The Cambridge South East Transport Order

Transport And Works Act 1992

Transport And Works (Applications And Objections Procedure) (England And Wales) Rules 2006

Appendix 10.12 Biodiversity Net Gain (BNG)

Document Reference	CSET-10-42
Revision Number	00
Applicant	Cambridgeshire County Council
Date	January 2025

Methodology

Desk study

10.10.1 The following resources were reviewed to inform the assessment of the baseline habitat types and condition assessment using the Statutory Metric:

- Aerial imagery and OS maps;
- Multi-Agency Geographic Information for the Countryside (MAGIC);
- Environment Agency Catchment Data Explorer;
- Priority River Habitat Map;
- Chalk River Map.

10.10.2 UK Habitat Classification surveys were undertaken in July and August 2024.

10.10.3 In relation to this BNG assessment, the desk study undertaken in March 2023, and updated in September 2024, was used to evaluate the potential for important ecological features, and how their presence may influence the feasibility of delivering BNG, within and adjacent to the Site. Impacts to statutory designated sites for nature conservation and irreplaceable habitats are not adequately measured by Statutory Metric and they require separate consideration that complies with relevant policy and legislation.

10.10.4 To identify any designated sites for nature conservation within 2 km of the Site and irreplaceable habitats and/ or priority habitats within the Site, the following online data sources were accessed:

- MAGIC[1]
- Ancient Tree Inventory[2]

10.10.5 The Metric applies a strategic significance score based on whether the location of a site and/ or the baseline habitats present, or proposed habitat interventions have been identified as being locally important for biodiversity. All habitat parcels must be assigned a strategic significance score. The options for scoring each habitat parcel are:

- High – formally identified in local strategy, plan or policy (or River Basin Management Plan, Catchment Plan and/or Local Plans);
- Medium – location ecologically desirable but not identified in a local strategy, plan or policy; or
- Low – not identified in a local strategy, plan or policy OR no strategy or plan is in place in the area.

10.10.6 The desk study was used to identify local biodiversity strategies and plans, as set out by Cambridge City Council and Greater Cambridge Shared Planning to determine the strategic significance of the Site and/ or habitats within the Site. The following online data sources were accessed:

- Cambridge City Council Local Plan (2018)
- South Cambridgeshire Local Plan (2018)
- Greater Cambridge Local Plan First Proposals (2021)
- Greater Cambridge Local Plan Development Strategy Update report (2023)
- Greater Cambridge Biodiversity Supplementary Planning Document
- Cambridge City Council Biodiversity Strategy 2022-2030

1 Multi-Agency Geographic Information for the Countryside (MAGIC) [Online]. Available at: https://magic.defra.gov.uk/

Area habitat and linear hedgerow survey and condition assessment

10.10.7 The baseline biodiversity habitat data for the Site was calculated using habitat mapping and condition assessment data between July and August 2024. The condition assessment survey involved mapping habitats present on Site using a modified UK Habitat (UKHab) Classification System as set out within the Statutory Metric technical supplement and assigning a condition according to the methodology and criteria outlined within this technical supplement.

10.10.8 As part of the ecological walkover survey, the 'condition', as set out by the Metric, of each habitat, was recorded for each area habitat and linear hedgerow habitat. The habitat type was assessed and categorised as either 'Good', 'Fairly Good', 'Moderate', 'Fairly Poor', or 'Poor'. The assessment was made using the criteria within the Metric's Technical Supplement[3], with specific assessment criteria for each broad habitat type.

10.10.9 If a habitat type varied in condition within the Site, this was recorded and mapped separately. The area covered by each habitat type was mapped using Geographical Information Systems (GIS).

10.10.10 The Minimum Mappable Unit (MMU) was 25 m^2 for area habitats and 5 m length x 1 m width for linear features. Secondary codes were utilised focussing on habitat features and land use.

10.10.11 A UKHab plan of the Site developed for the Metric, which includes hedgerows assessed as linear features is provided in Annex A.

River Condition Assessment (RCA)/Modular River (MoRPh) survey

10.10.12 The baseline condition of the River Granta was surveyed by WSP using the Modular River (MoRPh) survey method as directed by the Statutory Metric User Guide. The River Granta was divided into discrete reaches for the purpose of MoRPh survey siting and BNG reporting, taking account of the Site interactions and existing river typology.

10.10.13 The baseline condition of Hobson's Brook was originally determined through the ditch condition assessment, as the watercourse presented a ditch-like typology at the location of its interaction with the Proposed Development. However, a review of aerial imagery and historical mapping indicated that the watercourse is naturally present and has been existing in the landscape as far back as the 1885-1900 map series. Consequently, it does not meet the definition of ditch according to the Statutory Metric guidance. Hobson's Brook has therefore, been subject to RCA in September 2024 and has been considered under 'Other rivers and streams' broad habitat typology under the Watercourse Module of the Statutory Metric. MoRPh surveys were conducted by AtkinsRéalis in September 2024.

10.10.14 The RCA is composed of two elements; MoRPh surveys and River Type desk study.

10.10.15 MoRPh surveys were conducted in September and October 2022 on the River Granta, and in September 2024on Hobson's Brook, by accredited MoRPh surveyors. The MoRPh survey method records features from bank top (floodplain), bank face (including channel margins) and channel bed. The MoRPh method is a quantitative visual geomorphological assessment of a river and riparian zone that records a list of features which are marked based on their extent across the survey reach, which are as follows:

- Extensive (>33%);
- Present (5% to 33%);

2 Woodland Trust (2023) Ancient Tree Inventory [online] Available at: https://ati.woodlandtrust.org.uk/
3 Buglife [online] Available at: https://statics.teams.cdn.office.net/evergreen-assets/safelinks/1/atp-safelinks.html

- Trace (<5%);
- Absent.

10.10.16 Such features include elements such as channel form, in-channel habitats (e.g. riffles and pools), bed substrates and bank material, as well as flow types. Broad categories of aquatic plant community structure and characteristics of the bankside and riparian zone are also recorded. Information collated during MoRPh surveys was uploaded to an online database called Cartographer.

10.10.17 Cartographer automatically calculates 32 indicators of river condition for each surveyed reach. Each river condition indicator is assigned a score ranging from 0 to 4 (positive indicators) or 0 to -4 (negative indicators) based on the MoRPh field survey data. Positive indicators represent the diversity (richness) and abundance (extent) of physical features and hydraulic habitats that can be observed at low flow. Negative condition indicators represent the extent and severity of local human interventions or pressures.

10.10.18 The indicators of river condition are split into four broad categories:

- B – Bank top indicators;
- C – Bank face indicators;
- D – Channel – water margin indicators; and
- E – Channel bed indicators.

10.10.19 These condition indicators not only feed into the final condition assessment but they also provide information on why a particular condition has been assigned and where to focus effort when attempting to improve condition. The average sum of positive and negative indicator scores are added together to calculate the Preliminary Condition Score.

10.10.20 MoRPh surveys were undertaken at or adjacent to Proposed Development interactions, in this case at Proposed Development crossing locations. Three MoRPh surveys were conducted on the River Granta at/ near to the Babraham crossing (Reach D1), and two MoRPh surveys were undertaken on the River Granta at/ near to the Stapleford crossing (Reach D2), with one of the MoRPh surveys in each location coincident with the crossing location (D1-S3 and D2-S2). One MoRPh survey was also undertaken on Hobson's Brook (D4-S1), coincident with the Proposed Development.

10.10.21 Reaches and sub-reaches on the River Granta have been numbered from upstream to downstream. MoRPh survey length is scaled according to river width and in total at least 20% of the river length within the Red Line Boundary (RLB) has been surveyed to represent overall river condition, as per the guidance. Only one sub-reach was surveyed on the Hobson's Brook. Each sub-reach survey was 50 m in length and comprised of five contiguous MoRPh modules of 10 m. The survey locations and sub-reach codes are presented in Table A10.12.1

Table A10.12.1 MoRPh survey details

Watercourse	Reach	Sub-reach	NGR	Date Surveyed
River Granta	D1	S1	TL 51819 49346 to TL 51788 49392	29/09/2022
		S2	TL 51674 49627 to TL 51624 49625	06/10/2022
		S3	TL 51374 49673 to TL 51326 49696	06/10/2022
	D2	S1	TL 48780 51289 to TL 48729 51282	29/09/2022 & 04/10/2022
		S2	TL 48438 51236 to TL 48390 51231	04/10/2022
Hobson's Brook	D4	S1	TL 45993 54171 to TL 45947 54190	23/09/2024

10.10.22 The River Granta adjoins the Site along two sections: the sub-reaches D1-S1 and D2-S1. The Statutory Metric guidance states that:

"If the site boundary crosses into the riparian zone, you should:

- *include adjacent lengths of watercourse in the watercourse module*
- *record and assess terrestrial habitats within the area and hedgerow modules if they are within the site boundary'.*

10.10.23 As such, sub-reaches where the RLB crosses the riparian zone within 10 m of a watercourse, these sections have been subject to RCA and identified for inclusion within this BNG assessment in the Watercourse module. It should be noted that the riparian zone for ditches under the Statutory Metric has been set at 5 m.

10.10.24 Note that due to a revision in the Site boundary that occurred after the surveys were completed, one of the MoRPh sub-reaches (D1-S2) is outside of the current RLB. The results of this survey are presented to provide contextual information on the condition of the wider River Granta but have not been included within the BNG calculation.

10.10.25 In addition to MoRPh surveys, the RCA also includes a desk-based element in which River Type is identified taking into account artificial modifications and functions (e.g. if a river is navigable) and for non-navigable or artificial watercourses, valley gradient, anabranching, braiding and sinuosity indices, valley length and channel bed material as detailed in the river condition assessment guidance.

10.10.26 There are 15 morphological river types, which include:

- Engineered canals and navigable rivers;
- Large rivers; and
- 13 river planform-bed material types (A to M): these are rivers that are not navigable or deemed to be 'Large' and are based on their planform and bed material and supported by their degree of confinement and valley gradient.

10.10.27 The combined information from the MoRPh survey and River Type desk study is used to determine the Final Condition Class. There are five condition classes; Poor, Fairly poor, Moderate, Fairly good and Good. The Preliminary Condition Score is translated into the final condition classes, dependant on the thresholds[4] met to reach the final condition class, based upon the River Type.

10.10.28 The final river condition scores for rivers within the RLB limits were inputted into the DEFRA Statutory Metric.

Ditch condition assessment

10.10.29 The baseline condition of watercourses identified as ditches were surveyed using the ditch condition assessment as directed by the Statutory Metric guidance.

10.10.30 The ditch condition assessment considers the following criteria in assigning condition:

- The ditch is of good water quality, with clear water (low turbidity) indicating no obvious signs of pollution;
- 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;
- There is less than 10% cover of filamentous algae and/ or duckweed (these are signs of eutrophication);
- A fringe of marginal vegetation is present along more than 75% of the ditch;
- 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;
- 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;
- Less than 10% of the ditch is heavily shaded;
- There is absence of non-native plant and animal species .

10.10.31 All eight criteria must be passed in order to achieve Good condition. If a ditch passes six or seven of the criteria it achieves Moderate condition. Any ditch that passes five or less of the criteria has a condition class of Poor. The survey locations and sub-reach codes are presented in Table A10.12.2.

Table A10.12.2 Locations and sub-reach codes of the ditches considered in the assessment

Watercourse	Sub-reach	Mid-point NGR	Dry at time of survey?*
Unnamed ditches	D2E	TL 48548 51143	Yes
	D5A	TL 46377 53409	NA*
	W1	TL 45961 55035	No
	W2	TL 45982 54398	Yes
	W3	TL 48025 51401	Yes
	W5	TL 48840 50703	Yes
	W6	TL 48323 51353	Yes
	W7	TL 45914 54402	NA*
	W8	TL 46052 54487	No
	W9	TL 45969 55029	No
	W22	TL 46413 53296	NA*
	W24	TL 46004 54883	Yes
	W27	TL 46113 54195	NA*
	W29	TL 46081 54623	No

*These ditches were not surveyed due to access constraints or because surveys were conducted prior to a change of Site boundary

10.10.32 Several of the ditches were dry at the time of survey but have been given a precautionary condition assessment due to the unusually dry conditions in the year preceding the survey, i.e., it is assumed that surveys were undertaken during an atypical year and that during a typical year the ditches are likely to retain water for more than four months of the year[5]. This may result in an overestimation of baseline WUs for ditches.

10.10.33 Ditches 5A and W7 were not possible to survey due to access limitations. Similarly, ditches W22 and W27 were outside of the RLB at the time of survey and were therefore excluded from field survey, however, these ditches are now within the RLB. Ditch condition has therefore been applied to these ditches based upon the condition of nearby ditches, aerial imagery, information from previous water vole and otter surveys carried out in 2022, and professional judgement. It was determined that ditches were of a similar character and condition to the other ditches within the RLB.

10.10.34 It should be noted that W1 and W9 no longer lie within the RLB, and RLB does not occur within 5 m of these watercourses. As such, they have been removed from the BNG Calculation and are not included further in this report.

10.10.35 The final ditch condition scores for ditches within the RLB limits were inputted into the DEFRA Statutory Metric.

On-site post development habitats

10.10.36 The current general arrangement and landscape design plans and management plans have been used to inform the post development scenario:

[4] A Guide to Assessing River Condition (https://modularriversurvey.org/wp-content/uploads/A-GUIDE-TO-ASSESSING-RIVER-CONDITION-Nov22.pdf#:~:text=The%20%E2%80%98MoRPh%E2%80%99%20survey%20(Shuker%20et%20al., [Accessed September 2024].

5 Ditches are defined as - ‘Artificially created, linear water-conveyancing features which are less than 5 m wide and likely to retain water for more than 4 months of the year.

- Cambridge South East Transport Phase 2 TWAO Application Public Transport and Active Travel Corridor Bridges, Structures and Proposed Development Extents6
- Cambridge South East Transport Phase 2 TWAO Application Public Transport and Active Travel Corridor – Route Layout Sheet 1 to 187
- Drainage Retention Pond drawing8
- Flood Compensation drawing9
- Landscape and Environmental Management Plan (CSET-10-05-00)

10.10.37 These plans were converted to a GIS environment and combined to produce a single layer, ensuring gaps and overlaps were removed, where possible. From this layer the areas of retained habitats, new carriageway and temporary land take were calculated. Each proposed planting type was translated into a UKHab classification category using the professional judgement of Atkins Ecologists and a target condition assigned based on the likely achievable condition, as outlined in Table A10.12.3. The likely achievable condition was determined with reference to the criteria outlined within the Statutory Metric technical supplement. Areas of proposed post development intervention (habitat creation and/ or habitat retention/enhancement), including built development, were calculated using GIS.

Table A10.11.3 Translation of the landscape schedule to UKHabs metric

Landscape planting type	Metric habitat	Assumed condition and justification
Area habitat		
Chalk grassland	Lowland calcareous grassland	Moderate – Although this will have a diverse range of grass and wildflower species it is unlikely to qualify as high-quality priority grassland and has been given moderate target condition as a precaution.
Amenity grassland	Modified grassland	Poor - Although this is likely to have a good number of species it will be subject to regular management and has been given moderate target condition as a precaution.
Species-rich grassland	Other neutral grassland	Moderate – species rich grassland mix will include native flowering plants. Although perennial rye grass is likely to be present at less than 30% a lot of the areas were previously cropland including cereal and non-cereal crops therefore existing seedbank and any agricultural weeds likely to germinate in first years following planting. This habitat type includes proposed roadside planting and are therefore likely to be subject to disturbance and management. As such this habitat type is unlikely to achieve good condition/priority habitat status.
Ponds	Ponds (non-priority habitat)	Moderate – By the nature of the inclusion in the design as drainage retention or flood compensation, the ponds are likely to be subject to pollution and run-off from the road and therefore given a precautionary moderate condition. Other criteria are expected to be met, including natural edge habitat, less than 10% duckweed or filamentous algae, absence of invasive species, water levels allowed to fluctuate and not artificially connected to other waterbodies or stocked with fish.
Woodland / Field margin	Other woodland; broadleaved	Moderate - Plantation woodland that is unlikely to have a diverse age and height structure or presence of standing and fallen deadwood so unlikely to meet good condition. Expected to meet other condition assessment criteria, including dominance of native species, complete canopy cover, free from damage or inappropriate management, and absence of invasive species.
Hedgerow	Modified grassland / Other neutral grassland	Moderate – Hedgerow habitats were mapped as hedgerow area habitats within the landscape plan. Therefore, this has been converted to grassland area habitat with hedgerow features mapped on top as linear hedgerow (outlined separately below), in line with the Statutory Metric User Guide.
Linear hedgerow habitat		
N/A	Native species-rich hedgerow	Moderate – Hedgerows largely comprise the boundary features along the Proposed Development and adjacent land. Therefore, subject to regular management and possible nutrient enrichment from farmland/roads as such unlikely to meet criteria for good condition and also unlikely to qualify as a priority habitat.

10.10.38 It is assumed that any land lying outside of these areas (i.e. within the temporary land take) would be returned to landowners in the same condition as the baseline.

10.10.39 The above general arrangement and landscape design plans and management plans were also used to identify points of interaction between the Proposed Development and linear river features.

6 Drawing Number 5212868-ATK-GEN-WHL_AL_SCHME-DR-CX-000001. Rev P01.1
7 Drawing Number 5212868-ATK-HGN-WHL_AL_SCHME-DR-CH-000001 to 000018. Rev C01
8 Drawing Ref CD-Ss_50_70_95 DGRP-M-Dn_DrainageRetentionPond
9 Drawing Reference ATK-HWY_Flood Compensation

Calculating area and linear hedgerow biodiversity units using Statutory Metric

10.10.40 The Statutory Metric uses a number of measures to quantify baseline biodiversity value for each habitat type within a site boundary. These measures include the habitats' intrinsic value (i.e. its distinctiveness), its condition and its area/ length (ha / km). In addition, the local strategic significance of a site and/or the habitats within it is taken into account by applying a spatial multiplier.

10.10.41 Area-based habitat features, linear hedgerow features (which includes lines of trees) and linear river features (which includes rivers, streams, ditches and canals) are measured as separate components in the Metric and the delivery of units, including the overall net unit change for a site, are reported separately.

10.10.42 A habitat's distinctiveness score is derived from its intrinsic biodiversity value, reflecting the rarity of the plant community, the time it takes to reach maturity, its value to fauna, and its ecosystem function. This score is pre-assigned and is pre-populated in the Metric.

10.10.43 The calculation of baseline biodiversity units for area-based habitat and linear hedgerow features is shown in Figure A10.12.1. The calculation for linear river features includes additional multipliers that take into account whether a river feature has been modified by built development through the presence of encroachment into the watercourse channel or riparian zone, i.e. the multipliers reduce the number of river units to reflect the negative impact that such encroachment has on a naturally functioning river system.

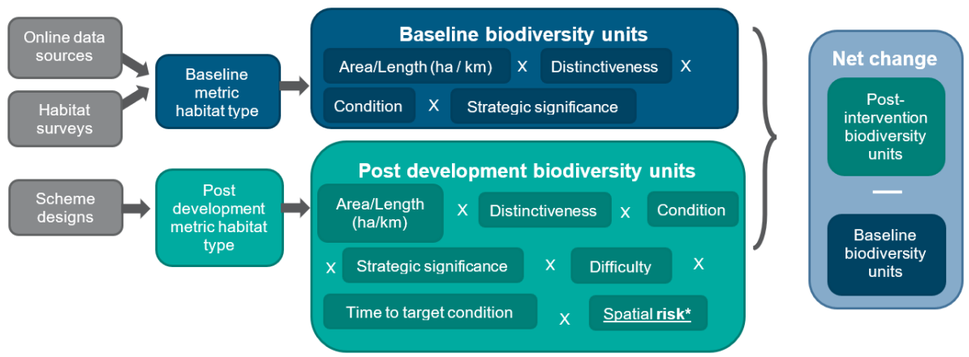


Figure A10.12.1 Calculation of Biodiversity Units using Statutory Metric. NB. Illustration does not fully depict calculation of river units; additional multipliers taking into account watercourse and riparian encroachment are applied. Text underlined indicates a risk factor applied when creating or enhancing habitats. *Applies to off-site habitat interventions only.

10.10.44 Post development biodiversity units are calculated the same way but with the addition of risk multipliers that take into account the difficulty and time it takes to create new habitat or enhance existing habitat (see Figure A10.12.1). These temporal and risk related multipliers are set by Natural England within the Metric and cannot be changed (full details are provided in the Technical Supplement of Statutory Metric). Where habitat creation or enhancement is off-site, biodiversity units are calculated the same way, but a spatial risk multiplier is applied based on the distance of habitat creation or enhancement to the site of habitat loss. No off-site habitat creation or enhancement is proposed for the Proposed Development.

10.10.45 The Metric also takes into account whether habitat creation or enhancement is delivered in advance of any impact it is compensating for or whether there will be any significant delay in an intervention relative to the impact. If taken into account, the standard temporal risk multiplier is adjusted accordingly.

10.10.46 To calculate the overall net change in biodiversity units, the baseline units are subtracted from the post development units, as detailed in Figure A10.12.1.

Calculating baseline Watercourse Units (WUs) using the Statutory Metric

10.10.47 The Statutory Metric includes a Watercourse module[30]. As for terrestrial habitats, the Watercourse Module requires an assessment of baseline Watercourse Units (WUs) and post-works WUs in order to assess overall change in WUs.

10.10.48 To determine the baseline WBUs, four key components are assessed and inputted to the DEFRA Statutory Metric Calculation Tool (along with the length of Rivers/streams and ditches within the RLB). These scores result in weightings which are used to calculate the number of WUs. The components are:

- Distinctiveness
- Strategic significance
- Watercourse and riparian encroachment
- River/ditch condition

10.10.49 The distinctiveness score is based on the type of watercourse habitat present, and its value based on its rarity. In the Watercourse Module of the Statutory Metric, rivers can be classed as 'Very high', 'High', 'Medium' or 'Low'. All ditches have a default classification of Low distinctiveness.

10.10.50 Strategic significance is dependent on whether the watercourse has been 'Formally identified in local strategy' (i.e. is a delineated Water Framework Directive (WFD) reportable water body, River Basin Management Plans (RBMPs), Catchment Plans), meaning that the watercourse has 'High strategic significance'. If a watercourse does not achieve this, it can either be considered 'Medium strategic significance', where the 'location is ecologically desirable but not in a local strategy', or 'Low strategic significance', where 'Area/compensation not in local strategy/ no local strategy'.

10.10.51 Encroachment scores refer to the extent of encroachment of a development: (a) in the watercourse, and (b) in the riparian zone (10 m from the top of the riverbank for rivers, and 5 m for ditches). Encroachment within the watercourse is classified as 'no encroachment', 'minor' or 'major' whereas in the riparian zone encroachment is classed as 'no encroachment', 'minor', 'moderate' or 'major'. Riparian encroachment is applied to both banks i.e., Major/ Major.

10.10.52 River condition is based upon results from the RCA, as detailed under 10.10.14. Ditch condition is based upon ditch condition assessments, with possible scores of 'Good', 'Moderate' or 'Poor' assigned based upon the number of criteria met.

10.10.53 Further details on the methods for determining distinctiveness, encroachment, strategic significance and condition are detailed in the Statutory Metric guidance[10].

10.10.54 WUs are linear units and cannot be combined with the area units calculated for terrestrial habitats within the assessment. A net gain in WUs would not automatically correlate to an overall net gain for the project as there may be a net loss in terrestrial biodiversity units. Therefore, each of the different module components of the Metric need to be considered in parallel and reported separately.

10.10.55 This is also true for Rivers/ streams and ditches, as they have different distinctiveness. As per the Trading Rules under the Statutory Metric guidance, WUs cannot be traded across watercourse types of different distinctiveness. As such, separate calculations have been undertaken to represent Rivers/ streams and ditches, which was also conducted during the previous iteration of this report. However, an overall calculation of all watercourses considered within this BNG assessment has been calculated as per the guidance and should be considered the true outcome of the BNG assessment for the Watercourse Module.

Mitigation hierarchy

10.10.56 In accordance with good practice, the principles of the mitigation hierarchy and the avoidance of impacts to irreplaceable habitats must be applied when committing to achieving BNG. This is reinforced through the publication of the British Standard BS 8683:20211.

10.10.57 The sequential approach to applying the mitigation hierarchy is to:

- Avoid – Where possible habitat damage should be avoided;
- Minimise – Where possible habitat damage and loss should be minimised;
- Remediate – Where possible any damaged or lost habitat should be restored;
- Compensate – As a last resort, damaged or lost habitat should be compensated for.

10.10.58 Application of the mitigation hierarchy is encouraged by the Metric because BNG can be more easily achieved by avoiding the loss of habitat through either retention or enhancement.

BNG Good Practice Principles

10.10.59 To claim BNG, evidence that demonstrates a project has clearly applied all ten of the good practice principles for achieving BNG, as detailed in Table A10.12.4, must be provided. Adhering to all principles together underpins the good practice required for achieving and sustaining BNG.

Table A10.12.4 BNG good practice principles

Principle	In practice
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.
Avoid losing biodiversity that cannot be offset by gains elsewhere	Avoid impacts on irreplaceable biodiversity – these impacts cannot be offset to achieve no net loss or net gain.
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.
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 losses occurring and the gains being fully realised.
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.

[10] The Statutory Metric User Guide (https://assets.publishing.service.gov.uk/media/669e45fba3c2a28abb50D4-S126/The_Statutory_Biodiversity_Metric_-_User_Guide__23.07.24_.pdf) [Accessed: September 2024].

Principle	In practice
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 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 the development while also contributing towards nature conservation priorities at local, regional and national levels; Enhancing existing or creating new habitat; Enhancing ecological connectivity by creating more, bigger, better and joined areas for biodiversity.
Be additional	Achieve nature conservation outcomes that demonstrably exceed existing obligations (i.e. do not deliver something that would occur anyway).
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 perpetuity11; Planning for adaptive management and securing dedicating 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; Avoiding displacing harmful activities from one location to another; Supporting local-level management of net gain activities.
Optimise sustainability	Prioritising BNG and, where possible, optimise the wider environmental benefits for a sustainable society and economy.
Be transparent	Communicate all net gain activities in a transparent and timely manner, sharing the learning with all stakeholders.

Assumptions and Limitations

10.10.60 Not all habitat areas received a field survey to assess the habitat types and condition due to a change in the Site boundary following field surveys in September and October 2022. Where this is the case, a desk-based assessment was completed, and a precautionary approach taken to the condition. As such this is not considered to be a significant limitation.

10.10.61 Criteria assessment sheets for baseline habitat conditions were not available at the time of writing this BNG assessment and therefore the justification for baseline condition on Site cannot be confirmed. The baseline condition scores have been assessed using professional judgement and reported in the Habitat Type and Condition Assessments for Biodiversity Net Gain Calculations report in line with the Metric Technical Supplement. These baseline conditions were obtained from field and desk-based assessment (where field surveys did not cover the full extent due to a change in site boundary, as described above) and were reflected in the Metric for this BNG assessment, therefore this is not considered to be a significant limitation.

10.10.62 The temporary land take will be over two years, so these habitats have been recorded as being lost and subsequently created to reflect the baseline. Therefore, this is not considered to be a significant limitation and has been accounted for in the calculations.

10.10.63 Landscape plans depicted hedgerows as area-based habitats. These have been converted to grassland with hedgerows plotted as a linear feature on top. The Metric includes separate calculations for area habitats and linear hedgerows to obtain a more meaningful measure of the ecological value of linear habitats as corridors. Therefore, this is not a significant limitation and has been accounted for in the calculations.

10.10.64 For this assessment, it is assumed that habitat creation will be delayed by two years as a worst case scenario (the duration of the anticipated construction programme) from the time of the initial Site clearance and the standard time to target condition has been adjusted accordingly. As detailed design progresses, opportunities to phase the Site clearance and habitat creation proposals will be sought to maximise the predicted delivery of biodiversity units. Based on this, the GCP target net gain of 20% for area habitat and hedgerow habitats is still achievable, however, any project design change will be reflected in the calculation of biodiversity units accordingly.

10.10.65 It is assumed that an appropriate BNG management and monitoring plan will be implemented for the duration of the maximum time for the habitat creation proposals to reach their target condition (i.e. 30 years for proposed 'Lowland mixed deciduous woodland' creation) and to give surety that the project will deliver the predicted net gain in biodiversity units. It is then assumed that the habitats will be subject to suitable management to maintain that condition for the operational life of the Proposed Development. A Landscape and Ecological Management Plan (LEMP) (CSET-10-05-00) has been produced with details of the management to be implemented.

10.10.66 Weather conditions in 2022 included a prolonged drought meaning that water levels were particularly low in watercourses. MoRPh scores and ditch condition assessments may be lower than typical as a result.

11 For development in the UK, the expectation is that compensation sites will be secured for at least the lifetime of the development (e.g. often 25-30 years) with the objective of net gain management continuing in the future.

10.10.67 Many of the ditches were dry at time of survey but were still given a precautionary habitat and condition assessment as they were assessed as likely to retain water for more than four months of the year during a typical year, taking into account the antecedent dry conditions. Additionally, the assessment of some ditches was based upon previous surveys or site information as they were not visited during surveys, either due to a change in the RLB or because site access was not possible.

Results

Designated sites

10.10.68 The desk study identified six statutory designated sites for nature conservation within 2 km of the Site. Of these, four were Sites of Special Scientific Interest (SSSI) and two were Local Nature Reserves (LNR). These are detailed in Table A10.12.5.

Table A10.12.5 Statutory designated sites for nature conservation within 2 km of the Site

Site name	Designation	Approximate Distance from Proposed Development	Description
Nine Wells	Local Nature Reserve (LNR)	Adjacent to the RLB	Nine Wells is a historically important site containing several chalk springs, which form the source of the Hobson Conduit. Nine Wells once contained some rare freshwater invertebrates, however following the drought of 1976 these were lost. Today the chalk watercourses are being managed with the aim of re-creating the conditions favourable for a possible re-introduction of these rare species.
Sawston Hall Meadows	Site of Special Scientific Interest (SSSI)	0.96 km west	This area of meadows overlying spring-fed peat over chalk is a relic of a once common type of wet pasture land found at the margins of the East Anglian Fenland. The plant and animal communities which it supports are generally scarce and poorly represented in Cambridgeshire. Grassland communities range from marshy grassland to drier calcareous grassland. The site is also noted for presence of nationally rare umbellifer *Selinum carnifolia*, now only found in Cambridgeshire. Also of note is the presence of saw wort *Serratula tinctoria* and the great fen-sedge *Cladium mariscus*.
Gog Magog Golf Club	SSSI	1.06 km east	This site supports grassland communities of the calcareous chalk grassland type. Management of the site has secured species-rich calcareous grassland on the Gog Magog Hills overlying chalk and chalky loam over glacial drift. Of additional note is the occurrence of the nationally rare moon carrot *Seseli libanotis* and the locally rare perennial flax *Linum anglicum*.

Site name	Designation	Approximate Distance from Proposed Development	Description
Dernford Fen	SSSI	1.19 km west	This site represents a relic of a much larger area of rough fen and carr. Vegetation ranges from dry grassland and scrub to relic fen, reedbed and alder carr. The grassland is of the neutral type on calcareous loam. The relic fen areas hold reed *Phragmites communis*, saw sedge Cladium mariscus and marsh orchids *Dactylorhiza* spp. Of additional note is the presence of two uncommon fenland orchids, the marsh helleborine *Epipactis palustris* and the fragrant orchid *Gymnadenia conopsea* subsp. *densiflora*. Areas of open pools within the site together with ditches and the chalk stream along the boundary further enhance the diversity of this site.
The Beechwoods	LNR	1.49 km east	A small wood of majestic beeches on a chalk ridge above Cambridge which was planted in the 1840s. Local people planted a new plantation of broad leaved trees in 1992. Wildlife includes white helleborine orchid, beech trees, fungi, great spotted and green woodpeckers, nuthatch, spotted flycatcher. In good beech-mast crop years large flocks of bramblings gather to eat the beech-mast.
Roman Road	SSSI	1.8 km east	The Roman Road SSSI supports species-rich calcareous grassland communities of a type which was once widespread on the chalk areas of lowland England and which is now scarce due to changes away from the traditional sheep grazing economy of these areas to arable. Thick hedgerows and small copses along this 'green lane' enhance the value of the grassland for invertebrates.

10.10.69 A total of 24 non-statutory designated sites for nature conservation were identified within 2 km of the Site as detailed in Table A10.12.6.

Table A10.12.6 Non-statutory designated sites for nature conservation within 2 km of the Site

Site name	Designation	Approximate distance from Site	Description
River Granta	County Wildlife Site (CWS)	Within the RLB	Major river not grossly modified by pollution or canalisation. Additionally, it supports concentrations of mature pollarded willows *Salix* sp.
Shelford – Haverhill disused railway (Pampisford)	CWS	155 m to the south-west of the Site, south of Babraham	Supports populations of a Nationally Rare vascular plant *Filago pyramidata*, and supports frequent numbers of at least six strong calcareous grassland indicator species .
Triangle North of Long Road	CWS	550 m north	The site qualifies as a CWS because of the presence of a Nationally Scarce vascular plant species (*Torilis arvensis*).
Stapleford Chalk Pit	CWS	750 m to the east	The pit is a site of significance in the wider landscape as it is one of many former chalk quarries in villages across the county, that are now a network of chalk grassland fragments.

Site name	Designation	Approximate distance from Site	Description
Magog Downs Chalk Grassland	CWS	1.0 km to the east	No description.
Netherhall Farm Meadow	CWS	1.3 km east	Contains more than 0.05 ha of CG3 upright brome calcareous grassland community. Supports frequent numbers of at least eight neutral grassland indicator species.
Magog Down and Stapleford Pit	CWS	1.3 km north	The site qualifies for habitat mosaic (over 10 ha in size supporting three or more habitat features), has an invertebrate index exceeding 500 and contains calcareous grassland supporting at least 0.05 ha of CG3 (upright brome) grassland.
Dernford Fen Grassland	CWS	1.46 km east	This site qualifies as CWS because it supports a population of a Nationally Scarce plant species. Additionally, it supports type 10B waterbodies with beds of stoneworts *Charales* spp.
Wandlebury	CWS	1.47 km to the north-east	The site is listed as important in the bryophyte register for Cambridgeshire and has an overall invertebrate index exceeding 500.
Lime Kiln Hill Reservoirs	CWS	1.67 km north	Supports frequent numbers of at least 3 strong neutral grassland indicator species and frequent numbers of at least 6 strong calcareous grassland indicator species.
Signal Hill Plantation Grassland	CWS	1.7 km north	Supports populations of Nationally Scarce plant species (*Fumaria vaillantii*, *Fumaria parviflora*, *Linum perenne*). Also contains at least 0.05 ha of NVC CG3 grassland and frequent numbers of at least six strong calcareous grassland indicators species.
Wort's Causeway Road Site Verge	CWS / Protected Road Verge	1.86 km to the north-west	Contains more than 0.05 ha of CG3 upright brome *Bromus erectus* calcareous grassland community. Supports frequent numbers of at least eight neutral grassland indicator species.
Cambridge University Botanic Garden	CWS	1.96 km north	The site is listed as a site of importance in the Bryophyte Site Register (NCC 1985) for Cambridgeshire and has an overall invertebrate index exceeding 500
Red Cross Lane Drain	City Wildlife Site (CiWS)	460 m to the east	Supports five or more neutral grassland indicator species in frequent numbers.
Hedgerow West of Babraham Road	CiWS	490m to the east	Hedgerow at least 100 m in length and 2 m in width at its widest point with four or more woody species.
Hobson's Brook South	CiWS	575 west	Chalk stream together with adjacent semi-natural habitat that has not been grossly modified through canalisation and/ or poor water quality.
Hobson's Brook Mid	CiWS	605 west	Chalk stream together with adjacent semi-natural habitat that has not been grossly modified through canalisation and/ or poor water quality.
Long Road Plantation	CiWS	1.08 km to the north	Recent woodland 1 ha or more in area and with five or more woodland plants.
Bentley Road Paddocks	CiWS	1.3 km north	Neutral grassland with two or more strong neutral grassland indicator species in frequent numbers.

Site name	Designation	Approximate distance from Site	Description
Hobson's Conduit / Vicar's Brook	CiWS	1.38 km north	Chalk stream together with adjacent semi-natural habitat that has not been grossly modified through canalisation and/ or poor water quality. Also supports a small group of pollard willows in a semi-natural setting
Clare Wood	CiWS	1.4 km north	Scrub over 0.5 ha in area with four or more woody species. Also qualifies as semi-natural habitat adjacent to a chalk stream.
Trumpington Road Woodland	CiWS	1.7 km to the north-west	Woodland 1 ha or more in area with five or more woodland plants.
Grantchester Road Plantations	CiWS	1.8 km to the north-west	Woodland over 1 ha in area and with five or more woodland plants.
Eight Acre Wood and Seven Acres Wood	CiWS	1.9 km west	Woodland over 1 ha in area and with 5 or more woodland plants.

Irreplaceable and priority habitats

10.10.70 The desk study found no ancient woodland/ veteran trees within the Site during the desk study. Native hedgerows and lowland mixed deciduous woodland are priority habitats within the RLB. Additionally, the River Granta was also identified as a priority river habitat.

Strategic significance

10.10.71 Part of the Site falls within the Gog Magog and Chalkland fringe; an area identified within the Greater Cambridge Local Plan First Proposal as being an area targeted for Policy BG/GI: Green infrastructure. This aims to provide links between habitats, connecting to the wider landscape.

10.10.72 An area of lowland mixed deciduous woodland, identified as priority habitat from the desk study and located within Shelford – Haverhill disused railway CWS, west of High Street to the south west of Babraham lies within the RLB. This area of woodland connects to other similar habitat beyond the Site and as such has been given High strategic significance.

10.10.73 Cambridge City Council's Biodiversity Strategy 2022-2030 lists the following habitats that occur within the Site as a priority and are therefore given High strategic significance:

- Lowland mixed deciduous woodland
- Hedgerows

10.10.74 All other area habitats have been assessed 'Low' strategic significance.

On-Site baseline condition assessment – Area habitat condition assessment

10.10.75 The majority of the Site comprised cropland composed of cereal and non-cereal crops. Other habitats include grassland comprising other neutral grassland and modified grassland predominantly in Good or Moderate condition, heathland and scrub comprising mixed scrub in Moderate condition, and a single non-priority pond in Poor condition. Other areas of the Site comprise existing roads and footpaths classified as developed land/ sealed surface for which there is no condition assessment. Urban trees are also present within the Site to the north of the Site.

10.10.76 Woodland is also present on Site comprising other broadleaved and lowland mixed deciduous woodland. A map of the habitat types provided in Appendix A.

On-Site baseline condition assessment – Linear hedgerow condition assessment

10.10.77 The Site comprises native hedgerows predominately considered to be low distinctiveness in Moderate condition. Native hedgerow associated with bank or ditch and native hedgerow with trees of medium distinctiveness and Moderate or Good condition are also present. Native hedgerow associated with bank or ditch has been included as a hedgerow only in baseline unit calculations with the ditch assessed separately in the ditch assessment below.

10.10.78 Native species rich hedgerows present on Site predominantly comprised medium distinctiveness, without trees or banks/ ditches, in Moderate or Good condition. Native species rich hedgerow with trees of high distinctiveness in Good condition is also present.

10.10.79 Approximately 0.34 km of line of trees was recorded as being present on Site in either Poor condition due to their young age and being newly planted or as a precautionary Good condition as they were not accessed. A map of the hedgerow types is provided in Appendix B.

On-Site baseline condition assessment – River condition assessment

10.10.80 The river condition assessment found that all sub-reaches on the River Granta were of River Type H (straight-sinuous planform with a sand channel bed). Hobson's Brook was determined to have a River Type K (straight/sinuous with a silt channel bed).. Detailed outputs of the river condition assessment are presented in Table A10.12.7.

Table A10.12.7 River type of the River Granta

River Type Indicators	River Granta					Hobson's Brook
	D1-S1	D1-S2	D1-S3	D2-S1	D2-S2	D4-S1
River category	Other river	Other river	Other river	Other river	Other river	Other river
Braiding index (A1)	1	1	1	1	1	1
Sinuosity index (A2)	1.090	1.090	1.090	1.046	1.046	1.008

River Type Indicators	River Granta					Hobson's Brook
	D1-S1	D1-S2	D1-S3	D2-S1	D2-S2	D4-S1
Anabranching index (A3)	1	1	1	1	1	1
Level of confinement (A4)	Unconfined	Unconfined	Unconfined	Unconfined	Unconfined	Unconfined
Valley gradient (A5)	0.002	0.002	0.002	0.001	0.001	0.001
Bedrock reaches (A6)	No	No	No	No	No	No
Coarsest bed material size class (A7)	Cobble	Cobble	Cobble	Cobble	Cobble	Silt
Average alluvial bed material size class (A8)	Sand	Sand	Sand	Sand	Sand	Silt
Calculated River Type	H	H	H	H	H	K

10.10.81 The final River Granta and Hobson's Brook condition scores for each sub-reach, that were inputted into the DEFRA Statutory Metric, are listed in Table A10.12.8. Sub-reaches D1-S1 and D2-S2 were found to be Fairly Poor, with the other sub-reaches classed as Moderate (noting that the lower threshold for Moderate is 0.5, meaning that D1-S3 is borderline Fairly Poor/ Moderate). Hobson's Brook D4-S1 was of Faily Poor condition.

Table A10.12.8 River condition scores and classes for the River Granta

River Name	Sub-reach	River type	Condition score	Condition class	River shape
River Granta	D1-S1	H	0.19	Fairly Poor	2.25
	D1-S2	H	1.40	Moderate	2.47
	D1-S3	H	0.53	Moderate	1.84
	D2-S1	H	0.91	Moderate	1.74
	D2-S2	H	0.41	Fairly Poor	1.66
Hobson's Brook	D4-S1	K	0.049	Faily Poor	1.613

10.10.82 In the UK, historical channel modifications mean that many river channels are 'overdeep' indicating that they are at least partially hydrologically and ecologically disconnected from their riparian margins and floodplains. These channels therefore have reduced potential to support biodiversity. Recognition of an overdeep channel is best assessed based on field investigation by an expert, but an index ('river shape' Table A10.12.8) has been created based on data collected during MoRPh surveys which can be used to assess the likelihood of a surveyed channel being sufficiently overdeep to affect its hydrological and ecological lateral connectivity. A river with a river shape score of ≤4 is likely to be overdeep, whilst rivers with a score of ≤2 are highly likely to be overdeep. All sub-reaches on the River Granta and the Hobson's Brook were therefore considered overdeep.

10.10.83 The Guide for Assessing River Condition states that if a channel is considered to be overdeep, its river condition assessment should be reduced by one class, however, this guidance applies only where the condition is estimated to be Good or Fairly Good. Therefore, the condition class has not been downgraded for any of the sub-reaches. It should be noted, however, that the overdeep channel shape is likely to be reflected in the river condition indicator scores, and so a possible method for achieving biodiversity net gain may be to seek enhancements that address this.

On-Site baseline condition assessment – Ditch condition assessment

10.10.84 The ditch condition scores for each sub-reach are presented in Table A10.12.9. All ditches were in 'Poor' condition. W2 was recorded as 'Moderate', but as the ditch was dry at the time of survey it was downgraded to Poor as this implies that sufficient water levels are not maintained (Criteria 6; "as a guide a minimum summer depth of approximately 50 cm in minor ditches").

Table A10.12.9 Ditch Condition Scores and Classes for Hobson's Brook and Unnamed Ditches

Watercourse	Sub-reach	Number of criteria met	Condition class
Unnamed ditches	D2E	3	Poor
	D5A	NA*	Poor
	W2	5	Poor
	W3	3	Poor
	W4	4	Poor
	W5	2	Poor
	W6	3	Poor
	W7	NA*	Poor
	W8	5	Poor
	W22	NA*	Poor
	W24	4	Poor
	W27	NA*	Poor
	W29	4	Poor
*Condition class assigned based on nearby ditches, aerial imagery, past surveys and professional judgement			

On-site baseline units – Area habitat baseline units

10.10.85 The area, distinctiveness, strategic significance and condition of area habitats were input to the Metric to calculate the Area Habitat Biodiversity Units (AHBU). The baseline conditions on Site currently generate a total of 278.23 AHBU over an area of approximately 114.17 ha.

10.10.86 A summary of the areas, condition, biodiversity units and retained habitat of the baseline area habitats are shown in Table A10.12.10. A UKHab plan of the baseline habitats is shown in Annex A.

Table A10.12.10 Baseline area habitat scores and unit values within the Site

Broad habitat	Proposed habitat	Baseline area (ha)	Distinctiveness		Condition		Strategic significance		Baseline units	Retained area (ha)	Retained units
			Band	Score	Band	Score	Band	Score			
Urban	Bare ground	0.82	Low	2	Poor	1	Low	1	1.64	0.1275	0.26
Cropland	Cereal crops	95.52	Low	2	N/A	1	Low	1	191.04	0.1474	0.29
Urban	Developed land; sealed surface	3.68	V.Low	0	N/A - Other	0	Low	1	0.00	1.4115	0.00
Grassland	Other neutral grassland	0.58	Medium	4	Good	3	Low	1	6.96	0.0038	0.05
Grassland	Other neutral grassland	3.7	Medium	4	Moderate	2	Low	1	29.60	1.3357	10.69
Grassland	Other neutral grassland	3.57	Medium	4	Poor	1	Low	1	14.28	0.174	0.70
Grassland	Modified grassland	0.94	Low	2	Good	3	Low	1	5.64	0.0699	0.42
Grassland	Modified grassland	2.29	Low	2	Moderate	2	Low	1	9.16	0	0.00
Grassland	Modified grassland	0.5	Low	2	Poor	1	Low	1	1.00	0.1595	0.32
Heathland and shrub	Bramble scrub	0.03	Medium	4	N/A	1	Low	1	0.12	0.0083	0.03
Heathland and shrub	Mixed scrub	0.15	Medium	4	Moderate	2	Low	1	1.20	0.0524	0.42
Heathland and shrub	Mixed scrub	0.04	Medium	4	Poor	1	Low	1	0.16	0	0.00
Lakes	Ponds (non-priority habitat)	0.02	Medium	4	Poor	1	Low	1	0.08	0.0147	0.06
Woodland and forest	Lowland mixed deciduous woodland	0.02	High	6	Moderate	2	High	1.15	0.28	0	0.00
Woodland and forest	Lowland mixed deciduous woodland	0.65	High	6	Poor	1	High	1.15	4.49	0.6485	4.47
Woodland and forest	Other woodland; broadleaved	1.14	Medium	4	Moderate	2	Low	1	9.12	0	0.00
Woodland and forest	Other woodland; broadleaved	0.39	Medium	4	Poor	1	Low	1	1.56	0	0.00
Urban	Artificial unvegetated, unsealed surface	0.52	V.Low	0	N/A - Other	0	Low	1	0.00	0	0.00
Individual trees	Urban tree	0.0814	Medium	4	Good	3	Low	1	0.98	0.0814	0.98

Broad habitat	Proposed habitat	Baseline area (ha)	Distinctiveness		Condition		Strategic significance		Baseline units	Retained area (ha)	Retained units
			Band	Score	Band	Score	Band	Score			
Individual trees	Rural tree	0.2484	Medium	4	Moderate	2	Low	1	1.99	0.2484	1.99
Totals		114.56 (114.89 incl. trees)							279.29	4.48	20.67

On-site baseline units – Linear hedgerow baseline units

10.10.87 The Site comprises a baseline of 66.88 hedgerow units over a length of 7.72 km.

10.10.88 A summary of the length, condition and biodiversity units and retained habitat of the baseline linear hedgerow are shown in Table A10.12.11.

Table A10.12.11 Baseline linear hedgerow scores and unit values within the Site

Proposed habitat	Baseline length (km)	Distinctiveness		Condition		Strategic significance		Baseline units	Retained length (ha)	Retained units
		Band	Score	Band	Score	Band	Score			
Line of trees	0.56	Low	2	Good	3	Medium	1.1	3.70	0.52	3.43
Line of trees	0.06	Low	2	Moderate	2	Medium	1.1	0.26	0	0.00
Native hedgerow	1.54	Low	2	Good	3	High	1.15	10.63	1.14	7.87
Native hedgerow	0.25	Low	2	Moderate	2	High	1.15	1.15	0.2	0.92
Native hedgerow	0.01	Low	2	Poor	1	High	1.15	0.02	0.01	0.02
Native hedgerow - associated with bank or ditch	0.66	Medium	4	Good	3	High	1.15	9.11	0.62	8.56
Native hedgerow - associated with bank or ditch	0.93	Medium	4	Moderate	2	High	1.15	8.56	0.78	7.18
Native hedgerow with trees	0.32	Medium	4	Good	3	High	1.15	4.42	0.28	3.86
Native hedgerow with trees	0.19	Medium	4	Moderate	2	High	1.15	1.75	0.15	1.38
Non-native and ornamental hedgerow	0.32	V.Low	1	Poor	1	High	1.15	0.37	0.32	0.37
Species-rich native hedgerow	1.31	Medium	4	Good	3	High	1.15	18.08	1.26	17.39
Species-rich native hedgerow	0.08	Medium	4	Moderate	2	High	1.15	0.74	0	0.00
Species-rich native hedgerow	0.8	Medium	4	Poor	1	High	1.15	3.68	0.8	3.68
Species-rich native hedgerow - associated with bank or ditch	0.25	High	6	Good	3	High	1.15	5.18	0.25	5.18
Species-rich native hedgerow with trees	0.44	High	6	Good	3	High	1.15	9.11	0.29	6.00
Total	7.72							76.73	6.62	65.83

On-site baseline units – Rivers/ streams baseline units

10.10.89 The length, distinctiveness, strategic significance, encroachment and condition of the rivers and streams (River Granta and Hobson's Brook) were inputted into the Metric to calculate WUs.

10.10.90 The River Granta has been identified as priority river habitat meaning that it is assigned a distinctiveness score of 'Very high'. This is because the watercourse is marked as a chalk river on Natural England's priority habitat chalk rivers map. Additionally, a review of the available aquatic ecological data and records of water-related mammals in the area found that five species from criterion level B (European eel, bullhead, brown trout, water vole, and otter) were present within the River Granta. There are also historical records of one criterion level A species (spined loach). Given that to qualify as priority habitat the watercourse needs to have records of any one criterion A species or any six criteria B species, the watercourse has been classified as priority river habitat. This is a precautionary approach which takes into account the high likelihood that spined loach are still a component of the watercourse's fish population.

10.10.91 The sub-reach of Hobson's Brook within the Site is assigned High distinctiveness based upon it not meeting any conditions for priority river habitat and therefore being entered into the Statutory Metric as Other Rivers and Streams. However, it should be noted that this sub-reach is a tributary of the main Hobson's Brook which is considered a chalk river.

10.10.92 The River Granta has High strategic significance as it is a WFD reportable water body and County Wildlife Site. This has been entered into the Statutory Metric as 'Formally identified in local strategy'. Although Hobson's Brook is also a WFD water body, the watercourse at the point of interaction is well upstream of the delimited watercourse on the Environment Agency's Catchment Data Explorer. However, Hobson's Brook is still assigned High strategic significance as it is included in Local Plans due to its relation to Hobson's Brook City Wildlife Site and Nine Wells Local Nature Reserve, directly to the east of the RLB where the watercourse arises.

10.10.93 In-watercourse encroachment was assigned as no encroachment for all watercourse, excepting D1-S1 and D1-S3. These sub-reaches were assigned major watercourse encroachment on account of the presence of bed/ bank reinforcement at both sites, an intermediate deflector at D1-S1, and a major weir (i.e., a permanent impermeable impounding structure across the entire channel width) at D1-S3.

10.10.94 Sub-reach D1-S1 on the River Granta has been assigned no riparian encroachment on both banks. All other sub-reaches have had riparian encroachment applied due to the presence of footpaths/tracks and managed land within 10 m of the watercourses. The riparian encroachment categories are presented in Table A10.12.11. The difference in encroachment severity reflects the different distances of the developments from the River Granta and Hobson's Brook for both banks.

10.10.95 River condition has been assigned to the River Granta and Hobson's Brook sub-reaches based on the results of the RCA.

10.10.96 No off-site reaches have been assessed as part of this BNG assessment. There is 0.986 km of river within the RLB; 0.842 km of which is 'Very high' distinctiveness habitat (River Granta), and the remainder of which (0.144 km) is 'High' distinctiveness habitat (Hobson's Brook). The on-site baseline WUs for Rivers/ streams are presented in Table A10.12.11. The total baseline WUs for Rivers/ streams is 11.79 WUs.

Table A10.11.12 On-site baseline Watercourse Units (WUs) for Rivers/ streams

Watercourse	Location	Length km (within the RLB)	River type (Distinctiveness)	Strategic significance	Condition	Extent of watercourse encroachment	Extent of riparian encroachment	Baseline WUs
River Granta (D1-S1)	Adjoining A11 and RLB at southern limit of Proposed Development	0.202	Priority Habitat (Very High)	Formally identified in local strategy (High)	Fairly Poor	Major	No Encroachment/ No Encroachment	1.39
River Granta (D1-S3)	Structure 8 crossing at Babraham	0.135	Priority Habitat (Very High)	Formally identified in local strategy (High)	Moderate	Major	Minor/ No Encroachment	1.22
River Granta (D2-S1)	Immediately upstream of D2-S2, near the Structure 6 crossing	0.373	Priority Habitat (Very High)	Formally identified in local strategy (High)	Moderate	No Encroachment	Moderate/ No Encroachment	6.31
River Granta (D2-S2)	Structure 6 crossing at Stapleford	0.132	Priority Habitat (Very High)	Formally identified in local strategy (High)	Fairly Poor	No Encroachment	Moderate/ No Encroachment	1.68
Hobson's Brook (D4-S1)	Structure 4 crossing near Addenbrooke's Road	0.144	Other Rivers and Streams (High)	Formally identified in local strategy (High)	Fairly Poor	No Encroachment	Major/ Moderate	1.19
Totals		0.986						11.79

On-site baseline units – Ditches on-Site baseline units

10.10.97 The length, distinctiveness, strategic significance, encroachment and condition of the ditches were inputted into the Metric to calculate WUs.

10.10.98 The ditches were assigned 'Medium' distinctiveness, as per the Statutory Metric guidance.

10.10.99 No ditches have any in-watercourse encroachment, but some of them have been assigned a riparian encroachment category on one or both banks (Minor, Moderate or Major) due to the presence of roads, railways, or managed land within 5 m of the watercourse, as per the guidance. No riparian encroachment was recorded for ditches: W2, W3, W4, W5 and W6. All other ditches had riparian encroachment.

10.10.100 Ditch condition has been assigned to ditches based on the results of the field survey (ditch condition assessment). No off-site reaches have been assessed as part of this BNG assessment. Baseline WUs were calculated for 13 ditches within the RLB, totalling 2.38 km of ditch. The on-site baseline WUs for ditches are presented in Table A10.12.13. The total baseline WUs for ditches is 8.93.

Table A10.12.13 On-site baseline river biodiversity units for ditches

Ditch	Location	Length km (within the Site)	River type (distinctiveness)	Strategic significance	Condition	Extent of watercourse encroachment	Extent of riparian encroachment	Baseline WUs
D2E	Tributary of the River Granta near Structure 6	0.240	Ditches (Medium)	Low	Poor	No Encroachment	No Encroachment/ No Encroachment	0.96
D5A	Near Graham's Road	0.159	Ditches (Medium)	Low	Poor	No Encroachment	Minor/ No Encroachment	0.62
W2	Crossed by Structures 1, 2 and 3 near Addenbrooke's Road	0.153	Ditches (Medium)	Low	Poor	No Encroachment	No Encroachment/ No Encroachment	0.61
W3	Near Stapleford	0.121	Ditches (Medium)	Low	Poor	No Encroachment	No Encroachment/ No Encroachment	0.48
W4	Crossed by Structure 7 at Sawston	0.174	Ditches (Medium)	Low	Poor	No Encroachment	No Encroachment/ No Encroachment	0.70
W5	Near Sawston	0.472	Ditches (Medium)	Low	Poor	No Encroachment	No Encroachment/ No Encroachment	1.64
W6	Crossed by Structure 5 at Stapleford, near River Granta	0.468	Ditches (Medium)	Low	Poor	No Encroachment	No Encroachment/ No Encroachment	1.87
W7	Adjoining railway at Addenbrooke's Road	0.020	Ditches (Medium)	Low	Poor	No Encroachment	Major/ No Encroachment	0.07
W8	Near Addenbrooke's Road	0.153	Ditches (Medium)	Low	Poor	No Encroachment	Major/ No Encroachment	0.53
W22	Near Graham's Road	0.118	Ditches (Medium)	Low	Poor	No Encroachment	Minor/ No Encroachment	0.46
W24	Near Francis Crick Avenue	0.099	Ditches (Medium)	Low	Poor	No Encroachment	Minor/ No Encroachment	0.30
W27	Alongside Nine Wells LNR	0.175	Ditches (Medium)	Low	Poor	No Encroachment	Major/ Major	0.61
W29	Near Francis Crick Avenue	0.024	Ditches (Medium)	Low	Poor	No Encroachment	Major/ No Encroachment	0.07
Totals		2.38						8.93

On-Site impacted units – Area habitat on-Site impacted units

10.10.101 There is a total of 258.62 baseline AHBU lost on Site, predominantly cropland, modified grassland, other neutral grassland and other woodland; broadleaved. These habitats are being lost due to the creation of the new active transport route and associated infrastructure.

10.10.102 While cropland habitats including cereal, non-cereal and winter stubble is being lost to the Proposed Development this will be replaced when the compound and laydown areas are returned following construction.

10.10.103 Small areas of lowland mixed deciduous woodland will also be lost to the Proposed Development. This is predominantly marginal fringes adjacent to the compound areas. However, one section, north of Hinton Way and one section south of Holm Farm where the Proposed Development crosses the River Granta will be bisected by the Proposed Development. These areas connect to larger woodland beyond the Proposed Development boundary. Proposed planting includes the opportunity to create the same habitat adjacent to the woodland north of Hinton Way which will allow habitat creation to be aided by natural regeneration post construction while retained habitat along the River Granta will continue to provide ecological connectivity.

10.10.104 Non-priority ponds and mixed scrub will also be lost. Other units impacted on Site, including woodland and grassland will be lost to accommodate the Proposed Development.

10.10.105 Proposed habitat units may be impacted by additional management and pollution run-off from the Proposed Development during construction and operation. The likely effects have been taken into account in the condition of post-development AHBU.

On-Site impacted units – Linear hedgerow on-Site Impacted units

10.10.106 There are 55 hedgerows on Site within the RLB, totalling 7.1 km of hedgerow habitat plus a 0.62 km line of trees. The Proposed Development would result in the loss of approximately 1.10 km of hedgerows and lines of trees. Losses are due to the construction of the Proposed Development and associated infrastructure and are largely based around existing road junctions and compound areas. Where hedgerows are lost there are currently no proposals to re-create hedgerows in existing locations. Instead, proposed hedgerows will largely border the proposed road and provide a barrier between the Proposed Development and adjacent land.

On-Site impacted units – Rivers/ streams on-Site impacted units

10.10.107 The Proposed Development impacts relate to the construction of single span viaduct crossings over the River Granta and its floodplain at Structures 6 and 8 (corresponding to D2-S2 and D1-S3 sub-reaches respectively). There is also a single-span bridge crossing of the Hobson's Brook at Structure 4 (corresponding to the D4-S1 sub-reach).

10.10.108 A desktop exercise was conducted to determine how the Proposed Development would impact the baseline indicator and subsequent river condition score/ class scores, which are calculated from RCA. This exercise took a 'worst-case' approach to ensure that impacts were not missed.

10.10.109 This exercise included the impacts associate with the viaduct crossings on both the River Granta and Hobson's Brook (as described in Section 10.10.107).

10.10.110 Impacts on river condition indicators can be summarised as follows:

- The primary impact of the new crossings would be an increase in shading from the structures. Shading would reduce the local condition through loss of bank-top, bank-face, and in-channel vegetation. It would also increase the extent of bare sediment on the banks. This includes 20 m of the River Granta and 12 m of the Hobson's Brook;
- There would be a positive impact on the condition score, noting that this will not result in an increase in river condition class, of the river through the shifting of riparian land use from arable agriculture to wildflower meadows/ tree planting, which would remove riparian encroachment from the BNG assessment associated with the sub-reaches D2-S1, D2-S2 and D4-S1. The riparian habitat would no longer be managed for agriculture and would be restored to reflect a more natural habitat;
- It is assumed that there will be no in-channel works or requirements for bank protection or reprofiling. Therefore, no changes to artificial structure, bank profile or in-channel features have been included;
- The final location of piers (and therefore their distance from the bank-top) is to be confirmed in detailed design, but it is assumed that there would be no change to riparian encroachment for any sub-reach. The River Granta piers (Structures 6 and 8) would be positioned outside of the riparian zone (>10 m from the bank-top), meaning that there is no encroachment from the Proposed Development. The bridge piers at the Hobson's Brook crossing (Structure 4) are assumed to have moderate encroachment (i.e., be placed within 4 to 10 m of the bank-top) but this does not signify a change in riparian encroachment from baseline, as the baseline watercourse encroachment is Major/ Moderate due to the presence of managed land on both banks footpath on the right bank. It should be noted that the footpath has been included as part of the RCA, and therefore, should not be included as riparian encroachment in the BNG calculation. However, due to the presence of managed land on the right bank, removing the footpath as part of riparian encroachment, does not change the encroachment category.

10.10.111 This desktop scenario modelling predicts that the Proposed Development would cause a reduction in condition score of 0.37 at D1-S3 and of 0.24 at D2-S2. This reduction corresponds to a reduction in condition class from Moderate to Fairly Poor for approximately 0.025 km of D1-S3 (as the baseline condition score was borderline Fairly Poor/ Moderate) but does not lead to a reduction in condition for D2-S2.

10.10.112 The desktop scenario modelling also predicts that the Proposed Development would cause a reduction in river condition score of the Hobson's Brook from 0.049 to -0.162, which correlates to a reduction in condition class from 'Fairly poor' to 'Poor'. This has been based on the impacts as described in 10.10.110.

10.10.113 In the Statutory Metric, a reduction in condition must be recorded as a loss of watercourse and creation of watercourse in poorer condition. It should be noted that this results in an over-estimation of WUs that are lost due to a reduction in condition, because of the application of multipliers for creation, associated with time to target condition and the difficulty in creating habitat.

On-Site impacted units – Ditches on-Site impacted units

10.10.114 There are 13 ditches within the RLB, totalling 2.38 km of ditch habitat. The total baseline WUs for ditches is 8.93.

10.10.115 The impacts of the Proposed Development on ditches can be summarised as follows:

- The Proposed Development would result in the loss of approximately 0.042 km and 0.005 km of W2 at Structures 1/2 and 3 respectively, 0.031 km of W4 at Structure 7, and 0.030 km of W6 at Structure 5 due to the culverting of these ditches underneath the embankments. This is accounted for within the Metric by counting these ditch lengths as 'loss' and then having 'creation' of new culverts[12]. This comes to a total of 0.108 km of ditch which would be culverted;
-
- One ditch (W5) would gain major riparian encroachment on one bank as the CSET Proposed Development alignment would pass parallel to the existing ditch. To account for the riparian encroachment of the W5 ditch in the Metric, the ditch length has been entered as loss and has then been created with major riparian encroachment. There is no change in terms of encroachment for all other ditches.
- Ditch W8, which currently adjoins Addenbrooke's Road, would be partially retained or recreated as a swale just outside of the footprint of the embankment, For the purposes of the BNG assessment, it has been assumed that the whole ditch length (0.153 km) is retained.

On-Site post development – Area habitat

10.10.116 The new proposed public transport route, including the path for active travel, and travel hub facility providing car parking and bike storage are categorised as built linear features. Areas of modified grassland or other neutral grassland border the hub facility and public transport route. Lowland calcareous grassland planting is proposed in the central part of the Proposed Development where the public transport route bisects an exposed cutting.

10.10.117 Woodland creation is present around the hub facility acting as a landscape feature and create visual screening and connectivity between existing habitats.

10.10.118 The creation of ditches (see paragraph 10.10.141) has been incorporated into the landscape design for the Proposed Development. These will comprise a top width of 6 m. In-line with the Statutory Metric User Guide, watercourse habitats greater than 5 m can be recorded as areas as well as lengths. If doing so, the area the watercourse occupies are excluded from the ABU calculation. However, due to the ephemeral nature of ditches, it is anticipated that the mean water height within the ditches incorporated into the landscape design for the Proposed Scheme will not achieve this width for most of the year. Furthermore, the design of the ditches incorporates a stepped edge resulting in a narrow width from bank to bank when water levels are lower. Therefore, the ditches have been included as linear features only within the Watercourse module and not incorporated into the post development area habitat.

10.10.119 The post-work Site habitat creation is currently predicted to generate a total of 399.08 area habitat biodiversity units (AHBU) over an area of 110.4 ha.

10.10.120 Due to the duration of time for which compound areas will be occupied these habitats are considered to be lost and will be re-established once construction of the Proposed Development is complete. These areas predominantly comprise cropland.

10.10.121 This equates to a net gain of 140.46 AHBU and a percentage increase of 50.29%.

10.10.122 The overall unit and area change for the Site is shown in Table A10.12.14 with summary of post development habitat creation broken down by broad habitat type provided in Table A10.12.15. A plan showing the post-works habitat creation is shown in Annex B

Table A10.12.14 Summary of area results

Measurement	Habitat units	Area (ha)
Baseline value	279.29	114.89
Retained	20.67	4.48
Habitat creation	399.08	110.40
Total post construction	419.75	-
Change in biodiversity units (% change)	140.46 (50.29%)	-

12 Any river or stream that is culverted and present within the Order limits has a River Type of 'Culvert' and is automatically assigned a condition of 'Poor'.

Table A10.12.15 On Site area habitat creation

Broad habitat	Proposed habitat	Proposed area (ha)	Distinctiveness		Condition		Strategic significance		Habitat units delivered
			Band	Score	Band	Score	Band	Score	
Urban	Lowland calcareous grassland	0.20	High	6	Moderate	2	High	1.15	0
Cropland	Modified grassland	1.61	Low	2	Poor	1	Medium	1.10	56.23
Cropland	Other neutral grassland	16.09	Medium	4	Moderate	2	High	1.15	11.67
Cropland	Other neutral grassland	24.17	Medium	4	Moderate	2	Medium	1.10	13.14
Grassland	Mixed scrub	0.16	Medium	4	Moderate	2	Medium	1.10	0.64
Grassland	Ponds (Non- Priority Habitat)	1.87	Medium	4	Moderate	2	Medium	1.10	3.41
Grassland	Lowland mixed deciduous woodland	1.33	High	6	Moderate	2	High	1.15	123.87
Grassland	Other woodland; broadleaved	5.01	Medium	4	Moderate	2	Medium	1.10	178.00
Heathland and shrub	Arable field margins game bird mix	0.18	Medium	4	N/A	1	Medium	1.10	1.19
Lakes	Arable field margins pollen & nectar	2.03	Medium	4	N/A	1	Medium	1.10	14.77
Woodland and forest	Lowland calcareous grassland	0.20	High	6	Moderate	2	High	1.15	1.94
Woodland and forest	Modified grassland	1.61	Low	2	Poor	1	Medium	1.10	25.84
Cropland	Other neutral grassland	16.09	Medium	4	Moderate	2	High	1.15	0.76
Cropland	Other neutral grassland	24.17	Medium	4	Moderate	2	Medium	1.10	8.62
Total area (ha)		110.40	Total units						440.08

On-Site post development – Linear hedgerow

10.10.123 New hedgerow creation will be incorporated into the landscape design for the Proposed Development. This will comprise native species-rich hedgerow species such as common dogwood, hazel, common hawthorn, wayfaring tree, blackthorn, and dog rose.

10.10.124 Hedgerows will predominantly form boundary features between the public transport route the surrounding land including agricultural fields.

10.10.125 Hedgerows and lines of trees retained total 6.62 km and 65.83 hedgerow biodiversity units (HBU). Hedgerow creation consisting of native species-rich hedgerow and native species-rich hedgerow with trees which total collectively 11.9 km, or 85.96 HBU, resulting a total net unit change of 75.05 HBU.

10.10.126 The overall unit and length change for the Proposed Development is shown in Table A10.12.16. A plan showing the post-works habitat creation is shown in Appendix B. The results of the post development habitat creation are summarised in Table A10.12.17.

Table A10.12.16 Summary of linear hedgerow results

Measurement	Hedgerow Biodiversity Units	Length (km)
Baseline value	76.73	7.72
Retained	65.83	6.62
Hedgerow creation	85.96	11.90
Total post construction	151.79	-
Change in biodiversity units (% change)	75.05 (97.81%)	-

Table A10.12.17 On-Site Habitat Creation - Linear Hedgerow

Broad habitat	Proposed habitat	Total length (km)	Distinctiveness		Condition		Strategic significance		Habitat units delivered
			Band	Score	Band	Score	Band	Multiplier	
Hedgerow	Native Species Rich Hedgerow	11.55	Medium	4	Moderate	2	High	1.15	82.81
Hedgerow	Native Species Rich Hedgerow with Trees	0.35	High	6	Moderate	2	High	1.15	3.15

On-Site post development – Watercourses

10.10.127 For the Watercourse Module of the Metric, the Proposed Development design would result in an increase of WUs from 11.79 WUs to 12.41 WUs for the River Granta and Hobson's Brook combined, which equates to a 5.26% net gain in WUs.

10.10.128 The net gain is a result of the removal of encroachment on the River Granta and Hobson's Brook, from managed land (i.e., permanently vegetated agriculture and arable land) to a more natural land-use, which includes wildflower meadows and tree planting adjacent to the River Granta (D2-S1 and D2-S2) and Hobson's Brook (D4-S1).

10.10.129 This improvement in riparian structure is reflected as a change (reduction) in riparian encroachment values within the enhancement component of the Metric, with a 2 year delay of included for the enhancement works. A review of bank top indicators scores indicates that the enhancements to the riparian zone would not act to improve the overall condition of the watercourse.

10.10.130 It should be noted that there is also creation of ditches on the left bank of the River Granta (D2-S2), which would enhance the riparian zone (i.e., aid in the removal of riparian encroachment), but not result in an increase in the condition class of the River Granta at this location.

10.10.131 Although there are losses of Very high distinctiveness habitat (0.18 WUs) associated with the reduction in condition of 20 m the of the River Granta (D1-S3) due to the Structure 8 crossing at Babraham), this has been off-set by the removal of riparian encroachment at other locations on the River Granta (D2-S1). As such, no bespoke compensation is required for the River Granta.

10.10.132 There are also losses of WUs units (0.10 WUs) associated with the reduction in condition of 12 m of the Hobson's Brook due to the new viaduct crossing at D4-S1. Similarly to the River Granta, the removal of riparian encroachment on the left bank of the Hobson's Brook has delivered units to off-set the losses associated with the new crossing.

10.10.133 A breakdown of the WUs delivered are presented in Table A10.12.18.

10.10.134 There is an opportunity for enhancements to the River Granta and Hobson's Brook at sub-reaches which are within the RLB but are not affected by the crossings. By examining the river condition indicator scores of the River Granta sub-reaches, potential opportunities for enhancements have been identified specific to the Proposed Development. These are detailed in Table A10.12.19.

10.10.135

Table A10.12.18 Rivers/ streams Biodiversity Net Gain Post-works

Watercourse	Sub-reach	Baseline Length (within site boundary) (km)	Baseline Units	Length Lost (km)	Length Retained (km)	Length Enhanced (km)	Length Created (km)	Retained Units	Units Lost	Baseline Units Enhanced	Units Generated	Total Post-works Units
River Granta	D1-S1	0.202	1.39	0	0.202	0	0	1.39	0	0	0	1.39
	D1-S3	0.135	1.22	0.02 (at Moderate)	0.115	0	0.02 (at Fairly Poor)	1.04	0.18	0	0.04*	1.08
	D2-S1	0.373	6.31	0	0	0.373	0	0	0	6.31	6.86**	6.86
	D2-S2	0.132	1.68	0	0.017	0.115	0	0.22	0	1.46	1.59**	1.82
Hobson's Brook	D4-S1	0.144	1.19	0.012 (at Fairly poor)	0	0.132	0.012 (at Poor)	0	0.10	1.09	1.28***	1.28
Total (Rivers/ streams)		0.986	11.79	0.032	0.334	0.62	0.025	2.65	0.28	8.86	9.77	12.43 (5.26%)

Note: numbers shown as are they are displayed in the Statutory Metric

* WUs generated through re-creation of Rivers/ streams to capture a reduction in condition associated with Proposed Development crossings, as per the guidance.

** WUs generated through enhancement of Rivers/ streams associated with enhancement to the riparian zone.

*** WUs generated through enhancement of Rivers/ streams, by recording a reduction in condition of Hobsons's Brook where there is a new viaduct crossing, and WUs delivered through enhancement of the riparian zone.

Table A10.12.19 Opportunities for enhancements in the River Granta and Hobson's Brook

Opportunity	Description and mechanism of improvement	Associated baseline indicators
Removal of artificial structures	There are some small areas of bank reinforcement, a deflector and a weir near the Babraham Crossing (River Granta). There may be an opportunity to remove structures which are no longer required which would improve bank/bed complexity and flow naturalness.	C7: Bank face artificial bank profile extent; C8: Bank face reinforcement extent; C9: Bank face reinforcement material severity; E8: Channel bed reinforcement extent; E9: Channel bed reinforcement materials severity; E10: Channel bed artificial features severity.
Bank reprofiling	The River Granta is incised with uniform bank profiles, therefore banks could be reprofiled with the aim of creating a more natural two-stage channel to facilitate the establishment of marginal features (such as berms/ benches). This could also improve the connection between the river and its floodplain and could benefit marginal and vegetation.	C1: Bank face riparian vegetation structure; C3: Bank face natural bank profile extent; C4: Bank face natural bank profile richness; C7: Bank face artificial bank profile extent; D1: Channel margin aquatic vegetation extent; D3: Chanel margin physical feature extent; D4-S1: Channel margin physical feature richness.
Introduction of woody material	Any suitable trees which are felled as part of the Proposed Development could be placed on the banks and within the channel of the River Granta/ Hobson's Brook to create flow deflectors. This would create fish habitat and contribute towards an increase in flow variability.	E3: Channel bed hydraulic feature richness; E4: Channel bed natural physical features extent.
Creation of in-channel geomorphological features	Riffle and pool features could be created by introducing coarse substrates (which would also increase substrate diversity) and wood features could be introduced as previously described to create and maintain pool features through scour. Applies to River Granta and Hobson's Brook.	E3: Channel bed hydraulic feature richness. E4: Channel bed natural physical features extent; E6: Channel bed material richness.

10.10.136 Scenario modelling has been undertaken to stress test the potential for watercourse enhancements within the RLB to provide net gain by increasing the number of post-works WUs. This found that works could increase the condition of all sub-reaches which are not directly affected by the Proposed Development by one condition class (see CSET-10-43-00 for stress test details).

10.10.137 In the River Granta, the enhancements would need to occur alongside the removal of artificial structures, which are the existing cause of major watercourse encroachment, in a least one of the two sub-reaches in which they occur (D1-S1 and D1-S3). It should be noted that there is currently a high level of uncertainty around the feasibility of the required structure removal. If achievable there is the potential for watercourse enhancements, including structure removal, to yield at least a 20% net gain for the Watercourse Module of the Metric.

10.10.138 Enhancements in addition to the landscaping works have not been included in the BNG assessment as it is not part of the current design, but these or similar enhancements could be incorporated into future design changes in order to meet Greater Cambridge Partnerships' BNG targets.

On-Site post development – Ditches

10.10.139 The Proposed Development would result in a net gain of WUs relating to ditches from 8.93 to 10.77 WUs, which equates to a 20.54% net gain in WUs.

10.10.140 There are losses of WUs associated with the culverting of three ditches (approximately 0.108 km in total), which is represented in the Statutory Metric as loss of ditch and creation of culvert. WUs are also lost due to the major riparian encroachment of W5 (approximately 0.472 km), which is represented in the Statutory Metric as loss of ditch length and then creation of the ditch with major encroachment on one bank.

10.10.141 Given site constraints and the hydrology of the existing ditches, there is limited potential for any enhancements to existing ditches to improve their condition class. However, new ditch creation has been incorporated into the landscape design for the Proposed Development. This will comprise of 6 m wide (top width) ditches designed to maintain sufficient depth throughout the year, with marginal berms incorporated into the design in order to support a range of emergent, submerged and floating-leaved plants.

10.10.142 A matrix of ditches has been incorporated into the landscape design at two locations:

- Approximately 170 m length of ditches connecting wildlife ponds south of the Travel Hub; and

- Approximately 489 m of ditches adjoining the River Granta (Stapleford) Crossing.

10.10.143 It is assumed that through the design principles being applied that created ditches would be able to achieve Moderate condition. This is a realistic assumption given that all eight ditch condition criteria must be met to achieve Good condition (Paragraph 10.10.30). Achieving all eight criteria may not be possible at this site given the presence of INNS within the catchment and the lowland, eutrophic nature of the adjacent river.

10.10.144 For this assessment, it is assumed that ditch creation will be delayed by two years as a worst case scenario (the duration of the anticipated construction programme) from the time of the initial Site clearance and the standard time to target condition has been adjusted accordingly. No delay in starting habitat creation has been applied to impacted units.

10.10.145 The retained ditches total 1.8 km in length and 6.86 WUs. Ditch creation of Moderate condition ditch totals 0.659 km, or 2.75 WUs, resulting a total net unit change of 1.83 WUs, or a 20.54% net gain.

10.10.146 A breakdown of the WUs including the overall unit and length change for the Proposed Development is presented in Table A10.12.20. A plan showing the post-works habitat creation is provided in Annex B.

Table A10.12.20 Ditches biodiversity net gain post-works

Watercourse	Baseline Length (within site boundary) (km)	Baseline Units	Length Lost (km)	Length Retained (km)	Length Enhanced (km)	Length Created (km)	Retained Units	Units Lost	Baseline Units Enhanced	Units Generated	Total Post-works Units
D2E	0.240	0.96	0	0.240	0	0	0.96	0	0	0	0.96
D5A	0.159	0.62	0	0.159	0	0	0.64	0	0	0	0.62
W2	0.153	0.61	0.047	0.106	0	0	0.42	0.19	0	0	0.42
W3	0.121	0.48	0	0.121	0	0	0.48	0	0	0	0.48
W4	0.174	0.70	0.031	0.143	0	0	0.57	0.12	0	0	0.57
W5	0.472	1.64	0.472	0	0	0.472	0	1.64	0	1.06	1.06
W6	0.468	1.87	0.030	0.438	0	0	1.75	0.12	0	0	1.75
W7	0.020	0.07	0	0.020	0	0	0.07	0	0	0	0.07
W8	0.153	0.53	0	0.153	0	0	0.53	0	0	0	0.53
W22	0.118	0.46	0	0.118	0	0	0.46	0	0	0	0.46
W24	0.099	0.30	0	0.099	0	0	0.30	0	0	0	0.30
W27	0.175	0.61	0	0.175	0	0	0.61	0	0	0	0.61
W29	0.024	0.07	0	0.024	0	0	0.07	0	0	0	0.07
Culverts	0	0	0	0	0	0.108	0	0	0	0.09	0.09
Travel hub ditches	0	0	0	0	0	0.170	0	0	0	0.71	0.71

Watercourse	Baseline Length (within site boundary) (km)	Baseline Units	Length Lost (km)	Length Retained (km)	Length Enhanced (km)	Length Created (km)	Retained Units	Units Lost	Baseline Units Enhanced	Units Generated	Total Post-works Units
River Granta (Stapleford) Crossing ditches	0	0	0	0	0	0.489	0	0	0	2.04	2.04
Total (Ditches)	2.380	8.93	0.58	1.8	0	1.24	6.86	2.07	0	3.91	10.77 (20.54 %)
Note: the reported numbers are as shown in the Metric. Note: Minor discrepancies in the addition and subtraction of WUs are a result of rounding to two decimal places.											

10.10.147 Note that a conservative approach has been taken when calculating the length of ditch creation required to achieve the BNG target. A precautionary approach was taken on whether to include ditches which were dry at the time of survey in the calculation of WUs, which may have led to an overestimation of baseline WUs and required net gain to achieve 20%.

On-Site post development – Strategic significance

10.10.148 Cambridge City Council's Biodiversity Strategy 2022-203019 lists lowland calcareous grassland as a priority. This habitat is proposed within the post-development landscape and planting plan and are therefore given High strategic significance.

10.10.149 Likewise lowland mixed deciduous woodland and hedgerows throughout the Site have been given High strategic significance and habitats containing pollen and nectar rich resources including species-rich grassland, species-rich hedgerows and mixed scrub within the Gog Magog and Chalkland Fringe area, pollinator corridor and B-Line have been given High strategic significance in line with baseline strategic significance.

10.10.150 All other natural habitats which fall under the broad habitats woodland and forest, lakes and grassland have been given Medium strategic significance while developed land; sealed surface has been given Low.

Trading summary

10.10.151 Statutory Metric sets out a number of principles and rules that should be followed when undertaking BNG assessments. Rule 3 states:

10.10.152 'Trading down' must be avoided. Losses of habitat are to be compensated for on a "like for like" or "like for better" basis. New or restored habitats should aim to achieve a higher distinctiveness and/or condition than those lost.

10.10.153 Losses of irreplaceable or very high distinctiveness habitat cannot adequately be accounted for through the metric.

10.10.154 Statutory Metric provides indicative advice regarding the actions to be taken to address habitat loss.

Trading summary – Very high distinctiveness habitats

10.10.155 For very high distinctiveness habitats losses cannot be adequately accounted for through the metric. For very high distinctiveness habitats where losses cannot be avoided, it is recommended that bespoke compensation is put in place.

10.10.156 The Proposed Development is predicted to result in a unit change of -0.17 units of priority river habitat. However, there would be no loss of direct habitat of very high distinctiveness, as the unit reduction is driven by a localised reduction in condition associated with viaduct crossing. This satisfies the trading rules.

Trading summary – High distinctiveness habitats

10.10.157 For high distinctiveness habitats, to avoid trading down Natural England recommends that habitat creation aims to create an equivalent number of units of the same habitat type.

10.10.158 The Proposed Development is predicted to result in a unit change of +1.65 units of lowland mixed deciduous woodland habitat and +0.60 units of calcareous grassland. There would be no change in units for river habitat of high distinctiveness. This satisfies the trading rules.

10.10.159 The Proposed Development is predicted to result in the loss of -3.11 units of native species-rich hedgerow with trees which is a high distinctiveness habitat. As the proposals have incorporated 0.35 km of native species-rich hedgerow with trees which provides +3.15 units, the trading rules have been satisfied.

Trading summary – Medium distinctiveness habitats

10.10.160 For medium distinctiveness habitats, to avoid trading down Natural England recommends that habitat creation aims to create an equivalent number of units of the same broad habitat type. For example, bramble scrub can be replaced with mixed scrub without risking trading down.

10.10.161 The Proposed Development results in a total of +277.63 Medium distinctiveness area habitat units, this comprises +8.74 units of cropland, +241.70 units of grassland, +0.08 units of heathland and scrub, +13.73 units of lakes and +13.39 units of woodland and forest. This satisfies the trading rules for Medium distinctiveness area habitat.

Trading summary - Low distinctiveness habitats

10.10.162 For low distinctiveness habitat, to avoid trading down the guidance within the Metric recommends that habitat creation aims to create an equivalent number of units for habitats of the same distinctiveness or better. There is no requirement for this to come from the same broad habitat type. Units can be used from any higher distinctiveness habitat (medium, high or very high), provided they have not already been counted as part of the trading down for these higher distinctiveness habitats.

10.10.163 The Proposed Development is predicted to result in the overall unit loss of –139.42 Low distinctiveness habitat area units. This comprises cropland and modified grassland. However, there is a sufficient surplus in the Medium distinctiveness habitats to account for this and therefore, there is no trading down of low distinctiveness habitats.

10.10.164 No further action is required to offset trading down in low distinctiveness habitats.

10.10.165 The Proposed Development also results in a gain of 32.06% low distinctiveness habitat units relating to ditches.

Conclusion

10.10.166 The Statutory Metric has been applied to the Proposed Development at the Site, based on the design at the time of publication of this report.

10.10.167 The assessment shows that the Proposed Development is predicted to result in a net gain of 140.46 AHBU, with a predicted total net change of +50.29%. The net change in hedgerow units is +75.05 which is a net gain of 97.81%. AHBU and HBU achieve and surpasses the 20% biodiversity net gain target for the Proposed Development.

10.10.168 The Proposed Development is also predicted to result in a net gain for both Rivers/ streams and ditches, at 12.41 WUs (5.26 %) and 10.23 (14.58 %) respectively. The overall baseline for Watercourses (which includes Rivers/ streams and ditches) is 20.97 WUs. The Proposed Scheme will result in an overall net gain for Watercourses of 2.07 WUs, to 23.04 overall WUs, which equates to a 9.89% net gain.

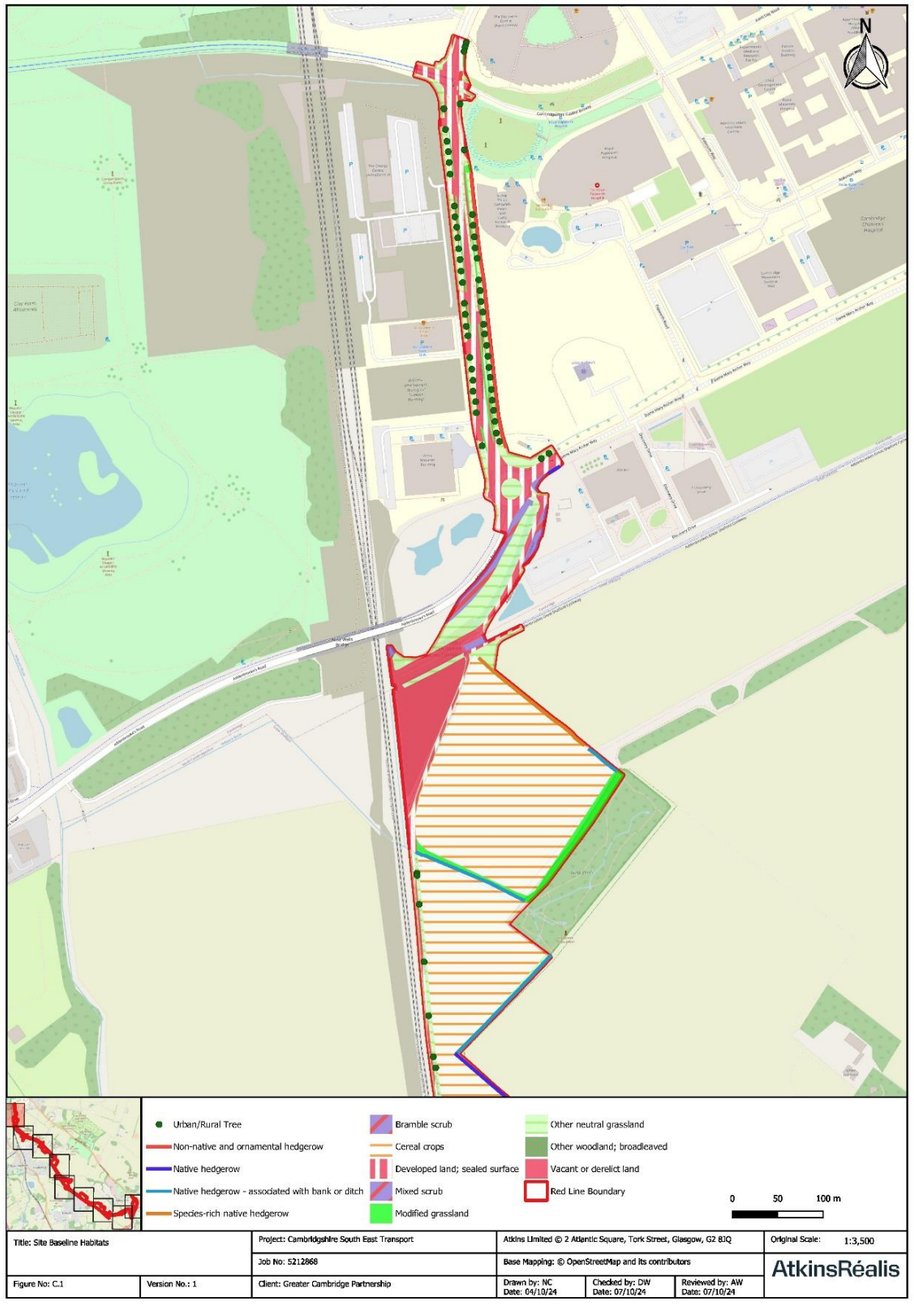
10.10.169 Further investigation of the weir at the proposed River Granta (Babraham) Crossing has identified that the structure is still in operation and is used to raise river water levels for a licenced abstraction for agricultural irrigation. It is therefore unlikely that the 20% net gain for Watercourses could be achieved and biodiversity credits would need to be purchased to offset biodiversity loss and achieve the 20% target.

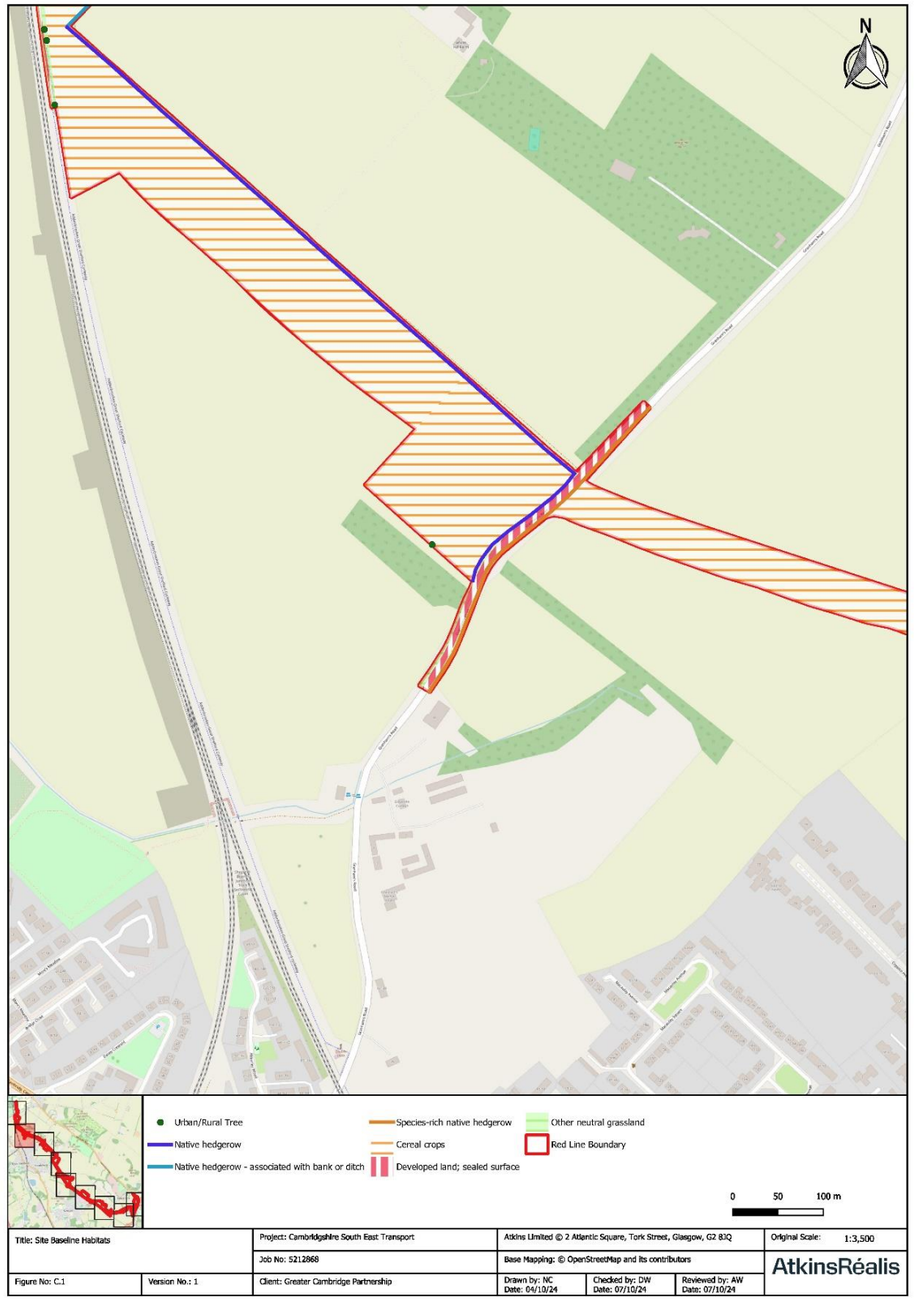
10.10.170 The strategy for achieving BNG, including its definition in relation to the proposed biodiversity improvement parameters, will need to be discussed and agreed with local stakeholders and must be based on ecological functionality with regard to local conservation priorities and local biodiversity targets.

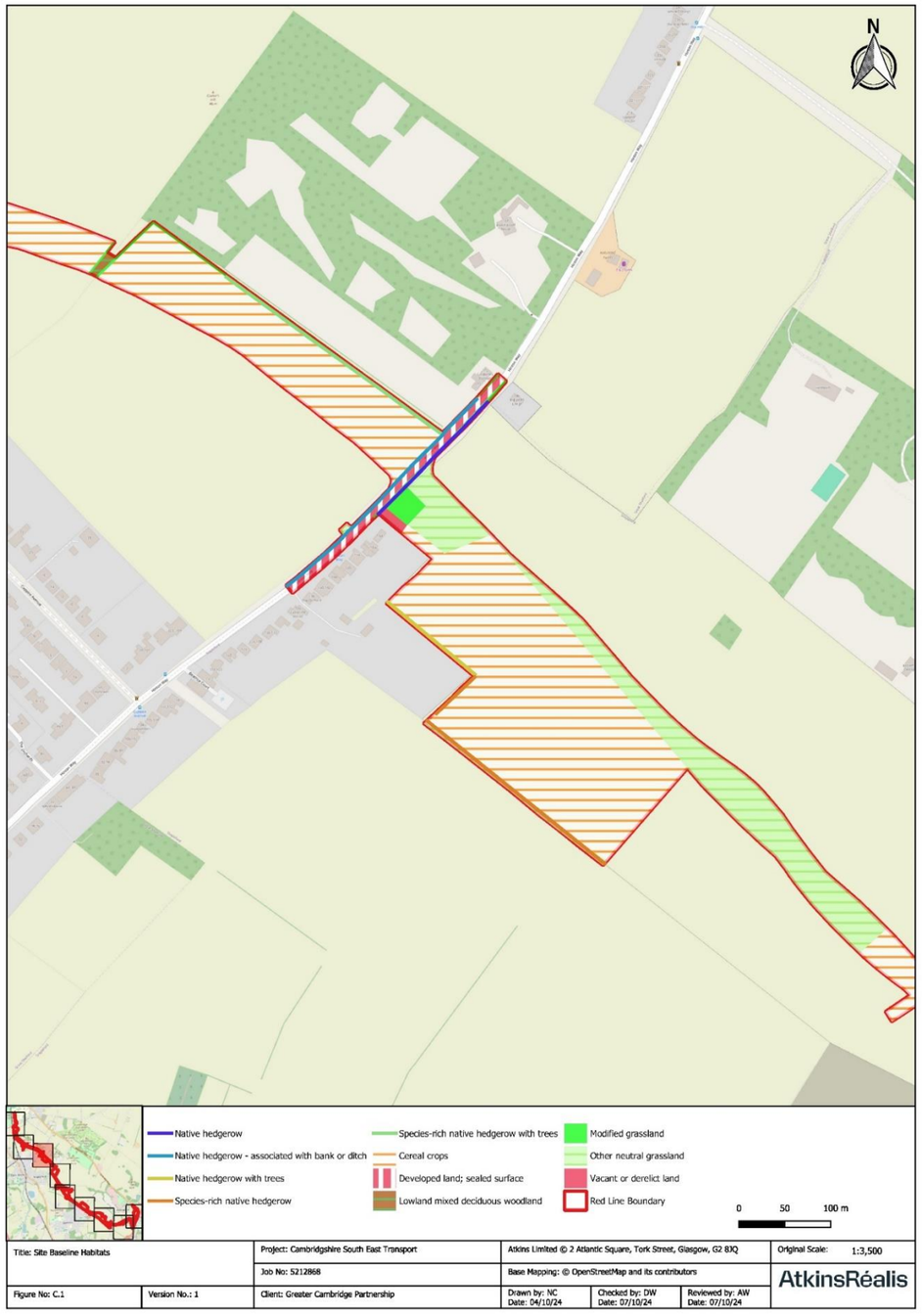
10.10.171 The undertaking of this BNG assessment has followed the mitigation hierarchy and the principles and rules of Statutory Metric.

10.10.172 A Landscape and Ecology Management Plan detailing appropriate BNG management and maintenance plan has been produced (CSET-10-05-00). This details the measures required to ensure the habitat creation proposals reach their target condition and give confidence that every effort will be made to enable the Proposed Development to deliver the predicted net gain in biodiversity units.

ANNEX A SITE BASELINE HABITAT MAPS






N
Native hedgerow
Native hedgerow - associated with bank or ditch
Native hedgerow with trees
Species-rich native hedgerow
Species-rich native hedgerow with trees
Cereal crops
Developed land; sealed surface
Lowland mixed deciduous woodland
Modified grassland
Other neutral grassland
Vacant or derelict land
Red Line Boundary
0 50 100 m
Title: Site Baseline Habitats
Project: Cambridgshire South East Transport
Job No: 5212868
Client: Greater Cambridge Partnership
Atkins Limited © 2 Atlantic Square, Tork Street, Glasgow, G2 8JQ
Base Mapping: © OpenStreetMap and its contributors
Drawn by: NC Date: 04/10/24
Checked by: DW Date: 07/10/24
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Original Scale: 1:3,500
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Version No.: 1
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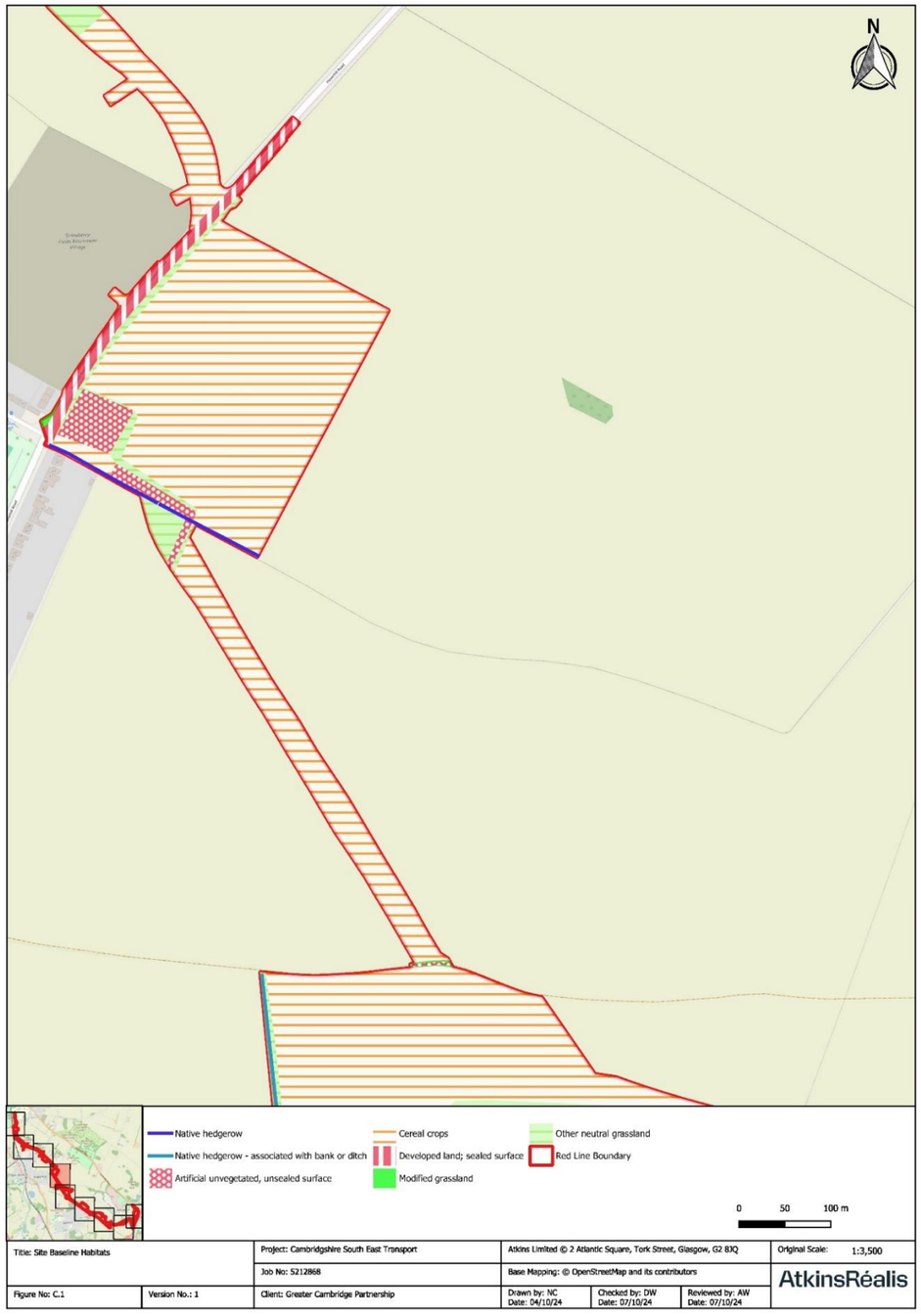
N
Native hedgerow
Native hedgerow - associated with bank or ditch
Artificial unvegetated, unsealed surface
Cereal crops
Developed land; sealed surface
Modified grassland
Other neutral grassland
Red Line Boundary
0 50 100 m
Title: Site Baseline Habitats
Project: Cambridgshire South East Transport
Job No: 5212868
Client: Greater Cambridge Partnership
Atkins Limited © 2 Atlantic Square, Tork Street, Glasgow, G2 8JQ
Base Mapping: © OpenStreetMap and its contributors
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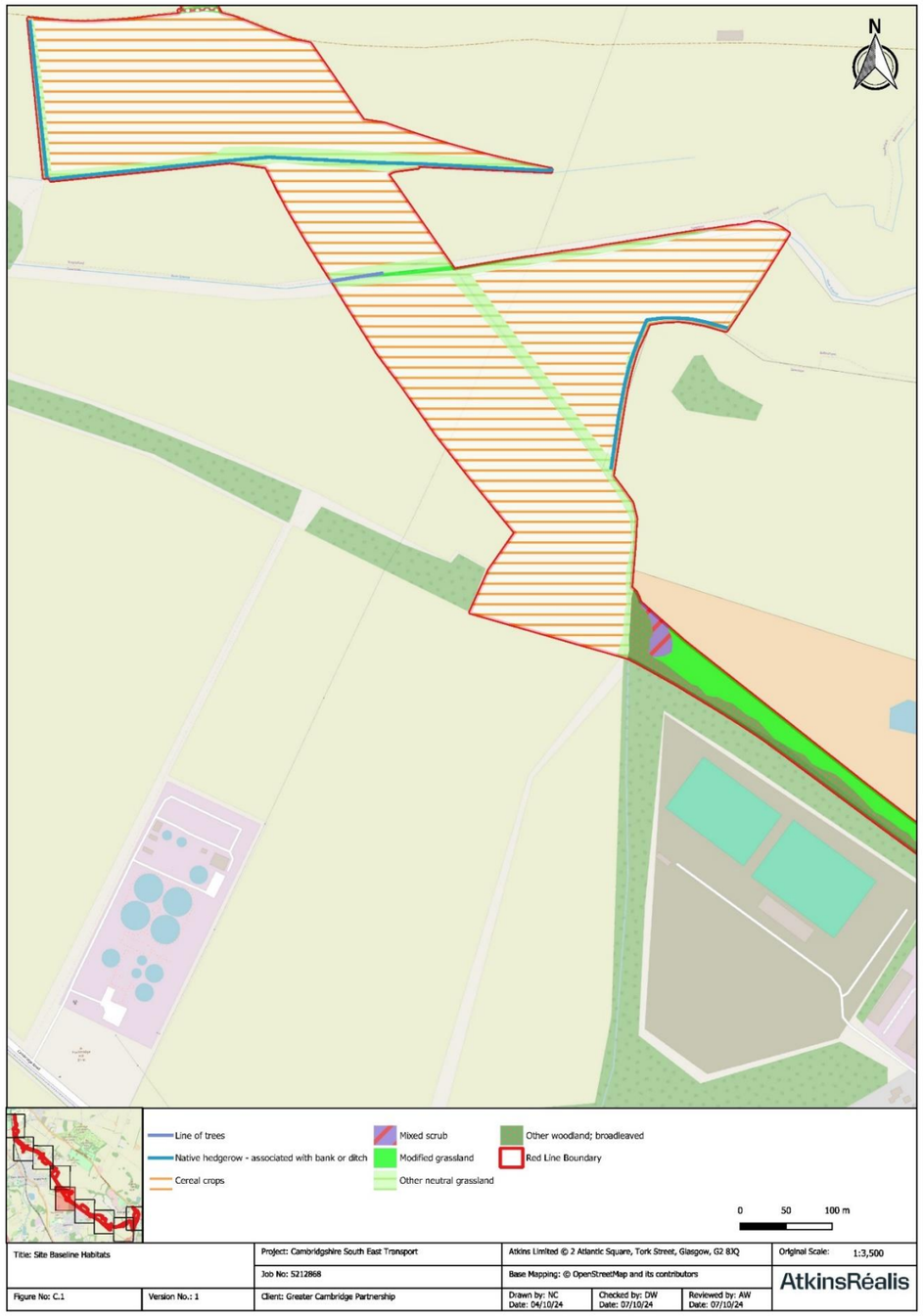
N
Line of trees
Native hedgerow - associated with bank or ditch
Cereal crops
Mixed scrub
Modified grassland
Other neutral grassland
Other woodland; broadleaved
Red Line Boundary
0 50 100 m
Title: Site Baseline Habitats
Project: Cambridgshire South East Transport
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Original Scale: 1:3,500
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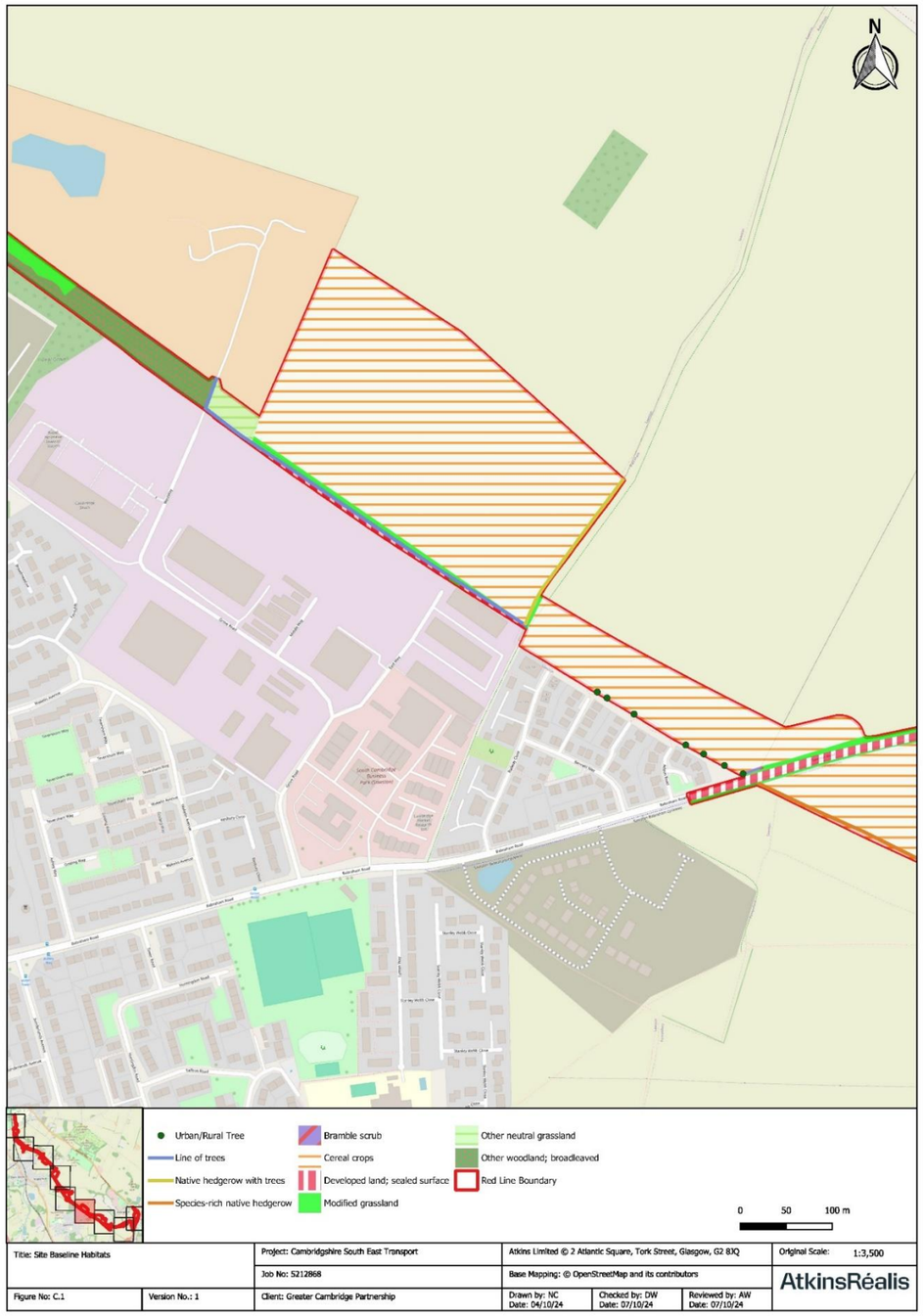
N
Urban/Rural Tree
Line of trees
Native hedgerow with trees
Species-rich native hedgerow
Bramble scrub
Cereal crops
Developed land; sealed surface
Modified grassland
Other neutral grassland
Other woodland; broadleaved
Red Line Boundary
0 50 100 m
Title: Site Baseline Habitats
Project: Cambridgshire South East Transport
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Original Scale: 1:3,500
Job No: 5212868
Base Mapping: © OpenStreetMap and its contributors
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Version No.: 1
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Drawn by: NC Date: 04/10/24
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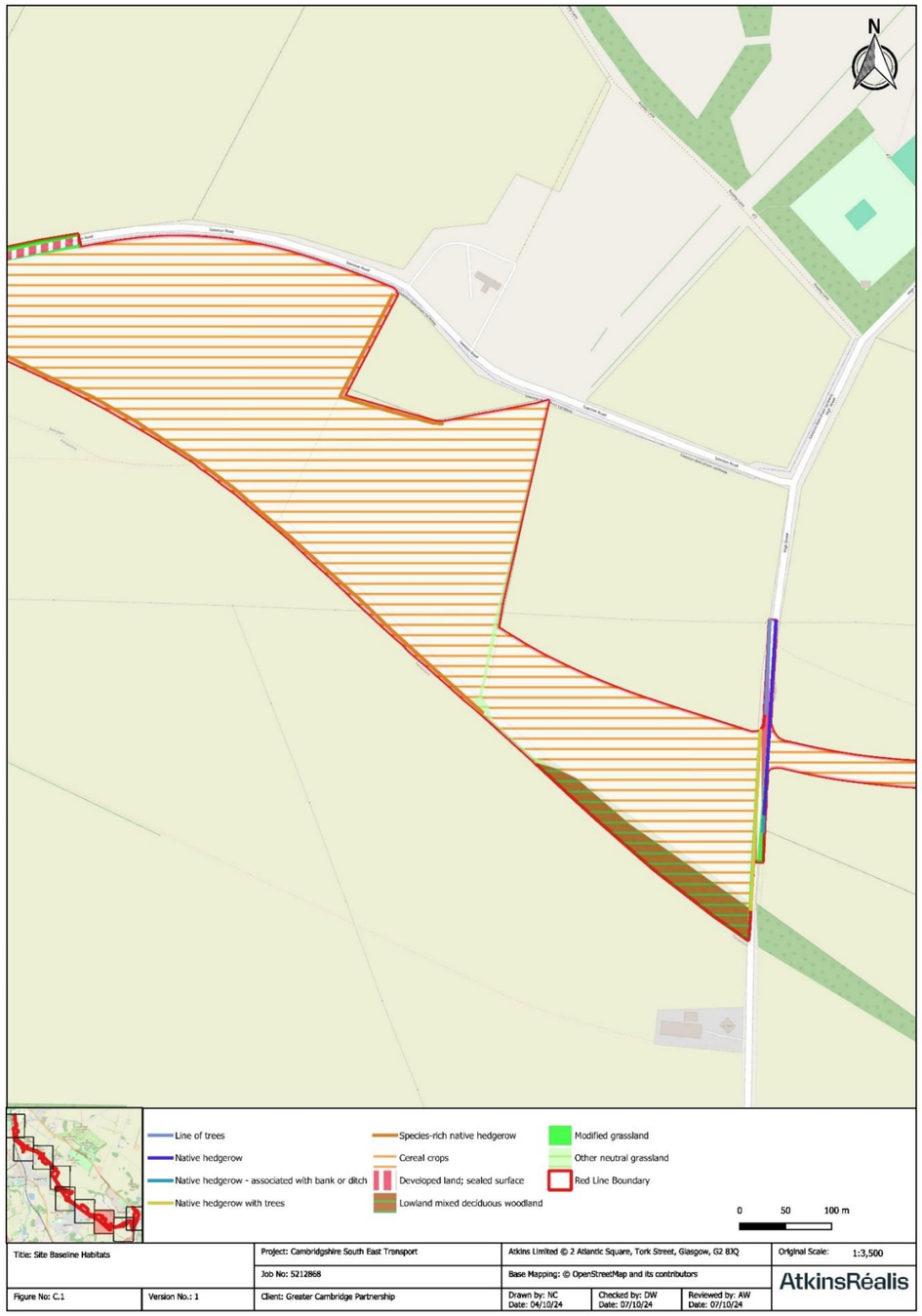
N
Line of trees
Native hedgerow
Native hedgerow - associated with bank or ditch
Native hedgerow with trees
Species-rich native hedgerow
Cereal crops
Developed land; sealed surface
Lowland mixed deciduous woodland
Modified grassland
Other neutral grassland
Red Line Boundary
0
50
100 m
Title: Site Baseline Habitats
Project: Cambridgshire South East Transport
Atkins Limited © 2 Atlantic Square, Tork Street, Glasgow, G2 8JQ
Original Scale: 1:3,500
Job No: 5212868
Base Mapping: © OpenStreetMap and its contributors
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Reviewed by: AW
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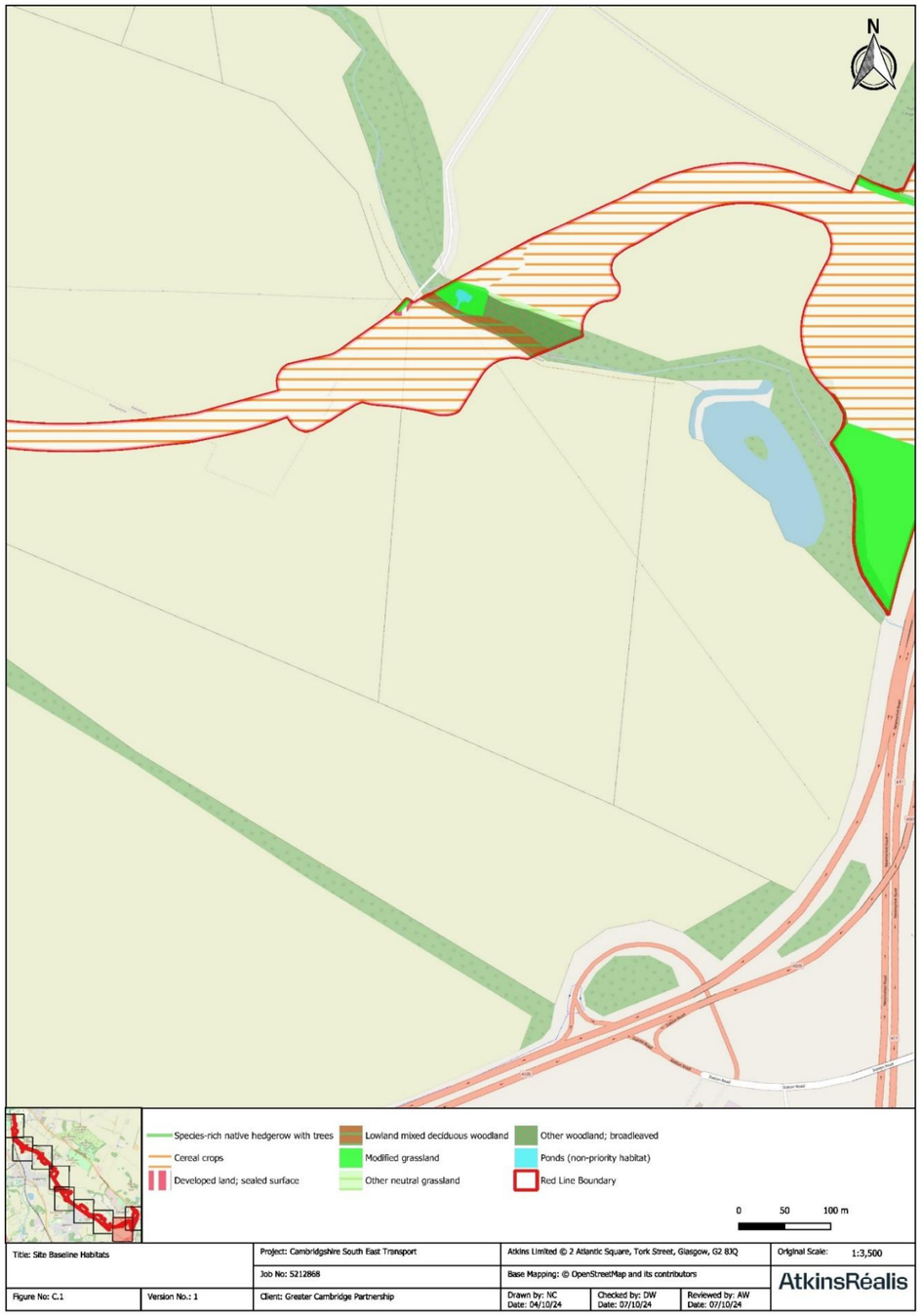
N
Species-rich native hedgerow with trees
Cereal crops
Developed land; sealed surface
Lowland mixed deciduous woodland
Modified grassland
Other neutral grassland
Other woodland; broadleaved
Ponds (non-priority habitat)
Red Line Boundary
0
50
100 m
Title: Site Baseline Habitats
Project: Cambridgshire South East Transport
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Original Scale: 1:3,500
Job No: 5212868
Base Mapping: © OpenStreetMap and its contributors
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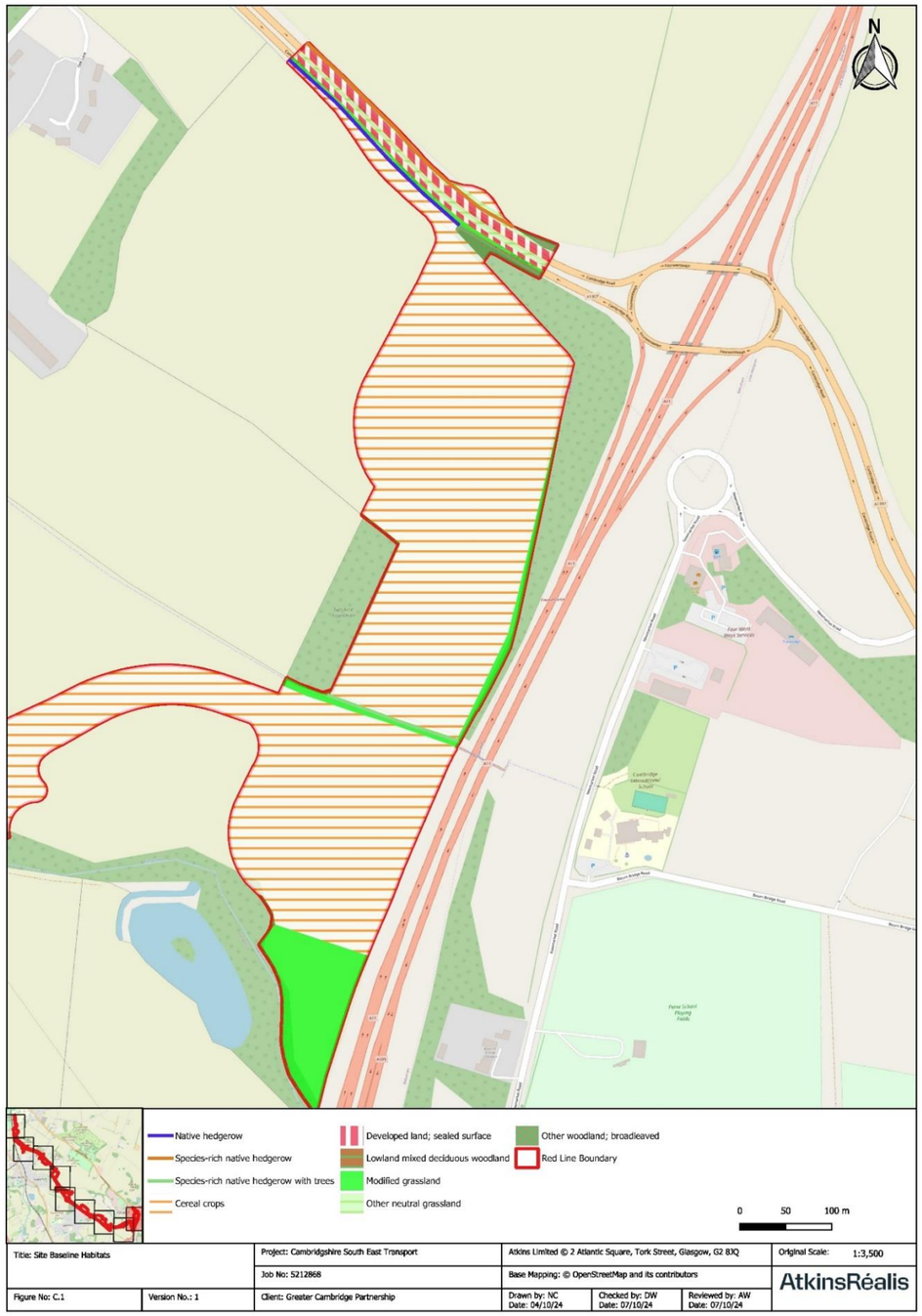
N
Native hedgerow
Species-rich native hedgerow
Species-rich native hedgerow with trees
Cereal crops
Developed land; sealed surface
Lowland mixed deciduous woodland
Modified grassland
Other neutral grassland
Other woodland; broadleaved
Red Line Boundary
0
50
100 m
Title: Site Baseline Habitats
Project: Cambridgshire South East Transport
Job No: 5212868
Client: Greater Cambridge Partnership
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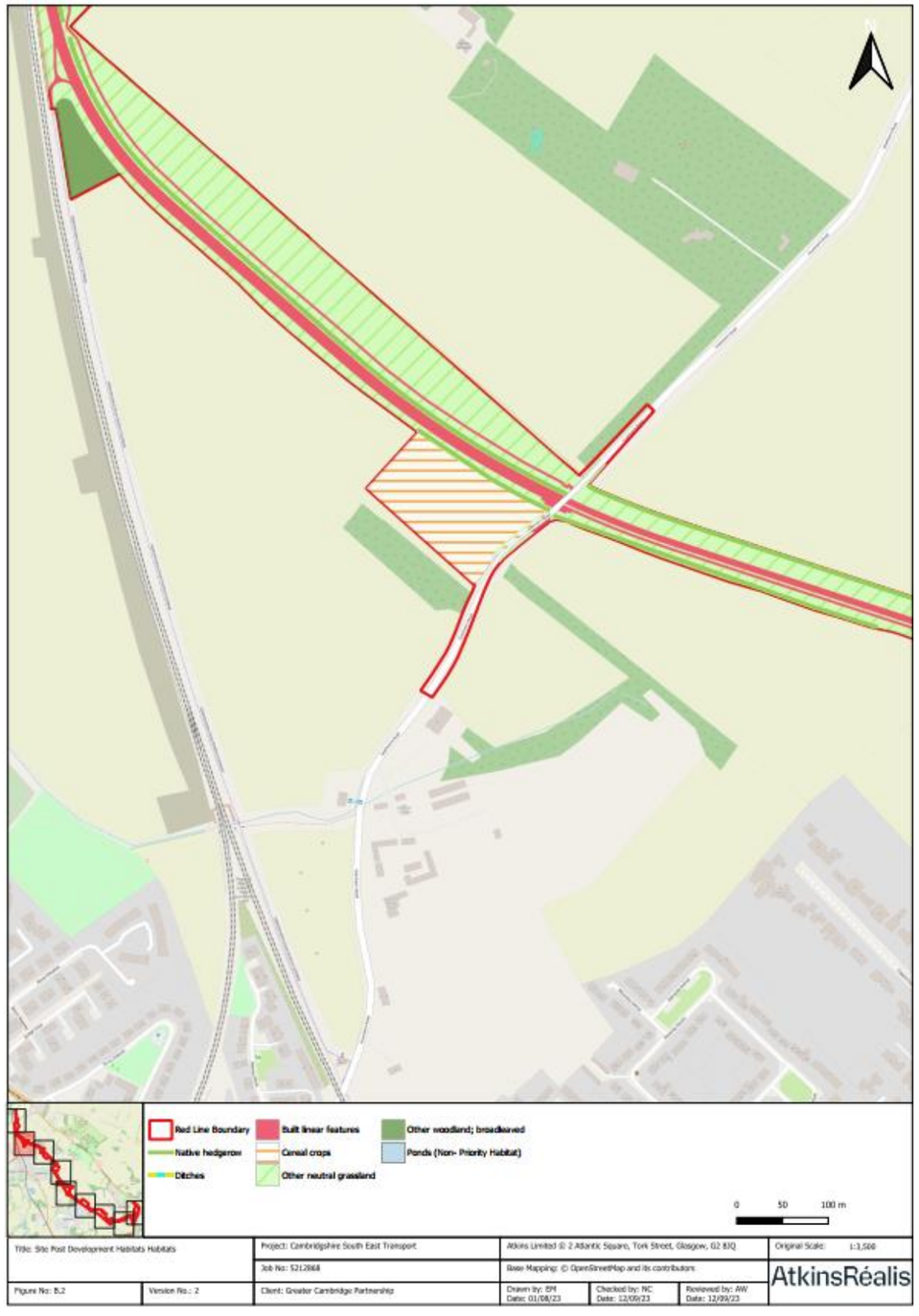
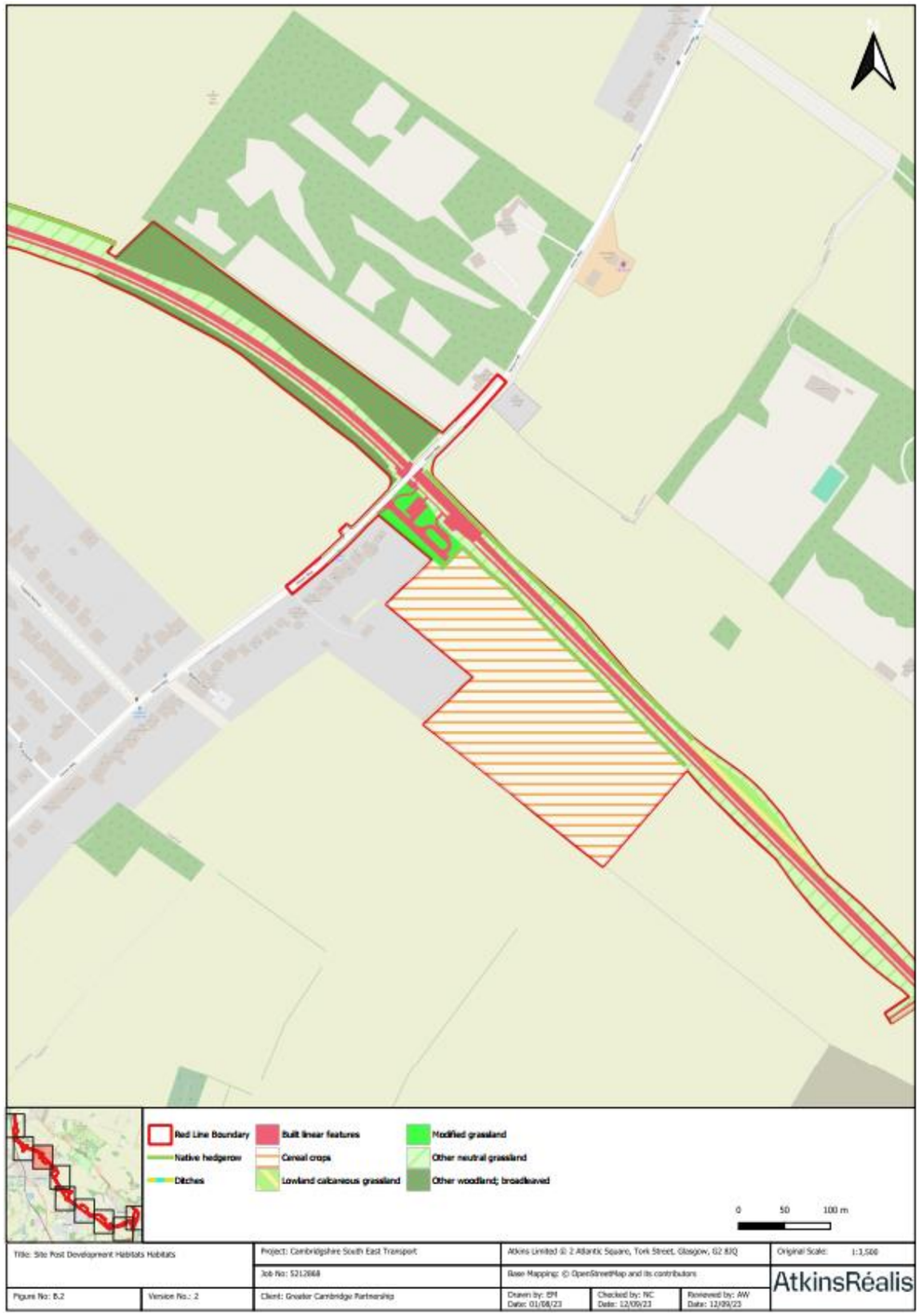
ANNEX B SITE HABITAT CREATION




Red Line Boundary
Native hedgerow
Ditches
Built linear features
Cereal crops
Lowland calcareous grassland
Modified grassland
Other neutral grassland
Other woodland; broadleaved
0
50
100 m
Title: Site Post Development Habitats Habitats
Project: Cambridgshire South East Transport
Job No: 5212868
Client: Greater Cambridge Partnership
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Date: 12/09/23
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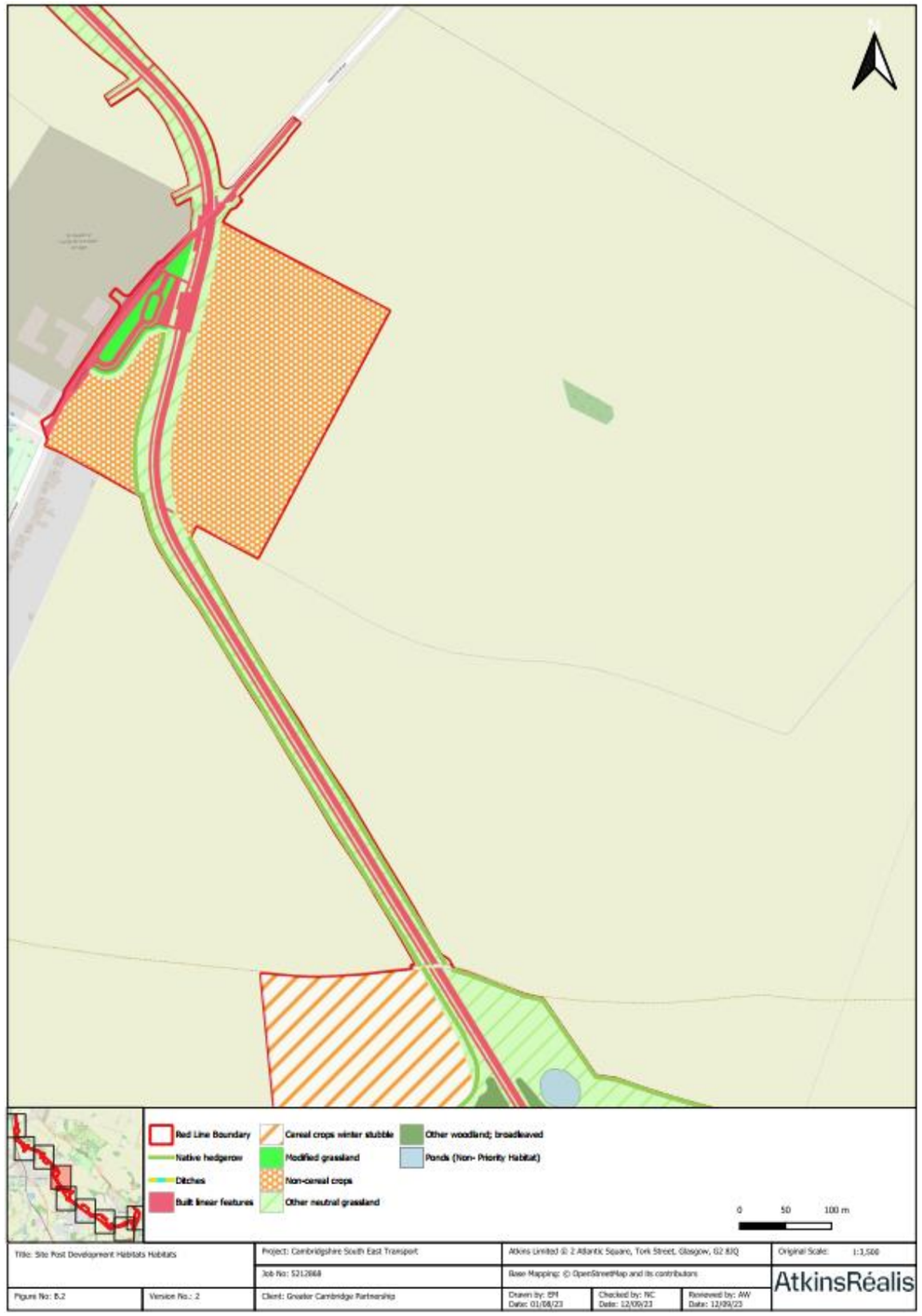
Red Line Boundary
Native hedgerow
Ditches
Built linear features
Cereal crops winter stubble
Modified grassland
Non-cereal crops
Other neutral grassland
Other woodland; broadleaved
Ponds (Non- Priority Habitat)
0
50
100 m
Title: Site Post Development Habitats Habitats
Project: Cambridgshire South East Transport
Job No: 5212868
Client: Greater Cambridge Partnership
Atkins Limited © 2 Atlantic Square, Tork Street, Glasgow, G2 8JQ
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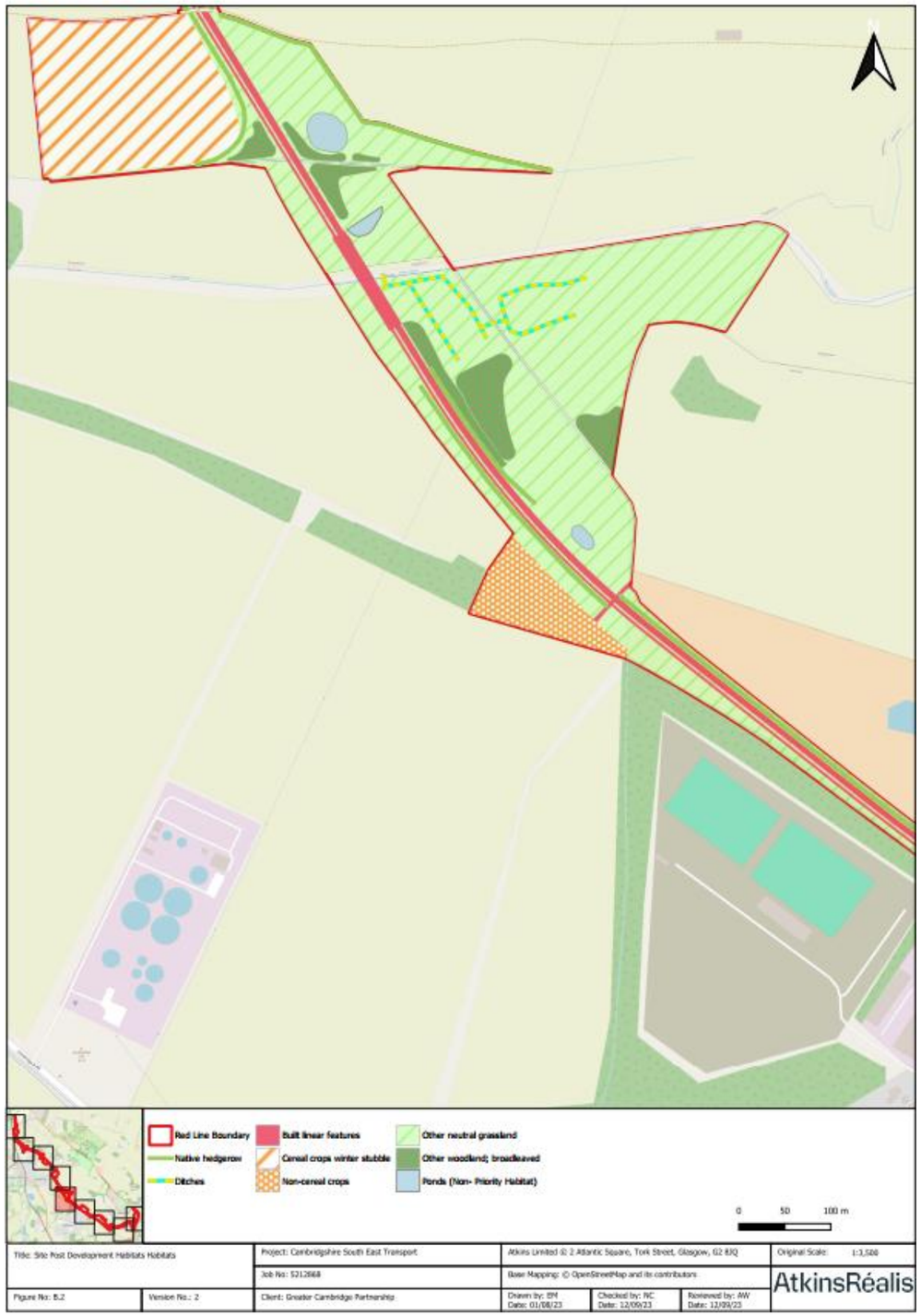
Red Line Boundary
Native hedgerow
Ditches
Built linear features
Cereal crops winter stubble
Non-cereal crops
Other neutral grassland
Other woodland; broadleaved
Ponds (Non- Priority Habitat)
0
50
100 m
Title: Site Post Development Habitats Habitats
Project: Cambridgshire South East Transport
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Original Scale: 1:1,500
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Version No.: 2
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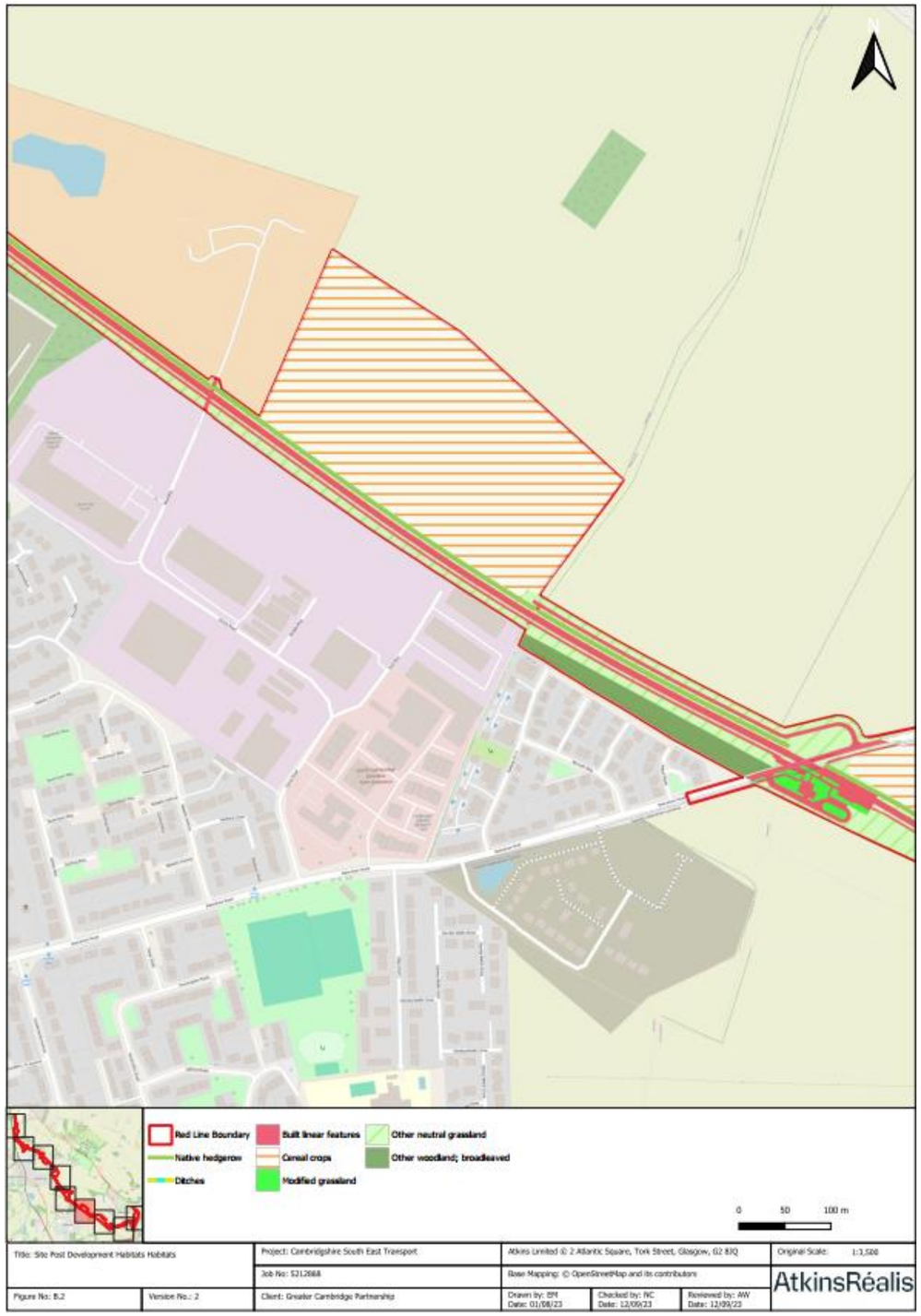
Red Line Boundary
Native hedgerow
Ditches
Built linear features
Cereal crops
Modified grassland
Other neutral grassland
Other woodland; broadleaved
0
50
100 m
Title: Site Post Development Habitats Habitats
Project: Cambridgshire South East Transport
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Original Scale: 1:1,500
Job No: 5212868
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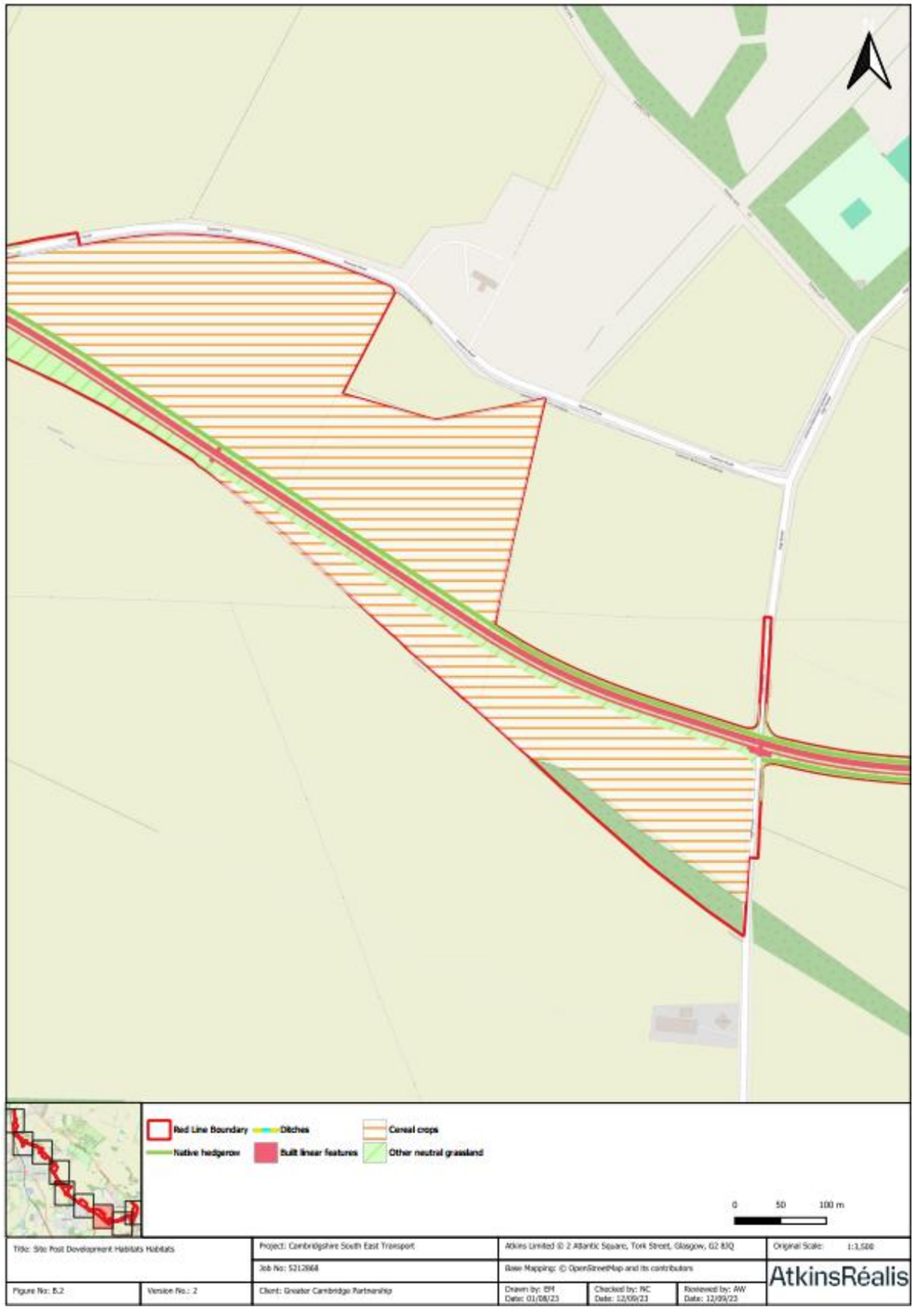
Red Line Boundary
Native hedgerow
Ditches
Built linear features
Cereal crops
Other neutral grassland
0
50
100 m
Title: Site Post Development Habitats Habitats
Project: Cambridgshire South East Transport
Job No: 5212868
Client: Greater Cambridge Partnership
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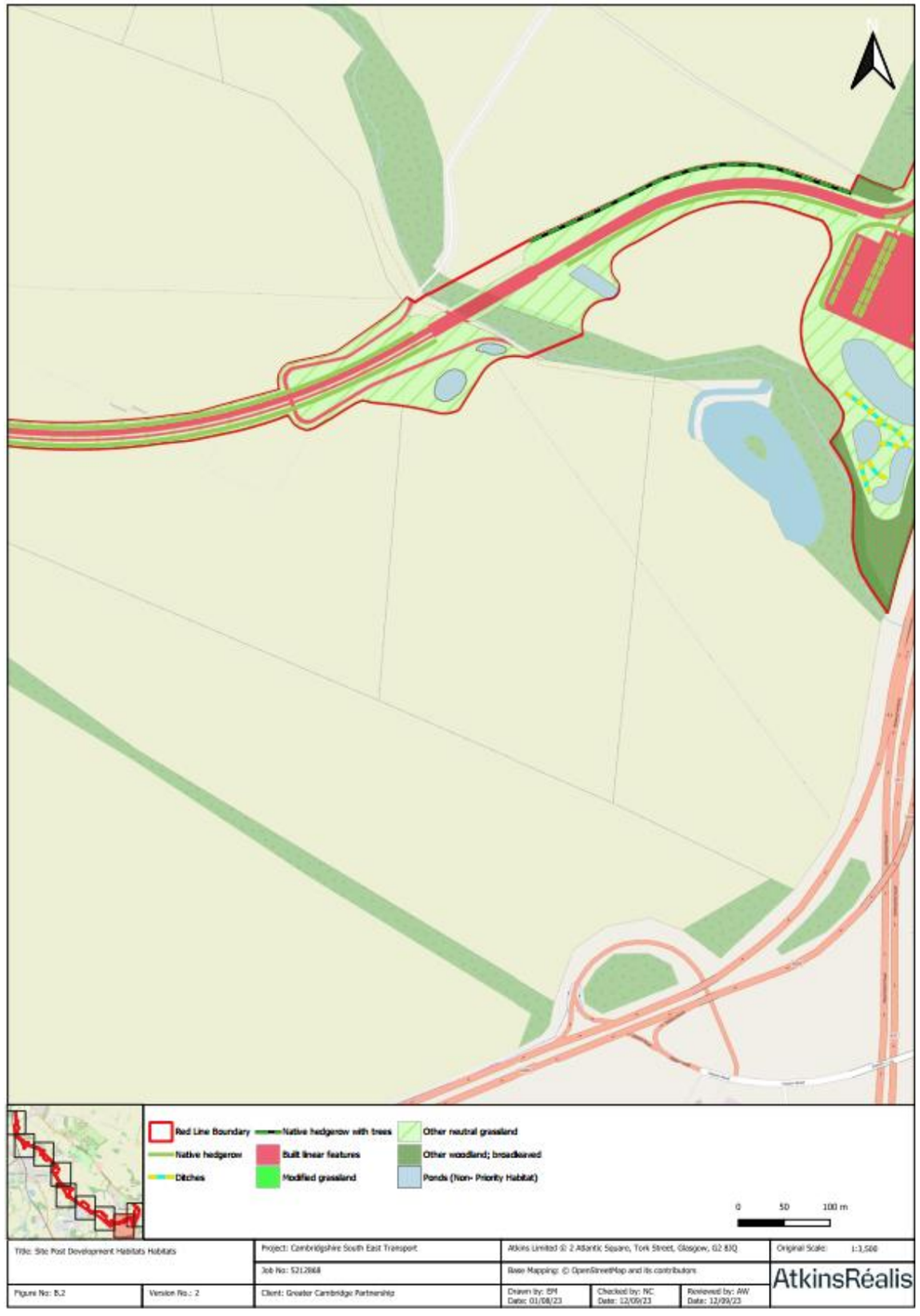
Red Line Boundary
Native hedgerow
Ditches
Native hedgerow with trees
Built linear features
Modified grassland
Other neutral grassland
Other woodland; broadleaved
Ponds (Non- Priority Habitat)
0
50
100 m
Title: Site Post Development Habitats Habitats
Project: Cambridgshire South East Transport
Job No: 5212868
Client: Greater Cambridge Partnership
Atkins Limited © 2 Atlantic Square, Tork Street, Glasgow, G2 8JQ
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Date: 12/09/23
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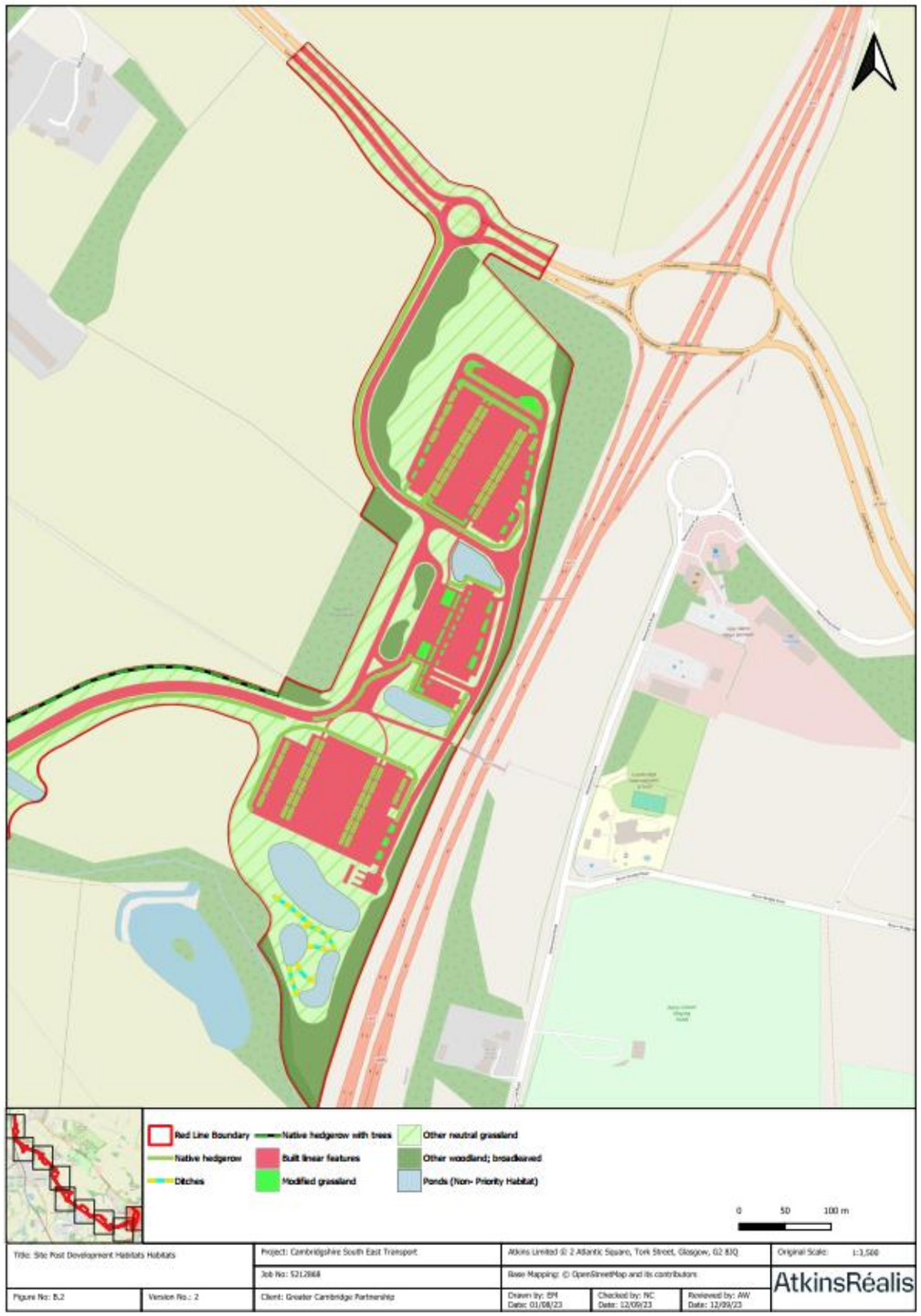
Red Line Boundary
Native hedgerow with trees
Native hedgerow
Ditches
Built linear features
Modified grassland
Other neutral grassland
Other woodland; broadleaved
Ponds (Non- Priority Habitat)
0
50
100 m
Title: Site Post Development Habitats Habitats
Project: Cambridgshire South East Transport
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Original Scale: 1:1,500
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ANNEX C SUB-REACH RIVER CONDITION INDICATOR SCORES FROM MORPH SURVEYS OF THE RIVER GRANTA

Reach name:			D1-S1	D1-S2	D1-S3	D2-S1	D2-S2
Bank top	Vegetation structure	B1	2	2	2	2	2
	Tree feature richness	B2	0	0	0	0	0
	Water related features	B3	0	0	0	0	0
	Invasive species	B4	-1	0	0	0	0
	Managed ground cover	B5	-3	-2	-2	-3	-2
Bank face	Riparian vegetation structure	C1	1	2	2	2	2
	Tree feature richness	C2	1	2	2	1	1
	Natural bank profile extent	C3	2	2	2	1	0
	Natural bank profile richness	C4	2	3	3	2	0
	Natural bank material richness	C5	3	1	1	1	1
	Bare sediment extent	C6	4	4	4	3	1
	Artificial bank profile extent	C7	-2	0	-2	-2	-2
	Reinforcement extent	C8	-2	0	-2	0	0
	Reinforcement material severity	C9	-1	0	-2	0	0
	Invasive species	C10	-1	-1	0	-2	-2
Water margin	Aquatic vegetation extent	D1	2	2	2	2	2
	Aquatic morphotype richness	D2	2	2	2	2	2
	Physical feature extent	D3	2	3	2	1	1
	Physical feature richness	D4	2	2	1	1	1

Reach name:			D1-S1	D1-S2	D1-S3	D2-S1	D2-S2
	Artificial features	D5	-2	0	-1	0	0
Channel	Aquatic morphotype richness	E1	1	0	2	3	3
	Tree feature richness	E2	2	2	2	1	1
	Hydraulic richness	E3	1	1	2	1	0
	Natural feature extent	E4	0	0	0	2	0
	Natural feature richness	E5	0	0	0	1	0
	Material richness	E6	3	3	0	3	1
	Bed siltation	E7	-2	0	0	0	0
	Reinforcement extent	E8	-1	0	0	0	0
	Reinforcement severity	E9	-2	0	0	0	0
	Artificial feature severity	E10	0	0	-4	0	0
	Invasives	E11	-1	0	0	-1	0
	Filamentous algae	E12	0	0	0	0	-1
Totals	River Shape		2.25	2.47	1.84	1.74	1.66
	Average width (m)		5.0	4.6	5.0	4.6	5.0
	Average positive index		1.58	1.63	1.53	1.53	0.95
	Average negative index		-1.38	-0.23	-1	-0.62	-0.54
	Condition Score		0.19	1.4	0.53	0.91	0.41
	River Type		H	H	H	H	H
	Final Condition Class		Fairly Poor	Moderate	Moderate	Moderate	Fairly Poor

ANNEX D RESULTS OF DESKTOP EXERCISE TO ESTIMATE WORST CASE IMPACTS OF THE PROPOSED DEVELOPMENT ON THE RIVER GRANTA

Sub-reach name:			BASELINE	SCENARIO	BASELINE	SCENARIO
			D2-S2	D2-S2 crossing	D1-S3	D1-S3 crossing
Bank top	Vegetation structure	B1	2	0	2	0
	Tree feature richness	B2	0	0	0	0
	Water related features	B3	0	0	0	0
	Invasive species	B4	0	0	0	0
	Managed ground cover	B5	-2	0	-2	0
Bank face	Riparian vegetation structure	C1	2	0	2	0
	Tree feature richness	C2	1	1	2	2
	Natural bank profile extent	C3	0	0	2	2
	Natural bank profile richness	C4	0	0	3	3
	Natural bank material richness	C5	1	1	1	1
	Bare sediment extent	C6	1	3	4	4
	Artificial bank profile extent	C7	-2	-2	-2	-2
	Reinforcement extent	C8	0	0	-2	-2
	Reinforcement material severity	C9	0	0	-2	-2
	Invasive species	C10	-2	-2	0	0
Water margin	Aquatic vegetation extent	D1	2	0	2	0
	Aquatic morphotype richness	D2	2	0	2	0

Sub-reach name:			BASELINE	SCENARIO	BASELINE	SCENARIO
			D2-S2	D2-S2 crossing	D1-S3	D1-S3 crossing
Bank face	Physical feature extent	D3	1	1	2	2
	Physical feature richness	D4	1	1	1	1
	Artificial features	D5	0	0	-1	-1
Channel	Aquatic morphotype richness	E1	3	0	2	0
	Tree feature richness	E2	1	1	2	2
	Hydraulic richness	E3	0	0	2	2
	Natural feature extent	E4	0	0	0	0
	Natural feature richness	E5	0	0	0	0
	Material richness	E6	1	1	0	0
	Bed siltation	E7	0	0	0	0
	Reinforcement extent	E8	0	0	0	0
	Reinforcement severity	E9	0	0	0	0
	Artificial feature severity	E10	0	0	-4	-4
	Invasives	E11	0	0	0	0
	Filamentous algae	E12	-1	0	0	0
Totals	Average positive index		0.95	0.47	1.53	1.00
	Average negative index		-0.54	-0.31	-1.00	-0.85
	Condition Score		0.41	0.17	0.53	0.15
	River Type		H	H	H	H

Sub-reach name:		BASELINE	SCENARIO	BASELINE	SCENARIO
		D2-S2	D2-S2 crossing	D1-S3	D1-S3 crossing
	Final Condition Class	Fairly Poor	Fairly Poor	Moderate	Fairly Poor

ANNEX E RESULTS OF DESKTOP EXERCISE TO ESTIMATE WORST CASE IMPACTS OF THE PROPOSED DEVELOPMENT ON THE HOBSON'S BROOK

Sub-reach name:			BASELINE	SCENARIO
			D4-S1	D4-S1
Bank top	Vegetation structure	B1	1	0
	Tree feature richness	B2	0	0
	Water related features	B3	0	0
	Invasive species	B4	0	0
	Managed ground cover	B5	-3	-3
Bank face	Riparian vegetation structure	C1	2	0
	Tree feature richness	C2	0	0
	Natural bank profile extent	C3	3	3
	Natural bank profile richness	C4	2	2
	Natural bank material richness	C5	1	1
	Bare sediment extent	C6	3	3
	Artificial bank profile extent	C7	0	0
	Reinforcement extent	C8	0	0
	Reinforcement material severity	C9	-2	-2
	Invasive species	C10	0	0
Water margin	Aquatic vegetation extent	D1	1	0
	Aquatic morphotype richness	D2	0	0
	Physical feature extent	D3	0	0
	Physical feature richness	D4	0	0
	Artificial features	D5	-1	-1
Channel	Aquatic morphotype richness	E1	2	0
	Tree feature richness	E2	0	0

Sub-reach name:			BASELINE	SCENARIO
			D4-S1	D4-S1
	Hydraulic richness	E3	1	1
	Natural feature extent	E4	0	0
	Natural feature richness	E5	0	0
	Material richness	E6	1	1
	Bed siltation	E7	-2	-2
	Reinforcement extent	E8	0	0
	Reinforcement severity	E9	0	0
	Artificial feature severity	E10	0	0
	Invasives	E11	0	0
	Filamentous algae	E12	-3	-3
Totals	Average positive index		0.895	0.684
	Average negative index		-0.846	-0.846
	Condition Score		0.048	-0.162
	River Type		K	K
	Final Condition Class		Fairly Poor	Poor