substrates across the site.

Evidence For Open Mosaic Habitat on Previously Developed Land (OMH)

A botanical walkover survey was undertaken to identify priority habitats and notable plant species. This identified a large area supporting Annual Beard-grass (*Polypogon monspeliensis*, nationally scarce) and a smaller area supporting Common Cudweed (*Filago vulgaris*, Near Threatened). Additional notable species recorded included Wild Strawberry (*Fragaria vesca*, Near Threatened) and Wall Bedstraw (*Galium parisiense*, nationally scarce). These species were largely confined to the Site margins and a discrete central area.

The habitat had developed following demolition of the former pet food factory in 2013 - 2014. However, when compared with other OMH sites in the local area, the habitat was of relatively low ecological value, lacking the substrate diversity, structural variation and areas of pooled water typically associated with higher quality OMH. Further ecological surveys were undertaken, including invertebrates, reptiles and Great Crested Newt *(Triturus cristatus)*.

Retention, Enhancement and Habitat Creation on Site

The mitigation hierarchy set out in BS42020 (2013) was followed, with avoidance and on-site enhancement prioritised. A Landscape and Ecological Management Plan was prepared and the site layout was designed to maximise biodiversity, including retention and creation of OMH using site-won materials (0.51ha retained, 0.76ha created), including bunds and ephemeral pools. Annual Beard-grass and Common Cudweed were translocated, creating additional populations. Species-rich grassland, SuDS, hedgerows and trees with habitat features to support reptiles and invertebrates were also created.

Biodiversity Units Shortfall

Despite these measures, a shortfall in BUs assessed under the Biodiversity Metric 2.0 remained, largely due to constraints associated with the proposed B2/B8 warehouse development that would not allow for biodiversity roofs without additional weight loading that would increase carbon footprint of the building significantly. Additional factor was the high metric value assigned to OMH habitats.

Off-site Compensation and Biodiversity Net Gain Delivery

Following the implementation of 10% BNG required by policy there was a shortfall in Biodiversity Units. Under BM 2.0 Rule 6 stated that "Deviations from the published methodology of BM2.0 need to be ecologically justified [...] that there may be exceptions. Any local or project specific adaptations of the metric must be transparent and fully justified."

In liaison with Peterborough City Council (PCC), an off-site compensation scheme was identified involving enhancement of Protected Road Verges (PRVs) across John Clare Country. This delivered biodiversity enhancement along 57km of road verge (over 12 ha), addressing a recognised local biodiversity need and improving habitat connectivity at a landscape scale.

Management is targeted towards pollinators and keystone species. The underlying calcareous geology allows delivery of Lowland Calcareous Grassland (G2a), a nationally scarce habitat. The enhancement methodology includes targeted seeding and a modified cutting regime, with two cuts per year and removal of arisings. Cutting timings are varied to align with flowering periods.

The PRV enhancements contribute to B-Lines and Pollinator Action Plans within the PCC Biodiversity Strategy and are secured for a 30-year management period.

Rationale and Outcomes

The Site comprised a former pet food factory, demolished in 2013 - 2014, within which brownfield / OMH developed amongst concrete slabs and scattered trees. While OMH is highly valued within the biodiversity metric, opportunities for further on-site delivery were constrained.

Arcadis, appointed by Trebor Developments, worked collaboratively with PCC to identify a cost-effective, locally appropriate offsetting solution that delivers measurable biodiversity gains while supporting regeneration of the site (now redeveloped for Crown Packaging). The project demonstrates how brownfield redevelopment can follow the mitigation hierarchy to maximise on-site biodiversity and deliver landscape-scale off-site enhancement aligned with local policy, ultimately supporting sustainable development and local biodiversity priorities.

Further Information

The project was shortlisted for the Brownfield Awards. PCC Wildlife Officer, Rowan Rumball, commented:

"There is a unique opportunity here to both achieve the net gain targets for an important town centre development, improve large areas of grassland and achieve habitat connectivity. These objectives are in line with PCC's local policy and can be financed through biodiversity net gain."

CASE STUDY 3:
COED ELAI

Client: Welsh Government

Local Planning Authority: Rhondda Cynon Taf County Borough Council (RCTCBC)

Metric Version: Net Benefit for Biodiversity

Ecology Lead: Siân Carr

Project Description

Coed Elai is a former South Wales colliery that ceased operations in 1986. The Welsh Government is leading an employment-led remediation and redevelopment scheme to deliver approximately 15ha of serviced employment land, with the ambition to create ~1,200 jobs and enhance local economic and social wellbeing. The masterplan integrates infrastructure (including access routes) that enables future renewable energy development, while prioritising sustainable development, landscape management, and habitat preservation.

Initial remediation works were completed in 2001, including creation of a wildlife wetland and planting of woodland blocks to support the future Parc Coed Elai Business Park. Renewal of planning permission in 2020 initiated a collaborative redesign between Arcadis, county ecologists and the Welsh Government. In the intervening years, brownfield habitats had established, supporting invertebrates, reptiles, birds, bats and small mammals, alongside notable fungi, including a diverse waxcap assemblage. However, the existing woodland was structurally uniform with minimal ground flora, and wetlands were heavily vegetated and shaded with limited open water. Grassland habitats had developed informally, creating open spaces of variable ecological value. These conditions necessitated a reassessment of the ecological strategy and an updated site design to optimise outcomes for biodiversity and people, while safeguarding the project's employment and enabling-renewables objectives.

Evidence For Open Mosaic Habitat on Previously Developed Land (OMH)

Following the earlier remediation works, brownfield and transitional grassland habitats formed across the plateaus, characteristic of OMH and supporting a broad range of invertebrates, fungi and protected fauna. Although the project is not subject to mandatory Biodiversity Net Gain, it must comply with Net Benefit for Biodiversity requirements under Planning Policy Wales, ensuring that habitat value and ecological resilience are enhanced through the design.

Retention, Enhancement and Habitat Creation on Site

Once a colliery (closed 1986) and later a remediated platform (2001), Coed Elai evolved into a complex brownfield/OMH mosaic of high ecological potential. Recognising this, the Welsh Government, Arcadis and county ecologists re-optimised the masterplan (from 2020), maximising on-site biodiversity alongside employment-led regeneration and enabling infrastructure for renewables.

The revised layout increased the retention of brownfield features and improved transitions between plateaus, wetlands and woodland. A previously proposed multi-use games area was redesigned as open brownfield and grassland with mown paths, supporting wildlife while offering informal recreation for local residents.

Around 15 hectares are now managed primarily for biodiversity, with ponds and wetlands restored through de-silting and selective vegetation removal, and woodlands restructured to create transitional edges from OMH to woodland, with varied age classes.

Since implementation of the 25-year Landscape and Habitat Management Plan (LHMP) in 2021, invasive species have been controlled, additional brownfield and grassland habitat created, and features such as hibernacula, scrapes and beetle banks established.

Wildlife boxes are now in use, wetlands have regained open water, and woodland changes have supported new records of Wild Strawberry *(Fragaria vesca)* and Early Dog-violet *(Viola reichenbachiana)*. Priority habitats and species listed under the Environment (Wales) Act are present, including pond and woodland systems and plants supporting Marsh Fritillary *(Euphydryas aurinia)* and Brown Banded Carder Bee *(Bombus humilis)*, while lighting and drainage have been designed to maintain dark corridors and connectivity across the site.

Net Benefit for Biodiversity

The project is on track to deliver a Net Benefit for Biodiversity by 2026 through habitat retention, creation and long-term active management. Resulting in increased Diversity, Extent, Condition, Connectivity and Aspects of resilience (DECCA) under the framework developed by Natural Resources Wales (NRW). Ecological mitigation is phased to avoid loss during plot development, and developers must adhere contractually to biodiversity requirements set out in the LHMP, ensuring long-term consistency across the business park as it is built out.

Benefits of the Adopted Approach

The approach avoids high-maintenance formal landscaping and instead establishes diverse, resilient ecosystems capable of providing multiple ecosystem services, including carbon storage, water regulation and flood mitigation.

The site offers improved wellbeing opportunities through accessible nature-rich spaces, while plot development aligns with high environmental standards such as CEEQUAL and BREEAM Excellent.

Habitat linkages across grass verges and corridors reinforce ecological connectivity within and beyond the site, and successful establishment of devil's-bit scabious contributes to wider marsh fritillary stepping-stone networks within the Tonyrefail Valley.

Alignment with Emerging Guidance

The project is consistent with the Well-being of Future Generations Act and the Section 6 Duty of the Environment (Wales) Act, with the NBB approach embedded throughout. It follows the ecological mitigation hierarchy and Planning Policy Wales requirements through the LHMP and applies recognised best practice, including CIRIA SuDS guidance and wildlife-sensitive lighting standards. Forecast increases in brownfield habitat and the suite of active management measures mean the project remains aligned with Net Benefit for Biodiversity expectations.

Further Information

Parc Coed Elai has received recognition for its approach from CIEEM, the Brownfield Awards, as well as the government and property sector.

CONCLUSION

The Priority Open Mosaic Habitat on Previously Developed Land (OMH) does not need to be a barrier to development, however it does demand early action and deliberate decision-making with the right expertise. The below summary points follow the Mitigation Hierarchy:

AVOID: Early and robust classification of OMH is critical. Decisions should be grounded in high-quality survey data and informed ecological judgement, keeping in mind the mis-identification risk. If uncertain, refer to additional data sets and seek expert ecological review. If you have OMH, can you redesign the development to avoid this habitat type altogether?

MINIMISE: The most powerful biodiversity gains come from creative, well-considered site design that prioritises strategic on-site retention and enhancements.

MITIGATE: Can you create habitat on site, translocate material to the periphery of the site, created bunds connected with the wider landscape and/or biodiverse brown roofs, increase diverse topography and microhabitats.

OFFSET: Work collaboratively with local wildlife groups, LPAs and academic partners who often hold underused opportunities for cost-effective off-site enhancement combined with long-term stewardship.

RULE 4: In some contexts, OMH may be relatively abundant in the local area compared to other habitats and biodiversity priorities. Where this is the case, and with strong evidence, Rule 4 may represent a pragmatic and defensible route, but only through a transparent dialogue with the LPA.

Ultimately, the best outcomes for ecology, developers and planners will be achieved by following the mitigation hierarchy and making the right decisions for the site in question, supported by the existing BNG guidance.

KEY INSIGHT FOR DECISION-MAKERS

Early recognition and safeguarding of OMH is essential.

Should high value OMH be discovered, it is time to rethink the site allocation and / or the design. Where OMH is identified late or incorrectly, avoidable biodiversity loss and regulatory risk increase significantly.

Applying the mitigation hierarchy as a risk management tool results in more robust ecological outcomes with greater financial predictability and higher likelihood of long-term success.

Where strict use of BNG metric trading rules will risk an inappropriate ecological outcome or is demonstrably financially unviable, alternative habitat solutions, using Rule 4, can deliver equivalent or greater ecological function at landscape scale. They should be considered subject to robust justification and LPA agreement.

Case studies demonstrate that regulatory compliance and enhancing nature recovery at scale are economically viable and provide a robust, defensible model for balancing development, planning consent, and long-term ecological value.

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CONTACT DETAILS:

Dr Martina Girvan

Ecology & Arboriculture Director

martina.girvan@arcadis.com

BIODIVERSITY & ENVIRONMENTAL NET GAIN GROUP

part of Green Construction Board

The GCB's Biodiversity and Environmental Net Gain group brings together senior leaders from across government and industry to drive sustainability, innovation and resilience within the built environment. The group provides strategic leadership on biodiversity and the transition to a nature-positive construction sector. By fostering collaboration, sharing best practice and aligning policy with delivery, we support the transformation of the construction industry to accelerate sustainable growth and long-term environmental value.

The GCB is a delivery body for the Net Zero and sustainability workstream of the Construction Leadership Council (CLC).