Biodiversity Net Gain Assessment

Motspur Park Gas Holders

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Contents

1 INTRODUCTION 3
1.1 Purpose and scope of this report 3
1.2 Biodiversity Net Gain and Methods 3
Condition Assessment 4

2 PRE-DEVELOPMENT HABITATS 5
2.1 Habitat Survey 5
2.2 Results: Pre-development habitats (on-site) 5
U1b: Developed land, sealed surface 5
U1b5: Developed land, sealed surface, buildings 5
W1g: Other Broadleaved Woodland 5
G3c: Other Neutral Grassland 6
H3d: Bramble scrub 7
U1f: Sparsely Vegetated Urban Land 7
Individual trees, urban 8
R2b: Other River and canals 9
Linear features 9

3 POST-DEVELOPMENT HABITATS 10
3.1 Post-development habitats 10
U1b: Developed land, sealed surface 10
U1, 847: Built up areas and gardens, introduced shrubs 10
G4: Modified grassland 10
G3c: Other, neutral grassland 11
W1g: Other, broadleaved woodland 12
H3h: Mixed scrub planting 12
Aquatic marginal planting 13
Individual tree planting: Urban 13
U1, 80 89: Built up areas and gardens, open mosaic habitat on previously developed land, other green roof. 14
H2a: Native hedgerow planting 15
R1b: Watercourse Retention and Enhancement 15

4 CONCLUSIONS / SUMMARY 16

REFERENCES 18

FIGURES 19

Figures

Figure 1: Pre-development UKHab Map 19
Figure 2: Post-development Landscaping Plans 20

Appendices

Appendix A – Pre-development habitat condition assessment
Appendix B – Post-development habitat condition assessment
Appendix C – River Condition Assessment

1 INTRODUCTION

1.1 Purpose and scope of this report

1.1.1 RPS Ecology were commissioned by Berkeley Homes (West London) Limited to undertake a Biodiversity Net Gain (BNG) Assessment of Motspur Park, Kingston, London, to ensure the scheme achieves +10% net gain, in line with the Environment Act 2021.

1.1.2 The site is primarily within the Royal Borough of Kingston, with the northern access situated in the London Borough of Merton. As such, the site is subject to both Kingston and Merton Local Plans. However, Kingston Local Plan 2024 is currently being drafted and currently has no weighting on planning applications.

1.1.3 Policy O15.3 Biodiversity and Access to Nature of the Merton Local Plan (2024) has specific information regarding Biodiversity Net Gain, which mirrors that of the Environment Act 2021, requiring applications to deliver a +10% net gain, and goes on to reference the DEFRA Metric and statutory guidance.

1.1.4 The proposals for the site involve the:

1.1.5 *"Proposed demolition of existing gasholders and associated above ground structures/buildings; relocation of gas governor and installation of new underground pipe network; minor reconfiguration of pressure inspection gauge; removal of redundant underground pipework; re-routing of existing gas infrastructure and ground works; delivery of five buildings up 18 storeys in height; delivery of up to 650 (class c3) residential units; delivery of car and cycle parking spaces; delivery of associated works to the existing accesses and internal vehicular routes, new pedestrian and cycle routes; delivery of new publicly accessible open space, amenity space, hard and soft landscaping; works to the Beverley brook embankment and subject to agreement with LBM, new pedestrian and cycle access into neighbouring sir joseph hood memorial playing fields off the northern access area"*

1.1.6 RPS undertook the Phase 1 Habitat Survey in 2023 for the Preliminary Ecological Appraisal (RPS, 2023). Due to the time elapsed between this initial walkover and the planning submission and following a move towards adopting the UKHab habitat classification system further botanical survey work was undertaken in the optimal survey season in 2025, which included a habitat condition assessment.

1.1.7 This report addresses the concept of Biodiversity Net Gain (BNG) and provides:

- Details of the UK Habitat Survey Map;
- Assessment of baseline ecological value; and
- Assessment of the post-development value.

1.2 Biodiversity Net Gain and Methods

1.2.1 Biodiversity Net Gain is defined in Baker *et al* (2019)[1] as:

1.2.2 "Development that leaves biodiversity in a better state than before"

1.2.3 The requirement for developments to seek to achieve BNG arises from the National Planning Policy Framework (NPPF), which states in Para. 193 (d) that:

Baker, J., Hoskins, R. & Butterworth, T. (2019). *Biodiversity Net Gain – good practice principles for development.* Ciria, London.

'When determining planning applications, local planning authorities should apply the following principles: …opportunities to improve biodiversity in and around developments should be integrated as part of their design, especially where this can secure measurable net gains for biodiversity…"

1.2.4 There is no single set method for quantifying the assessment of BNG, but one method is the use of biodiversity calculators to assess the biodiversity value of habitats pre- and post-development based on habitat type, distinctiveness and condition.

1.2.5 A biodiversity index is derived for the baseline and for the proposed development, and BNG is considered to be achieved where an increase in value is delivered (on or offsite), and where habitats of a higher value are not replaced exclusively with habitats of a lower value.

1.2.6 Defra made available its beta test update of its BNG assessment tool in July 2021 and updated to Statutory Version in December 2023. The Statutory Biodiversity Metric Tool July 2024 v1.0.3 (Natural England, 2024a) has been used for the assessment in this report.

Condition Assessment

1.2.7 During the updated UKHab Survey, a habitat condition assessment was undertaken for the habitats present within the project boundary. The appropriate 'condition sheet' was first selected via the Table TS1-1a in the technical supplement provided in The Statutory Biodiversity Metric -Technical Annex 1: Condition Assessment Sheets and Methodology, July 2024 (v1.0.2) (Natural England, 2024b).

1.2.8 The condition sheet was then used to assess the individual habitats by comparing how they scored against pre-set condition assessment criteria. The criteria describe what components are needed for the habitat to be of good, moderate or poor value.

1.2.9 Each habitat was scored the following:

- 1 – Poor;
- 2 – Moderate; and
- 3 – Good.

1.2.10 The calculator allows these to be further divided and provides categories for fairly good and poor. The ecologist undertaking the assessment used their professional judgement, considering the habitat condition assessment criteria, to decide when it was suitable to use these categories.

1.2.11 It should be noted that some habitats with low or no ecological value are given a fixed score and do not need assessing.

2 Pre-Development Habitats

2.1 Habitat Survey

2.1.1 A Phase 1 Habitat Survey of the site was undertaken as part of the Preliminary Ecological Appraisal in 2023 (RPS, 2023). Following on from this an updated UKHab and Habitat Condition Assessment survey was undertaken in the optimal botanical survey season in 2025. The survey was conducted by a suitably qualified RPS Ecologist, experienced in carrying botanical survey work.

2.1.2 The habitats are described below, with specific reference to guidance on habitat conditions, and are mapped in Figure 1.

2.1.3 The site is situated within an urban context, which presents certain challenges when applying the UKHab classification system, as many habitats present are influenced by urban land use and disturbance. In classifying the site's habitats, we have aimed to fit the UKHab categories as accurately as possible to the conditions observed on the ground. The best fit for the majority of the vegetated areas is neutral grassland, although it is recognised that the sward composition and structure may not fully align with typical examples of this habitat type. This classification has been adopted as a precautionary measure. However, this approach is considered preferable to under-estimating value, as it ensures that the assessment remains robust, and that appropriate mitigation and enhancement measures are considered.

2.1.4 Full habitat condition assessments can be found in Appendix A.

2.2 Results: Pre-development habitats (on-site)

U1b: Developed land, sealed surface

2.2.1 The gas holders were connected by areas of concrete and gravel hardstanding, and the access routes both north and south of the site were mainly hardstanding with vegetated strips along the edges.

2.2.2 Following Natural England guidance this habitat type does not require a condition assessment, being of 'no value' by default.

U1b5: Developed land, sealed surface, buildings

2.2.1 The main built feature of the site is the three gas holders, which are no longer in use. The southernmost gas holder is the smallest and the central is the largest. There were also several other structures related to the gas works, including a live compound to the southeast of the site, which was not accessed during this walkover survey. Additionally, outbuildings associated with these areas were present, and a temporary storage unit to the north of the site.

2.2.3 Following Natural England guidance this habitat type does not require a condition assessment, being of 'no value' by default.

W1g: Other Broadleaved Woodland

2.2.1 An area of broadleaved woodland was present in the southwest corner of the main part of the site, located directly south of the gas holders. This area of woodland was also designated as a Site of Importance for Nature Conservation (SINC).

2.2.2 There was little indication of grazing impact, the trees were in good health and there was an abundance of dead wood. There was very limited human and canine disturbance, likely due to the area being surrounded by private allotments, and the inaccessibility of the gas holder's site. Although there was a good composition of native tree and shrub species (see Appendix A), there was a lack of variation in the age classes of the trees (particularly no veteran trees), and a lack of woodland regeneration. There was evidence of significant nutrient enrichment and an unusual composition of woody species.

2.2.3 Fourty-five native species and seven non-native species were recorded in the woodland parcel. Although no full NVC assessment was undertaken, Oak *Quercus robur*, ash *Fraxinus excelsior*, and goat willow *Salix caprea*, were the most frequently occurring trees at the canopy layer, with fruit trees such as cherry *Prunus avium*, *Prumus domesitca* and cherry-plum *Prunus ceraseifera*. Bramble *Rubus fruticosus* was the most frequently occurring at the shrub layer. Therefore, the nearest NVC type is most likely to be W10 *Quercus robur-Pteridium aquilinum-Rubus fruticosus woodland*. There was no bracken *Pteridium aquilinum* noted, but this doesn't exclude W10 as a possible type.

2.2.4 Infrequent hybrid bluebell *Hyancinthoides x massartiana* and Japanese honeysuckle *Lonicera japonica* were also present within the ground flora, and a single spike of twayblade orchid *Neottia ovata* was recorded here.

2.2.5 Following Natural England guidance for assessing the condition of woodland habitat this would be categorised as 'moderate' thereby contributing 3.56 units to the baseline score. The full condition assessment can be found in Appendix A.

G3c: Other Neutral Grassland

2.2.6 Throughout the site there were various parcels of other neutral grassland. 70 native species were recorded and eight non-native species (see Appendix A for full species list). Species present here occurring as either as dominant, abundant or frequent included creeping bent *Agrostis stolonifera*, false oat grass *Arrhenatherum elatior*, grey sedge *Carex divulsa*, creeping thistle *Cirsium arvense*, cocks-foot grass *Dactylis glomerata*, field horsetail *Equisetum arvense*, goosegrass *Galium aparine*, hogweed *Heracleum sphondylium*, Yorkshire fog *Holcus lanatus*, meadow vetchling *Lathyrus pratensis*, common meadow grass *Poa pratensis*, rough meadow grass *Poa trivialis*, red clover *Trifolium pratensis* and tufted vetch *Vicia cracca*. Although no full NVC assessment was undertaken the abundance of false oat grass *Arrhenatherum elatior* suggests that the grasslands are mesotrophic and of type MG1.

2.2.4 Following Natural England guidance, the condition for this habitat is assessed under the high, medium and very high distinctiveness grassland habitat type. The grassland present on site pe-development is of *'moderate'* condition, as per Table 2.1, below. The habitat contributes 8.44 habitat units to the overall baseline value.

Table 2.1 – Individual tree condition assessment

	Habitat Condition Criteria	Criteria Met (Y/N)
A	The grassland is a good representation of the habitat type it has been identified as, based on its UKHab description - the appearance and composition of the vegetation closely matches the characteristics of the specific grassland habitat type. Indicator species listed by UKHab for the specific grassland habitat type are consistently present. Note - this criterion is essential for achieving Moderate or Good condition for non-acid grassland types only.	Yes

B	Sward height is varied (at least 20% of the sward is less than 7 cm and at least 20% is more than 7 cm) creating microclimates which provide opportunities for insects, birds and small mammals to live and breed.		No
C	Cover of bare ground is between 1% and 5%, including localised areas, for example, rabbit warrens1.		Yes
D	Cover of bracken Pteridium aquilinum is less than 20% and cover of scrub (including bramble Rubus fruticosus agg.) is less than 5%.		No
E	Combined cover of species indicative of sub-optimal condition and physical damage (such as excessive poaching, damage from machinery use or storage, damaging levels of access, or any other damaging management activities) accounts for less than 5% of total area. If any invasive non-native plant species (as listed on Schedule 9 of WCA4) are present, this criterion is automatically failed.		Yes
	Passes 5 criteria	Good	
	Passes 3 or 4 criteria	**Moderate**	**X**
	Passes 2 or fewer criteria	Poor	

H3d: Bramble scrub

2.2.1 The scrub areas on site were mostly levelled to the ground but species composition was still clear, being dominated by bramble *Rubus fruticosus,* rose *Rosa sp.,* with some Buddleja *Buddleia davidii* present, particularly closer to the railway line.

2.2.2 Following Natural England guidance this habitat type does not require a condition assessment, being of a low value by default.

U1f: Sparsely Vegetated Urban Land

2.2.3 The site was largely a mosaic of bare ground and grassland areas. These bare ground areas are best categorised as the UKHab type sparsely vegetated land. These areas were comprised of almost entirely concrete with ephemeral vegetation in any gaps, and mostly associated with the two access routes, parking areas, and surrounding the gas holders.

2.2.4 Species present here included grass species false oat grass *Arrhenatherum elatior* and sterile brome *Anisantha sterilis*. Many of the forb species present here were also present in the grassland as described above.

2.2.5 Native forb species present here included hawksbeard *Crepis spp.*, cranesbill *Geranium dissectum*, prickly ox-tongue *Helminthotheca echoides*, ribwort *Plantago lanceolata*, dock *Rumex crispus*, dandelion *Taraxacum agg.*..

2.2.6 The northern access route was mostly bare ground, where some perennial species had begun to colonise at the edges. This was largely covered by moss species and nettles *Urtica dioica*. Large leaved avens *Geum macrophyllum*, herb Robert *Geranium robertianum*, cranesbill *Geranium sp.* and cow parsley were frequent with ground ivy *Glechoma hederacea* and dock occurring occasionally.

2.2.7 One species of interest Jersey cudweed *Pseudognaphalium luteoalbum* was identified to the south of the site. The vegetation across the bare ground areas was too inconsistent to consider an NVC determination.

2.2.5 An earth bank was in the north of the site behind the disused outbuildings. Species composition on top of the bank was continuous with the rest of the site being grassland with patches of scrub. Additionally, the area of woodland on site was based on a large earth bank.

2.2.6 This habitat type is best described as ruderal/ephemeral in the BNG metric. Using the urban habitat type condition assessment sheet these areas all scored as 'poor' providing a total of 0.20 habitat units (Table 2.2, below).

Table 2.2 – Sparsely vegetated urban land condition assessment

	Habitat Condition Criteria		Criteria Met (Y/N)
A	Vegetation structure is varied, providing opportunities for vertebrates and invertebrates to live, eat and breed. A single structural habitat component or vegetation type does not account for more than 80% of the total habitat area.		No
B	The habitat parcel contains different plant species that are beneficial for wildlife, for example flowering species providing nectar sources for a range of invertebrates at different times of year.		No
C	Invasive non-native plant species (listed on Schedule 9 of WCA1) and others which are to the detriment of native wildlife (using professional judgement)2 cover less than 5% of the total vegetated area3. Note - to achieve good condition, this criterion must be satisfied by a complete absence of invasive non-native species (rather than <5% cover).		No
	Passes 5 criteria	Good	
	Passes 3 or 4 criteria	Moderate	
	Passes 2 or fewer criteria	**Poor**	**X**

Individual trees, urban

2.2.7 Aside from the trees indicating the edge of the woodland, only 11 semi-mature broadleaved scattered trees were present on site, and these had been subject to some pruning as part of ongoing site management. Species present included sycamores *Acer sp.* and oak *Quercus sp*. trees.

2.2.8 These were all considered to be in poor condition, based on meeting the following criteria (Table 2.3). The individual trees contribute 0.18 habitat units to the baseline score.

Table 2.3 – Individual tree condition assessment

	Condition Assessment Criteria	Criterion passed (Yes or No) – All trees
A	The tree is a native species (or at least 70% within the block are native species).	Yes
B	The tree canopy is predominantly continuous, with gaps in canopy cover making up <10% of total area and no individual gap being >5 m wide (individual trees automatically pass this criterion).	Yes
C	The tree is mature (or more than 50% within the block are mature).	No

D	There is little or no evidence of an adverse impact on tree health by human activities (such as vandalism, herbicide or detrimental agricultural activity). And there is no current regular pruning regime, so the trees retain >75% of expected canopy for their age range and height.	No
E	Natural ecological niches for vertebrates and invertebrates are present, such as presence of deadwood, cavities, ivy or loose bark.	No
F	More than 20% of the tree canopy area is oversailing vegetation beneath.	No
Passes 5 or 6 criteria	Good (3)	
Passes 3 or 4 criteria	Moderate (2)	
Passes 2 or fewer criteria	**Poor (1)**	**X**

R2b: Other River and canals

2.2.1 The eastern boundary to the site is marked by the Beverley Brook, with the direction of flow of water running north. The site side of the river largely compromised either scrub or concrete where it had been canalised further south. The water was relatively clear with some signs of littering and minimal aquatic vegetation.

2.2.2 The River Condition Assessment is provided in full in Appendix C.

Linear features

2.2.3 No hedgerows were present on site, pre-development.

3 Post-Development Habitats

3.1 Post-development habitats

3.1.1 This section of the report looks at the habitats which are to be created during the construction phase of the development and provides reasoning as to their target habitat classification and condition category, as was completed for the pre-development habitats.

3.1.2 Some habitats of higher value, such as the woodland on site, are to be retained in full and protected throughout the construction and operational phases of the development, along with proposed enhancements.

3.1.3 The below habitats are in accordance with the Landscape Planting Plan (Fabrik, 2025), with the area measurements taken from the Landscape Plan, and species compositions from the associated schedules.

U1b: Developed land, sealed surface

3.1.4 Ares of developed land, sealed surfaces are to be created around the scheme, including the substation, the BESS units and associated area, and the widening of the existing access track. In total, these areas account for 0.8322 ha within the post-development plans.

3.1.5 Developed land is of an inherently low ecological value, and therefore, is not considered to be suitable for a condition assessment, it is assigned a condition value within the metric.

U1, 847: Built up areas and gardens, introduced shrubs

3.1.2 Areas of introduced shrubs will be included around the scheme, largely associated with the developed areas of the site, surrounding the residential blocks of flats.

3.1.3 By default, areas of introduced shrubs are of an inherently low biodiversity value and so are not considered suitable for a condition assessment and assigned a value of N/A within the metric.

G4: Modified grassland

Species poor modified grassland (amenity)

3.1.1 There will be small areas of mown amenity (modified) grassland present within the site, post-development, which are largely associated with strips along internal roads, car parking bays and areas adjacent to the residential areas.

3.1.2 In line with the UKHab classifications, these would most likely fall under the habitat classification modified grassland; with the species present likely to be fast-growing grass species, with herb species such as white clover.

3.1.3 It's assumed target condition, in line with the NE guidance, would best fit in the poor condition category, as it would fail the essential criterion for moderate (having more than 6-8 species per m^2).

Species-rich modified grassland

3.1.4 Areas of species-rich grassland will be created toward the north-eastern corner of the scheme; this will be seeded with a mixture tolerable of regular mowing (to maintain a shorter sward height) but will have a higher species diversity than the standard modified

mix. The condition, when assessing against the condition criteria, would most likely fit into the moderate condition category, as it meets the following:

- There is an absence of non-native, invasive species;
- Scrub (bramble) cover is less than 20%;
- Cover of bracken is less than 20%; and
- Cover of bare ground is between 1% and 5%.

G3c: Other, neutral grassland

Wildflower meadow mix

3.1.5 Toward the north-east of the scheme, and alongside the eastern boundary / brook, a strip of meadow grassland (wildflower) will be planted, to provide a natural buffer to the river, as well as other areas buffering the SINC, which will simultaneously enhance the stretch as a green corridor within the wider landscape. These areas will be planted with an Emorsgate Wildflower Meadow Mixture (including grasses and herbs), and will be managed as per a meadow, with a longer sward height.

3.1.6 In line with the Natural England guidance, this would be classified as other, neutral grassland, with a target condition of moderate, meeting the criteria as set out in Table 3.1, below.

Table 3.1 – Neutral grassland (moderate): Target habitat condition

	Habitat Condition Criteria		Criteria Met (Y/N)
A	The grassland is a good representation of the habitat type it has been identified as, based on its UKHab description - the appearance and composition of the vegetation closely matches the characteristics of the specific grassland habitat type. Indicator species listed by UKHab for the specific grassland habitat type are consistently present. Note - this criterion is essential for achieving Moderate or Good condition for non-acid grassland types only.		Yes
B	Sward height is varied (at least 20% of the sward is less than 7 cm and at least 20% is more than 7 cm) creating microclimates which provide opportunities for insects, birds and small mammals to live and breed.		Yes
C	Cover of bare ground is between 1% and 5%, including localised areas, for example, rabbit warrens1.		Yes
D	Cover of bracken Pteridium aquilinum is less than 20% and cover of scrub (including bramble Rubus *fruticosus agg.)* is less than 5%.		No
E	Combined cover of species indicative of sub-optimal condition and physical damage (such as excessive poaching, damage from machinery use or storage, damaging levels of access, or any other damaging management activities) accounts for less than 5% of total area. If any invasive non-native plant species (as listed on Schedule 9 of WCA4) are present, this criterion is automatically failed.		Yes
	Passes 5 criteria	Good	
	Passes 3 or 4 criteria	**Moderate**	**X**
	Passes 2 or fewer criteria	Poor	

Ornamental meadow mix

3.1.7 Toward the north-east of the scheme, areas of ornamental meadow grassland will be planted. Species here will be more ornamental than that described above and are intended to provide structure and planting throughout the year, as opposed to just during the summer months.

3.1.8 In line with the Natural England guidance, this would be classified as other, neutral grassland, with a target condition of poor, meeting the criteria as set out in Table 3.2, below.

Table 3.2 – Neutral grassland (poor): Target habitat condition

	Habitat Condition Criteria		Criteria Met (Y/N)
A	The grassland is a good representation of the habitat type it has been identified as, based on its UKHab description - the appearance and composition of the vegetation closely matches the characteristics of the specific grassland habitat type. Indicator species listed by UKHab for the specific grassland habitat type are consistently present. Note - this criterion is essential for achieving Moderate or Good condition for non-acid grassland types only.		No
B	Sward height is varied (at least 20% of the sward is less than 7 cm and at least 20% is more than 7 cm) creating microclimates which provide opportunities for insects, birds and small mammals to live and breed.		No
C	Cover of bare ground is between 1% and 5%, including localised areas, for example, rabbit warrens1.		Yes
D	Cover of bracken Pteridium aquilinum is less than 20% and cover of scrub (including bramble Rubus *fruticosus agg.)* is less than 5%.		No
E	Combined cover of species indicative of sub-optimal condition and physical damage (such as excessive poaching, damage from machinery use or storage, damaging levels of access, or any other damaging management activities) accounts for less than 5% of total area. If any invasive non-native plant species (as listed on Schedule 9 of WCA4) are present, this criterion is automatically failed.		Yes
	Passes 5 criteria	Good	
	Passes 3 or 4 criteria	Moderate	
	Passes 2 or fewer criteria	**Poor**	**X**

W1g: Other, broadleaved woodland

3.1.9 A native woodland buffer is to be included at the south of the scheme, providing a further natural buffer between the built development areas and the retained Site of Importance for Nature Conservation. This will be planted with species of a similar composition to the existing woodland, for continuity, and this habitat will be targeted a condition of moderate, in line with that condition of the existing woodland, the specific criterion targeted are provided in Appendix B.

H3h: Mixed scrub planting

3.1.10 The mixed native scrub, which will feature glades of meadow, will provide a natural transition from the retained SINC, to the developed areas. Species to be planted will provide flowers and fruit/berries/seeds (including hazel, holly, dogwood and field maple), but also groundcover planting and individual standard trees. The scrub and groundcover

planting will provide further diversity of habitat and will provide nesting opportunities for birds and foraging opportunities for a range of species, including amphibians.

3.1.11 Based on the Natural England guidance for scrub conditions, this scrub would sit within the 'moderate' condition category, scoring 3 points out of a possible 5 on the condition checklist (see Appendix B).

Table 3.3 – Mixed scrub: Target habitat condition

Habitat Condition Criteria	Criteria Met (Y/N)
Good representation of the UK Habitat type it has been identified as, and at least 80% of the scrub is native.	Y
Seedlings, saplings, young shrubs and mature shrubs are all present	N (all same age class)
Absence of non-native, invasive species	Y
The scrub has a well-developed edge, with scattered scrub and tall grassland and / or forbs present between the scrub and adjacent habitat	Y
There are clearings, glades and / or rides present within the scrub, providing sheltered edges	N
Poor = passes 2 or fewer criteria	
Moderate = Passes 3 or 4 criteria	**X**
Good = Passes 5 criteria	

Aquatic marginal planting

3.1.4 Marginal planting will be included alongside Beverley Brook, a mixture of rushes, sedges and iris species, which will strengthen the Brook as a green and blue corridor in the context of the wider landscape.

3.1.5 In line with the Natural England guidance on habitat conditions, these areas have been targeted a moderate condition, as they will provide structural diversity, are appropriate and native species, and invasive are to be absent.

Individual tree planting: Urban

3.1.1 A series of 213Nr. trees are to be planted as part of the scheme proposals; these are to be as per Table 3.4, below.

3.1.2 All of these will be planted as small trees (stem diameter breast height >7.5 cm), and their condition largely is determined by whether they are native and / or their location within the scheme (i.e., those which are within hardstanding areas have been targeted a poor condition), and others, which are native and in softer landscaped areas, a target condition of moderate (see Table 3.5).

3.1.3 The condition must be met within 27 years in accordance with The Statutory Biodiversity Metric Calculation Tool.

Table 3.4 – Trees to be planted and their targeted condition

Type of tree	Size	Number to be planted	Condition
Woodland trees, native	Small	66	Poor
Street trees	Small	16	Poor
Riparian trees	Small	65	Moderate
Ornamental trees	Small	56	Poor

Feature trees	Small	10	Poor

Table 3.5 Future urban tree habitat condition assessment

Condition Assessment Criteria		Criterion passed (Yes or No) – Poor	Criterion passed (Yes or No) – Moderate
A	The tree is a native species (or at least 70% within the block are native species).	**No**	**Yes**
B	The tree canopy is predominantly continuous, with gaps in canopy cover making up <10% of total area and no individual gap being >5 m wide (individual trees automatically pass this criterion).	**Yes**	**Yes**
C	The tree is mature (or more than 50% within the block are mature).	**Yes**	**Yes**
D	There is little or no evidence of an adverse impact on tree health by human activities (such as vandalism, herbicide or detrimental agricultural activity). And there is no current regular pruning regime, so the trees retain >75% of expected canopy for their age range and height.	**No**	**No**
E	Natural ecological niches for vertebrates and invertebrates are present, such as presence of deadwood, cavities, ivy or loose bark.	**No**	**No**
F	More than 20% of the tree canopy area is oversailing vegetation beneath.	**Yes**	**Yes**
Passes 5 or 6 criteria	Good (3)		
Passes 3 or 4 criteria	**Moderate (2)**		**X**
Passes 2 or fewer criteria	**Poor (1)**	**X**	

U1, 80 89: Built up areas and gardens, open mosaic habitat on previously developed land, other green roof.

3.1.6 Open Mosaic Habitat (OMH) will be created on the proposed brown roofs. OMH is recognised for its greater structural and botanical diversity, supporting a wider range of plant and invertebrate species compared to typical urban grassland. By incorporating a varied substrate and a carefully selected seed mix, including locally important species such as Jersey cudweed, the new OMH areas will provide enhanced ecological function and resilience. Table 3.6 outlines the criteria which this habitat will aim to achieve as part of the proposals, with a target condition of good.

Table 3.5 Future urban tree habitat condit10ion assessment

	Habitat Condition Criteria		Criteria Met (Y/N)
A	Vegetation structure is varied, providing opportunities for vertebrates and invertebrates to live, eat and breed. A single structural habitat component or vegetation type does not account for more than 80% of the total habitat area.		Yes
B	The habitat parcel contains different plant species that are beneficial for wildlife, for example flowering species providing nectar sources for a range of invertebrates at different times of year.		Yes
C	Invasive non-native plant species (listed on Schedule 9 of WCA1) and others which are to the detriment of native wildlife (using professional judgement)2 cover less than 5% of the total vegetated area3. Note - to achieve good condition, this criterion must be satisfied by a complete absence of invasive non-native species (rather than <5% cover).		Yes
D	The parcel shows spatial variation and forms a mosaic of bare substrate PLUS: - At least four early successional communities (a) to (i); Communities: (a) annuals; (b) mosses/liverworts; (c) lichens; (d) ruderals; (e) inundation species; (f) open grassland; (g) flower-rich grassland; (h) heathland, (i) pools.		Yes
	Passes 3 core criteria and additional criteria D	**Good**	**X**
	Passes 2 core criteria	Moderate	
	Passes 1 or fewer core criteria	Poor	

H2a: Native hedgerow planting

3.1.1 Native hedgerow planting, of 1.2 km in length is to be included within the proposals for the scheme, which will comprise a mixture of at least five species, including hazel, holly, blackthorn, dogrose and elder, amongst others. In line with the condition assessments on hedgerows, these will be targeted a moderate condition, post-development (refer to Appendix B for the habitat condition assessment sheet).

3.1.2 1.2 km of new native hedgerow planting will provide 8.84 habitat units.

R1b: Watercourse Retention and Enhancement

3.1.7 As part of the proposed development the landscaping plans aim to enhance the watercourse through supplementary planting and re naturalisation of the bank face in strategic areas. The full length of the watercourse will be retained and will benefit from enhancements in the riparian zone taking the riparian encroachment score to minor/minor.

3.1.8 Around 200 m of the watercourse will be enhanced to target moderate condition.

3.1.9 Therefore, the trading rules are satisfied.

4 Conclusions / Summary

4.1.1 The site, pre-development comprises three redundant gas holders, a gas compound, and associated outbuildings. Hardstanding routes connected the site with areas of grassland and scrub along the boundaries and between the holders.

4.1.2 Based on the above, this provides a pre-development score of 11.89 habitat units.

4.1.3 No hedgerows are present on site, pre-development, and so the baseline is 0.

4.1.4 A watercourse is present within the application boundary, and so, a River Condition Assessment (RCA) has been appended to this report. The watercourse baseline is calculated to be 0.43.

4.1.5 As part of the ongoing development of the scheme, the mitigation hierarchy has been followed as to ensure that biodiversity impacts are minimised as much as possible, and this has included the protection of the features of highest value.

4.1.6 **Avoid:** The habitats of highest value have been retained and will be enhanced and restored. For example, the scheme has been designed to retain the areas of adjacent broadleaved woodland and focused the development footprint within the existing hardstanding footprint of the derelict gas holders.

4.1.7 **Minimise:** In order to minimise the impact of biodiversity loss as much as possible, vegetation removal required for works has been minimised as much as feasible.

4.1.8 **Mitigate:** In order to mitigate for the loss of pre-development habitats, new grassland and native tree and planting has been incorporated, to offset the loss of such habitats. In addition, areas of higher quality habitat, such as OMH as part of biodiverse roofs, mixed scrub and meadow have been included within the scheme.

4.1.9 **Offset:** Based on all of the above, the scheme meets the minimum requirement of +10% BNG for both habitats and hedgerows, and so, at this time, no offsetting has been considered for these.

4.1.10 Based on this above, the final BNG score for the site is a gain of **+4.08 habitat units (or +34.32%).** The trading rules are currently not satisfied, due to the loss of 1.99 units of neutral grassland.

4.1.11 While the scheme delivers an overall net gain in biodiversity units (+34%), it is important to note that the BNG trading rules require that losses of a particular habitat type, such as neutral grassland, are ideally replaced on a like-for-like or better basis.

4.1.12 Although the development will result in the loss of areas of neutral grassland, this impact will be offset through the creation of higher value Open Mosaic Habitat (OMH) on the proposed brown roofs. OMH is recognised for its greater structural and botanical diversity, supporting a wider range of plant and invertebrate species compared to typical urban grassland. By incorporating a varied substrate and a carefully selected seed mix, including locally important species such as Jersey cudweed, the new OMH areas will provide enhanced ecological function and resilience.

4.1.13 In this case, although the OMH provides higher ecological value and diversity, it does not strictly constitute a direct replacement for neutral grassland under the trading rules. As a result, the assessment has taken a precautionary approach, recognising the value of the OMH creation but also acknowledging that the trading rules are not fully satisfied due to the loss of neutral grassland units.

4.1.14 However, on balance, it is considered that the scheme compensates for the loss of grassland by providing habitats of higher distinctiveness, whilst also delivering a net gain in biodiversity, in line with best practice and policy requirements.

4.1.15 Given no hedgerows were present on site, pre-development, and 1.2 km of native hedgerow will be planted as part of the proposals, a **10% gain** is achieved by default.

4.1.16 As the watercourse being retained in full, with a small section enhanced, there is an overall gain of **16.97%,** with the Trading Rules satisfied.

4.1.17 In line with the Environment Act 2021, a Biodiversity Gain Plan and Habitat Mitigation and Management Plan (HMMP) should be conditioned to the planning approval, and subsequently prepared and discharged prior to works beginning on site.

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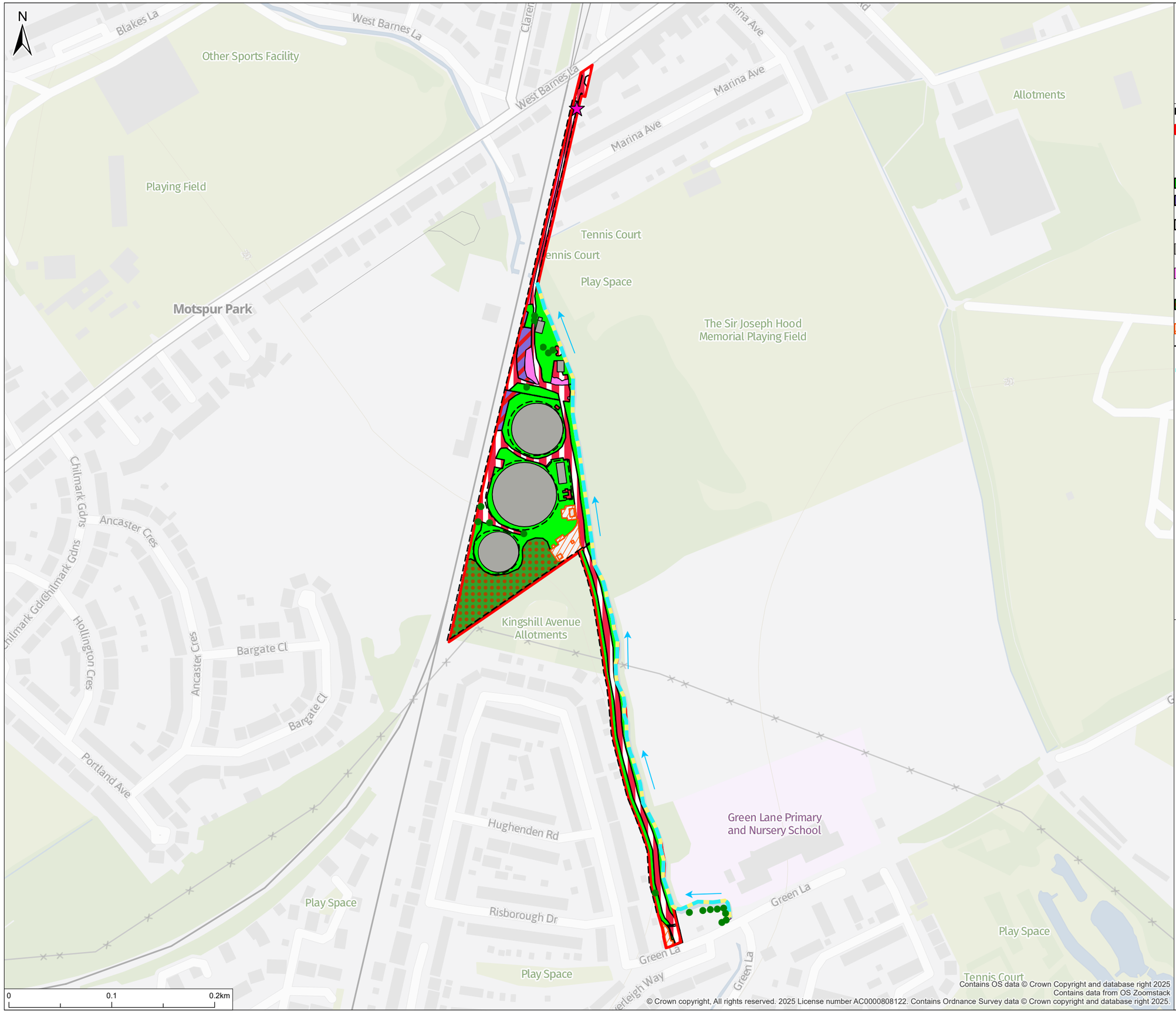
Figures

Figure 1: Pre-development UKHab Map



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LEGEND

- Site boundary
- Japanese knotweed
- G4, 200 – scattered trees
- G3, 516 – other neutral grassland, managed
- H3d – bramble scrub
- U1b, 800 – developed land, sealed surface, road
- U1b5 – buildings
- U1f, 81 – sparsely vegetated urban land, ruderal or ephemeral
- W1g, 30, 112 – other broadleaved woodland, semi-natural, earthbank
- No access
- u1e - buillt linear features (fence)
- R2b – other rivers and streams (Condition: Fairly Poor)
- Direction of flow

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Client **Berkeley Homes (West London) Limited**

Project **Motspur Park Gas Holders, London**

Title **UKHab Survey Map**

Status	Drawn By	PM/Checked By
FINAL	OW/LP	HM
Project Number	**Scale @ A3**	**Date Created**
ECO21423	1:3,500	SEP 2025
Figure Number		**Rev**
1		02

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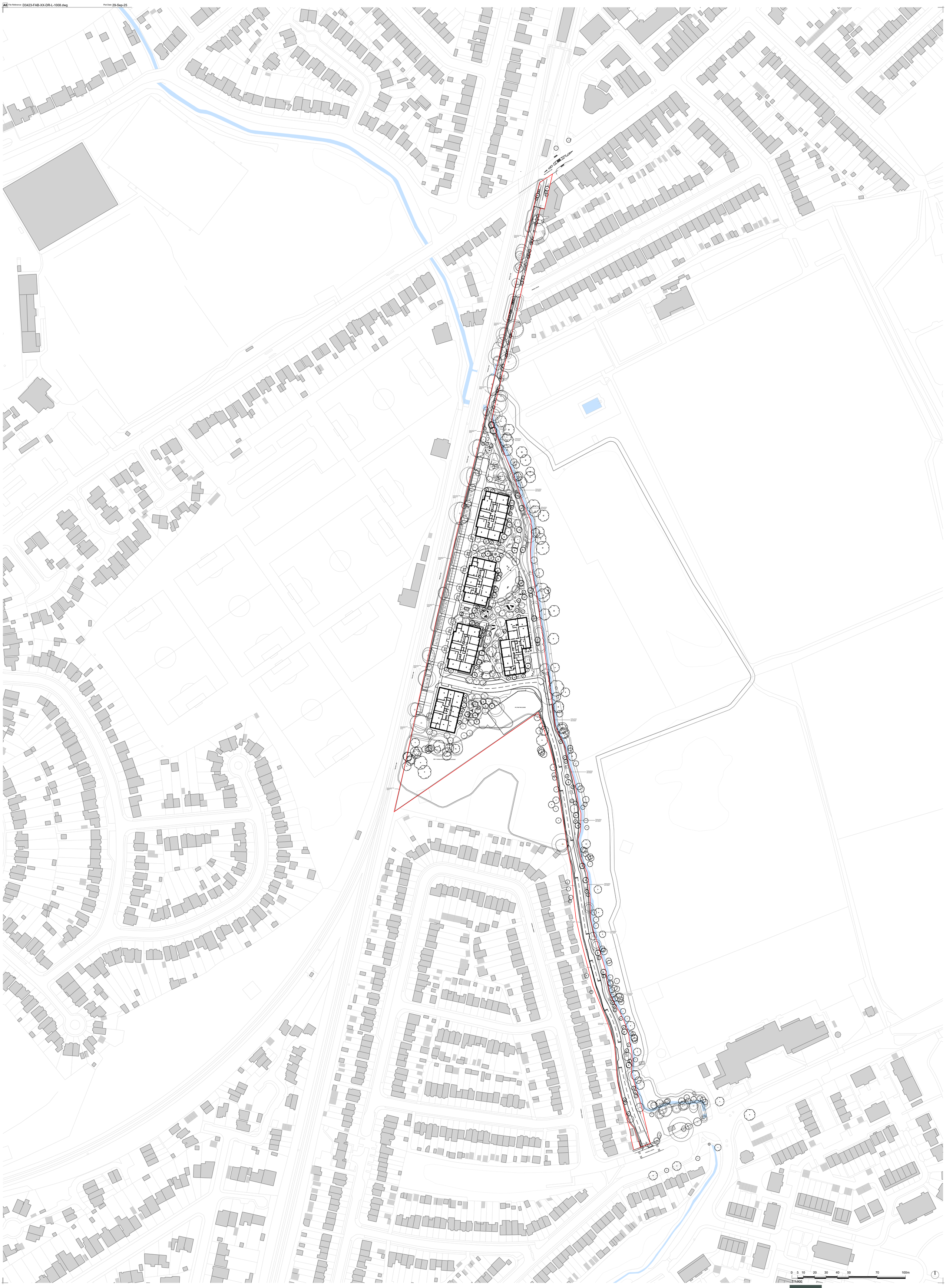
Figure 2: Post-development Landscaping Plans

A0 File Reference D3423-FAB-XX-DR-L-1008.dwg Plot Date 29-Sep-25



Revision	Date	Reason	Drawn	Checked
P01	29/09/2025	Issued for Planning	LR	JB

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Appendix A Condition Assessment Sheets (pre-development)

Table A.1 – Woodland Condition Assessment

Condition Assessment Criteria						
Indicator		**Good (3 points)**	**Moderate (2 points)**	**Poor (1 point)**	**Score per indicator**	**Notes (such as justification)**
A	**Age distribution of trees**	Three age-classes[1] present.	Two age-classes[1] present.	One age-class[1] present.	1	
B	**Wild, domestic and feral herbivore damage**	No significant browsing damage evident in woodland[2].	Evidence of significant browsing pressure is present in less than 40% of whole woodland[2].	Evidence of significant browsing pressure is present in 40% or more of whole woodland[2].	3	fenced off
C	**Invasive plant species**	No invasive species[3] present in woodland.	Rhododendron *Rhododendron ponticum* or cherry laurel *Prunus laurocerasus* not present, and other invasive species[3] <10% cover.	Rhododendron or cherry laurel present, or other invasive species[3] ≥10% cover.	2	
D	**Number of native tree species**	Five or more native tree or shrub species[4] found across woodland parcel.	Three to four native tree or shrub species[4] found across woodland parcel.	Two or less native tree or shrub species[4] across woodland parcel.	3	
E	**Cover of native tree and shrub species**	>80% of canopy trees and >80% of understory shrubs are native[5].	50 - 80% of canopy trees and 50 - 80% of understory shrubs are native[5].	<50% of canopy trees and <50% of understory shrubs are native[5].	3	
F	**Open space within woodland**	10 - 20% of woodland has areas of temporary open space[6]. Unless woodland is <10ha, in which case 0 - 20% temporary open space is permitted[7].	21 - 40% of woodland has areas of temporary open space[6].	<10% or >40% of woodland has areas of temporary open space[6]. But if woodland <10ha has <10% temporary open space, please see Good category[7].	3	

G	**Woodland regeneration**	All three classes present in woodland[8]; trees 4 - 7 cm Diameter at Breast Height (DBH), saplings and seedlings or advanced coppice regrowth.	One or two classes only present in woodland[8].	No classes or coppice regrowth present in woodland[8].	1	
H	**Tree health**	Tree mortality 10% or less, no pests or diseases and no crown dieback[9].	11% to 25% tree mortality and or crown dieback or low-risk pest or disease present[9].	Greater than 25% tree mortality and or any high-risk pest or disease present[9].	3	
I	**Vegetation and ground flora**	Recognisable NVC plant community[10] at ground layer present, strongly characterised by ancient woodland flora specialists.	Recognisable woodland NVC plant community[10] at ground layer present.	No recognisable woodland NVC plant community[10] at ground layer present.	1	all ivy and bramble
J	**Woodland vertical structure**	Three or more storeys across all survey plots, or a complex woodland[11].	Two storeys across all survey plots[11].	One or less storey across all survey plots[11].	2	trees and scrub only
K	**Veteran trees**	Two or more veteran trees[12] per hectare.	One veteran tree[12] per hectare.	No veteran trees[12] present in woodland.	1	
L	**Amount of deadwood**	50% of all survey plots within the woodland parcel have deadwood, such as standing and fallen deadwood, large dead branches and or stems, branch stubs and stumps, or an abundance of small cavities[13].	Between 25% and 50% of all survey plots within the woodland parcel have deadwood, such as standing and fallen deadwood, large dead branches and or stems, stubs and stumps, or an abundance of small cavities[13].	Less than 25% of all survey plots within the woodland parcel have deadwood, such as standing and fallen deadwood, large dead branches and or stems, stubs and stumps, or an abundance of small cavities[13].	3	lots of dead branches
M	**Woodland disturbance**	No nutrient enrichment or damaged ground evident[14].	Less than 1 hectare in total of nutrient enrichment across woodland area, and or less than 20% of woodland area has damaged ground[14].	1 hectare or more of nutrient enrichment, and or 20% or more of woodland area has damaged ground[14].	1	

Total Score (out of a possible 39)		27
Total score >32 (33 to 39)	Good (3)	
Total score 26 to 32	**Moderate (2)**	
Total score <26 (13 to 25)	Poor (1)	

Appendix B Condition Assessment Sheets (Post-development)

Table B.1 – Native hedgerow targeted condition assessment

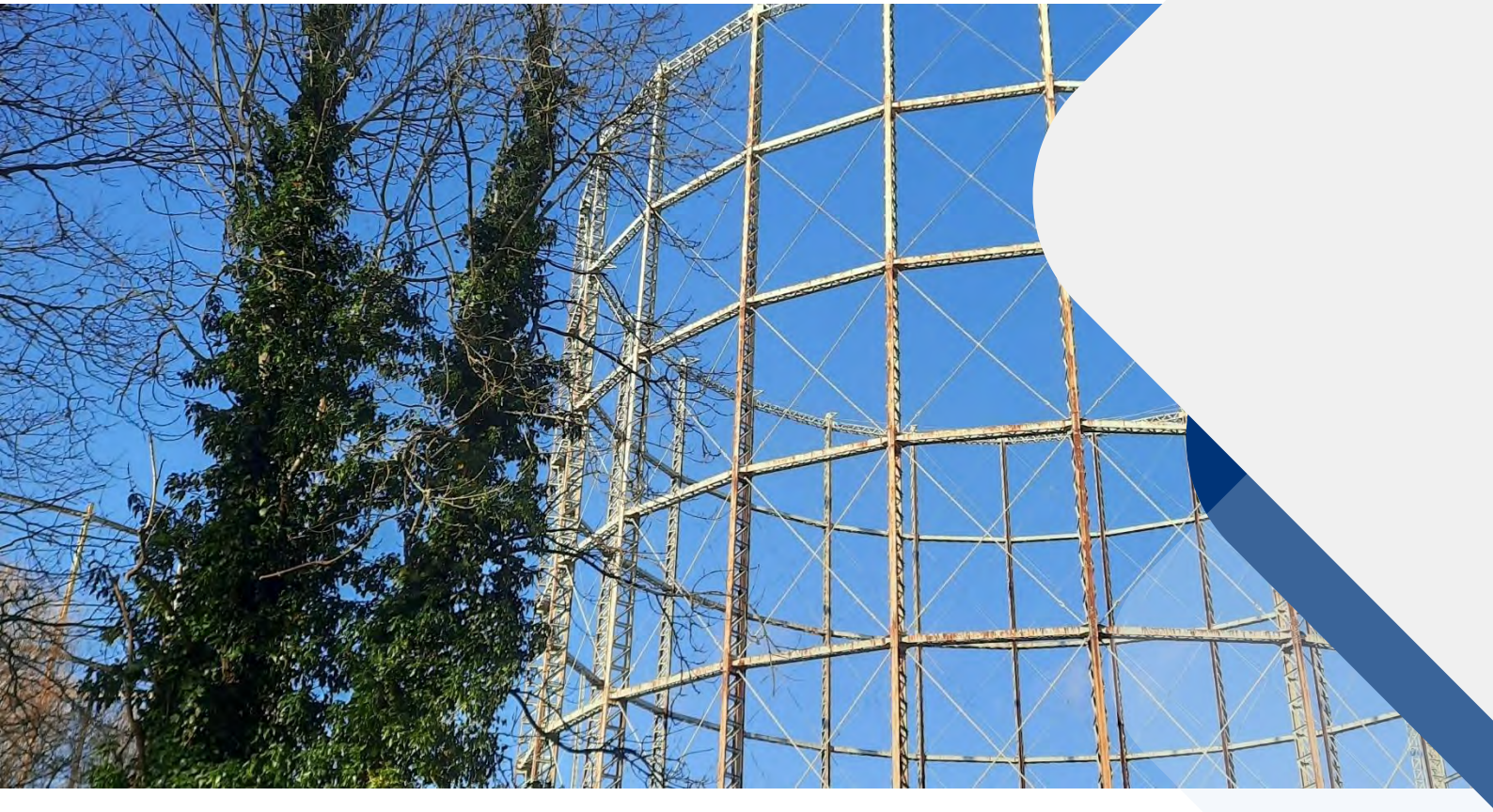
Criterion		Description	Criterion Met (Y / N) H1
A1. Height	>1.5 m average along length	The average height of woody growth estimated from base of stem to the top of the shoots, excluding any bank beneath the hedgerow, any gaps or isolated trees. Newly laid or coppiced hedgerows are indicative of good management and pass this criterion for up to a maximum of four years (if undertaken according to good practice). A newly planted hedgerow does not pass this criterion (unless it is >1.5 m height).	Y
A2. Width	>1.5 m average along length	The average width of woody growth estimated at the widest point of the canopy, excluding gaps and isolated trees. Outgrowths (such as blackthorn *Prunus spinosa* suckers) are only included in the width estimate when they are >0.5 m in height. Laid, coppiced, cut and newly planted hedgerows are indicative of good management and pass this criterion for up to a maximum of four years (if undertaken according to good practice).	N
B1. Gap - hedge base	Gap between ground and base of canopy <0.5 m for >90% of length	This is the vertical 'gappiness' of the woody component of the hedgerow, and its distance from the ground to the lowest leafy growth. Certain exceptions to this criterion are acceptable (see page 65 of the Hedgerow Survey Handbook).	Y
B2. Gap - hedge canopy continuity	Gaps make up <10% of total length; and No canopy gaps >5 m	This is the horizontal 'gappiness' of the woody component of the hedgerow. Gaps are complete breaks in the woody canopy (no matter how small). Access points and gates contribute to the overall 'gappiness' but are not subject to the >5 m criterion (as this is the typical size of a gate).	Y
C1. Undisturbed ground and perennial vegetation	>1 m width of undisturbed ground with perennial herbaceous vegetation for >90% of length: · Measured from outer edge of hedgerow; and · Is present on one side of the hedgerow (at least).	This is the level of disturbance (excluding wildlife disturbance) at the base of the hedgerow. Undisturbed ground is present for at least 90% of the hedgerow length, greater than 1 m in width and must be present along at least one side of the hedgerow. This criterion recognises the value of the hedgerow base as a boundary habitat with the capacity to support a wide range of species. Cultivation, heavily trodden footpaths, poached ground etc. can limit available habitat niches.	N

C2. Nutrient-enriched perennial vegetation	Plant species indicative of nutrient enrichment of soils dominate <20% cover of the area of undisturbed ground.	The indicator species used are nettles *Urtica* spp., cleavers *Galium aparine* and docks *Rumex* spp. Their presence, either singly or together, does not exceed the 20% cover threshold.	N
D1. Invasive and neophyte species	>90% of the hedgerow and undisturbed ground is free of invasive non-native plant species (including those listed on Schedule 9 of WCA[3]) and recently introduced species.	Recently introduced species refer to plants that have naturalised in the UK since AD 1500 (neophytes). Archaeophytes count as natives. For information on archaeophytes and neophytes see the JNCC website[4], as well as the BSBI website[5] where the 'Online Atlas of the British and Irish Flora'[6] contains an up-to-date list of the status of species. For information on invasive non-native species see the GB Non-Native Secretariat website[7].	Y
D2. Current damage	>90% of the hedgerow or undisturbed ground is free of damage caused by human activities.	This criterion addresses damaging activities that may have led to or lead to deterioration in other attributes. This could include evidence of pollution, piles of manure or rubble, or inappropriate management practices (e.g., excessive hedgerow cutting).	Y
Poor = 4 or more failures			
Moderate = No more than 4 failures			**X**
Good = No more than 2 failures			

Appendix C River Condition Assessment

River Condition Assessment

Motspur Park Gas Holders



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Prepared by:

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Prepared for:

Berkeley Homes (West London) Limited

Contents

1 INTRODUCTION 2
1.1 Purpose and scope of this report 2
1.2 Development proposals 2
2 METHODS 2
2.1 Modular River Physical Habitat (MoRPh) Survey 3
General Information 4
Bank top / Floodplain 4
Bank Face / Channel Margin 4
Channel Bed 5
2.2 River Type Assessment 5
2.3 River Condition Assessment 6
2.4 Limitations 7
3 RESULTS 8
3.1 MoRPh 5 Survey 8
3.2 River Type Assessment 9
3.3 River Condition Assessment 9
4 CONCLUSIONS 14

Tables

Table 1.1: River module lengths for MoRPh surveys for a typical river width. 3
Table 1.2: Abundance scale used in MoRPh surveys: 4
Table 3.1: General information recorded for Beverley Brook, sub-reach A. 8
Table 3.2: General information recorded for Beverley Brook, sub-reach B. 8
Table 3.3: General information recorded for Beverley Brook, sub-reach C. 9
Table 3.4: MoRPh 5 Pro Map Data for Beverley Brook sub-reach A. 10
Table 3.5: MoRPh 5 Pro Map Data for Beverley Brook sub-reach B. 11
Table 3.6: MoRPh 5 Pro Map Data for Beverley Brook sub-reach C. 12

Appendices

Site Photos

1 INTRODUCTION

1.1 Purpose and scope of this report

1.1.1 RPS Ecology were commissioned by Berkeley Homes (West London) Limited to undertake a River Condition Assessment (RCA) of Beverley Brook, in relation to works at the Motspur Park Gas Holders site, Kingston, London.

1.1.2 The objectives of the RCA were to:

- Carry out a Modular River Physical Habitat (MoRPh 5) Survey of the watercourses on site. Following the survey, use the data collected along with desk-based information (River Type Assessment) to undertake a River Condition Assessment (RCA). These will be undertaken by an accredited MoRPh surveyor.
- Provide a report detailing the methods and results of the MoRPh 5 survey and RCA. The report will include a discussion of the results in relation to the development proposals, including any legal implications and how these may be overcome, and recommendations for any remedial actions that should be undertaken.

1.1.3 This report pertains to these results only; recommendations included within this report are the professional opinion of an experienced ecologist and therefore the view of RPS.

1.1.4 The surveys and desk-based assessments undertaken as part of this review and subsequent report are prepared in accordance with the British Standard for Biodiversity Code of Practice for Planning and Development (BS42020:2013).

1.2 Development proposals

1.2.1 The proposals for the site involve the:

"Proposed demolition of existing gasholders and associated above ground structures/buildings; relocation of gas governor and installation of new underground pipe network; minor reconfiguration of pressure inspection gauge; removal of redundant underground pipework; re-routing of existing gas infrastructure and ground works; delivery of five buildings up 18 storeys in height; delivery of up to 650 (class c3) residential units; delivery of car and cycle parking spaces; delivery of associated works to the existing accesses and internal vehicular routes, new pedestrian and cycle routes; delivery of new publicly accessible open space, amenity space, hard and soft landscaping; works to the Beverley brook embankment and subject to agreement with LBM, new pedestrian and cycle access into neighbouring sir joseph hood memorial playing fields off the northern access area".

2 METHODS

2.1 Modular River Physical Habitat (MoRPh) Survey

2.1.1 The survey was carried out on 7th May 2025 by Harriet Miles, a trained and accredited MoRPh surveyor. All data was collected following The MoRPh Survey Technical Reference Manual (Modular River Survey; 2020). Survey data was collected using the Modular River Surveys survey forms and uploaded to the RPS Modular River Survey Cartographer workspace.

2.1.2 MoRPh is a survey technique that provides a sample of the physical character of the river reach within which it is located. Five contiguous MoRPh modules are combined to produce a MoRPh5 survey to record vegetation, sediment and Morphological characteristics of short sub-reaches.

2.1.3 For this site, 3 MoRPh5 surveys were recorded. To accurately assess the site, at least 20% of the river must be surveyed. Approximately 700m of river is within 10m of the redline boundary. Each module was 10m, with each MoRPh survey measuring 50m. After the surveys were recorded, this meant that 150m (or 21.4%) of the river within the redline boundary was surveyed.

2.1.4 The length of modules used in MoRPh surveys vary with rivers of different sizes. The MoRPh River width is measured at a typical cross section within the sub-reach. The MoRPh River width is defined as the width of the water and any bare sediments, bars and areas of emergent aquatic plants at the water's edge. A single typical MoRPh River width was selected to apply across all modules to ensure that all MoRPh modules were the same length. The appropriate module length for different sized rivers is given in (**Table 1.1**).

Table 1.1: River module lengths for MoRPh surveys for a typical river width.

MoRPh River Width	Module Length
< 5 m	10 m
5 to < 10 m	20 m
10 to < 20 m	30 m
20 to < 30 m	40 m
30 m (or where channel bed is not visible)	50 m

2.1.5 The MoRPh module survey is designed to characterise the river channel, banks (or generally steeper areas next to the active channel) and immediate bank tops (adjacent flatter areas) up to 10 m from the bank top edge. A 10 m distance from the bank top edge is chosen to enclose features (particularly vegetation) on the bank top that may provide habitat for river organisms or may act as a pressure on the river ecosystem.

2.1.6 For each river module, general information on the river was recorded, followed by the physical features and vegetation properties (both natural and human-modified) for each of the following:

- Bank top / floodplain (within 10m of the bank top edge);
- Bank faces and channel edges; and
- Channel bed.

2.1.7 Where abundances were recorded, the following scale was used (as shown in table 1.2):

Table 1.2: Abundance scale used in MoRPh surveys:

Scale	Percent Cover
Absent (A)	0 %
Trace (T)	< 5 %
Present (P)	5 – 33 %
Extensive (E)	>33 %

2.2 General Information

2.2.1 For each module the following general information was recorded: River name; Reach name; Sub-reach name; Module number; Module length; Grid reference (midpoint); MoRPh river width (m); Bankfull width (m); Left bank height (m); Right bank height (m); Water width (m); and water depth (m).

2.3 Bank top / Floodplain

2.3.1 For each module the following was recorded for the bank top / floodplain: Dominant and sub-dominant artificial ground cover[1] (type and abundance) for the left and right bank; Abundance of terrestrial vegetation types[2] on the left and right bank; Non-native invasive plant species (type and abundance) on the left and right bank; and Bank top water related features[3] (type and abundance) on the left and right bank.

2.4 Bank Face / Channel Margin

2.4.1 For each module the following was recorded for the bank face and channel margin: Dominant and sub-dominant bank profile[4] (type and abundance) for the left and right bank; Sediment type[5] for the top two-thirds and bottom one-third of the bank face for the left and right bank; Extent (vertical and horizontal) of bank face reinforcement for the left and right banks; Dominant and sub-dominant bank reinforcement type[6]; Natural physical features[7] (type, abundance and sediment size[8]) for the left and right banks; Artificial physical features[9] for the left and right banks; Abundance of terrestrial vegetation[10] on the bank face

[1] Pedestrianised footpath, transport infrastructure, buildings (commercial/industrial), buildings (residential), storage area, landfill area, arable agriculture/allotments, permanently vegetated agriculture, permanently vegetated recreation, plantation woodland, open water.

[2] Unvegetated (bare soil/rock), mosses/lichens, short/creeping herbs/grasses, tall herbs/grasses, scrub/shrubs, saplings/trees, fallen trees, leaning trees, j-shaped trees, tree/shrub branches tailing into channel, large wood, predominant tree type

[3] Pond - disconnected from river, pond – connected to river, side channel, wetland – short non-woody vegetation, wetland – tall non-woody vegetation, wetland – shrubs and trees.

[4] Vertical vertical with overhang, undercut or vertical with undercut, vertical with toe, steep (>45o), gentle (<45o), composite, reshaped, artificial two-stage, embanked, set-bank embankment, poached bank

[5] Artificial, bedrock, boulder, cobble, gravel-pebble, sand, silt, clay, organic, peat, earth, not visible.

[6] Concrete, concrete and brick, blocks or stone, brick/ laid stone/ block, sheet piling, wood piling, builders waste, riprap, gabions, willow spiling/faggot bundles, planted reeds, biotex/coir, washed out

[7] Bare unvegetated side bar, vegetated side bar, berm, bench, stable cliff, eroding cliff, toe, nest hole or animal burrows, marginal backwater, tributary junction/confluence (count)

[8] Unvegetated/vegetated side bar only.

[9] Pipes/outfalls (count), Jetty/Deflector (major, intermediate, minor, absent.

[10] Unvegetated (bare soil/rock), mosses/lichens, short/creeping herbs/grasses, tall herbs/grasses, scrub/shrubs, saplings/trees, fallen trees, leaning trees, j-shaped trees, tree/shrub branches tailing into channel, large wood, exposed tree roots, discrete organic accumulation.

for the left and right banks; Abundance of aquatic vegetation[11] at the bank-water margin for the left and right banks; and Non-native invasive plant species (type and abundance) on the left and right bank faces.

2.5 Channel Bed

2.5.1 For each module the following was recorded for the channel bed: Channel bed sediment size[12] (type and abundance); Channel bed reinforcement (extent and dominant/sub-dominant type[13]); Water surface flow patterns[14] (type and abundance); Channel bed natural physical features[15] (type and abundance); Channel bed artificial features[16] (type and abundance); Vegetation within the wetted channel[17] (type and abundance); Vegetation interacting with the wetted channel[18] (type and abundance); and Non-native invasive plant species (type and abundance).

2.6 River Type Assessment

2.6.1 The river reach was allocated to one of 13 river types (A to M). The 13 river types are defined primarily by their planform (e.g. straight, meandering or braided) and bed material, supported by the degree to which they are confined by their valley and also the valley gradient. The 13 types represent the range of near-natural river types likely to be encountered in England.

2.6.2 For the purposes of MoRPh rivers greater than 20m wide are considered to be 'large rivers' and are not surveyed using the methodology since it is considered that they will be too deep for their bed material to be assessed accurately. Canals and navigable rivers are also excluded since their modified nature prevents the assignment of an indicative 'near natural' type (Gurnell et al., 2020).

2.6.3 The river type for the reach within which the site is located was determined using an extended reach. The reach selected for analysis was long enough to determine its type robustly and was a length which broadly showed a similar width and planform along its length and did not include large structures (dams) or large tributaries.

2.6.4 For rivers which will be one of the A – M river types the following information was recorded using maps and aerial images:

- A1 – Braiding index (BI)[19]

[11] Liverworts, mosses and lichens, emergent broad-leaved, emergent linear-leaved (inc. horsetails), amphibious, filamentous algae.

[12] Bedrock, boulder, cobble, gravel-pebble, sand, silt, clay, organic, peat, silt overlying coarser sediments (continuous or patchy).

[13] Concrete, concrete and brick, blocks or stone, brick/ laid stone/ block, sheet piling, wood piling, builders waste, rip-rap, gabions, willow spiling/faggot bundles, planted reeds, biotex/coir, washed out

[14] Free fall, chute, broken standing waves, unbroken standing waves, upwelling, rippled, smooth, no perceptible flow, dry

[15] Exposed bedrock, exposed unvegetated boulders/rocks, exposed vegetated boulders/rocks, unvegetated mid channel bar, vegetated mid channel bar, island, cascade, pool (count), riffle (count), step (count), waterfall (count)

[16] Large trash, weir (major, intermediate, minor – as count), bridge piers (count), bridge shadow (wide, intermediate, narrow), culvert (count)

[17] Unvegetated, liverworts, mosses, lichens, emergent broad-leaved, emergent linear-leaved, floating leaved (rooted), free floating, amphibious, submerged broad-leaved, submerged linear-leaved, submerged fine-leaved, filamentous algae, channel choked with plants (Y/N)

[18] Vegetation shading the channel, submerged tree roots, trees, shrubs, saplings growing on river bed, large wood in channel, organic material, large wood dam (count), fallen trees (count)

[19] Average number of distinct flowing threads counted across 10 equally-spaced cross-sections of the river corridor. Reaches may be single thread (BI <1.1) or multithread (BI >1.1)

- A2 – Sinuousity index (SI)[20]
- A3 – Anabranching index (AI)[21]
- A4 – Level of confinement[22] (U, PC, C)[23]
- A5 – Valley gradient[24]
- A6 - Bedrock[25]
- A7 – Coarsest bed material size class[26]
- A8 – Average alluvial bed material size class[27]

2.6.5 The results for the values of each of the above indicators were entered into the workspace on the Cartographer data base and an indicative river type was generated.

2.7 River Condition Assessment

2.7.1 The river condition was assessed using 32 condition indicators that are automatically extracted from the MoRPh5 field surveys. Each river condition indicator was assigned a score of 0 to +4 (positive indicators[28]), or 0 to -4 (negative indicators[29]). Positive indicators represent diversity (richness) and abundance (extent) of physical habitats offered by vegetation, sediment, vegetation-sediment-related physical features and hydraulic habitats. Negative indicators represent the extent and severity of local human interventions or pressures.

2.7.2 The Preliminary Condition Score for each MoRPh5 sub-reach was calculated as the sum of the average of the positive condition indicator scores and the average of the negative condition indicator scores for the sub-reach.

2.7.3 The preliminary condition score for a MoRPh5 sub-reach is translated into a final condition score (5-Good, 4-Fairly Good, 3-Moderate, 2-Fairly Poor, 1-Poor) according to the river type under consideration.

2.7.4 Once the score or class has been assigned the Statutory Biodiversity Metric is used to derive the baseline river units, which contribute to the overall Biodiversity Net Gain for the

[20] For single thread rivers (BI <1.1). The ratio of the river reach length along the centre line divided by the length of the broad river or valley course. Reaches may be straight-sinuous (SI <1.5), or meandering (SI > 1.5)

[21] Average number of distinct flowing channels separated by islands, counted across 10 equally-sapaced crosssections.

[22] Proportion of the river reach's bank length that is in contact with the valley side slopes or ancient terraces.

[23] U = unconfined - <10% total river bank in contact, PC = partly confined 10 – 90% contact, C = confined - >90% contact.

[24] Difference in elevation between the start and end of the river reach divided by the length of the broad valley course.

[25] Recorded where bedrock is observed as 'extensive' (i.e. >33% cover) in at least 3 survey modules or is 'extensive' in 2 modules and 'present' (i.e. 5 to 33% cover) in the remaining 3 modules of the subreach.

[26] Records the coarsest bed material size class that is observed as present or extensive in any module in the subreach.

[27] Weighted average of the alluvial bed material size classes (i.e. excludes bedrock) recorded as present or extensive in all 5 modules within the subreach

[28] Bank top vegetation structure, bank top tree feature richness, bank top water related features, bank face riparian vegetation structure, bank face tree feature richness, bank face natural bank profile extent, bank face natural bank profile richness, bank face natural material richness, bank face bare sediment extent, channel margin aquatic vegetation extent, channel margin aquatic morphotype richness, channel margin physical feature extent, channel margin physical feature richness, channel aquatic morphotype richness, channel bed tree features richness, channel bed hydraulic features richness, channel bed natural features extent, channel bed natural features richness, channel bed material richness.

[29] Bank top NNIPS cover, Bank top managed ground cover, Bank face artificial bank profile extent, bank face reinforcement extent, bank face reinforcement material severity, bank face NNIPS cover, channel margin artificial features, channel bed siltation, channel bed reinforcement extent, channel bed reinforcement severity, channel bed artificial features severity, channel bed NNIPS extent, channel bed filamentous algae extent.

site. In addition to the river condition score, its strategic significance, based on whether it is a main river in the river basin management plan; and whether there is any encroachment into the watercourse or riparian zone.

2.8 Limitations

2.8.1 There were no constraints to access nor the assessment of this watercourse on the date of the survey.

3 RESULTS

3.1 MoRPh 5 Survey

3.1.1 The results of the MoRPh 5 survey for the Beverley Brook, associated with Motspur Park Gas Holders, are presented below.

3.1.2 Photographs for each MoRPh survey can be found in Appendix A.

3.1.3 The general information recorded for each MoRPh / module is shown below in **Table 3.1-3.3.**

Table 3.1: General information recorded for Beverley Brook, sub-reach A.

Module Name and Location					
River Name	Beverley Brook				
Location / Reach Name	Motspur Park				
Sub-reach name	A	A	A	A	A
Module Length	10m	10m	10m	10m	10m
Grid Reference	**TQ 22625 66800**	**TQ 22632 66785**	**TQ 22637 66768**	**TTQ 22642 66751**	**TQ 22655 66746**
Module number	**1**	**2**	**3**	**4**	**5**
MoRPh River Width (m)	4	5	5	5	5
Bankful width (m)	6	6	6	6	6
Left bank height (m)	1	1	1	1	1
Right bank height (m)	2	2	2	2	2
Water width (m)	4	5	4	4	4
Water depth (m)	0.5	0.5	0.5	0.5	0.5

Table 3.2: General information recorded for Beverley Brook, sub-reach B.

Module Name and Location					
River Name	Beverley Brook				
Location / Reach Name	Motspur Park				
Sub-reach name	B	B	B	B	B
Module Length	10m	10m	10m	10m	10m
Grid Reference	**TQ 22591 66980**	**TQ 22582 67024**	**TQ 22573 67049**	**TQ 22569 67070**	**TQ 22563 67100**
Module number	**1**	**2**	**3**	**4**	**5**
MoRPh River Width (m)	5	5	5	5	5
Bankful width (m)	7	5	5	7	7
Left bank height (m)	3	3	3	3	3
Right bank height (m)	3	3	3	3	3
Water width (m)	5	5	5	5	5
Water depth (m)	0.5	0.5	0.5	0.5	0.5

Table 3.3: General information recorded for Beverley Brook, sub-reach C.

Module Name and Location					
River Name	Beverley Brook				
Location / Reach Name	Motspur				
Sub-reach name	C	C	C	C	C
Module Length	20m	20m	20m	20m	20m
Grid Reference	**TQ 22541 67228**	**TQ 22537 67262**	**TQ 22518 67305**	**TQ 22518 67327**	**TQ 22511 67348**
Module number	**1**	**2**	**3**	**4**	**5**
MoRPh River Width (m)	8	6	6	6	6
Bankful width (m)	10	7	7	7	7
Left bank height (m)	3	3	3	3	2
Right bank height (m)	3	2	2	2	1
Water width (m)	7	5	5	5	5
Water depth (m)	0.5	0.5	0.5	0.5	0.5

3.2 River Type Assessment

3.2.1 The section of the Beverley Brook associated with Motspur Park Gas Holders calculated river type is straight/sinuous, with the coarsest bed material of gravel/pebble, and an average bed material size class of sand.

3.2.2 The upstream reach location is TQ 22341 66079, and the downstream reach location is TQ 21717 70633. This means that the river reach length is 4.84 km, with a valley reach length of 4.8 km. The reach valley gradient is 0.00063.

3.2.3 The braiding index (number of wet channels) is 1.

3.2.4 The sinuousity index (the reach river length divided by the reach valley length) is 1.008.

3.3 River Condition Assessment

3.3.1 The full results of the RCA for each indicator type for each MoRPh are presented in

3.3.2

3.3.3

3.3.4 Table 3.4**-3.6**.

3.3.5 The preliminary condition score for sub-reach A is 0.194, which gives a final river condition score of *'fairly poor'*.

3.3.6 The preliminary condition score for sub-reach B is -0.518, which gives a final river condition score of *'fairly poor'.*

3.3.7 The preliminary condition score for sub-reach C is 0.178, which gives a final river condition score of *'fairly poor'.*

Table 3.4: MoRPh 5 Pro Map Data for Beverley Brook sub-reach A.

Indicator Type		Baseline Condition Score
		Sub-reach A
Bank Top	B1: Vegetation Structure	1
	B2: Tree feature richness	0
	B3: Water related features	0
	B4: NNIPS cover	0
	B5: Managed ground cover	-2
Bank Face	C1: Riparian vegetation structure	1
	C2: Tree feature richness	0
	C3: Natural bank profile extent	3
	C4: Natural bank profile richness	2
	C5: Natural bank material richness	1
	C6: Bare sediment extent	0
	C7: Artificial bank profile extent	0
	C8: Reinforcement extent	0
	C9: Reinforcement material severity	0
	C10: NNIPS cover	0
Channel Water Margin	D1: Aquatic vegetation extent	0
	D2: Aquatic MoRPhotype richness	0
	D3: Physical feature extent	0
	D4: Physical feature richness	0
	D5: Artificial features	-1
Channel Bed	E1: Aquatic MoRPhotype richness	1
	E2: Tree related features	0
	E3: Hydraulic feature richness	0
	E4: Natural features extent	0
	E5: Natural features richness	0
	E6: Material richness	2
	E7: Siltation	0

Indicator Type		Baseline Condition Score
		Sub-reach A
	E8: Reinforcement extent	0
	E9: Reinforcement severity	0
	E10: Artificial features severity	-2
	E11: NNIPS extent	0
	E12: Filamentous algae extent	0
	Average of Positive Indicators	**0.579**
	Average of Negative Indicators	**-0.385**
	Preliminary Condition Score	**0.194**
	Final Condition Score	**Fairly Poor**

Table 3.5: MoRPh 5 Pro Map Data for Beverley Brook sub-reach B.

Indicator Type		Baseline Condition Score
		Sub-reach B
Bank Top	B1: Vegetation Structure	1
	B2: Tree feature richness	1
	B3: Water related features	0
	B4: NNIPS cover	0
	B5: Managed ground cover	-4
Bank Face	C1: Riparian vegetation structure	1
	C2: Tree feature richness	0
	C3: Natural bank profile extent	3
	C4: Natural bank profile richness	3
	C5: Natural bank material richness	0
	C6: Bare sediment extent	1
	C7: Artificial bank profile extent	0
	C8: Reinforcement extent	-4
	C9: Reinforcement material severity	-3
	C10: NNIPS cover	0
	D1: Aquatic vegetation extent	0

Indicator Type		Baseline Condition Score
		Sub-reach B
Channel Water Margin	D2: Aquatic MoRPhotype richness	0
	D3: Physical feature extent	0
	D4: Physical feature richness	0
	D5: Artificial features	0
Channel Bed	E1: Aquatic MoRPhotype richness	1
	E2: Tree related features	1
	E3: Hydraulic feature richness	1
	E4: Natural features extent	0
	E5: Natural features richness	0
	E6: Material richness	2
	E7: Siltation	0
	E8: Reinforcement extent	0
	E9: Reinforcement severity	0
	E10: Artificial features severity	-2
	E11: NNIPS extent	0
	E12: Filamentous algae extent	-4
	Average of Positive Indicators	**0.789**
	Average of Negative Indicators	**-1.308**
	Preliminary Condition Score	**-0.518**
	Final Condition Score	**Fairly Poor**

Table 3.6: MoRPh 5 Pro Map Data for Beverley Brook sub-reach C.

Indicator Type		Baseline Condition Score
		Sub-reach C
Bank Top	B1: Vegetation Structure	2
	B2: Tree feature richness	0
	B3: Water related features	0
	B4: NNIPS cover	0
	B5: Managed ground cover	-2
Bank Face	C1: Riparian vegetation structure	1
	C2: Tree feature richness	0

Indicator Type		Baseline Condition Score
		Sub-reach C
	C3: Natural bank profile extent	3
	C4: Natural bank profile richness	3
	C5: Natural bank material richness	1
	C6: Bare sediment extent	1
	C7: Artificial bank profile extent	0
	C8: Reinforcement extent	-2
	C9: Reinforcement material severity	-2
	C10: NNIPS cover	0
Channel Water Margin	D1: Aquatic vegetation extent	0
	D2: Aquatic MoRPhotype richness	0
	D3: Physical feature extent	1
	D4: Physical feature richness	1
	D5: Artificial features	0
Channel Bed	E1: Aquatic MoRPhotype richness	2
	E2: Tree related features	1
	E3: Hydraulic feature richness	0
	E4: Natural features extent	0
	E5: Natural features richness	0
	E6: Material richness	2
	E7: Siltation	0
	E8: Reinforcement extent	0
	E9: Reinforcement severity	0
	E10: Artificial features severity	-4
	E11: NNIPS extent	0
	E12: Filamentous algae extent	0
	Average of Positive Indicators	**0.947**
	Average of Negative Indicators	**-0.769**
	Preliminary Condition Score	**0.178**
	Final Condition Score	**Fairly Poor**

4 CONCLUSIONS

4.1.1 Three MoRPh5 surveys were undertaken on the section of the Beverley Brook, located adjacent to the site at Motspur Park Gas Holders.

4.1.2 This river had a preliminary condition score of 0.194, -0.518 and 0.178, and a final condition score of *'fairly poor'* across the whole length assessed.

4.1.3 The condition score is derived from the sum of the positive and negative indicators:

4.1.4 For sub-reach A: the positive index average is 0.579, compared a negative index average of -0.385.

4.1.5 For sub-reach B: the positive index average is 0.789, compared a negative index average of -1.308.

4.1.6 For sub-reach C: the positive index average is 0.947, compared a negative index average of -0.769.

4.1.7 Across all three sub-reaches, a majority of the indicators resulted in a neutral or negative score. The lowest scoring indicators for the river came from the filamentous algae extent on the channel bed (-4). The highest score for any indicator was 3, for the natural bank extent and profile richness in sub-reach B.

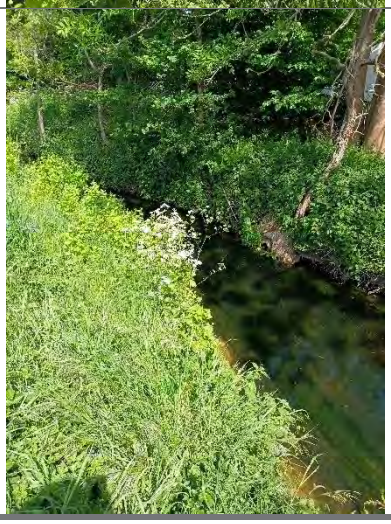
4.1.8 Meaningful enhancements for areas over a relatively small reach could include increasing the natural bank along the other sub-reaches, decreasing the severity of reinforcement and increasing vegetation cover on the bank top.

Appendix A Site Photos

Sub-reach A MoRPh 1

Across the MoRPh.	
Upstream.	
Downstream.	

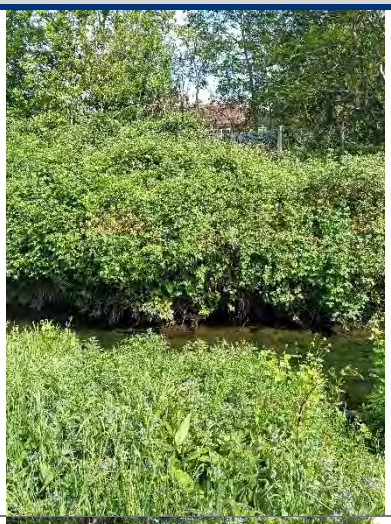
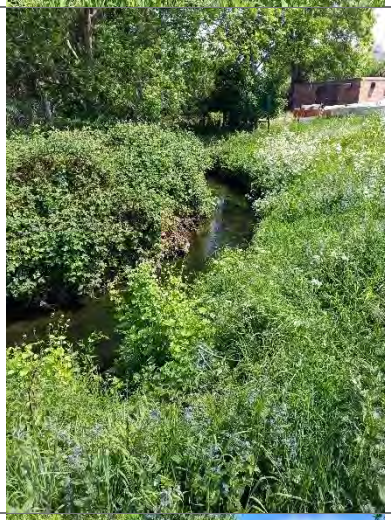
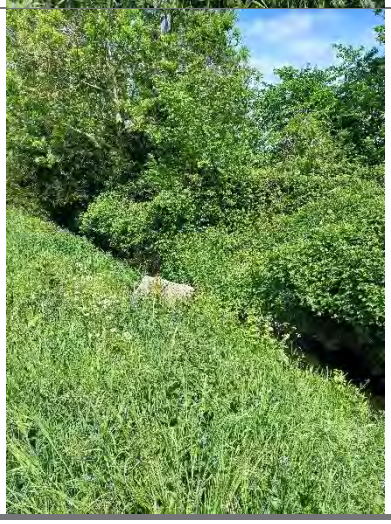
Sub-reach A MoRPh 2

Across the MoRPh.	
Upstream.	
Downstream.	

Sub-reach A MoRPh 3

Across the MoRPh.	
Upstream.	
Downstream.	

Sub-reach A MoRPh 4

Across the MoRPh.	
Upstream.	
Downstream.	

Sub-reach A MoRPh 5

Across the MoRPh.	
Upstream.	
Downstream.	

Sub-reach B MoRPh 1

Across the MoRPh.	
Upstream.	
Downstream.	

Sub-reach B MoRPh 2

Across the MoRPh.	
Upstream.	
Downstream.	

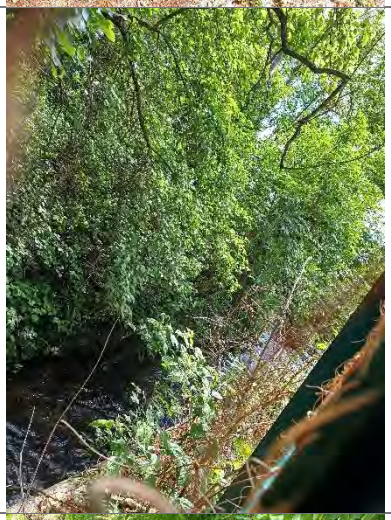
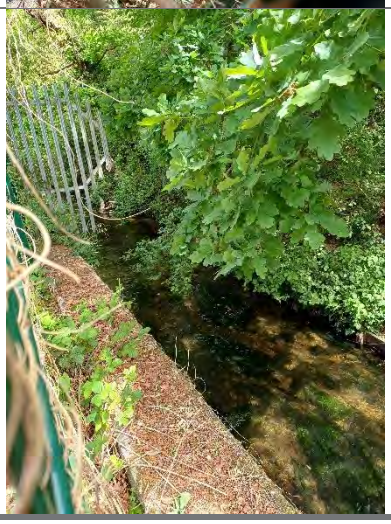
Sub-reach B MoRPh 3

Across the MoRPh.	
Upstream.	
Downstream.	

Sub-reach B MoRPh 4

Across the MoRPh.	
Upstream.	
Downstream.	

Sub-reach B MoRPh 5

Across the MoRPh.	
Upstream.	
Downstream.	

Sub-reach C MoRPh 1

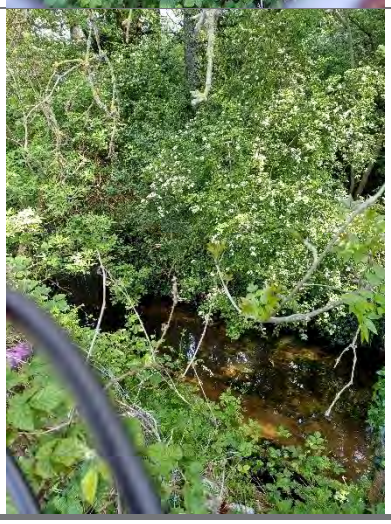
Across the MoRPh.	
Upstream.	
Downstream.	

Sub-reach C MoRPh 2

Across the MoRPh.

Upstream.

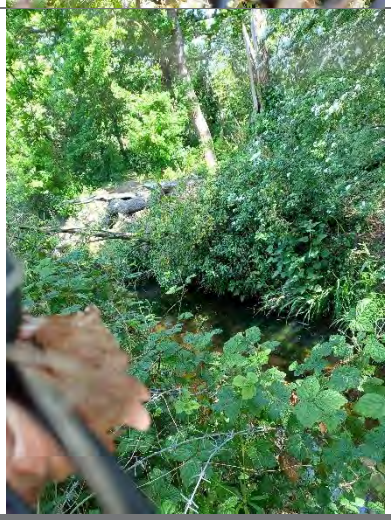
Downstream.



Sub-reach C MoRPh 3

Across the MoRPh.	
Upstream.	
Downstream.	

Sub-reach C MoRPh 4

Across the MoRPh.	
Upstream.	
Downstream.	

Sub-reach C MoRPh 5

Across the MoRPh.	
Upstream.	
Downstream.