APPENDIX 9.1 – HABITATS BASELINE

1. INTRODUCTION

1.1 Scope of Report

1.1.1 WSP UK Limited (WSP UK) was commissioned to undertake ecological studies to identify the baseline of the Site and surrounding area, which have been used to inform **Volume 2, Chapter 9: Ecology, Nature Conservation and Ornithology** of the EIA Report.

1.1.2 This report presents methods and baseline findings of studies relating to the habitats present within and surrounding the Site. This included UK Habitat Classification (UKHab) and National Vegetation Classification (NVC) surveys. The objectives of the surveys were to:

- spatially map and describe the primary habitats present within the Site using UKHab methods;
- identify primary habitats of elevated importance with reference to national and local biodiversity priority lists; and
- identify NVC communities within and surrounding the Site which could represent Groundwater Dependent Terrestrial Ecosystems (GWDTE) – subject to further assessment, and/ or priority peatland.

1.1.3 The report is linked to **Volume 4, Appendix 9.6: Biodiversity Net Gain Report** of the EIA Report which considers the condition, distinctiveness and spatial extent of habitats at the Site and demonstrates how positive effects for biodiversity would be achieved through habitat creation.

2. METHODS

2.1 UK Habitat Classification

2.1.1 An initial UKHab survey was undertaken during the detailed site selection stage in December 2022. This was led by an ecologist who is experienced at a 'capable'[1] level of surveying similar habitat types encountered in the geographical region and land-use setting. Another survey to review the UKHab mapping during the optimal botanical season and extend the coverage across the Site[2] was undertaken on 7 May 2024 by an 'accomplished'[1] surveyor accredited with the Botanical Society of Britain and Ireland (BSBI) Field Identification Skills Certificate (FISC) Level 3.

2.1.2 Habitat types have been recorded using the UKHab system[3]. UKHab mapping covered the full extent of the Site.

2.1.3 The UKHab system classifies habitats according to their vegetation types and structure, following a principal hierarchy of 'Primary Habitats'. Primary Habitats include ecosystems (level 1), broad habitat types (level 2 and 3); defined habitats, including UK Biodiversity Action Plan Priority Habitats[4] (level 4); and further defined habitats, including EU Habitats Directive Annex 1 habitats (level 5). Each Primary Habitat has an alpha-numeric code, unique to UKHab (i.e. different to other habitat survey methods such as Phase 1 and NVC).

2.1.4 A non-hierarchical system of numeric codes ('Secondary Codes') can then be used to provide more information on a habitat.

2.1.5 A Primary Habitat and any relevant Secondary Codes were assigned to each area-based polygon, point or linear feature mapped from the Site. Habitats were marked on a handheld mapping device using Geographical Information System (GIS) software. The smallest area to be mapped was 0.01 ha, which was selected as a suitable scale to sample the range of different vegetation types present.

2.1.6 Text descriptions to qualify habitat assignment, including plant species, were also recorded. The scientific names for plant species follow those in New Flora of the British Isles[5] and Mosses and Liverworts of the British Isles[6].

2.1.7 Additional data on habitat condition for area-based habitats and linear features were also recorded during the UKHab surveys using the system presented in Natural England's Biodiversity Metric V3.1[7]. This has been used to inform a separate Biodiversity Net Gain assessment (**Volume 4, Appendix 9.6: Biodiversity Net Gain Report**).

2.2 National Vegetation Classification

2.2.1 The UKHab data were reviewed to identify areas with potential to be GWDTE, peatland, or other habitats of elevated importance (e.g., EU Habitats Directive Annex 1 habitats). Any areas with potential to represent this were subject to additional botanical assessment via NVC survey. The data review and NVC survey were undertaken by an ecologist who is 'accomplished'[1] in habitat assessment with 10 years of experience.

2.2.2 A targeted NVC survey was undertaken in the field on 7 May 2024 to assess and assign NVC communities to areas of potential GWDTE and peatland. The survey covered habitats within the Site and was extended to search up to 250 m beyond the Site to identify additional potential GWDTE and priority peatland within the Proposed Development's potential zone of influence for these habitat types. This included areas of rush dominated

[1] CIEEM (2021). Competency Framework. Available at: https://cieem.net/resource/competency-framework/
[2] The Site boundary was extended to the east after the first UKHab survey.
[3] UKHab Ltd. (2020). UK Habitat Classification, Version 2.0. Available at: https://www.ukhab.org.
[4] Where UK Biodiversity Action Plan Priority Habitats have been identified, these have been assessed against the relevance within the Scottish Biodiversity List.
[5] Stace, C. A. (2019). New Flora of the British Isles. Fourth Edition. C&M Floristics, Suffolk.
[6] Atherton, I., Bosanquet, S., Lawley, M. eds. (2010). Mosses and Liverworts of the British Isles: a field guide. British Bryological Society.
[7] Natural England (2023). Biodiversity Metric 3.1 (JP039). Technical Annex 1 - Condition Assessment Sheets and Methodology. Available at: https://publications.naturalengland.org.uk/publication/5850908674228224.

grassland identified within the Site during the UKHab survey which could comprise NVC communities indicative of GWDTE[8].

2.2.3 The field survey classification methods followed industry standard guidelines[9]. At the targeted areas, homogenous stands and mosaics of vegetation were mapped as polygons on field survey maps. These polygons were surveyed quantitively with dominant and constant species, sub-dominant species and other species present across homogenous stands and mosaics. Vegetative data gathered within each stand in the field were analysed against published floristic tables[10] using surveyor experience to determine NVC communities. Wherever possible, communities were classified to sub-community level, although in some cases a sub-community level classification was not possible due to species-richness not being sufficient to allow meaningful sub-community determination.

2.3 Priority Habitat Identification

2.3.1 The UKHab system allows for identification of priority habitats by aligning certain Primary Habitat definitions to the UK Biodiversity Action Plan (UKBAP), which can be applied to the Scottish Biodiversity List[11] (SBL) with consideration of geographical relevance. It also considers EU Habitats Directive Annex 1 habitat types[12].

2.3.2 A review of the North East Scotland Biodiversity Partnership (NESBiP) statements on Important Habitats for Biodiversity[13] has also been reviewed to help identify priority habitats.

2.3.3 Guidance from NatureScot on identifying priority peatland habitats[14] was applied when targeting the NVC field survey and reviewing the data.

2.4 Limitations

2.4.1 UKHab classification provides a high-level overview of all terrestrial, coastal and freshwater habitat types (including engineered) and allows for priority and Annex 1 habitats to be identified. NVC provides a more detailed assessment of natural and semi-natural habitat types by separating specific communities by species presence and distribution. Therefore, the detail provided by the two surveys differs, one UKHab area may represent multiple NVC communities.

2.4.2 The results of the NVC survey, and the matches made in describing communities, represent a current community evaluation (as opposed to one seeking to describe what the community was before any human interference or may become in the future). In the absence of changes in land use, hydrology, or otherwise, and depending on the sensitivity and condition of communities identified, it is likely that data remains valid for up to three years.

[8] Scottish Environment Protection Agency (2017). Land Use Planning System Guidance Note 31: Guidance on assessing the impacts of development proposals on groundwater abstractions and groundwater dependent terrestrial ecosystems. Available at: https://www.sepa.org.uk/media/144266/lups-gu31-guidance-on-assessing-the-impacts-of-development-proposals-on-groundwater-abstractions.pdf.
[9] Rodwell, J. S. (2006). NVC Users' Handbook.
[10] Rodwell, J. S. (Ed), et al. (1991 – 2000). British Plant Communities (5 volumes).
[11] Scottish Ministers (2012). Scottish Biodiversity List. Available at: https://www.nature.scot/doc/scottish-biodiversity-list.
[12] Annex 1 habitat types which occur in the UK are listed here: https://sac.jncc.gov.uk/habitat/.
[13] NESBiP (online). Important Habitats for Biodiversity. Available at: https://www.nesbiodiversity.org.uk/biodiversity-information-for-developers/important-habitats-for-biodiversity-in-the-north-east-of-scotland/
[14] NatureScot (online). Advising on peatland, carbon-rich soils and priority peatland habitats in development management. Available at: https://www.nature.scot/doc/advising-peatland-carbon-rich-soils-and-priority-peatland-habitats-development-management

3. RESULTS

3.1 UK Habitat Classification

3.1.1 The spatial extents of the UKHab Primary Habitats at the Site (and associated Secondary Codes) at the Site are shown on **Volume 3, Figure 9.1.1 UK Habitat Classification**. A plant species list is provided in **Annex A** and photos are shown in **Annex B**. A description of each Primary Habitat is listed in **Table 1**, including identification of priority habitats.

3.1.2 No Annex 1 habitat types, important peat-forming habitats, or irreplaceable habitats were identified within the Site itself. Habitats considered a priority at the Site were limited to hedgerows providing connectivity across the open landscape for wildlife.

Table 1: UKHab Primary Habitats within the Site

Primary Habitat	Description	Area (ha) / length (m)
c1 – arable and horticulture	The largest portion of the Site, including all of the central area extending to both northern and southern boundaries, were used for arable purposes at the time of survey. Most of these fields were ploughed at the time of survey with one field noted as being recently sown, although it was not clear whether this was temporary ley or cereal/ non-cereal crop. These were actively managed habitats which are common and widespread in the northeast landscape. These do not qualify as SBL priority habitats.	65.77ha
g3c – other neutral grassland	Half of one field on the eastern boundary of the Site along with the southwest corner of a neighbouring field were mapped as other neutral grassland. The larger of the two areas was extensive and low-lying with a consistent species distribution albeit with a relatively species-poor assemblage. This area appeared to have poor drainage and appeared to be fed by overflowing surface water from a drainage ditch which extends through the Site towards Burn of Greens; visible surface water from the ditch was observed flowing towards this rushy low-lying area. Soft rush *Juncus effusus* was dominant with some parts dominated by Yorkshire-fog *Holcus lanatus* and common sorrel *Rumex acetosa*. The smaller of the two areas was also connected to the drainage ditch, with similar species composition – soft rush and Yorkshire-fog. These areas were included in the NVC survey and more detailed botanical assessment is recorded in **Section 3.2** below. These grasslands do not qualify as SBL priority habitats or match examples of the species-rich neutral grasslands described as being most valuable in the region[15].	4.46 ha
g4 – modified grassland	The next most prevalent habitat type on the Site after arable and horticulture comprised modified grassland. These areas were located along the eastern and western fields within the Site. This habitat was generally dominated by perennial rye-grass *Lolium perenne* and grazed by cattle and sheep. There were scattered rushes and scrub noted in one area, scattered trees in another area. Modified grassland was also used to map around the Mains of Green farm buildings, which were vacant and derelict. In all areas of modified grassland, species diversity was relatively poor, with less than nine species per square metre and predominantly grasses providing the cover. Other species included white clover *Trifolium repens*, meadow buttercup *Ranunculus acris*, broadleaved dock *Rumex obtusufolius* and daisy *Bellis perennis*, with rare occurrences of creeping thistle *Cirsium arvense*. This is a modified habitat of relatively low species diversity, which is common and widespread in the northeast landscape. This does not qualify as an SBL priority habitat and NESBiP acknowledges that improved grasslands are the least botanically rich[15].	38.22 ha

[15] NESBiP (online). Important Habitats for Biodiversity – Grasslands. Available: https://www.nesbiodiversity.org.uk/wp-content/uploads/2019/10/Grasslandsv1.pdf

Primary Habitat	Description	Area (ha) / length (m)
h2a – native hedgerows	Hedgerows were recorded on Site, between crop fields. They were dominated by hawthorn *Crataegus monogyna*, and less frequently elder *Sambucus nigra*, gorse *Ulex europaeus* and alder *Alnus glutinosa*. Nutrient-enriched field layers formed the understory with abundant common nettle *Urtica dioica* and frequent cleavers *Galium aparine*. Irrespective of their condition or management, these hedgerows have been considered priority features because they comprise predominantly of at least one woody UK native species[16]. NESBiP also acknowledges hedgerows as highly valuable features for biodiversity[17].	2,650 m
h3e – gorse scrub	Gorse scrub was mapped along a few field boundaries between arable and pasture fields at the western side of the Site. Gorse scrub is not an SBL priority habitat. Whilst NESBiP acknowledges that the biodiversity value of scrub is often underappreciated[17] and that it can provide cover for species in open spaces, the relatively minor extent and function of gorse scrub at the Site is not considered sufficient to elevate it's importance to priority status.	0.62 ha
u1b5 – buildings; u1e – built linear features	Buildings and other developed land were mapped in the southeast of the Site, at Mains of Greens. Built linear features recorded at the Site consisted of farm tracks and a minor road. These areas of urban habitats and developed land do not qualify as priority habitats.	0.38 ha
w2c – other coniferous woodland	A section of coniferous plantation woodland extended into the Site at the northwest corner. Two other small groups of coniferous trees and planted tree lines, including yew *Taxus baccata*, were recorded in the southeast of the Site at Mains of Greens. The edges of these were wind-blown resulting in up-turned root plates and dead trees. This plantation would not represent SBL priority habitat or important habitats described by NESBiP[17].	3.61 ha + 100m treeline at Mains of Greens
r2b – other rivers and streams; r1g – other standing water	A drainage ditch which feeds into the Burn of Greens extended through the Site from west to east. The western reach of the ditch between crop fields was overgrown and shaded by dense vegetation at the time of survey. Species included common nettle *Urtica dioica*, rosebay willowherb *Chamaenerion angustifolium*, monkeyflower *Mimulus guttatus*, reed canary-grass *Phalaris arundinacea*, creeping thistle *Cirsium arvense*, broadleaved dock *Rumex obtusifolius*, and gorse. At Mains of Greens, the ditch water was seen to be flowing over adjacent surface vegetation. The excess water appeared to contribute to the poor drainage of the nearby field recorded as rush dominated neutral grassland. The Burn of Greens itself extends along the eastern boundary of the Site. Rivers are listed as a priority habitat on the SBL and UK Biodiversity Action Plan[18]. Excluding the Burn of Greens there were no watercourses recorded within the Site that would qualify as SBL priority features. NESBiP acknowledges that straightened watercourses for agricultural drainage, such as the ditches and burns at the Site, have impacted ecology[19].	1,397 m

3.1.3 Secondary Codes shown on **Volume 3, Figure 9.1.1 UK Habitat Classification** relate to the following.

[16] This accords with the UKHab and UK Biodiversity Action Plan definitions, carried forward to the SBL.
[17] NESBiP (online). Important Habitats for Biodiversity – Woodlands. Available: https://www.nesbiodiversity.org.uk/wp-content/uploads/2019/10/Woodlandsv1-1.pdf.
[18] UK Biodiversity Action Plan: Priority Habitat Descriptions. BRIG (ed. Ant Maddock) 2008. (Updated Dec 2011)
[19] NESBiP (online). Important Habitats for Biodiversity – Freshwater Habitats. Available at: https://www.nesbiodiversity.org.uk/wp-content/uploads/2019/10/FreshwaterHabitatsv1.pdf

Table 2: UKHab Secondary Codes within the Site

Secondary Code	Description
10	Scattered scrub
14	Scattered rushes
15	Rushes dominant
29	Plantation
32	Scattered trees
33	Line of trees
49	Freshwater - artificial
50	Ditch
82	Vacant or derelict land
600	Ploughed
800	Road
839	Track

3.2 National Vegetation Classification

3.2.1 Vegetation within the Site mapped under the UKHab Primary Habitat g3c other neutral grassland aligned to a single NVC community, described below (MG10).

3.2.2 Areas which appeared to be semi-natural in the surrounding 250 m area were also inspected (e.g., surrounding the ponds to the north and east of the Site). However, these were recorded as modified habitats upon review. The remainder of the land within the Site and surrounding 250m area comprised modified cattle- and sheep-grazed grasslands, crops, developed land, coniferous woodland, gorse scrub, tree lines, and hedgerows; none of which would align to an NVC community indicative of GWDTE.

3.2.3 No NVC communities which would reflect priority peatland were identified within the Site or surrounding 250 m area.

3.2.4 **Volume 3, Figure 9.1.2 National Vegetation Classification** shows the spatial extent of targeted NVC mapping.

MG10 Holcus lanatus-Juncus effusus rush-pasture

3.2.5 Areas of rush-dominated vegetation occurring across low-lying land at the Site aligned to the MG10 community.

3.2.6 The extensive low-lying area in the east was very wet under foot at the time of survey with surface water visible, however fundamentally represented a grassland community. An overflow from a drainage ditch feeding the Burn of Greens was observed in the southwest corner with visible surface water from the ditch flowing towards this rushy area. This example of MG10 had consistently dominant soft rush and Yorkshire-fog, abundant common chickweed *Stellaria media*, creeping buttercup *Ranunculus repens* and bittercress *Cardamine* species, and frequent common sorrel *Rumex acestosa*. Other species included white clover, marsh willowherb *Epilobium palustre*, marsh thistle *Cirsium palustre*, broadleaved dock and daisy. This area aligned to the MG10a typical sub-community.

3.2.7 A smaller area of rush-dominated vegetation located to the southwest corner of a field also mapped to the same MG10a sub-community. This damp area of rank grassland was species-poor and dominated by soft rush. Other plants recorded are reed canary grass, common nettle, marsh willowherb, common sorrel, Yorkshire-fog and cuckooflower.

3.2.8 The MG10 community is listed as likely to be moderately groundwater dependent, depending on the hydrogeological setting[8] (i.e., a potential GWDTE).

3.3 Invasive and non-native species

3.3.1 Targeted surveys for invasive and non-native species have not been undertaken, however there was no indication or sightings of invasive and non-native plant species during the habitat surveys within the Site.

4. CONCLUSION

4.1.1 UKHab and NVC surveys have been undertaken of the Site and surrounding area.

4.1.2 Generally, the Site comprised modified grassland and cropland, with built features/ developed land including derelict buildings at Mains of Greens, a farm track and a minor road. Coniferous plantation was mapped in the northwest of the Site. Small groups and lines of coniferous trees were found by Mains of Greens. A drainage ditch extends through the Site from west to east, feeding into the Burn of Greens along the eastern Site boundary. Other linear features that were recorded include native hedgerows between crop fields; these would qualify as a priority habitat type.

4.1.3 Species-poor, rush-dominated neutral grassland was mapped from low lying areas in the east and centre of the Site. These rush habitats aligned to NVC community MG10, a community likely to be moderately groundwater dependent, depending on the hydrogeological setting. No other NVC communities which could be GWDTE were identified within the Site and surrounding 250 m area.

4.1.4 No Annex 1 habitat types, important peat-forming habitats/ priority peatland, or irreplaceable habitats were identified within the Site or surrounding 250 m area. Habitats considered a priority at the Site were limited to hedgerows.

4.1.5 The Burn of Greens, which lies within the site boundary is a priority habitat on the SBL and UKBAP.

ANNEX A: SPECIES LIST

Common name	Scientific name
European larch	*Larix decidua*
Common nettle	*Urtical dioica*
Cleavers	*Galium aparine*
Gorse	*Ulex europaeus*
Elder	*Sambucus nigra*
Hawthorn	*Crataegus monogyna*
Daisy	*Bellis perennis*
White clover	*Trifolium repens*
Perennial rye-grass	*Lolium perenne*
Creeping thistle	*Cirsium arvense*
Cock's-foot	*Dactylis glomerata*
Meadow buttercup	*Ranunculus acris*
Broadleaved dock	*Rumex obtusufolius*
Yorkshire-fog	*Holcus lanatus*
Soft rush	*Juncus effusus*
Common sorrel	*Rumex acestosa*
Willow	*Salix* species
Creeping buttercup	*Ranunculus repens*
Bittercress	*Cardamine* species
Common chickweed	*Stellaria media*
Marsh willowherb	*Epilobium palustre*
Marsh thistle	*Cirsium palustre*
Yew	*Taxus baccata*
Reed canary-grass	*Phalaris arundinacea*
Cuckooflower	*Cardamine pratensis*
Alder	*Alnus glutinosa*
Rosebay willowherb	*Chamaenerion angustifolium*
Monkeyflower	*Mimulus guttatus*
Reed canary-grass	*Phalaris arundinacea*

ANNEX B: SITE PHOTOS

Photo 1 - Ploughed crop field (c1 600)

Photo 2 - Modified grassland (g4) in east of Site

Photo 3 – rush dominated pasture (g3c 15; MG10) in east of Site

Photo 4 - rush dominated pasture (g3c 15; MG10) in east of Site

Photo 5 – Surface flow from drainage ditch by Mains of Green

Photo 6 - Surface flow from drainage ditch by Mains of Green, facing towards low-lying area of rush dominated pasture (g3c 15; MG10)

Photo 1 - Ploughed crop field (c1 600)

Photo 2 - Modified grassland (g4) in east of Site

Photo 7 - Hawthorn dominated hedgerow (h2a) along northern Site boundary

Photo 8 – Line of coniferous trees (w2c 33) with windblow damage, near Mains of Greens

Photo 9 – Drainage ditch (r2b 49) near Main of Greens, feeding into Burn of Greens