



Morven Hawthorn Pit Grid Connection Project

Preliminary Environmental Information Report

Volume 3, Annex 3.1: Terrestrial Ecology and
Terrestrial and Intertidal Ornithology Survey
Methodologies Technical Report

MVCNS-J4029-WSP-00021
October 2026
B01

Document status

Version	Purpose of document	Authored by	Checker	Approved by	Date
B01	PEIR	WSP	GH	AS	October 2026

Prepared by:	Prepared for:
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Glossary

Term	Meaning
Desk Study	A desk-based research method used to collect and analyse existing information, including the review of literature, previous survey reports, databases and maps to inform the baseline environment and the need for further surveys.
Expert Working Group	A topic-specific group of specialists formed under the evidence plan process (EPP) to resolve technical issues and agree approaches for environmental assessments.
Field Survey	The direct on-site observation and collection of environmental data, through sampling and recording, undertaken within the Survey Area.
Landfall	The area in which the offshore export cables make landfall (come onshore) and the transitional area between the offshore cabling and the onshore cabling. This term applies to the entire landfall area between the trenchless technique exit pits and the transition joint bay inclusive of all construction works.
Marine Directorate Licensing Operations Team (MD-LOT)	The part of the Scottish Government's Marine Directorate responsible for assessing and administering applications for marine licences and Section 36 consent (offshore) in Scotland.
Marine Management Organisation (MMO)	The MMO, as a UK government body, is responsible for licensing, regulating and overseeing activities in the marine environment for English waters. For a DCO and deemed marine licence, the MMO acts as a statutory consultee, advising on marine planning, environmental impacts, habitats and compliance with marine licensing regulations.
MHPGC Project Scoping Opinions	Separate scoping opinions received from PINS (on behalf of the Secretary of State) and MD-LOT (on behalf of the Scottish Ministers) in response to the MHPGC Project Scoping Report. The MHPGC Project Scoping Opinions contain the range of issues that PINS, and MD-LOT in consultation with statutory stakeholders, have identified should be considered within the EIA process.
MHPGC Project Scoping Report	A Scoping Report for the MHPGC Project, scoping the likely significant effects of the project on the environment, was submitted and accepted by Planning Inspectorate (PINS) and submitted to the Scottish Ministers, via the Marine Directorate – Licensing Operations Team (MD-LOT) in February 2025.
MHPGC Project Preliminary Environmental Information Report (PEIR)	Report that assesses the preliminary environmental impacts of the MHPGC Project, prior to the preparation of the Environmental Statement.
MHPGC Project PEIR Red Line Boundary	A report that provides preliminary environmental information in accordance with the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017. This is information that enables consultees to understand the likely significant environmental effects of a project and which helps to inform consultation responses.
MHPGC PEIR Red Line Boundary: Onshore	Spatial extent of the area used to define the environmental assessment within the PEIR. The area within which all components of the MHPGC Project will be located, including areas required on a temporary basis during construction and/or decommissioning (such as construction compounds).
Morven Hawthorn Pit Grid Connection Project	Spatial extent used to define the environmental assessment within the PEIR. The area within which all onshore components of the MHPGC Project will be

Term	Meaning
(hereafter MHPGC Project)	located landward of MHWS, including areas required on a temporary basis during construction and/or decommissioning (e.g. construction compounds).
Planning Inspectorate (PINS)	The PINS is an executive agency of the UK Government responsible for administering and examining DCO applications for NSIPs in England. PINS manages the application process, oversees consultation and examination, and makes a recommendation to the relevant Secretary of State on whether consent should be granted.
Special Protection Area (SPA)	Locations within the UK designated to conserve rare, vulnerable, and migratory bird species of European importance, as classified by the Conservation (Natural Habitats, &c.) Regulations 1994 (in Scotland), the Conservation of Habitats and Species Regulations 2017 (in England) and Conservation of Offshore Marine Habitats and Species Regulations 2017 (in Scotland and England).
Site of Special Scientific Interest (SSSI)	Designated areas which feature rare flora or fauna or are host to important features (physiological or geological) which are of scientific interest, designated under the Wildlife and Countryside Act 1981 (as amended).
Terrestrial Ecology and Terrestrial and Intertidal Ornithology Study Area	For each environmental topic, the baseline environment will be characterised, and the likely significant effect will be described within a topic-specific Study Area. Specific Study Areas are defined for each topic and are based on the maximum spatial extent across which likely significant effects of the MHPGC Project may be experienced by the relevant receptors (i.e. Zone of Influence (Zol)).
Survey Area	The area within which field surveys for the environmental topic are undertaken. This would include all areas for which impacts from the MHPGC Project may occur on relevant receptors.
Zone of influence	The area within which impacts arising from the MHPGC Project could occur upon receptors.

Acronyms

Acronym	Meaning
AC	Alternating Current
ARC	Amphibian and Reptile Conservation
BCT	Bat Conservation Trust
BNG	Biodiversity Net Gain
CBC	Common Bird Census
DAS	Discretionary Advice Service
DBW	Daytime Bat Walkover
DLL	District Level Licence
eDNA	Environmental DNA
EIA	Environmental Impact Assessment
ES	Environmental Statement
EWG	Expert Working Group
FISC	Field Identification Skills Certificate

Acronym	Meaning
GCN	Great Crested Newt
GLTA	Ground Level Tree Assessment
HCA	Habitat Condition Assessment
HSI	Habitat Suitability Index
IACPC	Impact Assessment and Conservation Payment Certificate
INNS	Invasive Non-Native Species
MD-LOT	Marine Directorate – Licencing Operations Team
MHPGC	Morven Hawthorn Pit Grid Connection
MMO	Marine Management Organisation
MvOWL	Morven Offshore Wind Limited
NE	Natural England
NSIP	Nationally Significant Infrastructure Project
NVC	National Vegetation Classification
NBW	Nighttime Bat Walkover
PEIR	Preliminary Environmental Information Report
PINS	Planning Inspectorate
PRF	Preliminary Roost Feature
PRLA	Preliminary Roost Assessment
PSCA	Population Size-Class Assessment
PSYM	Predictive System for Multimetrics
RCA	River Condition Assessment
RSPB	Royal Society of the Protection of Birds
SoS	Secretary of State
SPA	Special Protection Area
SPI	Species of Principle Importance
SSSI	Site of Special Scientific Interest
UKHab	UK Habitat Classification
WCC	White-Clawed Crayfish
WeBS	Wetland Bird Surveys
ZoI	Zone of Influence

Units

Unit	Meaning
cm	Centimetre
km	Kilometres
m	Metres
%	Percent
°C	Degrees Celsius

Executive Summary

This report presents the terrestrial ecology and terrestrial and intertidal ornithology survey methodologies for the Morven Hawthorn Pit Grid Connection Project (referred to hereafter as 'the MHPGC Project'). It forms **Volume 3, Technical Annex 3.1: Terrestrial Ecology and Terrestrial and Intertidal Ornithology Survey Methodologies Technical Report, of the Preliminary Environmental Information Report (PEIR)** prepared for the MHPGC Project and supports **Volume 3, Chapter 3: Terrestrial Ecology and Terrestrial and Intertidal Ornithology, of the PEIR**.

This report presents the terrestrial ecology and terrestrial and intertidal ornithology surveys scoped into the baseline data collection for the MHPGC Project, the need for which were informed by the habitats present within the MHPGC PEIR Red Line Boundary: Onshore. This report also details the terrestrial ecology and terrestrial and intertidal ornithology methodologies followed for surveys undertaken for the MHPGC Project. The scope and methodologies set out within this report have been developed and agreed via consultation with stakeholders, through the MHPGC Project Scoping Report and the Onshore Ecology and Onshore and Intertidal Ornithology Expert Working Group.

The relevant survey area for each survey type, together with the relevant technical report within the **Volume 3, Annexes, of the PEIR**, is also detailed.

Additional surveys that were considered and proposed as potentially required, based on limited existing data or habitat suitability are detailed within this report. These were proposed to only be undertaken should specific thresholds be met, such as evidence of habitats that could support significant populations or rare species. Said thresholds were not considered to be met at the time of writing and therefore no potentially required surveys were scoped in or completed to date, prior to PEIR publication.

Surveys not explicitly included within this report are considered scoped out, as they are not supported by existing records or habitat suitability within the MHPGC PEIR Red Line Boundary: Onshore and surrounding areas. This approach has been informed by the Scoping Report, previous surveys, and advice received via the Onshore and Intertidal Ecology and Ornithology Expert Working Group.

1 Introduction

1.1 Overview

- 1.1.1.1 This report presents the terrestrial ecology and terrestrial and intertidal ornithology survey methodologies for the Morven Hawthorn Pit Grid Connection Project (referred to hereafter as ‘the MHPGC Project’). It forms **Volume 3, Technical Annex 3.1: Terrestrial Ecology and Terrestrial and Intertidal Ornithology Survey Methodologies Technical Report, of the Preliminary Environmental Information Report (PEIR)** prepared for the MHPGC Project and supports **Volume 3, Chapter 3: Terrestrial Ecology and Terrestrial and Intertidal Ornithology, of the PEIR**.
- 1.1.1.2 This report presents the terrestrial ecology and terrestrial and intertidal ornithology surveys scoped into the baseline data collection for the MHPGC Project, the need for which were informed by the habitats present within the MHPGC PEIR Red Line Boundary. This report also details the terrestrial ecology and terrestrial and intertidal ornithology methodologies followed for surveys undertaken for the MHPGC Project. The scope and methodologies set out within this report have been developed and agreed via consultation with stakeholders.

1.2 Consultation and engagement

1.2.1 EIA Scoping

- 1.2.1.1 The MHPGC Project Scoping Report was issued to the PINS and MD-LOT in November 2024 (RPS, 2025). Following consultation with the appropriate statutory bodies, PINS (on behalf of the SoS) and MD-LOT provided a Scoping Opinion in March 2025 (PINS, 2025; MD-LOT, 2025).
- 1.2.1.2 **Section 3.3 of Volume 3, Chapter 3: Terrestrial Ecology and Terrestrial and Intertidal Ornithology, of the PEIR** sets out the key comments raised during the scoping process specific to terrestrial ecology and terrestrial and intertidal ornithology.

1.2.2 Expert Working Groups

- 1.2.2.1 The scope, methodology and findings of the terrestrial ecology and terrestrial and intertidal ornithology surveys completed to date have been discussed and, where appropriate, agreed with stakeholders via Onshore Ecology and Onshore and Intertidal Ornithology Expert Working Group meetings. Further detail regarding consultation undertaken with respect to terrestrial ecology and terrestrial and intertidal ornithology can be found in **Volume 3, Chapter 3: Terrestrial Ecology and Terrestrial and Intertidal Ornithology, of the PEIR**.

2 Scope of the surveys

2.1 Terrestrial ecology and terrestrial and intertidal ornithology

- 2.1.1.1 **Table 2.1** outlines the agreed scope of terrestrial ecological and terrestrial and intertidal ornithological surveys, as set out in the MHPGC Project Scoping Report and discussed via the Onshore and Ecology and Onshore and Intertidal Ornithology EWG. The relevant survey area for each survey type is set out within **Table 2.1**, together with the relevant technical report within the **Volume 3, Annexes, of the PEIR**.
- 2.1.1.2 **Table 2.2** identifies additional surveys that were considered and proposed as potentially required, based on limited existing data or habitat suitability. These were proposed to only be undertaken should specific thresholds be met, such as evidence of habitats that could support significant populations or rare species. As set out in **Section 3.6**, said thresholds were not considered to be met at the time of writing and therefore no potentially required surveys were scoped in or completed to date, prior to PEIR publication.
- 2.1.1.3 Surveys not included in **Table 2.1** or **Table 2.2** are considered scoped out, as they are not supported by existing records or habitat suitability within the MHPGC PEIR Red Line Boundary: Onshore and surrounding areas. This approach has been informed by the MHPGC Project Scoping Report, previous surveys undertaken on behalf of MvOWL, and advice received via the Onshore and Ecology and Onshore and Intertidal Ornithology EWG.

2.2 Intertidal ecology

- 2.2.1.1 Intertidal ecology surveys were scoped into the baseline surveys completed for the MHPGC Project following feedback from NE. As this report sets out the terrestrial ecology and terrestrial and intertidal ornithology survey scope and methodologies, the scope and methodology relating to the intertidal ecology surveys will be presented in the relevant technical survey report and the results reported in the Benthic Ecology Chapter in the Environmental Statement.

Table 2.1: Proposed surveys scoped in

Surveys scoped in	Survey Area	Detailed annex of the PEIR
Habitat surveys		
UKHab (including Habitat Condition Assessment (HCA))	UKHab Survey Area: Habitats within the MHPGC PEIR Red Line Boundary: Onshore, or within an additional 30m buffer.	Volume 3, Annex 3.2: UK Habitat Classification, National Vegetation Classification, River Condition Assessment and Hedgerow Surveys Technical Report, of the PEIR.
NVC	NVC surveys were undertaken within identified habitats of higher ecological value, such as habitats present within designated sites (i.e. SSSIs within or adjacent to the MHPGC PEIR Red Line Boundary: Onshore) and sensitive habitats such as woodlands and wetlands.	
Hedgerow surveys	Hedgerow Survey Area: Hedgerows within the MHPGC PEIR Red Line Boundary: Onshore, or within an additional 30m buffer.	
RCA	RCA Survey Area: Suitable watercourses within the MHPGC PEIR Red Line Boundary: Onshore, or within an additional 30m buffer.	
Protected species surveys		
Badger (<i>Meles meles</i>)	Badger Survey Area: Habitat considered to be suitable to support badger (such as woodland, scrub, verges, and grassland habitats which provide foraging and commuting) within the MHPGC PEIR Red Line Boundary: Onshore, or within an additional 30m buffer.	Volume 3, Annex 3.4: CONFIDENTIAL Interim Badger Surveys Technical Report, of the PEIR.

Surveys scoped in	Survey Area	Detailed annex of the PEIR
Bat - Preliminary Roost Assessment (PRA)	Bat Survey Area: Areas of woodland, trees, or buildings/structures with potential to support roosting bats, within the MHPGC PEIR Red Line Boundary: Onshore, or within an additional 50m buffer.	Volume 3, Annex 3.5: Interim Bat Surveys Technical Report, of the PEIR.
Bat - Ground Level Tree Assessment (GLTA)		
Bat – Emergence/activity		
GCN (<i>Triturus cristatus</i>)	GCN Survey Area: Suitable waterbodies within the MHPGC PEIR Red Line Boundary: Onshore, or within an additional 250m buffer	Volume 3, Annex 3.8: Interim Great Crested Newt Survey Technical Report, of the PEIR.
Otter (<i>Lutra lutra</i>)	Otter Survey Area: Suitable habitats within the MHPGC PEIR Red Line Boundary: Onshore, or within an additional 250m buffer.	Volume 3, Annex 3.10: Interim Otter Survey Technical Report, of the PEIR.
Water Vole	Water Vole Survey Area: Suitable habitats within the MHPGC PEIR Red Line Boundary: Onshore, or within an additional 10m buffer.	Volume 3, Annex 3.11: Interim Water Vole Survey Technical Report, of the PEIR.
Reptile	Reptile Surveys Area: Suitable habitats within the MHPGC PEIR Red Line Boundary: Onshore.	Volume 3, Annex 3.7: Interim Reptile Surveys Technical Report, of the PEIR.
Non-breeding season ornithology	Wintering and Intertidal Bird Survey Area: Habitats within the MHPGC PEIR Red Line Boundary: Onshore, or within an additional buffer of up to 650m where there is functionally linked land to account for species such as curlew.	Volume 3, Annex 3.13: Interim Wintering, Passage and Intertidal Birds Surveys Technical Report, of the PEIR.
Breeding season ornithology	Breeding Bird Survey Area: Habitats within the MHPGC PEIR Red Line Boundary: Onshore, or within an additional buffer of up to 650m where there is functionally linked land to account for species such as curlew.	Volume 3, Annex 3.12: Interim Breeding Birds Surveys Technical Report, of the PEIR.
Intertidal ornithology	Intertidal Bird Survey Area: Coastal habitats within the MHPGC PEIR Red Line Boundary: Onshore, or within an additional 500m from the MHPGC PEIR Red Line Boundary: Onshore north and south at landfall or within an additional 1.5 kilometre (km) viewshed, offshore.	Volume 3, Annex 3.13: Interim Wintering, Passage and Intertidal Birds Surveys Technical Report, of the PEIR.
WCC	WCC Survey Area: Watercourses present within the MHPGC PEIR Red Line Boundary: Onshore suitable for supporting populations of WCC, including relevant upstream/downstream habitats. These are watercourses that are alkaline, calcium-rich, clean and well oxygenated.	These surveys will not be included at PEIR, but will be included in the ES as a combined annex for the terrestrial freshwater surveys technical report.
Fish	Fish Survey Area: Watercourses suitable for supporting populations of migratory fish are present within the MHPGC PEIR Red Line Boundary: Onshore and up to 250m up and downstream. There are no physical impediments to fish migrating upstream and the watercourses are wide and deep enough for fish migration.	These surveys will not be included at PEIR, but will be included in the ES as a combined annex for the terrestrial freshwater surveys technical report.
Aquatic macroinvertebrates	Aquatic macroinvertebrates Survey Area: Watercourses suitable for supporting populations of aquatic invertebrates present within the MHPGC PEIR Red Line Boundary: Onshore. The watercourses are wide and deep enough for populations of aquatic invertebrates are present.	These surveys will not be included at PEIR, but will be included in the ES as a combined annex for the terrestrial freshwater surveys technical report.
Macrophytes	Macrophytes Survey Area: Watercourses and waterbodies present within the MHPGC PEIR Red Line Boundary: Onshore, large enough to support areas of aquatic macrophytes. Watercourses and waterbodies present	These surveys will not be included at PEIR, but will be included in the ES as a combined annex for the

Surveys scoped in	Survey Area	Detailed annex of the PEIR
	have water quality capable of supporting rarer macrophytes.	terrestrial freshwater surveys technical report.
Ponds	Ponds Survey Area: Ponds present within the MHPGC PEIR Red Line Boundary: Onshore of sufficient quality to support a population of species that are of increased biodiversity value. This would include ponds that are of good water quality and are unmodified by human intervention.	These surveys will not be included at PEIR, but will be included in the ES as a combined annex for the terrestrial freshwater surveys technical report.
SPI terrestrial invertebrate surveys.	Habitats suitable for supporting populations of terrestrial invertebrates of increased biodiversity value area present. These include Hesledon Moor East SSSI and Durham Coast SSSI and associated habitat.	Terrestrial invertebrate surveys are to be undertaken in 2026 but the results nor report will be ready to input into the PEIR. They will be included within the ES.

Table 2.2: Proposed surveys potentially scoped in and associated conditions for scoping in surveys

Surveys potentially scoped in	Conditions, if present, that would result in scoping in surveys	Need for surveys identified for PEIR
Species of Principal Importance (SPI) terrestrial vertebrate surveys.	Habitats suitable for supporting important populations of SPIs (including brown hare, harvest mouse and hedgehog) are present on site. These include good quality tussocky grassland, arable farmland, woodland edges, hedgerows, gardens and urban green spaces. Important vertebrate species SPI surveys will only be scoped in should the UKHab survey identify habitats with the potential to support substantial populations of SPI species. Furthermore, surveys will only be deemed necessary should the MHPGC Project have the potential to directly impact the suitable habitats.	No, at this stage, significant impacts on these species are not considered likely as detailed in Volume 3, Chapter 3: Terrestrial Ecology and Terrestrial and Intertidal Ornithology, of the PEIR.

3 Survey methodologies

3.1 Overview

3.1.1.1 **Table 3.1** to **Table 3.8** set out the proposed methodology for each of the terrestrial ecology and terrestrial and intertidal ornithological surveys that were either scoped in to the MHPGC Project or determined to be potentially required. Survey buffers for each survey type have been informed by best practice guidance, referenced per survey type where applicable.

3.2 Habitat surveys

3.2.1 UKHab and HCA surveys

Table 3.1: UKHab and HCA survey methodology

Survey	Details
UKHab survey	
Survey objectives	At the time of writing, the UKHab surveys are ongoing. The UKHab surveys will continue to be completed in line with the methodology followed to date. UKHab surveys were undertaken in 2025, and are ongoing in 2026, to provide general information on the type and distribution of habitats present, to establish baseline conditions, and follow best practice guidance (UKHab Ltd, 2023). Distinct habitat types and parcels will be identified and mapped. The objective is to record and provide a detailed, site-specific map of the habitats present within the UKHab Survey Area.
Required qualifications and experience of surveyors	Degree Level Qualification in Ecology or other relevant subject. Experience of surveyors varying between Graduate Ecologist (early career – 2 years' experience), Senior Ecologist (+8 years' experience) and Principal (over 10 years' experience). Experience of undertaking habitat surveys (following UKHab methodology) required.
Relevant guidance	UKHab Ltd (2023). UK Habitat Classification Version 2.0.
Description of survey methodology	Habitat surveys involved a site walkover and preliminary assessment of key habitats, land use and ecological features, particularly focusing on areas of natural interest which could be affected by the MHPGC Project. Prior to visiting the habitats within the UKHab Survey Area, a desk-based review was undertaken of all available data, including aerial imagery, previous survey data and publicly available biological/habitat data. The purpose of the desk-based review was to help guide survey efforts on the ground. During the walkover survey, the main habitats present were classified using standard UKHab methodology and definitions described in the UK Habitat Classification Version 2.0 guidance. Target notes were used to record habitats and features of particular interest. In addition to general habitat classification, a list was compiled of observed plant species. The abundance of each species was estimated for each habitat respectively using standard 'DAFOR' codes: • D = Dominant, A = Abundant, F = Frequent, O = Occasional, R = Rare. Habitats were mapped via the ArcGIS FieldMaps application on a handheld tablet by surveyors whilst in the field. Photographs and grid reference locations were collected, where relevant.
Seasonality and timings	The optimum season for UKHab surveys is between April and October. Given the scale of the MHPGC Project, survey work for UKHab took place across multiple survey visits. UKHab surveys completed to date, and any further surveys will be completed, within the optimum survey window.
Survey Area	The UKHab Survey Area comprised the MHPGC PEIR Red Line Boundary: Onshore, with an additional 30m buffer. Exceptions were considered where connectivity to a local feature may be relevant, or, where land use affords limited ecological connectivity, such as roads. It should be noted that private gardens, roads and carriageway embankments, railways and railway embankments and areas under construction were excluded from the UKHab Survey Area due to restrictions on access availability. Volume 3, Annex 3.2: UK Habitat Classification, National

Survey	Details
	Vegetation Classification, River Condition Assessment and Hedgerow Surveys Technical Report, of the PEIR details the results of the surveys, including percentage of completion.
HCA survey	
Survey objectives	A HCA was undertaken for each distinct habitat type/parcel in accordance with the condition criteria provided in the technical guidance that accompanies the Statutory Biodiversity Metric. The objective is to evaluate the condition of habitats, present within the HCA Survey Area to support the BNG assessment. Any further UKHab that has been/is to be completed in 2026 will include a HCA for each habitat parcel.
Required qualifications and experience of surveyors	Degree Level Qualification in Ecology or other relevant subject. Experience of surveyors varying between Graduate Ecologist (early career – 2 years' experience), Senior Ecologist (+8 years' experience) and Principal (over 10 years' experience). Experience of undertaking HCA as part of habitat surveys required.
Relevant guidance and legislation	- NE (2021). The Biodiversity Metric Supporting Documents; - DEFRA (2024). The Statutory Biodiversity Metric User Guide. Released February 2024; - DEFRA (2023). The Statutory Biodiversity Metric – Technical Annex 1: Condition Assessment Sheets and Methodology. Version 1.0.2, released 3rd July 2025.
Description of survey methodology	The HCA was carried out alongside the UKHab surveys as part of a site walkover. For each habitat type or feature recorded (via the UKHab methodology described above), an HCA was carried out to determine the condition of the habitat/feature as per the BNG Metric. Mapped habitats/feature parcels were scored based on specific criteria using a pass or fail system as set out in the Condition Assessment Sheets to obtain an overall condition score of Poor, Fairly Poor, Moderate, Fairly Good or Good. The sheets were stored in the Survey123 application, and the survey was carried out on a handheld tablet by surveyors whilst in the field. Each HCA was linked to the relevant habitat, mapped as part of the UKHab habitat survey, via georeferencing.
Seasonality and timings	The optimum season for HCA surveys is April to October. A single visit was required for each survey undertaken in the optimum season. HCA surveys have been completed to date within the optimum survey window.
Survey Area	The UKHab Survey Area (also the HCA survey area) comprised the MHPGC PEIR Red Line Boundary: Onshore, with an additional 30m buffer. Exceptions were considered where connectivity to a local feature may be relevant, or, where land use affords limited ecological connectivity, such as roads. It should be noted that private gardens, roads and carriageway embankments, railways and railway embankments and areas under construction were excluded from the UKHab Survey Area due to restrictions on access availability. Volume 3, Annex 3.2: UK Habitat Classification, National Vegetation Classification, River Condition Assessment and Hedgerow Surveys Technical Report, of the PEIR details the results of the surveys, including percentage of completion.

3.2.2 NVC surveys

Table 3.2: NVC survey methodology

Survey detail	Survey methodology
NVC survey	
Survey objectives	NVC surveys have been undertaken within identified habitat parcels of higher ecological value, particularly those considered to be priority or sensitive habitats such as designated sites and wetlands, with additional NVC surveys completed/scheduled in 2026. The objective is to classify the plant communities present within each of these habitat parcels within the MHPGC PEIR Red Line Boundary: Onshore or associated buffer (30m or up to 100m for Hawthorn Dene SSSI) by undertaking a targeted botanical assessment.

Survey detail	Survey methodology
Required qualifications and experience of surveyors	Degree Level Qualification in Ecology or other relevant subject. Experience of surveyors varying between Graduate Ecologist (early career – 2 years’ experience), Senior Ecologist (+5 years’ experience) and Principal (+7 years’ experience). Lead surveyor experienced in carrying out NVC as part of habitat surveys required, with at least a Field Identification Skills Certificate (FISC) level 3.
Relevant guidance and legislation	Rodwell, J.S. (2006) NVC Users’ Handbook, JNCC, Peterborough, ISBN 978 1 86107 574 1.

Survey detail	Survey methodology																						
Description of survey methodology	The NVC survey was and continues to be carried out within identified habitats of higher ecological value, such as habitats present within designated sites (i.e. Sites of Special Scientific Interest (SSSIs)) and sensitive habitats such as woodlands and wetlands, alongside the UKHab surveys as part of a walkover survey (Figure 2.2 of Volume 3, Annex 3.2: UK Habitat Classification, National Vegetation Classification, River Condition Assessment and Hedgerow Surveys Technical Report, of the PEIR). The survey scope has been adapted to ensure that advice from NE was considered. NE advised that NVC surveys are undertaken for habitats within Hawthorn Moor East SSSI, Hawthorn Moor West SSSI, Hawthorn Dene SSSI and Durham Coast SSSI where they are likely to be impacted directly or indirectly by the MHPGC Project. At the time of writing, the NVC surveys are ongoing. The NVC surveys will continue to be completed in line with the methodology followed to date. For the NVC surveys completed to date, the NVC survey involved undertaking a detailed botanical assessment of each of the habitats identified (via the UKHab methodology described above) as per the methodology described in best practice guidance¹. All plant species within each quadrat were recorded with an estimate of percentage cover and abundance using the Domin scale (Rodwell, 2006) (Table 3.2.1). The frequency of each species was determined based on the number of quadrats in which it was recorded, according to the values in Table 3.2.2. Five 2 metre squared (m²) quadrats were surveyed within each habitat area, and the species composition analysed. Table 3.2.1: Domin scale (Rodwell, 2006) <table><tr><th colspan="2">Domin</th></tr><tr><td>91-100%</td><td>10</td></tr><tr><td>76-90%</td><td>9</td></tr><tr><td>51-75%</td><td>8</td></tr><tr><td>34-50%</td><td>7</td></tr><tr><td>26-33%</td><td>6</td></tr><tr><td>11-25%</td><td>5</td></tr><tr><td>4-10%</td><td>4</td></tr><tr><td><4% (many individuals)</td><td>3</td></tr><tr><td><4% (several individuals)</td><td>2</td></tr><tr><td><4% (few individuals)</td><td>1</td></tr></table>	Domin		91-100%	10	76-90%	9	51-75%	8	34-50%	7	26-33%	6	11-25%	5	4-10%	4	<4% (many individuals)	3	<4% (several individuals)	2	<4% (few individuals)	1
	Domin																						
	91-100%	10																					
	76-90%	9																					
	51-75%	8																					
34-50%	7																						
26-33%	6																						
11-25%	5																						
4-10%	4																						
<4% (many individuals)	3																						
<4% (several individuals)	2																						
<4% (few individuals)	1																						
	Table 3.2.2: Frequency of species (Rodwell, 2006) <table><tr><th>Frequency class</th><th>% of quadrats in which species recorded</th><th>Frequency measure</th></tr><tr><td>I</td><td>1-20%</td><td>Scarce</td></tr><tr><td>II</td><td>21-40%</td><td>Occasional</td></tr><tr><td>III</td><td>41-60%</td><td>Frequent</td></tr><tr><td>IV</td><td>61-80%</td><td>Constant</td></tr><tr><td>V</td><td>81-100%</td><td>Constant</td></tr></table>	Frequency class	% of quadrats in which species recorded	Frequency measure	I	1-20%	Scarce	II	21-40%	Occasional	III	41-60%	Frequent	IV	61-80%	Constant	V	81-100%	Constant				
Frequency class	% of quadrats in which species recorded	Frequency measure																					
I	1-20%	Scarce																					
II	21-40%	Occasional																					
III	41-60%	Frequent																					
IV	61-80%	Constant																					
V	81-100%	Constant																					
Seasonality and timings	The optimum season for NVC surveys is April to October. A single visit was required for each survey completed in the optimum season. NVC surveys completed to date, and any further surveys will be completed, within the optimum survey window.																						

¹ Rodwell, J.S. (2006). NVC Users' Handbook. JNCC, Peterborough. ISBN 978 1 86107 574 1

Survey detail	Survey methodology
Survey Area	The NVC Survey Area comprised the MHPGC PEIR Red Line Boundary: Onshore, with an additional 30m buffer. Surveys were also undertaken within protected sites where appropriate) as requested by NE, detailed above. Exceptions may include where connectivity to a local feature may be relevant, or, where land use affords limited ecological connectivity, such as roads. It should be noted that private gardens, roads and carriageway embankments, railways and railway embankments and areas under construction were excluded from the NVC Survey Area. Volume 3, Annex 3.2: UK Habitat Classification, National Vegetation Classification, River Condition Assessment and Hedgerow Surveys Technical Report, of the PEIR details the results of the surveys, including percentage of completion.

3.2.3 Hedgerow surveys

Table 3.3: Hedgerow survey methodology

Survey detail	Survey methodology														
Hedgerow surveys															
Survey objectives	A survey was undertaken for all hedgerows within the Hedgerow Survey Area, as defined within the MHPGC PEIR Red Line Boundary: Onshore. The objective is to map the distribution and condition of hedgerows within the Hedgerow Survey Area, to identify those that are particularly important for wildlife and whether any of the hedgerows have the potential to be classified as 'important' under the Hedgerows Regulations 1997.														
Required qualifications and experience of surveyors	Degree Level Qualification in Ecology or other relevant subject. Experience of surveyors varying between Graduate Ecologist (early career – 2 years' experience), Senior Ecologist (+8 years' experience) and Principal (over 10 years' experience). Experience of carrying out hedgerow survey as part of habitat surveys required, with competence in botany.														
Relevant guidance and legislation	- DEFRA (2007). Hedgerow Survey Handbook. A standard procedure for local surveys in the UK. Defra, London; - The Hedgerow Regulations 1997.														
Description of proposed survey methodology	An initial assessment of hedgerows was made during the site walkover, alongside the UKHab survey, to assess whether the hedgerows had the potential to be classified as 'important' under the Hedgerows Regulations 1997. The next stage of the hedgerow field surveys, specifically field surveys to confirm hedgerow type and condition, are to be completed in September 2026. Hedgerow characteristics and associated features used to assess importance have been recorded as per Table 3.3.1. Table 3.3.1 Hedgerow characteristics/features recorded to assess importance <table> <tr> <th>Characteristic feature</th><th>Description</th></tr> <tr> <td>Hedgerow type</td><td>Shrubby hedgerow, line of trees, shrubby hedgerow with trees or gappy hedgerow</td></tr> <tr> <td>General notes</td><td>Special wildlife or nature conservation features e.g. badger setts</td></tr> <tr> <td>Dimensions</td><td>Average hedgerow height and width</td></tr> <tr> <td>Connectivity</td><td>Number of direct connections with other hedgerows which may form a valuable hedgerow network</td></tr> <tr> <td>Adjacent land use</td><td>Description of the adjacent land use on either side of the hedgerow such as arable, grassland, woodland, road/route and water, as well as presence of livestock</td></tr> <tr> <td>Associated features</td><td>Description of associated features including banks, ditches, fences or herbaceous vegetation on banks and margins</td></tr> </table>	Characteristic feature	Description	Hedgerow type	Shrubby hedgerow, line of trees, shrubby hedgerow with trees or gappy hedgerow	General notes	Special wildlife or nature conservation features e.g. badger setts	Dimensions	Average hedgerow height and width	Connectivity	Number of direct connections with other hedgerows which may form a valuable hedgerow network	Adjacent land use	Description of the adjacent land use on either side of the hedgerow such as arable, grassland, woodland, road/route and water, as well as presence of livestock	Associated features	Description of associated features including banks, ditches, fences or herbaceous vegetation on banks and margins
Characteristic feature	Description														
Hedgerow type	Shrubby hedgerow, line of trees, shrubby hedgerow with trees or gappy hedgerow														
General notes	Special wildlife or nature conservation features e.g. badger setts														
Dimensions	Average hedgerow height and width														
Connectivity	Number of direct connections with other hedgerows which may form a valuable hedgerow network														
Adjacent land use	Description of the adjacent land use on either side of the hedgerow such as arable, grassland, woodland, road/route and water, as well as presence of livestock														
Associated features	Description of associated features including banks, ditches, fences or herbaceous vegetation on banks and margins														

Survey detail	Survey methodology	
	Undisturbed ground and perennial herbaceous vegetation cover	Average width of undisturbed ground and average width of perennial herbaceous vegetation
	Nutrient enrichment ground flora indicator species	Percentage cover of enrichment species in the 303m survey section including nettles <i>Urtica</i> spp., cleavers <i>Galium aparine</i> or docks <i>Rumex</i> spp.
	Recently introduced, non-native species	Percentage cover of recently introduced, non-native species in the 30m survey section as defined in the 'New Atlas of the British and Irish Flora' by Preston (2002)
	Hedgerow shape	Shrubby hedgerows and shrubby hedgerows with trees should be sub-divided by the following shapes: trimmed and dense, intensively managed, untrimmed, tall and leggy, untrimmed with outgrowths, recently coppiced and recently laid
	Integrity (i.e. 'gappiness')	Integrity is measured as a factor of several features including the continuity of the canopy, estimated as a percentage of gaps along the 30m survey section, gaps >5m and the average height of the base of the canopy
	Isolated hedgerow trees	Total number of isolated hedgerow trees within the 30m section. Percentage of young trees with a maximum Diameter at Breast Height (DBH) of 1-5cm within the total number of trees in the sample and percentage of veteran trees with a DBH >1m within the total number of trees in the sample. Average number of isolated hedgerow trees per 100m (extrapolated from 30m counts).
	Woody species per 30m	Number of woody species per 30m of continuous woody species cover including structural species, not climbers (other than roses) or bramble
	Hedgerow management	Obvious signs of management e.g. trimming or gapping
The survey identified, and condition assessed all hedgerows (defined as any boundary line of trees or shrubs over 20m long and less than 5m wide at the base, provided these are largely continuous) within the Hedgerow Survey Area. Hedgerows within the survey area were defined then surveyed in units as per best practice set out in the Hedgerow Survey Handbook. The survey included identification of the hedgerow type and its characteristics (dimensions such as length, width, shape, gaps), adjacent land use, associated features (such as ditches, banks, fences, etc.), adjacent undisturbed ground and vegetation cover, and characterisation of species including adjacent ground flora. The ecological importance of the hedgerow were then assessed against the set criteria within the Hedgerows Regulations 1997. Based on the Hedgerows Regulations 1997, hedgerows are considered important if they are at least 30 years old and meet at least one of the following criteria: • Contain protected species listed in part 1 of Schedule 1, Schedule 5 or Schedule 8 of the Wildlife and Countryside Act 1981 (as amended); • Contain species that are endangered, vulnerable and rare and are identified in the British Red Data books (Perring and Farrell, 1977; Shirt, 1987; Bratton, 1991); • Include woody species and associated features as specified in Schedule 1, Part II Criteria, paragraph 7(1) of the Hedgerows Regulations 1997. In summary, and specifically for northwest England, the hedgerow must include one or more of the following: – At least six woody species; – At least five woody species plus at least three associated features (detailed in paragraph 2.4.2.5); – At least five woody species including black poplar, large-leaved lime, small-leaved lime or wild service tree; or – At least four woody species and at least four associated features.		

Survey detail	Survey methodology
	The associated features include: • A bank or wall for at least half the length; • A ditch for at least half the length; • Gaps over no more than 10% of the length; • At least one standard tree per 50m; • At least three ground flora woodland species as defined in Schedule 2 of the Regulations within 1m of the hedgerow; • Connections scoring four or more points, where connection with a hedgerow counts as one, and a connection with broadleaved woodland or a pond counts as two; • A parallel hedge within 15m. Hedgerows were mapped via the ArcGIS FieldMaps application on a handheld tablet by surveyors whilst in the field, with the detail on hedgerow type and condition. Photographs and grid reference locations were, and will continue to be, collected where relevant.
Seasonality and timings	The optimum season for Hedgerow surveys is April to October. At least one visit was required for each survey completed in the optimum season, with an additional visit planned for identifying type and condition. Hedgerow surveys have been completed, , within the optimum survey window.
Survey Area	The Hedgerow Survey Area comprises all relevant hedgerows within the MHPGC PEIR Red Line Boundary: Onshore, or within an additional 30m buffer. Exceptions may include where connectivity to a local feature may be relevant, or, where land use affords limited ecological connectivity, such as roads. It should be noted that private gardens, roads and carriageway embankments, railways and railway embankments and areas under construction will be excluded from the hedgerow Survey Area. Volume 3, Annex 3.2: UK Habitat Classification, National Vegetation Classification, River Condition Assessment and Hedgerow Surveys Technical Report, of the PEIR details the results of the surveys, including percentage of completion.

3.2.4 RCA surveys

Table 3.4: Ponds and River Habitat surveys methodology

Survey detail	Survey methodology
RCA	
Survey objectives	An RCA was completed to determine the ecological health, quality and function of watercourses present within the MHPGC PEIR Red Line Boundary: Onshore, as well as to inform the BNG assessment.
Required qualifications and experience of surveyors	Degree Level Qualification in Ecology or other relevant subject. Experience of surveyors varying between Graduate Ecologist (early career – 2 years' experience), Senior Ecologist (+8 years' experience) and Principal (over 10 years' experience). Qualified ecologist who has completed RCA training (MoRPh).
Relevant guidance	Gurnell, A.M., England, J., Scott, S.J. and Shaker, L.J. (2020 updated in 2024) A Guide to Assessing River Condition – Part of the Rivers and Streams Component of the Biodiversity Net Gain Metric. Queen Mary University of London
Description of proposed survey methodology	An RCA was carried out for all suitable rivers and streams identified as such during the initial desk study and site walkover (during UKHab surveys), in line with the appropriate guidance. Scoping: Prior to the commencement of surveys, a desk-based review was undertaken of aerial imagery to identify watercourses within the UKHab Survey Area. During the UKHab surveys, watercourses within the UKHab Surveys Area were identified. The RCA followed the MoRPh survey method and was undertaken by a certified surveyor. The method worked to sample each river/watercourse by surveying modules (splitting the watercourse into five survey locations) at which the physical and habitat features were recorded. The length of each module was determined by the MoRPh River

Survey detail	Survey methodology
	Width; estimated as the typical water width and width of regularly inundated bare sediment or marginal/emergent plants at the water edge. The MoRPh survey extended 10m from the bank top and the surveyor recorded information relating to river morphometrics, including bank top, bank face, channel margin and the riverbed. The survey captured the extent and character of: • Sediment composition; • Morphological and hydraulic features/habitats; • Riparian and aquatic vegetation extent and structure; • Presence and extent of non-native invasive plant species; • Land use; • Human intervention. Once data was uploaded into the information system, river condition was assessed using 32 condition indicators that were automatically extracted from MoRPh field surveys. The Preliminary Condition Score for the sub-reach was then calculated as the sum of the average of the positive condition indicator scores and the average of the negative condition indicator scores. A desk study was then carried out, which combined information obtained in the field survey on bed material with information collected in the desk study covering river planform, valley gradient and valley confinement. With this information, a series of indicators were derived, and the indicative river type was automatically generated. The indicative river type was used to translate the Preliminary Condition Score (which is the average of all positive indicators plus the average of all negative indicator) into a Final Condition Score. This information will inform further assessment including BNG.
Seasonality and timings	The optimum season for RCA surveys is May through September. For RCA surveys, a single visit is required for each survey completed in the optimum season.
Survey Area	The RCA Survey Area comprised suitable watercourses within the MHPGC PEIR Red Line Boundary: Onshore, or within an additional 30m buffer. It should be noted that watercourses within private gardens, or within/adjacent to roads and carriageway embankments, railways and railway embankments and areas under construction were excluded from the RCA Survey Area. Volume 3, Annex 3.2: UK Habitat Classification, National Vegetation Classification, River Condition Assessment and Hedgerow Surveys Technical Report, of the PEIR details the results of the surveys, including percentage of completion..

3.3 Terrestrial ecology surveys

Table 3.5: Terrestrial protected species surveys methodology

Survey detail	Survey methodology
Badger survey	
Survey objectives	Badger surveys were undertaken to determine species presence and habitat usage, by this species, within the MHPGC PEIR Red Line Boundary: Onshore. Badger surveys were undertaken within the Badger Survey Area defined below. The objectives were to: • identify habitats with potential to support badger populations within the Badger Survey Area; • to record any field signs or active setts within the Badger Survey Area; • determine habitat usage/presence of badger populations across the Badger Survey Area; • identify any constraints associated with badger populations and/or mitigation requirements.
Required qualifications and experience of surveyors	Degree Level Qualification in Ecology or other relevant subject. Experience of surveyors varying between Graduate Ecologist (early career – 2 years' experience), Senior Ecologist (+8 years' experience) and Principal (over 10 years' experience). Experience of surveying for badger required.

Survey detail	Survey methodology
Relevant guidance	- Harris S., Cresswell P., & Jeffries D. (1989). Surveying Badgers. The Mammal Society, London. ISBN 0 906282 06 3. - Protection of Badgers Act (1992).
Description of survey methodology	The Badger Survey Area considers all areas of suitable habitat with potential to support badger populations, supplemented by previous survey data and data collected as part of the UKHab surveys. The Badger Survey Area considers suitable habitat within 30m of the MHPGC PEIR Red Line Boundary: Onshore. Suitable badger habitat include habitats such as woodland, scrub and verges (suitable for establishment of setts) and also grassland habitats which may provide foraging and commuting habitat for badger groups, also referred to as clans. Once these areas were identified and mapped, targeted badger surveys were undertaken by suitably qualified ecologists as per best practice guidance. These surveys consisted of a walkover survey of the suitable habitats to record field signs which would evidence the presence of badger. Field signs of badger include but are not limited to setts, dung/latrines, snuffle holes (foraging signs), footprints, paths/runs, hairs and bedding material. Evidence of other mammals was also recorded, such as rabbit droppings, rabbit warrens, fox dens and mammal runs. Badger bait marking was not considered to be necessary due to the level of badger activity recorded on site and the lack of a main sett. Field signs were mapped using hand-held tablets using ArcGIS FieldMaps application, which recorded location, field sign type and photo evidence. Any setts identified were classified as either main, annexe, subsidiary or outlier and their level of usage (active/partially active/disused) determined by deployment of camera traps. These camera traps were checked periodically for a minimum of 21 days or until usage by badger was confirmed.
Seasonality and timings	The optimum season for badger surveys, including sett monitoring, is February through April and September through November. For badger surveys a single visit was required for each survey completed in the optimum season, with the exception of where camera traps were required. Surveys can be completed outside this season by experienced surveyors, but revisits may be required within the optimum season where inconclusive results have been recorded. For the sett monitoring, cameras should be left over a minimum of 3 weeks in the optimal season.
Survey Area	The Badger Survey Area comprised the MHPGC PEIR Red Line Boundary: Onshore, with an additional 30m buffer. Exceptions included where connectivity to a local feature was relevant, or, where land use afforded limited ecological connectivity, such as roads. It should be noted that private gardens, roads and carriageway embankments, railways and railway embankments and areas under construction were excluded from the Badger Survey Area. Volume 3, Annex 3.4: CONFIDENTIAL Interim Badger Surveys Technical Report, of the PEIR details the results of the surveys, including percentage of completion.
Bat survey – Daytime Bat Walkover, Preliminary Roost Assessment and Ground Level Tree Assessment	
Survey objectives	PRA and GLTA surveys were undertaken for trees and suitable habitat within the Bat Survey Area. The objective of the surveys is to assess the potential of trees and buildings/structures within the PRA/GLTA Survey Area to support roosting bats. Note that roost surveys of trees or structures usually follow a staged approach; the first stage being PRA and GLTA surveys. These initial surveys are followed up by presence/ absence surveys (See 'Bat Emergence Surveys' for further detail and methods). GLTA and PRAs have been completed in all areas of the Bat Survey Area.
Required qualifications and experience of surveyors	Degree Level Qualification in Ecology or other relevant subject. Experience of surveyors varying between Graduate Ecologist (early career – 2 years' experience), Senior Ecologist (+8 years' experience) and Principal (over 10 years' experience). Licensed bat worker (in case of identified trees and structures with Potential Roost Features (PRF)). Surveys via endoscope or tree climbing may be required if PRFs cannot be assessed adequately via ground surveys. This survey must be undertaken by an ecologist with a Class 2 NE bat licence, and a tree climbing licence if applicable.

Survey detail	Survey methodology
	Any works likely to result in disturbance of bats and their roosts would be conducted by holders of Class 2 NE licences (or Accredited Agents under these licences).
Relevant guidance	Collins J. (2024). Bat Surveys for Professional Ecologists: Good Practice Guidelines (4th edition). Bat Conservation Trust (BCT).
Description of survey methodology	Following good practice guidelines, a Daytime Bat Walkover (DBW) was carried out during the UKHab surveys which identified areas of woodland, trees or buildings/structures with potential to support roosting bats. This determined the areas to be surveyed during the PRA/GLTA surveys. The PRA/GLTA surveys involved a daytime visual inspection of buildings/structures and trees (limited to exterior elevations for buildings/structures, and trees, both external elevations and internal voids) carried out within the PRA/GLTA Survey Area. In accordance with good practice guidelines, structures and trees were assessed for potential to support bats based on the presence of features considered to afford roosting potential, referred to as PRF. The types and features of buildings/structures and trees with the potential to supporting roosting bats are set out within the BCT good practice guidelines and summarised below. Building/structure types and features are of particular suitability to support roosting bats include: • buildings of pre-20th or early 20th century construction; • agricultural buildings of brick, stone or timber construction; • large and complicated roof void(s) with unobstructed flying spaces; • large (>20cm) roof timbers with mortise joints, cracks and holes; • entrances into buildings for bats to fly through; • poorly maintained buildings such that they provide access points for bats into roofs, walls, bridges, but at the same time not being too cool and draughty; • roof warmed by the sun e.g. south-facing; • weatherboarding and/or hanging tiles with gaps; • undisturbed building roofs and structures; • buildings and built structures in proximity to each other providing a variety of roosting opportunities throughout the year; • buildings and built structures close to good foraging habitat e.g. mature trees, parkland, woodland or wetland. Tree features considered of particular suitability to support roosting bats include: • natural holes; • woodpecker holes; • cracks / splits in major limbs; • loose bark; • bat, bird or mammal boxes; • partially detached large-stemmed ivy; • other hollows/cavities. After inspection, each building/structure and tree was categorised dependent on the presence of PRFs. The categories assigned were either, Confirmed Roost, High Potential, Moderate Potential, Low Potential or Negligible Potential for use by bats. PRF inspections comprised aerial tree inspections or inspections from the ground using an endoscope and/or torch. All inspections were conducted either by a trained tree climber who is also a NE licensed bat worker or accredited agent, or by a tree climber under the direct supervision of a licensed bat worker. To minimise the risk of disturbance during inspections, all tree climbers who are not licensed bat workers were briefed by a licenced bat worker.

Survey detail	Survey methodology
	PRF inspections involved accessing any PRFs using a harness and ropes to carry out a detailed internal inspection using torches, mirrors, and endoscopes to determine the presence/likely absence of bats, and to obtain information on the suitability of the PRF for bats. Where PRFs are at a low height on the tree and can be reached from the ground or ladder, an aerial tree inspection was not undertaken. Instead, surveyors used a torch and/or endoscope to fully inspect the PRF from the ground or a ladder. Any trees categorised as FAR or PRF during the GLTA that were considered safe to climb and that may be impacted by works, were subject to a PRF inspection. When trees were not considered safe to climb, those categorised as FAR or PRF instead progressed directly to emergence survey, unless all PRFs present could be inspected from the ground. Trees that were not suitable (as defined by Collins (2023)) were not subject to further survey. Each PRF identified during the PRF inspection was categorised in accordance with Bat Conservation Trust's Good Practice Guidelines. Note that roost surveys of trees or structures usually follow a staged approach. The first stage being PRA and GLTA surveys. These initial surveys are followed up by presence/absence surveys (See 'Bat Emergence Surveys' for further detail and methods).
Seasonality and timings	GLTAs can be undertaken at any time of the year but it is best to avoid summer months when dense leaf cover can reduce the effectiveness of the survey. For PRA/GLTA surveys a single visit will be required for each survey completed in the optimum season. Surveys can be completed outside this season by experienced surveyors, but revisits would be required within the optimum season.
Survey Area	The PRA/GLTA Survey Area will comprise the MHPGC PEIR Red Line Boundary: Onshore, with an additional 50m buffer. Exceptions may include where connectivity to a local feature may be relevant, or, where land use affords limited ecological connectivity, such as roads. Volume 3, Annex 3.5: Interim Bat Surveys Technical Report, of the PEIR details the results of the surveys, including percentage of completion
Bat survey - emergence/activity/aerial inspections	
Survey objectives	The emergence/activity surveys/aerial inspections were informed by the DBW, PRA and GLTA surveys. Where features were identified within the Bat Survey Area with potential roosts emergence surveys were completed to determine presence / absence of bat roosts. No further survey is required for structures or trees assessed to offer negligible suitability as informed by the GLTA or PRA. All emergence, activity and aerial inspection surveys have been completed in all areas of the Bat Survey Area.
Required qualifications and experience of surveyors	Degree Level Qualification in Ecology or other relevant subject. Experience of surveyors varying between Graduate Ecologist (early career – 2 years' experience), Senior Ecologist (+5 years' experience) and Principal (+7 years' experience).
Relevant guidance	Collins J. (2024). Bat Surveys for Professional Ecologists: Good Practice Guidelines (4th edition). BCT.
Description of survey methodology	<u>Emergence Survey</u> The emergence surveys comprised dusk visits to determine presence/absence in accordance with good practice guidelines. The need for emergence surveys was informed by the findings of the PRA/GLTA, specifically where: - any building/structure or trees which have been assessed as low potential, moderate potential, high potential or confirmed roosts following the PRA/GLTA surveys; - the PRA/GLTA has not ruled out the reasonable likelihood of a roost being present, but no definitive evidence of the presence of bat roosts has been recorded; - a comprehensive inspection survey of a structure is not possible because of restricted access, but there are features with a reasonable likelihood of supporting bats; - there is a risk that evidence of bat use may have been removed by weather or human activities; or - where a feature cannot be safely accessed for inspection (e.g. dead tree) or may be damaged by close inspection (e.g. lifted bark).

Survey detail	Survey methodology
	The dusk visits involved recording possible and confirmed emergences (using a bat detector and Night Vision Aids), compiling information on species, numbers, access points, roosting locations and flightpaths. The timings of the surveys were based on site-specific circumstances, based on recommendations set out in the guidance. <u>Activity Survey</u> Where appropriate (i.e. along treelines, hedgerows and woodland edges) transects were walked by surveyors equipped with bat detectors, referred to as night-time bat walkover transects as per Good Practice Guidance (Collins, 2024). The surveys commenced at sunset and finish two-three hours after sunset. Surveys were targeted within a 50m buffer surrounding the MHPGC PEIR Red Line Boundary: Onshore (reflecting potential for indirect effects). In tandem with the Nighttime Bat Walkover (NBW) surveys, a number of static bat detectors were deployed in various areas to investigate bat activity throughout the Bat Survey Area. At least two static detectors were located on each of the NBW transect routes. Static locations included areas likely to be impacted by the scheme, whilst ensuring adequate coverage of perceived important habitat for bats. <u>Aerial Inspections</u> Trees categorised as either FAR or PRF during the GLTA surveys were subject to detailed at-height inspections (where safe and accessible to do so). These inspections were required where features could not be confidently categorised as PRF-I or PRF-M from the GLTA, in order to obtain sufficient information to determine their roosting suitability. Inspections were undertaken using appropriate access methods, including tree climbing equipment (ropes and harnesses) and ladders. A torch and endoscope were used as necessary to inspect PRFs. During these inspections, trees were re-assessed and the characteristics and suitability of PRFs recorded, including aspect and dimensions. Based on the information collected, trees were assigned a final suitability classification as appropriate outlined by Collins (2023). Trees were also inspected for field signs of roosting bats to help determine presence/absence at the time of survey if no bats are observed in PRFs. Field signs of bats using a roost can include droppings, scratch marks, or oil staining from fur rubbing.
Seasonality and timings	<u>Emergence Survey and Aerial Inspections</u> As per Good Practice Guidance (Collins, 2024), the optimum season for emergence surveys is May through September, with at least two undertaken between May and August, spaced at least three weeks apart where multiple visits are required For emergence surveys the number of visits that will be required for each survey completed in the optimum season depend on roost suitability. No visits were required for trees/structures assessed as having negligible suitability. Two visits for roost suitability assessed as moderate and for those assessed as high or confirmed, of trees with PRF-M three visits were required. For aerial inspections, the number of visits that will be required for each survey completed in the optimum season depend on roost suitability. No visits are required where PRF was assessed as having negligible suitability and three visits were required with PRF-M.. <u>Activity Surveys</u> As per Good Practice Guidance (Collins, 2024), one NBW should be completed per season (spring – April/May, summer – June/July/August, autumn – September/October), Three NBW have been completed from June – September.. NBW will start from sunset and run for 2/3 hours after sunset. Static surveys will be completed for a minimum of five consecutive nights per month (June to October) in appropriate weather conditions for bats.
Survey Area	To be informed by the initial PRA/GLTA surveys. Surveys will be targeted within a 50m buffer surrounding the MHPGC PEIR Red Line Boundary: Onshore (reflecting potential for indirect effects). It should be noted that private gardens, roads and carriageway embankments, railways and railway embankments and areas under construction will be excluded from the survey. Volume 3, Annex 3.5: Interim Bat Surveys Technical Report, of the PEIR details the results of the surveys, including percentage of completion.
GCN survey	
Survey objectives	GCN surveys were undertaken on all accessible ponds in 2025 and 2026 within the GCN Survey Area, with eDNA samples taken on suitable ponds. A number of ponds were dry at the time of

Survey detail	Survey methodology
	the surveys in 2025 and 2026 (checked on three separate occasions). The objective was to identify habitats with potential to support GCN and the presence and absence of GCN within said waterbodies, specifically ponds and ditches within the GCN Survey Area. The need for population size class assessment will be determined should GCN be recorded during the eDNA.
Required qualifications and experience of surveyors	Degree Level Qualification in Ecology or other relevant subject. Experience of surveyors varying between Graduate Ecologist (early career – 2 years' experience), Senior Ecologist (+8 years' experience) and Principal (over 10 years' experience). Work must be carried out under the supervision of a licenced ecologist – carrying a valid Natural England GCN licence.
Relevant guidance	- English Nature (2001). Great crested newt mitigation guidelines. Version: August 2001. - Biggs, J., Ewald, N., Valentini, A., Gaboriaud, C., Griffiths, R.A., Foster, J., Wilkinson, J., Arnett, A., Williams, P. and Dunn, F. (2014). Analytical and methodological development for improved surveillance of the Great Crested Newt. Appendix 4. Results of a pilot survey to test the use of eDNA outside of the recommended great crested newt survey window. Defra Project WC1067. Freshwater Habitats Trust: Oxford. - Langton T.E.S., Beckett C.L., and Foster J.P. (2001). Great Crested Newt Conservation Handbook. Froglife, Halesworth. ISBN 0952110644 - Amphibians and Reptile Groups of the United Kingdom (2010). ARG UK Advice Note 5: Great Crested Newt. HSI. ARGUK. Available at: https://cieem.net/resource/arg-uk-advice-note-5-great-crested-newt-habitat-suitability-index/ - SureScreen Scientifics (No Date). Great Crested Newt eDNA Guidance. Available at: https://www.surescreenscientifics.com/wp-content/uploads/2023/03/Detailed-GCN-Sample-Collection-Guidance-V4-1.pdf#:~:text=Natural%20England%20has%20defined%20the%20GCN%20eDNA%20sample,activity%20is%20noted%20in%20the%20area%20%28positive%20result%29.
Description of survey methodology	GCN surveys were completed for all suitable waterbodies, including ponds and ditches, within the defined GCN Survey Area. Suitable waterbodies were defined as waterbodies/features where water is stationary (i.e. not fast flowing) and aquatic vegetation is present on which GCN can lay eggs. Initially, suitable waterbodies were identified prior to survey by a desk study using aerial imagery, supplemented by existing habitat data. These were visited in the field and further assessed to confirm their suitability as described above. Note that any suitable waterbodies found during surveys not identified during the desk study were also considered. Further analysis involved testing of waterbodies for environmental DNA (eDNA) in line with best practice guidance (Amphibians and Reptile Groups of the United Kingdom, 2010; Langton <i>et al.</i>, 2001; SureScreen Scientifics, n.d.). 20 samples were taken using eDNA sampling kits from SureScreen Scientifics, specifically developed for GCN testing. All waterbodies considered at this stage were sampled within the correct sample window (15 April – 30 June) as per best practice and strict protocol followed as per sample kit manufacturer's instructions (SureScreen Scientifics). Once samples were analysed results determined likely presence of GCN within waterbodies. No GCN presence has been confirmed from the surveys completed to date. Where presence of GCN is confirmed by eDNA a Population Size-Class Assessment (PSCA) would be required to inform mitigation requirements or there would be utilisation of the Natural England DLL Scheme. PSCA surveys involve traditional survey methods to assess population size, involving either bottle trapping; torch surveys; netting or egg searches by licenced ecologists. Between four to six survey visits will be required for each waterbody with confirmed GCN prior to ES submission, surveys will need to fall within the optimum survey window (mid-March to mid-June). For MHPGC Project, should the presence of GCN be confirmed, the preference will be to utilise the DLL scheme. The DLL scheme will allow for strategic delivery of GCN conservation and mitigation on site. Rationale for favouring the latter option is based on ensuring the funding of long-term habitat maintenance and aims to boost GCN populations at a landscape scale by focusing conservation efforts where they will be most effective. Natural England have confirmed that the MHPGC Project falls within the amber risk zone within the GCN Risk Zone for Northumberland, Durham, Tyne and Wear and Tees Valley. Natural England confirm that

Survey detail	Survey methodology
	providing the MHPGC Project falls fully within either a green or amber risk zone, then a Natural England led DLL scheme will be available for use.
Seasonality and timings	The optimum season for GCN surveys, including eDNA surveys, is March through June. eDNA surveys were undertaken within this period (optimum timings being between mid-March to mid-June).
Survey Area	Suitable waterbodies up to 250m surrounding the MHPGC PEIR Red Line Boundary: Onshore (reflecting the distance within which the majority of adult GCN ordinarily remain around breeding ponds and where waterbodies are not separated from work areas by barriers to GCN dispersal). It should be noted that private gardens, roads and carriageway embankments, railways and railway embankments and areas under construction were excluded from the GCN Survey Area. Volume 3, Annex 3.8: Interim Great Crested Newt Survey Technical Report, of the PEIR details the results of the surveys, including percentage of completion
Otter survey	
Survey objectives	Otter surveys have been completed on all suitable riparian habitat within the Otter Survey Area. Otter surveys were undertaken to determine species presence and site usage by this species within the MHPGC PEIR Red Line Boundary: Onshore. Otter surveys were undertaken within the Otter Survey Area defined below. The objectives were to: • identify habitats with potential to support otter; • record any field signs or active holts within the Otter Survey Area; • determine habitat usage/presence of otter across the Otter Survey Area; • identify any constraints associated with otter and/or mitigation requirements.
Required qualifications and experience of surveyors	Degree Level Qualification in Ecology or other relevant subject. Experience of surveyors varying between Graduate Ecologist (early career – 2 years' experience), Senior Ecologist (+8 years' experience) and Principal (over 10 years' experience). Experience of surveying for otter required.
Relevant guidance	Chanin P (2003). Monitoring the otter: Conserving Natura 2000 Rivers Monitoring Series No. 10, English Nature, Peterborough.
Description of survey methodology	The Otter Survey Area considered all areas of riparian habitat with potential to support otters, supplemented by previous survey data and data collected as part of the UKHab surveys within the MHPGC PEIR Red Line Boundary: Onshore and a 250m buffer. Suitable otter habitat included riparian habitats associated with waterbodies and watercourses (including vegetated riverbanks, islands, reedbeds, ditches) and woodlands which may be used for foraging, breeding and resting. Note was taken to include both inland and coastal areas within the assessment, as otters are semi-aquatic mammals which make use of a wide range of ecological conditions including both fresh and salt water. Water quality was also considered as this is typically associated with food supply/abundance for otter. Signs of low-quality water conditions were determined by presence of agricultural run-off and/or pollution. Once these areas were identified and mapped, targeted otter surveys were then undertaken by suitably qualified ecologists as per best practice guidance. These surveys consisted of a walkover survey of the suitable habitats to record any field signs which evidence the presence of otter. Field signs of otter included holts, couches, slides, footprints, spraints, feeding remains and anal jelly (Chanin, 2023). Surveys were undertaken during suitable weather conditions in accordance with best practice guidance. Weather such as heavy rain (high water levels) and snow are considered sub-optimal for otter surveys as these conditions would wash away field signs such as spraints or footprints. Field signs were mapped using hand-held tablets using ArcGIS FieldMaps application, which recorded location, field sign type and photo evidence. If holts or couches were located then usage was determined, if likely to be impacted by the MHPGC Project. As such, camera traps were set up (focused on the potential holt/couch). These camera traps were checked after a set number of weeks (up to four weeks or until presence of otter is determined, except for where access limitations resulted in an extended period between checks). Where possible, this was undertaken in conjunction with other survey visits (i.e. reptile mat survey checks if required) to allow for survey efficiencies and reduce disturbance. The visits to these camera traps were

Survey detail	Survey methodology
	undertaken during the day, during which otters are less active, to minimise disturbance. If the presence of otter was confirmed then appropriate mitigation can be determined. To note, otter are mobile creatures; therefore any lack of evidence collected during field surveys does not confirm absence. As such, all suitable habitats identified as potential for supporting otter would be considered so at all stages of assessment via appropriate mitigation (i.e. pre-surveys surveys etc), even if otter signs are not found during field surveys.
Seasonality and timings	Otter surveys can be undertaken at any time of year. Survey timings are limited by vegetation cover and weather conditions more so than season. As such, spring is optimum for recording field signs, before riparian vegetation is fully established. Three targeted survey visit (September 2025, April and August 2026) covered all areas identified as potential otter habitat, as informed by desk and UKHab surveys. Experienced surveyors conducted all surveys in appropriate weather conditions. Where camera trap monitoring required, then monitoring took place across a set number of a weeks (up to four weeks or until presence of otter is determined).
Survey Area	Surveys focussed on suitable riparian habitats (i.e. waterbodies, watercourses, and ditches) up to a 250m buffer surrounding the MHPGC PEIR Red Line Boundary: Onshore. This was informed by UKHab surveys, previous survey records and aerial imagery (desk study). It should be noted that private gardens, roads and carriageway embankments, railways and railway embankments and areas under construction were excluded from the Otter Survey Area. Volume 3, Annex 3.10: CONFIDENTIAL Interim Otter Survey Technical Report, of the PEIR details the results of the surveys, including percentage of completion..
Water vole survey	
Survey objectives	Water vole surveys have been completed on all suitable riparian habitat within the Water Vole Survey Area. Water vole surveys were undertaken to determine species presence and site usage by this species within the Water Vole Survey Area as defined below. The objectives were to: • identify habitats with potential to support water vole; • record any field signs within the Water Vole Survey Area; • determine habitat usage/presence of water vole across the Water Vole Survey Area
Required qualifications and experience of surveyors	Degree Level Qualification in Ecology or other relevant subject. Experience of surveyors varying between Graduate Ecologist (early career – 2 years' experience), Senior Ecologist (+8 years' experience) and Principal (over 10 years' experience). Experience of surveying for water vole required.
Relevant guidance	• Strachan R. (2012). Water Vole Conservation Handbook, 3rd Edition. Wildlife Conservation Research Unit; • Dean, M., Strachan, R., Gow, D. and Andrews, R. (2016). The Water Vole Mitigation Handbook (The Mammal Society Mitigation Guidance Series). Eda Fiona Mathews and Paul Chanin. The Mammal Society, London.
Description of survey methodology	The Water Vole Survey Area considered all areas of riparian habitat with potential to support water vole and data collected as part of the UKHab surveys. The Water Vole Survey Area considers suitable habitat within 10m of the MHPGC PEIR Red Line Boundary: Onshore. Surveys were undertaken, and will continue, following best practice guidance (Dean, M., Strachan, R., Gow, D. and Andrews, R. (2016) and Strachan R. (2012). Suitable water vole habitat includes riparian habitats associated with waterbodies and watercourses (including vegetated riverbanks, islands, reedbeds, ditches) up to 2m from the waters edge, grasslands and woodlands which may be used for foraging, breeding and resting. Water quality and land use were also considered. Once these areas were identified and mapped, targeted water vole surveys were undertaken by suitably qualified ecologists as per best practice guidance. These surveys consisted of a walkover survey of suitable habitats to record field signs which would evidence the presence of water vole. Field signs of Water Vole included individual animals, burrows, droppings/latrines, feeding stations, footprints, runs and audible sounds from water vole.. Weather such as heavy rain (high water levels) and snow are considered sub-optimal for otter surveys as these conditions would wash away field signs such as spraints or footprints.

Survey detail	Survey methodology
	Field signs were mapped using hand-held tablets using ArcGIS FieldMaps application, which recorded location, field sign type and photo evidence.
Seasonality and timings	The optimum season for water vole surveys is mid-April and late September when they are generally most active. Surveys do not take place throughout winter, during which species activity declines and presence becomes harder to detect. Surveys were not undertaken during or preceded by periods of heavy rain.. A field survey was completed in September 2025 (where land access permissions allowed). The field surveys comprised two visits during the optimal survey period, scheduled between mid-April to end of June and a separate survey between July and September 2026, spaced at least two months apart. Note – due to land access issues one of the riparian habitats subject to survey could only be surveyed twice between August and September.
Survey Area	Surveys focussed on suitable watercourses and waterbodies within 10m of the MHPGC PEIR Red Line Boundary: Onshore. It should be noted that private gardens, roads and carriageway embankments, railways and railway embankments and areas under construction were excluded from the Water Vole Survey Area. Volume 3, Annex 3.11: Interim Water Vole Survey Technical Report, of the PEIR details the results of the surveys, including percentage of completion
Reptile survey	
Survey objectives	Reptile surveys were undertaken to determine location of suitable habitats for native reptile species and presence/absence of species within the MHPGC PEIR Red Line Boundary: Onshore. Reptile surveys were undertaken within the Reptile Survey Area as defined below. The objectives include to identify: • habitats with potential to support native reptiles within the Reptile Survey Area; • species presence/absence by conducting reptile surveys within the Reptile Survey Area; • any constraints associated with reptiles on site and/or mitigation requirements. In the instance that reptiles are recorded data would be analysed to determine the importance of the reptile population within the Reptile Survey Area. This assessment determined whether or not the site should be considered a Key Reptile Site, following guidance from Froglife (Froglife 1999). For a site to be considered a Key Reptile Site, at least three species of reptile must have been recorded, including two snake species.
Required qualifications and experience of surveyors	Degree Level Qualification in Ecology or other relevant subject. Experience of surveyors varying between Graduate Ecologist (early career – 2 years' experience), Senior Ecologist (+5 years' experience) and Principal (+7 years' experience). Lead surveyor demonstrates the following experience: • Field identification of all widespread reptile species and field signs (e.g., sloughs, burrows and eggs); • assessing the potential suitability of on-site habitats for widespread reptile species; • determining appropriate spatial scope for survey; • identifying appropriate survey techniques to achieve a robust survey in a variety of habitat types.
Relevant guidance	• Gent, T. and Gibson, S. (2003). Herpetofauna Workers Manual (revised edition). JNCC, Peterborough; • Froglife (1999). Reptile survey: an introduction to planning, conducting and interpreting surveys for snake and lizard conservation. Froglife Advice Sheet 10. Froglife, Halesworth; • Sewell D., Griffiths R.A., Beebee T.J.C., Foster J., & Wilkinson W. (2013). Survey Protocols for the British Herpetofauna. Version 1; • Amphibian and Reptile Conservation (ARC). National Reptile Survey Protocol.
Description of survey methodology	The Reptile Survey Area was determined based on review of suitable habitat present within the MHPGC PEIR Red Line Boundary: Onshore. This was informed by aerial imagery and UKHab surveys. All reptile surveys followed best practice guidelines as noted above. Habitats such as heathland, grassland, field margins, woodland edges were considered to be suitable for native reptile species (including slow worm (<i>Anguis fragilis</i>), common lizard (<i>Zootoca vivipara</i>), Grass snake (<i>Naatrix Helvetica</i>) and adder (<i>Vipera berus</i>)).

Survey detail	Survey methodology
	After the Reptile Survey Area was determined and mapped, the next stage was to set up refugia surveys as per best practice. This involved setting out refugia within the suitable habitat areas (Reptile Survey Area), consisting of 50cm by 50cm felt mats. One mat was set every 10m for linear features (field edges) or 10 mats per hectare (for areas i.e. heathland). The location of refugia was recorded using FieldMaps Application on handheld tablets. The refugia was left to settle for two weeks before the checks were made. Checks were made once every week for the following seven weeks. Checks of the reptile mats (refugia) were undertaken by ecologists following best practice guidance (see note regarding timings below). Mats were lifted carefully by hand and replaced in the same location. Any reptiles present under refugia were identified and counts made (refugia number, species, number, life stage (adult, subadult, juvenile) and where possible, sex.). All refugia checks were undertaken before 11am and no checks were undertaken in unfavourable weather conditions (i.e. heavy rain) when species would be unlikely to be utilising refugia.
Seasonality and timings	Reptiles are most active between March and October. Reptile surveys are best undertaken during April, May and September- i.e. periods when reptiles are most visible. Note: Three of the surveys were completed outside the active season (during October) for reptiles. Although this is not in line with Best Practice Guidance, the nil result is considered respective of the limited reptile populations recorded within the wider landscape. The artificial refugia were left to habituate for two weeks before the first survey commenced. Survey visits were made once every week for a seven-week period, between September and October 2025. All refugia checks were undertaken before 11am, during optimal weather conditions (i.e. between 9 degrees Celsius (°c) and 20°c, wind still to moderate (equivalent to Beaufort 4: 13-17 miles per hour with no or light rain only at time of survey), during the active period for reptiles (Froglife, 1999; Gent, T and Gibson, S., 2003; Sewell D., Griffiths R.A., Beebee T.J.C., Foster J., & Wilkinson W., 2013). Survey effectiveness is influenced by weather conditions, as such surveys were not undertaken during unfavourable conditions (i.e. heavy rain). Note that during the hottest summer months (June to August) reptiles are more difficult to detect as they bask less and make less use of refugia and this period is considered sub-optimal. Surveys cannot be completed November through February due to reptile hibernation. Surveys should be spaced at least 2 days apart and where possible, the survey period should last for longer than 30 days.
Survey Area	The Reptile Survey Area consisted of habitat within the MHPGC PEIR Red Line Boundary: Onshore which were suitable to support native reptiles. It should be noted that private gardens, roads and carriageway embankments, railways and railway embankments and areas under construction were excluded from the Reptile Survey Area. Volume 3, Annex 3.7: Interim Reptile Survey Technical Report, of the PEIR details the results of the surveys, including percentage of completion
SPI terrestrial invertebrate	
Survey objectives	The aim of the SPI terrestrial invertebrate survey is to identify potential species likely to occur and further identify habitats present within the MHPGC PEIR Red Line Boundary: Onshore, specifically those which have potential to support substation populations of SPI terrestrial invertebrate. The survey effort was informed by desk studies, UKHab surveys and protected species surveys.
Required qualifications and experience of surveyors	Degree Level Qualification in Ecology or other relevant subject Experience of surveyors varying between Graduate Ecologist (early career – 2 years' experience), Senior Ecologist (+5 years' experience) and Principal (+7 years' experience).
Relevant guidance	Drake C.M., Lott D.A., Alexander K.N.A., and Webb J. (2007). Surveying terrestrial and freshwater invertebrates for conservation evaluation. Natural England.
Description of survey methodology	Following consultation with Natural England SPI terrestrial invertebrate species (local and national) were carried out on the SSSI within the MHPGC PEIR Red Line Boundary: Onshore. A suitable methodology was designed, involving a review of the UKBAP List and priority species of conservation interest listed under the Natural Environment and Rural Communities Act (Section 41, England) returned by the desk study.

	Further survey will be undertaken, following best practice guidance, relevant to the invertebrate species for which suitable habitat(s) are identified and will be considerate of the known records, habitat mix and landscape. Survey methods included sweep netting, beating (of scrub), spot sweeping, hand searching, pan trapping and pitfall traps (where practicable). Identification of samples derived from the survey were undertaken by an experienced entomologist with reference to relevant taxonomic keys and literature. Records of SPI terrestrial invertebrate species and suitable habitat will be presented as mapped areas and Target Notes, collected via ArcGIS FieldMaps application on handheld tablets. Photographs and grid reference locations were collected where relevant. Habitats likely to support these species were also identified via mapping based on UKHab data.
Seasonality and timings	The optimum season for SPI terrestrial invertebrate surveys is April to September. For SPI terrestrial invertebrate surveys, a minimum of four visits at monthly intervals will be required for each survey area completed in the optimum season. Three survey visits have been completed in 2026, July, August and September)
Survey Area	The SPI Terrestrial Invertebrate Survey Area comprises habitat within Durham Coast SSSI (including small areas of connected suitable habitat) and Hesledon Moor East SSSI.

3.4 Terrestrial freshwater ecology surveys

Table 3.6: Terrestrial (aquatic) habitats and protected species surveys methodology

Survey detail	Survey methodology
WCC survey	
Survey objectives	WCC surveys were completed in 2026. The objective of these surveys is to determine the presence/absence of WCC in habitats assessed to be suitable within the MHPGC PEIR Red Line Boundary: Onshore.
Required qualifications and experience of surveyors	Experienced WCC surveyor (+10 years) with a relevant NE licence will be the lead surveyor. Licenced ecologist will be required where WCC might be present and will be caught / handled.
Relevant guidance	- Natural England (2022). White-clawed crayfish: advice for making planning decisions. - Peay (2002) Guidance on Habitat for White-clawed Crayfish and its Restoration. English Nature.
Description of survey methodology	Aquatic habitat (watercourses) suitable for WCC was identified during UKHab walkover surveys. Suitable habitat was identified as per best practice guidelines and Natural England guidance i.e. watercourses that are alkaline, calcium-rich, clean and well oxygenated. Aquatic habitats that were identified as being able to support WCC during the UKHab walkover surveys will be surveyed during the optimal survey window (between July and September). Where WCC presence is considered likely, survey of suitable watercourses followed best practice guidance, with the potential to include presence/likely absence surveys using eDNA and common standards monitoring.
Seasonality and timings	The optimum season for WCC surveys is July through September. Suitable aquatic habitats were surveyed during the optimal survey season. One survey visit was undertaken to take eDNA samples within the survey window, as per best practice.
Survey Area	The WCC Survey Area was determined, and surveys focused on suitable watercourses up to a 30m buffer surrounding the MHPGC PEIR Red Line Boundary: Onshore. It should be noted that private gardens, roads and carriageway embankments, railways and railway embankments and areas under construction will be excluded from the WCC Survey Area. Where access was not possible to private land review of satellite mapping, together with possible surveys from adjacent land, was utilised.

Survey detail		Survey methodology	
Freshwater Fish Surveys			
Survey objectives	A freshwater fish survey has been undertaken in 2026 within identified aquatic habitats of higher ecological value, where deemed suitable to support significant populations of fish. The objective was to classify the fish populations present within the identified aquatic habitats by undertaking targeted surveys within the MHPGC PEIR Red Line Boundary: Onshore and up to at least 250m up and downstream.		
Required qualifications and experience of surveyors	Experienced ecologist / fish survey expert (+10 years) will be the lead surveyor and hold Institute of Fisheries Management Electric Fishing Qualified (FR1). Fisheries Regulations 2 (FR2) permit was secured. All surveyors involved in screening and scoping for fish and eels were experienced in: • field identification of all widespread fish species and field signs; • assessing the potential suitability of on-site habitats for widespread freshwater fish species; • determining appropriate spatial scope for survey; • identifying appropriate survey techniques to achieve a robust survey in a variety of habitat types.		
Relevant guidance	• Beaumont et al., (2002) Guidelines for Electric Fishing Best Practice; • Environment Agency (2017a). Clearing Waters for All - Water Framework Directive assessment; • Environment Agency (2001). Electric fishing Code of Practice; • British Standards Institution (2003). BS EN 14011:2003: Water Quality Sampling of Fish with Electricity.		
Description of survey methodology	Prior to the commencement of surveys, a desk based review was undertaken of all available data, including aerial imagery and publicly available biological data. During the UKHab surveys, watercourses/waterbodies within the UKHab Surveys Area were assessed for their potential to support populations of fish species, including migratory species. Watercourses were inspected to confirm presence of specific features that have the potential to restrict the movement of fish species, such as dams or large waterfalls. These specific features, or other features that restrict the movement of fish, reduce the suitability of watercourses/waterbodies for fish. Freshwater fish surveys, inclusive of electric fishing surveys, was conducted following best practice guidance (Beaumont et al., 2002; Environment Agency, 2001; 2007; British Standards Institution, 2003).		
Seasonality and timings	The optimum season for freshwater fish surveys is June to October. The surveys will comprise one survey visit for each suitable watercourse.		
Survey Area	The Freshwater Fish Survey Area focussed on suitable watercourses within the MHPGC PEIR Red Line Boundary: Onshore and up to at least 250m up and downstream. It should be noted that private gardens, roads and carriageway embankments, railways and railway embankments and areas under construction were excluded from the Freshwater Fish Survey Area. Where access is not possible to private land review of satellite mapping, together with possible surveys from adjacent land, was utilised.		
Freshwater macrophyte survey			
Survey objectives	A macrophytes survey has been undertaken in 2026 within aquatic habitats deemed suitable to support significant populations of macrophytes. The objective was to classify the macrophyte populations present within the surveyed aquatic habitats, including any legally protected or invasive non-native macrophyte species, by undertaking targeted surveys within the MHPGC PEIR Red Line Boundary: Onshore,. The results of this survey will allow the site to be classified for its importance in relation to the freshwater macrophyte community present.		
Required qualifications and experience of surveyors	Degree Level Qualification in Ecology or other relevant subject. Experience of surveyors varying between Graduate Ecologist (early career – 2 years’ experience), Senior Ecologist (+5 years’ experience) and Principal (+7 years’ experience). Lead surveyor experienced in carrying out freshwater macrophyte required, with at least a FISC level 3.		

Survey detail	Survey methodology
Relevant guidance	Water Framework Directive – United Kingdom Technical Advisory Group (2014). UKTAG River Assessment Method: Macrophytes. ISBN 978-1-906934-44-6.
Description of survey methodology	The macrophyte surveys have been undertaken within aquatic habitats identified as suitable to support macrophyte populations. Aquatic habitats with suitability to support macrophyte populations were identified during the UKHab walkover surveys (i.e. watercourses and waterbodies with high water quality and suitable morphology). For those identified as suitable to support macrophyte populations, the aquatic habitats were surveyed along approximately 100m of the habitat features (i.e. waterbody or watercourse). The macrophyte surveys comprised one visit for each habitat during the optimal survey window. The macrophyte surveys recorded both the presence and the percentage of the habitat cover of the macrophyte species. Where it was not possible to identify a macrophyte to species level, the appropriate genus or taxa were recorded. Species lists were compiled and mapped as Target Notes via the ArcGIS FieldMaps application on a handheld tablet by surveyors whilst in the field. Photographs and grid reference locations were collected where relevant.
Seasonality and timings	The optimum season for freshwater macrophyte surveys is June through September. Surveys have been completed earlier in the year (April) to ensure water is present within watercourses and waterbodies. For freshwater macrophyte surveys, a single visit is required for each survey completed in the optimum season.
Survey Area	The Freshwater Macrophyte Survey Area was determined and surveys focused on suitable aquatic habitats within the MHPGC PEIR Red Line Boundary: Onshore. It should be noted that aquatic habitats within private gardens, or within/adjacent to roads and carriageway embankments, railways and railway embankments and areas under construction were excluded from the freshwater macrophyte Survey Area. Where access is not possible to private land review of satellite mapping, together with possible surveys from adjacent land, was utilised to inform the identification of suitable aquatic habitats.
Freshwater aquatic macroinvertebrate survey	
Survey objectives	Macroinvertebrate surveys have been undertaken in 2026 within aquatic habitats deemed suitable to support significant populations of macroinvertebrates. The objective was to classify the macroinvertebrate populations present within the surveyed aquatic habitats, including any legally protected or invasive non-native macroinvertebrate species, by undertaking targeted surveys within the MHPGC PEIR Red Line Boundary: Onshore, where required. The results of this survey will allow the site to be classified for its importance in relation to the freshwater aquatic macroinvertebrate community present.
Required qualifications and experience of surveyors	Experienced ecologist / macroinvertebrate survey expert (+10 years) will be the lead surveyor.
Relevant guidance	- Environment Agency. (2014). Freshwater macroinvertebrate analysis of riverine samples: Operational Instruction 024_08. Issued 28/01/14. Environment Agency, Bristol; - Environment Agency. (2017b). Freshwater macroinvertebrate sampling in rivers: Operational Instruction 018 08. Issued 01/03/17. Environment Agency, Bristol
Description of proposed survey methodology	The macroinvertebrate surveys were undertaken within aquatic habitats identified as suitable to support macroinvertebrate populations. Aquatic habitats with suitability to support macroinvertebrate populations were identified during the UKHab walkover surveys (i.e. watercourses which are wide and deep enough to support aquatic invertebrates). Waterbodies identified as being suitable to support aquatic macroinvertebrate populations were sampled using dip netting methods to dislodge and collect animals within the substrate and water column, as per Environment Agency best practice guidance (as detailed above). The surveys were undertaken in the summer season (between June and August). Samples will be collected from each aquatic habitat throughout mesohabitats in the edge areas. The samples were sorted following standard guidance, and a species list was compiled for each pond, mapped as Target Notes via the ArcGIS FieldMaps application on a handheld tablet by surveyors whilst in the field. Photographs and grid reference locations were collected where relevant. Surveys were conducted following best practice guidance. Two survey visits were undertaken for each sampled watercourse.

Survey detail		Survey methodology	
Seasonality and timings	The optimum season for freshwater aquatic macroinvertebrate surveys in standing water is June through August, and March through May and September through October for flowing waters.		
Survey Area	The Freshwater Macroinvertebrate Survey Area was determined, and surveys focused on suitable watercourses within the MHPGC PEIR Red Line Boundary: Onshore. It should be noted that aquatic habitats within private gardens, or within/adjacent to roads and carriageway embankments, railways and railway embankments and areas under construction were excluded from the freshwater aquatic macroinvertebrate Survey Area. Where access is not possible to private land review of satellite mapping, together with possible surveys from adjacent land, was utilised to inform the identification of suitable aquatic habitats.		
Ponds			
Survey objectives	Pond surveys have been completed in 2026. The surveys are needed to provide an assessment of the water quality of suitable (still) waterbodies within the MHPGC PEIR Red Line Boundary: Onshore, where required.		
Required qualifications and experience of surveyors	Experienced ecologist with prior survey experience and knowledge of macrophyte and aquatic macroinvertebrates required. Lead surveyor will have + 10 years’ experience surveying ponds		
Relevant guidance	Howard, S. (2002). A guide to monitoring the ecological quality of ponds and canals using PSYM: PSYM Manual. December 2002. Environment Agency, Bristol.		
Description of proposed survey methodology	Prior to the commencement of surveys, a desk-based review was undertaken of aerial imagery. During the UKHab surveys, waterbodies within the UKHab Surveys Area were assessed for their potential to support notable species and/or populations of biodiversity value. An initial site walkover was completed to further confirm the suitability of waterbodies including waterbodies of high-water quality and which are unmodified by human intervention. If relevant, suitable waterbodies will be surveyed following best practice guidance including Predictive System for Multimetrics (PSYM).		
Seasonality and timings	The optimum season for pond habitat surveying is June through August. Surveys have been completed earlier in the year (April) to ensure water is present within waterbodies. For pond surveys, a single visit was required for each survey completed in the optimum season. The PSYM surveys cannot be completed outside the optimum season, and macrophyte and aquatic invertebrates must be surveyed in the same survey window to inform the pond surveys.		
Survey Area	The Pond Survey Area focused on suitable waterbodies within the MHPGC PEIR Red Line Boundary: Onshore. It should be noted that waterbodies within private gardens, or within/adjacent to roads and carriageway embankments, railways and railway embankments and areas under construction will be excluded from the Pond Survey Area. Where access is not possible to private land review of satellite mapping, together with possible surveys from adjacent land, will be utilised to inform the identification of suitable aquatic habitats.		

3.5 Terrestrial and intertidal ornithology surveys

3.5.1 Non-breeding season ornithology (including wintering and intertidal)

Table 3.7: Non-breeding season bird survey methodology

Survey detail	Survey methodology
Wintering bird surveys	
Survey objectives	The purpose of the wintering bird survey was to identify species utilising the Wintering Bird Survey Area, defined in the below, during the wintering season, with specific attention to any protected or target species or notable aggregations (such as winter roosting areas). The objective was to map the distribution of wintering birds, estimating the approximate size of wintering bird populations.

Survey detail	Survey methodology
	and to identify areas of relatively high ornithological sensitivity within the MHPGC PEIR Red Line Boundary: Onshore. Protected or target species are considered as species associated with designated sites located within the Study Area, of which are notified for wintering bird populations, including: • Northumbria Coast Special Protection Area (SPA) - notified for non-breeding turnstone (<i>Arenaria interpres</i>) and purple sandpiper (<i>Calidris maritima</i>); • Northumbria Coast Ramsar site - contiguous with Northumbria Coast SPA; • Durham Coast Site of SSSI - international and national significance for purple sandpiper turnstone, sanderling (<i>C. alba</i>), golden plover (<i>Pluvialis apricaria</i>), ringed plover (<i>Charadrius hiaticula</i>) and redshank (<i>Tringa tetanus</i>). Protected or target species are considered as species associated with nearby designated sites (within 10km), which are notified for non-breeding and wintering bird populations, including: • Teesmouth and Cleveland Coast SPA - supports internationally important populations of passage/breeding and non-breeding waterbirds including avocet (<i>Recurvirostra avosetta</i>), common tern (<i>Sterna Hirundo</i>), red knot (<i>Calidris canutus</i>), little tern (<i>Sternula albifrons</i>), common redshank (<i>Tringa tetanus</i>), ruff <i>Calidris pugnax</i> and sandwich tern (<i>Thalasseus sandvicensis</i>). Waterbird assemblage including numbers exceeding 1% of the Great British non-breeding populations of gadwall (<i>Mareca strepera</i>), northern shoveler (<i>Spatula clypeata</i>) and sanderling (<i>Calidris alba</i>.) Eurasian wigeon (<i>Mareca penelope</i>), northern lapwing (<i>Vanellus vanellus</i>), herring gull (<i>Larus argentatus</i>) and black-headed gull (<i>Chroicocephalus ridibundus</i>); • Teesmouth and Cleveland Coast Ramsar site – contiguous with SPA.
Required qualifications and experience of surveyors	Degree Level Qualification in Ecology/Ornithology or other relevant subject. Experience of surveyors varying between Graduate ecologist/ornithologist (early career – 2 years' experience), Senior Ecologist/ ornithologist +8 years' experience) and Principal (over 10 years' experience). Experience of bird surveying required.
Relevant guidance	Gilbert, G., Gibbons, D.W. & Evans, J. (1998) Bird Monitoring Methods, RSPB/BTO. pp. 394-396.
Description of survey methodology	For the surveys completed between October 2023 and March 2024, an assessment of the potential for breeding Schedule 1 species to be present was made using desk study data, habitat present and the known geographical range. A twice-monthly survey approach, using a protocol aligned to the Common Bird Census (CBC) methodology, was undertaken and is considered sufficient to robustly assess the non-breeding status of species within the Wintering Bird Survey Area. For surveys conducted between October 2025 and March 2026 wintering bird survey methodology followed best practice adapted from Gilbert et al (1998) considering appropriate survey strategy for non-breeding priority species and any notable aggregations of target or non-target species. Surveys were undertaken once per month between October 2025 to March 2026 inclusive. Counts of non-breeding notable and target species were recorded within the Wintering Bird Survey Area. Surveys were undertaken around the same time per month (i.e. early, mid or late) and completed alongside with the Intertidal Bird Surveys. The ecology of the priority or target species that may occur within the Wintering Bird Survey Area was taken into account when considering the timing of surveys, as it may have been necessary to vary the start time to incorporate dawn and/or dusk. Survey transects were identified prior to surveys commencing and repeated each visit. Transects mimicked those undertaken during 2023-24 surveys where possible. These transects were walked at a slow pace, data was recorded on handheld, surveyors utilised binoculars and/or scopes. Species-specific considerations to survey-design were factored, considering species such as curlew (known to be disturbed up to 650m). In addition, habitats which may be of high value for wildfowl or waders sheltering during harsh weather were checked during such weather, if safe and possible to do so. In addition, the MHPGC Project will undertake a third year of wintering bird surveys across the 2026/2027 wintering period. This additional survey year is intended to ensure that the MHPGC Project is supported by a current and representative baseline, including two consecutive years of wintering bird data.
Seasonality and Timings	The optimum season for wintering bird surveys is October through March. For wintering bird surveys, six visits were required, once per month over two wintering seasons. These surveys were

Survey detail	Survey methodology
	undertaken alongside intertidal bird surveys which will involve counts of birds present at high and low tide once per month.
Survey Area	The Wintering Bird Survey Area comprises the MHPGC PEIR Red Line Boundary: Onshore, with an additional 250m buffer. Where appropriate this was extended to up to 650m (the maximum non-breeding distance for curlew) where impacts on such species are possible within designated sites. It should be noted that private gardens, roads and carriageway embankments, railways and railway embankments and areas under construction were excluded from the Wintering Bird Survey Area. Volume 3, Annex 3.13: Interim Wintering, Passage and Intertidal Birds Surveys Technical Report, of the PEIR details the results of the surveys, including percentage of completion.
Intertidal bird surveys	
Survey objectives	The purpose of the intertidal bird survey was to identify species utilising the intertidal areas within Intertidal Bird Survey Area, defined in the below, with specific attention to any protected or target species or notable aggregations (such as winter roosting areas). The objective was to map the distribution of birds utilising the intertidal habitats associated within the MHPGC PEIR Red Line Boundary: Onshore, estimating the approximate size of intertidal bird populations, and identifying areas of relatively high ornithological sensitivity within the MHPGC PEIR Red Line Boundary: Onshore. These surveys were undertaken between April 2023 and March 2024 (excluding June 2024) and alongside the wintering bird surveys in 2025-26 and continued from April-September 2026. Protected or target species are considered as species associated with designated sites located within the Study Area, of which are notified for wintering bird populations, including; • Northumbria Coast SPA - notified for non-breeding turnstone and purple sandpiper; • Northumbria Coast Ramsar site - Contiguous with Northumbria Coast SPA; • Durham Coast SSSI - international and national significance for purple sandpiper turnstone, sanderling, golden plover, ringed plover and redshank. Protected or target species are considered as species associated with nearby designated sites (within 10km), of which are notified for non-breeding and wintering bird populations, including; • Teesmouth and Cleveland Coast SPA - supports internationally important populations of passage/breeding and non-breeding waterbirds including avocet and common tern; red knot, little tern, common redshank, ruff and sandwich tern. Waterbird assemblage including numbers exceeding 1% of the GB non-breeding populations of gadwall, northern shoveler and sanderling. Eurasian wigeon, northern lapwing, herring gull and black-headed gull; • Teesmouth and Cleveland Coast Ramsar site – Contiguous with SPA.
Required qualifications and experience of surveyors	Degree Level Qualification in Ecology/Ornithology or other relevant subject. Experience of surveyors varying between Graduate ecologist/ornithologist (early career – 2 years' experience), Senior Ecologist/ ornithologist +8 years' experience) and principal (over 10 years' experience). Experience of bird surveying required.
Relevant guidance	Gilbert, G., Gibbons, D.W. & Evans, J. (1998) Bird Monitoring Methods, RSPB/BTO. pp. 394-396.
Description of proposed survey methodology	The Intertidal Bird Survey Area includes intertidal habitats present within with the MHPGC PEIR Red Line Boundary: Onshore, including a 1.5km viewshed from the coast (to cover subtidal/marine habitat). Surveys were undertaken once per month between October 2025 to September 2026 inclusive. Surveys were undertaken alongside the wintering bird surveys (October 2025 – March 2026) and continued through to September 2026 The intertidal bird survey methodology followed Through-the-Tidal-Cycle in 2023 and 2024 and Wetland Bird Surveys (WeBS) methods in 2025 and 2026 and best practice adapted from Gilbert <i>et al</i> (1998) considering appropriate survey strategy for non-breeding target species and any notable aggregations of target or non-target species at high and low tide (within two hours of high/low tide). High tide counts established maximum counts of bird species within intertidal habitats, as this is typically when birds congregate on roosts or gather on open water. Low tide counts assessed the spatial distribution of non-breeding species and help determine the important foraging areas. Species specific considerations to survey-design were factored i.e. considering species such as curlew (known to be disturbed up to 650m). In addition, habitats which may be of high value for wildfowl or waders sheltering during harsh weather were checked during such weather if safe and possible to do so, as suggested by Natural England.

Survey detail	Survey methodology
Seasonality and timings	The optimum season for intertidal bird surveys is October through March. Although surveys can be completed at any time of the year, once per month, to provide data for a whole year to inform assessment.
Survey Area	The Intertidal Bird Survey Area comprises the MHPGC PEIR Red Line Boundary: Onshore, extending 1.5km offshore (at landfall location). The survey area includes all coastal areas of the MHPGC PEIR Red Line Boundary, with a particular focus on rocky shore areas that present suitable habitat for roosts of wading birds, including turnstone and purple sandpiper. It should be noted that private gardens, roads and carriageway embankments, railways and railway embankments and areas under construction were excluded from the Intertidal Bird Survey Area. Volume 3, Annex 3.13: Interim Wintering, Passage and Intertidal Birds Surveys Technical Report, of the PEIR details the results of the surveys, including percentage of completion..

3.5.2 Breeding season ornithology

Table 3.8: Breeding season bird survey methodology

Survey detail	Survey methodology
Breeding season bird	
Survey objectives	The purpose of breeding bird surveys was to identify species utilising the Breeding Bird Survey Area during the breeding season, with specific attention to any protected or target species, breeding areas (such as nests including cliff colonies), or notable aggregations (such as summer roosting areas). The objective was to map the distribution of breeding birds, estimating the approximate size of breeding bird populations, and identifying areas of relatively high ornithological sensitivity within the MHPGC PEIR Red Line Boundary: Onshore. Protected or target species are considered as species associated with designated sites located within the Study Area, which are notified for breeding or summer bird populations, including; - Northumbria Coast SPA - notified for breeding Arctic tern and little tern; - Northumbria Coast Ramsar site - contiguous with Northumbria Coast SPA; - Durham Coast SSSI - breeding little tern and coastal breeding populations of kittiwake (<i>Rissa tridactyla</i>), cormorant (<i>Phalacrocorax carbo</i>) and fulmar (<i>Fulmarus glacialis</i>). Protected or target species are considered as species associated with nearby designated sites (within 10km), which are notified for breeding or summer bird populations, including; - Teesmouth and Cleveland Coast SPA - supports internationally important populations of passage/breeding and non-breeding waterbirds including avocet and common tern, red knot, little tern, common redshank, ruff and sandwich tern; - Teesmouth and Cleveland Coast Ramsar site - contiguous with SPA.
Required qualifications and experience of surveyors	Degree Level Qualification in Ecology/Ornithology or other relevant subject. Experience of surveyors varying between Graduate ecologist/ornithologist (early career – 2 years' experience), Senior Ecologist/Ornithologist +8 years' experience) and Principal (over 10 years' experience). Experience of bird surveying required.
Relevant guidance	- BTO (2020) CBC Methodology. - JNCC (2004) Common Standards Monitoring Guidance for Birds. JNCC.
Description of proposed survey methodology	Breeding season surveys were completed between April and July 2023, April and July 2025 and March and July 2026... For breeding bird surveys conducted between April – July 2025 and March and July 2026, the approach followed best practice, as adapted from the BTO CBC methodology and the Common Standards Monitoring Guidance for Birds (referenced above). The survey aimed to capture details of species, numbers, notable aggregations and potential breeding sites. For each survey visit, multiple transects were walked throughout the Breeding Bird Survey Area, as defined below, to ensure coverage of the MHPGC PEIR Red Line Boundary: Onshore. Transects were walked at a pace to allow for identification of birds and bird songs/calls and behaviours. Data was gathered on handheld tablets using the ArcGIS FieldMaps app. Survey

Survey detail	Survey methodology
	timings varied through the spring/summer but generally commenced half an hour to one hour after sunrise and finish after noon when activity levels decreased.
Seasonality and timings	The optimum season for breeding bird surveys is March through July. For breeding bird surveys, six visits were required for each survey completed in the optimum season.
Survey Area	The Breeding Bird Survey Area will comprise the MHPGC PEIR Red Line Boundary: Onshore, with an additional 100m buffer. It should be noted that private gardens, roads and carriageway embankments, railways and railway embankments and areas under construction were excluded from the Breeding Bird Survey Area. Volume 3, Annex 3.12: Interim Breeding Birds Surveys Technical Report, of the PEIR details the results of the surveys, including percentage of completion Natural England advised that survey buffers were reviewed to include baseline for indirect effects particular disturbance effects from noise and visual disturbance. These potential indirect effects, and the implication for survey areas, were considered as part of the assessment where there is a likelihood of significant effects occurring. The noise surveys completed for the MHPGC Project were used to inform the consideration of potential disturbance of ecological and ornithological receptors in proximity to the MHPGC Project, where relevant. Locations surveyed for the noise monitoring surveys included locations within and in proximity to SSSIs, allowing measures of baseline noise levels to be collected and an assessment of changes in noise level to be carried out.

3.6 Surveys potentially scoped in

- 3.6.1.1 Additional surveys are considered and proposed as potentially required, based on limited existing data or habitat suitability. These are proposed to only be undertaken should specific thresholds be met, such as evidence of habitats that could support significant populations or rare species, or become a requirement as the project design develops.

3.6.2 SPI surveys

Table 3.9: SPI survey methodology

Survey detail	Survey methodology
SPI terrestrial vertebrate survey	
Survey objectives	The aim of the SPI terrestrial vertebrate survey will be to identify potential SPI species likely to occur within the MHPGC PEIR Red Line Boundary: Onshore and further identify habitats present within the MHPGC PEIR Red Line Boundary: Onshore which have potential to support substation populations of SPI terrestrial vertebrate. This will be informed by the UKHab surveys. Should the UKHab survey identify habitats within the MHPGC PEIR Red Line Boundary: Onshore which are suitable to support substantial populations of vertebrate SPI, surveys will be scoped in for the MHPGC Project. These surveys will follow best practice guidance, relevant to the terrestrial vertebrate SPI for which suitable habitat(s) are identified.
Required qualifications and experience of surveyors	Degree Level Qualification in Ecology or other relevant subject. Experience of surveyors varying between Graduate Ecologist (early career – 2 years' experience), Senior Ecologist (+8 years' experience) and Principal (over 10 years' experience)
Relevant guidance	- DEFRA (2022). Guidance: Habitats and Species of Principal Importance in England. - JNCC (No Date) UK Biodiversity Action Plan.
Description of proposed survey methodology	A desk review of SPI terrestrial vertebrate species (local and national) has been undertaken at Scoping stage which identified species relevant to the MHPGC PEIR Red Line Boundary: Onshore. The MHPGC Project Scoping Report desk study returned the following records within 2km of the MHPGC Project Scoping Boundary. Three records of common toad (<i>Bufo bufo</i>) (two within the MHPGC Project Scoping Boundary), 11 records of brown hare (<i>Lepus europaeus</i>) (six within the MHPGC Project Scoping Boundary), one record of harvest mouse (<i>Micromys minutus</i>) within the MHPGC Project Scoping Boundary, and 89 records of West European hedgehog (<i>Erinaceus europaeus</i>) (12 within the MHPGC Project Scoping Boundary). The initial site walkover identified habitats where there is potential for vertebrate SPI to be present, as well as presence of vertebrate SPI, such as brown hare and hedgehog. Based on this knowledge, and the data collected during UKHab and protected species surveys, records of these species and habitats likely to support substantial populations of SPI species within the MHPGC PEIR Red Line Boundary: Onshore will be identified. If required, further species-specific survey will be undertaken, of which will follow best practice guidance relevant to the vertebrate species in question. Records of SPI species and suitable habitat will be presented as mapped areas and Target Notes, collected via ArcGIS FieldMaps application on handheld tablets. Photographs and grid reference locations will be collected where relevant. Habitats likely to support these species will also be identified via mapping based on UKHab data.
Seasonality and timings	The optimum season for SPI terrestrial vertebrate survey will vary per species as per best practice guidance (species dependant).
Survey Area	The SPI Terrestrial Vertebrate Survey Area will comprise the MHPGC PEIR Red Line Boundary: Onshore. It should be noted that private gardens, roads and carriageway embankments, railways and railway embankments and areas under construction will be excluded from the SPI Terrestrial Vertebrate Survey Area. Where access is not possible to private land review of satellite mapping, together with possible surveys from adjacent land, will be utilised.
Likelihood of survey being scoped in/out	SPI terrestrial vertebrate surveys will only be scoped in should the UKHab survey identify habitats with the potential to support substantial populations of SPI species. Furthermore, surveys will only be deemed necessary should the MHPGC Project have the potential to directly impact the suitable habitats.

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