



Harworth Group

Houghton Main Colliery

Biodiversity Impact Assessment

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1.0 INTRODUCTION

- 1.1 This report has been prepared by FPCR Environment and Design Ltd on behalf of the Harworth Group in support of an outline planning application for a proposed employment development located site off the A6195 at Little Houghton, South Yorkshire (central OS grid ref: SE 347 013).

Site Description

- 1.1 The site extends to 14 acres (5.6ha) and is located to the north of Little Houghton and approximately 5.5km east of the centre of Barnsley. It comprises a single compartment of land, part of the former Houghton Main Colliery, with a mosaic of habitats largely comprising established broadleaved woodland, and grassland, with scrub, mature tree lines and a ditch also extant.

Proposals

- 1.2 The Site is proposed for employment development comprising five units, with associated parking and access infrastructure, with a mix of retained and created habitats surrounding the built areas. The main access will be formed along the western boundary off the A6195, with allowance for an altered bus turning head in the south and re-routed public path to this through habitats to the east from the north.

Biodiversity Impact Assessment Context

- 1.2 The overall aim of utilising a biodiversity metric is to provide a mechanism by which conservation activities are designed to deliver biodiversity benefits in compensation for losses, which can be delivered with a measurable outcome.
- 1.3 Using the biodiversity metric means that a developer employs a standardised formula to calculate the number of biodiversity 'units' to be lost as a result of their development, based on the habitat(s) and hedgerow(s) affected, their condition and extent. The developer then provides an 'offset' (where necessary) to deliver an equivalent number of biodiversity units; these ideally should be within the development boundary (habitat enhancement/creation) or off-site.
- 1.4 Biodiversity offsetting is to compensate for adverse impacts on biodiversity identified after appropriate avoidance, minimisation and on-site rehabilitation measures have been undertaken, according to the mitigation hierarchy as required by National Planning Policy Framework (NPPF, 2019 (as amended)). Any subsequent changes to planning proposals may affect the credit requirement of the site and a review of the changes would be required.

Legislative Context

- 1.5 The UK Government, as signatory to the Rio Convention on Biological Diversity, is committed to conserving and enhancing biodiversity. This commitment is further enforced in the Natural Environment and Rural Communities (NERC) Act 2006 and the Natural Environment White Paper (June 2011).
- 1.6 DEFRA's 25 Year Environment Plan (2018) seeks to embed a 'net environmental gain' principle for development to deliver environmental improvements locally and nationally. Current policy is that the planning system should provide biodiversity net gains where possible however this is moving towards a mandatory requirement.

- 1.7 In 2021 the Environment Act came into force. Of particular relevance is the requirement that all developments subject to the Town and Country Planning Act will need to provide an at least 10% biodiversity net gain (BNG), as calculated using a Biodiversity Metric and a Biodiversity Gain Plan, with habitat used for net gain to be secured for a minimum of 30 years. Delivery of BNG may be on site, off-site or undertaken using statutory biodiversity credits. The requirement for BNG does not over-ride the need to apply the mitigation hierarchy (avoidance, mitigation and compensation) when considering biodiversity assets and their loss and does not change existing environmental and wildlife legal protection.
- 1.8 Whilst the Act mandates a 10% BNG delivery and for this to be a condition of planning permissions (Part 6 section 98 and Schedule 14 part 1), section 147 (3) states that this will only come into force once the secondary legislation is in place to support this requirement. Therefore there is a transition period (the length of which is not defined, but anticipated as being around 2 years) until the mandated 10% is required under law. A key point in the current legislative context described above, is that the term “measurable net gain” is not defined within the NPPF (2019). Additionally, this term currently has no agreed definition in local or UK policy. Whilst a figure of 10% is widely viewed as emerging best practice, it currently has no adopted policy support at either a local or national level.
- 1.9 NPPF in particular seeks to ensure that the planning system contributes to and enhances the natural and local environment, protect and enhance biodiversity and geodiversity by:
- 170. d) Minimising impacts on and providing net gains for biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures;*
- 174. b) promote the conservation, restoration and enhancement of priority habitats, ecological networks and the protection and recovery of priority species; and identify and pursue opportunities for securing measurable net gains for biodiversity.*
- 1.10 The Barnsley Local Plan Objective 5 is to “Achieve net gains in biodiversity”; Policy Bio1 states that developments are expected to observe and enhance biodiversity, “maximising biodiversity and geodiversity opportunities in and around new developments” and that they will be “expected to follow the mitigation hierarchy (avoid, mitigate, compensate)” and “encourage provision of biodiversity enhancements”.
- 1.11 Within the supplementary planning document: Biodiversity and Geodiversity, it further states:
- The LPA will not support applications that would damage the ecological network and cause a net-loss in biodiversity in line with the NPPF.*
- 1.12 The Site is located within the Dearne Valley Green Heart Nature Improvement Area (NIA). With specific reference to sites located within this NIA the above document states:
- Within the NIA (Nature Improvement Area) we require specific biodiversity enhancements with developments over and above the minimum mitigation/ compensation measures.....*
- Such quantifiable, significant benefits could include:*
- *New woodland;*
 - *New wetland;*
 - *Enhancing areas of poor environmental quality;*
 - *Improving public access, or*

- *Improving the management of existing habitats;*

2.0 METHODOLOGY

Habitat Assessment

2.1 Data was drawn from a number of surveys and reports to inform the baseline habitat values. These were-

- Barnsley Biological Records Centre (BBRC) - hosted by Sheffield City Council and accessed via Sheffield Biological Records Centre (SBRC),
- Extended Phase 1 Survey – Ian Hunter FISC 5 (FPCR 2021).

Natural England's The Biodiversity Metric 3.0

2.2 Natural England's published biodiversity net gain metric is an MS Excel spreadsheet that is used to quantify the predicted net-change in biodiversity value ("biodiversity units") of a proposed development site before and after development. It treats the flat "habitats" and linear features "hedgerows" and water-courses separately, and is based on pre-determined values, along with published written guidance, set by a Natural England-led team of experts.

2.3 Following quantification of the biodiversity value of habitats / hedgerows / watercourses to be lost, to then determine the offsetting requirement it is also necessary to measure the offsetting potential of mitigation measures. This allows for the potential quantity of any off-site units required to be calculated. For this to take place a number of factors must be considered:

- the size of the mitigation areas;
- the habitat distinctiveness band it is assigned currently, and the target band once improved; and
- the condition of the habitat at the start of the offset project, and its condition at the end.

2.4 The potential compensation value is derived from the difference in quality between the habitat to be lost and that to be created. The area from which the same number of units can be achieved may allow for the area required for mitigation to be smaller than that which is being lost. For example, if a habitat of low distinctiveness and poor condition is improved to create a habitat of high distinctiveness in good condition, the area needed to offset can theoretically be less than that lost.

2.5 The Biodiversity Metric version 3.0 was therefore utilised to undertake the initial assessment, with the relevant condition assessment used to guide habitat creation and management objectives for the site.

2.6 To facilitate this, the Site has been mapped and digitised using QGIS, with the baseline habitats plotted and measured. In accordance with the 3.0 Metric User Guide, habitats have been defined under UK Habitat Classification. The indicative landscaping proposals for the Site were then uploaded into the QGIS, and the proposed habitats mapped and digitised to generate areas for each of the habitats proposed for creation.

2.7 These pre- and post-development habitat areas were then inputted into the 3.0 Metric Calculation tool. Pre-development habitats were grouped into their habitat type and condition based on the

results of the UKHab and condition assessment surveys, while post-developments were classified into their UKHab type as identified through the classification of proposed habitats within landscaping plans into appropriate UKHab types and their target condition scores. The metric then provides a habitat distinctiveness score for each of the baseline and proposed habitats which are pre-assigned scores based on the habitat type.

- 2.8 The strategic significance of the habitats was also assessed for both the pre- and post-development habitats based on the location of the site, its proximity to existing areas of biodiversity interest and its setting within wider habitat corridors.
- 2.9 The metric then assigns a range of pre-assigned factors to each of the proposed habitats. These have been advised by subject knowledge experts and are universal multipliers generated by the metric itself for the following variables relevant to habitat creation, enhancement or restoration proposals:
- Difficulty of creating or restoring/enhancing a habitat: This pre-assigned score is based on how difficult a particular habitat type is to create or restore/enhance
 - Temporal risk: This is the 'time to target condition' for any particular habitat and determines how long a particular habitat type is likely to take to reach the condition score that the desired condition score assigned to it.
 - Spatial Risk: This score is based on the distance between the site of habitat loss and any habitats creation or enhancement proposals at any offsite offsetting solutions.
- 2.10 Full details of the calculation methodology used is provided in the Biodiversity Metric 3.0 – User Guide¹.

Limitations

- 2.11 Data provided by third party sources collated during the desktop study is generally made up from a wide range of sources including (but not limited to) those submitted by ecological consultancies, wildlife conservation organisations and volunteers. As such, this data is typically focused on areas of known nature conservation, is reliant upon formal surveys having been undertaken within an area or the presence of an expert within the locality and as such this data can never be fully relied upon as a complete ecological dataset for any given area. Rather, this data is used as a guide to likely presence of notable ecological features and can never be relied upon for likely absence.
- 2.12 The UKHab habitat map has been reproduced from detailed field notes and informed by aerial imagery, OS mapping and site maps provided by the client. The accuracy of this figure is therefore ultimately guided by the accuracy of these sources and can only be relied upon to a certain degree of resolution.
- 2.13 The proposed site layout in terms of division between green spaces and built areas was based on the illustrative master plan produced by htc architects (drawing number 2621 P401 D, March 2021). The components of the green spaces have been modified to contribute to an overall net gain in value for habitats and should be adopted in finalised design and landscaping plans.
- 2.14 Natural ecological communities are susceptible to change; at times this change can be rapid as a result of internal and external environmental factors. The biodiversity offsetting calculations are

¹ Natural England, The biodiversity metric 3.0 (July 2021) Available at: <http://publications.naturalengland.org.uk/publication/6049804846366720>

based on ecological assessments of habitats carried out during 2020; as a result, changes which may affect the conclusions of this report may occur, if a prolonged period of time elapses prior to the commencement of the project.

- 2.15 The aim of biodiversity offsetting is to compensate for significant adverse impacts on biodiversity identified after appropriate avoidance, minimisation and on-site rehabilitation measures have been taken, according to the mitigation hierarchy as required by the NPPF. Any changes to planning proposals or decisions may affect the credit requirement of the site. As the project is currently at outline stage, all the specific details of the design are yet to be determined and will not be available until the project progresses to full planning; therefore, some changes are likely to the framework and GI provision, meaning that the calculations will need to be reassessed. Thus, all scores within this assessment are indicative, and should be treated as such.
- 2.16 No other limitations specific to this report influenced this assessment.

3.0 BASELINE CONDITIONS AND PRE-DEVELOPMENT VALUE

Desktop Study

Internationally Designated Sites of Nature Conservation Importance

- 3.1 No international sites of nature conservation importance are present within a 5km radius of the subject site.

Nationally Designated Sites of Nature Conservation Importance

- 3.2 The site is located within the Dearne Valley Green Heart Nature Improvement Area (NIA) which is a national, landscape-scale nature conservation designation and is subject to requirements set out within the Barnsley Local Plan Supplementary Planning Document: Biodiversity and Geodiversity.
- 3.3 No sites of international importance were located within 5km of the Site. One Site of Special Scientific Interest (SSSI) of nature conservation interest was identified within 2km, - a large SSSI comprising numerous parcels located across the Dearne Valley region, with seven parcels located within the search area. These units have been designated for supporting breeding and non-breeding gadwall, shoveler, garganey and breeding willow tit, as well as general assemblages of breeding birds of damp grassland, open water and scrub. In addition, of relevance to this BIA, a further unit of the SSSI, occurs at Barrow Colliery LWS, approximately 6km to the south west of the Application Site, designated for breeding willow tit, and breeding birds of lowland scrub habitat.

Non-statutory Sites

- 3.4 A single Local Wildlife Site (LWS), Edderthorpe Ings, also part of the Dearne Valley Wetlands SSSI lies, 500m to the northwest, comprising flooded agricultural land, of open water, marginal vegetation, of value to a range of birds.

Strategic Significance

- 3.5 The site is set within the Dearne Valley Nature Improvement Area and as such all habitats meet the criteria for inclusion within the maximum valued strategic significance category- “*within area formally identified in local strategy*”.

Baseline Habitat Value

- 3.6 The Site largely comprised a mix of broadleaved woodland, predominantly of self-sown silver birch and grey willow and species poor neutral grassland. Two tree lines adjoined the woodland edge, forming a part of the woodland edge along sections of the northern and eastern boundary. A heavily vegetated drainage ditch also occurred within the woodland, close to its periphery at the northern boundary. The biodiversity value of these habitats is therefore reflected in the wider broad woodland habitat, of which they are considered to be functional components, for the purposes of BIA and the calculations. Other habitats on site included small areas of scrub/ruderal habitats.
- 3.7 A section of a single hedgerow associated with the A6195, followed alongside the western boundary. Its outgrown and unmanaged nature meant that it was largely contiguous with the woodland and functionally acting as the woodland edge, although it lies outside of the red line and therefore has not been included in this assessment and is not expected to be affected.
- 3.8 The baseline habitats are show in Figure 1, with Condition and Distinctiveness in Figure 2 and described below. Justifications for condition scores are detailed below with species lists provided in Appendix A.

Other Neutral Grassland (g3c)

- 3.9 Two distinct areas of unmanaged neutral grassland within the central areas of the site, although both were considered to be relatively species poor and did not represent clear affinity with any specific community assemblage.
- 3.10 Both areas held some affinity with the perennial rye grass – crested dog’s tail (*Lolium perenne* – *Cynosuarus cristatus*) community. In both areas some indicators of the crested dog’s tail – black knapweed (*Cynosuarus cristatus* – *Centaurea nigra*) community were present albeit generally localised and the community lacked the overall abundance and species diversity associated with unimproved swards. Yorkshire fog characterised the fields having an abundant distribution, while red fescue was generally frequent.
- 3.11 Herbs were confined to common and widespread forbs and tall herbs typical of such habitats including the locally frequent common bird’s-foot trefoil and creeping buttercup, the former being replaced by meadow vetchling on the flatter ground towards the west of the site, with lesser numbers of autumn hawkbit and lesser trefoil also noted.
- 3.12 The grassland was assessed as being in moderate condition (passes 3 of 5 criteria). Table 1 details the primary assessment criteria used.

Table 1: Grassland Condition Assessment Criteria

Condition Assessment	Result	Description
1. The appearance and composition of the vegetation closely matches characteristics of the specific grassland habitat type. Wildflowers, sedges and indicator species for the grassland are very clearly visible throughout the sward.	FAIL--	Grassland does not closely match or have clear affinity with any specific grassland community. Indicator species for most likely grassland type were rarely present or absent.
2. Sward height is varied (at least 20% of the sward is less than 7cm at least 20% is more than 7cm creating micro-climates which provide opportunities for insects, birds, and small mammals to live and breed. .	PASS	Whilst much of the grassland is of similar height, there are areas of shorter grassland.
3. Cover of bare ground between 1% and 5% including localised areas, for example rabbit warrens.	FAIL	Continuous sward with no extensive bare ground areas.
4. Cover of bracken less than 20% and cover of scrub including bramble less than 5%.	PASS	No bracken and scrub/tree encroachment limited to peripheries bordering adjacent woodland.
5. There is an absence of invasive non-native species (as listed on Sch 9 of the WCA, 1981). Combined cover of undesirable species and physical damage (such as excessive poaching, damaging levels of access or any other damaging management activities) accounts for less than 5% of the total area	PASS	Creeping buttercup <i>Ranunculus repens</i> , Spear Thistle <i>Cirsium vulgare</i> and White Clover <i>Trifolium repens</i> present but coverage below 5% of grassland area. Some evidence of informal tracks through the site,

Ruderal / Ephemeral Vegetation (secondary 17)

- 3.13 An area of bramble with tall ruderal herbs was noted on the area of disturbed ground around the existing turning head close to the site's south-easterly boundary.
- 3.14 Associated species recorded within this community including locally frequent common nettle and occasional cow parsley, cleavers, rough meadow grass. Other rarely recorded species in this area were limited to imperforate St John's wort, red deadnettle and daisy.
- 3.15 The area of ruderal/ephemeral vegetation was assessed as being in moderate condition. Ruderal/ephemeral vegetation is a short-lived, transitory habitat unless the area is frequently disturbed and is thus not considered a priority habitat.
- 3.16 The ruderal area on site was checked against the criteria for the priority habitat Open Mosaic Habitat on Previously Developed Land, though the area is not deemed to have qualified as this habitat type due to the lack any significant spatial variation in its communities, moderately sized

areas of bare, unvegetated substrate, or pools. The area is therefore considered as a homogeneous area of early successional ruderal vegetation.

- 3.17 Grass species did not dominate the community assemblage recorded so use of the grassland condition assessment is inappropriate in this case and therefore condition was assessed using the urban habitat condition assessment guidelines and considered to be in moderate condition scoring 2 of 3 criteria.

Table 2: Ruderal/Ephemeral Vegetation following Urban Condition Assessment Criteria

Condition Assessment	Condition	Description
1. Vegetation structure is varied, providing opportunities for insects, birds and bats to live and breed. A single ecotone (ie scrub, grassland and herbs) should not account for more than 80% of the total habitat area.	FAIL	Whilst a range of vegetation types are present with bramble scrub and grasses/herbs, overall vegetation structure was not particularly structurally diverse. .
2. There is a diverse range of flowering plant species, providing nectar source for insects. These species may be either native or non-native, but beneficial to wildlife.	PASS	A small range of common and widespread flowering species occurred, with most occurring only rarely including extensive bramble areas, however they offer a reliable annual nectar source and are native species used by insects as larval food plants.
3. Invasive non-native species (Sch 9 of WCA) cover less than 5% of total vegetated area.	PASS	No Sch 9 species occur.

Other Broadleaved Woodland (w1g)

- 3.18 Woodland was present largely around the boundaries of the site with ingress into the central grassland habitats particularly obvious at the southern end. To the north, a line of mature hybrid black poplar formed a section of the woodland edge, with mature common lime along its eastern edge. Within the broadleaved woodland, a drainage ditch, with only shallow standing water at its base and heavily vegetated, extended into the red line in two places. These habitats have been included within the woodland, as they are integral with the woodland and their biodiversity value as such forms a functional part of the biodiversity value of the woodland.
- 3.19 The woodland canopy predominantly comprised self-sown silver birch and grey willow with localised areas of alder woodland with an open canopy and evidence of regeneration. The ground flora in these areas was broadly similar to that of the central grassland communities.
- 3.20 To the northwest and the east of site there was evidence of supplementary planting and a more diverse mix of non-native species and horticultural cultivars of native trees and shrubs. These included lilac, bladder senna, purple filbert, sea buckthorn, kerria and evergreen spindle. In these areas the canopy was closed, and the ground flora species poor being dominated by bramble.
- 3.21 The broadleaved woodland at the site was not considered to qualify as a Habitat of Principal Importance and was classed as poor condition (scoring 25 of 39 points) within the condition assessment framework. Due to the score being on the cusp of the next condition banding, and

some assessed characteristics being present in low density / infrequently, a condition score of fairly-poor was used in the calculations to reflect this.

Table 3: Woodland Condition Assessment Criteria

Condition Assessment	Result	Description
1. Age distribution of trees	POOR (1)	Species predominantly of intermediate age throughout and largely without a consistent recognisable layer of mature or young trees across the woodland, with few mature trees and only a localised area suggesting regeneration.
2. Wild, domestic, and feral herbivore damage	GOOD (3)	No evidence of excessive grazing or browsing pressure.
3. Invasive plant species	POOR (1)	Cherry laurel present. Other invasive species present, although less than 10% cover.
4. Number of native tree species	GOOD (3)	Greater than 5 native tree and shrub species occur
5. Cover of native tree and shrub species	GOOD (3)	>80% of canopy trees and >80% of shrubs considered to be native.
6. Open space within woodland	MODERATE (2)	Some open areas exist in some sections, between 21-40% at the lower end of this overall estimated.
7. Woodland regeneration	MODERATE (2)	Very occasional saplings noted, and no evidence of coppicing.
8. Tree health	GOOD (3)	Tree mortality not more than 10% and no particular evidence of pests, disease or dieback
9. Vegetation and ground flora	POOR (1)	No recognisable NVC community present
10. Woodland Vertical Structure	MODERATE (2)	Evidence of woodland layers are not present across whole woodland, with only some areas having more than one obvious layer.
11. Veteran trees	POOR (1)	No veteran trees present

Condition Assessment	Result	Description
12. Amount of deadwood	POOR (1)	There is limited evidence (less than 25%) of standing deadwood, large dead branches/stems and stumps.
13. Woodland disturbance	MODERATE (2)	Signs of nutrient are present but are not significant and less than 1ha of nutrient enrichment and less than 20% woodland area with damaged ground

- 3.22 The biodiversity units for each habitat on the site have been calculated and are presented in Table 4.

Table 4: Biodiversity Units: Existing On-Site Habitats

Habitat	Area (ha)	Condition	Biodiversity Units
Grassland: Other Neutral Grassland (g3c)	1.599	Moderate	14.71
Sparsely Vegetated Land: Ruderal/Ephemeral (secondary 17)	0.002	Moderate	0.01
Urban: Developed Land (u1b)	0.038	N/A - Other	0
Woodland and Forest: Other Woodland; broadleaved (w1g) (including tree lines and ditch)	4.011	Moderate	27.68
Total	5.65		42.40

Please note there may be minor discrepancies (rounding errors) between the columns and the totals, however, the numbers duplicate those presented within the matrix calculator.

4.0 PROPOSED DESIGN - POST – DEVELOPMENT VALUE

Retention & Enhancement

- 4.1 Habitat retention is illustrated in Figure 3.
- 4.2 Proposals have sought to retain boundary woodland habitat where possible, The retention of these areas will maintain established habitat corridors around peripheral areas, allowing continued connectivity and will be maintained in their current condition. The retention of these woodland areas include the mature tree lines and ditch within the woodlands.
- 4.3 Across the site 1.106ha of the existing broadleaved woodland will be retained. This area primarily comprises the area along the eastern boundary of the site beyond the rerouted footpath and along the northern boundary plus a small section west of the footpath in the far north-eastern corner that is retained to maintain a continuous belt of woodland habitat between the existing warehouse development to the north and the more extensive broadleaved woodland that extends away from the site to the south. This additional section will also link to a new woodland block detailed below. A second section of broadleaved woodland, will be retained in the southwest corner bordering the

road and will be connected to the other woodland areas on site via the contiguous belt of woodland off-site to the south.

Creation

- 4.4 Post development habitats are shown in Figures 4 and 5, with target notes to assist in clarity. In addition to the retention of woodland habitats, a small range of habitats will be created at the peripheries and close to development plots
- 4.5 The following section outlines the habitats to be created and enhanced and provides a summary of the conditions required for these scores within the metric. A separate management plan will provide additional details on long term management to achieve these goals.
- 4.6 The proposed onsite mitigation and their target conditions are presented in Table 5

Table 5: Biodiversity Units: On-site Habitat Creation

Proposed Habitat	Area (ha)	Target Condition	Biodiversity Units
Grassland: Modified Grassland	0.531	Moderate	2.12
Urban: Artificial Unvegetated, Unsealed Surface (footpath)	0.085	N/A - Other	0
Urban: Developed Land	3.819	N/A – Other	0
Urban: Urban Trees [not included in area calculations]	0.2686	Moderate	0.94
Woodland and Forest: Other Woodland; broadleaved	0.108	Moderate	0.58
Total	4.81		3.64

Please note, there may be minor discrepancies (rounding errors) between the columns and the totals; however, the numbers duplicate those presented within the matrix calculator

Grassland – Modified Grassland

- 4.7 Small areas of grassland habitat will be located along street frontages and surround the five commercial units to buffer the woodland habitats. Given the restricted nature of these areas and the expected management involving frequent mowing it is expected that these areas will be restricted to low distinctiveness modified grassland.
- 4.8 Achieving moderate condition in these areas is a realistic expectation given the expected management regime will limit the growth and spread of scrub, bramble, and bracken to below 20% of the grassland area in all cases. Furthermore, the land use of this site should not result in excessive physical damage to the grassland areas nor result in excessive amounts of bare ground being present on site.
- 4.9 However, it is unlikely that good condition could be achieved for these grassland areas due to the requirement of varied sward heights being incompatible with the expected management regime of

frequent mowing and the opportunity for undesirable species such as creeping thistle, common nettle, white clover, cow parsley and greater plantain to encroach on these areas thus resulting in cover above the 5% maximum threshold needed to pass the associated criterion.

- 4.10 Given the concerns about achieving good condition the calculations have assumed that the modified grassland in the proposals is of moderate condition only.

Woodland and Forest – Other Broadleaved Woodland

- 4.11 Woodland creation is planned for a single, 0.1063ha block to the rear of Unit 2 contiguous with the area of retained woodland to the west of the proposed footpath route where it will replace a section of the existing woodland that needs to be removed to facilitate the development proposals and will provide a buffer between the developed area and the existing ditch and its associated habitats to the north of the site.
- 4.12 This habitat is targeted for moderate condition. To achieve this, the planting scheme is to include a minimum of three to four native tree and shrub species across the woodland parcel and avoid the use of non-native species or horticultural cultivars wherever possible. Management will be required to maintain the woodland vertical structure and ensure the minimum requirements of 50% of both canopy trees and understorey shrubs are native species and tree mortality limited to under 25% are met. No artificial nutrient enrichment should be applied to the ground in this area.
- 4.13 The following criteria should be targeted by design and management:
- Weed control for at least the first three years to reduce competition for the planting saplings allowing them time to establish aiding canopy closure.
 - Removal of any rhododendron or laurel that colonises the woodland and other invasives restricted to less than 10% cover.
 - Thinning operation undertaken at 10 years to favour a climax community assemblage and allow shrub species to develop the understorey beneath the developing canopy.
 - Coppicing of suitable species on a rotational basis such as hazel, hawthorn and elder to ensure a diverse understorey and areas of temporary open space are present.
 - Timber created by thinning and coppicing will be cut to lengths and stacked to introduce dead wood habitats.

Urban – Developed Land with Sealed Surface

- 4.14 A significant proportion of the site area is planned as urban development to accommodate the five commercial units and the accompanying areas of hardstanding and road infrastructure. As this habitat type offers little in the way of opportunities for biodiversity its condition is not assessed and is deemed to provide zero biodiversity units.

Urban – Developed Land with Unsealed Surface

- 4.15 A narrow strip of unvegetated, unsealed artificial surface is planned for the re-routing of the current public track between its two existing access points in the northeast corner of the existing turning head and the area of retained woodland at the extreme north of the site.

- 4.16 This area is expected to closely resemble the existing walkway and consist of gravel-type material laid onto bare ground. Whilst permeable this area is expected to be frequently trodden and offer little chance for plant communities to establish and is therefore considered by the metric to offer zero biodiversity unit value.

Urban – Street Tree

- 4.17 The inclusion of 66 medium-sized street trees as screening for the development from the residential areas to the south and west will provide additional foraging and commuting habitat for mobile species, particularly urban bird species. The metric classes urban street trees as a low distinctiveness habitat but unlike previous metrics does not restrict condition assessments.
- 4.18 The planting scheme should be restricted to use only native species and allow more than half of them to reach at least two thirds of the typical mature height for the species such that they can be considered mature trees. In such circumstances it is reasonable that the street trees on this site would satisfy the criteria for moderate condition as all will be planted immediately adjacent to other vegetation courtesy of being part of the modified grassland areas or roadside verges as opposed to isolated in urban planters. By satisfying these three conditions this habitat would achieve moderate condition.

Habitat Trading

- 4.19 The habitats provided on site are appropriate to the local area and no high or very high distinctiveness habitats will be lost as part of the development.
- 4.20 34.75 units of medium distinctiveness habitats will be lost through the development consisting of
- Grassland – Other Neutral Grassland (14.71units)
 - Woodland and Forest – Other Broadleaved Woodland (20.04units)
- 4.21 The replanting of a section of the woodland lost during the construction phase will restore 0.58units of this habitat. This combined with the loss of the grassland results in a total net change in medium distinctiveness habitats of -34.17units.
- 4.22 The low distinctiveness ruderal/ephemeral vegetation is not being directly compensated for within the same broad habitat type. The provision of other forms of low distinctiveness habitat, namely the modified grassland and urban street trees, results in a +4.49unit change in low distinctiveness habitats under these proposals.
- 4.23 Overall, the habitat changes associated with the proposed development lead to an on-site net unit change of -31.12units to be made up through off-site mitigation.

Additional Enhancements outside the BNG metric

- 4.24 A number of measures which are not captured within the Natural England metric, primarily related to fauna will also be implemented, providing non-quantifiable biodiversity net gains at the Site as part of the Scheme, which will be of benefit to local wildlife using or with the potential to use the Site:
- Bat hop-over created across the breached boundary for the main site access from A6195

- Sensitive lighting scheme to ensure dark woodland edge habitats for foraging and commuting fauna, notably bats, and to avoid illumination of the potential tree roost within the single horse chestnut in the south of the Site
 - A range of bat boxes erected on suitable retained trees to enhance bat roosting habitat opportunities
 - Relaxed grassland management at woodland edges and particularly in the north and east to provide sheltering and foraging habitat for a range of fauna, but notably great crested newts
 - The inclusion of a species rich grassland mix, with a high proportion of seeding flowers to provide foraging habitat for birds, away from built areas, managed extensively. Whilst not contributing in any meaningful way to measurable net gains for grassland habitats, these will provide localised biodiversity value to bird species.
 - New planting to include fruit and berry bearing species as foraging for fauna including birds
 - A mix of nest box types with 26mm and 32mm hole and open front boxes placed within retained habitats
 - Creation of log piles and artificial hibernacula at south, east and west facing woodland edges to create new habitat opportunities for fauna including herpetofauna and saproxylic flora,
 - Inclusion of damp tolerant tree species in northern area near wet areas to encourage willow tit habitat
 - 26mm hole nest boxes filled with woodchips, set at low levels to attract nesting willow tits.
 - Woodland management suitable for enhancing willow tit habitat, including artificial creation of dead-wood
 - Boundary fencing to include gaps at bases of 15cm/15cm to allow for hedgehog movement
- 4.25 Details of these should be included within a Biodiversity Management Plan, or similar for the Site, secured by condition.

Off-site Compensation

- 4.26 A loss of biodiversity on this site is a given under these proposals due to the area of developed land required and the pre-existing habitats of a semi-natural nature mostly being lost with only the boundary habitats being retained or created. Therefore, no degree of creation or enhancement in the remaining areas would be sufficient to produce an overall net gain on site.
- 4.27 Accepting the above biodiversity loss on site would mandate that the unit deficit plus the further habitat units to achieve an overall gain for this development be delivered via off-site habitat creation and enhancement.
- 4.28 The values included in the net gain calculations are illustrative but typical of such schemes. Off-site habitat creation should be located inside the LPA or NCA or, failing that, be deemed sufficiently proximal to the site of the proposed development and offer a broadly similar range of habitats that satisfy the trading requirements of the metric. The “difficulty multiplier” within the metric applies penalties into the calculations, ensuring that if all appropriate management is implemented to achieve good condition, the potential difficulty associated with achieving this condition is already accounted for.

- 4.29 Woodland losses will be compensated for by enhancement of woodland within the client's control located at Barrow Colliery LWS, a part of the Dearne Valley Wetlands SSSI, currently supporting a large extent of woodland of moderate value. Calculations indicate that 6.5ha of this woodland would be required to be enhanced into good condition, which the Barrow Colliery LWS can more than sufficiently accommodate. Enhancements would include, targeting good condition where feasible to achieve at least 33 of 39 points:
- Improvement to age class of trees through strategic removal and planting
 - Continued exclusion of damage from wild and domestic herbivore damage via appropriate means
 - Monitoring and removal programme for any invasive species as appropriate
 - Maintenance and enhancement of native tree and scrub species diversity through removal and planting as necessary
 - Creation and management of open spaces, and other woodland management practices to ensure sufficient open space and enable successful regeneration
 - Monitoring of tree health and remediation measures to ensure tree mortality, die back and pest/disease levels are maintained as far as is ever feasibly practicable or foreseeable.
 - More diverse ground flora allowed to develop
 - Ongoing management to enhance woodland structure to develop better and discernible layers across woodland
 - Management and incorporation of dead wood into woodland as naturally arises
 - Continued management to ensure nutrient enrichment and disturbance levels remain low.
- 4.30 The above would be set out in a detailed management plan, including setting out the current condition of the woodland to be used, condition targets for each criterion and prescriptions and management to achieve these over the short, medium and long term to 30 years, with monitoring and remediation measures set out to ensure ongoing prescription and management can respond to any changes required to achieve desired condition for each criterion.
- 4.31 Barrow Colliery LWS is unsuitable for grassland habitat creation. Similar schemes using off-site contributions to achieve biodiversity net gain typically do so by creating habitats of the same type to those lost on land currently used for arable agriculture. A land-agent has been contacted to source suitable available habitat banking land in the borough which can be used for off-setting purposes to ensure the requisite gain can be achieved.
- 4.32 Using such a site to offset the biodiversity loss incurred as a result of this proposed development, 1.95ha of agricultural land for cereal crops would need to be available and in control of the client onto which a sufficient area of neutral grassland must be created to provide the required units to satisfy the trading requirements of the metric as discussed in Section 3.35-3.36 and will provide a +15.01 unit gain in this habitat type, again when targeting moderate condition. This is recommended to be achieved through the sowing of seed mix from a reputable source, ideally of local provenance, such as Emorsgate EM2 General Purpose Meadow Mixture or similar in accordance with the manufacturer's instructions. No artificial fertilizers should be used and ideally the ground consist of low nutrient subsoil. Management should target a variable sward height with multiple microclimates to provide opportunities for insects, birds and small mammals to live and

breed, the limiting of bracken to no more than 20% of the area and of scrub and bramble to no more than 5%, rye grass cover to a maximum of 25% of the grassland area on top of the removal of undesirable species and prevention of physical damage to the habitat through machinery use or damaging levels of public access.

- 4.33 Alternatively, financial contributions commensurate to the required units and net gain identified above could be made to enable delivery of the agreed biodiversity net gain. This could be to secure habitat creation and delivery on any suitable land known to the LPA which may contribute to local strategic objectives for biodiversity within the borough.
- 4.34 It is recommended that all off-site compensation required and the preferred approach to delivery is agreed with the LPA, following which full details of the delivery mechanism will be drawn up and submitted, for both land already in the control of the Harworth Group (Barrow Colliery) with other land to be secured and used/ financial contributions, via an agreed legal planning mechanism as part of the planning process. This will include the location, ownership and management responsibilities and terms for the land, alongside a comprehensive Biodiversity Management and Monitoring Plan, with clear objectives, targets and prescriptions as well monitoring and remediation processes for the habitat creation and management necessary to achieve the agreed biodiversity net gains within the delivery period.

5.0 BIODIVERSITY NET GAIN PRINCIPLES

- 5.1 The above assessment has been guided by the Biodiversity Good Practice Principles (CIRIA-CIEEM-IEMA, 2016). Table 6 lists all of the principles along with a description of how the principles has been applied to this assessment.

Table 6: Application of the Biodiversity Net Gain Principles to the Proposals

Principle	Indicators
Principle 1: Apply the Mitigation Hierarchy	Medium distinctiveness habitats have been retained wherever possible, with woodland retention along the northern and eastern boundaries.
Principle 2: Avoid losing biodiversity that cannot be offset by gains elsewhere	The proposals have sought to retain specific habitats of interest wherever possible within the context of the semi-natural nature of the whole site. These ensure a semi-natural corridor between habitats north and south maintains ecological connectivity in the local area .
Principle 3: Be inclusive and equitable	Preliminary biodiversity net gain calculations were provided during the design stage to inform the proposals and encourage retention of habitats where possible.
Principle 4: Address risks	The habitats recommended for creation include those that would be suitable for establishment at the Site and within the off-site compensation areas. The condition scores have been set at achievable levels, though management will ultimately strive to improve the condition scores above those stated above where possible.
Principle 5: Make a measurable Net Gain contribution	Given the nature of the site's baseline, an on-site measure bale net gain is not possible. The nature of

Principle	Indicators
Principle 6: Achieve the best outcomes for biodiversity	the losses has guided offsite habitat creation/enhancement proposals to ensure sufficient gains are provided, of the corresponding distinctiveness. Localised small scale enhancements will be integrated into the on-site scheme, benefitting local fauna, such as bird boxes, bat boxes and hibernacula and management practices. Off-site proposals will provide appropriate habitats for the local areas and species, including at the Barrow Colliery LWS/SSSI woodlands, above any existing management requirements for this area of the SSSI and which will contribute to the additional biodiversity value. .
Principle 7: Be additional	
Principle 8: Create a Net Gain legacy	Management plans produced for the proposals will ensure that the management is secured in the long-term to ensure that the target conditions can be achieved on and off site.
Principle 9: Optimise sustainability	The footpath through the green infrastructure will provide opportunities for employees and local residents to cross though the site outside the built area along side less formally managed habitats.
Principle 10: Be transparent	All assumptions have been set out within this report and its appendices to ensure that the information used to inform the calculations can be reviewed

6.0 CONCLUSIONS

- 6.1 The approach has been to minimise as far as is possible loss of habitats of at least medium distinctiveness, whilst it is acknowledged that this must be undertaken in the context of the majority of the site forming such semi-natural habitats, which will inevitably lead to losses. On site habitat creation has aimed to maximise biodiversity value with consideration to the requirements of the Nature Improvement Area.
- 6.2 Biodiversity offsetting has been used to inform the habitat creation and enhancement proposals for the scheme.
- 6.3 The results of the assessment demonstrate that the proposed scheme currently is unable to lead to the delivery of a total net gain in biodiversity for habitats on-site but with the inclusion of off-site habitat creation within the LPA or NIA, or proximally to the site of the development delivered directly by Harworth Group and/or via financial contributions these losses can be mitigated and an overall net gain for biodiversity for habitats can be delivered in line with local policy and NPPF.
- 6.4 To ensure that the benefits of the proposed habitat creation are maximised, in both the on-site and off-site parcels, it is recommended that a Biodiversity Management Plan be produced detailing habitat creation measures and long-term management prescriptions for the sites, secured by condition.

APPENDIX A: BOTANICAL SPECIES LISTSOther Neutral Grassland (g3c)

Common Name	Scientific Name	Frequency
Soft Rush	<i>Juncus effusus</i>	A
Yorkshire Fog	<i>Holcus lanatus</i>	A
Grey Willow	<i>Salix cinerea</i>	F
Pointed Spear Moss	<i>Callergon cuspidata</i>	F
Red Fescue	<i>Festuca rubra</i>	F
Sweet Vernal Grass	<i>Anthoxanthum odorata</i>	F
Common Bird's-foot Trefoil	<i>Lotus corniculatus</i>	LF
Common Couch	<i>Elytrigia repens</i>	LF
Common Reed	<i>Phragmites australis</i>	LF
Creeping Bent	<i>Agrostis stolonifera</i>	LF
Creeping Buttercup	<i>Ranunculus repens</i>	LF
Field Woodrush	<i>Luzula campestris</i>	LF
Glaucous Sedge	<i>Carex flacca</i>	LF
Lupin	<i>Lupinus sp.</i>	LF
Meadow Vetchling	<i>Lathyrus pratensis</i>	LF
Common Fleabane	<i>Pulicaria dysenterica</i>	O
Common Mouseear	<i>Cerastium holeostoides</i>	O
Common Vetch	<i>Vicia sativa</i>	O
Dandelion	<i>Taraxacum officinale</i>	O
Red Clover	<i>Trifolium pratense</i>	O
Ribwort Plantain	<i>Plantago lanceolata</i>	O
Smooth Meadow Grass	<i>Poa pratensis</i>	O
Alder	<i>Alnus glutinosa</i>	R
Cat's Ear	<i>Hypochaeris radicata</i>	R
Cock's-foot	<i>Dactylis glomerata</i>	R
Common Bent	<i>Agrostis tenuis</i>	R
Common Spike Rush	<i>Eleocharis palustre</i>	R
Crested Dog's Tail	<i>Cynosuarius cristatus</i>	R
Curled Leaf Dock	<i>Rumex crispus</i>	R
Cut-leaved Crane's-bill	<i>Geranium dissectum</i>	R
Downy Birch	<i>Betula pubescens</i>	R
Greater Plantain	<i>Plantago major</i>	R
Hard Rush	<i>Juncus inflexus</i>	R
Hogweed	<i>Heracleum spondylium</i>	R
Lesser Trefoil	<i>Trifolium dubium</i>	R
Marsh Bedstraw	<i>Galium palustre</i>	R
Meadow Foxtail	<i>Alopecurus pratensis</i>	R
Osier Grey Willow hybrid	<i>Salix viminalis x cinerea</i>	R
Oxeye Daisy	<i>Leucanethemum vulgare</i>	R
Perennial Rye Grass	<i>Lolium perenne</i>	R
Self-heal	<i>Prunella vulgaris</i>	R
Spear Thistle	<i>Cirsium vulgare</i>	R
Ragwort	<i>Senecio jacobea</i>	R
Wavy Hair Grass	<i>Deschampsia caespitosa</i>	R
White Clover	<i>Trifolium repens</i>	R

Ruderal / Ephemeral Vegetation (secondary 17)

Common Name	Scientific Name	Frequency
Bramble	<i>Rubus fruticosus</i>	LF
Common Nettle	<i>Urtica dioica</i>	LF
Charlock	<i>Sinapsis arvensis</i>	O
Cleavers	<i>Galium aparine</i>	O
Cow Parsley	<i>Anthriscus sylvestris</i>	O
Rough Meadow Grass	<i>Poa trivialis</i>	O
Alder	<i>Alnus glutinosa</i>	R
Common Daisy	<i>Bellis perennis</i>	R
Creeping Bent	<i>Agrostis capillaris</i>	R
Creeping Thistle	<i>Cirsium arvense</i>	R
Dandelion	<i>Taraxacum officinale</i>	R
Field Mustard	<i>Brassica rapa</i>	R
Groundsel	<i>Senecio vulgaris</i>	R
Hairy Buttercress	<i>Cardamine hirsute</i>	R
Hemlock	<i>Conium maculatum</i>	R
Imperforate St John's Wort	<i>Hypericum imperforate</i>	R
Red Deadnettle	<i>Lamium purpureum</i>	R
Ribwort Plantain	<i>Plantago lanceolata</i>	R

Other Broadleaved Woodland (w1g)

Common Name	Scientific Name	Frequency
Yorkshire Fog	<i>Holcus lanatus</i>	A
Grey Willow	<i>Salix cinerea</i>	F
Silver Birch	<i>Betula pendula</i>	F
Alder	<i>Alnus glutinosa</i>	LF
Bramble	<i>Rubus fruticosus</i>	LF
Common Nettle	<i>Urtica dioica</i>	LF
Cowslip	<i>Primula veris</i>	LF
Creeping Buttercup	<i>Ranunculus repens</i>	LF
Hybrid Black Poplar	<i>Populus canadensis</i>	LF
Wych Elm	<i>Ulmus glabra</i>	LF
Cock's-foot	<i>Dactylis glomerata</i>	O
Common Bird's-foot Trefoil	<i>Lotus corniculatus</i>	O
Common Vetch	<i>Vicia sativa</i>	O
Dog Rose	<i>Rosa canina</i>	O
Downy Birch	<i>Betula pubescens</i>	O
Goat Willow	<i>Salix caprea</i>	O
Hawthorn	<i>Crataegus monogyna</i>	O
Lodge Pole	<i>Pinus contorta</i>	O
White Poplar	<i>Populus alba</i>	O
Ash	<i>Fraxinus excelsior</i>	R
Apple	<i>Malus sp.</i>	R
Bee Orchid	<i>Ophrys apifera</i>	R
Blackthorn	<i>Prunus spinosa</i>	R
Bladder Senna	<i>Colutea arborescens</i>	R
Box	<i>Buxus sempervirens</i>	R
Broad Buckler Fern	<i>Dryopteris dilatata</i>	R
Broadleaved Dock	<i>Rumex obtusifolius</i>	R

Broom	<i>Cytisus scoparius</i>	R
Cherry Laurel	<i>Prunus laurocerasus</i>	R
Cleavers	<i>Galium aparine</i>	R
Colt's-foot	<i>Tussilgao farfara</i>	R
Common Daisy	<i>Bellis perennis</i>	R
Common Male Fern	<i>Dryopteris filix-mas</i>	R
Common Ragwort	<i>Senecio jacobea</i>	R
Common Tansy	<i>Tanacetum vulgare</i>	R
Cow Parsley	<i>Anthriscus sylvestris</i>	R
Creeping Thistle	<i>Cirsium arvense</i>	R
Daffodil	<i>Narcissus sp.</i>	R
Dandelion	<i>Taraxacum officinale</i>	R
English Oak	<i>Quercus robur</i>	R
Evergreen Spindle	<i>Euonymus japonica</i>	R
Field Maple	<i>Acer campestre</i>	R
Field Woodrush	<i>Luzula campestris</i>	R
Foxglove	<i>Digitalis purpurea</i>	R
Hairy Buttercress	<i>Cardamine hirsute</i>	R
Hazel	<i>Corylus avellana</i>	R
Hogweed	<i>Heracleum spondylium</i>	R
Horse Chestnut	<i>Aesculus hippocastanum</i>	R
Ivy	<i>Hedera helix</i>	R
Japanese Rosa	<i>Kerria japonica</i>	R
Laburnum	<i>Laburnum anagyroides</i>	R
Lilac	<i>Syringia vulgaris</i>	R
Lime	<i>Tilia sp.</i>	R
Lupin	<i>Lupinus sp.</i>	R
Meadow Vetchling	<i>Lathyrus pratensis</i>	R
Perennial Rye Grass	<i>Lolium perenne</i>	R
Purple Filibert	<i>Corylus maxima purpurea</i>	R
Red Clover	<i>Trifolium pratense</i>	R
Red Fescue	<i>Festuca rubra</i>	R
Ribwort Plantain	<i>Plantago lanceolata</i>	R
Rosebay Willowherb	<i>Chamaenerion angustifolia</i>	R
Rowan	<i>Sorbus aucuparia</i>	R
Scot's Pine	<i>Pinus sylvestris</i>	R
Sea Buckthorn	<i>Hippophae rhamnoides</i>	R
Soft rush	<i>Juncus effusus</i>	R
Spanish Bluebell	<i>Hyacinthoides var hispanica</i>	R
Sycamore	<i>Acer pseudoplatanus</i>	R
Swedish Whitebeam	<i>Sorbus intermedia</i>	R
Sweet Vernal Grass	<i>Anthoxanthum odorata</i>	R
Tutsan	<i>Hypericum androsaeum</i>	R
Wilson's Honeysuckle	<i>Lonicera nitida</i>	R
Common Feather Moss	<i>Kindbergia praelongia</i>	X
Common Tamarisk Moss	<i>Thuidium tamariscium</i>	X
Pointed Spear Moss	<i>Callergon cuspidate</i>	X
Springy Turf Moss	<i>Rhytidadelphus squarrous</i>	X

Appendix B: DEFRA metric calculations