wsp

HAWESWATER AQUEDUCT RESILIENCE PROGRAMME

Bowland Section - Biodiversity Net Gain Assessment, Habitat Compensation: Ribble Valley Borough Council

wsp

United Utilities

HAWESWATER AQUEDUCT RESILIENCE PROGRAMME

Bowland Section - Biodiversity Net Gain Assessment, Habitat Compensation: Ribble Valley Borough Council

TYPE OF DOCUMENT (VERSION) PUBLIC

PROJECT NO. 70074191
OUR REF. NO. RVBC-BO-APP-008_02

DATE: FEBRUARY 2022

wsp

United Utilities

HAWESWATER AQUEDUCT RESILIENCE PROGRAMME

Bowland Section - Biodiversity Net Gain Assessment, Habitat Compensation: Ribble Valley Borough Council

WSP

8 First Street
Manchester
M15 4RP

Phone: +44 161 200 5000

WSP.com

QUALITY CONTROL

Issue/revision	First issue	Revision 1	Revision 2	Revision 3
Remarks	First Issue	Second Issue		
Date	June 2021	February 2022		
Prepared by	Luke Roberts	Sophie Trigg		
Signature				
Checked by	Hannah Williams	Luke Roberts		
Signature				
Authorised by	Tom Butterworth	Joe Gough		
Signature				
Project number	70074191	70074191		
Report number	RVBC-MH--APP-008_02	RVBC-MH--APP-008_02		
File reference	\\uk.wspgroup.com\central data\Projects\700741xx\70074191 - United Utilities - HARP BNG Offsetting\03 WIP\EC Ecology\05 Reports\Planning reports\RVBC-MH-APP-008_02 BNG Habitat Compensation			

CONTENTS

HAWESWATER AQUEDUCT RESILIENCE PROGRAMME
Project No.: 70074191 | Our Ref No.: RVBC-BO-APP-008_02
United Utilities

PUBLIC | WSP
February 2022
Page **1** of 21

WSP

TABLES

FIGURES

APPENDICES

APPENDIX A

OUTLINE LONG TERM HABITAT MANAGEMENT PLAN

APPENDIX B

BOTANICAL SURVEY REPORT

HAWESWATER AQUEDUCT RESILIENCE PROGRAMME
Project No.: 70074191 | Our Ref No.: RVBC-BO-APP-008_02
United Utilities

PUBLIC | WSP
February 2022
Page **2** of 21

APPENDIX C

METHODOLOGY FOR THE CALCULATION OF RIVER BIODIVERSITY UNITS

HAWESWATER AQUEDUCT RESILIENCE PROGRAMME
Project No.: 70074191 | Our Ref No.: RVBC-BO-APP-008_02
United Utilities

PUBLIC | WSP
February 2022
Page **3** of 21

1 INTRODUCTION

1.1 PROJECT BACKGROUND

1.1.1. United Utilities are proposing a project known as Haweswater Aqueduct Resilience Project ('*the Proposed Programme of Works*).

1.1.2. There are six Tunnel Routes (TR) to the Proposed Programme of Works, known as TR1 to TR6. These traverse seven Local Planning Authorities (LPAs). A total of five Environment Statements are being produced, with some being submitted to more than one Local Planning Authority (LPA), with a total of nine planning applications being submitted.

1.1.3. Biodiversity Net Gain (BNG) is the result of a process applied to development so that overall, there is a positive outcome for biodiversity. The process itself follows the mitigation hierarchy, which sets out that everything possible must be done to firstly avoid, secondly minimise and thirdly restore / rehabilitate losses of biodiversity on-site. Only as a last resort, residual losses are compensated for using biodiversity offsets, which are distinguished from other forms of mitigation in that they are off the development site. BNG assessment reports are intended to provide a detailed insight into the adherence of a proposed development to the BNG Good Practice Principles for Development (CIRIA, CIEEM and IEMA, 2016) (hereafter, 'the Good Practice Principles').

1.1.4. To inform the planning applications for the Proposed Programme of Works, BNG assessments are being completed for each Planning application and LPA. *The Environment Partnership Ltd* ('TEP') have completed BNG assessments that consider the effects of habitat clearance and post development reinstatement of habitats. In addition, *Ricardo Ltd* have undertaken assessments considering riparian habitats. These assessments are hereafter referred to as '*the On-site BNG Assessment(s)'.*

1.1.5. WSP UK Ltd ('WSP') have been commissioned to support the assessment and delivery of proposals for habitat compensation. These include sites within and outside of the Proposed Programme of Works' Red Line Boundary (RLB, hereafter 'the Site'), where additional habitat creation and/ or enhancements are proposed, beyond simple reinstatement. These sites are hereafter referred to as 'Habitat Creation Site(s)'. It should be noted that some Habitat Creation Sites account for losses from more than one application. In this instance, this is clearly identified and proposals are made such that double counting of biodiversity units is avoided.

1.1.6. For each LPA area, one Biodiversity Metric 3.0 Calculation Tool (Natural England, 2019) has been completed, detailing the overall outcome of the BNG assessments in the LPA Area. In the First Issue of this report, assessments were based on the Biodiversity Metric 2.0 Calculation Tool.

1.2 SCOPE OF REPORT

1.2.1. The TR3 Bowland section of the Proposed Programme of Works includes land within both Ribble Valley Borough Council and Lancaster City Council LPA areas. This report considers the land occurring within the Ribble Valley Brough Council area only. The following information is set out within this report:

¡ A summary of the outcome of the On-site BNG Assessment.

HAWESWATER AQUEDUCT RESILIENCE PROGRAMME
Project No.: 70074191 | Our Ref No.: RVBC-BO-APP-008_02
United Utilities

PUBLIC | WSP
February 2022
Page **4** of 21

- Identification of an area with the Ribble Valley District Council area where habitat compensation[1] is proposed.
- A description of baseline habitat types at the Habitat Creation Site, including assumptions made with respect to habitat type, condition, distinctiveness, and strategic significance.
- Digitised mapping presenting the existing baseline conditions at the Habitat Creation Site.
- Details, supported by digitised mapping, of the proposed habitat creation and enhancements at the Habitat Creation Site, and the associated quantitative BNG outcome predicted. Reference is made to the associated, completed Biodiversity Metric 3.0 Calculation Tool.
- Commentary regarding the allocation of Biodiversity Units at the Habitat Creation Site to different planning applications[2].
- Commentary regarding adherence of the assessments to the BNG Good Practice Principles.
- **Appendix A** presents an outline long term habitat management plan for the Habitat Creation Site.

1.2.2.   This report presents an update to the First Issue of this report which presented an assessment based on the Biodiversity Metric 2.0 Calculation Tool. In addition, botanical surveys have been undertaken at the Habitat Creation Site to inform the assessment (see **Appendix B**).

---

[1] Including both enhancement of existing habitats and creation of new ones.
[2] As set out in Section 2.3.6, the Habitat Creation Site is also proposed to offset effects arising from the TR4 Marl Hill section of the Proposed Programme (report ref RVDC-MH-008_02)

HAWESWATER AQUEDUCT RESILIENCE PROGRAMME
Project No.: 70074191 | Our Ref No.: RVBC-BO-APP-008_02
United Utilities

PUBLIC | WSP
February 2022
Page **5** of 21

2 METHODS

2.1 REVIEW OF ON-SITE BNG ASSESSMENTS

2.1.1. The baseline BNG assessments were reviewed to inform the development of a habitat creation and enhancement strategy for the Habitat Creation Site. This included Tabs A-1, A-2, B-1, B-2, C-1 and C-2 of the Biodiversity Metric 3.0 Calculation Tool and accompanying reports (report reference RVBC-BO-APP-008_01; **Appendix C**).

2.1.2. The outcome of this review was used to devise an appropriate habitat creation/ enhancement strategy that aims to adhere to the Good Practice Principles. Particular regard was given to Principle 6 (achieve the best outcomes for biodiversity), and proposals for compensation are made that are ecologically appropriate and of an equivalent or better distinctiveness and / or condition. Compensation measures must also be ecologically appropriate, for example by supporting the same community of species. The habitat creation/ enhancement strategy was informed also by assessment of existing baseline conditions at the Habitat Creation Site (see Section 2.3).

2.2 HABITAT CREATION SITE

2.2.1. United Utilities in collaboration with WSP, reviewed their land holdings to identify suitable Habitat Creation Sites. In line with the Good Practice Principles, effort was made to identify sites as local as possible to the biodiversity losses and where it would be possible to secure long term benefits.

2.3 BNG ASSESSMENT OF HABITAT CREATON SITE

BASELINE CONDITIONS

2.3.1. This Habitat Creation Site (see **Figure 1**) was overlaid with Natural England's Ancient Woodland Inventory dataset to identify presence of irreplaceable habitat. Statutory designated sites for nature conservation were identified by overlaying publicly available Open-Source Natural England datasets with the boundary.

2.3.2. The Habitat Creation Site occurs within and adjacent to the Site (i.e. the Proposed Scheme RLB).

2.3.3. For those areas occurring within the Site, baseline conditions are derived from and considered by the on-site BNG assessment (BMBC-HW-APP-008_01).

2.3.4. For those areas outside of the RLB, baseline conditions are based on a botanical survey including condition assessment conducted by WSP in June 2021 (WSP, 2021; see **Appendix B**). The distribution of habitats in these areas is displayed on **Figure 2** in UKHab (UK Habitat Classification Working Group, 2020) typology.

2.3.5. Additional sites where habitat compensation may be possible were also identified. These sites were subject to an initial feasibility assessment including review of freely available data and satellite imagery.

BNG ASSESSMENT

2.3.6. A BNG assessment of the Habitat Creation Site was undertaken in accordance with good practice guidance (CIEEM, IEMA & CIRIA, 2016 & 2019 and Natural England, 2021). This involves quantifying baseline and post development habitat type, condition, and strategic significance.

HAWESWATER AQUEDUCT RESILIENCE PROGRAMME
Project No.: 70074191 | Our Ref No.: RVBC-BO-APP-008_02
United Utilities

PUBLIC | WSP
February 2022
Page **6** of 21

2.3.7. Relevant tabs of the Biodiversity Metric 3.0 Calculation Tool were completed as follows, with comments left in the assessor's comments box to identify the information input by WSP:

¡ For areas of the Habitat Creation within the Site (i.e. the TR3 RLB), data was input to Tabs A-2 and B-2. For areas outside of the Site (i.e. outwith the TR3 RLB), tabs D-1, D-2, D-3, E1 and E2 were completed.

¡ River data for the Habitat Creation Site was inputted into Tabs F-1 and F-3 by Ricardo Ltd (**Appendix C**).

¡ In Tab A2, data was added to rows 54 to 60 and deducted from rows 12, 14, 16, 18, 20, 21, 22, 24, 25, 26 and 35 as habitats had already been entered as reinstated as per the On-site BNG Assessment. Data added or entered by WSP in Tab A-2 has been labelled in the assessors comments box.

¡ The habitat creation strategy includes Very High distinctiveness habitats which are excluded from calculations. Therefore, these were entered as 'Urban – Developed land; sealed surface' to ensure habitat areas balance but that Habitat Units were not accrued.

2.3.8. A plan in UKHab typology was produced to outline a proposed distribution of habitats at the Habitat Creation Site (see **Figure 3**).

2.3.9. The Habitat Creation Site considered in this report (Land at Newton-in-Bowland, see Section 3.2) is also currently proposed to offset effects relating to the TR4 Marl Hill planning application (see report RVBC-MH-APP-008_02). Proposals for habitat creation/ enhancement have been made such that offsets for both applications are accounted for. Two Biodiversity Metric 3.0 Calculation Tools have been produced for these applications that split the proposed enhancement and creation measures, with the habitat creation/ enhancement proposed for one application treated as retained in the other Biodiversity Metric 3.0 Calculation Tool.

2.3.10. An overall quantitative BNG result is presented for the TR3 Bowland planning application, factoring in the On-site BNG Assessment and Habitat Creation Site BNG assessments. The results were categorised as achieving Net Loss (NL), No Net Loss (NNL) or Net Gain (NG). The quantitative outcome awarded will be dependent on the residual change in Habitat Units (HU) or Hedgerow Units (HeU).

2.3.11. Commentary is also provided with respect to adherence of the Habitat Creation Site BNG Assessment to the Good Practice Principles; limited to the aspects relevant to the Habitat Creation Site.

2.4 ASSUMPTIONS AND LIMITATIONS

2.4.1. This report details the Habitat Creation Site BNG assessment only and should be read in conjunction with the On-site BNG Assessment (report number RVBC-BO-APP-008_01).

2.4.2. **Appendix B** presents a botanical survey report that informed assessment of baseline conditions of those areas of the Habitat Creation Site located outside of the Site. No significant limitations were noted to this survey.

2.4.3. In October 2021, an additional field was purchased for use within the within the Newton in Bowland Habitat Creation Site. This purchase was subsequent to the botanical survey undertaken in June 2021. The condition for this grassland was assumed based on knowledge of the surrounding grasslands during the botanical survey and the professional judgement of an experienced ecologist with a history of undertaking similar assessments.

HAWESWATER AQUEDUCT RESILIENCE PROGRAMME
Project No.: 70074191 | Our Ref No.: RVBC-BO-APP-008_02
United Utilities

PUBLIC | WSP
February 2022
Page **7** of 21

2.4.4.   Two areas of modified and other neutral grassland were present to the south of the river within the Habitat Creation Site. Due to inaccessibility to this area, their condition was assumed based on knowledge of the grasslands within the rest of the site.

2.4.5.   Strategic significance was assigned into the category 'Area/ compensation not in local strategy/ no local strategy' on a precautionary basis.

2.4.6.   The post development plan (**Figure 3**) has been devised to outline proposals for habitat creation. An accompanying outline long term habitat management plan has been produced (**Appendix A**) providing an overview of intended creation and management methods, which will be developed as detailed proposals for the Habitat Creation Site emerge (e.g. landscape planting plans).

2.4.7.   It has been assumed that habitats in the Habitat Creation Site will reach good condition, based on the implementation of the outline long term habitat management plan (**Appendix A**).

2.4.8.   Due to uncertainty in project programme at the time of writing, it is assumed that there will be no temporal advance or delay in habitat creation works.

3 RESULTS

3.1 REVIEW OF ON-SITE BNG ASSESSEMENT

3.1.1. The On-site BNG Assessment for TR3 Bowland, Ribble Valley Borough Council is summarised in **Table 3-1**. This is based on the reinstatement of baseline habitats of equivalent or better distinctiveness and condition and represents the quantitative BNG result prior to the inclusion of habitat creation and enhancement measures described in this report.

Table 3-1 – TR4 Marl Hill, Ribble Valley Borough Council: On-site BNG Assessment Summary Results

Biodiversity Units	Baseline Value	Post-development Value	Change in Units	Percentage Outcome
Habitat-based	128.60	115.22	-13.38	-10.40%
Hedgerow	21.42	13.58	-7.84	-36.60%
River	13.54	13.18	-0.36	-2.63%

3.1.2. The On-site BNG Assessment identifies the loss of 0.63ha of 'fens (upland and lowland)' between good and moderate condition and 0.04ha of 'purple moor grass and rush pastures' between poor and moderate condition. These habitats are very high distinctiveness habitats (and priority habitats/ Habitats of Principal Importance, HPI), and therefore in accordance with good practice guidance are excluded from BNG calculations. Bespoke compensation measures are required for such habitats; it has been agreed with the Local Planning Authority that a compensation ratio of 4:1 is the aim for these habitats.

3.1.3. In addition, as detailed in **Table 3-2** below, high distinctiveness priority habitat is present. These habitats require like for like compensation in area and biodiversity units.

Table 3-2 - TR3 Bowland, Ribble Valley Borough Council: On-site Priority Habitats

Priority Habitat Type	Baseline Area (ha) / Units	On-site Restoration Area (ha) / Units	Offsite Area / Units Required
Upland heathland	0.01 / 0.14	0.01 / 0.05	0.00 / 0.09

3.1.4. Other habitats identified are of between very low and medium distinctiveness. They include UKHab types 'other neutral grassland' and 'other woodland; broadleaved'. Accordingly, habitat compensation measures will need to consist of habitats of the same or higher distinctiveness. Compensation measures must also be ecologically appropriate, for example by supporting the same community of species.

3.2 HABITAT CREATION SITE

3.2.1. Habitat compensation will be provided at the following site:

HAWESWATER AQUEDUCT RESILIENCE PROGRAMME
Project No.: 70074191 | Our Ref No.: RVBC-BO-APP-008_02
United Utilities

PUBLIC | WSP
February 2022
Page **9** of 21

¡   Land at Newton-in-Bowland, BB7 3ED. Grid Reference: SD 6961 4998

3.2.2.   The boundary of this site is set out in **Figure 1**. It is 22.51ha in size. The Habitat Creation Site is located within the Ribble Valley LPA area, and 6.62ha of it overlaps with the TR3 Bowland section of the Site. A total of 1.9ha of the Habitat Creation Site comprises the River Ribble and is not included within the area-based assessment. Of this 1.9ha, 1.83ha is located outside of the TR3 RLB, and 0.07ha is located inside the TR3 RLB.

ADDITIONAL SITES

3.2.3.   A further two sites with UU landholding have been identified as potentially suitable and available for the provision of habitat compensation, pending further assessment. These are:

¡   Land at Stocks Reservoir (**Figure 4**). It is approximately 4.12ha in size and the central grid reference is SD 72523 57133. It is located 5.6km from the TR3 Section of the Site. There is currently no habitat data available for this site, however, aerial imagery appears to show an area of woodland, with the rest of the site consisting of grassland habitat. A small area of deciduous woodland HPI borders the site boundary to the north-west and an area of Lowland fen HPI is located 55m north of the site boundary. The River Hodder runs along the north and east boundaries of the site boundary

¡   Gamble Hole Farm (**Figure 5**) is approximately 6.67ha in size and the central grid reference is SD 68800 50400. This land has been subject to botanical survey (See **Appendix D** for further habitat information) and has been identified as a Site of Biological Importance (SBI). It is adjacent to the Newton in Bowland Habitat Creation Site, located within the TR3 Section of the Site. The HPI habitat lowland fen has been identified within the site boundary and previous botanical survey data indicates that the remainder of the site consists of modified grassland and a watercourse running along the south-west boundary.

3.2.4.   Further discussion with regards to these sites is provided in in Section 3.4 (qualitative outcome) and Section 4 (conclusions).

3.3   BNG ASSESSMENT OF HABITAT CREATION SITE

BASELINE CONDITIONS

3.3.1.   A figure showing the habitats within the Habitat Creation Site is included in **Figure 2**.

3.3.2.   There are no internationally or nationally designated sites for nature conservation within the Habitat Creation Site. There are no HPI as recorded in the Priority Habitat Inventory within the Habitat Creation Site.

3.3.3.   **Table 3-3** and **Table 3-4** summarise the baseline conditions at the Habitat Creation Site. This is also detailed in the Biodiversity Metric 3.0 Calculation Tool (Tabs D-1 and E-1).

3.3.4.   These figures exclude 6.62ha that occurs within the TR3 Site boundary. This area is assumed to be cleared as part of the Proposed Programme of Works. Rivers and Streams (comprising the River Ribble), of 1.83ha, is also excluded.

Table 3-3 –Habitat Creation Site – Baseline Biodiversity Units

Habitat type	Distinctiveness	Condition	Area total (ha)	Area excluded - meadow creation/ fen creation	Area included	Total habitat units included
Grassland – Other neutral grassland	Medium	Poor	8.52	1.28	7.24	28.96
Grassland – Other neutral grassland	Medium	Moderate	0.46	N/A	0.46	3.68
Grassland – Modified grassland	Low	Good	5.08	2.60	2.47	14.82
Totals			**14.06**	**3.88**	**10.17**	**47.46**

Table 3-4 –Habitat Creation Site – Baseline Hedgerow Units

Hedgerow Type	Distinctiveness	Length (km)	Condition	Hedgerow Units
Native hedgerow	Low	0.28	Moderate	1.12
Native hedgerow	Low	0.35	Poor	0.70
Line of trees	Low	0.64	Moderate	2.56
Line of trees	Low	0.15	Poor	0.30
Totals		**1.42**		**4.68**

POST DEVELOPMENT BIODIVERSITY

3.3.5.　A figure showing the proposed habitats within the Habitat Creation Site is included in **Figure 3**.

3.3.6.　**Table 3-5** and **Table 3-6** below details the habitat creation and enhancement within the Habitat Creation Site, inclusive of those allocated to the TR4 Marl Hill application (report reference RVBC-MH-APP-008_02). The final column details area/ units allocated specifically to the TR3 Bowland application, which when added to the area/ units detailed in RVBC-MH-APP-008_02 account for the total. Where the value is zero, this indicates all units are allocated to the TR4 Marl Hill application.

HAWESWATER AQUEDUCT RESILIENCE PROGRAMME
Project No.: 70074191 | Our Ref No.: RVBC-BO-APP-008_02
United Utilities

PUBLIC | WSP
February 2022
Page **11** of 21

Table 3-5 –Habitat Creation Site – Post-Development Habitat Units

Habitats	Location	Distinctive ness	Treatment[3]	Condition	Total Area (ha)/ Habitat Units	Bowland/ Allocated Area (ha)/ Habitat Units
Grassland – Other neutral grassland[4]	Outside TR3 RLB	Medium	Enhanced	Good	5.63/ 50.90	0.45/ 4.86
Heathland and scrub – Mixed scrub	Outside TR3 RLB	Medium	Created	Good	2.60/ 21.85	2.11/ 17.73
Woodland and forest – Other woodland; broadleaved	Outside TR3 RLB	Medium	Created	Good	1.90/ 7.29	1.14/ 4.37
Lakes – Temporary lakes, ponds and pools	Outside TR3 RLB	High	Created	Good	0.04/ 0.40	0.00/ 0.00
River Ribble	Outside TR3 RLB	N/A	Excluded	N/A	1.83/ 0.00	0.00/ N/A
Wetland – Fens (upland and lowland)	Outside TR3 RLB	Very high	Bespoke compensation[5]	N/A	1.28/ N/A	1.28/ N/A
Grassland – Lowland hay meadows	Outside TR3 RLB	Very high	Bespoke compensation[6]	N/A	2.60/ N/A	0.00/ N/A
Grassland – Other neutral grassland	Inside TR3 RLB	Medium	Created	Good	3.96/ 33.28	3.96/ 33.28
Lakes – Temporary lakes, ponds and pools	Inside TR3 RLB	High	Created	Good	0.10/ 1.01	0.10/ 1.01
Heathland and shrub – Mixed scrub	Inside TR3 RLB	Medium	Created	Good	1.04/ 8.74	1.04/ 8.74

---

[3] Note that if none of the creation/ enhancement is allocated to TR3 Bowland, it is treated as retained in the accompanying Biodiversity Metric 3.0 Calculation
[4] Enhanced 'Grassland – Other neutral grassland' is summarised here. 4.41ha of this is enhanced from Poor or Moderate condition 'Grassland – Other neutral grassland'. The remaining 1.22ha is enhanced from poor quality 'Grassland – Modified grassland'.
[5] Created on other neutral grassland. Excluded from toolkit.
[6] Created on modified grassland. Excluded from toolkit.

HAWESWATER AQUEDUCT RESILIENCE PROGRAMME
Project No.: 70074191 | Our Ref No.: RVBC-BO-APP-008_02
United Utilities

PUBLIC | WSP
February 2022
Page **12** of 21

Habitats	Location	Distinctive ness	Treatment[3]	Condition	Total Area (ha)/ Habitat Units	Bowland/ Allocated Area (ha)/ Habitat Units
Woodland and forest – Other woodland; broadleaved	Inside TR3 RLB	Medium	Created	Good	0.66/ 2.53	0.66/ 2.53
Urban – Developed land; sealed surface	Inside TR3 RLB	Very low	Created	N/A	0.14/ 0.00	0.14/ 0.00
Urban – vacant/ derelict land/ bare ground	Inside TR3 RLB	Very low	Created	Moderate	0.04/ 0.14	0.04/ 0.14
River Ribble	Outside TR3 RLB	N/A	Excluded	N/A	0.07/ N/A	0.00/ N/A
Wetland – Fens (upland and lowland)	Inside TR3 RLB	Very high	Bespoke compensation[7]	N/A	0.61/ N/A	0.61/ N/A
Grand total	**N/A**	**N/A**	**N/A**	**N/A**	**22.50[8]/ 126.14**	**9.64/ 72.66**

Table 3-6 –Habitat Creation Site – Post Development Hedgerow Units

Hedgerow Type	Location	Distinctive-ness	Treatment[9]	Condition	Total Length (km)/ Hedgerow Units	Bowland Allocated Length/ Hedgerow Units
Native species rich hedgerow	Outside TR3 RLB	Medium	Created	Good	0.95/ 7.43	0.46/ 3.60
Native hedgerow	Outside TR3 RLB	Low	Enhanced	Good	0.63/ 3.54	0.00/ 0.00
Line of trees	Outside TR3 RLB	Low	Enhanced	Moderate	0.15/ 0.45	0.00/ 0.00
Line of trees	Outside TR3 RLB	Low	Retained	Moderate	0.64/ 2.56	0.00/ 0.00

---

[7] Created on 0.39ha modified grassland and 0.22ha of other neutral grassland. Excluded from toolkit.
[8] 16.11ha when very high distinctiveness habitats and the river are excluded.
[9] Note that creation has all been allocated to TR4 Marl Hill and is therefore treated as retained within the Biodiversity Metric 2.0 calculation tool

HAWESWATER AQUEDUCT RESILIENCE PROGRAMME
Project No.: 70074191 | Our Ref No.: RVBC-BO-APP-008_02
United Utilities

PUBLIC | WSP
February 2022
Page **13** of 21

Hedgerow Type	Location	Distinctive-ness	Treatment[9]	Condition	Total Length (km)/ Hedgerow Units	Bowland Allocated Length/ Hedgerow Units
Native species rich hedgerow	Inside TR3 RLB	Medium	Created	Good	0.59/ 5.31	0.59/ 5.31
Totals					**2.96/ 19.29**	**1.05/ 8.91**

FUTURE MANAGEMENT

3.3.7. An outline long term habitat management plan is included within **Appendix A** providing details on proposed management methods for the created and enhanced habitats.

3.4 OVERALL BIODIVERSITY NET GAIN OUTCOME

QUANTITATIVE OUTCOME

As detailed in the Biodiversity Metric 3.0 Calculation Tool, when considering the Habitat Creation Site, the following outcome is achieved within the LPA area (

Table 3-7).

Table 3-7 – Summary of Quantitative Results

Biodiversity Units	On-site Value Pre/ Post Development	Off-site Value Pre/ Post Development	Change in Units	Percentage Outcome
Habitat units	128.60/ 145.69	47.46/ 57.83	+27.46	+21.35%
Hedgerow units	21.42/ 18.89	4.68/ 8.28	+1.07	+5.00%
River units	13.54/ 13.18	21.93/ 23.62	+1.33	+9.82%

3.4.1. Very high distinctiveness (VHD) habitats are excluded from BNG calculations, and instead a replacement ratio of 4 to 1 has been targeted. A total of 0.63ha of 'fens (upland and lowland)' and 0.04ha of 'grassland – purple moor grass and rush pasture' is to be lost by the Proposed Programme of Works.

3.4.2. The proposed compensation for this habitat loss includes the creation of 1.89ha[10] of fens (upland and lowland) and 0.04ha[11] of purple moor grass and rush pastures. In order for a 4:1 replacement ratio, at least 2.52ha of 'fens (upland and lowland)' and 0.16ha of 'grassland – purple moor grass and rush pasture' would be required to be provided.

---

[10] The 1.89ha of fen creation forms part of the Off-site Habitat Creation Site assessment.
[11] The 0.04ha of purple moor grass and rush pasture creation forms part of the On-site BNG assessment.

HAWESWATER AQUEDUCT RESILIENCE PROGRAMME
Project No.: 70074191 | Our Ref No.: RVBC-BO-APP-008_02
United Utilities

PUBLIC | WSP
February 2022
Page **14** of 21

3.4.3. Therefore, a further 0.63ha of 'fens – upland and lowland' compensation is still required in addition to the 1.89ha currently proposed. Additionally, 0.12ha of purple moor grass and rush pastures compensation is still required in addition to the 0.04ha currently proposed.

3.4.4. Two further offset Sites are being considered for the remaining VHD compensation as detailed in Section 3.2.3. Further assessments as set out in Section 4 will be required to establish whether these additional sites are appropriate for the proposed VHD habitats.

QUALITATIVE OUTCOME

3.4.1. **Table 3-8** discusses, where relevant to this report and the Habitat Creation Site, compliance to each of the Good Practice Principles. As proposals for habitat creation and enhancement are at an outline stage, this outcome should be revisited at detailed design stage.

Table 3-8 - Evidence of Project Compliance with the Good Practice Principles

Principle	Description	Evidence of Compliance
Apply the mitigation hierarchy	Do everything possible to first avoid and then minimise impacts on biodiversity. Only as a last resort, and in agreement with external decision-makers where possible, compensate for losses that cannot be avoided. If compensating for losses within the development footprint is not possible or does not generate the most benefits for nature conservation, then offset biodiversity losses by gains elsewhere.	Details on avoidance and minimising of effects are considered in the Environmental Statement chapter. The proposed Habitat Creation Site overlaps with the TR3 section of the Site.
Avoid losing biodiversity that cannot be offset elsewhere	Avoid impacts on irreplaceable biodiversity – these impacts cannot be offset to achieve No Net Loss or Net Gain.	Refer to TEP (RVBC-BO-APP-008_01) for baseline effects. No impacts to irreplaceable habitats are known to occur. Very high distinctiveness habitats are however affected. These habitats are important habitats identified by Natural England (2021) as rare and largely unprotected habitats and/ being classified as Critical or Endangered under the IUCN Red List of Ecosystems criteria (Bland *et al.*, 2016). A 4 to 1 compensation for VHD habitats has been targeted and additional offset sites are being considered to accommodate this habitat creation.
Be inclusive and equitable	Engage stakeholders early, and involve them in designing, implementing, monitoring and evaluating the approach to Net Gain. Achieve Net Gain in partnership with stakeholders where possible and share the benefits fairly among stakeholders.	The LPA ecologist (where in-position) and Natural England have been consulted as part of the BNG process for the Proposed Programme of Works.

HAWESWATER AQUEDUCT RESILIENCE PROGRAMME
Project No.: 70074191 | Our Ref No.: RVBC-BO-APP-008_02
United Utilities

PUBLIC | WSP
February 2022
Page **15** of 21

Principle	Description	Evidence of Compliance
Address risks	Mitigate difficulty, uncertainty and other risks to achieving Net Gain. Apply well-accepted ways to add contingency when calculating biodiversity losses and gains in order to account for any remaining risks, as well as to compensate for the time between the losses occurring and the gains being fully realised.	The BNG assessment used industry recognised risk multipliers from the Biodiversity Metric 3.0 Calculation Tool. The offset site is within United Utilities ownership and therefore delivery can be controlled. A botany survey was done to inform the BNG assessment and proposals for habitat creation and enhancement are considered to be achievable based upon available information. The outline long-term habitat management plan (**Appendix A**) identifies how proposals should be developed. Two additional sites have been identified for further habitat compensation as noted in Section 3.2.3. Where these sites are to be included in habitat proposals, they would be subject to assessments of suitability for proposed habitat interventions, including habitat survey and condition assessment and other assessments, such as hydrology and soil fertility, as appropriate.
Make a measurable net gain contribution	Achieve a measurable overall gain for biodiversity and the services ecosystems provide while directly contributing towards nature conservation priorities.	With the exception of Very High Distinctiveness habitats, this report demonstrates that the Bowland section of the Proposed Programme of Works will deliver a quantitative Net Gain. Bespoke compensation will be provided for very high distinctiveness habitats. The Habitat Creation Site includes semi-natural habitat types that will contribute to maintaining biodiversity in the surrounding area by providing dedicated areas for biodiversity. With regard to very high distinctiveness habitats, further habitat compensation is being sought to address losses and two further sites have been identified for further VHD compensation (see Section 3.2.3).
Achieve the best outcomes for biodiversity	Achieve the best outcomes for biodiversity by using robust, credible evidence and local knowledge to make clearly-justified choices when: Delivering compensation that is ecologically equivalent in type, amount	The Habitat Creation Site includes semi-natural habitat types that will contribute to maintaining biodiversity in the surrounding area by providing dedicated areas for biodiversity. With regard to very high distinctiveness habitats, 4:1 compensation has been

HAWESWATER AQUEDUCT RESILIENCE PROGRAMME
Project No.: 70074191 | Our Ref No.: RVBC-BO-APP-008_02
United Utilities

PUBLIC | WSP
February 2022
Page **16** of 21

Principle	Description	Evidence of Compliance
	and condition, and that accounts for the location and timing of biodiversity losses; Compensating for losses of one type of biodiversity by providing a different type that delivers greater benefits for nature conservation; Achieving Net Gain locally to development while also contributing towards nature conservation priorities at local, regional and national; Enhancing existing or creating new habitat.; and Enhancing ecological connectivity by creating more, bigger, better and joined areas for biodiversity.	identified. This assessment shows that further compensation is required to offset the loss of VHD habitats from the Proposed Programme of Works. The trading summary tab of the Biodiversity Metric 3.0 Calculation Tool identifies that the proposed habitat compensation strategy would result in an overall deficit in the high distinctiveness habitat 'Heathland and shrub – Upland heathland' and an overall loss in medium distinctiveness woodland and forest habitat units has also been identified. Opportunities to improve on these losses should be pursued during subsequent assessments. The net loss in 'other lowland acid grassland' is considered to be adequately compensated for by the increase in units for 'other neutral grassland' which is of the same broad habitat type. The Habitat Creation Site includes a section of the River Ribble. Proposed habitat improvements will act to enhance this river corridor by the addition of tree cover, which would also act to exclude livestock. These measures are in line with recommendations provided to the project team by the Ribble Rivers Trust.
Be additional	Achieve nature conservation outcomes that demonstrably exceed existing obligations (i.e. do not deliver something that would occur anyway).	The Habitat Creation Site delivers habitat compensation above and beyond simple reinstatement.
Create a net gain legacy	Ensure Net Gain generates long-term benefits by: Engaging stakeholders and jointly agreeing practical solutions that secure Net Gain in perpetuity; Planning for adaptive management and securing dedicated funding for long-term management; Designing Net Gain for biodiversity to be resilient to external factors, especially climate change; Mitigating risks from other land uses;	United Utilities own the Habitat Creation Site and are able to commit to its long-term management. An outline long term management plan (**Appendix A**) accompanies this report, demonstrating adherence to this principle.

HAWESWATER AQUEDUCT RESILIENCE PROGRAMME
Project No.: 70074191 | Our Ref No.: RVBC-BO-APP-008_02
United Utilities

PUBLIC | WSP
February 2022
Page **17** of 21

Principle	Description	Evidence of Compliance
	Avoiding displacing harmful activities from one location to another; Supporting local-level management of Net Gain activities.	
Optimise sustainability	Prioritise Biodiversity Net Gain and, where possible, optimise the wider environmental benefits for a sustainable society and economy,	Proposals for habitat creation include a range of semi-natural habitat types such as scrub and woodland which may contribute to wider environmental gains such as carbon sequestration and water attenuation.
Be transparent	Communicate all Net Gain activities in a transparent and timely manner, sharing the learning with all stakeholders.	The full BNG outcome is to be shared with relevant stakeholders through delivery of the Proposed Programme of Works. Documents will be available to the public through the planning process.

HAWESWATER AQUEDUCT RESILIENCE PROGRAMME
Project No.: 70074191 | Our Ref No.: RVBC-BO-APP-008_02
United Utilities

PUBLIC | WSP
February 2022
Page **18** of 21

4   CONCLUSIONS

4.1.1.   This report demonstrates that the TR3 Bowland section of the Proposed Programme of Works can deliver a quantitative net-gain in area-based, hedgerow and river habitats. However, due to a net-loss in very high-distinctiveness habitats (fens (upland and lowland) and purple moor grass and rush pasture) and because like for like compensation in High and Medium distinctiveness habitats (upland heathland and woodland and forest), has not yet been delivered, biodiversity net gain cannot currently be claimed for this area as a whole. This report identifies two further sites, Stocks Hodder and Gamble Hole Farm, which are being considered for their potential to deliver further habitat compensation to address current deficits.

4.1.2.   It is proposed that updated BNG assessments are undertaken as detailed proposals for the Proposed Programme of Works emerge, including technical design specifications for proposals for habitat creation and enhancement informed by appropriate levels of survey and assessment. This updated assessment would also document any additional habitat compensation secured, factoring in also the fixed design of the Proposed Programme of Works. Where these sites are to be included in habitat proposals, they would be subject to assessments of suitability for proposed habitat interventions, including habitat survey and condition assessment and other assessments, such as hydrology and soil fertility, as appropriate.

5   REFERENCES

5.1   PROJECT REFERENCES

¡   The Environment Partnership (2021): Haweswater Aqueduct Resilience Programme Bowland Section: Biodiversity Net Gain Assessment. Document Reference: RBC-BO-APP-008_01
¡   WSP (2021): Haweswater Aqueduct Resilience Programme; Botanical survey and condition assessment: Bowland Section, Ribble Valley Borough Council

5.2   TECHNICAL REFERENCES

¡   CIRIA, CIEEM, IEMA (2016). Biodiversity Net Gain: Good practice principles for development. Available online: https://cieem.net/i-am/current-projects/biodiversity-net-gain [Accessed: May 2021].
¡   CIRIA, CIEEM, IEMA (2019). Biodiversity Net Gain. Good practice principles for development. A Practical Guide. Available online: https://cieem.net/resource/biodiversity-net-gain-good-practice-principles-for-development-a-practical-guide/ [Accessed: May 2021].
¡   Bland, L.M., Keith, D.A., Miller, R.M., Murray, N.J. and Rodríguez, J.P. (eds.) (2016). Guidelines for the application of IUCN Red List of Ecosystems Categories and Criteria, Version 1.0. Gland, Switzerland: IUCN.
¡   JNCC (2010). Handbook for Phase 1 Habitat Survey: A Technique for Environmental Audit. JNCC, Peterborough.
¡   Natural England (2021). The Biodiversity Metric 3.0 (JP039) [online]. Available: The Biodiversity Metric 3.0 - JP039 (naturalengland.org.uk) [accessed 24/09/2021]
¡   Natural England (2021). The Biodiversity Metric 3.0: auditing and accounting for biodiversity user guide. [online]. Available: Biodiversity Metric 3.0 User Guide.pdf [accessed 24/09/2021]
¡   UK Habitat Classification Working Group (2020). *UK Habitat Classification – Habitat Definitions V1.1* at. Available online: https://ukhab.org/ukhab-documentation [Accessed: May 2021].

HAWESWATER AQUEDUCT RESILIENCE PROGRAMME
Project No.: 70074191 | Our Ref No.: RVBC-BO-APP-008_02
United Utilities

PUBLIC | WSP
February 2022
Page **20** of 21

6   FIGURES

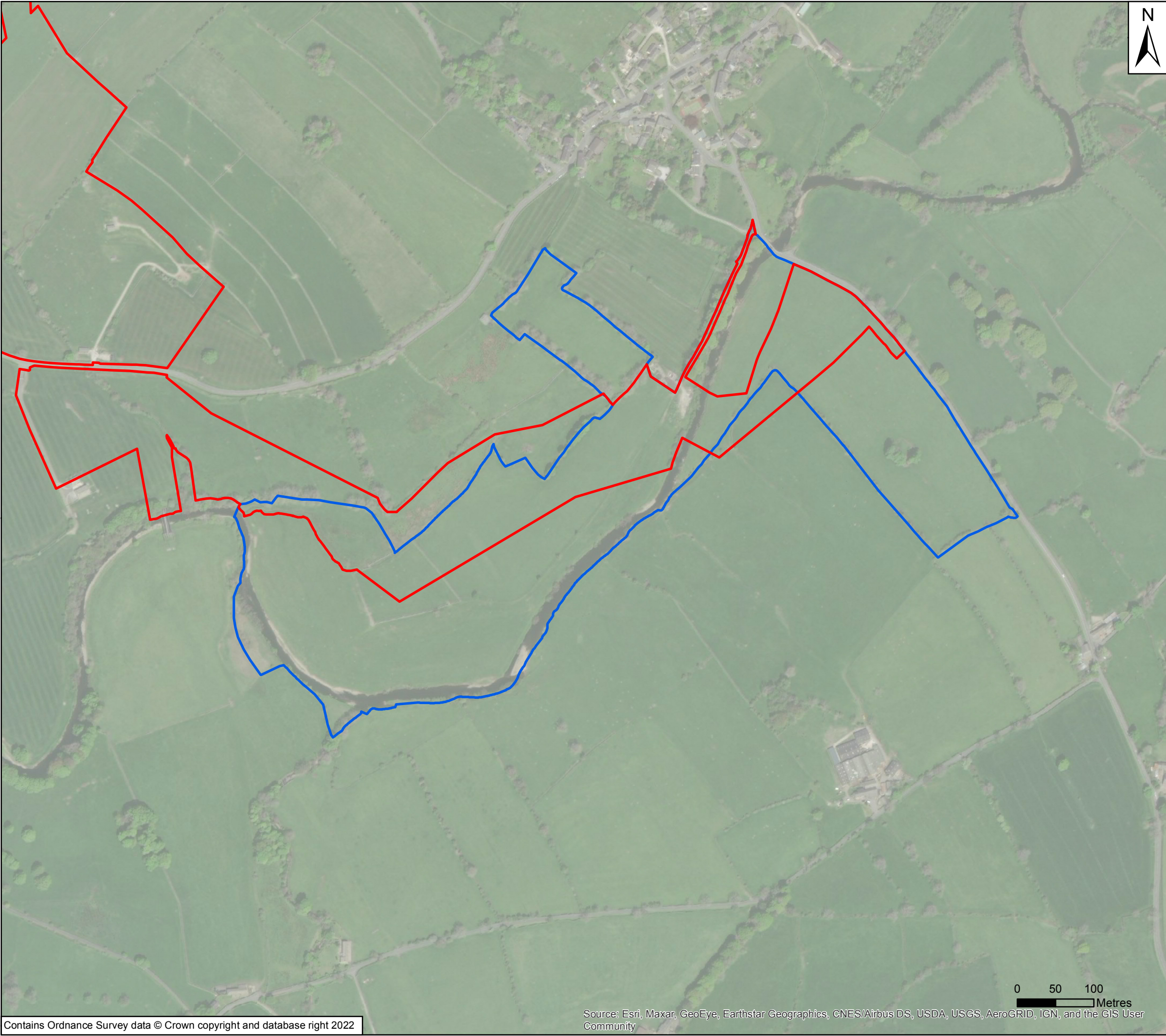**Figure 1 – Newton-in-Bowland Habitat Creation Site: Location Plan**

Figure 2 - Newton-in-Bowland Habitat Creation Site: Baseline Habitat Map

Figure 3 - Newton-in-Bowland Habitat Creation Site: Post-development Habitats

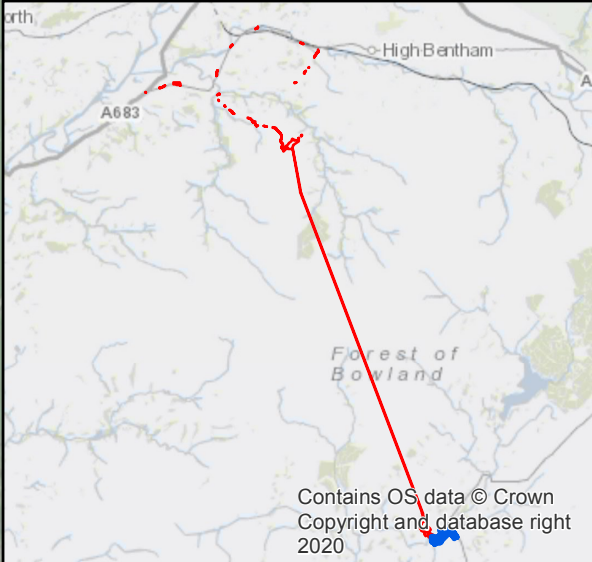**Figure 4 - Stocks Hodder Creation Site - Location Plan**

Figure 5 - Gamble Hole Farm Creation Site - Location Plan

HAWESWATER AQUEDUCT RESILIENCE PROGRAMME
Project No.: 70074191 | Our Ref No.: RVBC-BO-APP-008_02
United Utilities

PUBLIC | WSP
February 2022
Page **21** of 21

Legend

▭ TR3 Planning Red Line Boundary

▭ Newton in Bowland Habitat Creation Site Boundary

Contains OS data © Crown Copyright and database right 2020

Contains Ordnance Survey data © Crown copyright and database right 2022

Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

0 50 100 Metres

wsp

Client:
United Utilities

Project:
Haweswater Aqueduct Resilience Programme

Title:
Figure 1 - Newton In Bowland Habitat Creation Site: Location Plan

Drawing No: Layers	Drawn: ST
Date: 19/01/2022	Checked: LR
Scale: 4,800 @ A3	Approved: HW

Figure 2 - Newton in Bowland Creation Site: Baseline Habitats
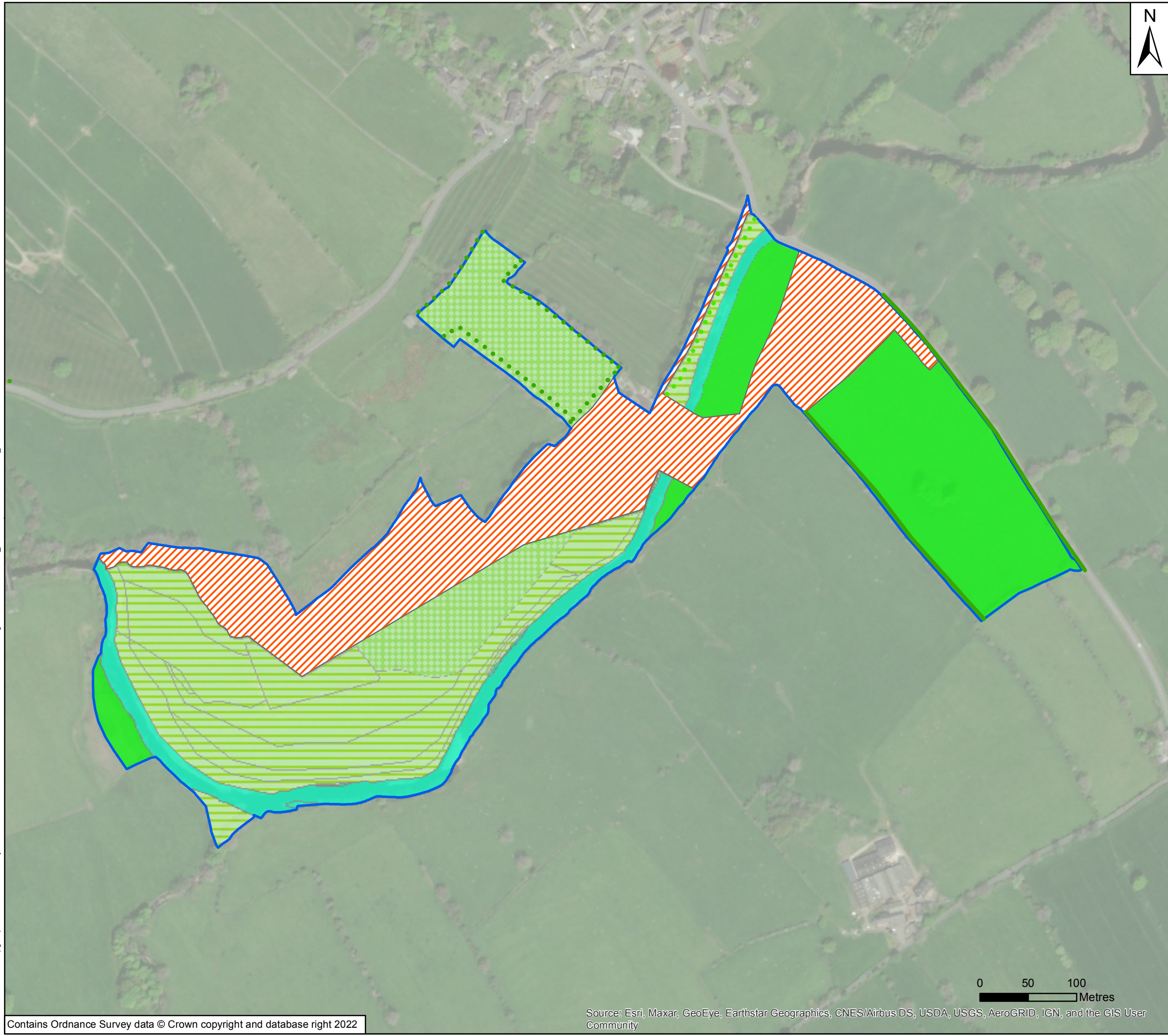
Legend

- Newton in Bowland Habitat Creation Site Boundary
- Refer to On-site BNG Assessment
- h2a - hedgerows (priority habitats)
- w1c6 - line of trees - beech forest
- w1g6 - line of trees - other woodland; broadleaved
- r2a - rivers (priority habitat)
- g3c - other neutral grassland
- g3c8 - Holcus-Juncus neutral grassland
- g4 - modified grassland
- s - sparsely vegetated land

Client:
United Utilities

Project:
Haweswater Aqueduct Resilience Programme

Title:
Figure 2 - Newton in Bowland Creation Site: Baseline Habitats

Drawing No: Figure 2
Date: 19/01/2022
Scale: 3,800 @ A3

Drawn: ST
Checked: LR
Approved: HW

wsp

Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Contains Ordnance Survey data © Crown copyright and database right 2022

Document Path: \\uk.wspgroup.com\central data\Projects\70074191xxx\17007.19 - United Utilities - HARP BNG Offsetting\03 WIP\GIS\MXD\ST_070921\Newton in Bowland_Baseline 211021.mxd

User Name: UKSLT002   Date Saved: 19/01/2022 14:45:31

0   50   100   Metres

Legend

TR3 Planning Red Line Boundary

Newton in Bowland Habitat Creation Site Boundary

Retained hedgerows

h2a - hedgerows - priority habitat

w1c6 - line of trees; lowland beech

w1g6 - line of trees; other woodland, broadleaved

Created hedgerows

h2a - hedgerows - priority habitat

h2b - other hedgerows - native species-rich defunct hedge

h2b - other hedgerows - species-poor defunct hedge

h2b - other hedgerows - species-poor intact hedge

Post-Develpoment Habitats

r2a - rivers (priority habitat)

u1h - vacant/derelict land/ bareground

f2a - lowland fens

g3a5 - lowland hay meadows

g3c - other neutral grassland

g4 - modified grassland

h3h - mixed scrub

r1 - standing open water and canals

u1b - developed land, sealed surface

w1g - other woodland, broadleaved

w1h - other woodland, mixed

Client:

United Utilities

Project:

Haweswater Aqueduct Resilience Programme

Title

Newton-in-Bowland Habitat Creation Site: Post-Development Habitats

Drawing No:	Figure 3	Drawn:	ST
Date:	19/01/2022	Checked:	LR
Scale:	3,551 @ A3	Approved:	HW

0   50   100 Metres

Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Legend
◻ Stocks Hodder Site Boundary

N

0   50   100
Metres

wsp

Client:	
	United Utilities

Project:	
	Haweswater Aqueduct Resilience Programme

Title:	
	Stocks Hodder Habitat Creation Site: Location Plan

Drawing No: Layers		Drawn: ST
Date: 17/12/2021		Checked: JG
Scale: 400,000 @ A3		Approved: LR

Legend

— TR2 Planning Red Line Boundary

⋯ Beela Compound Habitat Creation Site Boundary

N

Contains OS data © Crown Copyright and database right 2020. Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community

wsp
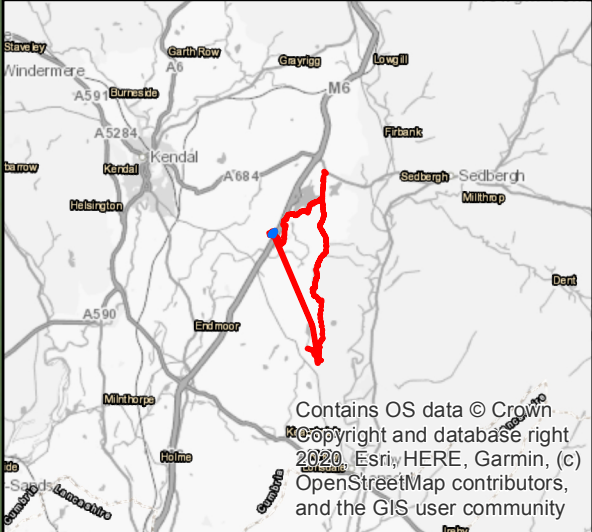
Client:

United Utilities

Project:

Haweswater Aqueduct Resilience Programme

Title:

Beela Compound Habitat Creation Site: Location Plan

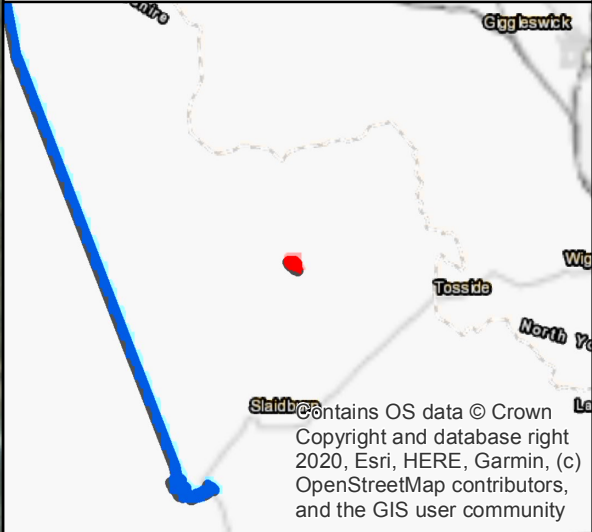| Drawing No: Layers | Drawn: ST |
| Date: 27/01/2022 | Checked: JG |
| Scale: 1,400 @ A3 | Approved: LR |

0   50   100   Metres

Source: Esri, Maxar, GeoEye, Earthstar Geographies, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Appendix A

OUTLINE LONG TERM HABITAT MANAGEMENT PLAN

wsp

HAWESWATER AQUEDUCT RESILIENCE PROGRAMME

Outline Long Term Management Plan – Newton-In-Bowland

wsp

United Utilities

HAWESWATER AQUEDUCT RESILIENCE PROGRAMME

Outline Long Term Management Plan – Newton-In-Bowland

TYPE OF DOCUMENT (VERSION) PUBLIC

PROJECT NO. 70074191

DATE: JANUARY 2022

United Utilities

HAWESWATER AQUEDUCT RESILIENCE PROGRAMME

Outline Long Term Management Plan – Newton-In-Bowland

WSP

8 First Street
Manchester
M15 4RP

Phone: +44 161 200 5000

WSP.com

WSP

QUALITY CONTROL

Issue/revision	First issue	Revision 1	Revision 2	Revision 3
Remarks	First Issue	Second Issue		
Date	July 2021	January 2022		
Prepared by	Devon Gilbert/ Luke Roberts	Sophie Trigg		
Checked by	Hannah Williams	Luke Roberts		
Authorised by	Tom Butterworth	David Chatterton		
Project number	70074191	70074191		
Report number	RVBC-BO-APP-008_02; RVBC-MH-APP-008_02	RVBC-BO-APP-008_02; RVBC-MH-APP-008_02		
File reference	\\uk.wspgroup.com\central data\Projects\700741xx\70074191 - United Utilities - HARP BNG Offsetting\03 WIP\EC Ecology\05 Reports\LTMP			

CONTENTS

APPENDICES

1 INTRODUCTION

1.1.1. United Utilities are undertaking a project known as Haweswater Aqueduct Resilience Programme ('the Proposed Programme of Works'), involving replacement of underground aqueducts with associated above ground works including compounds. Habitat creation works, proposed to compensate the effects of the Proposed Programme of Works, are described in an accompanying Biodiversity Net Gain (BNG) report (report numbers RVBC-BO-APP-008_02; RVBC-MH-APP-008_02, dated November 2021).

1.1.2. This report presents an outline long term management plan to support habitat creation and enhancement works described within the accompanying BNG reports (report numbers RVBC-BO-APP-008_02; RVBC-MH-APP-008_02, dated November 2021). This management plan will be subject to updates in response to detailed proposals associated with project delivery and over time as habitats develop.

1.1.3. The measures contained within this outline long term management plan pertain to a site located in Newton-in-Bowland, postcode BB7 3ED, centred on grid reference SD 6961 4998 (hereafter referred to as 'the Habitat Creation Site'[1]). The boundary of the Habitat Creation Site is set out in Figure 1 of the BNG reports (report numbers RVBC-BO-APP-008_02; RVBC-MH-APP-008_02, dated November 2021). It is approximately 22.51ha in size and is located within the Ribble Valley District Council area. The Habitat Creation Site overlaps with the TR3 Bowland section of the Proposed Programme of Works red line boundary (see report number RVBC-BO-APP-008_02, dated November 2021) and is approximately 8km from the TR4 Marl Hill section of the Proposed Programme of Works red line boundary (RVBC-MH-APP-008_02, dated November 2021).

---

[1] Where relevant, this term is used to describe both creation and enhancement interventions.

HAWESWATER AQUEDUCT RESILIENCE PROGRAMME
Project No.: 70074191
United Utilities

PUBLIC | WSP
January 2022
Page 1 of 3

2 MANAGEMENT PLAN

2.1 OVERVIEW

2.1.1. This outline long term management plan is based on the suggested structure of landscape ecological management plans as set by British Standard 42020:2013 Biodiversity — Code of practice for planning and development[2].

2.2 ECOLOGICAL TRENDS AND CONSTRAINTS ON SITE THAT MIGHT INFLUENCE MANAGEMENT

2.2.1. Certain operations required to implement this management plan (or subsequent updated versions) could negatively affect ecological features and/or contravene nature conservation legislation. For example, legally protected species could be present and be affected by management, or legally controlled plant species could be present or colonise the site and be spread by management.

2.2.2. The Habitat Creation Site is located within the Forest of Bowland Area of Outstanding Natural Beauty (AONB). Measures included within this management plan have been devised to support delivery of the Forest of Bowland AONB Management Plan 2019-2024[3]. Relevant measures include the provision of woodland in riparian areas of the Habitat Creation Site, supporting objectives to improve riparian habitats and increase woodland cover. Any updates to this management plan should be undertaken in compliance with the objectives of the AONB management plan.

2.2.3. Updates to this management plan should be informed by a Preliminary Ecological Appraisal (PEA) of the Habitat Creation Site, which should be used to devise appropriate measures to ensure ecological constraints to management are properly considered and addressed.

2.2.4. Following the completion of the PEA, it may be appropriate to include, within updates to this management plan, enhancement features for fauna, such as nest boxes or habitat piles and incorporate appropriate management or monitoring prescriptions for these features.

2.3 DESCRIPTION AND EVALUATION OF FEATURES TO BE MANAGED

2.3.1. A description of the features to be managed on the Habitat Creation Site are provided in **Annex A** of the management plan. Habitats are described in terms of the UKHab[4] classification. Habitat to be retained, enhanced or created is identified with the corresponding distinctiveness and condition. An evaluation of the nature conservation importance of these features is also provided.

---

[2] The British Standards Institution (2013). BS 42020:2013 Biodiversity — Code of practice for planning and development. British Standards Institution, London.
[3] Landscapes for Life (2019). Forest of Bowland Area of Outstanding Natural Beauty Management Plan 2019-2024 [online]. Available at: https://www.forestofbowland.com/management-plan.
[4] UK Habitat Classification Working Group (undated). UK Habitat classification [online]. Available at: https://ukhab.org/

HAWESWATER AQUEDUCT RESILIENCE PROGRAMME
Project No.: 70074191
United Utilities

PUBLIC | WSP
January 2022
Page 2 of 3

2.4 AIMS AND OBJECTIVES OF MANAGEMENT

2.4.1. The overall aim of this management plan is to facilitate delivery of habitat compensation measures described in the accompanying BNG reports (report number RVBC-BO-APP-008_02; RVBC-MH-APP-008_02, dated January 2022).

2.4.2. Objectives to achieve this for each ecological feature are provided in **Annex B**. The parameters of these objectives including the target distinctiveness, condition and Habitat Units (HU) or Hedgerow Units (HeU) (collective term for habitat, hedge and river units used in the BNG Calculation Tool[5]) will be the parameters that will be measured to identify progress and determine if the objective has been achieved.

2.5 PRESCRIPTIONS FOR MANAGEMENT

2.5.1. **Annex C** sets out the habitat creation and enhancement management prescriptions required to achieve the stated objectives and end targets (**Annex B**). The Annex provides a works schedule and details of those responsible for undertaking each intervention.

2.6 PRESCRIPTIONS FOR MONITORING

2.6.1. **Annex D** sets out monitoring of the ecological features to be managed, to assess whether the stated aim and objectives of the project are being met (**Annex B**). The Annex provides a works schedule and details of those responsible for undertaking each intervention.

2.6.2. **Annex D** proposes condition assessment surveys, based on the latest guidance as published by Natural England.

2.7 ONGOING MONITORING AND REMEDIAL MEASURES

2.7.1. In addition to the management and monitoring activities, a review of this management plan should be undertaken, as a minimum, every five years or if conditions on the Habitat Creation Site change, to ensure that the results of monitoring activities and remedial measures identified are captured and implemented; or if necessary, to ensure that the objectives of the management plan are reviewed to allow for appropriate adaptive management measures to be taken. Changes to this plan should be captured in **Annex E**.

2.8 GLOSSARY OF TERMS

2.8.1. **Annex F** provides a glossary of terms used in this document.

---

[5] Natural England (2021). The Biodiversity Metric 3.0 (JP029). Available at The Biodiversity Metric 3.0 - JP039 (naturalengland.org.uk) [Accessed 11/10/2021]

Annex A

DESCRIPTION OF FEATURES TO BE MANAGED ON THE HABITAT CREATION SITE

wsp

Table A1- Description and evaluation of habitats to be managed on the Habitat Creation Site

Existing feature UKHab Primary Code	Existing feature UKHab Secondary Codes	Habitat created or enhanced	Distinctiveness	Target Condition	Habitat Units (HU)/ Hedgerow Units (HeU)	Nature conservation importance (as determined through legal / policy protection)
Modified Grassland g4. No secondary habitat code used.		Create Lowland Hay Meadow g3a	Very High	N/A	N/A (bespoke compensation)	The grassland will be valuable in providing habitat and resources to a range of species, including pollinating invertebrates.
Other Neutral Grassland g3c / Modified Grassland g4/ on cleared land post development No secondary habitat code used.		Create Lowland Fen f2a	Very High	N/A	N/A (bespoke compensation)	Lowland Fen is a priority habitat/ Habitat of Principal importance (HPI) and can support high diversities of species, particularly plants and invertebrates. High numbers of invertebrates can use these habitats which provide good feeding areas for other species groups such as birds.
Other Neutral Grassland g3c / *Holcus* Neutral Grassland g3c8. No secondary habitat code used.		Enhanced	Medium	Good	50.90	The grassland will be valuable in providing habitat and resources to a range of species, including pollinating invertebrates.
To be created on cleared land post-development.	N/A	Create Other Neutral Grassland g3c	Medium	Good	33.28	The grassland will be valuable in providing habitat and resources to a range of species, including pollinating invertebrates.
Other Neutral Grassland g3c / Modified Grassland g4 / on cleared land post-development. No secondary habitat code used.		Create Mixed Scrub h3h	Medium	Good	30.59	The scrub will provide cover, resources and habitat for a range of species including birds and small mammals.

Existing feature UKHab Primary Code	Existing feature UKHab Secondary Codes	Habitat created or enhanced	Distinctiveness	Target Condition	Habitat Units (HU)/ Hedgerow Units (HeU)	Nature conservation importance (as determined through legal / policy protection)
Holcus Neutral Grassland g3c8 / on cleared land post-development. No secondary habitat code used.		Create Temporary Lakes, Ponds and Pools r1,19	High	Good	1.41	A priority habitat/ Habitat of Principal Importance (HPI). The pond will be valuable in providing habitat and resources to a range of specialist species, including invertebrates and plants.
Other Neutral Grassland g3c / Modified Grassland g4 / on cleared land post-development. No secondary habitat code used.		Create Other Woodland; Broadleaved w1g	Medium	Good	9.82	The woodland would provide cover, resources and habitat for a range of species including birds and small mammals. Certain trees have protection under Tree Preservation Orders.
Native Hedgerow h2. No secondary habitat codes used.		Enhanced	Low	Good	3.51	Priority habitat/ HPI/ Hedgerows would provide cover, resources and habitat for a range of species including birds and small mammals.
Line of trees w1g6. No secondary habitat codes used.		Enhanced	Low	Moderate	0.45	
N/A	N/A	Create Native Species Rich Hedgerow h2a	Medium	Good	12.05	

Annex B

AIMS AND OBJECTIVES
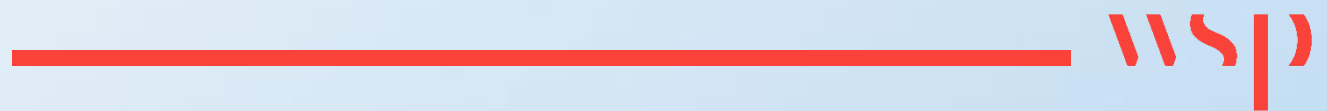
Table B1 – Aims, objectives and management options – habitats

Existing feature UKHab Primary Code	Existing feature UKHab Secondary Codes	Aim	Objectives[6]	Target distinctiveness	Target condition	Target HU / HeU
Modified Grassland g4. No secondary habitat code used.		Create Lowland Hay Meadow 3a	Create a grassland subject to non-intensive hay-meadow management. Cover of grass species and clover should not exceed 50% cover. There should be a high proportion of characteristic lowland meadow indicators such as wood cranesbill *Geranium sylvaticum*, lady's mantles *Alchemilla spp.*, yellow oat-grass *Trisetum flavescens*, pignut *Conopodium majus*, sweet vernal grass *Anthoxanthum odoratum,* globeflower *Trollius europaeus* and northern hawksbeard *Crepis mollis.* Management should aim for achieving good condition by satisfying all of the following criteria, as defined within the Biodiversity Metric 3.0: recognisable as a good example of this type of habitat through presence of indicator species for the habitat type; varied sward height (at least 20% of the sward less than 7cm and at least 20% more than 7cm); cover of bare ground between 1-5%; cover of bracken *Pteridium aquilinum* less than 20%; cover of scrub including bramble *Rubus fruticosus* less than 5%; absence of invasive non-native species; combined cover of undesirable species and physical damage less than 5%.	Very High	Good	NA

---

[6] Objectives follow habitat definitions from UKHab and Natural England Condition Assessment Guidance (Natural England (2021). The Biodiversity Metric 3.0 (JP039) – Habitat Condition Assessment Sheets. Available at: The Biodiversity Metric 3.0 - JP039 (naturalengland.org.uk) [Accessed 01/11/2021]

Existing feature UKHab Primary Code	Existing feature UKHab Secondary Codes	Aim	Objectives[6]	Target distinctiveness	Target condition	Target HU / HeU
Other Neutral Grassland g3c / Modified Grassland g4. No secondary habitat code used.		Create Lowland Fen f2a	Create and manage a soligenous wetland fed by surface or ground water. Vegetation should include a range of characteristic species such as tall broad-leaved wetland herb formations; rushes, sedges and bryophytes. Management should aim for achieving good condition, as defined within the Biodiversity Metric 3.0, by satisfying all of the following criteria: the water table is at or near the surface throughout the year, this could be open water or saturation of soil at the surface; there is no artificial drainage, unless specifically to maintain the water levels as specified above (non-negotiable condition); the appearance and composition of the vegetation closely matches characteristics of the specified wetland habitat with clearly visible indicator species; the water supply is of good quality with low turbidity and no obvious signs of pollution; cover of scrub and scattered trees less than 10%; cover of bare ground less than 5%; invasive non-native species are absent and undesirable species make up less than 5% of the ground cover. Additionally, no more than 25% of the fen area should have a continuous cover of litter preventing regeneration.	Very High	Good	N/A
Other Neutral Grassland g3c / *Holcus* Neutral Grassland g3c8. No secondary habitat code used.		Enhance to good condition / Create on Modified Grassland g4	Grassland should have between nine and 15 native species per m^2, with perennial ryegrass *Lolium perenne* present at <30%. The cover of wildflowers and sedges should make up more than 10% of the grassland, excluding creeping buttercup *Ranunculus repens* and injurious weeds.	Medium	Good	84.18

Existing feature UKHab Primary Code	Existing feature UKHab Secondary Codes	Aim	Objectives[6]	Target distinctiveness	Target condition	Target HU / HeU
			Management should aim for achieving good condition as defined within the Biodiversity Metric 3.0 Habitat Condition Assessment[7]. All of the following criteria should be satisfied: recognisable as a good example of this type of habitat through presence of characteristic species (of UKHAB habitat type g3c); varied sward height (at least 20% is less than 7cm and >20% is more than 7cm); cover of bare ground between 1% and 5%; cover of bracken less than 20%; cover of scrub and bramble less than 5%; combined cover of undesirable species and physical damage less than 5%. Invasive non-native species should be absent.			
Other Neutral Grassland g3c / Modified Grassland g4. No secondary habitat code used.		Create Mixed Scrub h3h	Create a scrub habitat of good condition as defined by the Biodiversity Metric 3.0 Habitat Condition Assessment[5]. This requires all five condition criteria to be satisfied with only minor variation. Criteria include: at least three woody species present with no one species comprising more than 75% cover; there should be a good age range, including a mixture of seedlings, saplings, young scrub and mature shrubs; an absence of invasive species whilst undesirable species should make up less than 5% of the ground	Medium	Good	30.59

[7] Natural England (2021). The Biodiversity Metric 3.0 (JP039) – Habitat Condition Assessment Sheets. Available at: The Biodiversity Metric 3.0 - JP039 (naturalengland.org.uk) [Accessed 05/10/2021]

Existing feature UKHab Primary Code	Existing feature UKHab Secondary Codes	Aim	Objectives[6]	Target distinctiveness	Target condition	Target HU / HeU
			cover; the scrub should have a well-developed edge with un-grazed tall herbs; and clearings / glades should be present.			
Other Neutral Grassland g3c / Modified Grassland g4. No secondary habitat code used.		Create Temporary Lakes, Ponds and Pools r1,19	This habitat includes waterbodies that usually contain water for less than four months each year. Create and maintain pond of high ecological quality as defined by the Predictive System for Multimetrics (PSYM[8]) method. Management to aim for good condition defined within the Biodiversity Metric 3.0 Habitat Condition Assessment[5], which requires most condition criteria to be satisfied with little variation. Criteria include: having good (clear) water quality with no obvious sign of pollution; semi-natural habitat for at least 10m from the pond edge; not artificially connected to other waterbodies; supporting a range of native submerged and emergent plants with less than 10% coverage of duckweed Lemnoideae or filamentous algae; an absence of fish and only natural water level fluctuations (no direct drainage).	High	Good	1.41

[8] PSYM is a method for assessing the biological quality of still waters in England and Wales; plant species and / or invertebrate families are surveyed using a standard method; the PSYM model makes predictions for the site based on environmental data and using a minimally impaired pond dataset; comparison of the prediction and observed data gives a % score for ponds quality.

Existing feature UKHab Primary Code	Existing feature UKHab Secondary Codes	Aim	Objectives[6]	Target distinctiveness	Target condition	Target HU / HeU
Other Neutral Grassland G3c / Modified Grassland G4. No secondary habitat code used.		Create Other Woodland; Broadleaved W1g	Create a broadleaved woodland dominated by native species, with a variety of native trees, shrubs and ground flora. The woodland should be managed to qualify as good condition, as defined by the Biodiversity Metric 3.0 Habitat Condition Assessment[5]. This involves achieving a score of >32 (33 to 39) following the indicator assessment. Those indicators categorised as good include: three age classes should be present (young (0-20 years), intermediate (20 – 150 years), old (>150 years)); no significant browsing damage should be evident; no presence of invasive species; presence of five or more native tree/shrub species; >80% of canopy and understory should comprise native species; 10-20% of woodland should have areas of temporary open space; three regenerative classes present within; tree mortality should be less than 10%; presence of ancient woodland flora indicators, three or more storeys should be present across vertical structure; two or more veteran trees should be present per hectare; 50% of survey plots within woodland should have standing or fallen deadwood and no nutrient enrichment or damaged ground should be evident. The ground flora should include specialist native woodland flora at the highest coverage possible. This may be achieved by consideration of sowing a specific woodland flora mix.	Medium	Good	9.82
Line of trees w1g6. No secondary habitat codes used.		Enhanced	Enhance existing lines of trees to moderate condition, as defined by the Biodiversity Metric 3.0 Habitat Condition Assessment.	Low	Moderate	0.45

Existing feature UKHab Primary Code	Existing feature UKHab Secondary Codes	Aim	Objectives[6]	Target distinctiveness	Target condition	Target HU / HeU
			At least three or four of the following criteria should be satisfied: More than 70% of trees are native species; tree canopy is predominantly continuous with gaps in canopy cover making up <10% of total area and no individual gap being >5 m wide; includes one or more mature1 or veteran tree; there is an undisturbed naturally vegetated strip of at least 6m on both sides to protect the line of trees from farming and other anthropogenic operations; at least 95% of the trees are in a healthy condition (excluding veteran features valuable for wildlife); there is little or no evidence of an adverse impact on tree health by damage from livestock or wild animals, pests or diseases, or human activity.			
N/A	N/A	Create Native Species Rich Hedgerow H2a	Management to promote a wide and dense hedgerow with no significant gaps. There should be no more than two failures in total from the following criteria, as defined by the Biodiversity Metric 3.0 Habitat Condition Assessment: On average, the hedge should be over 1.5m wide and tall and have a gap of less than 0.5m between the ground and the lowest leafy growth for >90% of the length; gaps should make up less than 10% of the total length with no canopy gaps of more than 5m; there should be an undisturbed buffer of at least 1m width at hedgerow base comprising perennial herbaceous vegetation for more than 90% of the length; species indicative of nutrient enrichment (such as nettle Urtica dioica or cleavers Galium aparine) dominate less than 20% cover of perennial vegetation; non-native invasive species should be absent from more than 90% of the hedgerow and ground flora and more than 90% of the hedgerow should be free of damage caused by human activities.	Medium	Good	12.05

Annex C

MANAGEMENT PRESCRIPTIONS

Table C1 - Management prescriptions, responsibilities and work schedule

Ecological feature	Management prescription	Responsible	Required (refer also to Annex D)
Lowland Hay Meadows (created)	Creation methods: ■ The ground will be prepared appropriately as informed by soil testing (pH and plant nutrients). pH should be above 5.5 and phosphate index should be below 1. If required, measures may be taken to reduce soil fertility, such as stripping turf and the top 5 to 10cm of topsoil or deep ploughing the grassland (i.e. burying the topsoil). ■ A diverse seed mixture containing appropriate species (for the g3b habitat type) should be used. Seeds should be native and locally sourced (i.e. within the region, or else, the UK) species suited to the soil conditions should be used. Yellow rattle *Rhinanthus minor* could be used, a parasitic species that can help combat competitive grass species. ■ The optimal time to sow seeds is September/ October, though April/ May is also suitable. ■ Mow newly sown grassland regularly as required to control annual weeds (i.e. undesirable species as defined within the Biodiversity Metric 3.0 Habitat Condition Assessment[5]) throughout the first year of establishment, removing arisings. This will control annual weeds and help maintain balance between faster growing grasses and slower developing wildflowers.	Suitably qualified contractor or conservation partner appointed by United Utilities.	Year 1 and repeated if not successfully established.
	Once established: ■ Cut circa 70% of the grassland areas every summer with a late-summer hay cut. Undertake a cut in March if sward height is >25cm in those areas cut in summer. Cuttings to be removed. ■ Cut buffers to woodland and scrub, only occasionally to prevent scrub growth. ■ Encroachment of undesirable weed species (as defined by the Technical Supplement, including common nettle, dock Rumex sp. (excluding common sorrel *Rumex acetosa*), creeping thistle *Cirsium arvense*, spear thistle *Cirsium vulgare,* willowherb *Epilobium* sp., bramble) will be monitored. During the early developmental stages of the grassland sward some undesirable species are to be expected and should become less dominant as the communities become established. However, where the levels of weed growth are excessive (e.g. where weed species occur in more than 5% of the total area), control measures may be required.		Annually once successfully established. Cutting once to twice a year as required.

Ecological feature	Management prescription	Responsible	Required (refer also to Annex D)
	▪ Ensure bare ground patches do not exceed 10% of the area and re-sow seed where needed, according to year 1 instructions. ▪ Fertiliser should not be applied.		
Lowland Fen (created)	Creation methods: ▪ Undertake detailed site appraisal to determine appropriate methods to enhance the habitat. This will include a hydrological assessment to determine how to maintain the requisite water level[9], as well as other investigations such as topographic assessment, botanical assessment, water quality and soil testing (pH and fertility). Some form of water control structure is likely to be required (e.g. a bund or sluice). Consultation or permitting may be required with statutory bodies (e.g. the lead local flood authority) with regard to water control methods. ▪ It will be necessary to introduce fen vegetation, which may be achieved by a combination of planting plug plants; planting vegetative propagules (transplantation) and spreading hay. Plant species introduced should be matched to the aquatic and soil conditions, particularly pH and water level. During early establishment it may be necessary to introduce protection from grazing animals such as deer, rabbit and geese.	Suitably qualified contractor or conservation partner appointed by United Utilities.	Year 1, repeated if required.
	Long term management:		Year 2 onwards.

[9] Indicatively in summer up to 10cm above the substrate to 30 cm or more below the surface at the end of the summer, depending on the type of fen vegetation and water supply mechanism. Winter water levels are significantly higher and can be 30 to 50 cm above the fen surface (from The Fen Management Handbook (The Fen Management Handbook, (2011), Editors A. McBride, I. Diack, N Droy, B. Hamill, P.Jones, J. Schutten, A. Skinner, and M. Street. Scottish Natural Heritage, Perth.

Ecological feature	Management prescription	Responsible	Required (refer also to Annex D)
	- Annual check to monitor establishment of fen vegetation. If little establishment is observed after two seasons, creation methods to be revised and repeated as necessary. - Water levels should be monitored such as by the use of a dipwell. - Habitat to be made managed on a low intervention basis, with light grazing or cutting (with removal of material) to prevent accumulation of litter, maintain diversity and prevent dominance of invasive species or scrub. Appropriate water levels will need to be maintained. Management to be reactive to findings of monitoring visits.		Frequency responsive to monitoring.
Neutral Grassland (created and enhanced)	Creation methods: - The ground will be prepared appropriately with measures taken to test the soil pH, reduce soil fertility, such as stripping turf and the top 5 to 10cm of topsoil or deep ploughing the grassland (i.e. burying the topsoil). - A diverse seed mixture containing native and locally sourced (i.e. within the region, or else, the UK) species suited to the soil conditions should be used. Yellow rattle could be used, a parasitic species that can help combat competitive grass species. - The optimal time to sow seeds is September/ October, though April/ May is also suitable. - Mow newly sown grassland regularly as required to control the annual weeds throughout the first year of establishment, removing arisings. This will control annual weeds and help maintain balance between faster growing grasses and slower developing wildflowers.	Suitably qualified contractor or conservation partner appointed by United Utilities.	Year 1 and repeated if not successfully established.
	Enhancement methods: - Based on the findings of the botanical survey (report number RVBC-BO-APP-008_02; RVBC-MH-APP-008_02, Appendix B, dated November 2021), in order to reach good condition, it will be necessary to reduce the dominance of perennial rye grass and improve species diversity, reduce over grazing and achieve a more varied sward. - Undertake species and soil condition/nutrient surveys to refine enhancement measures required to achieve good condition, such as routine mowing,	Suitably qualified contractor or conservation partner appointed by United Utilities.	Year 1 and repeated if not successfully established.

Ecological feature	Management prescription	Responsible	Required (refer also to Annex D)
	additional planting or seeding and removal of undesirable species within the sward. ■ Implement a management regime prior to applying seed to reduce the vigour of coarser grasses and create gaps with exposed soil by either autumn/winter grazing or mechanical exposure. Any management regime should involve selective measures for weed control and rigorous mowing (cut and collect)/ grazing to maintain a short sward prior to seeding. ■ Measures should be undertaken in Year 1 with seed (including yellow rattle) applied in autumn or spring, followed by further mowing/grazing.		
	Once established: ■ Grassland may be subject to low intensity grazing and/or subject to meadow management. If grazing is pursued, appropriate stocking densities should be agreed in order to promote a diverse sward with areas of taller grass maintained. ■ Meadow management would involve cutting circa 70% of the grassland areas every summer with a late-summer hay cut. Undertake a cut in March if sward height is >25cm in those areas cut in summer. Cut buffers to woodland and scrub only occasionally to prevent scrub growth. Cuttings to be removed. ■ Encroachment of undesirable weed species (e.g. common nettle, dock sp. (excluding common sorrel), creeping thistle, spear thistle, willowherb sp., bramble) will be monitored. During the early developmental stages of the grassland sward some 'undesirable' species are to be expected and should become less dominant as the communities become established. However, where the levels of weed growth are excessive (e.g. where weed species occur in more than 5% of the total area), control measures may be required. Invasive non-native species should be controlled where present. ■ Ensure bare ground patches and physical damage do not exceed 5% of the area and re-sow seed where needed, according to year 1 instructions. ■ Fertiliser should not be applied.		Annually once successfully established.
Mixed Scrub (created)	Creation methods: ■ Planting should proceed in spring or autumn when there should be good amounts of rainfall but limited risk of frost.	Suitably qualified contractor or conservation partner	Year 1 only.

Ecological feature	Management prescription	Responsible	Required (refer also to Annex D)
	▪ Utilise a range of native and locally sourced species (i.e. within the region, or else, within the UK). Ensure that there are at least three woody species, with no one species comprising more than 75% of the cover. Some areas to be left unplanted (approximately 30% of area) to allow natural colonisation. ▪ Remove injurious/pernicious weeds (common ragwort *Jacobaea vulgaris*, spear thistle *Cirsium vulgare*, creeping or field thistle *Cirsium arvense*, broad-leaved dock *Rumex obtusifolius*, curled dock *Rumex crispus*) and invasive species, making sure they make up less than 5% of the ground cover.	appointed by United Utilities.	
	Long-term management: ▪ Allow leaf litter and brash to remain on the ground to improve soil and provide refuge. ▪ Maintain an infrequently mown buffer strip of 1-2m around the edge of the scrub, cut only to prevent succession to scrub. ▪ Remove injurious/pernicious weeds (common ragwort, spear thistle, creeping or field thistle, broad-leaved dock, curled dock) and invasive species, making sure they make up less than 5% of the ground cover. ▪ Undertake rotational cutting as required to maintain glades and clearings to maintain a ratio of approximately 75% scrub to 25% clearings.		Year 2 onwards.
Temporary Lakes, Ponds and Pools (created)	Creation methods: ▪ Ponds will be designed in accordance with guidance within The Freshwater Habitats Trust's Pond Creation Toolkit[10] and should be designed to support a similar range of micro-habitats and associated species of this habitat type lost to the Proposed Programme of Works.	Suitably qualified contractor or conservation partner appointed by United Utilities.	Year 1 only.

[10] Available online: https://freshwaterhabitats.org.uk/projects/million-ponds/pond-creation-toolkit/ [accessed 18:05:2021]

Ecological feature	Management prescription	Responsible	Required (refer also to Annex D)
	- Constructed with a variable profile, with some shallow slopes (indicatively less than 30 degrees) to allow animals to enter and exit easily. - Creation of substantial cover of marginal and submerged vegetation. Some natural colonisation allowance is acceptable and, if desired for speed, the pond can be planted with suitable native species of local provenance. - Ponds may be created at any time of year, though the optimal periods are spring or autumn.		
	Once established: - Detailed design measures should be produced with reference to replacing the characteristics of the habitat type lost to the Proposed Programme of Works. Management likely to be on a low intervention basis - Annual summer check of pond condition and remedial action as required. - Reduction of management close to banks by reduced mowing to retain a 2m buffer around the edge of the pond. - Periodic check and control for invasive species. Where identified these should be controlled/ removed. - No fertilisers to be applied within vicinity of habitat.		Year 2 onwards, annually.
Woodland - Other woodland; broadleaved (Created).	Creation methods: - A range of native species of local provenance should be used, including canopy species, shrubs and woodland flora. The canopy should be typically made up mainly of native species such as small-leaved lime *Tilia cordata*, wych elm *Ulmus glabra* and oak *Quercus robur*. Species should be selected in cognisance of pathogens and anticipated effects of climate change. - A specialist native woodland flora seed mix could be planted across at least 70% of the woodland area. There may be some loss through predation, and this may need to be re-sown to prevent bare patches. - Planting should proceed in in spring or autumn when there should be good amounts of rainfall but limited risk of frost. - Measures, such as tree guards, will be required to prevent pest damage from wildlife such as deer or voles, or damage from grazing animals.	Suitably qualified contractor or conservation partner appointed by United Utilities.	Year 1 only.

Ecological feature	Management prescription	Responsible	Required (refer also to Annex D)
	■ Ensure weeds/ competitive grasses are controlled around the base of planted trees. This can be achieved by hand pulling or by the application of mulch such as wood chip or mats around the base of trees. ■ Woodland planting area to be supplemented with log piles, such as may be available from clearance works associated with the Proposed Programme of Works.		
	<u>Early establishment management:</u> ■ Ensure weeds/ competitive grasses are controlled around the base of planted trees. This can be achieved by hand pulling or by applying a mulch such as wood chip or mats around the base of each tree. ■ Where more than around 15% of planted specimens fail, replacement planting with equivalent species will be undertaken in the next available planting season after failure is recorded (noting that consideration should be given to alternative species to prevent recurrence of failure). ■ Avoid soil compaction surrounding new trees such as may be caused by machinery and trampling. ■ Check and maintain condition of stakes, ties, guys, guards and irrigation and ventilation systems.		Years 1-5 annually.
	<u>Long term management:</u> ■ Tree guards to be removed after five to ten years once trees are established. ■ Low intervention management. Occasional thinning of trees to promote a more diverse woodland structure. ■ Material yielded from felling to be collected and placed into log piles. Wood chip may also be spread thinly on the ground. ■ Where management (thinning) is carried out, it should be undertaken between September and November inclusive, when the risk of disturbing active birds' nests and hibernating fauna is minimal. No more than 10-20% of tree cover should be thinned.		Year 5 onwards.
Hedgerows (enhanced)	<u>Enhancement measures:</u>		Years 1 only.

Ecological feature	Management prescription	Responsible	Required (refer also to Annex D)
	- Undertake further survey to identify measures required for hedgerow to achieve good condition. Measures may include infill planting gaps with appropriate native species; protection from adjacent operations (e.g. agriculture); control of weeds/ invasive species; or undertaking cutting/ laying to achieve desired structure. - Based on the findings of the botanical survey (report number RVBC-BO-APP-008_02; RVBC-MH-APP-008_02, Appendix B, dated November 2021), in order to reach good condition it will be necessary to undertake infill planting; protect the hedges from disturbance (e.g. grazing and compaction); and implement an appropriate regime of cutting and laying to achieve the desired structure.	Suitably qualified contractor or conservation partner appointed by United Utilities.	
	Long term management: - Continue control of weeds until hedgerow established (indicatively up to 5 years). - Hedgerows to be trimmed on rotation, such that they are trimmed every two to three years, such that only one-third proportion of hedgerows on site are trimmed in a given year. - Trimming approach to be sensitive such as to promote wider, thicker hedgerows that do not get too tall/leggy, in line with management objectives. Trimming to allow tall trees specimens, indicatively every 10m. - Gaps to be planted up in the next available planting season after failure is recorded and be of the same species composition, size and pattern. - An unmown buffer strip of 1-2m will be left around the base of hedgerows. Occasional mowing will be carried out on an ad-hoc basis to prevent scrub or invasive weed encroachment. - Consideration should be given to the periodic hedgerow laying to which will promote the establishment of a thick and good condition hedge. The hedge needs to be at least 3 to 4m high to be successfully laid. - All hedgerow management would be undertaken outside the bird nesting season, i.e. it would avoid the period March to August (inclusive).		Year 2 onwards. Annual trimming on rotation once established. Other interventions on an ad-hoc basis.
	Creation methods:		Year 1 only.

Ecological feature	Management prescription	Responsible	Required (refer also to Annex D)
Native Species Rich Hedgerows (created)	■ Planting should proceed in in spring or autumn when there should be good amounts of rainfall but limited risk of frost. ■ Utilise a range of native and locally sourced species, with at least 5 species per 30m stretch, including tall tree specimens, such as oak *Quercus robur* or *Q. petraea*. Species should be selected in cognisance of tree pathogens and anticipated effects of climate change. ■ Prepare ground with appropriate mulching materials. ■ Ensure weeds/ competitive grasses are controlled around the base of planted shrubs and trees. This can be achieved by hand pulling or by applying a mulch such as wood chip or mats around the base of each tree. ■ Once established, management in line with prescription for enhanced hedgerows.	Suitably qualified contractor or conservation partner appointed by United Utilities.	
	■ Once established, management in line with prescription for enhanced hedgerows, above.		Year 2 onwards. Annual trimming on rotation once established. Other interventions on an ad-hoc basis.
Line of trees (enhanced)	Enhancement measures: ■ Undertake further survey to identify measures required for lines of trees to achieve moderate condition. ■ Based on the findings of the botanical survey (report number RVBC-BO-APP-008_02; RVBC-MH-APP-008_02, Appendix B), in order to reach good condition it will be necessary to undertake infill planting; and establish naturally vegetated buffer strips of at least 6m to protect the vegetation from farming or other anthropogenic operations.	Suitably qualified contractor or conservation partner appointed by United Utilities.	Year 1 only.
	■ Lines of trees should require little ongoing management beyond ensuring infill planting establishes successfully and buffer strip is maintained.		Year 2 onwards.

Annex D

MONITORING PRESCRIPTIONS
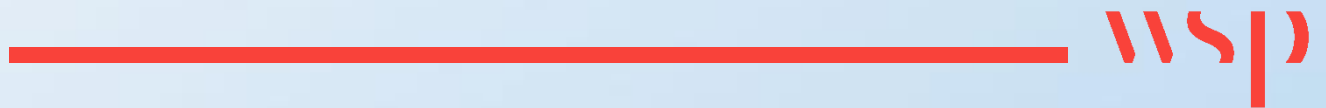
Table D1 – Monitoring prescriptions, responsibilities and work schedule

Ecological Feature	Monitoring Prescription	Responsible	Required (Years)	Date Last Undertaken	Actioned by
Grasslands (Lowland Hay Meadow and Other Neutral Grassland).	Annual monitoring visit (botanical survey and condition assessment) to assess progress to objectives and identify requirement for remedial measures. Monitoring to include audit to check on implementation of management measures.	Ecologist appointed by UU	1-5		
	Check for encroachment by invasive trees, shrubs, weed species and indicators of water logging (such as large sedges, rushes or reeds).				
	Monitoring visit every five years (botanical survey and condition assessment) to assess progress to objectives and identify requirement for remedial measures. Monitoring to include audit to check on implementation of management measures.		Years 10, 15, 20, 25 and 30.		
Lowland Fen	Annual monitoring visit (botanical survey and condition assessment) to assess progress to objectives and identify requirement for remedial measures. Monitoring to include audit to check on implementation of management measures	Ecologist appointed by UU	1-5		
	Check for encroachment by invasive/ undesirable species.				
	Monitor water levels and amend hydrological regime if required.	Hydrologist appointed by UU			

Ecological Feature	Monitoring Prescription	Responsible	Required (Years)	Date Last Undertaken	Actioned by
	Monitoring visit every five years (botanical survey and condition assessment) to assess progress to objectives and identify requirement for remedial measures. Monitoring to include audit to check on implementation of management measures.	Ecologist appointed by UU	Years 10, 15, 20, 25 and 30.		
Woodland, scrub, hedgerows and lines of trees	Annual monitoring visit (botanical survey and condition assessment) to assess progress to objectives and identify requirement for remedial measures. Monitoring to include audit to check on implementation of management measures.	Ecologist appointed by UU	1-5		
	Check tree guards for tightness and tree stem for overall condition, including damage by wild animals or disease.				
	Check that weeds/ competitive grasses are controlled around the base of planted trees.				
	Check that planted specimens are not failing to grow or have become diseased.				
	Check that non-native species do not account for more than 10% of the overall vegetation cover and that invasive species have not become established.				
	Monitoring visit every five years (botanical survey and condition assessment) to assess progress to objectives and identify requirement for remedial measures. Monitoring to include audit to check on implementation of management measures.		Years 10, 15, 20, 25 and 30.		

Ecological Feature	Monitoring Prescription	Responsible	Required (Years)	Date Last Undertaken	Actioned by
Temporary lakes ponds and pools	Annual survey and condition assessment survey to assess progress to objectives and identify requirement for remedial measures. Monitoring to include audit to check on implementation of management measures.	Ecologist appointed by UU	1-5		
	Monitoring visit every five years (botanical survey and condition assessment) to assess progress to objectives and identify requirement for remedial measures. Monitoring to include audit to check on implementation of management measures.		Years 10, 15, 20, 25 and 30.		

Annex E

CHANGE LOG

Table E1 below provides details of changes that have been made to this management plan alongside document references and justifications for any change. **Table E1 – Change log**

Date	Change	Reason	References / linked documents

Annex F

GLOSSARY

Table F1 – Terms of reference used in this document

Term	Description
BNG	Biodiversity Net Gain
Condition (of habitats)	Condition is defined as the quality of a habitat. For example, a habitat may be in poor condition if it fails to support some of the rare or notable species for which it is valued or if there are certain threats or disturbances affecting it such as pollution, erosion or invasive species. Assessed on a scale of poor, moderate, good in accordance with published guidance (at the time of writing, the Biodiversity Metric 3.0 Technical Supplement (2021)).
Distinctiveness (of habitats)	A collective measure of biodiversity, including parameters such as species richness, diversity, rarity and the degree to which a habitat supports species rarely found in other habitats. Classified on a scale of very low, low, medium, high or very high in BNG assessments.
Habitat of Principal Importance (HPI)	Habitats identified under Section 41 of the Natural Environment and Rural Communities Act (2006) as being priorities for the conservation of biodiversity in England. This list is used to guide decision-makers such as public bodies, including local and regional authorities, in implementing their duty under section 40 of the NERC Act, to have regard to the conservation of biodiversity in England when carrying out their normal functions.
Habitat unit (Hu)	Habitat Unit - this is a nominal figure that is derived from a calculation using numerical values assigned for the distinctiveness, condition and size (area), connectivity and strategic significance of a habitat. Post-Development Habitat Units are calculated using risk factor multipliers to aid the discussion of loss, impacts avoided and gains of habitat as a result of management and development activities. The tool automatically calculates the number of Habitat Units based on the information that the user inputs.
Hedgerow unit (HeU)	Hedgerow Unit – is the same as a habitat unit except that the measurement unit is length instead of area. HU and HeU cannot be added together for this reason.
Predictive System for Multimetrics (PSYM)	PSYM is a method for assessing the biological quality of still waters in England and Wales. Plant species and / or invertebrate families are surveyed using a standard method. The PSYM model makes predictions for the site based on environmental data and using a minimally impaired pond dataset.

Term	Description
	Comparison of the prediction and observed data gives a % score for ponds quality.

8 First Street
Manchester
M15 4RP

wsp.com

Appendix B

BOTANICAL SURVEY REPORT

\\\\sp

HAWESWATER AQUEDUCT RESILIENCE PROGRAMME

Botanical survey and condition assessment: Newton-in-Bowland

WSP

United Utilities

HAWESWATER AQUEDUCT RESILIENCE PROGRAMME

Botanical survey and condition assessment: Newton-in-Bowland

TYPE OF DOCUMENT (VERSION) PUBLIC

PROJECT NO. 70074191
OUR REF. NO. NB1

DATE: NOVEMBER 2021

WSP

8 First Street
Manchester
M15 4RP

Phone: +44 161 200 5000

WSP.com

QUALITY CONTROL

Issue/revision	First issue	Revision 1	Revision 2	Revision 3
Remarks	First issue			
Date	November 2021			
Prepared by	Stanley Whitfield			
Checked by	Hannah Williams			
Authorised by	Luke Roberts			
Project number	70074191			
Report number	NB1			
File reference	\\uk.wspgroup.com\central data\Projects\700741xx\70074191 - United Utilities - HARP BNG Offsetting\03 WIP\EC Ecology\05 Reports\Planning reports			

CONTENTS

TABLES

FIGURES

ANNEXES

ANNEX A

SPECIES DATA AND CONDITION ASSESSMENTS

1 INTRODUCTION

1.1 PROJECT BACKGROUND

1.1.1. United Utilities are proposing a project known as Haweswater Aqueduct Resilience Project ('the Proposed Scheme').

1.1.2. There are six Tunnel Routes (TR) to the Proposed Scheme, known as TR1 to TR6. These traverse nine Local Planning Authorities (LPAs). A total of five Environment Statements are being produced, with some being submitted to more than one Local Planning Authority (LPA).

1.1.3. WSP UK Ltd ('WSP') have been commissioned to support the assessment and delivery of proposals for habitat compensation, as informed by Biodiversity Net Gain (BNG) assessments. These include sites within and outside of the Proposed Scheme's Red Line Boundary (RLB, hereafter 'the Site'), where additional habitat creation and/ or enhancements are proposed, beyond simple reinstatement. These sites are hereafter referred to as 'Habitat Creation Site(s)'.

1.1.4. BNG assessments of proposals for habitat compensation were produced earlier in 2021 by WSP. These were based upon a mixture of data sources, including interpretation of aerial imagery and rapid walkover assessments. This report presents the methods and results of surveys undertaken with the objective of gathering updated habitat data.

1.2 SCOPE OF REPORT

1.2.1. This report presents a botanical survey and habitat condition assessment of the Newton-in-Bowland Habitat Creation Site, Newton-in-Bowland, BB7 3ED. Grid Reference: SD 6961 4998. The following information is set out within this report:

- The methods and results of a desk-based assessment to check for records of notable plants within or adjacent to the Habitat Creation Site.
- The methods and results of a botanical assessment survey to map habitats present and determine habitat condition.

1.2.2. The data collected here will inform an update to BNG calculations previously undertaken (see report number RVBC-BO-APP-008_02) to allow a more accurate description of the baseline of this Habitat Creation Site. This in turn will be used to re-assess what is possible to offset at the Site, and to allow a more appropriate, refined design of habitat creation and enhancement proposals.

HAWESWATER AQUEDUCT RESILIENCE PROGRAMME
Project No.: 70074191 | Our Ref No.: NB1
United Utilities

PUBLIC | WSP
November 2021
Page 1 of 33

2 METHODS

2.1 DESK-BASED ASSESSMMENT

2.1.1. Lancashire Environment Records Network (LERN) was contacted to request records of vascular plant species from within 0.5km of Newton-in-Bowland Habitat Creation Site. Records of non-statutory designated sites overlapping with this Site were also requested.

2.2 BOTANICAL ASSESSMENT

2.2.1. Surveys combined three elements. These were: National Vegetation Classification (NVC), UKHab classification and condition assessment. The methods are presented as follows.

2.2.2. The surveys were undertaken with reference to the NVC guidelines (Rodwell, 2006). Methods were modified to enable a rapid assessment of habitat types present and focused on areas of habitat likely to be affected by habitat enhancement or creation works.

2.2.3. A site walkover was undertaken to identify homogenous stands of vegetation. Maps were hand drawn onto field maps and subsequently digitised. Homogenous vegetation stands were given the corresponding NVC community code to identify them. Stands were surveyed qualitatively to record dominant and constant species, sub-dominant species and other species present, and an overall species list was collated. An overall qualitative description and photographs were collected for each habitat type.

2.2.4. As areas were not subject to quadrat sampling, plant species abundance was recorded qualitatively using the DOMIN scale (see Table 2-1).

2.2.5. The collected data was assembled in a floristic species table – these included frequencies as per the DOMIN scale.

Table 2-1 - Domin Scale

Cover %	Domin value
91-100	10
76-90	9
51-75	8
34-50	7
26-33	6
11-25	5
4-10	4
<4 with many individuals	3
<4 with several individuals	2

HAWESWATER AQUEDUCT RESILIENCE PROGRAMME
Project No.: 70074191 | Our Ref No.: NB1
United Utilities

PUBLIC | WSP
November 2021
Page 2 of 33

Cover %	Domin value
<4 with few individuals	1

2.2.6. Vegetation samples were compared to the published NVC community descriptions and floristic tables (Rodell *et al.* 1991-2000) and classified to community level based on professional judgement and the use of keys within the published descriptions. In some cases, there was some ambiguity regarding NVC classification, in which case this was noted. Not all habitats are well covered by the NVC system and in some cases no NVC classification was assigned.

2.2.7. Habitats were also assigned a classification in accordance with the UKHab classification system (UK Habitat Classification Working Group, 2020).

2.2.8. Condition assessments were performed for each of the recorded habitat types utilising the guidance contained within the Natural England Biodiversity Metric 3.0 Technical Supplement (Panks et al. 2021). For each assessment, notes were made with regard to each criterion, including reasons for failure or if there was any ambiguity regarding assessment against condition criteria.

2.3 PERSONNEL AND DATES OF SURVEY

2.3.1. The survey was completed on the 20 July 2021 in fine weather conditions. The survey was led by a Principal Ecologist with over ten years' experience of habitat survey and who is a full member of the Chartered Institute of Ecology and Environmental Management. The surveyor has completed the Botanical Society of Britain and Ireland Field Studies Identification Certificate and achieved Level 4, which is recommended by as the competence threshold for NVC survey.

2.4 NOTES AND LIMITATIONS

2.4.1. The survey approach implemented a modified rapid approach to NVC survey, focusing on dominant habitats and/ or those that would be the subject of habitat creation and enhancement proposals.

2.4.2. Aquatic habitats were not subject to condition assessment as part of this survey which involves utilising an alternative methodology to that employed with regard to terrestrial habitats. Any proposals to enhance or alter aquatic habitats should be informed by a separate condition assessment survey.

HAWESWATER AQUEDUCT RESILIENCE PROGRAMME
Project No.: 70074191 | Our Ref No.: NB1
United Utilities

PUBLIC | WSP
November 2021
Page 3 of 33

3 RESULTS

3.1 DESK STUDY

3.1.1. LERN returned records of 59 plant species which had been recorded within 1 km of the site.

3.1.2. No notable plant species were recorded on or adjacent to the Habitat Creation Site. The nearest notable plant species record was bluebell *Hyacinthoides non-scripta*, a species with schedule 8 status, located approximately 0.17 km away.

3.1.3. Seven invasive species records were obtained, although none of the recorded where from within or adjacent to the Habitat Creation Site, the nearest record being 0.6 km from the Habitat Creation Site.

3.1.4. The Habitat Creation Site does overlaps with the Gamble Hole Farm Pasture Local Wildlife Site but does not occur within or adjacent to any other non-statutory or statutory designated nature conservation site.

3.1.5. Gamble Hole Farm Pasture Local Wildlife Site is an area of wet, semi-natural, neutral grassland with springs and flushes and is designated due to priority fen habitat.

3.2 FIELD SURVEY

OVERVIEW

3.2.1. The Site contains a mixture of habitats dominated by grassland, hedgerows, lines of trees and a river. The distribution of these habitats is shown on **Figure 1**. A total of six homogenous terrestrial habitat types were recorded within 33 identified features. The six terrestrial habitat types are as follows:

- Rush pastured RP1 – RP3
- Line of trees L1 – L10
- Grasslands G1 – G9
- Hedgerows H1 – H9
- River R1
- Ditch D1

3.2.2. Descriptions, habitat classifications, photographs and habitat condition assessment outcomes are provided below. Species lists, floristic tables and full habitat condition assessments are provided in **Appendix A**.

HAWESWATER AQUEDUCT RESILIENCE PROGRAMME
Project No.: 70074191 | Our Ref No.: NB1
United Utilities

PUBLIC | WSP
November 2021
Page 4 of 33

RUSH PASTURE RP1

Description	Rush *Juncus* spp. pasture in south-west corner of modified grassland field; recently grazed, but livestock were not present when the visit was undertaken. Area of pasture were not stock-proof; i.e. not fenced, thus accessible to livestock. The pasture was dominated by hard rush *Juncus inflexus*, with white clover *Trifolium repens* frequent. Field horsetail *Equisetum arvense*, marsh bedstraw *Galium palustre*, water mint *Mentha aquatica*, creeping cinquefoil *Potentilla reptans*, meadow buttercup *Ranunculus acris*, and creeping buttercup *Ranunculus repens* feature occasionally throughout the pasture.
NVC classification	M23 *Juncus effusus/acutiflorus-Galium palustre* rush-pasture It should be noted that *Juncus inflexus* is not typical of this NVC community, which is usually dominated either by soft rush *Juncus effusus* or sharp-flowered rush *Juncus acutiflorus*, however, the community otherwise has greatest affinity to this community class.
UKHab classification	f2a Lowland fens
Condition	Good

RUSH PASTURE – RUNNING DITCH RP2

Description	Running ditch within Grassland G6. Livestock had access to the ditch causing soil erosion in some areas and pollution of watercourse. Dominated by soft rush, hard rush, water forget-me-not *Myosotis scorpioides* and *Poa* sp.. Common bent *Agrostis capillaris*, sweet vernal-grass *Anthoxanthum odoratum*, crested dog's-tail *Cynosurus cristatus*, Yorkshire fog *Holcus lanatus* and water mint all featured frequently.
NVC classification	M23b *Juncus effusus/acutiflorus-Galium palustre* rush-pasture, *Juncus effusus* sub-community
UKHab classification	f2a Lowland fens
Condition	Poor

HAWESWATER AQUEDUCT RESILIENCE PROGRAMME
Project No.: 70074191 | Our Ref No.: NB1
United Utilities

PUBLIC | WSP
November 2021
Page 5 of 33

![WSP logo]

RUSH PASTURE – WETLAND RP3

Description	Wetland situated north of Grassland G7 and Hedgerow H10. Evidence of livestock being able to access in some places. Soft rush dominated with stinging nettle frequent *Urtica dioica*. Large sedge (unidentified; but swamp community found nearby suggests this could be lesser pond sedge *Carex acutiformis*) and water mint occasional.
NVC classification	M23b *Juncus effusus/acutiflorus-Galium palustre* rush-pasture, *Juncus effusus* sub-community
UKHab classification	f2a Lowland fens
Photograph	
Condition	Good

HAWESWATER AQUEDUCT RESILIENCE PROGRAMME
Project No.: 70074191 | Our Ref No.: NB1
United Utilities

PUBLIC | WSP
November 2021
Page 6 of 33

LINE OF TREES L1

Description	Line of trees towards the north-western boundary with mature sycamore *Acer pseudoplatanus*, ash *Fraxinus excelsior*, oak *Quercus robur* and hawthorn *Crataegus monogyna*. Situated within modified grassland with evidence of grazing right to the base of the trees. Soil erosion around tree roots indicative of the recent presence of livestock.
NVC classification	n/a
UKHab classification	w1g6 Line of trees
Condition	Poor

LINE OF TREES L2

Description	Line of trees forming the field boundary between Grassland G3 and Grassland G1. Alder *Alnus glutinosa* was the dominant tree species with sycamore, ash, willow *Salix* sp., holly *Ilex aquifolium*, and oak also present. The understorey was dominated by meadowsweet *Filipendula ulmaria* with soft rush *Juncus effusus* also frequently present. Meadow foxtail *Alopecurus pratensis*, field horsetail *Equisetum arvense*, jointed rush *Juncus articulatus*, meadow vetchling *Lathyrus pratensis*, common bird's-foot-trefoil, *Lotus corniculatus* and rough meadow-grass *Poa trivialis* appeared throughout but not as frequently as soft rush. No evidence of significant grazing within the feature.
NVC classification	n/a
UKHab classification	w1g6 Line of trees
Photograph	
Condition	Poor

HAWESWATER AQUEDUCT RESILIENCE PROGRAMME
Project No.: 70074191 | Our Ref No.: NB1
United Utilities

PUBLIC | WSP
November 2021
Page 7 of 33

LINE OF TREES L3

Description	Line of trees along the boundary between Grassland G4 and Grassland G2. Historically likely a hedge but long since defunct. Some mature hawthorn, elder *Sambucus nigra* and semi-mature ash trees were present. Yorkshire fog, perennial rye-grass *Lolium perenne* and rough meadow-grass dominated the understorey along with stinging nettles. Creeping thistle *Cirsium arvense* and broad-leaved dock *Rumex obtusifolius* were occasional.
NVC classification	n/a
UKHab classification	w1g6 Line of trees
Photograph	
Condition	Moderate

HAWESWATER AQUEDUCT RESILIENCE PROGRAMME
Project No.: 70074191 | Our Ref No.: NB1
United Utilities

PUBLIC | WSP
November 2021
Page 8 of 33

LINE OF TREES L4

Description	Line of trees situated on northern field boundary of Grassland G6. Positioned midway along slope going from north to south towards the river. The feature was composed of mature ash trees and occasional hawthorn with an understorey of stinging nettles, creeping thistle and Yorkshire fog. Clear evidence of sheep presence around the base of the trees with exposed roots as a result of soil erosion.
NVC classification	n/a
UKHab classification	w1g6 Line of trees
Condition	Poor

LINE OF TREES L5

Description	Line of trees along north-western field boundary of Grassland G7. Composed of mature ash and sycamore trees with occasional hawthorn and rare bird cherry *Prunus padus*. Understorey was dominated by Yorkshire fog, stinging nettle and perennial rye-grass. Impacts of livestock presence was in effect here with exposed roots and evidence of grazing.
NVC classification	n/a
UKHab classification	w1g6 Line of trees
Photograph	
Condition	Moderate

HAWESWATER AQUEDUCT RESILIENCE PROGRAMME
Project No.: 70074191 | Our Ref No.: NB1
United Utilities

PUBLIC | WSP
November 2021
Page 9 of 33

LINE OF TREES L6

Description	Line of trees along the field boundaries of Grassland G8 and Grassland G9. Composed of mature ash trees with hawthorn and blackthorn *Prunus spinosa* interspersed throughout. The understorey was dominated by stinging nettle with Yorkshire fog less frequent. Creeping thistle and cock's-foot were occasional.
NVC classification	n/a
UKHab classification	w1g6 Line of trees
Photograph	
Condition	Moderate

HAWESWATER AQUEDUCT RESILIENCE PROGRAMME
Project No.: 70074191 | Our Ref No.: NB1
United Utilities

PUBLIC | WSP
November 2021
Page 10 of 33

LINE OF TREES L7

Description	Line of trees along the north-west field boundary of Grassland G9. Several mature ash trees formed the dominant woody species cover with hawthorn occasional and hazel *Corylus avellana* infrequent. The understorey was dominated by stinging nettles with Yorkshire fog appearing frequently. Cock's-foot was also frequent throughout with creeping thistle and smooth meadow-grass occasional.
NVC classification	n/a
UKHab classification	w1g6 Line of trees
Photograph	
Condition	Poor

HAWESWATER AQUEDUCT RESILIENCE PROGRAMME
Project No.: 70074191 | Our Ref No.: NB1
United Utilities

PUBLIC | WSP
November 2021
Page 11 of 33

LINE OF TREES L8

Description	Line of trees on the north-eastern field boundary of Grassland G9. Several mature ash trees and hawthorn form the dominant woody species cover with sycamore and wild cherry *Prunus avium* rare. The understorey was dominated by stinging nettles with Yorkshire fog featuring occasionally. Cock's-foot, perennial rye-grass, rough meadow-grass and creeping buttercup all featured infrequently.
NVC classification	n/a
UKHab classification	w1g6 Line of trees
Photograph	
Condition	Moderate

HAWESWATER AQUEDUCT RESILIENCE PROGRAMME
Project No.: 70074191 | Our Ref No.: NB1
United Utilities

PUBLIC | WSP
November 2021
Page 12 of 33

LINE OF TREES L9

Description	Line of trees on the south-eastern aspect of a narrow track west of the River Hodder. Dominated by mature beech *Fagus sylvatica* with mature ash trees wych elm *Ulmus glabra* interspersed occasionally throughout. Alder was rarely present of the other woody species. The understorey was composed of frequent false oat-grass *Arrhenatherum elatius* and rough meadow-grass. Bearded couch *Elymus caninus* and germander speedwell *Veronica chamaedrys* were occasionally present and bryophytes formed a carpet along an adjoining stone wall.
NVC classification	W12 *Fagus sylvatica-Mercurialis perennis* woodland
UKHab classification	w1c6 Beech forests on neutral to rich soils (H9130)
Condition	Moderate

LINE OF TREES L10

Description	Line of trees on the north western aspect of narrow track west of the river Hodder. Dominated by mature beech trees with hawthorn, sycamore, ash, hazel and wych elm all infrequent. Rarely occurring *Rosa* sp. was the only other woody species present. The understorey featured an extensive list of species which can be found in the species data table for Line of trees L10 in **Appendix A**.
NVC classification	W12 *Fagus sylvatica-Mercurialis perennis* woodland
UKHab classification	w1c6 Beech forests on neutral to rich soils (H9130)
Condition	Poor

HAWESWATER AQUEDUCT RESILIENCE PROGRAMME
Project No.: 70074191 | Our Ref No.: NB1
United Utilities

PUBLIC | WSP
November 2021
Page 13 of 33

GRASSLAND G1

Description	Neutral grassland in north western area of the Site. Evidence of grazing in recent past. Dominated by Yorkshire fog and perennial rye-grass with crested dog's-tail also frequent. White clover was relatively common within the stand, whilst creeping thistle and creeping buttercup were less frequent.
NVC classification	MG6a *Lolium perenne-Cynosurus cristatus* grassland, typical sub-community
UKHab classification	g3c Other neutral grassland
Condition	Poor

GRASSLAND G2

Description	Area of neutral grassland currently grazed by sheep. Strong gradient from north-east down to south-west of the Site. Grassland was dominated by crested dog's-tail, fescue *Festuca* sp., Yorkshire fog, perennial rye-grass and meadow-grass *Poa* sp.. White clover, creeping thistle, greater plantain *Plantago major* were also present throughout the grassland.
NVC classification	MG6
UKHab classification	g3c Other neutral grassland
Condition	Poor

HAWESWATER AQUEDUCT RESILIENCE PROGRAMME
Project No.: 70074191 | Our Ref No.: NB1
United Utilities

PUBLIC | WSP
November 2021
Page 14 of 33

![wsp]

GRASSLAND G3

Description	Area of neutral grassland with no recent evidence of livestock but appeared mown within the last month. Yorkshire fog was by far the most dominant species with creeping buttercup and broad-leaved dock appearing frequently within the grassland.
NVC classification	MG6a *Lolium perenne-Cynosurus cristatus* grassland, typical sub-community
UKHab classification	g3c Other neutral grassland
Photograph	
Condition	Poor

HAWESWATER AQUEDUCT RESILIENCE PROGRAMME
Project No.: 70074191 | Our Ref No.: NB1
United Utilities

PUBLIC | WSP
November 2021
Page 15 of 33

GRASSLAND G4

Description	Area of neutral grassland with evidence of recent mowing. No livestock present. Gradient from north to south of feature. Perennial rye-grass and Yorkshire fog were the two dominant species within the grassland. Sweet vernal-grass, meadow buttercup and broad-leaved dock were the next most prevalent species occurring within the grassland.
NVC classification	MG6a *Lolium perenne-Cynosurus cristatus* grassland, typical sub-community
UKHab classification	g3c Other neutral grassland
Photograph	
Condition	Poor

HAWESWATER AQUEDUCT RESILIENCE PROGRAMME
Project No.: 70074191 | Our Ref No.: NB1
United Utilities

PUBLIC | WSP
November 2021
Page 16 of 33

GRASSLAND G5

Description	Modified grassland field in western extent of the Site boundary. Intensively grazed by sheep. Perennial rye-grass was the dominant species in the grassland with sweet vernal-grass also featuring throughout. Creeping thistle, cock's-foot and annual meadow-grass *Poa annua* were noticeably present throughout but not as frequently as the sweet vernal-grass. Red fescue *Festuca rubra* and white clover occasionally occurred. There was a steep gradient on the Site parallel to Hedgerow H5 and Hedgerow H6 going from south-east to north-west where it plateaued out.
NVC classification	MG7 *Lolium perenne* leys and related grasslands
UKHab classification	g4 Modified grassland
Photograph	
Condition	Moderate

HAWESWATER AQUEDUCT RESILIENCE PROGRAMME
Project No.: 70074191 | Our Ref No.: NB1
United Utilities

PUBLIC | WSP
November 2021
Page 17 of 33

GRASSLAND G6

Description	Large area of neutral grassland north of the river Hodder with livestock present. Perennial rye-grass dominated with creeping bent *Agrostis stolonifera*, Yorkshire fog and annual meadow-grass also prominent. Common bent and creeping thistle appeared occasionally.
NVC classification	MG7b *Lolium perenne* leys and related grasslands, *Lolium perenne-Poa trivialis* leys
UKHab classification	g3c Other neutral grassland
Condition	Poor

GRASSLAND G7

Description	Neutral grassland heavily grazed by sheep. Yorkshire fog dominated with perennial rye-grass frequent. Common bent-grass *Agrostis stolonifera*, common mouse-ear *Cerastium fontanum* and meadow-grass *Poa* sp. were occasional throughout.
NVC classification	MG10 *Holcus lanatus-Juncus effusus* rush-pasture
UKHab classification	g3c8 *Holcus-Juncus* neutral grassland
Condition	Poor

HAWESWATER AQUEDUCT RESILIENCE PROGRAMME
Project No.: 70074191 | Our Ref No.: NB1
United Utilities

PUBLIC | WSP
November 2021
Page 18 of 33

![WSP logo]

GRASSLAND G8

Description	Modified grassland north-west of Line of trees L5. Dominated by Yorkshire fog and perennial rye-grass. Common bent, sweet vernal-grass and soft rush were also frequent.
NVC classification	MG10a *Holcus lanatus-Juncus effusus* rush-pasture, typical sub-community
UKHab classification	g3c8 *Holcus-Juncus* neutral grassland
Photograph	
Condition	Moderate

HAWESWATER AQUEDUCT RESILIENCE PROGRAMME
Project No.: 70074191 | Our Ref No.: NB1
United Utilities

PUBLIC | WSP
November 2021
Page 19 of 33

![WSP logo]

GRASSLAND G9

Description	Neutral grassland field had evidence of recent mowing though there was no evidence of recent livestock presence. Almost exclusively composed of Yorkshire fog. Rare creeping thistle, meadow buttercup, creeping buttercup, common sorrel *Rumex acetosa*, broad-leaved dock and stinging nettle.
NVC classification	MG10a *Holcus lanatus-Juncus effusus* rush-pasture, typical sub-community
UKHab classification	g3c8 *Holcus-Juncus* neutral grassland
Photograph	
Condition	Poor

HAWESWATER AQUEDUCT RESILIENCE PROGRAMME
Project No.: 70074191 | Our Ref No.: NB1
United Utilities

PUBLIC | WSP
November 2021
Page 20 of 33

HEDGEROW H1

Description	Hedgerow along boundary of Grassland G1 and Grassland G2. Defunct hawthorn hedge with a dominant understorey of creeping thistle, crested dog's-tail, Yorkshire fog and perennial rye-grass. False oat-grass and white clover also featured frequently amongst the hedge understorey.
NVC classification	W21 *Crataegus monogyna-Hedera helix* scrub
UKHab classification	h2a Hedgerow (priority habitat)
Condition	Poor

HAWESWATER AQUEDUCT RESILIENCE PROGRAMME
Project No.: 70074191 | Our Ref No.: NB1
United Utilities

PUBLIC | WSP
November 2021
Page 21 of 33

HEDGEROW H2

Description	Hedgerow with trees that form the boundary between Grassland G2 and Grassland G3. Post and wire-mesh fence on south-west aspect of hedge that prevented access of livestock to south-west aspect. North-east aspect displayed damage from livestock around the base of the hedgerow with exposed roots from soil erosion and grazing suppression of leafy growth to about a 1.5m height. The hedge was predominantly hawthorn with hazel, dog rose *Rosa canina* and ash also present. Ash trees were present, mainly along the north-west stretch of hedge. The understorey did not appear subject to grazing. Yorkshire fog was dominant; perennial rye-grass; common bent, sweet vernal-grass, false oat-grass, creeping thistle, stinging nettle were regularly featuring.
NVC classification	W21 *Crataegus monogyna-Hedera helix* scrub
UKHab classification	h2a Hedgerow (priority habitat)
Photograph	
Condition	Moderate

HAWESWATER AQUEDUCT RESILIENCE PROGRAMME
Project No.: 70074191 | Our Ref No.: NB1
United Utilities

PUBLIC | WSP
November 2021
Page 22 of 33

HEDGEROW H3

Description	Defunct hedgerow along northern boundary of Grassland G4. No evidence of any management for a while. Hedge composed of hawthorn with an understorey dominated by Yorkshire fog. Rough meadow-grass was also frequent within the understorey with bent *Capillaris* sp. and perennial rye-grass featuring less frequently.
NVC classification	W21 *Crataegus monogyna-Hedera helix* scrub
UKHab classification	h2a Hedgerow (priority habitat)
Photograph	
Condition	Poor

HAWESWATER AQUEDUCT RESILIENCE PROGRAMME
Project No.: 70074191 | Our Ref No.: NB1
United Utilities

PUBLIC | WSP
November 2021
Page 23 of 33

HEDGEROW H4

Description	Intact hedgerow along southern field boundary of Grassland G4 and the road. Hawthorn was dominant with bird cherry, ash and hazel the other woody species present. The understorey and margin were dominated by Yorkshire fog with creeping thistle, stinging nettle and cleavers *Galium aparine* all frequent. Well managed hedge.
NVC classification	W21 *Crataegus monogyna-Hedera helix* scrub
UKHab classification	h2a Hedgerow (priority habitat)
Photograph	
Condition	Moderate

HAWESWATER AQUEDUCT RESILIENCE PROGRAMME
Project No.: 70074191 | Our Ref No.: NB1
United Utilities

PUBLIC | WSP
November 2021
Page 24 of 33

HEDGEROW H5

Description	Hedgerow with trees along field boundary of Grassland G5 with road on north-east aspect. Sheep were grazing in field and present in and around the hedgerow with intense grazing and soil erosion around the base of the hedgerow and associated trees. The hedgerow was composed of dominant hawthorn with ash and elm *Ulmus minor* the other woody species in the hedgerow. Mature ash trees appeared throughout. Stinging nettles dominated the understorey with creeping thistle and meadowsweet also prominent. Perennial rye-grass also featured throughout albeit less frequent than the aforementioned species.
NVC classification	W21 *Crataegus monogyna-Hedera helix* scrub
UKHab classification	h2a Hedgerow (priority habitat)
Photograph	
Condition	Moderate

HAWESWATER AQUEDUCT RESILIENCE PROGRAMME
Project No.: 70074191 | Our Ref No.: NB1
United Utilities

PUBLIC | WSP
November 2021
Page 25 of 33

HEDGEROW H6

Description	Hedgerow on the south-west boundary of Grassland G5. No signs of recent management and clear signs of the prolonged impacts of livestock. No leafy growth around the base and soil erosion around roots from livestock. The hedge was dominated by hawthorn as the only woody species. The understorey was composed of dominant stinging nettle with perennial rye-grass and Yorkshire fog also prominent. Creeping thistle and spear thistle *Cirsium vulgare* were less frequent but featured sporadically throughout.
NVC classification	W21 *Crataegus monogyna-Hedera helix* scrub
UKHab classification	h2a Hedgerow (priority habitat)
Photograph	
Condition	Poor

HAWESWATER AQUEDUCT RESILIENCE PROGRAMME
Project No.: 70074191 | Our Ref No.: NB1
United Utilities

PUBLIC | WSP
November 2021
Page 26 of 33

HEDGEROW H7

Description	Defunct hedgerow running perpendicular to Hedgerow H6 and formed a part of the field boundary for Grassland G5 in collaboration with a post and wire-mesh fence. Livestock pressures were in effect from both sides of the hedgerow and coupled with a lack of management had resulted in a poor condition. The remaining hedge was comprised of dominant hawthorn. The understorey was just an extension of the species present in Grassland G5.
NVC classification	W21 *Crataegus monogyna-Hedera helix* scrub
UKHab classification	h2a Hedgerow (priority habitat)
Photograph	
Condition	Poor

HAWESWATER AQUEDUCT RESILIENCE PROGRAMME
Project No.: 70074191 | Our Ref No.: NB1
United Utilities

PUBLIC | WSP
November 2021
Page 27 of 33

HEDGEROW H8

Description	Hedgerow between Rush Pasture RP3 and Grassland G7. Wet ditch at base of hedge. Livestock access in and around hedge causing severe soil erosion and grazing impacts on leafy growth around the hedge base. The hedge was composed of hawthorn with an understorey dominated by Yorkshire fog with perennial rye-grass and stinging nettle frequent. Soft rush, hard rush and water mint occurred occasionally.
NVC classification	W21 *Crataegus monogyna-Hedera helix* scrub
UKHab classification	h2a Hedgerow (priority habitat)
Condition	Poor

HEDGEROW H9

Description	Small section of hedgerow forming a northern field boundary of Grassland G7. Similarly to Hedgerow H9, severe damage from livestock. Hawthorn was the sole woody species within the hedge. The understorey was composed of dominant stinging nettle with frequent Yorkshire fog. Perennial rye-grass occurred occasionally with creeping thistle less frequent and common mouse-ear rare.
NVC classification	W21 *Crataegus monogyna-Hedera helix* scrub
UKHab classification	h2a Hedgerow (priority habitat)
Condition	Moderate

HAWESWATER AQUEDUCT RESILIENCE PROGRAMME
Project No.: 70074191 | Our Ref No.: NB1
United Utilities

PUBLIC | WSP
November 2021
Page 28 of 33

RIVER R1

Description	No condition assessment undertaken for aquatic features. River Hodder running through agricultural landscape, with modified grassland adjacent to the southern bank and woodland outside of the Site bordering the northern bank.
NVC classification	n/a
UKHab classification	r2a Rivers (priority habitat)
Photograph	
Condition	n/a

HAWESWATER AQUEDUCT RESILIENCE PROGRAMME
Project No.: 70074191 | Our Ref No.: NB1
United Utilities

PUBLIC | WSP
November 2021
Page 29 of 33

DITCH D1

Description	Wet ditch running east to west, in northern aspect of Grassland G7 running along Hedgerow H9. Livestock seen in watercourse and evidence of access all along stretch. *Carex* sp. (considered likely to be lesser pond sedge due to associates with affinity to this community) was the most the prevalent species with marsh willowherb *Epilobium palustre*, hoary willowherb *Epilobium parviflorum*, marsh-bedstraw *Galium palustre* and Yorkshire fog all infrequent throughout.
NVC classification	S7 *Carex acutiformis* swamp
UKHab classification	n/a
Condition	Moderate

HAWESWATER AQUEDUCT RESILIENCE PROGRAMME
Project No.: 70074191 | Our Ref No.: NB1
United Utilities

PUBLIC | WSP
November 2021
Page 30 of 33

4 CONCLUSION

4.1.1. This report presents the outcome of botanical surveys including condition assessments carried out at Newton-in-Bowland. The data presented herein, including accompanying Geographical Information System (GIS) files are intended to be used to inform proposals for habitat creation and enhancement. It is recommended that these surveys are updated if a period of greater than three years elapses prior to the commencement of habitat improvements.

HAWESWATER AQUEDUCT RESILIENCE PROGRAMME
Project No.: 70074191 | Our Ref No.: NB1
United Utilities

PUBLIC | WSP
November 2021
Page 31 of 33

5 REFERENCES

- Panks et al. (2021). Biodiversity metric 3.0: Auditing and accounting for biodiversity – User Guide. Natural England.
- Rodwell, J.S. (Ed), et al. (1991 – 2000). British Plant Communities (5 volumes). Cambridge, Cambridge University Press.
- Rodwell, (1996). National Vegetation Classification: Users' Handbook Joint Nature Conservation Committee, Peterborough.
- UK Habitat Classification Working Group (2020). UK Habitat Classification – Habitat Definitions V1.1 at. Available online: https://ukhab.org/ukhab-documentation [Accessed: May 2021]

HAWESWATER AQUEDUCT RESILIENCE PROGRAMME
Project No.: 70074191 | Our Ref No.: NB1
United Utilities

PUBLIC | WSP
November 2021
Page 32 of 33

6   FIGURES

FIGURE 1 - HABITAT SURVEY RESULTS

HAWESWATER AQUEDUCT RESILIENCE PROGRAMME
Project No.: 70074191 | Our Ref No.: NB1
United Utilities

PUBLIC | WSP
November 2021
Page 33 of 33

Legend

- **TR3 Site Boundary** (red outline)
- **Newton in Bowland Habitat Creation Site Boundary** (blue dashed outline)
- **Survey Area** (magenta outline)
- **h2a - hedgerows (priority habitat)** (dark green line)
- **w1c6 - line of trees, beech forest** (green dotted line)
- **w1g6 - line of trees, other woodland; broadleaved** (dark green dotted line)
- **f2a - lowland fens** (pink/yellow hatched)
- **g3c - other neutral grassland** (light green)
- **g3c8 - Holcus-Juncus neutral grassland** (light green dotted)
- **g4 - modified grassland** (green)
- **r1 - standing open water and canals** (blue hatched)
- **r2a - rivers and lakes** (cyan)
- **u15 - developed land sealed surface** (red dotted)

Map labels: Grassland G1, Rush Pasture RP1, Grassland G2, Grassland G3, Grassland G4, Grassland G5, Grassland G6, Grassland G7, Grassland G8, Grassland G9, Rush pasture RP2, Rush pasture RP3, Ditch D1, River R1

wsp

Client:
United Utilities

Project:
Haweswater Aqueduct Resilience Programme

Title:
Figure 1 - Habitatl Survey Results

Drawing No:	Layers		Drawn:	ST
Date:	03/11/2021		Checked:	LR
Scale:	5,200 @ A3		Approved:	TB

Scale: 0   50   100 Metres

Appendix A

SPECIES DATA AND CONDITION ASSESSMENTS
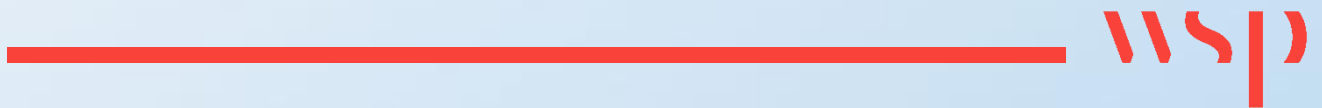
RUSH PASTURE RP1

SPECIES DATA

Common Name	Scientific Name	DOMIN
Hard rush	*Juncus inflexus*	9
White clover	*Trifolium repens*	4
Field horsetail	*Equisetum arvense*	3
Marsh bedstraw	*Galium palustre*	3
Water mint	*Mentha aquatica*	3
Creeping cinquefoil	*Potentilla reptans*	3
Meadow buttercup	*Ranunculus acris*	3
Creeping buttercup	*Ranunculus repens*	3
Hairy sedge	*Carex hirta*	2
Marsh thistle	*Cirsium palustre*	2
Marsh willowherb	*Epilobium palustre*	2
Meadowsweet	*Filipendula ulmaria*	2
Soft rush	*Juncus effusus*	2

CONDITION ASSESSMENT

Condition Assessment Criteria			
CORE CRITERIA - Applicable to all wetland habitat types:			
1	The water table is at or near the surface throughout the year, this could be open water or saturation of soil at the surface. There is no artificial drainage, unless specifically to maintain water levels as specified above. NB - this criterion is non-negotiable for achieving good condition.	Pass	Assumed to be damp at surface most of year due to species present such as water mint and meadowsweet.
2	The appearance and composition of the vegetation closely matches characteristics of the specific wetland habitat type (see definitions and links above). Indicator species for the specific wetland habitat type are very clearly and easily visible.	Pass	Difficult to know if it matches the specific wetland type closely as habitat description is broad. Considered to have most affinity to M22; UKHab f2a. Pass is precautionary

Condition Assessment Criteria

3	The water supplies (groundwater, surfacewater and/or rainwater) to the wetland are of good water quality, with clear water (low turbidity) indicating no obvious signs of pollution.	Fail	Little surface water observed but in field grazed by sheep, likely to be polluted.
4	Cover of scrub and scattered trees less than 10%.	Pass	No scrub species
5	Cover of bare ground less that 5%.	Pass	No bare ground
6	There is an absence of invasive non-native species (as listed on Schedule 9 of WCA, 1981) and undesirable species make up less than 5% of ground cover.	Pass	No undesirable species recorded.
ADDITIONAL CRITERION - only applicable to Fen and Purple moor grass and rush pasture habitat type:			
7a	No more than 25% of the fen area has a continuous cover of litter (i.e. dead vegetation) preventing regeneration.	Pass	Less than 25% continuous cover of litter.

RUSH PASTURE – RUNNING DITCH RP2

SPECIES DATA

Common Name	Scientific Name	DOMIN
Soft rush	*Juncus effusus*	5
Hard rush	*Juncus inflexus*	5
Water forget-me-not	*Myosotis scorpioides*	5
Meadow grass species	*Poa sp.*	5
Common bent	*Agrostis capillaris*	4
Sweet vernal-grass	*Anthoxanthum odoratum*	4
Crested dog's-tail	*Cynosurus cristatus*	4
Yorkshire fog	*Holcus lanatus*	4
Water mint	*Mentha aquatica*	4
Oval sedge	*Carex ovalis*	3
Marsh horsetail	*Equisetum palustre*	3
Floating sweet-grass	*Glyceria fluitans*	3

CONDITION ASSESSMENT

	Condition Assessment Criteria		
1	The ditch is of good water quality, with clear water (low turbidity) indicating no obvious signs of pollution.	Pass	
2	A range of emergent, submerged and floating leaved plants are present. As a guide >10 species of emergent, floating or submerged plants in a 20 m ditch length.	Fail	Insufficient diversity
3	There is less than 10% cover of filamentous algae and/or duckweed (these are signs of eutrophication).	Pass	
4	A fringe of marginal vegetation is present along more than 75% of the ditch.	Pass	
5	Physical damage evident along less than 5% of the ditch, such as excessive poaching, damage from machinery use or storage, or any other damaging management activities.	Fail	Access by sheep
6	Sufficient water levels are maintained; as a guide a minimum summer depth of approximately 50 cm in minor ditches and 1 m in main drains.	Fail	Insufficient depth
7	Less than 10% of the ditch is heavily shaded.	Pass	
8	There is an absence of non-native plant and animal species.	Pass	

RUSH PASTURE – WETLAND RP3

SPECIES DATA

Common Name	Scientific Name	DOMIN
Soft rush	*Juncus effusus*	8
Stinging nettle	*Urtica dioica*	5
Large sedge		3
Water mint	*Mentha aquatica*	3
Meadowsweet	*Filipendula ulmaria*	2
Marsh willowherb	*Epilobium palustre*	2

CONDITION ASSESSMENT

Condition Assessment Criteria			
CORE CRITERIA - Applicable to all wetland habitat types:			
1	The water table is at or near the surface throughout the year, this could be open water or saturation of soil at the surface. There is no artificial drainage, unless specifically to maintain water levels as specified above. NB - this criterion is non-negotiable for achieving good condition.	Pass	
2	The appearance and composition of the vegetation closely matches characteristics of the specific wetland habitat type (see definitions and links above). Indicator species for the specific wetland habitat type are very clearly and easily visible.	Pass	Difficult to know if it matches the specific wetland type closely as habitat description is broad. Considered to have most affinity to M23b; UKHab f2a. Pass is precautionary
3	The water supplies (groundwater, surfacewater and/or rainwater) to the wetland are of good water quality, with clear water (low turbidity) indicating no obvious signs of pollution.	Pass	
4	Cover of scrub and scattered trees less than 10%.	Pass	
5	Cover of bare ground less that 5%.	Pass	
6	There is an absence of invasive non-native species (as listed on Schedule 9 of WCA, 1981)	Pass	

and undesirable species make up less than 5% of ground cover.		
ADDITIONAL CRITERION - only applicable to Fen and Purple moor grass and rush pasture habitat type:		
7a	No more than 25% of the fen area has a continuous cover of litter (i.e. dead vegetation) preventing regeneration.	Pass	

LINE OF TREES L1

SPECIES DATA

Common Name	Scientific Name	DOMIN
Sycamore	*Acer pseudoplatanus*	3
Ash	*Fraxinus excelsior*	3
Oak	*Quercus robur*	3
Hawthorn	*Crataegus monogyna*	2

CONDITION ASSESSMENT

	Condition Assessment Criteria		
1	More than 70% of trees are native species.	Pass	
2	Tree canopy is predominantly continuous with gaps in canopy cover making up <10% of total area and no individual gap being >5 m wide.	Fail	Gap more than 5m
3	Includes one or more mature or veteran tree.	Pass	All very mature
4	There is an undisturbed naturally vegetated strip of at least 6 m on both sides to protect the line of trees from farming and other anthropogenic operations.	Fail	No buffer strip
5	At least 95% of the trees are in a healthy condition (excluding veteran features valuable for wildlife). There is little or no evidence of an adverse impact on tree health by damage from livestock or wild animals, pests or diseases, or human activity.	Fail	Roots exposed on bank. Livestock able to move between trees.

LINE OF TREES L2

SPECIES DATA

Common Name	Scientific Name	DOMIN
Alder	*Alnus glutinosa*	3
Sycamore	*Acer pseudoplatanus*	2
Ash	*Fraxinus excelsior*	2
Willow	*Salix sp.*	2
Holly	*Ilex aquifolium*	1
Oak	*Quercus robur*	1
Meadow foxtail	*Alopecurus pratensis*	4
Wild angelica	*Angelica sylvestris*	3
Marsh-marigold	*Caltha palustris*	3
Common spotted-orchid	*Dactylorhiza fuchsii*	2
Hoary willowherb	*Epilobium parviflorum*	3
Field horsetail	*Equisetum arvense*	4
Meadowsweet	*Filipendula ulmaria*	6
Jointed rush	*Juncus articulatus*	4
Soft rush	*Juncus effusus*	5
Meadow vetchling	*Lathyrus pratensis*	4
Common bird's-foot-trefoil	*Lotus corniculatus*	4
Rough meadow-grass	*Poa trivialis*	4
Meadow buttercup	*Ranunculus acris*	3

CONDITION ASSESSMENT

	Condition Assessment Criteria		
1	More than 70% of trees are native species.	Pass	
2	Tree canopy is predominantly continuous with gaps in canopy cover making up <10% of total area and no individual gap being >5 m wide.	Fail	Gap more than 5m
3	Includes one or more mature or veteran tree.	Pass	All mature
4	There is an undisturbed naturally vegetated strip of at least 6 m on both sides to protect the line of trees from farming and other anthropogenic operations.	Fail	Buffer strip not large enough
5	At least 95% of the trees are in a healthy condition (excluding veteran features valuable for wildlife). There is little or no evidence of an adverse impact on tree health by damage from livestock or wild animals, pests or diseases, or human activity.	Fail	Suspected ash dieback

LINE OF TREES L3

SPECIES DATA

Common Name	Scientific Name	DOMIN
Yorkshire fog	*Holcus lanatus*	6
Perennial rye-grass	*Lolium perenne*	6
Rough meadow-grass	*Poa trivialis*	6
Stinging nettle	*Urtica dioica*	5
Creeping thistle	*Cirsium arvense*	4
Broad-leaved dock	*Rumex obtusifolius*	4
Hawthorn	*Crataegus monogyna*	2
Ash	*Fraxinus excelsior*	1
Elder	*Sambucus nigra*	1

CONDITION ASSESSMENT

	Condition Assessment Criteria		
1	More than 70% of trees are native species.	Pass	
2	Tree canopy is predominantly continuous with gaps in canopy cover making up <10% of total area and no individual gap being >5 m wide.	Pass	
3	Includes one or more mature or veteran tree.	Pass	
4	There is an undisturbed naturally vegetated strip of at least 6 m on both sides to protect the line of trees from farming and other anthropogenic operations.	Fail	No undisturbed strip present
5	At least 95% of the trees are in a healthy condition (excluding veteran features valuable for wildlife). There is little or no evidence of an adverse impact on tree health by damage from livestock or wild animals, pests or diseases, or human activity.	Fail	Ash dieback present

LINE OF TREES L4

SPECIES DATA

Common Name	Scientific Name	DOMIN
Stinging nettle	*Urtica dioica*	8
Creeping thistle	*Cirsium arvense*	6
Yorkshire fog	*Holcus lanatus*	5
Ash	*Fraxinus excelsior*	4
Hawthorn	*Crataegus monogyna*	3

CONDITION ASSESSMENT

	Condition Assessment Criteria		
1	More than 70% of trees are native species.	Pass	
2	Tree canopy is predominantly continuous with gaps in canopy cover making up <10% of total area and no individual gap being >5 m wide.	Fail	Gaps >5m
3	Includes one or more mature or veteran tree.	Pass	
4	There is an undisturbed naturally vegetated strip of at least 6 m on both sides to protect the line of trees from farming and other anthropogenic operations.	Fail	No undisturbed strip present due to grazing
5	At least 95% of the trees are in a healthy condition (excluding veteran features valuable for wildlife). There is little or no evidence of an adverse impact on tree health by damage from livestock or wild animals, pests or diseases, or human activity.	Fail	Ash dieback present

LINE OF TREES L5

SPECIES DATA

Common Name	Scientific Name	DOMIN
Yorkshire fog	*Holcus lanatus*	5
Perennial rye-grass	*Lolium perenne*	5
Stinging nettle	*Urtica dioica*	5
Hawthorn	*Crataegus monogyna*	4
Sycamore	*Acer pseudoplatanus*	3
Cock's-foot	*Dactylis glomerata*	3
Ash	*Fraxinus excelsior*	3
Creeping thistle	*Cirsium arvense*	2
Smooth meadow-grass	*Poa pratensis*	2
Bird cherry	*Prunus padus*	2

CONDITION ASSESSMENT

	Condition Assessment Criteria		
1	More than 70% of trees are native species.	Pass	
2	Tree canopy is predominantly continuous with gaps in canopy cover making up <10% of total area and no individual gap being >5 m wide.	Pass	
3	Includes one or more mature or veteran tree.	Pass	
4	There is an undisturbed naturally vegetated strip of at least 6 m on both sides to protect the line of trees from farming and other anthropogenic operations.	Fail	No undisturbed strip present due to grazing
5	At least 95% of the trees are in a healthy condition (excluding veteran features valuable for wildlife). There is little or no evidence of an adverse impact on tree health by damage from livestock or wild animals, pests or diseases, or human activity.	Fail	Ash dieback present

LINE OF TREES L6

SPECIES DATA

Common Name	Scientific Name	DOMIN
Stinging nettle	*Urtica dioica*	6
Hawthorn	*Crataegus monogyna*	4
Ash	*Fraxinus excelsior*	4
Yorkshire fog	*Holcus lanatus*	4
Creeping thistle	*Cirsium arvense*	3
Cock's-foot	*Dactylis glomerata*	3
Blackthorn	*Prunus spinosa*	2
Lesser stitchwort	*Stellaria graminea*	2
Common hogweed	*Heracleum sphondylium*	1

CONDITION ASSESSMENT

Condition Assessment Criteria			
1	More than 70% of trees are native species.	Pass	
2	Tree canopy is predominantly continuous with gaps in canopy cover making up <10% of total area and no individual gap being >5 m wide.	Pass	
3	Includes one or more mature or veteran tree.	Pass	
4	There is an undisturbed naturally vegetated strip of at least 6 m on both sides to protect the line of trees from farming and other anthropogenic operations.	Fail	No undisturbed strip present due to grazing
5	At least 95% of the trees are in a healthy condition (excluding veteran features valuable for wildlife). There is little or no evidence of an adverse impact on tree health by damage from livestock or wild animals, pests or diseases, or human activity.	Fail	Ash dieback present

LINE OF TREES L7

SPECIES DATA

Common Name	Scientific Name	DOMIN
Stinging nettle	*Urtica dioica*	8
Yorkshire fog	*Holcus lanatus*	5
Cock's-foot	*Dactylis glomerata*	4
Ash	*Fraxinus excelsior*	4
Creeping thistle	*Cirsium arvense*	3
Hawthorn	*Crataegus monogyna*	3
Smooth meadow-grass	*Poa pratensis*	3
Common bent	*Agrostis capillaris*	2
Meadow foxtail	*Alopecurus pratensis*	2
Hazel	*Corylus avellana*	2
Perennial rye-grass	*Lolium perenne*	2

CONDITION ASSESSMENT

Condition Assessment Criteria			
1	More than 70% of trees are native species.	Pass	
2	Tree canopy is predominantly continuous with gaps in canopy cover making up <10% of total area and no individual gap being >5 m wide.	Fail	Gaps present along line of trees
3	Includes one or more mature or veteran tree.	Pass	
4	There is an undisturbed naturally vegetated strip of at least 6 m on both sides to protect the line of trees from farming and other anthropogenic operations.	Fail	No undisturbed strip present due to grazing
5	At least 95% of the trees are in a healthy condition (excluding veteran features valuable for wildlife). There is little or no evidence of an adverse impact on tree health by damage from livestock or wild animals, pests or diseases, or human activity.	Fail	Ash dieback present

LINE OF TREES L8

SPECIES DATA

Common Name	Scientific Name	DOMIN
Stinging nettle	*Urtica dioica*	9
Yorkshire fog	*Holcus lanatus*	4
Hawthorn	*Crataegus monogyna*	3
Cock's-foot	*Dactylis glomerata*	3
Ash	*Fraxinus excelsior*	3
Perennial rye-grass	*Lolium perenne*	3
Rough meadow-grass	*Poa trivialis*	3
Creeping buttercup	*Ranunculus repens*	3
Sycamore	*Acer pseudoplatanus*	1
Wild cherry	*Prunus avium*	1

CONDITION ASSESSMENT

	Condition Assessment Criteria		
1	More than 70% of trees are native species.	Pass	
2	Tree canopy is predominantly continuous with gaps in canopy cover making up <10% of total area and no individual gap being >5 m wide.	Pass	
3	Includes one or more mature or veteran tree.	Pass	
4	There is an undisturbed naturally vegetated strip of at least 6 m on both sides to protect the line of trees from farming and other anthropogenic operations.	Fail	Mown or grazed to edge
5	At least 95% of the trees are in a healthy condition (excluding veteran features valuable for wildlife). There is little or no evidence of an adverse impact on tree health by damage from livestock or wild animals, pests or diseases, or human activity.	Fail	Ash dieback present

LINE OF TREES L9

SPECIES DATA

Common Name	Scientific Name	DOMIN
Beech	*Fagus sylvatica*	8
False oat-grass	*Arrhenatherum elatius*	5
Ash	*Fraxinus excelsior*	5
Rough meadow-grass	*Poa trivialis*	5
Bearded couch	*Elymus caninus*	4
Meadow-grass	*Poa sp.*	4
Wych elm	*Ulmus glabra*	4
Germander speedwell	*Veronica chamaedrys*	4
Alder	*Alnus glutinosa*	1

CONDITION ASSESSMENT

Condition Assessment Criteria			
1	More than 70% of trees are native species.	Pass	Beech
2	Tree canopy is predominantly continuous with gaps in canopy cover making up <10% of total area and no individual gap being >5 m wide.	Pass	
3	Includes one or more mature or veteran tree.	Pass	
4	There is an undisturbed naturally vegetated strip of at least 6 m on both sides to protect the line of trees from farming and other anthropogenic operations.	Fail	Next to track
5	At least 95% of the trees are in a healthy condition (excluding veteran features valuable for wildlife). There is little or no evidence of an adverse impact on tree health by damage from livestock or wild animals, pests or diseases, or human activity.	Pass	

LINE OF TREES L10

SPECIES DATA

Common Name	Scientific Name	DOMIN
Beech	*Fagus sylvatica*	7
Meadow foxtail	*Alopecurus pratensis*	4
Cock's-foot	*Dactylis glomerata*	4
Bearded couch	*Elymus caninus*	4
Smooth meadow-grass	*Poa pratensis*	4
Garlic mustard	*Alliaria petiolata*	3
False oat-grass	*Arrhenatherum elatius*	3
Hedge woundwort	*Stachys sylvatica*	3
Sycamore	*Acer pseudoplatanus*	2
Wild garlic	*Allium ursinum*	2
Cow parsley	*Anthriscus sylvestris*	2
False wood brome	*Brachypodium sylvaticum*	2
Hazel	*Corylus avellana*	2
Hawthorn	*Crataegus monogyna*	2
Scaly male-fern	*Dryopteris affinis*	2
Male-fern	*Dryopteris filix-mas*	2
Broad-leaved willowherb	*Epilobium montanum*	2
Ash	*Fraxinus excelsior*	2
Cleavers	*Galium aparine*	2
Herb-robert	*Geranium robertianum*	2
Ivy	*Hedera helix*	2
Common hogweed	*Heracleum sphondylium*	2
Perforate st. John's-wort	*Hypericum perforatum*	2
Nipplewort	*Lapsana communis*	2

Common Name	Scientific Name	DOMIN
Dog's mercury	*Mercurialis perennis*	2
Wood-sorrel	*Oxalis acetosella*	2
Creeping buttercup	*Ranunculus repens*	2
Red campion	*Silene dioica*	2
Wych elm	*Ulmus glabra*	2
Stinging nettle	*Urtica dioica*	2
Wood speedwell	*Veronica montana*	2
Violet	*Viola sp.*	2
Lords-and-ladies	*Arum maculatum*	1
Wild strawberry	*Fragaria vesca*	1
Wood avens	*Geum urbanum*	1
Rose	*Rosa sp.*	1
Dandelion	*Taraxacum officinale*	1

CONDITION ASSESSMENT

	Condition Assessment Criteria		
1	More than 70% of trees are native species.	Pass	
2	Tree canopy is predominantly continuous with gaps in canopy cover making up <10% of total area and no individual gap being >5 m wide.	Fail	Gaps
3	Includes one or more mature or veteran tree.	Pass	
4	There is an undisturbed naturally vegetated strip of at least 6 m on both sides to protect the line of trees from farming and other anthropogenic operations.	Fail	Insufficient buffer
5	At least 95% of the trees are in a healthy condition (excluding veteran features valuable for wildlife). There is little or no evidence of an adverse impact on tree health by damage from livestock or wild animals, pests or diseases, or human activity.	Fail	Ash with die-back

GRASSLAND G1

SPECIES DATA

Common Name	Scientific Name	DOMIN
Yorkshire fog	*Holcus lanatus*	7
Perennial rye-grass	*Lolium perenne*	7
Crested dog's-tail	*Cynosurus cristatus*	6
White clover	*Trifolium repens*	4
Creeping thistle	*Cirsium arvense*	3
Creeping buttercup	*Ranunculus repens*	3
Common mouse-ear	*Cerastium fontanum*	2
Hawthorn	*Crataegus monogyna*	1

CONDITION ASSESSMENT

	Condition Assessment Criteria		
1	The appearance and composition of the vegetation closely matches characteristics of the specific grassland habitat type (see UKHab definition). Wildflowers, sedges and indicator species for the specific grassland habitat type are very clearly and easily visible throughout the sward.	Fail	>30% perennial rye-grass, <9-15 other species (m^2)
2	Sward height is varied (at least 20% of the sward is less than 7 cm and at least 20 per cent is more than 7 cm) creating microclimates which provide opportunities for insects, birds and small mammals to live and breed.	Fail	Mostly over 20cm
3	Cover of bare ground between 1% and 5%, including localised areas, for example, rabbit warrens.	Fail	Less than 1% cover
4	Cover of bracken less than 20% and cover of scrub (including bramble) less than 5%.	Pass	
5	There is an absence of invasive non-native species (as listed on Schedule 9 of WCA, 1981). Combined cover of undesirable species and physical damage (such as excessive poaching, damage from machinery use or storage, damaging levels of access, or any other damaging management activities) accounts for less than 5% of total area.	Pass	

GRASSLAND G2

SPECIES DATA

Common Name	Scientific Name	DOMIN
Crested dog's tail	*Cynosurus cristatus*	6
Fescue	*Festuca sp.*	6
Yorkshire fog	*Holcus lanatus*	6
Perennial rye-grass	*Lolium perenne*	6
Meadow-grass	*Poa sp.*	6
White clover	*Trifolium repens*	4
Creeping thistle	*Cirsium arvense*	3
Greater plantain	*Plantago major*	3
Meadow buttercup	*Ranunculus acris*	2
Dandelion	*Taraxacum officinale*	2
Brooklime	*Veronica beccabunga*	2

CONDITION ASSESSMENT

	Condition Assessment Criteria		
1	The appearance and composition of the vegetation closely matches characteristics of the specific grassland habitat type (see UKHab definition). Wildflowers, sedges and indicator species for the specific grassland habitat type are very clearly and easily visible throughout the sward.	Fail	>30% perennial rye-grass, <9-15 other species (m²)
2	Sward height is varied (at least 20% of the sward is less than 7 cm and at least 20 per cent is more than 7 cm) creating microclimates which provide opportunities for insects, birds and small mammals to live and breed.	Fail	Mostly over 20cm
3	Cover of bare ground between 1% and 5%, including localised areas, for example, rabbit warrens.	Fail	Less than 1% cover
4	Cover of bracken less than 20% and cover of scrub (including bramble) less than 5%.	Pass	
5	There is an absence of invasive non-native species (as listed on Schedule 9 of WCA, 1981). Combined cover of undesirable species and physical damage (such as excessive poaching, damage from machinery use or storage, damaging levels of access, or any other damaging management activities) accounts for less than 5% of total area.	Pass	

GRASSLAND G3

SPECIES DATA

Common Name	Scientific Name	DOMIN
Yorkshire fog	*Holcus lanatus*	9
Creeping buttercup	*Ranunculus repens*	3
Broad-leaved dock	*Rumex obtusifolius*	3
Daisy	*Bellis perennis*	2
Cat's-ear	*Hypochaeris radicata*	2
Greater plantain	*Plantago major*	2
Dandelion	*Taraxacum officinale*	2
White clover	*Trifolium repens*	2
Cuckooflower	*Cardamine pratensis*	1
Sticky mouse-ear	*Cerastium glomeratum*	1

CONDITION ASSESSMENT

	Condition Assessment Criteria		
1	The appearance and composition of the vegetation closely matches characteristics of the specific grassland habitat type (see UKHab definition). Wildflowers, sedges and indicator species for the specific grassland habitat type are very clearly and easily visible throughout the sward.	Fail	<9-15 other species (m^2)
2	Sward height is varied (at least 20% of the sward is less than 7 cm and at least 20 per cent is more than 7 cm) creating microclimates which provide opportunities for insects, birds and small mammals to live and breed.	Pass	
3	Cover of bare ground between 1% and 5%, including localised areas, for example, rabbit warrens.	Fail	Less than 1% cover
4	Cover of bracken less than 20% and cover of scrub (including bramble) less than 5%.	Pass	
5	There is an absence of invasive non-native species (as listed on Schedule 9 of WCA, 1981). Combined cover of undesirable species and physical damage (such as excessive poaching, damage from machinery use or storage, damaging levels of access, or any other damaging management activities) accounts for less than 5% of total area.	Fail	Mown

GRASSLAND G4

SPECIES DATA

Common Name	Scientific Name	DOMIN
Perennial rye-grass	*Lolium perenne*	8
Yorkshire fog	*Holcus lanatus*	7
Sweet vernal-grass	*Anthoxanthum odoratum*	3
Meadow buttercup	*Ranunculus acris*	3
Broad-leaved dock	*Rumex obtusifolius*	3
Dandelion	*Taraxacum officinale*	3
Yarrow	*Achillea millefolium*	2
Mouse-ear	*Cerastium sp.*	2
Creeping thistle	*Cirsium arvense*	2
Cock's-foot	*Dactylis glomerata*	2
Creeping buttercup	*Ranunculus repens*	2
Common sorrel	*Rumex acetosa*	2
Cuckooflower	*Cardamine pratensis*	1
Stinging nettle	*Urtica dioica*	1
White clover	*Trifolium repens*	1

CONDITION ASSESSMENT

Condition Assessment Criteria			
1	The appearance and composition of the vegetation closely matches characteristics of the specific grassland habitat type (see UKHab definition). Wildflowers, sedges and indicator species for the specific grassland habitat type are very clearly and easily visible throughout the sward.	Fail	>30% perennial rye-grass
2	Sward height is varied (at least 20% of the sward is less than 7 cm and at least 20 per cent is more than 7 cm) creating microclimates which provide opportunities for insects, birds and small mammals to live and breed.	Pass	
3	Cover of bare ground between 1% and 5%, including localised areas, for example, rabbit warrens.	Fail	Less than 1% cover

	Condition Assessment Criteria		
4	Cover of bracken less than 20% and cover of scrub (including bramble) less than 5%.	Pass	
5	There is an absence of invasive non-native species (as listed on Schedule 9 of WCA, 1981). Combined cover of undesirable species and physical damage (such as excessive poaching, damage from machinery use or storage, damaging levels of access, or any other damaging management activities) accounts for less than 5% of total area.	Fail	Mown / grazed

GRASSLAND G5

SPECIES DATA

Common Name	Scientific Name	DOMIN
Perennial rye-grass	*Lolium perenne*	7
Sweet vernal-grass	*Anthoxanthum odoratum*	5
Creeping thistle	*Cirsium arvense*	4
Cock's-foot	*Dactylis glomerata*	4
Annual meadow-grass	*Poa annua*	4
Red fescue	*Festuca rubra*	3
White clover	*Trifolium repens*	3
Common mouse-ear	*Cerastium fontanum*	2
Spear thistle	*Cirsium vulgare*	2
Creeping buttercup	*Ranunculus repens*	2

CONDITION ASSESSMENT

	Condition Assessment Criteria		
1	There must be 6-8 species per m^2. Note - if a grassland has 9 or more species per m^2 it should be classified as a moderate distinctiveness grassland habitat type. NB - this criterion is non-negotiable for achieving good condition.	Pass	
2	Sward height is varied (at least 20% of the sward is less than 7 cm and at least 20 per cent is more than 7 cm) creating microclimates which provide opportunities for insects, birds and small mammals to live and breed.	Pass	
3	Some scattered scrub (including bramble) may be present, but scrub accounts for less than 20% of total grassland area. Note - patches of shrubs with continuous (more than 90%) cover should be classified as the relevant scrub habitat type.	Pass	
4	Physical damage evident in less than 5% of total grassland area, such as excessive poaching, damage from machinery use or storage, damaging levels of access, or any other damaging management activities.	Fail	Largely overgrazed
5	Cover of bare ground between 1% and 5%, including localised areas, for example, rabbit warrens.	Fail	Less than 1% cover
6	Cover of bracken less than 20%.	Pass	
7	There is an absence of invasive non-native species (as listed on Schedule 9 of WCA, 1981) and undesirable species make up less than 5% of ground cover.	Pass	

GRASSLAND G6

SPECIES DATA

Common Name	Scientific Name	DOMIN
Perennial rye-grass	*Lolium perenne*	7
Creeping bent	*Agrostis stolonifera*	5
Yorkshire fog	*Holcus lanatus*	5
Annual meadow-grass	*Poa annua*	5
Common bent	*Agrostis capillaris*	4
Creeping thistle	*Cirsium arvense*	4
Common mouse-ear	*Cerastium fontanum*	3

CONDITION ASSESSMENT

	Condition Assessment Criteria		
1	The appearance and composition of the vegetation closely matches characteristics of the specific grassland habitat type (see UKHab definition). Wildflowers, sedges and indicator species for the specific grassland habitat type are very clearly and easily visible throughout the sward.	Fail	>30% perennial rye-grass, <9-15 other species (m^2)
2	Sward height is varied (at least 20% of the sward is less than 7 cm and at least 20 per cent is more than 7 cm) creating microclimates which provide opportunities for insects, birds and small mammals to live and breed.	Fail	<20%
3	Cover of bare ground between 1% and 5%, including localised areas, for example, rabbit warrens.	Fail	Less than 1% cover
4	Cover of bracken less than 20% and cover of scrub (including bramble) less than 5%.	Pass	
5	There is an absence of invasive non-native species (as listed on Schedule 9 of WCA, 1981). Combined cover of undesirable species and physical damage (such as excessive poaching, damage from machinery use or storage, damaging levels of access, or any other damaging management activities) accounts for less than 5% of total area.	Fail	Overgrazed

GRASSLAND G7

SPECIES DATA

Common Name	Scientific Name	DOMIN
Yorkshire fog	*Holcus lanatus*	7
Perennial rye-grass	*Lolium perenne*	6
Creeping bent-grass	*Agrostis stolonifera*	3
Common mouse-ear	*Cerastium fontanum*	3
Meadow-grass	*Poa sp.*	3
Creeping buttercup	*Ranunculus repens*	2
Broad-leaved dock	*Rumex obtusifolius*	2

CONDITION ASSESSMENT

	Condition Assessment Criteria		
1	The appearance and composition of the vegetation closely matches characteristics of the specific grassland habitat type (see UKHab definition). Wildflowers, sedges and indicator species for the specific grassland habitat type are very clearly and easily visible throughout the sward.	Fail	No *Juncus* sp. present.
2	Sward height is varied (at least 20% of the sward is less than 7 cm and at least 20 per cent is more than 7 cm) creating microclimates which provide opportunities for insects, birds and small mammals to live and breed.	Fail	Similar height throughout
3	Cover of bare ground between 1% and 5%, including localised areas, for example, rabbit warrens.	Fail	Less than 1% cover
4	Cover of bracken less than 20% and cover of scrub (including bramble) less than 5%.	Pass	
5	There is an absence of invasive non-native species (as listed on Schedule 9 of WCA, 1981). Combined cover of undesirable species and physical damage (such as excessive poaching, damage from machinery use or storage, damaging levels of access, or any other damaging management activities) accounts for less than 5% of total area.	Fail	Overgrazed

GRASSLAND G8

SPECIES DATA

Common Name	Scientific Name	DOMIN
Yorkshire fog	*Holcus lanatus*	5
Perennial rye grass	*Lolium perenne*	5
Common bent	*Agrostis capillaris*	4
Sweet vernal-grass	*Anthoxanthum odoratum*	4
Soft rush	*Juncus effusus*	4
Common mouse-ear	*Cerastium fontanum*	3
Creeping thistle	*Cirsium arvense*	3
Meadow buttercup	*Ranunculus acris*	3
White clover	*Trifolium repens*	3
Marsh thistle	*Cirsium palustre*	1
Autumn hawkbit	*Leontodon autumnalis*	1
Dandelion	*Taraxacum officinale*	1

CONDITION ASSESSMENT

	Condition Assessment Criteria		
1	The appearance and composition of the vegetation closely matches characteristics of the specific grassland habitat type (see UKHab definition). Wildflowers, sedges and indicator species for the specific grassland habitat type are very clearly and easily visible throughout the sward.	Pass	
2	Sward height is varied (at least 20% of the sward is less than 7 cm and at least 20 per cent is more than 7 cm) creating microclimates which provide opportunities for insects, birds and small mammals to live and breed.	Pass	
3	Cover of bare ground between 1% and 5%, including localised areas, for example, rabbit warrens.	Fail	Less than 1% cover
4	Cover of bracken less than 20% and cover of scrub (including bramble) less than 5%.	Pass	

Condition Assessment Criteria

5	There is an absence of invasive non-native species (as listed on Schedule 9 of WCA, 1981). Combined cover of undesirable species and physical damage (such as excessive poaching, damage from machinery use or storage, damaging levels of access, or any other damaging management activities) accounts for less than 5% of total area.	Fail	Overgrazed

GRASSLAND G9

SPECIES DATA

Common Name	Scientific Name	DOMIN
Yorkshire fog	*Holcus lanatus*	10
Creeping thistle	*Cirsium arvense*	2
Meadow buttercup	*Ranunculus acris*	2
Creeping buttercup	*Ranunculus repens*	2
Common sorrel	*Rumex acetosa*	2
Broad-leaved dock	*Rumex obtusifolius*	2
Stinging nettle	*Urtica dioica*	2

CONDITION ASSESSMENT

	Condition Assessment Criteria		
1	The appearance and composition of the vegetation closely matches characteristics of the specific grassland habitat type (see UKHab definition). Wildflowers, sedges and indicator species for the specific grassland habitat type are very clearly and easily visible throughout the sward.	Fail	No *Juncus* sp. present.
2	Sward height is varied (at least 20% of the sward is less than 7 cm and at least 20 per cent is more than 7 cm) creating microclimates which provide opportunities for insects, birds and small mammals to live and breed.	Fail	Mown short
3	Cover of bare ground between 1% and 5%, including localised areas, for example, rabbit warrens.	Fail	Less than 1% cover
4	Cover of bracken less than 20% and cover of scrub (including bramble) less than 5%.	Pass	
5	There is an absence of invasive non-native species (as listed on Schedule 9 of WCA, 1981). Combined cover of undesirable species and physical damage (such as excessive poaching, damage from machinery use or storage, damaging levels of access, or any other damaging management activities) accounts for less than 5% of total area.	Fail	Mown

HEDGEROW H1

SPECIES DATA

Common Name	Scientific Name	DOMIN
Creeping thistle	*Cirsium arvense*	5
Crested dog's tail	*Cynosurus cristatus*	5
Yorkshire fog	*Holcus lanatus*	5
Perennial rye-grass	*Lolium perenne*	5
False oat-grass	*Arrhenatherum elatius*	4
White clover	*Trifolium repens*	4
Creeping buttercup	*Ranunculus repens*	3
Hawthorn	*Crataegus monogyna*	2
Ash	*Fraxinus excelsior*	1
Holly	*Ilex aquifolium*	1

CONDITION ASSESSMENT

Hedgerow favourable condition attributes					
Attributes and functional groupings (A, B, C, D & E)		Criteria (the minimum requirements for 'favourable condition'	Description	Pass / Fail	Reasoning
Core groups - applicable to all hedgerow types					
A1.	Height	>1.5 m average along length	The average height of woody growth estimated from base of stem to the top of shoots, excluding any bank beneath the hedgerow, any gaps or isolated trees. Newly laid or coppiced hedgerows are indicative of good management and pass this criterion for up to a maximum of four years (if undertaken according to good practice). A newly planted hedgerow does not pass this criterion (unless it is > 1.5 m height).	Pass	

Hedgerow favourable condition attributes

Attributes and functional groupings (A, B, C, D & E)		Criteria (the minimum requirements for 'favourable condition'	Description	Pass / Fail	Reasoning
A2.	Width	>1.5 m average along length	The average width of woody growth estimated at the widest point of the canopy, excluding gaps and isolated trees. Outgrowths (e.g. blackthorn suckers) are only included in the width estimate when they >0.5 m in height. Laid, coppiced, cut and newly planted hedgerows are indicative of good management and pass this criterion for up to a maximum of four years (if undertaken according to good practice).	Pass	
B1.	Gap - hedge base	Gap between ground and base of canopy <0.5 m for >90% of length (unless 'line of trees')	This is the vertical gappiness of the woody component of the hedgerow, and its distance from the ground to the lowest leafy growth. Certain exceptions to this criterion are acceptable (see page 65 of the Hedgerow Survey Handbook).	Pass	
B2.	Gap - hedge canopy continuity	· Gaps make up <10% of total length and · No canopy gaps >5 m	This is the horizontal gappiness of the woody component of the hedgerow. Gaps are complete breaks in the woody canopy (no matter how small). Access points and gates contribute to the overall gappiness, but are not subject to the >5 m criterion (as this is the typical size of a gate).	Fail	Gaps larger than 10%
C1.	Undisturbed ground and perennial vegetation	>1 m width of undisturbed ground with perennial herbaceous vegetation for >90% of length: · measured from outer edge of hedgerow, and · is present on one side of the hedge (at least)	This is the horizontal gappiness of the woody component of the hedgerow. Gaps are complete breaks in the woody canopy (no matter how small). Access points and gates contribute to the overall gappiness, but are not subject to the >5 m criterion (as this is the typical size of a gate).	Fail	Grazed short up to hedge woody species

![WSP logo]

Hedgerow favourable condition attributes

Attributes and functional groupings (A, B, C, D & E)		Criteria (the minimum requirements for 'favourable condition'	Description	Pass / Fail	Reasoning
C2.	Undesirable perennial vegetation	Plant species indicative of nutrient enrichment of soils dominate <20% cover of the area of undisturbed ground	The indicator species used are nettles (Urtica spp.), cleavers (Galium aparine) and docks (Rumex spp.). Their presence, either singly or together, should not exceed the 20% cover threshold.	Fail	Nutrient rich species >20%
D1.	Invasive and neophyte species	>90% of the hedgerow and undisturbed ground is free of invasive non-native and neophyte species	Neophytes are plants that have naturalised in the UK since AD 1500. For information on neophytes see the JNCC website and for information on invasive non-native species see the GB Non-Native Secretariat website.	Pass	
D2.	Current damage	>90% of the hedgerow or undisturbed ground is free of damage caused by human activities	This criterion addresses damaging activities that may have led to or lead to deterioration in other attributes. This could include evidence of pollution, piles of manure or rubble, or inappropriate management practices (e.g. excessive hedge cutting).	Fail	Nutrient rich species . Mown close to tree species.
Additional group - applicable to hedgerows with trees only					
E1.	Tree age	At least one mature tree per 30m stretch of hedgerow. A mature tree is one that is at least 2/3 expected fully mature height for the species.	This criterion addresses if there are sufficient mature trees (within the scope of planning timescales) which are of higher value to biodiversity.	Fail	Only one tree >30m stretch
E2.	Tree health	At least 95% of hedgerow trees are in a healthy condition (excluding veteran features valuable for wildlife). There is little or no evidence of an adverse impact on tree health by damage from livestock or wild animals, pests or diseases, or human activity.	This criterion identifies if the trees are subject to damage which compromises the survival and health of the individual specimens.	Fail	Unlikely that the trees health is not affected due to close mowing activities, grazing, etc.

HEDGEROW H2

SPECIES DATA

Common Name	Scientific Name	DOMIN
Yorkshire fog	*Holcus lanatus*	8
Perennial rye-grass	*Lolium perenne*	4
Common bent	*Agrostis Capillaris*	3
Sweet vernal-grass	*Anthoxanthum odoratum*	3
False oat grass	*Arrhenatherum elatius*	3
Creeping thistle	*Cirsium arvense*	3
Hawthorn	*Crataegus monogyna*	3
Stinging nettle	*Urtica dioica*	3
Yarrow	*Achillea millefolium*	2
Tufted hair-grass	*Deschampsia cespitosa*	2
Field horsetail	*Equisetum arvense*	2
Ash	*Fraxinus excelsior*	2
Pineappleweed	*Matricaria discoidea*	2
Butterbur	*Petasites hybridus*	2
Timothy	*Phleum pratense*	2
Great burnet	*Sanguisorba officinalis*	2
Hazel	*Corylus avellana*	1
Dog-rose	*Rosa canina*	1

CONDITION ASSESSMENT

Hedgerow favourable condition attributes

Attributes and functional groupings (A, B, C, D & E)		Criteria (the minimum requirements for 'favourable condition'	Description	Pass / Fail	Reasoning
Core groups - applicable to all hedgerow types					
A1.	Height	>1.5 m average along length	The average height of woody growth estimated from base of stem to the top of shoots, excluding any bank beneath the hedgerow, any gaps or isolated trees. Newly laid or coppiced hedgerows are indicative of good management and pass this criterion for up to a maximum of four years (if undertaken according to good practice). A newly planted hedgerow does not pass this criterion (unless it is > 1.5 m height).	Pass	
A2.	Width	>1.5 m average along length	The average width of woody growth estimated at the widest point of the canopy, excluding gaps and isolated trees. Outgrowths (e.g. blackthorn suckers) are only included in the width estimate when they >0.5 m in height. Laid, coppiced, cut and newly planted hedgerows are indicative of good management and pass this criterion for up to a maximum of four years (if undertaken according to good practice[4]).	Pass	
B1.	Gap - hedge base	Gap between ground and base of canopy <0.5 m for >90% of length (unless 'line of trees')	This is the vertical gappiness of the woody component of the hedgerow, and its distance from the ground to the lowest leafy growth. Certain exceptions to this criterion are acceptable (see page 65 of the Hedgerow Survey Handbook).	Fail	Gap >0.5m

Hedgerow favourable condition attributes

Attributes and functional groupings (A, B, C, D & E)		Criteria (the minimum requirements for 'favourable condition'	Description	Pass / Fail	Reasoning
B2.	Gap - hedge canopy continuity	Gaps make up <10% of total length and No canopy gaps >5 m	This is the horizontal gappiness of the woody component of the hedgerow. Gaps are complete breaks in the woody canopy (no matter how small). Access points and gates contribute to the overall gappiness, but are not subject to the >5 m criterion (as this is the typical size of a gate).	Pass	
C1.	Undisturbed ground and perennial vegetation	>1 m width of undisturbed ground with perennial herbaceous vegetation for >90% of length: measured from outer edge of hedgerow, and is present on one side of the hedge (at least)	This is the horizontal gappiness of the woody component of the hedgerow. Gaps are complete breaks in the woody canopy (no matter how small). Access points and gates contribute to the overall gappiness, but are not subject to the >5 m criterion (as this is the typical size of a gate).	Fail	Access by sheep
C2.	Undesirable perennial vegetation	Plant species indicative of nutrient enrichment of soils dominate <20% cover of the area of undisturbed ground	The indicator species used are nettles (Urtica spp.), cleavers (Galium aparine) and docks (Rumex spp.). Their presence, either singly or together, should not exceed the 20% cover threshold.	Fail	Nutrient enriched
D1.	Invasive and neophyte species	>90% of the hedgerow and undisturbed ground is free of invasive non-native and neophyte species	Neophytes are plants that have naturalised in the UK since AD 1500. For information on neophytes see the JNCC website and for information on invasive non-native species see the GB Non-Native Secretariat website.	Pass	
D2.	Current damage	>90% of the hedgerow or undisturbed ground is free of damage caused by human activities	This criterion addresses damaging activities that may have led to or lead to deterioration in other attributes. This could include evidence of pollution, piles of manure or rubble, or inappropriate management practices (e.g. excessive hedge cutting).	Fail	Accessed and grazed by sheep

Hedgerow favourable condition attributes

Attributes and functional groupings (A, B, C, D & E)		Criteria (the minimum requirements for 'favourable condition'	Description	Pass / Fail	Reasoning
Additional group - applicable to hedgerows with trees only					
E1.	Tree age	At least one mature tree per 30m stretch of hedgerow. A mature tree is one that is at least 2/3 expected fully mature height for the species.	This criterion addresses if there are sufficient mature trees (within the scope of planning timescales) which are of higher value to biodiversity.	Pass	
E2.	Tree health	At least 95% of hedgerow trees are in a healthy condition (excluding veteran features valuable for wildlife). There is little or no evidence of an adverse impact on tree health by damage from livestock or wild animals, pests or diseases, or human activity.	This criterion identifies if the trees are subject to damage which compromises the survival and health of the individual specimens.	Fail	Ash die back disease present

HEDGEROW H3

SPECIES DATA

Common Name	Scientific Name	DOMIN
Yorkshire Fog	Holcus lanatus	7
Rough meadow-grass	Poa trivialis	5
Bent	Capillaris sp.	4
Perennial rye-grass	Lolium perenne	4
False-oat grass	Arrhenatherum elatius	3
Hawthorn	Crataegus monogyna	3
Creeping thistle	Cirsium arvense	2
Cock's-foot	Dactylis glomerata	2
Dandelion	Taraxacum officinale	2
Stinging nettle	Urtica dioica	2
Harebell	Campanula rotundifolia	1
Common sorrel	Rumex acetosa	1

CONDITION ASSESSMENT

Hedgerow favourable condition attributes				
Attributes and functional groupings (A, B, C, D & E)	Criteria (the minimum requirements for 'favourable condition')	Description	Pass / Fail	Reasoning
Core groups - applicable to all hedgerow types				
A1. Height	>1.5 m average along length	The average height of woody growth estimated from base of stem to the top of shoots, excluding any bank beneath the hedgerow, any gaps or isolated trees. Newly laid or coppiced hedgerows are indicative of good management and pass this criterion for up to a maximum of four years (if undertaken according to good practice). A newly planted hedgerow does not pass this criterion (unless it is > 1.5 m height).	Pass	

Hedgerow favourable condition attributes

Attributes and functional groupings (A, B, C, D & E)		Criteria (the minimum requirements for 'favourable condition'	Description	Pass / Fail	Reasoning
A2.	Width	>1.5 m average along length	The average width of woody growth estimated at the widest point of the canopy, excluding gaps and isolated trees. Outgrowths (e.g. blackthorn suckers) are only included in the width estimate when they >0.5 m in height. Laid, coppiced, cut and newly planted hedgerows are indicative of good management and pass this criterion for up to a maximum of four years (if undertaken according to good practice).	Pass	
B1.	Gap - hedge base	Gap between ground and base of canopy <0.5 m for >90% of length (unless 'line of trees')	This is the vertical gappiness of the woody component of the hedgerow, and its distance from the ground to the lowest leafy growth. Certain exceptions to this criterion are acceptable (see page 65 of the Hedgerow Survey Handbook).	Fail	Gap >0.5m
B2.	Gap - hedge canopy continuity	Gaps make up <10% of total length and No canopy gaps >5 m	This is the horizontal gappiness of the woody component of the hedgerow. Gaps are complete breaks in the woody canopy (no matter how small). Access points and gates contribute to the overall gappiness, but are not subject to the >5 m criterion (as this is the typical size of a gate).	Fail	Gaps make up >10%
C1.	Undisturbed ground and perennial vegetation	>1 m width of undisturbed ground with perennial herbaceous vegetation for >90% of length: · measured from outer edge of hedgerow, and · is present on one side of the hedge (at least)	This is the horizontal gappiness of the woody component of the hedgerow. Gaps are complete breaks in the woody canopy (no matter how small). Access points and gates contribute to the overall gappiness, but are not subject to the >5 m criterion (as this is the typical size of a gate).	Fail	Grazed close to hedge

Hedgerow favourable condition attributes					
Attributes and functional groupings (A, B, C, D & E)		Criteria (the minimum requirements for 'favourable condition'	Description	Pass / Fail	Reasoning
C2.	Undesirable perennial vegetation	Plant species indicative of nutrient enrichment of soils dominate <20% cover of the area of undisturbed ground	The indicator species used are nettles (Urtica spp.), cleavers (Galium aparine) and docks (Rumex spp.). Their presence, either singly or together, should not exceed the 20% cover threshold.	Fail	Nutrient enriched
D1.	Invasive and neophyte species	>90% of the hedgerow and undisturbed ground is free of invasive non-native and neophyte species	Neophytes are plants that have naturalised in the UK since AD 1500. For information on neophytes see the JNCC website and for information on invasive non-native species see the GB Non-Native Secretariat website.	Pass	
D2.	Current damage	>90% of the hedgerow or undisturbed ground is free of damage caused by human activities	This criterion addresses damaging activities that may have led to or lead to deterioration in other attributes. This could include evidence of pollution, piles of manure or rubble, or inappropriate management practices (e.g. excessive hedge cutting).	Fail	Grazed close to hedge
Additional group - applicable to hedgerows with trees only					
E1.	Tree age	At least one mature tree per 30m stretch of hedgerow. A mature tree is one that is at least 2/3 expected fully mature height for the species.	This criterion addresses if there are sufficient mature trees (within the scope of planning timescales) which are of higher value to biodiversity.	N/A	
E2.	Tree health	At least 95% of hedgerow trees are in a healthy condition (excluding veteran features valuable for wildlife). There is little or no evidence of an adverse impact on tree health by damage from livestock or wild animals, pests or diseases, or human activity.	This criterion identifies if the trees are subject to damage which compromises the survival and health of the individual specimens.	N/A	

HEDGEROW H4

SPECIES DATA

Common Name	Scientific Name	DOMIN
Hawthorn	*Crataegus monogyna*	9
Yorkshire fog	*Holcus lanatus*	8
Creeping thistle	*Cirsium arvense*	6
Hazel	*Corylus avellana*	5
Cleavers	*Galium aparine*	5
Stinging nettle	*Urtica dioica*	5
Cock's-foot	*Dactylis glomerata*	3
Ash	*Fraxinus excelsior*	3
Bird cherry	*Prunus padus*	3
Creeping buttercup	*Ranunculus repens*	2

CONDITION ASSESSMENT

Hedgerow favourable condition attributes					
Attributes and functional groupings (A, B, C, D & E)		Criteria (the minimum requirements for 'favourable condition')	Description	Pass / Fail	Reasoning
Core groups - applicable to all hedgerow types					
A1.	Height	>1.5 m average along length	The average height of woody growth estimated from base of stem to the top of shoots, excluding any bank beneath the hedgerow, any gaps or isolated trees. Newly laid or coppiced hedgerows are indicative of good management and pass this criterion for up to a maximum of four years (if undertaken according to good practice). A newly planted hedgerow does not pass this criterion (unless it is > 1.5 m height).	Pass	

Hedgerow favourable condition attributes				
Attributes and functional groupings (A, B, C, D & E)	Criteria (the minimum requirements for 'favourable condition'	Description	Pass / Fail	Reasoning
A2. Width	>1.5 m average along length	The average width of woody growth estimated at the widest point of the canopy, excluding gaps and isolated trees. Outgrowths (e.g. blackthorn suckers) are only included in the width estimate when they >0.5 m in height. Laid, coppiced, cut and newly planted hedgerows are indicative of good management and pass this criterion for up to a maximum of four years (if undertaken according to good practice).	Pass	
B1. Gap - hedge base	Gap between ground and base of canopy <0.5 m for >90% of length (unless 'line of trees')	This is the vertical gappiness of the woody component of the hedgerow, and its distance from the ground to the lowest leafy growth. Certain exceptions to this criterion are acceptable (see page 65 of the Hedgerow Survey Handbook).	Pass	
B2. Gap - hedge canopy continuity	Gaps make up <10% of total length and No canopy gaps >5 m	This is the horizontal gappiness of the woody component of the hedgerow. Gaps are complete breaks in the woody canopy (no matter how small). Access points and gates contribute to the overall gappiness, but are not subject to the >5 m criterion (as this is the typical size of a gate).	Pass	
C1. Undisturbed ground and perennial vegetation	>1 m width of undisturbed ground with perennial herbaceous vegetation for >90% of length: · measured from outer edge of hedgerow, and · is present on one side of the hedge (at least)	This is the horizontal gappiness of the woody component of the hedgerow. Gaps are complete breaks in the woody canopy (no matter how small). Access points and gates contribute to the overall gappiness, but are not subject to the >5 m criterion (as this is the typical size of a gate).	Fail	Mown to within 1m

Hedgerow favourable condition attributes				
Attributes and functional groupings (A, B, C, D & E)	Criteria (the minimum requirements for 'favourable condition'	Description	Pass / Fail	Reasoning
C2. Undesirable perennial vegetation	Plant species indicative of nutrient enrichment of soils dominate <20% cover of the area of undisturbed ground	The indicator species used are nettles (Urtica spp.), cleavers (Galium aparine) and docks (Rumex spp.). Their presence, either singly or together, should not exceed the 20% cover threshold.	Fail	Stinging nettles and cleavers present throughout.
D1. Invasive and neophyte species	>90% of the hedgerow and undisturbed ground is free of invasive non-native and neophyte species	Neophytes are plants that have naturalised in the UK since AD 1500. For information on neophytes see the JNCC website and for information on invasive non-native species see the GB Non-Native Secretariat website.	Pass	
D2. Current damage	>90% of the hedgerow or undisturbed ground is free of damage caused by human activities	This criterion addresses damaging activities that may have led to or lead to deterioration in other attributes. This could include evidence of pollution, piles of manure or rubble, or inappropriate management practices (e.g. excessive hedge cutting).	Pass	
Additional group - applicable to hedgerows with trees only				
E1. Tree age	At least one mature tree per 30m stretch of hedgerow. A mature tree is one that is at least 2/3 expected fully mature height for the species.	This criterion addresses if there are sufficient mature trees (within the scope of planning timescales) which are of higher value to biodiversity.	N/A	
E2. Tree health	At least 95% of hedgerow trees are in a healthy condition (excluding veteran features valuable for wildlife). There is little or no evidence of an adverse impact on tree health by damage from livestock or wild animals, pests or diseases, or human activity.	This criterion identifies if the trees are subject to damage which compromises the survival and health of the individual specimens.	N/A	

HEDGEROW H5

SPECIES DATA

Common Name	Scientific Name	DOMIN
Hawthorn	*Crataegus monogyna*	8
Stinging nettle	*Urtica dioica*	7
Creeping thistle	*Cirsium arvense*	6
Meadow sweet	*Filipendula ulmaria*	6
Perennial rye-grass	*Lolium perenne*	5
Elm	*Ulmus minor*	4
Ash	*Fraxinus excelsior*	3
Dog-rose	*Rosa canina*	2
Cow parsley	*Anthriscus sylvestris*	1

CONDITION ASSESSMENT

Hedgerow favourable condition attributes					
Attributes and functional groupings (A, B, C, D & E)		Criteria (the minimum requirements for 'favourable condition'	Description	Pass / Fail	Reasoning
Core groups - applicable to all hedgerow types					
A1.	Height	>1.5 m average along length	The average height of woody growth estimated from base of stem to the top of shoots, excluding any bank beneath the hedgerow, any gaps or isolated trees.	Pass	
			Newly laid or coppiced hedgerows are indicative of good management and pass this criterion for up to a maximum of four years (if undertaken according to good practice).		
			A newly planted hedgerow does not pass this criterion (unless it is > 1.5 m height).		

Hedgerow favourable condition attributes

Attributes and functional groupings (A, B, C, D & E)		Criteria (the minimum requirements for 'favourable condition'	Description	Pass / Fail	Reasoning
A2.	Width	>1.5 m average along length	The average width of woody growth estimated at the widest point of the canopy, excluding gaps and isolated trees. Outgrowths (e.g. blackthorn suckers) are only included in the width estimate when they >0.5 m in height. Laid, coppiced, cut and newly planted hedgerows are indicative of good management and pass this criterion for up to a maximum of four years (if undertaken according to good practice).	Pass	
B1.	Gap - hedge base	Gap between ground and base of canopy <0.5 m for >90% of length (unless 'line of trees')	This is the vertical gappiness of the woody component of the hedgerow, and its distance from the ground to the lowest leafy growth. Certain exceptions to this criterion are acceptable (see page 65 of the Hedgerow Survey Handbook).	Pass	
B2.	Gap - hedge canopy continuity	Gaps make up <10% of total length and No canopy gaps >5 m	This is the horizontal gappiness of the woody component of the hedgerow. Gaps are complete breaks in the woody canopy (no matter how small). Access points and gates contribute to the overall gappiness, but are not subject to the >5 m criterion (as this is the typical size of a gate).	Fail	Gaps over 5m and cover more than 10%
C1.	Undisturbed ground and perennial vegetation	>1 m width of undisturbed ground with perennial herbaceous vegetation for >90% of length: measured from outer edge of hedgerow, and is present on one side of the hedge (at least)	This is the horizontal gappiness of the woody component of the hedgerow. Gaps are complete breaks in the woody canopy (no matter how small). Access points and gates contribute to the overall gappiness, but are not subject to the >5 m criterion (as this is the typical size of a gate).	Fail	Grazed to within 1m

Hedgerow favourable condition attributes

Attributes and functional groupings (A, B, C, D & E)		Criteria (the minimum requirements for 'favourable condition'	Description	Pass / Fail	Reasoning
C2.	Undesirable perennial vegetation	Plant species indicative of nutrient enrichment of soils dominate <20% cover of the area of undisturbed ground	The indicator species used are nettles (Urtica spp.), cleavers (Galium aparine) and docks (Rumex spp.). Their presence, either singly or together, should not exceed the 20% cover threshold.	Fail	Stinging nettles present throughout.
D1.	Invasive and neophyte species	>90% of the hedgerow and undisturbed ground is free of invasive non-native and neophyte species	Neophytes are plants that have naturalised in the UK since AD 1500. For information on neophytes see the JNCC website and for information on invasive non-native species see the GB Non-Native Secretariat website.	Pass	
D2.	Current damage	>90% of the hedgerow or undisturbed ground is free of damage caused by human activities	This criterion addresses damaging activities that may have led to or lead to deterioration in other attributes. This could include evidence of pollution, piles of manure or rubble, or inappropriate management practices (e.g. excessive hedge cutting).	Fail	Grazed to within 1m and road on northern aspect.
Additional group - applicable to hedgerows with trees only					
E1.	Tree age	At least one mature tree per 30m stretch of hedgerow. A mature tree is one that is at least 2/3 expected fully mature height for the species.	This criterion addresses if there are sufficient mature trees (within the scope of planning timescales) which are of higher value to biodiversity.	Pass	
E2.	Tree health	At least 95% of hedgerow trees are in a healthy condition (excluding veteran features valuable for wildlife). There is little or no evidence of an adverse impact on tree health by damage from livestock or wild animals, pests or diseases, or human activity.	This criterion identifies if the trees are subject to damage which compromises the survival and health of the individual specimens.	Fail	Ash trees showing signs of ash dieback

HEDGEROW H6

SPECIES DATA

Common Name	Scientific Name	DOMIN
Hawthorn	*Crataegus monogyna*	7
Stinging nettle	*Urtica dioica*	7
Perennial rye-grass	*Lolium perenne*	6
Yorkshire fog	*Holcus lanatus*	5
Creeping thistle	*Cirsium arvense*	4
Spear thistle	*Cirsium vulgare*	4
Wavy hair-grass	*Deschampsia flexuosa*	3

CONDITION ASSESSMENT

Hedgerow favourable condition attributes					
Attributes and functional groupings (A, B, C, D & E)		Criteria (the minimum requirements for 'favourable condition'	Description	Pass / Fail	Reasoning
Core groups - applicable to all hedgerow types					
A1.	Height	>1.5 m average along length	The average height of woody growth estimated from base of stem to the top of shoots, excluding any bank beneath the hedgerow, any gaps or isolated trees. Newly laid or coppiced hedgerows are indicative of good management and pass this criterion for up to a maximum of four years (if undertaken according to good practice). A newly planted hedgerow does not pass this criterion (unless it is > 1.5 m height).	Pass	
A2.	Width	>1.5 m average along length	The average width of woody growth estimated at the widest point of the canopy, excluding gaps and isolated trees. Outgrowths (e.g. blackthorn suckers) are only included in the	Pass	

Hedgerow favourable condition attributes				
Attributes and functional groupings (A, B, C, D & E)	Criteria (the minimum requirements for 'favourable condition'	Description	Pass / Fail	Reasoning
		width estimate when they >0.5 m in height. Laid, coppiced, cut and newly planted hedgerows are indicative of good management and pass this criterion for up to a maximum of four years (if undertaken according to good practice).		
B1. Gap - hedge base	Gap between ground and base of canopy <0.5 m for >90% of length (unless 'line of trees')	This is the vertical gappiness of the woody component of the hedgerow, and its distance from the ground to the lowest leafy growth. Certain exceptions to this criterion are acceptable (see page 65 of the Hedgerow Survey Handbook).	Fail	Gap at base higher than 0.5m
B2. Gap - hedge canopy continuity	Gaps make up <10% of total length and No canopy gaps >5 m	This is the horizontal gappiness of the woody component of the hedgerow. Gaps are complete breaks in the woody canopy (no matter how small). Access points and gates contribute to the overall gappiness, but are not subject to the >5 m criterion (as this is the typical size of a gate).	Fail	Gaps over 5m and cover more than 10%
C1. Undisturbed ground and perennial vegetation	>1 m width of undisturbed ground with perennial herbaceous vegetation for >90% of length: measured from outer edge of hedgerow, and is present on one side of the hedge (at least)	This is the horizontal gappiness of the woody component of the hedgerow. Gaps are complete breaks in the woody canopy (no matter how small). Access points and gates contribute to the overall gappiness, but are not subject to the >5 m criterion (as this is the typical size of a gate).	Fail	Grazed to within 1m
C2. Undesirable perennial vegetation	Plant species indicative of nutrient enrichment of soils dominate <20% cover of the area of undisturbed ground	The indicator species used are nettles (Urtica spp.), cleavers (Galium aparine) and docks (Rumex spp.). Their presence, either singly or together, should not exceed the 20% cover threshold.	Fail	Stinging nettles present throughout.
D1. Invasive and neophyte species	>90% of the hedgerow and undisturbed ground is free of	Neophytes are plants that have naturalised in the UK since AD 1500. For information on neophytes	Pass	

Hedgerow favourable condition attributes				
Attributes and functional groupings (A, B, C, D & E)	Criteria (the minimum requirements for 'favourable condition'	Description	Pass / Fail	Reasoning
	invasive non-native and neophyte species	see the JNCC website and for information on invasive non-native species see the GB Non-Native Secretariat website.		
D2. Current damage	>90% of the hedgerow or undisturbed ground is free of damage caused by human activities	This criterion addresses damaging activities that may have led to or lead to deterioration in other attributes. This could include evidence of pollution, piles of manure or rubble, or inappropriate management practices (e.g. excessive hedge cutting).	Fail	Grazed to within 1m
Additional group - applicable to hedgerows with trees only				
E1. Tree age	At least one mature tree per 30m stretch of hedgerow. A mature tree is one that is at least 2/3 expected fully mature height for the species.	This criterion addresses if there are sufficient mature trees (within the scope of planning timescales) which are of higher value to biodiversity.	N/A	
E2. Tree health	At least 95% of hedgerow trees are in a healthy condition (excluding veteran features valuable for wildlife). There is little or no evidence of an adverse impact on tree health by damage from livestock or wild animals, pests or diseases, or human activity.	This criterion identifies if the trees are subject to damage which compromises the survival and health of the individual specimens.	N/A	

HEDGEROW H7

SPECIES DATA

Common Name	Scientific Name	DOMIN
Perennial rye-grass	Lolium perenne	7
Sweet vernal-grass	Anthoxanthum odoratum	5
Creeping thistle	Cirsium arvense	4
Cock's-foot	Dactylis glomerata	4
Annual meadow-grass	Poa annua	4
Red fescue	Festuca rubra	3
White clover	Trifolium repens	3
Common mouse-ear	Cerastium fontanum	2
Spear thistle	Cirsium vulgare	2
Hawthorn	Crataegus monogyna	2
Creeping buttercup	Ranunculus repens	2

CONDITION ASSESSMENT

Hedgerow favourable condition attributes				
Attributes and functional groupings (A, B, C, D & E)	Criteria (the minimum requirements for 'favourable condition')	Description	Pass / Fail	Reasoning
Core groups - applicable to all hedgerow types				
A1. Height	>1.5 m average along length	The average height of woody growth estimated from base of stem to the top of shoots, excluding any bank beneath the hedgerow, any gaps or isolated trees. Newly laid or coppiced hedgerows are indicative of good management and pass this criterion for up to a maximum of four years (if undertaken according to good practice). A newly planted hedgerow does not pass this criterion (unless it is > 1.5 m height).	Pass	

Hedgerow favourable condition attributes

Attributes and functional groupings (A, B, C, D & E)		Criteria (the minimum requirements for 'favourable condition'	Description	Pass / Fail	Reasoning
A2.	Width	>1.5 m average along length	The average width of woody growth estimated at the widest point of the canopy, excluding gaps and isolated trees. Outgrowths (e.g. blackthorn suckers) are only included in the width estimate when they >0.5 m in height. Laid, coppiced, cut and newly planted hedgerows are indicative of good management and pass this criterion for up to a maximum of four years (if undertaken according to good practice[4]).	Pass	
B1.	Gap - hedge base	Gap between ground and base of canopy <0.5 m for >90% of length (unless 'line of trees')	This is the vertical gappiness of the woody component of the hedgerow, and its distance from the ground to the lowest leafy growth. Certain exceptions to this criterion are acceptable (see page 65 of the Hedgerow Survey Handbook).	Fail	Gap at base higher than 0.5m
B2.	Gap - hedge canopy continuity	Gaps make up <10% of total length and No canopy gaps >5 m	This is the horizontal gappiness of the woody component of the hedgerow. Gaps are complete breaks in the woody canopy (no matter how small). Access points and gates contribute to the overall gappiness, but are not subject to the >5 m criterion (as this is the typical size of a gate).	Fail	Large gaps
C1.	Undisturbed ground and perennial vegetation	>1 m width of undisturbed ground with perennial herbaceous vegetation for >90% of length: measured from outer edge of hedgerow, and is present on one side of the hedge (at least)	This is the horizontal gappiness of the woody component of the hedgerow. Gaps are complete breaks in the woody canopy (no matter how small). Access points and gates contribute to the overall gappiness, but are not subject to the >5 m criterion (as this is the typical size of a gate).	Fail	Grazed close to edge

Hedgerow favourable condition attributes

Attributes and functional groupings (A, B, C, D & E)		Criteria (the minimum requirements for 'favourable condition'	Description	Pass / Fail	Reasoning
C2.	Undesirable perennial vegetation	Plant species indicative of nutrient enrichment of soils dominate <20% cover of the area of undisturbed ground	The indicator species used are nettles (Urtica spp.), cleavers (Galium aparine) and docks (Rumex spp.). Their presence, either singly or together, should not exceed the 20% cover threshold.	Fail	Creeping thistle present throughout
D1.	Invasive and neophyte species	>90% of the hedgerow and undisturbed ground is free of invasive non-native and neophyte species	Neophytes are plants that have naturalised in the UK since AD 1500. For information on neophytes see the JNCC website and for information on invasive non-native species see the GB Non-Native Secretariat website.	Pass	
D2.	Current damage	>90% of the hedgerow or undisturbed ground is free of damage caused by human activities	This criterion addresses damaging activities that may have led to or lead to deterioration in other attributes.

This could include evidence of pollution, piles of manure or rubble, or inappropriate management practices (e.g. excessive hedge cutting). | Fail | Grazed to within 1m. No change in ground flora to adjacent field. |
Additional group - applicable to hedgerows with trees only					
E1.	Tree age	At least one mature tree per 30m stretch of hedgerow. A mature tree is one that is at least 2/3 expected fully mature height for the species.	This criterion addresses if there are sufficient mature trees (within the scope of planning timescales) which are of higher value to biodiversity.	N/A	
E2.	Tree health	At least 95% of hedgerow trees are in a healthy condition (excluding veteran features valuable for wildlife). There is little or no evidence of an adverse impact on tree health by damage from livestock or wild animals, pests or diseases, or human activity.	This criterion identifies if the trees are subject to damage which compromises the survival and health of the individual specimens.	N/A	

HEDGEROW H8

SPECIES DATA

Common Name	Scientific Name	DOMIN
Yorkshire fog	*Holcus lanatus*	6
Perennial rye-grass	*Lolium perenne*	5
Stinging nettle	*Urtica dioica*	5
Soft rush	*Juncus effusus*	4
Hard rush	*Juncus inflexus*	4
Water mint	*Mentha aquatica*	4
Creeping thistle	*Cirsium arvense*	3
Hawthorn	*Crataegus monogyna*	3

CONDITION ASSESSMENT

Hedgerow favourable condition attributes				
Attributes and functional groupings (A, B, C, D & E)	Criteria (the minimum requirements for 'favourable condition')	Description	Pass / Fail	Reasoning
Core groups - applicable to all hedgerow types				
A1. Height	>1.5 m average along length	The average height of woody growth estimated from base of stem to the top of shoots, excluding any bank beneath the hedgerow, any gaps or isolated trees. Newly laid or coppiced hedgerows are indicative of good management and pass this criterion for up to a maximum of four years (if undertaken according to good practice). A newly planted hedgerow does not pass this criterion (unless it is > 1.5 m height).	Pass	

Hedgerow favourable condition attributes

Attributes and functional groupings (A, B, C, D & E)		Criteria (the minimum requirements for 'favourable condition'	Description	Pass / Fail	Reasoning
A2.	Width	>1.5 m average along length	The average width of woody growth estimated at the widest point of the canopy, excluding gaps and isolated trees. Outgrowths (e.g. blackthorn suckers) are only included in the width estimate when they >0.5 m in height. Laid, coppiced, cut and newly planted hedgerows are indicative of good management and pass this criterion for up to a maximum of four years (if undertaken according to good practice).	Pass	
B1.	Gap - hedge base	Gap between ground and base of canopy <0.5 m for >90% of length (unless 'line of trees')	This is the vertical gappiness of the woody component of the hedgerow, and its distance from the ground to the lowest leafy growth. Certain exceptions to this criterion are acceptable (see page 65 of the Hedgerow Survey Handbook).	Fail	Gap at base higher than 0.5m
B2.	Gap - hedge canopy continuity	· Gaps make up <10% of total length and · No canopy gaps >5 m	This is the horizontal gappiness of the woody component of the hedgerow. Gaps are complete breaks in the woody canopy (no matter how small). Access points and gates contribute to the overall gappiness, but are not subject to the >5 m criterion (as this is the typical size of a gate).	Fail	Gaps over 5m and cover more than 10%
C1.	Undisturbed ground and perennial vegetation	>1 m width of undisturbed ground with perennial herbaceous vegetation for >90% of length: · measured from outer edge of hedgerow, and · is present on one side of the hedge (at least)	This is the horizontal gappiness of the woody component of the hedgerow. Gaps are complete breaks in the woody canopy (no matter how small). Access points and gates contribute to the overall gappiness, but are not subject to the >5 m criterion (as this is the typical size of a gate).	Fail	Grazed to within 1m

Hedgerow favourable condition attributes

Attributes and functional groupings (A, B, C, D & E)		Criteria (the minimum requirements for 'favourable condition'	Description	Pass / Fail	Reasoning
C2.	Undesirable perennial vegetation	Plant species indicative of nutrient enrichment of soils dominate <20% cover of the area of undisturbed ground	The indicator species used are nettles (Urtica spp.), cleavers (Galium aparine) and docks (Rumex spp.). Their presence, either singly or together, should not exceed the 20% cover threshold.	Fail	Stinging nettle present throughout
D1.	Invasive and neophyte species	>90% of the hedgerow and undisturbed ground is free of invasive non-native and neophyte species	Neophytes are plants that have naturalised in the UK since AD 1500. For information on neophytes see the JNCC website and for information on invasive non-native species see the GB Non-Native Secretariat website.	Pass	
D2.	Current damage	>90% of the hedgerow or undisturbed ground is free of damage caused by human activities	This criterion addresses damaging activities that may have led to or lead to deterioration in other attributes. This could include evidence of pollution, piles of manure or rubble, or inappropriate management practices (e.g. excessive hedge cutting).	Fail	Grazed to within 1m
Additional group - applicable to hedgerows with trees only					
E1.	Tree age	At least one mature tree per 30m stretch of hedgerow. A mature tree is one that is at least 2/3 expected fully mature height for the species.	This criterion addresses if there are sufficient mature trees (within the scope of planning timescales) which are of higher value to biodiversity.	N/A	
E2.	Tree health	At least 95% of hedgerow trees are in a healthy condition (excluding veteran features valuable for wildlife). There is little or no evidence of an adverse impact on tree health by damage from livestock or wild animals, pests or diseases, or human activity.	This criterion identifies if the trees are subject to damage which compromises the survival and health of the individual specimens.	N/A	

HEDGEROW H9

SPECIES DATA

Common Name	Scientific Name	DOMIN
Stinging nettle	*Urtica dioica*	7
Hawthorn	*Crataegus monogyna*	6
Yorkshire fog	*Holcus lanatus*	6
Perennial rye-grass	*Lolium perenne*	3
Creeping thistle	*Cirsium arvense*	2
Common mouse-ear	*Cerastium fontanum*	1

CONDITION ASSESSMENT

Hedgerow favourable condition attributes					
Attributes and functional groupings (A, B, C, D & E)	Criteria (the minimum requirements for 'favourable condition'	Description		Pass / Fail	Reasoning
Core groups - applicable to all hedgerow types					
A1. Height	>1.5 m average along length	The average height of woody growth estimated from base of stem to the top of shoots, excluding any bank beneath the hedgerow, any gaps or isolated trees. Newly laid or coppiced hedgerows are indicative of good management and pass this criterion for up to a maximum of four years (if undertaken according to good practice). A newly planted hedgerow does not pass this criterion (unless it is > 1.5 m height).		Pass	
A2. Width	>1.5 m average along length	The average width of woody growth estimated at the widest point of the canopy, excluding gaps and isolated trees. Outgrowths (e.g. blackthorn suckers) are only included in		Pass	

Hedgerow favourable condition attributes

Attributes and functional groupings (A, B, C, D & E)		Criteria (the minimum requirements for 'favourable condition'	Description	Pass / Fail	Reasoning
			the width estimate when they >0.5 m in height. Laid, coppiced, cut and newly planted hedgerows are indicative of good management and pass this criterion for up to a maximum of four years (if undertaken according to good practice).		
B1.	Gap - hedge base	Gap between ground and base of canopy <0.5 m for >90% of length (unless 'line of trees')	This is the vertical gappiness of the woody component of the hedgerow, and its distance from the ground to the lowest leafy growth. Certain exceptions to this criterion are acceptable (see page 65 of the Hedgerow Survey Handbook).	Fail	Gap at base higher than 0.5m
B2.	Gap - hedge canopy continuity	Gaps make up <10% of total length and No canopy gaps >5 m	This is the horizontal gappiness of the woody component of the hedgerow. Gaps are complete breaks in the woody canopy (no matter how small). Access points and gates contribute to the overall gappiness, but are not subject to the >5 m criterion (as this is the typical size of a gate).	Pass	
C1.	Undisturbed ground and perennial vegetation	>1 m width of undisturbed ground with perennial herbaceous vegetation for >90% of length: measured from outer edge of hedgerow, and is present on one side of the hedge (at least)	This is the horizontal gappiness of the woody component of the hedgerow. Gaps are complete breaks in the woody canopy (no matter how small). Access points and gates contribute to the overall gappiness, but are not subject to the >5 m criterion (as this is the typical size of a gate).	Fail	Grazed to within 1m
C2.	Undesirable perennial vegetation	Plant species indicative of nutrient enrichment of soils dominate <20%	The indicator species used are nettles (Urtica spp.), cleavers (Galium aparine) and docks	Fail	Stinging nettle

Hedgerow favourable condition attributes

Attributes and functional groupings (A, B, C, D & E)		Criteria (the minimum requirements for 'favourable condition'	Description	Pass / Fail	Reasoning
		cover of the area of undisturbed ground	(Rumex spp.). Their presence, either singly or together, should not exceed the 20% cover threshold.		present throughout
D1.	Invasive and neophyte species	>90% of the hedgerow and undisturbed ground is free of invasive non-native and neophyte species	Neophytes are plants that have naturalised in the UK since AD 1500. For information on neophytes see the JNCC website and for information on invasive non-native species see the GB Non-Native Secretariat website.	Pass	
D2.	Current damage	>90% of the hedgerow or undisturbed ground is free of damage caused by human activities	This criterion addresses damaging activities that may have led to or lead to deterioration in other attributes. This could include evidence of pollution, piles of manure or rubble, or inappropriate management practices (e.g. excessive hedge cutting).	Fail	Grazed to within 1m
Additional group - applicable to hedgerows with trees only					
E1.	Tree age	At least one mature tree per 30m stretch of hedgerow. A mature tree is one that is at least 2/3 expected fully mature height for the species.	This criterion addresses if there are sufficient mature trees (within the scope of planning timescales) which are of higher value to biodiversity.	N/A	
E2.	Tree health	At least 95% of hedgerow trees are in a healthy condition (excluding veteran features valuable for wildlife). There is little or no evidence of an adverse impact on tree health by damage from livestock or wild animals, pests or diseases, or human activity.	This criterion identifies if the trees are subject to damage which compromises the survival and health of the individual specimens.	N/A	

DITCH D1

SPECIES DATA

Common Name	Scientific Name	DOMIN
Undetermined sedge	*Carex sp.*	4
Marsh willowherb	*Epilobium palustre*	3
Hoary willowherb	*Epilobium parviflorum*	3
Marsh-bedstraw	*Galium palustre*	3
Yorkshire fog	*Holcus lanatus*	3
Marsh-marigold	*Caltha palustris*	2
Common mouse-ear	*Cerastium fontanum*	2
Crested dog's-tail	*Cynosurus cristatus*	2
Tufted hair-grass	*Deschampsia cespitosa*	2
Field horsetail	*Equisetum arvense*	2
Floating sweet-grass	*Glyceria fluitans*	2
Dock	*Rumex sp.*	2
Stinging nettle	*Urtica dioica*	2
Brooklime	*Veronica beccabunga*	2

CONDITION ASSESSMENT

	Condition Assessment Criteria		
1	The ditch is of good water quality, with clear water (low turbidity) indicating no obvious signs of pollution.	Pass	
2	A range of emergent, submerged and floating leaved plants are present. As a guide >10 species of emergent, floating or submerged plants in a 20 m ditch length.	Fail	No submerged
3	There is less than 10% cover of filamentous algae and/or duckweed (these are signs of eutrophication).	Pass	
4	A fringe of marginal vegetation is present along more than 75% of the ditch.	Pass	
5	Physical damage evident along less than 5% of the ditch, such as excessive poaching, damage from machinery use or storage, or any other damaging management activities.	Pass	

Condition Assessment Criteria

|			
6	Sufficient water levels are maintained; as a guide a minimum summer depth of approximately 50 cm in minor ditches and 1 m in main drains.	Fail	Insufficient depth
7	Less than 10% of the ditch is heavily shaded.	Pass	
8	There is an absence of non-native plant and animal species.	Pass	

8 First Street
Manchester
M15 4RP

wsp.com

Appendix C

METHODOLOGY FOR THE CALCULATION OF RIVER BIODIVERSITY UNITS

WSP
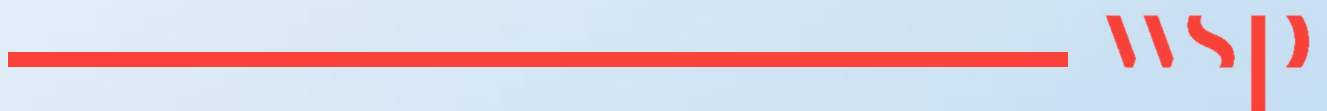
Note on the methodology used for the calculation of River Biodiversity Units

1. Introduction

The Natural England Biodiversity Metric 3.0 has been utilised to generate the baseline (pre-construction) River Biodiversity Units (RBU) units and the post-intervention RBU. The net change in number of RBU calculated represents the biodiversity losses or gains in relation to rivers and streams for each planning application.

1.1 Rivers & Streams in the Biodiversity Metric 3.0

The Biodiversity Metric 3.0 is not specifically designed to address temporary habitat degradation, rather it focusses on loss. During application of the Biodiversity Metric 3.0, for on-site metric calculations, the User Guide 3.0[1] states that where it will take greater than 2 years for habitat to be returned to the baseline condition this should be considered a 'loss'.

The enabling and construction phases of the HARP schemes will require a number of temporary outfalls, watercourse crossings, bridges and culverts which will be in place for an extended period due to the length of the construction period. The impacts of these interventions have therefore been recorded in the Biodiversity Metric 3.0 as additional encroachment on the riparian zone and/or watercourse and contribute to a loss in RBU.

Reinstatement of watercourse substrate and banks will take place following removal of the culverts, bridge, and temporary outfalls, alongside other environmental mitigation measures such as reinstatement of terrestrial habitats. Further information can be found in each HARP Environmental Statement. This activity will therefore eventually remove the additional encroachment on watercourses and the riparian zone, however this has not been included in the RBU calculations at this stage. Therefore the loss of RBU as currently calculated, and the extent of offsite enhancement required to achieve a net gain in RBU, represents a worst case scenario.

The User Guide advises that this loss is recorded in the metric as loss of baseline habitat and then as 'creation' of the replacement habitat, which in the current calculations requires creation of the same length of 'lost' habitat with the addition of the relevant level of encroachment. Therefore, the River Creation tab of each metric is used to record the degraded river habitat.

The Biodiversity Metric 3.0 allows for recording of river habitat enhancement opportunities for both on-site and off-site areas. In the current calculations, enhancement opportunities are only relevant for the off-site metrics (the Damas Gill and Newton-in-Bowland Habitat Creation Areas), as the activities within the red line boundaries (the on-site areas) are assumed to be restricted to reinstatement only.

1.2 River Condition and MoRPh

The Biodiversity 3.0 Metric requires input of river condition data for each watercourse included in the calculations. The river condition describes the on-site physical habitat diversity for each watercourse. The metrics prepared for the on-site calculations have utilised assumptions in order to enter this data (see Section 2 below).

The off-site metrics have utilised data obtained through a River Condition Assessment, which comprised a desk study and a sub-reach scale field survey (the Monitoring of River Physical habitat 'MoRPh' survey). The River Condition Assessment requires at least five contiguous MoRPh surveys to be undertaken to capture the general characteristic of a river reach (see Section 3 below for further information).

---

[1] STEPHEN PANKS A , NICK WHITE A , AMANDA NEWSOME A , JACK POTTER A , MATT HEYDON A , EDWARD MAYHEW A , MARIA ALVAREZ A , TRUDY RUSSELL A , SARAH J. SCOTT B , MAX HEAVER C , SARAH H. SCOTT C , JO TREWEEK D , BILL BUTCHER E and DAVE STONE A 2021. Biodiversity metric 3.0: Auditing and accounting for biodiversity – User Guide. Natural England - Natural England Joint Publication JP039

2. On-site Metrics (Within Redline Boundary)

All watercourses present within the redline boundary of each planning application have been included in the relevant baseline calculations. The watercourses are named within the metrics according to the convention used in the HARP planning application Environmental Statements, which provide an identification number if the watercourse is not formally named. GIS data was used to calculate the length of each watercourse within the redline boundary.

The following assumptions were used for the on-site RBU calculations:
- All watercourses were assumed to be in moderate condition;
- As the majority of watercourses included in the calculations have not been formally identified in any local plans, a strategic significance of Low (multiplier of 1) was applied to all watercourses with the exception of the River Hodder and the River Ribble which were allocated a strategic significance of High[2] (multiplier of 1.15);
- When calculating the extent of encroachment to outfalls and culverts, a worst-case scenario approach was adopted. The impacts of any outfalls and culverts have been assumed to impact a 10m length of the watercourse;
- Outfalls have been assumed to represent a Major encroachment on the riparian environment[3];
- Crossings and culverts have been assumed to represent a Major encroachment on both the riparian environment and the watercourse[4];
- Clear span bridges are assumed to represent a Moderate encroachment on the riparian environment[5];
- Reinstatement/removal of culverts and outfalls is not included in the calculations (see Section 1.1 above). Therefore the net loss in RBU represents a worst case scenario.

3. Offsite Metrics (Habitat Creation Areas)

The baseline condition score of watercourses within the off-site assessment has been generated through metrics recorded in-field using the River Metric Survey. To calculate the baseline condition of rivers there are two components to the assessment: MoRPh field surveys and calculation of MoRPh River Type. A summary of each component is provided below.

3.1 MoRPh field survey

MoRPh surveys were undertaken by aquatic surveyors on the River Hodder (within the Newton-in-Bowland Habitat Creation Area) and the Damas Gill (within the Damas Gill Habitat Creation Area) during August 2021. Depending on the width of the watercourse being surveyed, the length of each MoRPh is between 10-40m. The MoRPH surveys were undertaken following the methodologies detailed in the MoRPh survey technical reference manual[6].

Digital photographs of important habitat features were taken during surveys and these, together with the raw survey data, provide a permanent record of the habitat present at the time of the surveys. From each of the MoRPh survey modules for each watercourse a preliminary condition score has been generated using the River Condition Assessment software tool. The preliminary condition score is generated from a detailed set of 37 indicators.

3.2 River Type

The Indicative River Type is automatically assessed within the software tool using 8 indicators. These indicators are extracted from a desk study of the reach within which the study site is located, and bed material information derived from MoRPh5 survey subreach(es). River typing is a desk-based reach-scale (5 to 10 km) study which identifies the hydrogeomorphological river type. There are 15 River Types included in the Rivers and Streams metric; canals and navigable rivers, large rivers and 13 indicative natural river types labelled A to M. The hydrogeomorphological river type is called an indicative type as all 13 distinct river types could arise as naturally functioning types in England. Using

---

[2] The Biodiversity Metric 3.0 uses the delivery of identified actions within River Basin Management Plans, Catchment Plans and Local Plans to represent high strategic significance.

[3] Defined in the Biodiversity Metric 3.0 User Guide as any development in the riparian zone 0-4m from bank-top

[4] Defined in the Biodiversity Metric 3.0 User Guide as encroachment of >10% of channel width

[5] Defined in the Biodiversity Metric 3.0 User Guide as any development in the riparian zone 4-10m from bank-top

[6] Gurnell, A., England, J., Shuker, L. & Wharton, G. (2019) MoRPH survey technical reference manual.

desk study evidence, the study site is assigned to a type, because it appears to conform to that type. There are no assumptions made to the naturalness of that river.

3.2 River Condition

The MoRPh survey quantifies 32 indicators (scored on a scale 0 to 4/-4) that contribute to the preliminary condition score[7]. There are 19 positive indicators and 13 negative indicators. The final river type translates the preliminary condition score for each MoRPh5 into a final condition score and reflects what is achievable for that river type.

3.3 Net Gain in RBU

The final condition score has been entered into the Biodiversity 3.0 Metric as the baseline condition for watercourses to calculate the baseline RBU within each Habitat Creation Area. Following the calculation of baseline RBU, an assessment has been made of enhancement opportunities for the watercourses within each Habitat Creation Area (e.g. install fences to restrict poaching, hedgerow reinstatement). The River Condition Assessment software tool has then been used to provide the post-intervention river condition score. The revised river condition has been entered into the Biodiversity 3.0 Metric to calculate the net gain in RBU which would be achieved with the identified enhancements.

Appendix 1 provides detailed results for each river type and river condition indicator for the River Hodder (within the Newton-in-Bowland Habitat Creation Area) and Damas Gill (within the Damas Gill Habitat Creation Area). The river condition results are presented for baseline conditions and for an enhancement scenario for each river. Details of the assumed enhancements are also included in **Appendix 1**.

---

[7] Gurnell, A., England, J., Shuker, L. & Wharton, G. (2020) The MoRPH survey - Technical reference manual. Available at Microsoft Word - A GUIDE TO ASSESSING RIVER CONDITION Jly2020.docx (modularriversurvey.org)

Appendix 1 - Habitat Creation Sites- River Condition under baseline conditions and enhancement scenarios

Newton-In-Bowland Habitat Creation Site - River Hodder

Baseline Condition

The River Condition Assessment identified the River Hodder within the Newton-In-Bowland Habitat Creation Site as **river type F** (unconfined, straight-sinuous river with a cobble/gravel substrate). Rivers assigned to type F can never achieve good condition status without being modified into another river type.

On the basis of the MoRPh survey data collected in August 2021, the MoRPh5 preliminary condition score was 0.89 which provided a final river condition class of **Moderate** for the baseline situation.

The MoRPh survey quantifies over 30 indicators (scored on a scale 0 to 4/-4) that contribute to the preliminary condition score[8]. See **Annex A** for a description of all MoRPh5 river condition indicators and 'The MoRPH survey - Technical reference manual' for full details.

The MoRPh5 indicators negatively affecting the baseline condition of the River Hodder included surrounding land use[9] (B5 MoRPh5 score = -2) and the presence of filamentous algae (E12 MoRPh5 score = -3). See **Annex B** for all MoRPh5 river condition indicator scores under the baseline and enhancement scenarios.

Metrics positively affecting the condition score include bank-top vegetation structure (B1 MoRPh5 score = 2), bank face natural profile extent (C3 MoRPh5 score = 3), bank face bare sediment extent (C6 MoRPh5 score = 3) and channel bed material richness (E6 MoRPh5 score = 3).

Enhancement Scenario

To improve the riverine conditions of the River Hodder, modifications to the bank top, bank face and river channel could be implemented. Fencing off the River Hodder from poaching and planting hedgerow, shrubbery or trees on the bank top and creating ponds would lead to increases in condition scores such as the B2 and B3 indicator. Increasing the macrophyte extent and diversity in the marginal habitat would lead to improvements in the D1 and D2 indicators. Finally, the addition of large woody debris and retention of coarse woody debris to the channel would increase the richness of features present (E5) and potentially alter other indicators in a positive manner.

Indicators that are assumed to be altered through the above enhancement, thus increasing the condition score of the River Hodder, include the following:

- bank top tree related features (B2) - MoRPh5 score altered from 0 to 3;
- bank top water-related features (B3) – MoRPh5 score altered from 0 to 2;
- surrounding land use (B5) – MoRPh5 score altered from -2 to 2;
- channel margin aquatic vegetation extent (D1) - MoRPh5 score altered from 0 to 2;
- channel margin aquatic morphotype richness (D2) - MoRPh5 score altered from 0 to 2;
- channel bed natural features richness (E5) - MoRPh5 score altered from 0 to 3).

Metrics positively affecting the condition score and would be retained as in the baseline condition.

Implementation of these recommendations would increase the preliminary condition score from 0.89 to 1.77 which remains a final class of **Fairly Good**.

Further enhancement opportunities relate to wider land use changes and have not been considered under the current enhancement scenario but if considered realistic to implement would further increase the condition score. This includes the implementation of a management plan for filamentous algae which would alter the MoRPh5 indicator negatively affecting the baseline condition of the River Hodder (the presence of filamentous algae (E12)).

---

[8] Gurnell, A., England, J., Shuker, L. & Wharton, G. (2020) The MoRPH survey - Technical reference manual. Available at Microsoft Word - A GUIDE TO ASSESSING RIVER CONDITION Jly2020.docx (modularriversurvey.org)

[9] This indicator assesses the potential severity (likely pressure on the river ecosystem) and extent of the dominant and sub-dominant artificial / managed ground cover types observed on each bank (Gurnell et al 2020).

Damas Gill Habitat Creation Site – Damas Gill

Baseline Condition

The River Condition Assessment identified Damas Gill within the Damas Gill Habitat Creation Site as **river type F** (unconfined, straight-sinuous river with a cobble/gravel substrate). Rivers assigned to type F can never achieve good condition status without being modified into another river type.

On the basis of the MoRPh survey data collected in August 2021, the MoRPh5 preliminary condition score was 1.19 which provided a final river condition class of **Moderate** for the baseline situation.

The MoRPh5 indicators negatively affecting the baseline condition of Damas Gill included surrounding land use[10] (B5 MoRPh5 score = -2) and the presence of filamentous algae (E12 MoRPh5 score = -3). See **Annex C** for all MoRPh5 river condition indicator scores under the baseline and enhancement scenarios.

Metrics positively affecting the condition score include bank face natural profile extent (C3 MoRPh5 score = 3), bank face natural bank profile richness (C4 MoRPh5 score = 4), bank face natural bank material richness (C5 MoRPh5 score = 4), bank face bare sediment extent (C6 MoRPh5 score = 3) and channel bed material richness (E6 MoRPh5 score = 3).

Enhancement Scenario

To improve the riverine conditions of Damas Gill, modifications to the bank top, bank face and river channel could be implemented. Poaching-preventative fencing on the bank tops of Damas Gill and planting hedgerow, shrubbery or trees would lead to an increase in the condition scores for the B2 indicator. Modifying the surrounding land use from agricultural modified grassland to upland hay meadow, and dense scrub would lead to improvements in the surrounding land use (B5) indicator. Increasing the macrophyte extent and diversity in the marginal habitat zone would lead to improvements in the D1 and D2 indicators. The addition of large woody debris in strategic positions within the channel would increase the richness of features present (E5) and potentially alter other indicators in a positive manner.

Indicators that are assumed to be altered through the above enhancement, thus increasing the condition score of Damas Gill, include the following:

- bank top tree related features (B2) - MoRPh5 score altered from 0 to 3;
- surrounding land use (B5) – MoRPh5 score altered from -2 to 1;
- channel margin aquatic vegetation extent (D1) - MoRPh5 score altered from 1 to 2;
- channel margin aquatic morphotype richness (D2) - MoRPh5 score altered from 1 to 2;
- channel bed natural features richness (E5) - MoRPh5 score altered from 1 to 3).

Metrics positively affecting the condition score and would be retained as in the baseline condition.

Implementation of these recommendations would increase the preliminary condition score from 1.19 to 1.79 which would provide a final class of **Fairly Good**.

Further enhancement opportunities relate to wider land use changes and have not been considered under the current enhancement scenario but if considered realistic to implement would further increase the condition score. This includes implementation of a management plan for filamentous algae which would alter the MoRPh5 indicator negatively affecting the baseline condition of Damas Gill (the presence of filamentous algae (E12)).

---

[10] This indicator assesses the potential severity (likely pressure on the river ecosystem) and extent of the dominant and sub-dominant artificial / managed ground cover types observed on each bank (Gurnell et al 2020).

Annex A – River Condition Assessment Indicators

Table A1 River Type indicators derived from desk study and MoRPh5 field survey that contribute to assessing the river type and function (Gurnell et al 2020)

Source	Code	Name
Desk study	A1	Braiding index (BI)
Desk study	A2	Sinuosity index (SI)
Desk study	A3	Anabranching index (AI)
Desk study	A4	Level of confinement (U, PC, C)
Desk study	A5	Valley gradient
Field survey	A6	Bedrock reaches
Field survey	A7	Coarsest bed material size class
Field survey	A8	Average alluvial bed material size class

Table A2 River Condition indicators extracted from MoRPh5 field surveys (Gurnell et al 2020)

Location	Indicator
Bank top	B1 Bank top vegetation structure
	B2 Bank top tree feature richness
	B3 Bank top water-related features
	B4 Bank top NNIPS cover
	B5 Bank top managed ground cover
Bank face	C1 Bank face riparian vegetation structure
	C2 Bank face tree feature richness
	C3 Bank face natural bank profile extent
	C4 Bank face natural bank profile richness
	C5 Bank face natural bank material richness
	C6 Bank face bare sediment extent
	C7 Bank face artificial bank profile extent
	C8 Bank face reinforcement extent
	C9 Bank face reinforcement material severity
	C10 Bank face NNIPS cover
Channel – water margin	D1 Channel margin aquatic vegetation extent
	D2 Channel margin aquatic morphotype richness
	D3 Channel margin physical feature extent
	D4 Channel margin physical feature richness
	D5 Channel margin artificial features
Channel bed	E1 Channel aquatic morphotype richness
	E2 Channel bed tree features richness
	E3 Channel bed hydraulic features richness
	E4 Channel bed natural features extent
	E5 Channel bed natural features richness
	E6 Channel bed material richness
	E7 Channel bed siltation
	E8 Channel bed reinforcement extent
	E9 Channel bed reinforcement severity
	E10 Channel bed artificial features severity
	E11 Channel bed NNIPS extent
	E12 Channel bed filamentous algae extent

Annex B – River Hodder River Condition Results

Table B1 River Type indicators and condition scores for the River Hodder

Indicator	Value
Easting	368948.7648
Northing	449783.0291
NGR	SD 68948 49783
River Category	Other
A1	0
A2	1.03974891
A3	0
A4	Unconfined
A5	0.003138075
A6	FALSE
A7	BO
A8	GP
Calculated River Type	F
Final River Type	F
Shape	11.363636
Average Width	15
Preliminary Condition Score (Baseline)	0.88
Final Condition Class (Baseline)	**Moderate**
Preliminary Condition Score (Enhancement)	1.77
Final Condition Class (Enhancement)	**Fairly Good**

Table B2 MoRPh5 indicators for the River Hodder under baseline conditions and the enhancement scenario

MoRPh5	Baseline Condition	Enhancement Scenario
B1	2	2
B2	0	**3**
B3	0	**2**
B4	0	0
B5	-2	**2**
C1	1	1
C2	0	0
C3	3	3
C4	2	2
C5	2	2
C6	3	3
C7	0	0
C8	0	0
C9	0	0
C10	0	0
D1	0	**2**
D2	0	**2**
D3	1	1
D4	1	1
D5	0	0
E1	0	0
E2	1	1
E3	2	2
E4	2	2
E5	1	**3**
E6	3	3
E7	0	0
E8	0	0
E9	0	0
E10	0	0
E11	0	0
E12	-3	-3
Preliminary Condition Score	0.88	1.77
Final Condition Class	Moderate	Fairly Good

Annex C – Damas Gill River Condition Results

Table C1 River Type indicators and condition scores for Damas Gill

Indicator	Value
Easting	352780
Northing	457225.5
NGR	SD 52779 57225
River Category	Other
A1	0
A2	1.039749
A3	0
A4	Unconfined
A5	0.003138
A6	FALSE
A7	BO
A8	GP
Calculated River Type	F
Final River Type	F
Shape	3.978495
Average Width	2.22
Preliminary Condition Score (Baseline)	1.19
Final Condition Class (Baseline)	**Moderate**
Preliminary Condition Score (Enhancement)	1.79
Final Condition Class (Enhancement)	**Fairly Good**

Table C2 MoRPh5 indicators for Damas Gill under baseline conditions and the enhancement scenario

MoRPh5	Baseline Condition	Enhancement Scenario
B1	1	1
B2	0	3
B3	1	1
B4	0	0
B5	-2	**1**
C1	1	1
C2	0	0
C3	3	3
C4	4	4
C5	4	4
C6	3	3
C7	0	0
C8	0	0
C9	0	0
C10	0	0
D1	1	**2**
D2	1	**2**
D3	2	2
D4	1	1
D5	0	0
E1	1	1
E2	1	1
E3	1	1
E4	1	1
E5	1	**3**
E6	3	3
E7	0	0
E8	0	0
E9	0	0
E10	0	0
E11	0	0
E12	-3	-3
Preliminary Condition Score	1.19	1.79
Final Condition Class	Moderate	Fairly Good