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Biodiversity Net Gain Assessment

Land off Luke's Lane, Monkton, South Tyneside

February 2025

Barratt Homes North East



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	Name	**Position**	**Date**
Report Originator	Becky White	Senior Ecologist	5th August 2021
Reviewed	Mark Osborne	Director	5th August 2021
Amendment (V2)	Becky White	Senior Ecologist	6th August 2021
Amendment (V3)	Becky White	Senior Ecologist	9th August 2021
Amendment (V4)	James Streets	Director	14th February 2022
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Amendment (V13)	Ally Vitali	Ecological Technician	January 2025
Reviewed	Becky White	Principal Technical Manager	February 2025

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1. Introduction

1.1 OS Ecology Ltd were commissioned by Barratt Homes North East in February 2021 to provide a Biodiversity Net Gain Assessment for a proposed development on land off Luke's Lane, Monkton.

Site Location

1.2 The site is located to the northeast of Monkton, South Tyneside at an approximate central grid reference of NZ 31933 62380. The site location is illustrated within figure 1 in the appendices.

Site Description

1.3 The site is approximately 7.43ha in extent and comprises a two pastoral fields with hedgerow boundaries and a watercourse flowing through the site. The northern boundary is formed by the Metro line.

Objectives of the Study

1.4 The objectives of this report are:

- To assess and map the habitats present within the proposed development area using UK Habitat Classification[1] criteria.
- To calculate the baseline 'Biodiversity Units' using Natural England's Biodiversity Metric 3.0[2].
- To use the above metric to assess the anticipated change in biodiversity as a result of the proposed development.

Development Proposals

1.5 The site is proposed for residential development with associated infrastructure.

[1] Butcher, B., Carey, P., Edmonds, R., Norton, L. and Treweek, J. (2020). The UK Habitat Classification User Manual Version 1.1 at http://www.ukhab.org/

[2] Natural England Joint Publication JP039 The Biodiversity Metric 3.0 Auditing and Accounting for Biodiversity July 2021

2. Methodology

Scope of Study

2.1 This study aims to utilise the Biodiversity Metric 3.0[3] to provide a measure of the existing biodiversity value of the proposed development site and of the anticipated impact on biodiversity of the development proposals.

Assessment of Baseline Conditions

Habitat Mapping

2.2 The proposed development site was mapped as different habitat types using the habitat classifications detailed within the UK Habitat Classification User Manual[4].

2.3 Habitat maps were digitised and area calculations for each UK Habitat Classification habitat type present within the site were undertaken using QGIS.

2.4 Area measurements are provided in hectares.

Habitat and Hedgerow Condition Assessment

2.5 Each area of habitat was assigned a condition score based on the relevant 'habitat condition sheet' as per the Biodiversity Metric 3.0 – Technical Supplement[3].

2.6 Habitat parcels are assigned one of three categories: Good, Moderate or Low. If condition varies across an area of the same habitat type, the habitat will be split into separate parcels, each assigned a different condition category.

2.7 Certain habitat categories are allocated a fixed condition score and do not need their condition assessed as per the Technical Supplement[5].

2.8 Where appropriate, completed habitat condition sheets for each parcel of habitat are provided within the appendices.

River Habitat Assessment

2.9 If watercourses are present on site or adjacent to the site, the assessment of riverine habitats on site was completed using the MoRPH5 field survey methodology. The survey was

[3] Stephen Panks, Nick White, Amanda Newsome, Jack Potter, Matt Heydon, Edward Mayhew, Maria Alvarez, Trudy Russell, Sarah J. Scott, Max Heaver, Sarah H. Scott, Jo Treweek, Bill Butcher and Dave Stone 2021. Biodiversity metric 3.0: Auditing and accounting for biodiversity – User Guide. Natural England

[4] Butcher, B., Carey, P., Edmonds, R., Norton, L. and Treweek, J. (2020). The UK Habitat Classification User Manual Version 1.1 at http://www.ukhab.org/

[5] Stephen Panks, Nick White, Amanda Newsome, Jack Potter, Matt Heydon, Edward Mayhew, Maria Alvarez, Trudy Russell, Sarah J. Scott, Max Heaver, Sarah H. Scott, Jo Treweek, Bill Butcher and Dave Stone 2021. Biodiversity metric 3.0: Auditing and accounting for biodiversity – User Guide. Natural England

completed by a trained assessor, James Streets, who has completed the training and assessment process for the methodology.

2.10 The survey takes place over a number of points at equal spacing along the watercourse, which depends on the river width. At each point a range of 30 different riverine characteristics are assessed. These include elements such as river width, depth, flow, substrate, river features such as mid-channel islands, bank composition, vegetation structure and any artificial elements to the channel.

2.11 A desktop assessment of the river is also completed assessing elements such as the braiding of the river, the level of confinement, gradient and the overall bed material across the survey area.

2.12 The data obtained from each point is then input into the Cartographer software, which provides an assessment of the river condition based on this information.

2.13 Where the watercourse length is great than the survey length, a representative reach of the river is surveyed.

Use of the Calculation Tool

2.14 The Biodiversity Metric 3.0 Calculation Tool is used to calculate biodiversity units for the existing baseline conditions within the proposed development area.

2.15 Habitat type, area (ha) and condition score as calculated above are entered into the metric for each parcel of habitat present within the proposed development site.

2.16 The metric assigns a 'Distinctiveness' category and score to each habitat parcel.

2.17 A 'Strategic Significance' score is then assigned to each habitat parcel. The assessment of strategic significance is based on local planning policy in the first instance. For example, if the site is located within a designated wildlife corridor, within the local biodiversity action plan, National Character Area or Nature Recovery Area then it would be of 'High Strategic Significance'. For this site, the Durham Biodiversity Action Plan has been used to identify habitats that would be of strategic significance in this location.

2.18 Areas of 'Moderate Strategic Significance' would be classified as areas not formally designated, but which are ecologically desirable. 'Areas of Low Strategic Significance' are those which do not meet the above criteria.

2.19 Based on the above information, the metric then calculates Biodiversity Units for each habitat parcel and a total number of Biodiversity Units for the proposed development area.

Post Development Conditions

2.20 The areas of habitat to be retained within the proposed development are specified within the metric. Data is then entered into the metric with respect to enhanced habitats and new areas of habitat to be created as part of the development, in the same way as for the baseline conditions.

2.21 The same criteria detailed above are input for each habitat parcel, as well as an additional criterion for any off-site creation/enhancement proposed. A spatial risk category is associated with any off-site works. This spatial risk category specifies whether the proposed off-site mitigation is within the same local authority as the proposed development site, within an adjacent local authority or beyond the neighbouring authority.

2.22 The metric tool automatically applies an appropriate difficulty level associated with each type of habitat creation proposed and a temporal category based on the likely time taken to reach the assigned target condition.

2.23 For habitat enhancement the metric identifies the change in distinctiveness and condition of the habitat. Full details are provided within the Biodiversity Metric 3.0 User Guide[6].

Biodiversity Metric Calculation

2.24 Once both the pre-development and post-development habitat calculations have been assessed, the metric provides the results in a range of tables and graphs. These highlight whether biodiversity losses or gains have been achieved based on pre and post development Biodiversity Units. The metric presents a total net unit change and a total net percentage change.

[6] Stephen Panks, Nick White, Amanda Newsome, Jack Potter, Matt Heydon, Edward Mayhew, Maria Alvarez, Trudy Russell, Sarah J. Scott, Max Heaver, Sarah H. Scott, Jo Treweek, Bill Butcher and Dave Stone 2021. Biodiversity metric 3.0: Auditing and accounting for biodiversity – User Guide. Natural England

3. Results

Baseline Habitat Types and Condition Assessment

3.1 The following table details the results of the habitat survey and condition assessment and assigns the relevant UK Habitat Classification and Metric Category to each parcel of habitat. Figures illustrating the habitats within the site and condition assessment forms for each type of habitat are provided within the appendices. Full survey information is provided within the Ecological Impact Assessment report for this site[7].

Table 3.1: Baseline Habitat Types and Condition Assessment

Habitat Description	Photographs	UK Habs. Category	Metric Category	Condition
Grassland The site is dominated by permanent pasture. Species recorded across the site included perennial rye (*Lolium perenne*), Yorkshire fog (*Holcus lanatus*), Bent sp. (*Agrostis* sp.), cocksfoot (*Dactylis glomerata*), creeping buttercup (*Ranunculus repens*), white clover (*Trifolium repens*), common mouse-ear (*Cerastium fontanum*), self heal (*Prunella vulgaris*), greater plantain (*Plantago major*), creeping thistle (*Cirsium arvense*), daisy (*Bellis perennis*), common sorrel (*Rumex acetosa*), creeping cinquefoil (*Potentilla reptans*), meadow buttercup (*Ranunculus acris*), meadow grass (*Poa* sp.), red clover (*Trifolium pratense*), colt's foot (*Tussilago farfara*), broadleaved dock (*Rumex obtusifolius*), greater stitchwort (*Stellaria holostea*), cleavers (*Gallium aparine*), marsh foxtail (*Alopecurus geniculatus*), false oat grass (*Arrhenatherum elatius*), crested dog's tail (*Cynosurus cristatus*),		g3c – Other Neutral Grassland	*Broad Habitat* Grassland *Habitat Type* Other Neutral Grassland	Moderate

[7] Ecological Impact Assessment, Land off Luke's Lane, Monkton, Southern Tyneside, July 2021, OS Ecology Ltd

Table 3.1: Baseline Habitat Types and Condition Assessment				
Habitat Description	**Photographs**	**UK Habs. Category**	**Metric Category**	**Condition**
meadow foxtail (*Alopecurus pratensis*), sweet vernal grass (*Anthoxanthum odoratum*) and ribwort plantain (*Plantago lanceolata*).				
Hedgerow The southern boundary of the site is defined by a species poor intact hedgerow. The western boundary is comprised of a fence with a hedgerow. The southern section of this hedge is defunct with large gaps present in places. The central section of this hedgerow is intact and grades into a larger block of dense scrub at the most northern extent. The eastern boundary is defined by a watercourse however a mostly intact hedgerow is present along the southern section. All hedgerows are dominated by hawthorn (*Crataegus monogyna*) however bramble (*Rubus fruticosus*) and dogrose (*Rosa canina*) are also present. Evidence of rabbits is present throughout the western hedgerow.		h2a Hedgerow (Priority Habitat)	Native Hedgerow	Moderate

Table 3.1: Baseline Habitat Types and Condition Assessment				
Habitat Description	**Photographs**	**UK Habs. Category**	**Metric Category**	**Condition**
Watercourse A small stream with running water is present along the eastern boundary of the site. The banksides are heavily poached in several locations and lack vegetation. Additional species present within the watercourse and in places along the banks include soft rush (*Juncus effusus*), creeping buttercup, broadleaf dock (*Rumex obtusifolius*), cow parsley (*Anthriscus sylvestris*), white dead nettle (*Lamium album*) and brooklime (*Veronica beccabunga*).		r2b Other Rivers and Streams	Other Rivers and Streams	Moderate

3.2 The following sections of this report focus on those habitats within the planning application boundary in order to calculate the baseline Biodiversity Units.

Baseline Biodiversity Units

3.3 Based on the results of field survey, the following table details the baseline Biodiversity Units for the site.

Table 3.2: Baseline Biodiversity Units					
Habitat Type	**Area (ha)/ Length (km)**	**Distinctiveness**	**Condition**	**Strategic Significance***	**Biodiversity Units**
Habitat Element					
Other Neutral Grassland	7.427	Medium	Moderate	Location ecologically desirable but not in local strategy	65.36
				Baseline Habitat Units:	**65.36**
Hedgerow Element					
Native Hedgerow	0.38	Low	Moderate	Within area formally identified in local strategy	1.75
				Baseline Hedgerow Units:	1.75
River Element					
Other Rivers and Steams	0.47	High	Moderate	Low potential/action, not identified in any plan	4.29
				Baseline River Units:	**4.29**
*Native hedgerow is a priority habitat within the Durham Biodiversity Action Plan (BAP), The grassland, stream and scrub habitats within the site are not considered to meet the definitions within the Durham BAP for priority grassland, stream and scrub habitats.					

Post Development – Baseline Habitat Retention Category

3.4 The following table details for each of the baseline habitat types present on site the relevant retention category (retained, enhanced or lost) as a result of the proposed development.

3.5 For each category the area of each habitat type that falls into each category is provided. Where habitat is to be lost the number of Biodiversity Units to be lost is provided. In this case, all existing habitats are anticipated to be lost through development of the site.

Table 3.3: Post Development – Baseline Habitat Retention Category				
Habitat Type	**Area/Length Retained (Ha)/(Km)**	**Area Enhanced (Ha)**	**Area Lost (Ha)**	**Biodiversity Units Lost**
Habitat Element				
Other Neutral Grassland	0.00	3.1	4.33	38.08
			Habitat Units Lost:	**38.08**

Table 3.3: Post Development – Baseline Habitat Retention Category				
Hedgerow Element				
Native Hedgerow	0.35	0.00	0.03	0.14
			Hedgerow Units Lost:	**0.14**
River Element				
Other Rivers and Streams	0.00	0.47	0.00	0.00
			River Units Lost:	**0.00**

Post Development – Habitat Enhancement

3.6 Site design has ensured the retention of the area of grassland to the east. This area will be enhanced. The following table details the area of habitat to be enhanced, the current habitat condition, the target habitat condition and the number of biodiversity units delivered through the proposed enhancement

Table 3.4: Post Development – Habitat Enhancement				
Habitat Type	**Area (Ha)/ Length (Km)***	**Current Condition**	**Target Condition**	**Biodiversity Units Delivered**
Other Neutral Grassland	3.08	Moderate	Good	38.51
Other Rivers and Streams	0.47	Moderate	Good with moderate encroachment	6.19

3.7 For the purposes of the metric, it is assumed that a detailed management plan will be produced and adhered to, to ensure delivery of the target habitats and conditions.

3.8 Moderate encroachment has been included in the assessment as although there is some development within 0-4m of the bank top, it is considered that the footpath will not constitute encroachment as it is listed as an exemption from the major encroachment category if the area is less than 5% of the area within 4m of the bank top[8]. In this instance the total area within 4m of the bank is 182m^2. The total area within 4m of the watercourse 4,284m^2 and as such the 182m^2 is less than 5% of this area. Rather that classifying this as no encroachment it has been included as moderate encroachment however in order to better assess impacts.

[8] Biodiversity Metric 3.1 Auditing and accounting for biodiversity; User Guide; Natural England Joint Publication JP039; 21st April 2022; P90 table 9-3 of states: ***Major encroachment only*** *– a maximum total of 5% footprint for amenity features (e.g. benches and associated paths) and small utility units (e.g. pump houses and associated paths) would not constitute encroachment.*

3.9 For the riverine habitat, the key elements to increase its condition to good include the following measures:

- Increased riparian vegetation structure to increase diversity at bank tops and on the banks themselves;
- Additional bank top and bank face tree planting in order to increase the richness of tree features to include tree roots, trailing branches etc.;
- Maintenance of non-native species absence from the site;
- Management of bank-top habitats for wildlife;
- Reduction in poaching along the banks allowing for them to re-vegetate in places, but also allowing some areas of bare bank to persist.
- Increased bank profile variation;
- Consideration of native species introduction to the channel, such as emergent species and submerged species.

Post Development – Habitat Creation

3.10 The following table details the post development habitats proposed within the site and the metric category considered to most closely match the proposed habitat types.

Table 3.5: Post Development Habitats

Habitat Type	Metric Category	Area (Ha)/ Length (Km)
Native Scrub Planting	Mixed Scrub	0.02
Amenity Grassland	Modified Grassland	0.21
Dwellings Footprint, roads and hardstanding within Development Area	Developed Land; Sealed Surface	2.54
Vegetated Gardens of Dwellings	Vegetated Garden	1.07
EM2 Wildflower Mix and EM8 Wetland Mix	Other Neutral Grassland	0.37
Native Species Rich Hedgerow	Native Species Rich Hedgerow	0.4
Ornamental Hedgerow	Hedge Ornamental Non Native	0.07
Broadleaved Trees – 35 Heavy Standards	Urban Tree	0.1424
Broadleaved Trees – 15 Native Feathered	Urban Tree	0.0068

3.11 For the purposes of the metric, it is assumed that a detailed management plan will be produced and adhered to, to ensure delivery of the target habitats and conditions.

3.12 A figure illustrating the location of habitat creation proposals is provided within the appendices. The following table details each element of the habitat creation proposed, including the target condition, other criteria assigned by the metric and the associated biodiversity units delivered by each element.

3.13 For the areas of mixed scrub and neutral grassland, a target condition of 'good' has been assigned. For the areas of modified grassland (amenity grassland), hedgerow and the urban trees it is anticipated that a target condition of 'moderate' can be achieved given the nature of the habitats and urban location. For gardens, the metric assigns a condition of 'poor' based on the habitat type while condition assessment is not required in relation to developed land.

3.14 Improvements to the SuDS basin have been considered as part of the habitat improvements on site, however this cannot be achieved through the inclusion of permanent water as a result of the LLFA and Network Rail requirements.

3.15 The mixed scrub is proposed to be of moderate condition and this will be achieved through active management of this area. This will include the following elements:

- The habitat is representative of UKHab description (Dense scrub comprising a mixture of species without a single species dominant). There are at least three woody species, with no one species comprising more than 75% of the cover. This is incorporated into the design.
- There is an absence of invasive non-native species (as listed on Schedule 9 of WCA, 1981) and species indicative of sub-optimal condition make up less than 5% of ground cover. This can be achieved through management and monitoring.
- The scrub has a well-developed edge with scattered scrub and tall grassland and/or herbs present between the scrub and adjacent habitat(s). This can be achieved through management ensuring the edges of the scrub areas are allowed to develop. The areas of scrub are adjacent to areas of grassland so this should be feasible.

Table 3.6: Post Development Habitats - Biodiversity Units Delivered							
Habitat Type	**Area (ha)/Length (km)**	**Distinctiveness**	**Condition**	**Strategic Significance**	**Time to target condition/years[1]**	**Difficulty of Creation**	**Biodiversity Units Delivered**
Habitat Creation							
Mixed Scrub	0.02	Medium	Moderate	Location ecologically desirable but not in local strategy	10	Low	0.18
Other Neutral Grassland	0.37	Medium	Good	Within area formally identified in local strategy	10	Low	3.58
Modified Grassland	0.21	Low	Moderate	Area/compensation not in local strategy/no local strategy	4	Low	0.73
Developed Land; Sealed Surface	2.54	V. Low	N/A		0	Medium	0.00
Vegetated Garden	1.07	Low	Poor		1	Low	2.07
Urban Tree	0.1424	Medium	Moderate		27	Low	0.44
Urban Tree	0.0068	Medium	Moderate		27	Low	0.02
						Habitat Units:	**7.01**
Hedgerow Creation							
Native Species Rich Hedgerow	0.4	Medium	Moderate	Within area formally identified in local strategy	5	Low	3.08
Hedge Ornamental Non Native	0.13	V. Low	Poor	Area/compensation not in local strategy/no local strategy	1	Low	0.13
						Hedgerow Units:	**3.20**
1 Time to target years should be calculated from a first occupancy date of August 2024							

4. Net Gain Assessment

4.1 The following table details the anticipated change in Biodiversity Units as a result of the proposed development, including the associated habitat creation proposals. The full results broken down per habitat type, are detailed within the Biodiversity Metric 3.0 – Calculation Tool for this site which can be provided on request.

On-site baseline	*Habitat units*	65.36
	Hedgerow units	1.75
	River units	5.64
On-site post-intervention (Including habitat retention, creation & enhancement)	*Habitat units*	45.52
	Hedgerow units	3.20
	River units	6.19
On-site net % change (Including habitat retention, creation & enhancement)	*Habitat units*	-30.36%
	Hedgerow units	83.35%
	River units	9.69%
Off-site baseline	*Habitat units*	0.00
	Hedgerow units	0.00
	River units	0.00
Off-site post-intervention (Including habitat retention, creation & enhancement)	*Habitat units*	0.00
	Hedgerow units	0.00
	River units	0.00
Total net unit change (including all on-site & off-site habitat retention, creation & enhancement)	*Habitat units*	-19.84
	Hedgerow units	1.46
	River units	0.55
Total on-site net % change plus off-site surplus (including all on-site & off-site habitat retention, creation & enhancement)	*Habitat units*	-30.36%
	Hedgerow units	83.35%
	River units	9.69%
Trading rules Satisfied?	No - Check Trading Summary	

4.2 It can be seen that the current proposals will result in a **net gain in biodiversity units within both the Hedgerow and Rivers elements** of the metric. However, a **loss of 19.84 biodiversity units is found within the Habitats element**.

4.3 This biodiversity unit loss is due to the loss of grassland within the site, categorised as other neutral grassland, a grassland type of medium distinctiveness. The loss of areas of this grassland type to the development footprint has an associated loss of 38.08 units, losses that are partially but not fully compensated through the proposed enhancement of retained areas of grassland and creation of wildflower grassland within the SUDS feature to the east of the site as well as within the wider area of grassland to be enhanced.

4.4 Based on the recommendations of the metric, losses of grassland of this type should be compensated through provision of the same broad habitat or of a higher distinctiveness habitat. Given the site location and the nature of the site, achieving net gain through the

provision of higher distinctiveness habitats, as defined within the metric, on site is unlikely to be feasible.

4.5 It is therefore recommended that in order to achieve net gain in relation to this development and to satisfy the trading rules of the metric, an offsite contribution is made. This has been secured through a Section 106 agreement with a total of £288,000 to be paid to the council to address the deficit to allow the creation of grassland or other suitable habitat within South Tyneside.

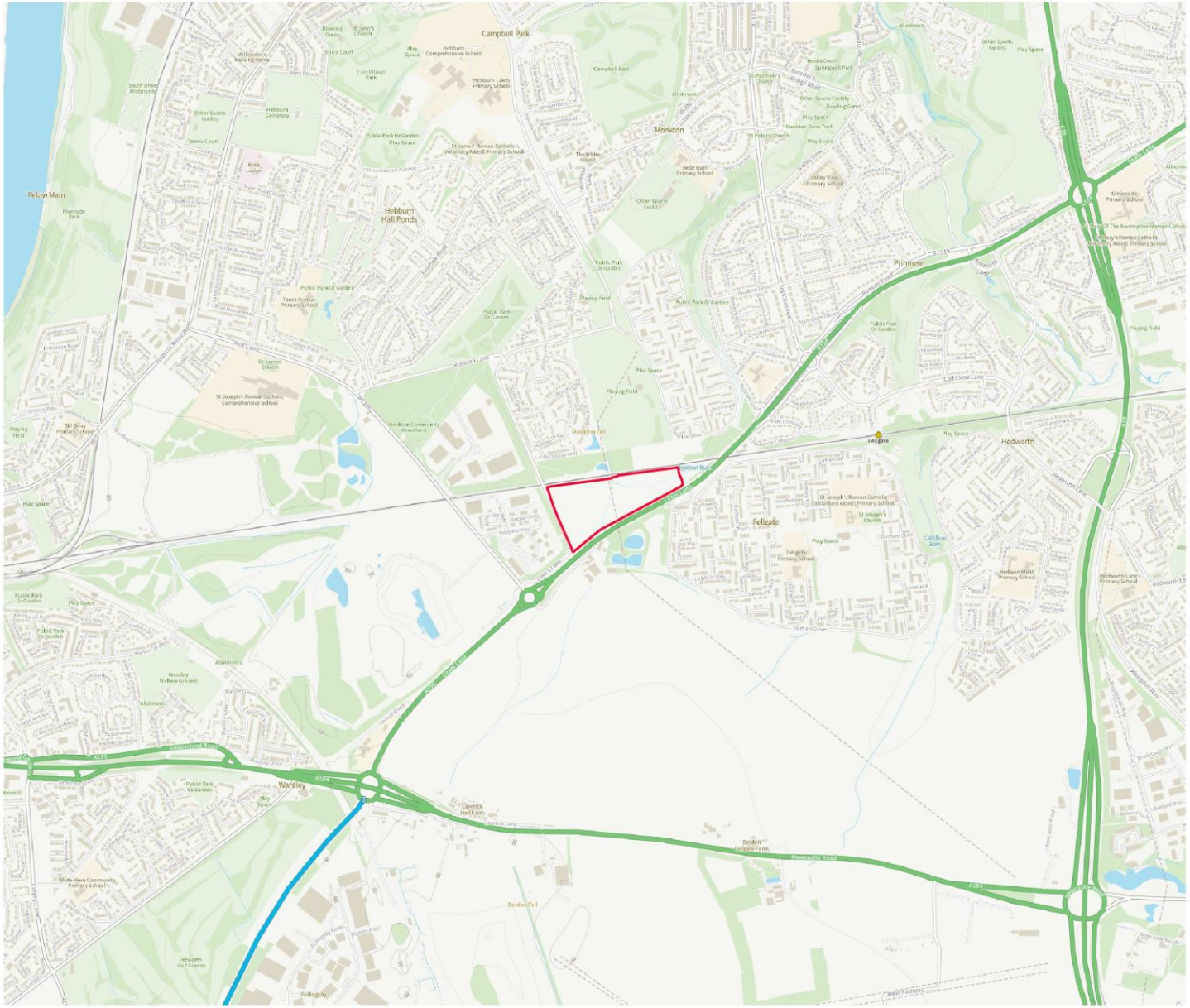
Appendix 1: Condition Assessment

CONDITION ASSESSMENT PROFORMA FOR USE WITH BIODIVERSITY METRIC 3.0 - AREA BASED HABITATS														
Date	3rd August 2021					Metric 3.0 survey reference (if condition assessment of this polygon relates to a wider habitat survey)								
Weather conditions	21oC, 10% cloud cover, wind F1-2, dry													
Surveyor name(s)	Mark Osborne and Mandy Rackham					Unique polygon reference(s)					Grass01			
Project / development name	Maples 3					Metric 3.0 habitat type					Other Neutral Grassland			
Site name or location	Land off Lukes Lane					Condition assessment required? (y/n)					Y			
Onsite or offsite?	Onsite					Condition sheet used					Grassland - Medium, High and V. High Distictiveness			
Reason for assessment (if not baseline condition survey)														
Limitations (if applicable)														
Habitat description														
See report														
Allocate pass 'P' or fail 'F'. Allocate 'NA' to any irrelevant criteria numbers where condition sheet contains fewer than 13 criteria. For Woodland & Intertidal condition sheets, allocate scores of '1' '2' or '3' against each criteria assessed.														
Criterion	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	**TOTAL**
Result	F	P	P	P	F	NA	NA	NA	NA	NA	NA	NA	NA	3
Photo ref														
Target note ref														
Are any criteria non-negotiable? (Y/N) If Yes are they passed?	N					Condition (Good/Moderate/Poor):				Moderate				
Suggested enhancement interventions to improve condition score	See report													

CONDITION ASSESSMENT PROFORMA FOR USE WITH BIODIVERSITY METRIC 3.0														
Date	3rd August 2021					Metric 3.0 survey reference (if condition assessment of this polygon relates to a wider habitat survey)								
Weather conditions	21oC, 10% cloud cover, wind F1-2, dry													
Surveyor name(s)	Mark Osborne and Mandy Rackham					Unique p reference(s)					Hedgerow H1			
Project / development name	Maples 3					Metric 3.0 habitat type					Native Hedgerow			
Site name or location	Land off Lukes Lane					Condition assessment required? (y/n)					Y			
Onsite or offsite?	Onsite					Condition sheet used					Hedgerow			
Reason for assessment (if not baseline condition survey)														
Limitations (if applicable)														
Habitat description														
See report														
Allocate pass 'P' or fail 'F'. Allocate 'NA' to any irrelevant criteria numbers where condition sheet contains fewer than 13 criteria. For Woodland & Intertidal condition sheets, allocate scores of '1' '2' or '3' against each criteria assessed.														
Criterion	A1	A2	B1	B2	C1	C2	D1	D2	C9	C10	C11	C12	C13	**TOTAL**
Result	P	P	P	F	F	F	P	P	NA	NA	NA	NA	NA	5
Photo ref														
Target note ref														
Are any criteria non-negotiable? (Y/N) If Yes are they passed?	N					Condition (Good/Moderate/Poor):				Moderate				
Suggested enhancement interventions to improve condition score	See report													

Stream Condition Assessment	
Survey Details	
River	Monkton Burn
Reach	Monkton Burn, Luke's Lane
Subreach	Monkton Burn, Luke's Lane, 1
Module Numbers	1 to 5
WFD Water Body ID	-
Project Name	Land at Luke's Lane
MoRPh Correlation Code	OS1
Survey Type	Pre-Project
Scenario	-
River Condition	
Condition Score (Preliminary)	0.79
Condition Class/Score (Final)	Moderate / 3
Dimensions	
River Shape	-
Average Width	-
Calculations	
River Category	Other
A1: Braiding Index	1
A2: Sinuosity Index	1
A3: Anabranching Index	1
A4: Level of Confinement	Unconfined
A5: Reach Valley Gradient	0.02
A6: Bedrock Reach?	No
A7: Coarsest Bed Material	Cobble
A8: Average Bed Material	Gravel-Pebble
River Type	Type F

Appendix 2: Figures



Key

Site Boundary

North

Figure No: 01
Figure Name: Site Location
Project Name: Land off Lukes Lane
Project Ref. No: 21018
Date: August 2024
Author: AV

0 250 500 (m)



Key

Site Boundary

North

Figure No: 2
Figure Name: Site Aerial
Project Name: Land off Lukes Lane
Project Ref. No: 21018
Date: August 2024
Author: AV

0 50 100 (m)



Key

- Site Boundary
- h2 - Hedgerow
- r1e - Canal or Ditch
- g3c - Other Neutral Grassland

Secondary codes
10 - Scattered scrub

North

Figure No: 9
Figure Name: Uk Habitat Classification
Project Name: Lukes Lane
Project Ref. No: 21018
Date: August 2024
Author: AV

0 50 100 (m)



Key

- Site Boundary
- Development Area
- Buffer zone

Area within 10m Buffer - 0.89ha.

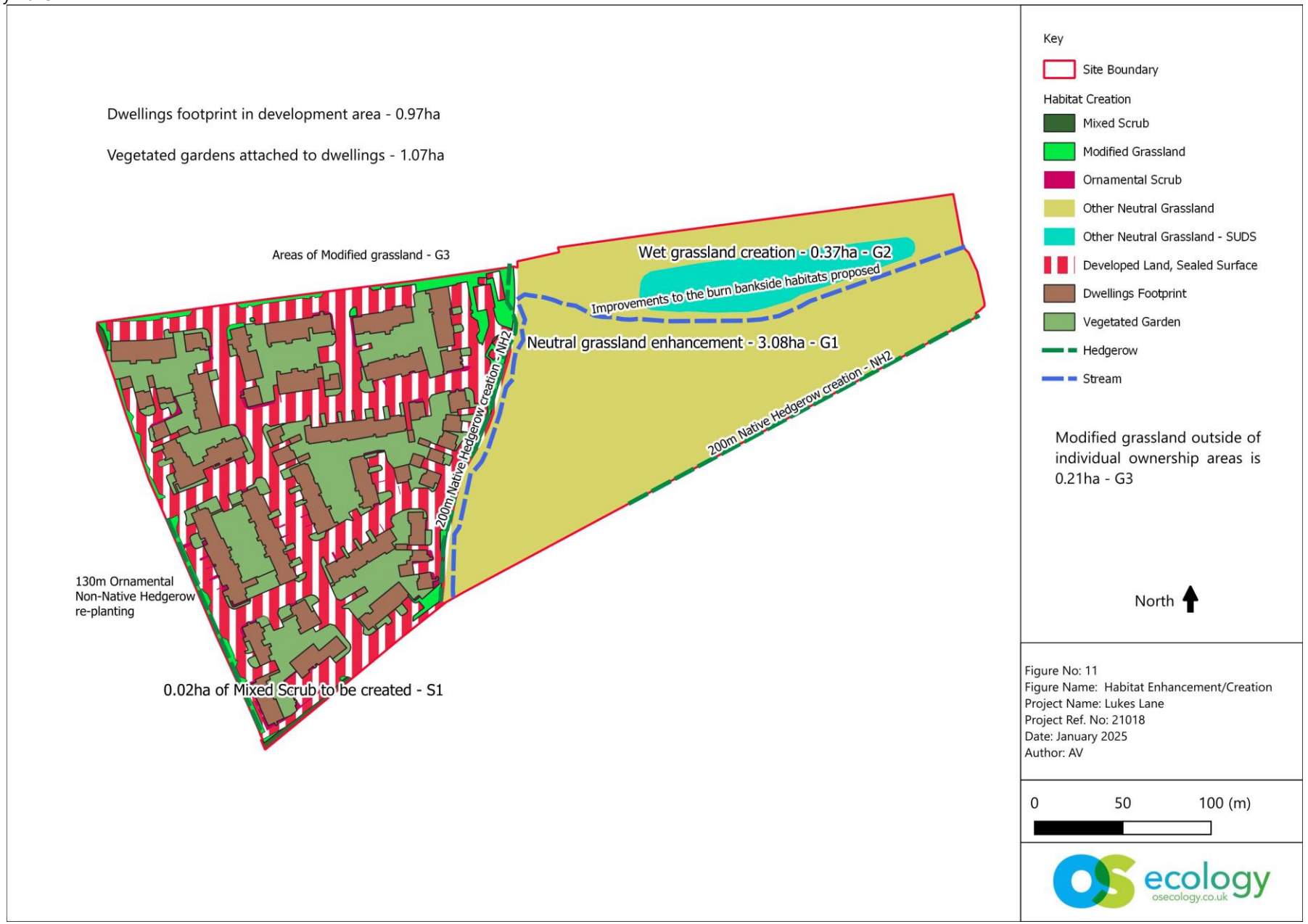
Area of development winth 10m buffer - 0.2ha.

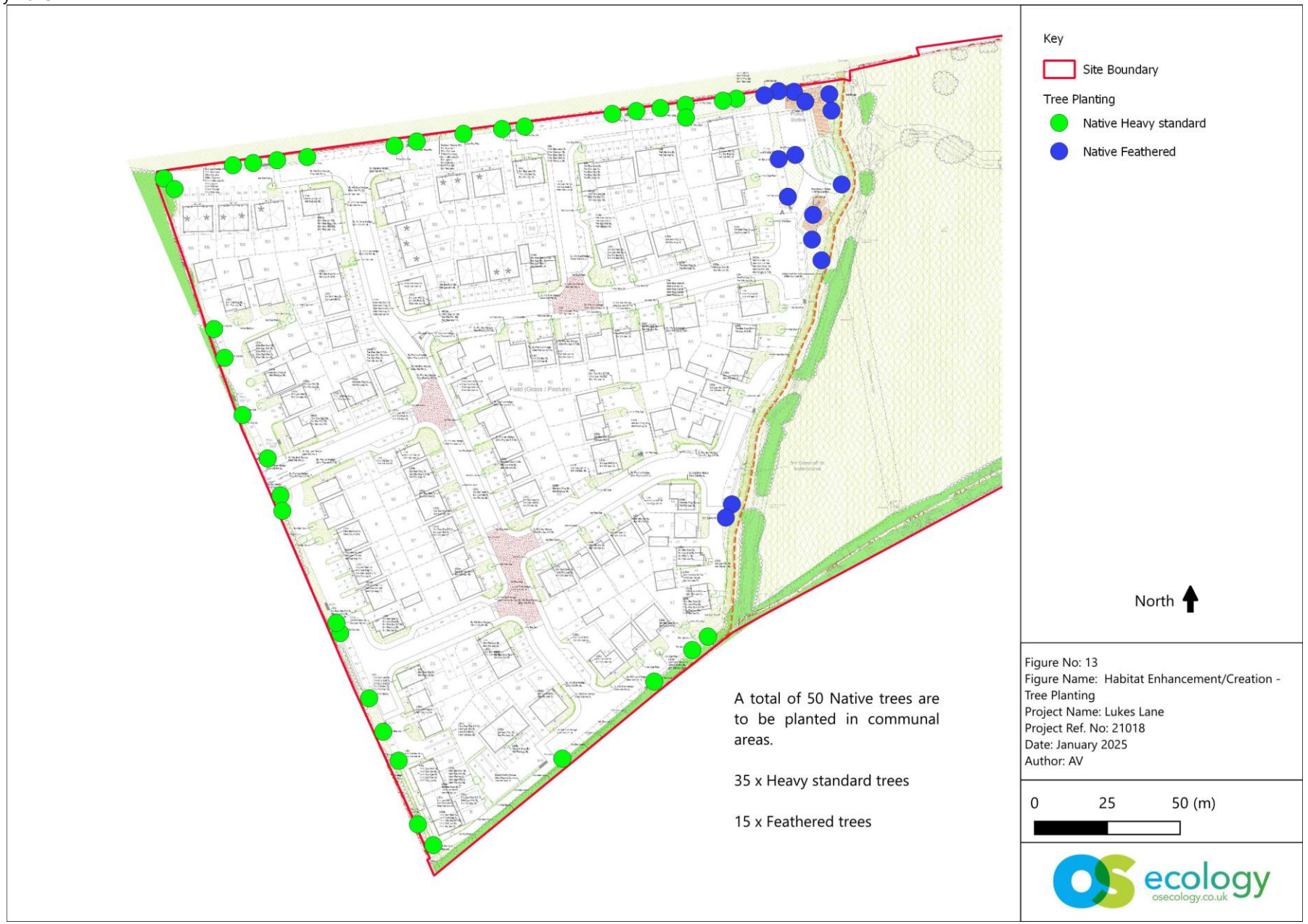
22% of riverine buffer zone encroached.

North

Figure No: 10
Figure Name: River Habitat Encroachment
Project Name: Lukes Lane
Project Ref. No: 21018
Date: August 2024
Author: AV

0 50 100 (m)


Dwellings footprint in development area - 0.97ha
Vegetated gardens attached to dwellings - 1.07ha
Areas of Modified grassland - G3
Wet grassland creation - 0.37ha - G2
Improvements to the burn bankside habitats proposed
Neutral grassland enhancement - 3.08ha - G1
200m Native Hedgerow creation - NH2
200m Native Hedgerow creation - NH2
130m Ornamental Non-Native Hedgerow re-planting
0.02ha of Mixed Scrub to be created - S1
Key
Site Boundary
Habitat Creation
Mixed Scrub
Modified Grassland
Ornamental Scrub
Other Neutral Grassland
Other Neutral Grassland - SUDS
Developed Land, Sealed Surface
Dwellings Footprint
Vegetated Garden
Hedgerow
Stream
Modified grassland outside of individual ownership areas is 0.21ha - G3
North
Figure No: 11
Figure Name: Habitat Enhancement/Creation
Project Name: Lukes Lane
Project Ref. No: 21018
Date: January 2025
Author: AV
0
50
100 (m)


Key
Site Boundary
Tree Planting
Native Heavy standard
Native Feathered
North
A total of 50 Native trees are to be planted in communal areas.
35 x Heavy standard trees
15 x Feathered trees
Figure No: 13
Figure Name: Habitat Enhancement/Creation - Tree Planting
Project Name: Lukes Lane
Project Ref. No: 21018
Date: January 2025
Author: AV
0
25
50 (m)


c-1918-01 Revision N

Appendix 3: Detailed Riverine Assessment Results

	Module				
	1	**2**	**3**	**4**	**5**
INDEX 1: Number of flow types	3	3	2	2	1
INDEX 2: Highest energy flow type	Unbroken standing waves	Unbroken standing waves	Rippled	Rippled	No perceptible flow
INDEX 3: Number of bed material types	3	3	3	3	1
INDEX 4: Coarsest present/ extensive bed material type	Cobble	Cobble	Cobble	Cobble	Silt
INDEX 5: Average alluvial bed material size (phi units)	-2.323809524	-2.323809524	-2.323809524	-2.323809524	6.5
INDEX 6: Average alluvial bed material size class	Gravel-Pebble	Gravel-Pebble	Gravel-Pebble	Gravel-Pebble	Silt
INDEX 7: Extent of superficial bed siltation	0	0	0	0	0
INDEX 8: Channel physical habitat complexity	2.5	2.5	2.083333333	2.083333333	0.833333333
INDEX 9: Number of aquatic vegetation morphotypes	2	2	2	2	2
INDEX 10: Riparian physical habitat complexity	2.5	2.5	2.5	2.5	2.5
INDEX 11: Riparian vegetation structural complexity	4	4	4	4	4
INDEX 12: Human pressure imposed by bank top land cover	1	1	1	1	1
INDEX 13: Channel reinforcement	0	0	0	0	0
INDEX 14: Non-native invasive plant extent	0	0	0	0	0

Module	1	2	3	4	5
Project Name	Land at Lukes Lane	Land at Lukes Lane	Land at Lukes Lane	Land at Lukes Lane	Land at Lukes Lane
MoRPh Correlation Code	OS1	OS1	OS1	OS1	OS1
WFD Waterbody ID	Monkton Burn	Monkton Burn	Monkton Burn	Monkton Burn	Monkton Burn
SurveyType	Pre-project	Pre-project	Pre-project	Pre-project	Pre-project
Riverfly Site?	FALSE	FALSE	FALSE	FALSE	FALSE
Module Length	10	10	10	10	10
Midpoint Location: Latitude	54.95597	54.956	54.95601	54.95607	54.9562
Midpoint Location: Longitude	-1.49837	-1.49818	-1.49792	-1.49781	-1.49762
Midpoint Location: Easting	432222	432234	432251	432258	432270
Midpoint Location: Northing	562485	562489	562490	562497	562511
Midpoint Location: NGR	NZ 32222 62484	NZ 32234 62488	NZ 32251 62489	NZ 32258 62496	NZ 32270 62510
Survey Bank	Left bank	Left bank	Left bank	Left bank	Left bank
Bed Visible	TRUE	TRUE	TRUE	TRUE	TRUE
Adverse Conditions?	FALSE	FALSE	FALSE	FALSE	FALSE
MoRPh River Width	2	2	2	1	1
Left Bank Height	1	1	1	0.5	0.5
Right Bank Height	1	1	1	1	1
Bankfull Width	3	3	3	2	2
Water Width	0.2	0.2	0.2	0.2	0.2
Water Depth	0.1	0.1	0.1	0.1	0.1

Module	1	2	3	4	5
Artificial Ground Cover: Dominant Artificial Ground Cover: Abundance: Left Bank	Extensive	Extensive	Extensive	Extensive	Extensive
Artificial Ground Cover: Dominant Artificial Ground Cover: Abundance: Right Bank	Extensive	Extensive	Extensive	Extensive	Extensive
Artificial Ground Cover: Dominant Artificial Ground Cover: Code: Left Bank	Permanently vegetated agriculture (e.g. pasture, orchard)	Permanently vegetated agriculture (e.g. pasture, orchard)	Permanently vegetated agriculture (e.g. pasture, orchard)	Permanently vegetated agriculture (e.g. pasture, orchard)	Permanently vegetated agriculture (e.g. pasture, orchard)
Artificial Ground Cover: Dominant Artificial Ground Cover: Code: Right Bank	Permanently vegetated agriculture (e.g. pasture, orchard)	Permanently vegetated agriculture (e.g. pasture, orchard)	Permanently vegetated agriculture (e.g. pasture, orchard)	Permanently vegetated agriculture (e.g. pasture, orchard)	Permanently vegetated agriculture (e.g. pasture, orchard)
Artificial Ground Cover: Subdominant Artificial Ground Cover: Abundance: Left Bank	Absent	Absent	Absent	Absent	Absent
Artificial Ground Cover: Subdominant Artificial Ground Cover: Abundance: Right Bank	Absent	Absent	Absent	Absent	Absent
Terrestrial Vegetation: Unvegetated: Abundance: Left Bank	Absent	Absent	Absent	Absent	Absent
Terrestrial Vegetation: Unvegetated: Abundance: Right Bank	Absent	Absent	Absent	Absent	Absent
Terrestrial Vegetation: Mosses / lichens: Abundance: Left Bank	Absent	Absent	Absent	Absent	Absent
Terrestrial Vegetation: Mosses / lichens: Abundance: Right Bank	Absent	Absent	Absent	Absent	Absent
Terrestrial Vegetation: Short Herbs / Grasses: Abundance: Left Bank	Extensive	Extensive	Extensive	Extensive	Extensive
Terrestrial Vegetation: Short Herbs / Grasses: Abundance: Right Bank	Extensive	Extensive	Extensive	Extensive	Extensive
Terrestrial Vegetation: Tall Herbs / Grasses: Abundance: Left Bank	Present	Present	Present	Present	Present
Terrestrial Vegetation: Tall Herbs / Grasses:	Present	Present	Present	Present	Present

Abundance: Right Bank					
Terrestrial Vegetation: Scrub / Shrubs: Abundance: Left Bank	Absent	Absent	Absent	Absent	Absent
Terrestrial Vegetation: Scrub / Shrubs: Abundance: Right Bank	Absent	Absent	Absent	Absent	Absent
Terrestrial Vegetation: Saplings / Trees: Abundance: Left Bank	Absent	Absent	Absent	Absent	Absent
Terrestrial Vegetation: Saplings / Trees: Abundance: Right Bank	Absent	Absent	Absent	Absent	Absent
Terrestrial Vegetation: Leaning Trees: Abundance: Left Bank	Absent	Absent	Absent	Absent	Absent
Terrestrial Vegetation: Leaning Trees: Abundance: Right Bank	Absent	Absent	Absent	Absent	Absent
Terrestrial Vegetation: Fallen Trees: Abundance: Left Bank	Absent	Absent	Absent	Absent	Absent
Terrestrial Vegetation: Fallen Trees: Abundance: Right Bank	Absent	Absent	Absent	Absent	Absent
Terrestrial Vegetation: J-Shaped Trees: Abundance: Left Bank	Absent	Absent	Absent	Absent	Absent
Terrestrial Vegetation: J-Shaped Trees: Abundance: Right Bank	Absent	Absent	Absent	Absent	Absent
Terrestrial Vegetation: Trailing Tree / Shrub Branches: Abundance: Left Bank	Absent	Absent	Absent	Absent	Absent
Terrestrial Vegetation: Trailing Tree / Shrub Branches: Abundance: Right Bank	Absent	Absent	Absent	Absent	Absent
Terrestrial Vegetation: Large Wood: Abundance: Left Bank	Absent	Absent	Absent	Absent	Absent
Terrestrial Vegetation: Large Wood: Abundance: Right Bank	Absent	Absent	Absent	Absent	Absent
Terrestrial Vegetation: Predominant Tree Type: Code: Left Bank	Absent	Absent	Absent	Absent	Absent
Terrestrial Vegetation: Predominant Tree	Absent	Absent	Absent	Absent	Absent

Type: Code: Right Bank					
Nuisance Plant Species: Himalayan Balsam: Abundance: Left Bank	Absent	Absent	Absent	Absent	Absent
Nuisance Plant Species: Himalayan Balsam: Abundance: Right Bank	Absent	Absent	Absent	Absent	Absent
Nuisance Plant Species: Japanese Knotweed: Abundance: Left Bank	Absent	Absent	Absent	Absent	Absent
Nuisance Plant Species: Japanese Knotweed: Abundance: Right Bank	Absent	Absent	Absent	Absent	Absent
Nuisance Plant Species: Giant Hogweed: Abundance: Left Bank	Absent	Absent	Absent	Absent	Absent
Nuisance Plant Species: Giant Hogweed: Abundance: Right Bank	Absent	Absent	Absent	Absent	Absent
Nuisance Plant Species: Floating Pennywort: Abundance: Left Bank	Absent	Absent	Absent	Absent	Absent
Nuisance Plant Species: Floating Pennywort: Abundance: Right Bank	Absent	Absent	Absent	Absent	Absent
Nuisance Plant Species: Other Species 1: Abundance: Left Bank	Absent	Absent	Absent	Absent	Absent
Nuisance Plant Species: Other Species 1: Abundance: Right Bank	Absent	Absent	Absent	Absent	Absent
Nuisance Plant Species: Other Species 2: Abundance: Left Bank	Absent	Absent	Absent	Absent	Absent
Nuisance Plant Species: Other Species 2: Abundance: Right Bank	Absent	Absent	Absent	Absent	Absent
Water Related Features: Disconnected Pond: Abundance: Left Bank	Absent	Absent	Absent	Absent	Absent
Water Related Features:	Absent	Absent	Absent	Absent	Absent

Disconnected Pond: Abundance: Right Bank					
Water Related Features: Connected Pond: Abundance: Left Bank	Absent	Absent	Absent	Absent	Absent
Water Related Features: Connected Pond: Abundance: Right Bank	Absent	Absent	Absent	Absent	Absent
Water Related Features: Side Channel: Abundance: Left Bank	Absent	Absent	Absent	Absent	Absent
Water Related Features: Side Channel: Abundance: Right Bank	Absent	Absent	Absent	Absent	Absent
Water Related Features: Short Non Woody Wetland: Abundance: Left Bank	Absent	Absent	Absent	Absent	Absent
Water Related Features: Short Non Woody Wetland: Abundance: Right Bank	Absent	Absent	Absent	Absent	Absent
Water Related Features: Tall Non Woody Wetland: Abundance: Left Bank	Absent	Absent	Absent	Absent	Absent
Water Related Features: Tall Non Woody Wetland: Abundance: Right Bank	Absent	Absent	Absent	Absent	Absent
Water Related Features: Wetland Shrubs and Trees: Abundance: Left Bank	Absent	Absent	Absent	Absent	Absent
Water Related Features: Wetland Shrubs and Trees: Abundance: Right Bank	Absent	Absent	Absent	Absent	Absent

Module	1	2	3	4	5
Profile: Dominant Bank Profile: Abundance: Left Bank	Extensive	Extensive	Extensive	Extensive	Extensive
Profile: Dominant Bank Profile: Abundance: Right Bank	Extensive	Extensive	Extensive	Extensive	Extensive
Profile: Dominant Bank Profile: Code: Left Bank	Steep (> 45 degrees)	Steep (> 45 degrees)	Steep (> 45 degrees)	Steep (> 45 degrees)	Steep (> 45 degrees)
Profile: Dominant Bank Profile: Code: Right Bank	Steep (> 45 degrees)	Steep (> 45 degrees)	Steep (> 45 degrees)	Steep (> 45 degrees)	Steep (> 45 degrees)
Profile: Subdominant Bank Profile: Abundance: Left Bank	Present	Present	Present	Present	Present
Profile: Subdominant Bank Profile: Abundance: Right Bank	Present	Present	Present	Present	Present
Profile: Subdominant Bank Profile: Code: Left Bank	Vertical with toe	Vertical with toe	Vertical with toe	Vertical with toe	Vertical with toe
Profile: Subdominant Bank Profile: Code: Right Bank	Vertical with toe	Vertical with toe	Vertical with toe	Vertical with toe	Vertical with toe
Natural Materials: Dominant Upper Bank Sediment Size: Code: Left Bank	Earth (i.e. mixed, mainly sand and finer)	Earth (i.e. mixed, mainly sand and finer)	Earth (i.e. mixed, mainly sand and finer)	Earth (i.e. mixed, mainly sand and finer)	Earth (i.e. mixed, mainly sand and finer)
Natural Materials: Dominant Upper Bank Sediment Size: Code: Right Bank	Earth (i.e. mixed, mainly sand and finer)	Earth (i.e. mixed, mainly sand and finer)	Earth (i.e. mixed, mainly sand and finer)	Earth (i.e. mixed, mainly sand and finer)	Earth (i.e. mixed, mainly sand and finer)
Natural Materials: Dominant Lower Bank Sediment Size: Code: Left Bank	Earth (i.e. mixed, mainly sand and finer)	Earth (i.e. mixed, mainly sand and finer)	Earth (i.e. mixed, mainly sand and finer)	Earth (i.e. mixed, mainly sand and finer)	Earth (i.e. mixed, mainly sand and finer)
Natural Materials: Dominant Lower Bank Sediment Size: Code: Right Bank	Earth (i.e. mixed, mainly sand and finer)	Earth (i.e. mixed, mainly sand and finer)	Earth (i.e. mixed, mainly sand and finer)	Earth (i.e. mixed, mainly sand and finer)	Earth (i.e. mixed, mainly sand and finer)
Reinforcement: Vertical Extent: Abundance: Left Bank	Absent	Absent	Absent	Absent	Absent
Reinforcement: Vertical Extent: Abundance: Right Bank	Absent	Absent	Absent	Absent	Absent
Reinforcement: Horizontal Extent: Abundance: Left Bank	Absent	Absent	Absent	Absent	Absent
Reinforcement: Horizontal Extent: Abundance: Right Bank	Absent	Absent	Absent	Absent	Absent
Natural Physical Features: Unvegetated Side Bar: Abundance: Left Bank	Absent	Absent	Absent	Absent	Absent
Natural Physical Features: Unvegetated Side Bar: Abundance: Right Bank	Absent	Absent	Absent	Absent	Absent
Natural Physical Features: Vegetated Side Bar: Abundance: Left Bank	Absent	Absent	Absent	Absent	Absent
Natural Physical Features: Vegetated Side Bar: Abundance: Right Bank	Absent	Absent	Absent	Absent	Absent

Natural Physical Features: Berm: Abundance: Left Bank	Absent	Absent	Absent	Absent	Absent
Natural Physical Features: Berm: Abundance: Right Bank	Absent	Absent	Absent	Absent	Absent
Natural Physical Features: Bench: Abundance: Left Bank	Absent	Absent	Absent	Absent	Absent
Natural Physical Features: Bench: Abundance: Right Bank	Absent	Absent	Absent	Absent	Absent
Natural Physical Features: Stable Cliff: Abundance: Left Bank	Absent	Absent	Absent	Absent	Absent
Natural Physical Features: Stable Cliff: Abundance: Right Bank	Absent	Absent	Absent	Absent	Absent
Natural Physical Features: Eroding Cliff: Abundance: Left Bank	Absent	Absent	Absent	Absent	Absent
Natural Physical Features: Eroding Cliff: Abundance: Right Bank	Absent	Absent	Absent	Absent	Absent
Natural Physical Features: Toe: Abundance: Left Bank	Absent	Absent	Absent	Absent	Absent
Natural Physical Features: Toe: Abundance: Right Bank	Absent	Absent	Absent	Absent	Absent
Natural Physical Features: Animal Burrows: Abundance: Left Bank	Absent	Absent	Absent	Absent	Absent
Natural Physical Features: Animal Burrows: Abundance: Right Bank	Absent	Absent	Absent	Absent	Absent
Natural Physical Features: Marginal Backwater: Abundance: Left Bank	Absent	Absent	Absent	Absent	Absent
Natural Physical Features: Marginal Backwater: Abundance: Right Bank	Absent	Absent	Absent	Absent	Absent
Natural Physical Features: Tributary Confluence: Abundance: Left Bank	0	0	0	0	0
Natural Physical Features: Tributary Confluence: Abundance: Right Bank	0	0	0	0	0
Artificial Features: Pipes / Outfalls: Abundance: Left Bank	0	0	0	0	0
Artificial Features: Pipes / Outfalls: Abundance: Right Bank	0	0	0	0	0
Terrestrial Vegetation: Unvegetated: Abundance: Left Bank	Absent	Absent	Absent	Absent	Absent
Terrestrial Vegetation: Unvegetated: Abundance: Right Bank	Absent	Absent	Absent	Absent	Absent

Terrestrial Vegetation: Mosses / lichens: Abundance: Left Bank	Absent	Absent	Absent	Absent	Absent
Terrestrial Vegetation: Mosses / lichens: Abundance: Right Bank	Absent	Absent	Absent	Absent	Absent
Terrestrial Vegetation: Short Herbs / Grasses: Abundance: Left Bank	Extensive	Extensive	Extensive	Extensive	Extensive
Terrestrial Vegetation: Short Herbs / Grasses: Abundance: Right Bank	Extensive	Extensive	Extensive	Extensive	Extensive
Terrestrial Vegetation: Tall Herbs / Grasses: Abundance: Left Bank	Present	Present	Present	Present	Present
Terrestrial Vegetation: Tall Herbs / Grasses: Abundance: Right Bank	Present	Present	Present	Present	Present
Terrestrial Vegetation: Scrub / Shrubs: Abundance: Left Bank	Absent	Absent	Absent	Absent	Absent
Terrestrial Vegetation: Scrub / Shrubs: Abundance: Right Bank	Absent	Absent	Absent	Absent	Absent
Terrestrial Vegetation: Saplings / Trees: Abundance: Left Bank	Absent	Absent	Absent	Absent	Absent
Terrestrial Vegetation: Saplings / Trees: Abundance: Right Bank	Absent	Absent	Absent	Absent	Absent
Terrestrial Vegetation: Large Wood: Abundance: Left Bank	Absent	Absent	Absent	Absent	Absent
Terrestrial Vegetation: Large Wood: Abundance: Right Bank	Absent	Absent	Absent	Absent	Absent
Terrestrial Vegetation: Fallen Trees: Abundance: Left Bank	Absent	Absent	Absent	Absent	Absent
Terrestrial Vegetation: Fallen Trees: Abundance: Right Bank	Absent	Absent	Absent	Absent	Absent
Terrestrial Vegetation: Leaning Trees: Abundance: Left Bank	Absent	Absent	Absent	Absent	Absent
Terrestrial Vegetation: Leaning Trees: Abundance: Right Bank	Absent	Absent	Absent	Absent	Absent
Terrestrial Vegetation: JShaped Trees: Abundance: Left Bank	Absent	Absent	Absent	Absent	Absent
Terrestrial Vegetation: JShaped Trees: Abundance: Right Bank	Absent	Absent	Absent	Absent	Absent
Terrestrial Vegetation: Trailing Tree / Shrub Branches: Abundance: Left Bank	Absent	Absent	Absent	Absent	Absent
Terrestrial Vegetation: Trailing Tree / Shrub	Absent	Absent	Absent	Absent	Absent

Branches: Abundance: Right Bank					
Terrestrial Vegetation: Exposed Tree Roots: Abundance: Left Bank	Absent	Absent	Absent	Absent	Absent
Terrestrial Vegetation: Exposed Tree Roots: Abundance: Right Bank	Absent	Absent	Absent	Absent	Absent
Terrestrial Vegetation: Discrete Organic Accumulations: Abundance: Left Bank	Absent	Absent	Absent	Absent	Absent
Terrestrial Vegetation: Discrete Organic Accumulations: Abundance: Right Bank	Absent	Absent	Absent	Absent	Absent
Vegetation at Water Margin: Liverworts / Mosses / Lichens: Abundance: Left Bank	Absent	Absent	Absent	Absent	Absent
Vegetation at Water Margin: Liverworts / Mosses / Lichens: Abundance: Right Bank	Absent	Absent	Absent	Absent	Absent
Vegetation at Water Margin: Emergent Broad Leaved: Abundance: Left Bank	Absent	Absent	Absent	Absent	Absent
Vegetation at Water Margin: Emergent Broad Leaved: Abundance: Right Bank	Absent	Absent	Absent	Absent	Absent
Vegetation at Water Margin: Emergent Reeds / Linear Leaved: Abundance: Left Bank	Absent	Absent	Absent	Absent	Absent
Vegetation at Water Margin: Emergent Reeds / Linear Leaved: Abundance: Right Bank	Absent	Absent	Absent	Absent	Absent
Vegetation at Water Margin: Amphibious: Abundance: Left Bank	Present	Present	Present	Present	Present
Vegetation at Water Margin: Amphibious: Abundance: Right Bank	Present	Present	Present	Present	Present
Vegetation at Water Margin: Filamentous Algae: Abundance: Left Bank	Absent	Absent	Absent	Absent	Absent
Vegetation at Water Margin: Filamentous Algae: Abundance: Right Bank	Absent	Absent	Absent	Absent	Absent
Nuisance Plant Species: Himalayan Balsam: Abundance: Left Bank	Absent	Absent	Absent	Absent	Absent
Nuisance Plant Species: Himalayan Balsam: Abundance: Right Bank	Absent	Absent	Absent	Absent	Absent

Nuisance Plant Species: Japanese Knotweed: Abundance: Left Bank	Absent	Absent	Absent	Absent	Absent
Nuisance Plant Species: Japanese Knotweed: Abundance: Right Bank	Absent	Absent	Absent	Absent	Absent
Nuisance Plant Species: Giant Hogweed: Abundance: Left Bank	Absent	Absent	Absent	Absent	Absent
Nuisance Plant Species: Giant Hogweed: Abundance: Right Bank	Absent	Absent	Absent	Absent	Absent
Nuisance Plant Species: Floating Pennywort: Abundance: Left Bank	Absent	Absent	Absent	Absent	Absent
Nuisance Plant Species: Floating Pennywort: Abundance: Right Bank	Absent	Absent	Absent	Absent	Absent
Nuisance Plant Species: Other Species 1: Abundance: Left Bank	Absent	Absent	Absent	Absent	Absent
Nuisance Plant Species: Other Species 1: Abundance: Right Bank	Absent	Absent	Absent	Absent	Absent
Nuisance Plant Species: Other Species 2: Abundance: Left Bank	Absent	Absent	Absent	Absent	Absent
Nuisance Plant Species: Other Species 2: Abundance: Right Bank	Absent	Absent	Absent	Absent	Absent

Module	1	2	3	4	5
Natural Materials: Bedrock: Abundance	Absent	Absent	Absent	Absent	Absent
Natural Materials: Boulder: Abundance	Absent	Absent	Absent	Absent	Absent
Natural Materials: Cobble: Abundance	Present	Present	Present	Present	Absent
Natural Materials: Gravel-Pebble: Abundance	Extensive	Extensive	Extensive	Extensive	Absent
Natural Materials: Sand: Abundance	Absent	Absent	Absent	Absent	Absent
Natural Materials: Silt: Abundance	Present	Present	Present	Present	Extensive
Natural Materials: Clay: Abundance	Absent	Absent	Absent	Absent	Absent
Natural Materials: Organic: Abundance	Absent	Absent	Absent	Absent	Absent
Natural Materials: Peat: Abundance	Absent	Absent	Absent	Absent	Absent
Natural Materials: Continuous Silt Layer: Abundance	Absent	Absent	Absent	Absent	Absent
Natural Materials: Patchy Thin Silt Layer: Abundance	Absent	Absent	Absent	Absent	Absent
Reinforcement: Extent: Abundance	Absent	Absent	Absent	Absent	Absent
Surface Flow Type: Free Fall: Abundance	Absent	Absent	Absent	Absent	Absent
Surface Flow Type: Chute: Abundance	Absent	Absent	Absent	Absent	Absent
Surface Flow Type: Broken Standing Waves: Abundance	Absent	Absent	Absent	Absent	Absent
Surface Flow Type: Unbroken Standing Waves: Abundance	Present	Present	Absent	Absent	Absent
Surface Flow Type: Upwelling: Abundance	Absent	Absent	Absent	Absent	Absent
Surface Flow Type: Rippled: Abundance	Extensive	Extensive	Extensive	Extensive	Absent
Surface Flow Type: Smooth: Abundance	Absent	Absent	Absent	Absent	Absent
Surface Flow Type: No Perceptible Flow: Abundance	Present	Present	Present	Present	Extensive
Surface Flow Type: Dry: Abundance	Absent	Absent	Absent	Absent	Absent
Natural Physical Features: Exposed Bedrock: Abundance	Absent	Absent	Absent	Absent	Absent
Natural Physical Features: Exposed Unvegetated Rocks: Abundance	Absent	Absent	Absent	Absent	Absent
Natural Physical Features: Exposed Vegetated Rocks: Abundance	Absent	Absent	Absent	Absent	Absent
Natural Physical Features: Unvegetated Mid-Channel Bar: Abundance	Absent	Absent	Absent	Absent	Absent
Natural Physical Features: Vegetated Mid-Channel Bar: Abundance	Absent	Absent	Absent	Absent	Absent
Natural Physical Features: Island: Abundance	Absent	Absent	Absent	Absent	Absent
Natural Physical Features: Cascade: Abundance	Absent	Absent	Absent	Absent	Absent
Natural Physical Features: Pool: Abundance	0	0	0	0	0
Natural Physical Features: Riffle: Abundance	0	0	0	0	0
Natural Physical Features: Step: Abundance	0	0	0	0	0
Natural Physical Features: Waterfall: Abundance	0	0	0	0	0
Artificial Features: Large Trash: Abundance	Absent	Absent	Absent	Absent	Absent
Artificial Features: Major Weir: Abundance	0	0	0	0	0
Artificial Features: Intermediate Weir: Abundance	0	0	0	0	0
Artificial Features: MinorWeir: Abundance	0	0	0	0	0

Artificial Features: Bridge Piers in River Bed: Abundance	0	0	0	0	0
Artificial Features: Culvert: Abundance	0	0	0	0	0
InChannel Vegetation: Unvegetated (bare river bed): Abundance	Absent	Absent	Absent	Absent	Absent
InChannel Vegetation: Liverworts / Mosses / Lichens (Terrestrial & Aquatic): Abundance	Absent	Absent	Absent	Absent	Absent
InChannel Vegetation: Emergent Broad Leaved: Abundance	Absent	Absent	Absent	Absent	Absent
InChannel Vegetation: Emergent Reeds / Linear Leaved: Abundance	Extensive	Extensive	Extensive	Extensive	Extensive
InChannel Vegetation: Floating Leaved: Abundance	Absent	Absent	Absent	Absent	Absent
InChannel Vegetation: Free Floating: Abundance	Absent	Absent	Absent	Absent	Absent
InChannel Vegetation: Amphibious: Abundance	Present	Present	Present	Present	Present
InChannel Vegetation: Submerged Broad Leaved: Abundance	Absent	Absent	Absent	Absent	Absent
InChannel Vegetation: Submerged Linear Leaved: Abundance	Absent	Absent	Absent	Absent	Absent
InChannel Vegetation: Submerged Fine Leaved: Abundance	Absent	Absent	Absent	Absent	Absent
InChannel Vegetation: Filamentous Algae: Abundance	Absent	Absent	Absent	Absent	Absent
InChannel Vegetation: Channel Choked with Aquatic Plants?: Abundance	FALSE	FALSE	FALSE	FALSE	FALSE
Interacting Vegetation: Vegetation Shading Channel: Abundance	Absent	Absent	Absent	Absent	Absent
Interacting Vegetation: Submerged Tree Roots: Abundance	Absent	Absent	Absent	Absent	Absent
Interacting Vegetation: Trees / Shrubs / Saplings Growing from Submerged River Bed: Abundance	Absent	Absent	Absent	Absent	Absent
Interacting Vegetation: Large Wood: Abundance	Absent	Absent	Absent	Absent	Absent
Interacting Vegetation: Discrete Organic Material: Abundance	Absent	Absent	Absent	Absent	Absent
Interacting Vegetation: Large Wood Dam (Crosses Entire Width of Channel): Abundance	0	0	0	0	0
Interacting Vegetation: Fallen Tree: Abundance	0	0	0	0	0
Nuisance Plant Species: Himalayan Balsam: Abundance	Absent	Absent	Absent	Absent	Absent
Nuisance Plant Species: Japanese Knotweed: Abundance	Absent	Absent	Absent	Absent	Absent
Nuisance Plant Species: Giant Hogweed: Abundance	Absent	Absent	Absent	Absent	Absent
Nuisance Plant Species: Floating Pennywort: Abundance	Absent	Absent	Absent	Absent	Absent
Nuisance Plant Species: Other Species 1: Abundance	Absent	Absent	Absent	Absent	Absent
Nuisance Plant Species: Other Species 2: Abundance	Absent	Absent	Absent	Absent	Absent