



THE  
ENVIRONMENT  
PARTNERSHIP

# Haweswater Aqueduct Resilience Programme - Proposed Marl Hill section

Environmental Statement

Volume 2

Chapter 9A: Terrestrial Ecology

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## Haweswater Aqueduct Resilience Programme - Proposed Marl Hill section

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## 9. Ecology – 9A Terrestrial Ecology

### 9.1 Introduction

- 1) This chapter presents the approach and findings of the ecological impact assessment (EclA) of potential impacts on nature conservation assets arising from the Proposed Marl Hill Section on Terrestrial Ecology.
- 2) The chapter begins by reviewing the legislation and planning policies relevant to Ecology. The study area and methods for the assessment are then outlined. The nature, value and sensitivity of the existing baseline environment are then identified before an assessment is made of the potential effects on Terrestrial Ecology from the Proposed Marl Hill Section. Mitigation measures have been proposed to avoid, reduce or offset any potential effects and these embedded mitigation measures have been taken into account in the assessment, which are mentioned in Chapter 3: Design Evolution & Development Description. Additional mitigation measures are further outlined in Section 9A.7.
- 3) This assessment covers the Proposed Marl Hill Section, located in Lancashire between National Grid References SD696489 and SD709449. The study area for the Proposed Marl Hill Section is northeast of Clitheroe and is bounded to the east by the B6478.
- 4) The Proposed Marl Hill Section broadly comprises an above-ground launch facility, from which the tunnel boring machine (TBM) would drive approximately 4.1 km northwards below-ground to an above-ground reception facility. Tunnel boring activities would be at depths of between 15 m and 120 m below ground level and would not have potential to give rise to significant ecological effects upon important (terrestrial) ecological features. The study area therefore focussed only on above-ground works for the purposes of this EclA for Terrestrial Ecology.
- 5) Full details of the proposals are provided at Chapter 3: Design Evolution & Development Description, the following paragraphs provide a brief summary. Above-ground works include a mix of temporary construction activities and permanent installations. Above-ground works for the Proposed Marl Hill Section consist of the following components:
  - Braddup Compound would be the launch facility in the south, approximately 3.8 km northwest of Clitheroe. Site access for the Braddup Compound would be from the B6478 in the east via an upgraded existing track.
  - Bonstone Compound would be the reception facility in the north, approximately 8 km northwest of Clitheroe. Site access for the Bonstone Compound would be from the B6478 in the east via a newly constructed access road.
- 6) The construction access traffic route for the Proposed Marl Hill Section for light vehicles and HGVs 3.5 m in height or less would be via Junction 31 of the M6, A59, A671 Pimlico Link Road through Clitheroe and onto the B6478 northwards. Abnormal loads and HGVs over 3.5 m in height would exit the A59 onto Worston Road and travel via Chatburn and Grindleton Road, joining the B6478 to the north of Waddington. An option for construction traffic to avoid West Bradford and bypass Waddington by creating a new temporary crossing of the River Ribble is described and assessed in Volume 6 (Proposed Ribble Crossing) of the Environmental Statement (RVBC-MH-RC-ES) and summary findings are incorporated into Section 9.9 Conclusions of this Chapter and also in Chapter 21 (Summary of Significant Effects).
- 7) Requirements for parking facilities near Clitheroe, road widening, passing places and junction improvements along the route are described and assessed in Volume 5 (Off-Site Highways Works) of the Environmental Statement (RVBC-MH-ES-V5-P1-001) and summary findings are incorporated into Section 9.9 Conclusions of this Chapter and also in Chapter 21 (Summary of Significant Effects).
- 8) The study area for baseline field surveys encompassed varied buffers from Braddup and Bonstone Compounds and access routes according to the target feature (discussed further in Section 9A.4.2), while the study area for desk-based assessment encompassed a buffer of up to 5 km from these locations.

## 9.2 Scoping and Consultations

### 9.2.1 Scoping

- 9) An Ecology chapter was included within the EIA Scoping Report which was submitted to Ribble Valley Borough Council for comment in October 2019. Scoping report responses were provided by Ribble Valley Borough Council and these have been reviewed and incorporated into the assessment. An EIA Scoping Addendum was submitted to Ribble Valley Borough Council in February 2021 to capture changes in the proposed development and EIA approach since October 2019. Scoping comments and responses are outlined in Appendix 4.1.

### 9.2.2 Consultation

- 10) During the course of this assessment, consultation has taken place with relevant statutory and non-statutory consultees, stakeholders and third parties, through both correspondence and face-to-face meetings. This has been summarised in Appendix 4.1.

## 9.3 Key Legislation and Guidance

- 11) Table 9A.1 introduces relevant Ecology legislation and key guidance of relevance to undertaking EclA.

Table 9A.1: Ecology Key Legislation and Guidance

Legislation / Guidance	Description
International Legislation	
Convention on Biological Diversity 1992 (CBD)	Established a global vision for biodiversity, including a set of strategic goals and targets to drive action. Government subsequently published The Natural Choice ('White Paper') in June 2011 which responds to the global commitments of the CBD, outlining the government's vision for the natural environment, putting greater emphasis on a more integrated landscape-scale approach as opposed to piecemeal conservation action. The White Paper sets out a vision for better valuing the natural environment in decision making to unlock growth in green economy and reconnect people with nature.
Bern Convention on the Conservation of European Wildlife and Natural Habitats 1979	The primary aims are to ensure conservation and protection of wild plant and animal species and their natural habitats, particularly where this requires cooperation between contracting parties. The obligations of the Convention are transposed in the UK into national law by means of the Wildlife and Countryside Act 1981 as amended.
Bonn Convention on the Conservation of Migratory Species of Wild Animals 1979	Pertains to migratory species and those that regularly cross the political boundaries of countries. Appendix I includes critically threatened species (those in danger of extinction). Appendix II lists migratory species whose conservation status is unfavourable and which would benefit from coordinated conservation measures. The obligations of the Convention are transposed in the UK into national law by means of the Wildlife and Countryside Act 1981 as amended, with the Countryside and Rights of Way Act 2000 strengthening the protection of certain species in England and Wales.
Conservation of Populations of European Bats 1991 (EUROBATS)	Legally binding agreement under the Bonn Convention, which came into force in the UK in 1994. It recognises that endangered migratory species can only be properly protected if activities are carried out over the entire migratory range of the species, and it aims to protect all species of bats identified in Europe through legislation, education, conservation measures and international co-operation.
Ramsar Convention on Wetlands of International	Intergovernmental treaty that provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources. The Convention has several mechanisms to help Contracting Parties

Legislation / Guidance	Description
Importance especially as Waterfowl Habitat 1971	designate their most significant wetlands as Ramsar Sites, and to take the steps necessary to manage them effectively, maintaining their ecological character.
Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora	Referenced by the Conservation of Habitats and Species Regulations 2017 (as amended). Provides definitions for factors such as the favourable conservation status of habitats and species. Sets out a framework at Annex III for site selection criteria to be applied for the designation of special areas of conservation, in addition to providing lists of natural habitat types (Annex I) and species (Annex II) for which the designation of special areas of conservation should be prioritised. Also lists species of animals (Annex IV(a)) and plants (Annex IV(b)) species which are in need of strict protection.
National Legislation	
The Conservation of Habitats and Species Regulations 2017 (as amended) Including by: The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019	Provide for the identification, designation and protection of Natura 2000 (N2k) sites; for the purposes of these provisions, N2k sites include Special Areas of Conservation (SAC); Special Protection Areas (SPA) (and Ramsar sites). The Regulations also convey a statutory requirement for authorities to undertake a Habitats Regulations Assessment (HRA) of the potential impacts of plans and projects, including development proposals, on N2k sites and also convey strict levels of protection to certain species and their habitats or places of shelter. Derogations are afforded for such species through grant of licences, which must satisfy three tests relating to purpose and no satisfactory alternative for the proposed activity and maintaining favourable conservation status (FCS) of the affected species.
Wildlife and Countryside Act 1981 as amended (WCA)	The major legal instrument for wildlife protection in the UK, providing varying levels of protection for wild animals, birds and plants, controls for non-native invasive species and protects the important habitats as Sites of Species Scientific Interest.
Countryside and Rights of Way Act 2000 (CROW)	Part III deals specifically with wildlife protection and nature conservation, requiring Government Departments to have regard for the conservation of biodiversity, in accordance with the Convention on Biological Diversity, and that The Secretary of State publishes a list of living organisms and habitat types that are considered to be of principal importance in conserving biodiversity. It also amends and strengthens certain protections afforded by the WCA.
Natural Environment and Rural Communities Act 2006 (NERC)	Imposes a duty on all public bodies to have regard for biodiversity conservation when carrying out their functions. This extends the duty imposed upon Government and Ministers by CROW. Section 41 provides for the establishment of a list of habitat and species that are considered to be of ' <i>principal importance for the for the purpose of conserving biodiversity</i> ' for which biodiversity conservation should be prioritised. These are referred to hereafter as habitat of principal importance (HPI) and species of principal importance (SPI).
National Parks and Access to the Countryside Act 1949	<p>Enables the establishment and management of Nature Reserves:</p> <ul style="list-style-type: none"> <li>▪ for the purpose of research and study of flora and fauna or geological and geographical features</li> <li>▪ for the preservation of such special features.</li> </ul> <p>National Nature Reserves (NNR) may be established and declared by the statutory nature conservation agencies and managed by them or an approved body. Local authorities may also establish nature reserves and declare them Local Nature Reserves (LNR), provided the relevant statutory nature conservation agency approves.</p>

Legislation / Guidance	Description		
Hedgerows Regulations 1997	Protects certain 'important' hedgerows from removal or damage without permission from the local planning authority. Works to important hedgerows are exempt under the Regulations if planning consent is granted which allows their removal.		
Protection of Badgers Act 1992 (PBA)	This makes it an offence to wilfully kill, injure, take, possess or cruelly ill-treat a badger, or to attempt to do so; or to intentionally or recklessly interfere with a sett. Sett interference includes disturbing badgers whilst they are occupying a sett, as well as damaging or destroying a sett or obstructing access to it. A badger sett is defined in the legislation as 'any structure or place, which displays signs indicating current use by a badger' and includes above and below ground features.		
Key EcIA Guidance			
CIEEM Guidelines for Preliminary Ecological Appraisal <sup>1</sup>	Provides a common framework for preliminary ecological assessment (PEA) to promote better communication, understanding and cooperation between stakeholders.		
CIEEM Guidelines for Ecological Impact Assessment <sup>2</sup>	Promotes good practice, a scientifically rigorous and transparent approach to ecological impact assessment (EcIA). Provides a common framework for EcIA to promote better communication and closer cooperation between ecologists undertaking EcIA and provides decision makers with relevant information about the likely ecological effects of a project.		
Biodiversity: Code of practice for planning and development <sup>3</sup>	Provides standard recommendations on topics such as professional practices, proportionality, pre-application discussions, ecological surveys scope and method, adequacy of ecological information, reporting and monitoring. Cites CIEEM EcIA Guidelines as the acknowledged reference on EcIA.		
Forest of Bowland Area of Outstanding Natural Beauty Management Plan 2019 – 2024 <sup>4</sup>	The AONB sets out the challenges and objectives for management of the AONB. One of the three core Themes is 'An Outstanding Landscape of Natural and Cultural Heritage' and one of the four objectives for this Theme is <i>Habitats and Species: Conserve, enhance and restore the AONB's characteristic mosaic of habitats by improving their connectivity, extent and condition; whilst taking targeted action to conserve key species and improving understanding of the biodiversity of the AONB.</i>		
Lancashire Biodiversity Action Plan <sup>5</sup>	<p>Describes Lancashire's biodiversity evidence base and explains the full range of information that should be considered in the planning process including statutory and non-statutory designations, priority habitats and Lancashire Biodiversity Action Plan (LBAP) Species and Habitat Statements, produced for habitats and species requiring priority active in Lancashire and for which targets are set for recovery.</p> <table border="0" data-bbox="480 1608 1471 1861"> <tr> <td data-bbox="480 1608 991 1861"> <p>In addition to a variety of coastal, intertidal and urban habitats, LBAP habitats include:</p> <ul style="list-style-type: none"> <li>arable farmland</li> <li>broad-leaved and mixed woodland</li> <li>calcareous grasslands</li> </ul> </td> <td data-bbox="991 1608 1471 1861"> <p>Relevant LBAP species include:</p> <ul style="list-style-type: none"> <li>bird's-eye primrose</li> <li>black poplar</li> <li>dwarf cornel</li> <li>flat sedge</li> <li>greater butterfly orchid</li> </ul> </td> </tr> </table>	<p>In addition to a variety of coastal, intertidal and urban habitats, LBAP habitats include:</p> <ul style="list-style-type: none"> <li>arable farmland</li> <li>broad-leaved and mixed woodland</li> <li>calcareous grasslands</li> </ul>	<p>Relevant LBAP species include:</p> <ul style="list-style-type: none"> <li>bird's-eye primrose</li> <li>black poplar</li> <li>dwarf cornel</li> <li>flat sedge</li> <li>greater butterfly orchid</li> </ul>
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<sup>1</sup> CIEEM (2017) Guidelines for Preliminary Ecological Appraisal, Second Edition. Chartered Institute of Ecology and Environmental Management, Winchester

<sup>2</sup> CIEEM (2018) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal. Chartered Institute of Ecology and Environmental Management, Winchester

<sup>3</sup> British Standards Institute (2013). Biodiversity: Code of practice for planning and development. BS 42020:2013

<sup>4</sup> Forest of Bowland Area of Outstanding Natural Beauty Management Plan 2019 – 2024, Forest of Bowland AONB Partnership <https://www.forestofbowland.com/files/images/FOB%20ManPlan0719bLoRes.pdf> [Accessed June 2020]

<sup>5</sup> Lancashire Biodiversity Action Plan [Accessed June 2020] <https://ftps.lancashire.gov.uk/>

Legislation / Guidance	Description	
	limestone pavement moorland and fell mossland reedbed rivers and streams species-rich neutral grassland	lady's slipper orchid Lancaster whitebeam purple ramping fumitory bats (all species) farmland birds black-tailed godwit house sparrow lapwing reed bunting skylark song thrush twite brown hare red squirrel common frog great crested newt natterjack toad belted-beauty moth <i>Doros profuges</i> high brown fritillary large heath butterfly northern brown argus pearl bordered fritillary shining guest ant southern wood ant wall mason bee

12) National and Local Planning Policies are covered in Chapter 5.

## 9.4 Assessment Methods and Assessment Criteria

### 9.4.1 Assessment Methods

13) Reference has been made to national and local policy documents, relevant British Standards, national guidance (set out in Table 9A.1) and other relevant information in determining the assessment methodology and criteria to be used.

14) The assessment was undertaken in accordance with the following assessment method below:

- Describe the baseline conditions relevant to terrestrial ecology and identify important ecological features
- Identify the important ecological (terrestrial) features which may potentially be affected by the construction or operation of the Proposed Marl Hill Section, these including:
  - habitats or species afforded protection under international or national legislation
  - habitats of principal importance (HPI) or species of principal importance (SPI) for nature conservation as determined under Section 41 of the NERC Act



- other habitats or species identified as being of regional or local conservation concern (e.g. those for which Biodiversity Action Plans (BAP) have been delivered or which appear on 'Red lists' or other lists identifying conservation concern)
- Evaluate ecological features in accordance with *Guidelines for EclA*<sup>6</sup> (2018)
- Identify and characterise potential effects during construction and operational phases (in respect of biophysical changes and taking account of relevant aspects of ecosystem structure or function);
- Incorporate measures to avoid or reduce these effects;
- Assess the significance of residual effects after mitigation;
- Identify appropriate compensation measures to offset significant residual effects; and
- Identify opportunities for ecological enhancement.

15) The method was agreed with relevant stakeholders as outlined above in Section 9A.2.2

#### 9.4.2 Establishing the Baseline

16) Table 9A.2 summarises the desk and field based surveys completed to establish and describe the baseline for terrestrial ecology at the Proposed Marl Hill Section. The table provides references to the relevant Appendices for technical data and Figures for presentation of results for each respective survey.

Table 9A.2: Baseline Surveys

Survey	Summary and Timing	Standard	Appendix	Figure
Desk-based Assessment (DBA)	Search of Natural England data inventories via MAGIC <sup>7</sup> for the following: Statutory designations within 5 km Priority habitats within 1 km Ancient woodlands within 1 km Data request to Lancashire Environment Record Network (LERN) for the following: Non-statutory designations within 2 km Pre-existing records for protected species, SPI and other notable species Assessment of potentially sensitive features (designated sites or habitats) up to 5 km for internationally designated sites and up to 200 m from compound boundaries to identify potential features that may be affected by air quality changes resulting from compound generator use. August 2018, August 2019, May to June 2020	CIEEM Guidelines for Preliminary Ecological Appraisal <sup>8</sup>	Appendix 9A.1	Figures 9A.1 to 9A.4
Extended Phase 1 habitats	Field survey within extent of the Proposed Marl Hill Section and, where accessible, land up to 200 m. Supplemented by review of DBA, Ordnance Survey maps and	Handbook for Phase I Habitat Survey <sup>9</sup>	Appendix 9A.2	Figure 9A.5

<sup>6</sup> CIEEM (2018) *op. cit*

<sup>7</sup> Multi-Agency Geographical Information for the Countryside (MAGIC) [Accessed May 2020] <https://magic.defra.gov.uk/MagicMap.aspx>

<sup>8</sup> CIEEM (2017) *op. cit*

<sup>9</sup> JNCC (2010) Handbook for Phase I Habitat Survey: A technique for environmental audit. Joint Nature Conservation Committee, Peterborough

Survey	Summary and Timing	Standard	Appendix	Figure
	aerial photography. Target notes recorded for each habitat feature of note. July to November 2019, February to May 2020			
Hedgerows	Botanical survey within extent of the Proposed Marl Hill Section and, where accessible, land up to 200 m. July to November 2019, February to May 2020	Hedgerow Survey Handbook <sup>10</sup> Hedgerow Regulations 1997	Appendix 9A.3	Figure 9A.6
National Vegetation Classification (NVC)	Botanical survey of target vegetation communities, applying MAVIS <sup>11</sup> to quadrat data to identify closest fit NVC community types. July 2020	NVC Users' Handbook <sup>12</sup>	Appendix 9A.4	Figure 9A.7
Groundwater Dependant Terrestrial Ecosystems (GWDTE)	Analysis of habitat and botanical / wetland community data alongside hydrological data to identify potential GWDTE located within 200 m from compounds, 250 m from access roads and 500 m from shafts. April 2020	Handbook for Phase I Habitat Survey <sup>13</sup> Rodwell (1991) <sup>14</sup> SNIFFER WFD95 Wetland Typology (2009) <sup>15</sup> UKTAG guidance <sup>16</sup>	Appendix 7.2	Figure 7.7
Badgers	Badger setts, signs and suitable habitats were recorded during the Phase 1 habitat survey along with incidental sightings during other Phase 2 survey visits. July to November 2019, February to May 2020	Harris <i>et. al</i> (1989) <sup>17</sup>	Appendix 9A.5	Figure 9A.8
Ground-based assessment (GBA) of bat roosts in trees	Ground based assessment of trees (individual, hedgerow and woodland edge trees) in and within 50 m of the Proposed Marl Hill Section. July to November 2019, February to May 2020	Bat Surveys for professional Ecologists: Good Practice Guidelines <sup>18</sup>	Appendix 9A.6	Figure 9A.9
Bat activity	Combination of manual walked transects and remote monitoring surveys completed	Bat Surveys for professional	Appendix 9A.6	Figure 9A.10

<sup>10</sup> Defra (2007) Hedgerow Survey Handbook. A standard procedure for local surveys in the UK. Defra, London

<sup>11</sup> Modular Analysis of Vegetation Information System (MAVIS) developed by Centre for Ecology and Hydrology [Accessed May 2020] <https://www.ceh.ac.uk/services/modular-analysis-vegetation-information-system-mavis>

<sup>12</sup> Rodwell, J.S (2006) National Vegetation Classification: Users' Handbook. Joint Nature Conservation Committee, Peterborough

<sup>13</sup> JNCC (2010) *op. cit*

<sup>14</sup> Rodwell, J.S. (1991) *op. cit*

<sup>15</sup> SNIFFER (2009) WFD95: A Functional Wetland Typology for Scotland – Project Report [Online] Available from: <https://www.sniffer.org.uk/wfd95-a-functional-wetland-typology-for-scotland> [Accessed June 2020]

<sup>16</sup> UK Technical Advisory Group on the Water Framework Directive (2004) Guidance on the identification and risk assessment of groundwater dependent terrestrial ecosystems. [Online] Available from: [http://wfd.uk.org/sites/default/files/Media/Characterisation%20of%20the%20water%20environment/Risk%20assessment%20of%20terrestrial%20ecosystems%20groundwater\\_Draft\\_210104.pdf](http://wfd.uk.org/sites/default/files/Media/Characterisation%20of%20the%20water%20environment/Risk%20assessment%20of%20terrestrial%20ecosystems%20groundwater_Draft_210104.pdf) [Accessed: July 2020].

<sup>17</sup> Harris, S., Cresswell, P. and Jeffries, D. (1989) Surveying Badgers. The Mammal Society, London

<sup>18</sup> Collins, J. (2016) Bat Surveys for professional Ecologists: Good Practice Guidelines, 3rd edition. The Bat Conservation Trust, London

Survey	Summary and Timing	Standard	Appendix	Figure
	<p>within and surrounding the Proposed Marl Hill Section and.</p> <p>Transect 1 encompassed the eastern extent of the Bonstone Compound access road, extending along the southern boundary of the Compound during the 2019 transect surveys. The transect was supplemented by a single static monitoring point immediately adjacent to the compound (T04 static 1). Transect 1 was altered during the 2020 transect surveys to encompass the eastern extent of the Bonstone Compound access road, extending through the eastern and central areas of the Compound, supplemented by two static monitoring points immediately adjacent to the compound (TR4.T1A &amp; TR4.T1B).</p> <p>Transect 2 encompassed the Braddup Compound access road, passed through the centre of the Braddup Compound and extended to the south east of the Compound, supplemented by two static monitoring points adjacent to (TR4.T2A) and approximately 850 m to the south west (TR4.T2B) of the compound.</p> <p>Transect surveys – Braddup Compound: April (x1), May (x1), June (x1), July (x1) 2020; Bonstone Compound: August (x1) and October (x2) 2019. April (x1) May (x1), June (x1) and July (x1) 2020</p> <p>Static surveys (minimum 5 nights per survey) – Bonstone Compound: September 2019 (x1, Static A only), October 2019 (x1, Static A only), April 2020 (x1, Static A only), June 2020 (x1, Statics A &amp; B), July 2020 (x1 Statics A &amp; B); Braddup Compound: April 2020 (x1), May 2020 (x1), June 2020 (x1) and July 2020 (x1)</p>	<p>Ecologists: Good Practice Guidelines<sup>19</sup></p>		
<p>Breeding birds</p>	<p>Three daytime (early mornings) walkovers encompassing the Proposed Marl Hill Section Bonstone Compound. Transect routes pre-determined to sample all key habitats. Bird species seen or heard and activity patterns were mapped using standard symbology.</p>	<p>Bird Census Techniques<sup>20</sup> Gilbert <i>et. al</i> (1998) <sup>21</sup></p>	<p>Appendix 9A.7</p>	<p>Figures 9A.11 to 9A.13</p>

<sup>19</sup> Collins, J. (2016) *op. cit*

<sup>20</sup> Bibby, C. J., Birgess, N. D., Hill, D. A. & Mustoe, S. H. (2000) *Bird Census Techniques*. 2nd ed. Academic Press, London

<sup>21</sup> Gilbert, G., Gibbons, D.W. and Evans, J. (1998) *Bird Monitoring Methods: A manual of techniques for key UK species*. RSPB, Bedfordshire

Survey	Summary and Timing	Standard	Appendix	Figure
	Braddup Compound – April, May and June 2020 Bonstone Compound – April, May and June 2019	Birds of Conservation Concern 4 <sup>22</sup>		
Wintering birds	Seven daytime walkovers encompassing the Proposed Marl Hill Section. Transect routes pre-determined to sample all key habitats. Bird species seen or heard and activity patterns were mapped using standard symbology. September, October, November, December 2019 and January, February, March 2020	Bird Census Techniques <sup>23</sup> BTO EWBS Method <sup>24</sup> Fuller, R.J. (1980) <sup>25</sup> Birds of Conservation Concern 4 <sup>26</sup>	Appendix 9A.7	Figures 9A.14 to 9A.20
Great crested newts	eDNA samples from all ponds up to 500 m from the Proposed Marl Hill Section Braddup and Bonstone Compounds. April and June 2019	Great Crested Newt Mitigation Guidelines <sup>27</sup>	Appendix 9A.8	Figure 9A.21

#### 9.4.3 Valuation of Ecological Features

- 17) Ecological features are valued based on a geographical scale following Guidelines for EclA28. Values are assigned according to the inherent conservation value of the flora, fauna or habitats in terms of the conservation value of genetic resources. Values do not take account of the amenity or economic importance of the ecological resources. Further, legal protection is considered separately to the conservation value; not all legally protected species show the same rarity or range, for example. The geographical frame of reference applied for the valuation of ecological features is summarised in Table 9A.3.

Table 9A.3: Evaluation of Ecological Features

Ecological Value	Typical Criteria
International	Designated or proposed/candidate N2k sites (SAC, SPA and Ramsar sites) and their qualifying features, some of which may depend on land outside the designation boundaries. Under NPPF, land that is set aside as compensation for adverse effects of development on N2k sites should also be regarded as of international value. Species populations or habitat areas of international importance due to relative size, rarity or quality of the feature.
National	Designated or proposed SSSI, NNR, Marine Conservation Zones ('MCZ') and their qualifying features, some of which may depend on land outside the designation boundaries. A viable area of ancient semi-natural woodland (ASNW) or BAP habitat which meets SSSI selection thresholds or other nationally significant criteria.

<sup>22</sup> Eaton, M.A., Aebischer, N.J., Brown, A.F., Hearn, R.D., Lock, L., Musgrove, A.J., Noble, D.G., Stroud, D.A. & Gregory, R.D. (2015) Birds of Conservation Concern 4: The population status of birds in the United Kingdom, Channel Islands and Isle of Man. *British Birds* 108, 708–746 [Accessed 21-05-2020] [www.britishtobirds.co.uk/wp-content/uploads/2014/07/BoCC4.pdf](http://www.britishtobirds.co.uk/wp-content/uploads/2014/07/BoCC4.pdf)

<sup>23</sup> Bibby *et al.* (2000) *op. cit*

<sup>24</sup> British Trust for Ornithology – English Winter Bird Survey (EWBS) [Accessed June 2020] <https://www.bto.org/our-science/projects/english-winter-bird-survey/ewbs-survey-resources>

<sup>25</sup> Fuller, R. J. (1980) A method for assessing the ornithological interest of sites for conservation. *Biological Conservation* 17(3) pp229-239

<sup>26</sup> Eaton, M.A. *et al.* (2015) *op. cit*

<sup>27</sup> English Nature (2001) Great Crested Newt Mitigation Guidelines. English Nature, Peterborough.

<sup>28</sup> CIEEM (2018) *op. cit*

Ecological Value	Typical Criteria
	Species populations of national importance due to relative size, rarity or quality (including, but not exclusively, species listed on Schedules 5 or 8 of the W&C Act 1981 or occurring on UK Red Data lists).
Regional	Designated or proposed sites or species populations which exceed the County level designations but fall short of SSSI selection criteria. A viable area of ASNW or Regional BAP habitat which meets regionally significant criteria or smaller areas that are essential to maintain the viability of the whole at a regional level.
County / District	Designated or proposed County Wildlife Sites (CWS) or other Local Wildlife Site (LWS) and their qualifying features where they occur within the designation boundaries. A viable area of ASNW or local BAP habitat which meets County significant criteria or smaller areas that are essential to maintain the viability of the whole at a county level. Regularly occurring species populations (including, but not exclusively protected species, SPI or other species of conservation concern) or habitat areas of County (or District) importance due to relative size, rarity or quality.
Local	Local Nature Reserves (LNR), other reserves owned/managed by e.g. Local Wildlife Trust, Local Authority, RSPB (unless also designated at a higher level) and other non-designated sites which may not meet any of the above criteria but which appreciably enrich the local ecological network. Regularly occurring species populations which may include protected species, SPI, or County notable species which are of local significance due to relative size, quality or critical life stage supported. Features that do not meet any of the above criteria but which appreciably enrich the local ecological network, although these may themselves be common and widespread, such as ecologically diverse hedgerow networks, long-established hedgerows, inter-connected woodland belts, pond systems and other viable local landscape corridors.
Less than local	Populations of common and widespread species or habitats without protection or conservation designation but which contribute to the diversity, ecological function or interest of the immediate local area. Isolated and small fragments of HPI or populations of SPI (only where better representative examples of such habitats or species are common nearby).
Immediate site	Habitats of little or no ecological value or function e.g. densely urbanised environments, amenity grassland, hard standing etc.

- 18) The purpose of assigning value to an ecological feature is to allow potential effects to be considered in relation to the feature value. The viability of an ecological feature is considered at the appropriate geographic frame of reference, thereby determining whether an ecological effect is likely to be significant or not. Viability of an ecological feature is taken to refer to 'integrity' for sites and ecosystems and 'conservation status' in respect of habitats and species.
- 19) Site 'integrity' is defined by Government Circular29 as 'The coherence of its ecological structure and function, across its whole area, that enables it to sustain the habitat, complex of habitats and/or levels of populations of species for which it is classified'.
- 20) Conservation of Habitats and Species Regulations 2017 (as amended) Regulation 3(1) confirms the conservation status of natural habitats is defined by Article 1(e) of the Habitats Directive to be favourable when:

<sup>29</sup> ODPM Circular 06/2005: Biodiversity and Geological Conservation

*'its natural range and areas it covers within that range are stable or increasing; and the species structure and functions which are necessary for its long term maintenance exist and are likely to continue to exist for the foreseeable future; and the conservation status of its typical species is favourable as defined in Article 1(i)'*

- 21) The conservation status of a species is defined (as per Article 1(i) of the Habitats Directive) as favourable when:

*'population dynamics data on the species concerned indicate that it is maintaining itself on a long term basis as a viable component of its natural habitats; and the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future; and there is, and will probably continue to be, a sufficiently large habitat to maintain its population on a long-term basis'*

#### 9.4.4 Characterising Effects

- 22) Characterisation of an impact upon an important ecological feature considers the parameters described in Table 9A.4.

Table 9A.4: Characterisation of Ecological Impacts

Parameter	Description
Direction	Positive: a change that improves the quality of the environment e.g. by increasing species diversity, extending habitat or improving water quality. This may also include slowing or halting an existing decline in the quality of the environment. Adverse: a change which reduces the quality of the environment e.g. destruction of habitat, removal of foraging habitat, habitat fragmentation, pollution.
Extent	The spatial or geographical scale over which the impact may occur under a suitable representative range of conditions e.g. noise transmission under water.
Magnitude	The size, amount, intensity or volume e.g. the amount of habitat lost, percentage change to the habitat area, percentage decline in a species population.
Duration	Defined in relation to ecological characteristics (e.g. the lifecycle of a species) as well as human timeframes. For example, five years may seem short-term in the in the context of a long-lived species but may span five generations of some invertebrate species.
Frequency and timing	The number of times an activity occurs and the timing of the activity as it may correlated with critical life-stages or seasons e.g. the bird nesting season.
Reversibility	Irreversible: recovery is not possible within a reasonable timescale or there is no reasonable change of action being taken to reverse it. Reversible: spontaneous recovering is possible or it may be counteracted by mitigation.

#### Significance of Effects

- 23) Guidelines for EclA 30 defines a significant ecological effect as 'an effect that either supports or undermines the biodiversity conservation objectives for important ecological features or for biodiversity in general'.
- 24) The significance of impacts on important ecological features is determined in accordance with Guidelines for EclA31, such that an ecological effect is assessed to be either significant or not significant at the appropriate geographic frame of reference. For most designated wildlife sites, a significant upon such a site is likely to be significant at the same scale at which the site is valued (for example, an effect upon a SSSI is likely to be of national significance). However, the scale of significance may not always directly

<sup>30</sup> CIEEM (2018) As Reference 2

<sup>31</sup> CIEEM (2018) As Reference 2

correspond to the geographic scale at which an ecological feature is valued. An effect upon a species which is included on the national list of SPI may not have a significant effect upon its national population

#### 9.4.5 Embedded Mitigation and Good Practice

- 25) Embedded mitigation is inherent to the design, and good practice measures are those which are standard industry practice used to manage commonly occurring environmental effects. The assessment of likely significant effects in Section 9.6 takes into account the application of both embedded mitigation and good practice measures as set out in this section.
- 26) The need for any additional topic-specific essential mitigation (generally for effects likely to be significant in the context of the EIA Regulations) identified as a result of the assessment in Section 9.6 is then set out separately in Section 9.7.

#### Embedded Mitigation

- 27) Chapter 3: Design Evolution and Development Description explains the evolution of the design with input from the environmental team, including mitigation workshops and the use of GIS based constraints data. Embedded mitigation of particular relevance to Terrestrial Ecology is set out below (decisions of benefit to ecology may also have been driven by engineering or other factors, but are none the less identified here).
- 28) Within the limitations of needing to join the new pipeline to the existing Haweswater Aqueduct within relatively restricted location, the design process has been iterative, applying information derived from ecological and other environmental surveys to avoid or minimise potential environmental effects.
- 29) The following engineering design choices have resulted in the avoidance or reduction of potential adverse effects upon important ecological features:
- Tunnel construction avoids open cut methods (except for short multi-line siphon (MLS) sections to connect between the new and existing aqueduct sections)
  - Adjustment of boundaries at the Braddup and Bonstone Compounds to avoid direct impacts on areas of woodland and some boundary features and provide a buffer zone where possible
  - Realignment of the Braddup Compound access road route to utilise the existing track and reduce the extent of habitats lost for this element
  - Adjustment of Bonstone Compound access road route to avoid impacts on ephemeral ponds/scrapes (TR4.TN14 and TR4.TN15) and marshy grassland habitat (identified as GWDTE)
  - While this section would always have been constructed as a tunnel, maximising the use a tunnelling reduces the amount of ground disturbance associated with open cut methods to the short sections of multi-line siphon (MLS) required to connect between the new and existing aqueduct sections

#### Good Practice Measures

- 30) In addition to the above design considerations to deliver avoidance measures, a series of common approaches to facilitate feature avoidance has been developed to ensure legal compliance and to accord with industry standards and best practice. Details of these measures are provided within the Construction Code of Practice (CCoP) (Appendix 3.2). Those measure of most relevance to important ecological features include, but may not be limited to, the following:
- CCoP Section 5.2.2 'Protection of trees' requires appropriate tree and hedgerow protection measures to be implemented in accordance with current standards (BS 5837:2012) for all retained woodland, trees and hedgerows to avoid risk of incidental damage and disturbance to the habitats and the species they support during site clearance and construction
  - CCoP Section 5.3.3.1 'Geomorphology – General Provisions' requires works to be avoided in or on the floodplains of Main Rivers and Ordinary Watercourses where practical and, where this is not practicable, the CCoP requires a minimum distance of 10 m to be provided between the works and the banks of the watercourse

- CCoP Section 5.3 'Water Environment' and Section 5.6 'Soils, Geology and Land Quality' set out a series of measures to preserve existing surface water run-off rates and land drainage rates and protect surface and groundwater flows, levels and quality
- CCoP Section 5.9 'Noise and Vibration' specifies a range of measures that, while focussed primarily on human features, would also reduce the potential for disturbance effects upon ecological features
- CCoP Section 4.5 'Lighting' requires that artificial lighting, where unavoidably required for safety and security during the construction phase, is designed in accordance with best practice to minimise potential impact upon the environment, including ecological features
- CCoP Section 5.11 'Air quality' specifies measures that would control and limit dust, air pollution, odour and exhaust emissions to reduce the impact of dust and other adverse effects upon air quality
- CCoP Sections 5.2.1 'Landscape management – general provisions', 5.4.1 'Ecological management – general provisions' and 5.4.2 'Measures to reduce potential impacts on ecological resources' in combination require updated pre-commencement surveys to be completed, vegetation removal to be minimised as far as practical, removal / translocation of habitats and other habitat features to be subject to ecological watching briefs, procedures for unanticipated discoveries or disturbance of protected species or important habitats and for accidental pollution incidents that may affect valued ecological features
- CCoP Sections 5.4.1 'Ecological management – general provisions' and 5.4.2 'Measures to reduce potential impacts on ecological resources' in combination require habitat re-instatement and restoration to be implemented at the earliest appropriate and to deliver at least like for like (quantity and quality) for all valued habitats and habitat features requiring permanent or temporary removal. As in the long term there would be no change to habitat types, this would be compatible with the aims of the Forest of Bowland AONB Management Plan. Any habitat creation as a result of BNG offsetting is reported separately and the approach is summarised in Section 9A.7.12
- Replacement of dry stone walls would reuse original materials within pre-existing locations (i.e. each wall to be reinstated with its original stone), therefore replacing any moss, lichen or bryophyte interest present
- CCoP Section 4.4 specifies the fencing around compounds. Screening to dampen noise and dust effects are also included in the CCoP. These screening measures could help to reduce visual disturbance effects from certain activities within the compounds

31) For ease of reference, when the term embedded mitigation is used in the assessment of effects, this also encompasses good practice measures.

#### 9.4.6 Assumptions and Limitations

32) Likely ecological effects described in this EclA are based on the Proposed Marl Hill Section development as described in Chapters 2 and 3.

33) Only above-ground works are considered in the EclA for Terrestrial Ecology. Detailed ecological surveys were completed for the above-ground envelopes comprising the Braddup Compound (launch facility) and Bonstone Compound (reception facility), inclusive of temporary and permanent enabling and construction works. Buffers applied to the envelopes to extend areas for survey and assessment varied according to the type of survey, target feature(s) and access permissions but generally included up to a 50 m as part of detailed assessment and buffers up to 200 m for habitat and species context (e.g. species mobility and landscape permeability) and up to 200 m from compounds, 250 m from access routes and 500 m from shafts for identification of potential GWDTE.

34) This EclA has been completed on the basis of a reasonable worst-case. For example, the compound areas are wider than the comprehensive draft compound designs to provide some flexibility for the contractor in compound layout. Where retention of features within the compound is certain, due to location along boundaries for example or because of a commitment to protect a high value feature, this is reflected in the assessment. All other features within compounds are recorded as lost, although there is a commitment to minimise these losses were possible when compound layouts are updated. Habitat



losses that United Utilities aspires to avoid but cannot guarantee at this stage are included in the EclA impact calculations. However, for clarification, those features that would be unavoidably lost (for example due to the location of shafts or open cut sections) are identified.

- 35) Assumptions have been made with regard to the quantification of habitat features. Numbers of individual trees are quantified from the Arboricultural survey (Appendix 6.6). However, it should be noted that other assessments, for example ground-based assessment of trees for bat roost suitability, may include additional trees that are not identified by the Arboricultural survey as they may be hedgerow features or occur within groups. Consequently quantification of individual trees may differ according to the target feature being assessed. Linear hedgerow or watercourse measurements and woodland and other habitat area measurements are calculated from digitised field survey data using GIS. All measures quantified in this EclA are considered reasonable estimates.
- 36) Surveys were completed within appropriate seasons over appropriate periods in accordance with industry standards for the specific survey. Nevertheless, the surveys only identify habitats and plants present at the time of survey. Additionally, most species investigated are mobile and would move into and out of areas over time. For these reasons a precautionary approach has been taken in the prediction of impacts. Where there is any doubt, except where specifically noted, species are assumed present and the impact is given the higher level of significance.
- 37) Constraints or limitations upon survey method or interpretation of survey findings are discussed in the relevant Appendix.
- 38) Information provided by third parties, including publicly available information, is correct at the time of publication.
- 39) It is assumed for the purposes of this EclA that the current land uses within and adjacent to the Proposed Marl Hill Section would remain as they were at the time of the field surveys, except in cases where planning permission has already been granted for development. For consented developments, it is assumed that the developments would take place. These have been considered in the cumulative assessment in Chapter 19.

## 9.5 Baseline Conditions

### 9.5.1 Information Sources

- 40) Information from the following sources have been used to inform this EclA for the Proposed Marl Hill Section:
- Haweswater Aqueduct Resilience Programme – Proposed Marl Hill Section – EIA Scoping Report (Jacobs, October 2019)
  - Lancashire Environment Record Network (LERN), including boundaries and site information for non-statutorily designated sites such as Biological Heritage Sites (BHS) and pre-existing species records within 2 km of the Proposed Marl Hill Section
  - Natural England habitat and species inventories<sup>32</sup> including:
    - land-based statutory designated wildlife sites in England, including Ramsar sites, proposed Ramsar sites, Special Areas of Conservation (SAC), Possible SACs, Special Protection Areas (SPA), Potential SPAs, Sites of Special Scientific Interest (SSSI), SSSI units, SSSI Impact Risk Zones (IRZ), National Nature Reserves (NNR) and Local Nature Reserves (LNR)
    - Inventory of Ancient Woodland (IAW)
    - Priority Habitat Inventory (PHI)
    - European Protected Species Licences (EPSL)
  - RSPB reserve boundaries

<sup>32</sup> MAGIC [Accessed May 2020] *op. cit*

- RSPB 'Important Bird Areas' (IBA)
- Plantlife International 'Important Plant Areas' (IPA)
- Ecology Survey Data Reports produced by Bowland Ecology for the Proposed Marl Hill Section (Appendices 9.2 to 9.8) and supporting plans (Figures 9.5 to 9.21)
- Haweswater Aqueduct Resilience Programme Proposed Marl Hill Section AIA (Jacobs) (Appendix 6.6) and supporting plans (Figures 6.5 and 6.6)
- Haweswater Aqueduct Resilience Programme Proposed Marl Hill Section Habitats Regulation Assessment (HRA) (The Environment Partnership) (RVBC-MH-APP-010)
- Haweswater Aqueduct Resilience Programme Proposed Marl Hill Section SSSI Report (The Environment Partnership) (RVBC-MH-APP-009)
- Haweswater Aqueduct Resilience Programme Proposed Marl Hill Section GWDTE Assessment (Jacobs) (Appendix 7.2) and supporting plans (Figure 7.7)
- Haweswater Aqueduct Resilience Programme Proposed Marl Hill Section Air Quality Assessment (Jacobs) (Appendices 18.1 and 18.2) and supporting plan (Figure 18.1)

#### 9.5.2 Designated Sites

- 41) There are 10 statutorily designated wildlife sites of international or national importance located within 5 km of the Proposed Marl Hill Section. As the interest features of the Coplow Quarry SSSI (4.2 km south east from the Braddup Compound), Salthill and Bellmanpark Quarries SSSI (4.7 km south east from the Braddup Compound) and Hodder River Section SSSI (4.7 km south from the Braddup Compound) are geological in nature, impacts upon these SSSIs are not considered further as part of this EclA for Terrestrial Ecology. Two internationally important designated sites (North Pennine Dales Meadows SAC and Bowland Fells SPA) and five other SSSIs (Bell Sykes Meadows, Langcliff Cross Meadow, Myttons Meadows, Bowland Fells and Field Head Meadow) are located within 5 km of the Proposed Marl Hill Section. A summary of the site features is presented at Table 9A.5. Further information relating to these sites is provided at Appendix 9A.1.
- 42) The Bonstone Compound falls within the IRZ from Bowland Fells, Langcliffe Cross Meadows and Bell Sykes Meadows SSSIs. This IRZ identifies risk categories relating to air pollution and combustion processes.
- 43) No NNR or LNR were identified within 5 km or 2 km from the Proposed Marl Hill Section, respectively. No other statutory wildlife site was identified within 5 km from the Proposed Marl Hill Section.
- 44) A total of 23 Biological Heritage Sites (BHS) were identified within 2 km from the Proposed Marl Hill Section. Both the Bonstone and Braddup Compounds are located within the Bowland Fells IBA. No other non-statutory wildlife site, including RSPB reserves or IPAs, were identified within the search area. These non-statutory sites are summarised in Table 9A.5.

Table 9A.5: Designated Wildlife Sites

Wildlife Site	Proximity to Proposed Marl Hill Section and Site Area	Summary Features
Statutorily Designated Wildlife Sites Within 5 km of the Proposed Marl Hill Section		
Langcliff Cross Meadow SSSI	3.6 km north east from the Bonstone Compound access road 5.27 ha	An area of northern hay meadow containing 19 grass species. Forms part of the North Pennine Dales Meadows SAC
North Pennine Dales Meadows SAC	3.6 km north east from the Bonstone Compound access road	The site is designated for supporting <i>Molinia</i> meadows on calcareous, peaty or clayey-silt-laden soils and for its mountain hay meadows which contain a wide range of

Wildlife Site	Proximity to Proposed Marl Hill Section and Site Area	Summary Features
	497.09 ha	rare and local meadow species. The grasslands included show very limited effects of agricultural improvement and have good conservation of structure and function
Bell Sykes Meadows SSSI	3.67 km north east from the Bonstone Compound 13.68 ha	One of three of the SSSI underlying the North Pennine Dales Meadows SAC. Six fields of unimproved, enclosed, herb-rich grassland supporting a rich floral community. Forms part of the North Pennine Dales Meadows SAC
Myttons Meadows SSSI	3.9 km north from the Bonstone Compound 10.09 ha	One of the SSSI underlying the North Pennine Dales Meadows SAC. Three fields below Myttons Farm and part of a fourth field to the south representing the largest traditionally managed, species-rich hay meadows in Lancashire. The site forms part of the North Pennine Dales Meadows SAC
Bowland Fells SPA	4.05 km north west from the Bonstone Compound 16,002.3 ha	The Bowland Fells SPA encompasses the main upland block within the area of Lancashire known as the Forest of Bowland. It is an area of upland fells supporting Lancashire's largest expanse of blanket bog and heather moorland. The site provides habitat suitable for a diverse upland breeding bird community including Annex I upland breeding birds, hen harrier and merlin, and an internationally important breeding population of lesser black-backed gull
Bowland Fells SSSI	4.05 km north west from the Bonstone Compound 16,002.3 ha	The SSSI Unit closest to the Proposed Marl Hill Section comprises unit 1011820, which was last reported to be in 'favourable' condition. The main habitat present is upland bogs.
Field Head Meadow SSSI	4.15 km north east from the Bonstone Compound access road 3.29 ha	One of the SSSIs forming part of the North Pennine Dales Meadows SAC. Field Head Meadows consists of a single field of enclosed, moderately herb-rich hay meadow, typical of its type in northern England. Field Head Meadow is one of the few remaining herb-rich grasslands present in this part of Lancashire. The SSSI Unit (1022962) was last reported to be in 'favourable' condition.
<b>Non-Statutorily Designated Wildlife Sites Within 2 km of the Proposed Marl Hill Section</b>		
Gibb's Wood and Bonstone Wood BHS	93 m south west from the Bonstone Compound 4.15 ha	The site comprises woodland which is ancient semi-natural in character
Bonstone Brook Pastures BHS	0.16 km south from the Bonstone Compound 1.5 ha	Two pastures containing species-rich semi-natural grassland
Feazer Wood BHS	0.3 km east from the Braddup Compound access road 4.89 ha	Semi-natural clough woodland

Wildlife Site	Proximity to Proposed Marl Hill Section and Site Area	Summary Features
Hospital Wood BHS	0.36 km east from the Braddup Compound access road 8.46 ha	Semi-natural clough woodland
Waddington Fell and Browsholme Moor BHS	0.45 km south east from the Bonstone Compound access road 268.03 ha	Extensive area of moorland with upland heath, blanket bog, acid grassland and mires
Bradford Fell, Easington Fell and Harrop Fell BHS	0.46 km south east from the Bonstone Compound access road 517.97 ha	Extensive area of upland heath and mire
Ashnott Wood BHS	0.51 km south west from the Bonstone Compound 2.55 ha	The site comprises semi-natural woodland which is identified within Natural England's Inventory of Ancient Woodland.
River Hodder From Confluence with River Ribble Upstream to Cross of Greet Bridge/ Bowland Fells SSSI Boundary BHS	0.52 km north east from the Bonstone Compound 94.9 ha	The site comprises almost the entire length of the River Hodder. The river is important for otter and supports salmon, brown trout, sea trout, bullhead, dace and stone loach. Sandpipers and oystercatchers are associated with areas of shingle. Three species included in the Provisional Lancashire Red Data List of Vascular Plants are present along the riverside, namely yellow star-of-Bethlehem, green figwort and melancholy thistle. Many of the river's banks are lined by woodland or individual trees and shrubs
Braddup Wood North BHS	0.54 km north west from the Braddup Compound 17.92 ha	Large semi-natural woodland occupying the steep sides of Bashall Brook and its tributary along Braddup Clough
Cross Lane Roadside Verges BHS	0.63 km south west from the Braddup Compound 0.37 ha	Species rich roadside verges notable for presence of green figwort
Crag House Roadside Verges BHS	0.7 km south west from the Bonstone Compound 0.75 ha	Species-rich roadside verges.
Braddup Wood South BHS	0.84 km south west from the Braddup Compound 6.29 ha	Broadleaved woodland situated on steep banks adjoining Bashall Brook
Ashnott Meadow BHS	0.86 km south west from the Bonstone Compound 2.6 ha	Damp, semi-natural, neutral grassland meadow notable for containing heath spotted-orchid
Waddington Fell Road, Roadside Verges BHS	0.88 km north east from the Bonstone Compound 0.22 ha	Species-rich roadside verges

Wildlife Site	Proximity to Proposed Marl Hill Section and Site Area	Summary Features
Moor Piece BHS	1.05 km west from the Braddup Compound 16.19 ha	Woodland and scrub; bog; fungi; butterflies and moths
Drakehouse Wood BHS	1.4 km east from the Braddup Compound	Ancient, semi-natural woodland occupying the steep sides of Drakehouse Brook and Brocklehurst Brook
Birkett Fell, Hodder Bank Fell and Mossthwaite Fell BHS	1.56 km west from the Bonstone Compound 231.14 ha	Large area of upland heath and blanket bog with scattered flushes. Much of the site is dominated by heather with purple moor-grass in varying proportions. The site provides valuable habitat for upland breeding birds such as red grouse
Newton North Roadside Verges BHS	1.6 km north from the Bonstone Compound	Roadside verge
Great Dunnow Wood BHS	1.7 km north east from the Bonstone Compound	Semi-natural woodland situated on limestone along the north west bank of the River Hodder. Valuable limestone grassland /herb communities present
Clerk Laithe BHS	1.8 km north from the Bonstone Compound	Areas of species-rich pastoral grassland
Great Dunnow Hill BHS	1.8 km north east from the Bonstone Compound	A large limestone reef knoll rising to 212 m situated in the Hodder Valley. The hill supports areas of species-rich calcareous grassland
Waddington Brickworks Old Working BHS	1.8km south east from the Braddup compound	Old workings colonised by species-rich, semi-natural neutral grassland and used as pasture
Rabbit Lane Meadow BHS	1.97 km west from the Braddup Compound 3.04 ha	A field of semi-natural marshy and neutral grassland bordered by two sides of plantation woodland.
Bowland Fells IBA	Extensive coverage which lies contiguous with the Forest of Bowland AONB. The Proposed Marl Hill Section is entirely situated within the IBA.	An important landscape for upland birds including hen harrier, ring ouzel, whinchat, curlew, golden plover, lapwing, merlin, oyster catcher, peregrine, red grouse, redshank, snipe and stonechat. Other notable wildlife recorded across the landscape includes brown hare, bats (eight species resident in Lancashire) and moths (among the more notable include common heath, emperor, Manchester treble bar, northern spinach, red twin-spot carpet).

### 9.5.3 Habitats and Flora

- 45) Table 9A.6 summarises the habitat features present within and surrounding (within 200 m) the Proposed Marl Hill Section Braddup and Bonstone Compounds. Further details of habitat, hedgerow and NVC survey and assessment results are presented at Appendices 9A.2, 9A.3 and 9A.4, respectively.
- 46) Target notes (referenced TR4.TN#) are illustrated on the Phase 1 Habitat Survey (Figure 9A.5). Hedgerows (referenced HTR4.H#) are illustrated on the Phase 1 Habitat Survey and are also highlighted on the Hedgerow Assessment Plan (Figure 9A.6). Tree locations (referenced T# for individual trees, G# for tree groups and W# for woodlands) are illustrated on the Tree Constraints and Trees at Risk plans

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(Figure 6.5 and 6.6) while trees with bat roost suitability are identified on Figure 9A.9. Watercourses (referenced W) are identified the Geomorphology Baseline plans (RVBC-MH-FIG-WFD-003).

Table 9A.6: Habitats present at the Proposed Marl Hill Section

Habitat	Extent *			Summary Features	Status
	Braddup Compound	Bonstone Compound	Offsite		
Broadleaved semi-natural woodland	< 0.01 ha	Not present	Present < 50 m (Braddup Compound) 50 m – 250 m (Bonstone Compound)	A narrow belt of broadleaved semi-natural woodland is present along the western edge of the B6478 road to the north of the access track for the Braddup Compound. A further narrow belt of woodland is present immediately adjacent to the south west corner of the Braddup Compound. A more extensive area of woodland is associated with Gibb's Wood and Bonstone Wood BHS, located approximately 100 m south west of the Bonstone Compound.	HPI LBAP
Broadleaved plantation woodland	Not present	Not present	Present 50 m – 250 m (Braddup Compound)	A small area of broadleaved plantation woodland is located approximately 80m to the southwest of the Braddup Compound (TR4.TN30).	None
Mixed plantation woodland	0.06 ha	Not Present	Present < 50 m (Braddup and Bonstone Compounds) 50 m – 250 m (Braddup and Bonstone Compounds)	The access Road for the Braddup Compound passes through mixed plantation woodland associated with Sandy Ford Brook (TR4.TN6). The canopy comprises sycamore, alder, rowan and Scots pine. The understory comprises dominant common gorse with some hawthorn. The ground flora includes foxglove, bramble, Yorkshire fog, common bent and wavy hair grass. Further areas of woodland are located adjacent to the western boundary of the Braddup Compound (TR4.TN11) and within 50 m of the Bonstone Compound to the north and south (TR4.TN12 and TR4.TN24).	None
Conifer plantation	Not Present	Not Present	Present 50 m – 250 m (Braddup Compound)	A small area of coniferous plantation woodland (TR4.TN31) is located approximately 80m to the southwest of the Braddup Compound. . The canopy is dominated by Scots pine. The understory is sparse but locally dominant Rhododendrons and holly are present. Ground flora is grassland dominated by tufted hair grass, with honeysuckle, wood sorrel and soft rush.	None
Dense / continuous scrub	0.01 ha	Not Present	Present < 50 m (Braddup and Bonstone Compounds)	Occasionally present within Braddup. Associated with field and track margins, possibly as a remnant from historical hedgerows. Predominately hawthorn.	None

Habitat	Extent *			Summary Features	Status
	Braddup Compound	Bonstone Compound	Offsite		
Scattered broadleaved trees	18 no. individual and 10 no. groups (or part of groups)	5 no. individual and 9 no. groups (or part of groups)	Present < 50 m (Braddup and Bonstone Compounds) 50 m – 250 m (Braddup and Bonstone Compounds)	Five veteran Category A3 trees are located within the Braddup compound: two alder towards the northeast of the main compound area (T187 and T190) and two further alder (T185 and T184) and one oak (T176) located on the northern edge of the access road. A further Category A1 oak tree is located at the start of the access road (T165). An additional 7 Category B trees (T183, TT189, T182, T192, T195, T178 and T193) and 5 Category C (T177, T180, T186, T175 and T188) trees are located within the compound and access road area.  Trees within the Bonstone Compound are associated with old field margins and along the periphery of the compound area. One Category A3 tree is present within the compound envelope, a potential veteran hawthorn tree (T144). The other trees comprise three Category B trees (T148, T153 and T160) and one Category C tree (T150).	NPPF: veteran trees
Improved grassland	Not Present	Not Present	Present 50 m – 250 m (Braddup Compound)	A small improved grassland field is located approximately 90 m to the north of the Braddup Compound access track.	None
Semi-improved acid grassland	Not present	Not present	Present 50 m – 250 m (Bonstone Compound)	A small area of semi-improved acid grassland is located approximately 110 m to the south of Bonstone Compound, immediately to the north of Bonstone Brook. The grassland is characterised by the presence of tormentil, heath bedstraw, sweet vernal grass and crested dog's-tail.	HPI
Semi-improved neutral grassland	0.21 ha	2.08 ha	Present < 50 m (Braddup and Bonstone Compounds) 50 m – 250 m (Braddup and Bonstone Compounds)	Access for the Bonstone Compound passes through an area of semi-improved neutral grassland. The grassland appears to be relatively species-rich and is dominated by tufted hair grass. Species include Yorkshire fog, tormentil, heath bedstraw, compact rush, soft rush, sharp flowered rush, marsh thistle, sedges, bird's-foot trefoil, star sedge, marsh willowherb, common bent, purple moor grass, white clover, water mint, meadowsweet, lesser spearwort, lesser stitchwort, marsh valerian, marsh bedstraw, hard rush, yarrow, quaking grass, selfheal, ribwort plantain, barren strawberry, red clover and crested dog's-tail.	HPI LBAP



Habitat	Extent *			Summary Features	Status
	Braddup Compound	Bonstone Compound	Offsite		
				Semi-improved neutral grassland is also found occasionally on the access track verge to the Braddup Compound and within an area of fenced-off grassland with no access for livestock (TR4.TN4).	
Poor semi-improved grassland	14.41 ha	6.93 ha	Present < 50 m (Braddup and Bonstone Compounds) 50 m – 250 m (Braddup and Bonstone Compounds)	Found extensively across both the Braddup and Bonstone Compounds. Generally grazed with sheep.	None
Marshy grassland	1.14 ha	< 0.01 ha	Present < 50 m (Braddup and Bonstone Compounds) 50 m – 250 m (Braddup and Bonstone Compounds)	While not abundant, an area of marshy grassland is present towards the centre of the Braddup Compound (TR4.TN3). The grassland is dominated by compact rush and soft rush with Yorkshire fog, perennial rye grass, white clover, creeping thistle, common nettle and creeping buttercup. The grassland is not a particularly species rich.  Limited further fragments of this habitat are located within the access road corridor for both the Braddup and Bonstone Compounds.	None
Mire	Not Present	< 0.01 ha	Present < 50 m (Bonstone Compound)	Small pockets of M27c <i>Filipendula ulmaria</i> – <i>Angelica sylvestris</i> mire and S19 <i>Eleocharis palustris</i> swamp and other sedge dominated communities, identified during the NVC survey, are located within the access road corridor for the Bonstone Compound.	HPI
Amenity grassland	Not Present	Not Present	Present < 50 m (Braddup Compound) 50 m – 250 m (Braddup Compound)	Areas of amenity grassland are associated with residential properties to the east of the B6478 road.	None

Habitat	Extent *			Summary Features	Status
	Braddup Compound	Bonstone Compound	Offsite		
Tall ruderals	0.11 ha	Not present	Present < 50 m (Braddup Compound) 50 m – 250 m (Braddup Compound)	Limited to small areas within the marshy grassland habitat within the Braddup Compound (TR4.TN3) and towards the edge of the compound area. Tall ruderal vegetation also forms small stands throughout the species-poor semi-improved grassland of the Marl Hill Section and typically comprises common nettle, broadleaved dock and common hogweed. Occasionally present outside of the compound areas but within 150 m.	None
Buildings and hardstanding	0.01 ha	0.02 ha	Present < 50 m (Braddup and Bonstone Compounds) 50 m – 250 m (Braddup and Bonstone Compounds)	A number of buildings of varied construction are present within and adjacent to the Marl Hill section. Within the Braddup Compound the buildings comprise operations buildings (TR4.TN1, TR4.TN2 and TR4.TN5) and associated parking. A traditional agricultural building is also present outside of the Braddup Compound to the north (TR4.TN9). Within the Bonstone Compound the buildings comprise a pump house and small operational building (TR4.TN27 and TR4.TN28) and associated parking. Further residential and agricultural buildings are present outside of the Bonstone Compound to the north (TR4.TN25) and south (TR4.TN18 and TR4.TN19).	None
Spoil	0.02 ha	Not Present	Present <50 m (Braddup and Bonstone Compounds) 50 m – 250 m (Braddup and Bonstone Compounds)	Bare ground includes gravel and bare earth and is infrequent in the Braddup Compound envelope and is largely associated with farm tracks.	None
Ponds	< 0.01 ha	0.01 ha	Present < 50 m (Braddup and Bonstone Compounds) 50 m – 250 m (Braddup and	Two small scrapes are present within an area of marshy grassland at the Bonstone Compound (TR4.TN14), one of which extends into the access road boundary. The scrapes contain a shallow water level which and are ephemeral in nature. Immediately to the north of the proposed Bonstone Compound access road are five scrapes within neutral grassland (TR4.TN15), which have been purposefully excavated for lapwing breeding. The scrapes are shallow (approx. 20 cm to 40 cm) and are ephemeral in nature.	HPI LBAP

Habitat	Extent *			Summary Features	Status
	Braddup Compound	Bonstone Compound	Offsite		
			Bonstone Compounds)		
Running water (mesotrophic)	112 m	243 m	Present < 50 m (Braddup and Bonstone Compounds) 50 m – 250 m (Braddup and Bonstone Compounds)	Two watercourses W530 and W535 flow across the Braddup Compound. W530 (Sandy Ford Brook), flows adjacent to the northern compound boundary before crossing the access road. W535 crosses the western edge of the compound. A further watercourse W539 (a small drainage ditch) flows into W530 north of the compound. Further small drainage ditches cross the Braddup Compound access track (W541, W520, W521, W557 and W523)  One watercourse, W483, flows across the north western part of the Bonstone Compound. A further two watercourses, W480 and W1465, comprise small drainage ditches flowing adjacent to the site. A more substantial watercourse W485 (Bonstone Brook) flows approximately 150 m to the south west of the compound.  Valuation and impact assessment are provided in Chapter 9B.	HPI LBAP
Intact native species rich hedgerows	Not Present	Not Present	Present < 50 m (Bonstone Compound) 50 m – 250 m (Bonstone Compound)	TR4.H2 is a short section of species rich intact hedgerow located along the north edge of the existing farm track, to the west of the point at which the proposed construction access for the Bonstone Compound diverts in-field to the northwest. TR4.H2 was assessed as an important hedgerow. Another species rich intact hedgerow (TR4.H4) runs approximately south perpendicular to the existing farm track, adjoining the southern boundary of the Bonstone Compound. TR4.H4 was not assessed to be important.	HPI LBAP Hedgerow Regulations
Intact native species poor hedgerow	121 m	96 m	Present < 50 m (Braddup and Bonstone Compounds) 50 m – 250 m (Braddup and Bonstone Compounds)	One short species-poor intact hedgerow (TR4.H5) is present within the Bonstone Compound. Further species poor hedgerows (H1 and H3) are present within 50 m of the compound envelope.  TR4.H6- TR4.H11 and TR4.H13 are species poor intact hedgerows that form a small interlinked network located west of the Braddup Compound. TR4.H13 is the most easterly of these and is located approximately 175 m west of the compound, the only such feature to occur within the survey area as all other hedgerows identified are generally isolated features. TR4.H12 is a relatively short length of species rich hedgerow (not assessed as important) which runs parallel to Slaidburn Road at the point where construction access	HPI LBAP

Habitat	Extent *			Summary Features	Status
	Braddup Compound	Bonstone Compound	Offsite		
				would come off the road. None were assessed to be 'important' under ecological criteria of the Hedgerow Regulations 1997.	
Walls	Not Present	211 m	Present < 50 m (Braddup and Bonstone Compounds) 50 m – 250 m (Braddup and Bonstone Compounds)	Walls enclose a hay meadow at the eastern end of the Bonstone Compound access road (TR4.TN16). Further walls are located within 50 m of the compound envelope. The walls support a range of bryophytes, lichens and ferns.	None
Dry ditch	454 m	310 m	Present < 50 m (Braddup and Bonstone Compounds) 50 m – 250 m (Braddup and Bonstone Compounds)	Three dry ditches cross or extend into the Braddup Compound. One is associated with the existing access road. They comprise small drainage ditches that were dry at the time of survey but which may wet at other times of the year. A single dry ditch crosses the Bonstone Compound access road.	None

- 47) No plant species of note were identified within the Proposed Marl Hill Section above-ground working areas. However, a number of Ancient Woodland Indicator (AWI) species were recorded within the woodland associated with Bonstone Brook at TR4.TN21, approximately 100 m south west of the Bonstone Compound, including dog's mercury, English bluebell (also Sch8), giant fescue, moschatel, ramsons, remote sedge and wood sorrel. This woodland is part of the Gibb's Wood and Bonstone Wood BHS, but does not appear on Natural England's Ancient Woodland Inventory.
- 48) Non-native invasive plant species (Sch9) identified within the Proposed Marl Hill Section above-ground working areas included Himalayan balsam associated with Sandy Ford Brook which crosses the Braddup Compound access road (TR4.TN7). Additionally, rhododendron and Himalayan balsam were recorded at TR4.TN11, within mixed plantation woodland adjacent to the western Braddup Compound boundary, with a further stand of Himalayan balsam recorded at TR4.TN9 to the north of the compound.

#### 9.5.4 Fauna

- 49) Table 9A.7 provides a summary of the baseline from fauna surveys completed across the Proposed Marl Hill Section. Detailed survey findings are described in the relevant Appendix and illustrated on the relevant Figures, as directed by Table 9A.2.

Table 9A.7: Species and species groups present at the Proposed Marl Hill Section

Species / Group	Summary Features	Status
Bats: roost sites	<p>No records for confirmed or possible bat roosts were identified within 2 km of the Proposed Marl Hill Section from within the past 10 years.</p> <p>One building with moderate bat roost suitability (TR4.TN1) and two buildings with low suitability (TR4.TN2 And TR4.TN5) are present within the Braddup Compound. An additional building with moderate suitability is located outside of the compound to the north (TR4.TN9).</p> <p>One group of trees with high bat roost suitability (G181(BG20)) and 3 no. trees or groups of trees with low bat roost suitability (T165(BT34), T195(BT3) and G189(BG1)) are present within or on the boundary of the Braddup Compound. A limited number of trees or groups of trees possessing low to moderate suitability are located within 50 m of the Braddup Compound to the north and south.</p> <p>One building with low to moderate bat roost suitability (TR4.TN28) and one building with negligible suitability (TR4.TN27) are present within the Bonstone Compound. A building with moderate suitability for roosting bats is also located within 50 m to the east of the compound (TR4.TN25). The landowner verbally confirmed the presence of roosting bats within the residential building and/or stone barn located approximately 60 m to the south of the Bonstone Compound access road (TR4.TN18).</p> <p>One tree with high bat roost suitability (T156(BT12), 6 no. trees or groups of trees with moderate bat roost potential (T161(BT7), T151(BT14), T158(BT8), G158(BT9, 10 &amp; 11), G157(BT13) and T153(BT20)) and one tree with low bat roost suitability (T150(BT19)) are present within or on the boundary of the Bonstone Compound. Further trees or groups of trees with high and moderate bat roost potential are located within 50 m of the Bonstone Compound.</p>	<p>Conservation of Habitats and Species Regulations 2017 (as amended)</p> <p>Wildlife and Countryside Act 1981 (as amended)</p> <p>SPI (certain species only)</p> <p>LBAP</p>
Bats: flyways and foraging	<p>Myotis bats, noctule, common pipistrelle, soprano pipistrelle and brown long-eared bat have been recorded by the combination of transect and static activity surveys around both compounds. Common pipistrelle was generally the most abundant species recorded around both compounds, although occasional peaks in soprano pipistrelle and Myotis species activity</p>	<p>SPI (soprano pipistrelle, brown long-eared bat and noctule)</p>

Species / Group	Summary Features	Status
	<p>were recorded. Species diversity in the landscape around the Braddup Compound appears more consistently diverse than around the Bonstone Compound.</p> <p>Habitats within and immediately surrounding the Braddup compound are of limited diversity, dominated by pasture enclosed by wire and post fence lines. Small blocks of mixed plantation woodland and a stream are present representing potential bat foraging and commuting habitat. The access road crosses Sandy Ford Brook, which together with the associated linear woodland provide more optimal foraging and commuting habitat in the vicinity of the site. Common pipistrelle was the most frequently recorded species during transect and static detector surveys at the Braddup Compound. Surveys were only completed in April, May, June and July 2020, with no data collected at Static B (Figure 9A.11, Sheet 3 of 3) in April 2020 or Static A in July 2020, making any interpretation of seasonal activity unreliable. However, peaks in activity recorded at Static A in April 2020 and Static B in May 2020 appear to show a relative reduction in activity from Spring to Summer.</p> <p>Habitats within the Bonstone Compound are again dominated by pasture, but more varied with scattered trees, scrub, hedgerows, watercourses and ponds which offer more diverse and sheltered foraging opportunities for a wider range of species with greater carrying capacity than the Braddup Compound. Furthermore, adjacent habitat corridors exist in the form of linear woodland blocks and Bonstone Brook that provide stronger connectivity with and across the wider landscape. Common pipistrelle was the most frequently recorded species during transect and static detector surveys at the Bonstone Compound. Peaks in common pipistrelle passes recorded at Static location B during the period following sunset and before sunrise during May and June 2020, could indicate the presence of a nearby common pipistrelle summer roost.</p>	LBAP (all bat species)
Badgers	<p>No setts were identified within 30 m of the Braddup Compound. Two badger prints were recorded in soft mud adjacent to the Braddup Compound access road (TR4.TN46 and TR4.TN46).</p> <p>Habitats within the Braddup Compound offer limited habitat suitability for the excavation of badger setts. Many of the habitats offer suitable foraging habitat for badger. More optimal habitats lie adjacent to the Braddup compound comprising blocks of mixed plantation woodland.</p> <p>No setts were identified within 30 m of the Bonstone Compound.</p> <p>Habitats within the Bonstone Compound survey area offer suitable habitat for the excavation of badger setts, including woodland and hedgerows. Many of the habitats offer suitable foraging habitat for badger. The most optimal habitats lie adjacent to the Bonstone Compound.</p>	Protection of Badgers Act 1992
Brown hare	Brown hare was recorded at two locations within the Bonstone Compound (TR4.TN 17 and TR4.TN26) and adjacent to the Braddup Compound within 50 m (TR4.TN8). Suitable habitats, notably pasture and other grasslands, are present within and surrounding the Braddup and Bonstone Compounds.	SPI LBAP

Species / Group	Summary Features	Status
Hedgehog	<p>Records reveal presence within 2 km of the Proposed Marl Hill Section. The landowner also confirmed hedgehog presence during the Phase 1 surveys of the Bonstone Compound.</p> <p>Habitats within and surrounding the Braddup and Bonstone Compounds include potentially suitable habitats or features that could support this species, although shelter opportunities within the Braddup Compound are limited to adjacent areas of woodland and forage habitats are limited to poor semi-improved pasture and marshy grassland, which are likely to be sub-optimal. Offsite adjacent woodlands are likely to provide the most optimal habitat.</p> <p>Habitats within the Bonstone Compound are more varied including scattered scrub and hedgerow, but again forage habitats are limited to poor semi-improved pasture and marshy grassland. Offsite adjacent woodlands are likely to provide the most optimal habitat.</p>	SPI
Breeding birds	<p>A total of 38 no. bird species were recorded within 100 m of the Bonstone Compound and temporary construction access area. Sixteen of these are BoCC: common gull (Amber), curlew (SPI, Red), lapwing (SPI, Red), linnet (SPI, Red), mallard (Amber), meadow pipit (Amber), oystercatcher (Amber), pied flycatcher (Red), redshank (Amber), redstart (Amber), snipe (Amber), spotted flycatcher (SPI, Red), starling (SPI, Red), stock dove (Amber), swift (Amber) and willow warbler (Amber). Of these 11 no. species were confirmed or probable breeders within the compound and buffer (curlew, lapwing, linnet, meadow pipit, oystercatcher, pied flycatcher, redshank, redstart, spotted flycatcher, starling and stock dove) and 3 no. were possible breeders (mallard, snipe and willow warbler). In addition, from discussions with the tenant farmer, barn owl (WCA Schedule 1) is known to nest within the agricultural building at TR4.TN19, located approximately 50 m south of the Bonstone Compound.</p> <p>A total of 38 no. bird species were recorded within 10 m of the Braddup Compound and temporary construction access route, of which 12 no. species are BoCC: bullfinch (SPI, Amber), curlew (SPI, Red), dunnock (SPI, Amber), lesser black-backed gull (Amber), mallard (Amber), mistle thrush (Red), redstart (Amber), song thrush (SPI, Red), spotted flycatcher (SPI, Red), starling (SPI, Red), stock dove (Amber) and willow warbler (Amber). Of these seven no. were confirmed or probable breeders within the compound (curlew, mallard, mistle thrush, redstart, song thrush, stock dove and willow warbler) and four were possible breeders (bullfinch, dunnock, spotted flycatcher and starling). In addition, barn owl (WCA) is known to roost within the traditional farm building at TR4.TN9, approximately 30 m north of the Braddup Compound. Barn owl is likely to nest nearby.</p>	<p>Wildlife and Countryside Act 1981 (as amended)</p> <p>SPI (certain species)</p> <p>BoCC (certain species)<sup>33</sup></p> <p>LBAP (certain species)</p>
Wintering birds	<p>A total of 60 no. species were recorded for the Proposed Marl Hill Section at the two compounds, with 56 no. species recorded at the Bonstone Compound and surrounding 500 m buffer and 44 no. species recorded at the Braddup Compound and surrounding 500 m buffer. Of these, 24 no. species are BoCC: black headed gull, common gull, greylag goose, house martin, kestrel, lesser black-backed gull, mallard, meadow pipit, redshank, snipe, stock dove and tawny owl (Amber), bullfinch, dunnock, reed bunting</p>	<p>SPI (certain species)</p> <p>BoCC (certain species)</p> <p>LBAP (certain species)</p>

<sup>33</sup> Eaton, M.A. *et. al* (2015) As Reference 22

Species / Group	Summary Features	Status
	<p>(Amber and SPI), grey wagtail, mistle thrush (Red), fieldfare, redwing (Red and WCA Schedule 1 (breeding only)), curlew, herring gull, lapwing, lesser redpoll, skylark, song thrush, spotted flycatcher and starling (Red and SPI). The wider assemblage was reported to be typical of the habitats present.</p> <p>Small numbers of waders were recorded at the Braddup Compound; a single snipe in November and two in January favouring the marshy grassland to the west of central survey area. A single curlew was recorded in wet grassland at the northern section of the site in February.</p> <p>Two species of gull were recorded during the surveys at the Braddup Compound; however, numbers were very low with the only records in January comprising a single common gull and three lesser black-backed gulls.</p> <p>Redwing was recorded regularly during the winter surveys at the Braddup Compound, feeding across the site with a peak count of 22 no. in October. Fieldfare was recorded in December, with 32 no. birds observed.</p> <p>No wildfowl were recorded within habitats situated within the Braddup Compound.</p> <p>Snipe was recorded using the numerous scrapes and marshy grassland habitats in the eastern half of the Bonstone Compound survey area, directly adjacent to the access track, with a maximum count of 16 no. in October.</p> <p>Curlew, lapwing and redshank were present outside the core winter period as birds returned to their breeding territories. Curlew was present throughout the Bonstone Compound survey area in February and numbers reached six in March. Lapwing returned to wet grassland and scrapes at the eastern section of the area in February, peaking at 12 no. individuals in March, alongside two redshank.</p> <p>Four gull species were recorded at the Bonstone Compound during the surveys; however, numbers were low and generally comprised of birds flying over the site, with a few birds feeding in the grassland in the northern section of the site.</p> <p>Redwing and fieldfare were recorded regularly during the winter surveys at the Bonstone Compound feeding across the site. Peak counts for fieldfare comprised 30 individuals in October 2019 and 46 no. for redwing in November 2019.</p> <p>Other than occasional mallard, no wildfowl were recorded within habitats situated within the Bonstone Compound.</p>	
Reptiles	<p>No records of reptiles were returned as part of the desk study and no reptiles were observed during the extended Phase 1 habitat survey or other Phase 2 surveys completed at the Proposed Marl Hill Section.</p> <p>The poor semi-improved pasture that dominates the Braddup Compound is considered to be sub-optimal reptile habitat, although the smaller areas of marshy grassland represent more optimal habitat. Shelter habitat / features are limited to adjacent areas of woodland.</p> <p>Habitats within the Bonstone Compound are more varied including scattered scrub and hedgerow, but again dominated by poor semi-improved pasture and smaller areas of marshy grassland.</p>	Wildlife and Countryside Act 1981 (as amended)
Amphibians, including	No permanent ponds are present within either the Braddup or Bonstone Compounds.	SPI (common toad)



Species / Group	Summary Features	Status
great crested newts: breeding ponds	No ponds within 500 m of either the Braddup or Bonstone Compounds were confirmed to support great crested newts. A small pond cluster is present within 50 m of the Bonstone Compound access road which was confirmed by the landowner to support common frog and common toad and also has potential to support palmate newt and smooth newt (TR4.TN14 and TR4.TN15).	LBAP (common toad)
Amphibians, including great crested newts: terrestrial habitats	Common toad and common frog are known to occur within 50 m of the proposed Marl Hill section. Pond density across the local landscape is generally low and consequently amphibian terrestrial habitat densities are likely to be low also, although the ponds/scrapes and marshy grassland immediately to the north of the Bonstone Compound access road could provide a localised concentration of terrestrial amphibian presence. Suitable terrestrial habitats within the Braddup and Bonstone Compounds are limited to small areas of marshy grassland, scattered scrub and hedgerow habitat, with the poor semi-improved pasture that dominates these areas considered sub-optimal.	SPI (common toad) LBAP (common toad)
Terrestrial invertebrates	Various records of notable butterfly and moth species including 8 no. SPI (broom moth, small heath, white ermine, small square-spot, buff ermine, dusky brocade, Autumnal rustic and neglected rustic). The limited range of habitats and floral diversity within the Braddup Compound is unlikely to support significant populations of terrestrial invertebrates (individual species or assemblages). The Bonstone Compound incorporates more varied habitats including marshy grassland, scrub, scattered trees and hedgerows which may provide localised forage and shelter for terrestrial invertebrates. However, Gibb's Wood and Bonstone Wood BHS and Bonstone Brook Pastures BHS to the south west and south respectively of the Bonstone Compound present the most optimal habitats for terrestrial invertebrates and consequently these offsite areas are more likely to support viable populations than habitats present within the Braddup and Bonstone Compounds.	Wildlife and Countryside Act 1981 (as amended) (certain species) SPI (certain species) LBAP (certain species) Nationally Rare / Notable (certain species)

Future baseline

50) It is assumed for the purposes of this EclA that the current land uses within and adjacent to the Proposed Marl Hill Section would remain as they were at the time of the field surveys, except in cases where planning permission has already been granted for development. For consented developments, it is assumed that the developments would take place. These have been considered in the cumulative assessment in Chapter 19.

9.5.5 Identification and Valuation of Ecological Features

51) Table 9A.8 summarises the ecological features which comprise the EclA baseline which may potentially be affected by the Proposed Marl Hill Section and their ecological importance.

Table 9A.8: Valuation of Terrestrial Ecology Features Present at the Proposed Marl Hill Section

Ecological Feature	Description	Value
Broadleaved semi-natural woodland	No ancient woodland is present within the Proposed Marl Hill Section. Ancient woodlands present within 2 km of the Proposed Marl Hill Section	County

Ecological Feature	Description	Value
	<p>are found within Gibb's Wood and Bonstone Wood BHS, Feazer Wood BHS, Hospital Wood BHS, Ashnott Wood BHS and Braddup Wood BHS; ancient woodlands are therefore evaluated and assessed as part of these locally designated sites.</p> <p>Other semi-natural woodland is not present within the Bonstone Compound. Rare within the Braddup Compound, limited to &lt; 0.01 ha. A narrow belt of broadleaved semi-natural woodland is present along the western edge of the B6478 road to the north of the access track for the Braddup Compound. Woodland is reasonably common within the wider landscape, including a number of clough woodlands that are present locally. Important for diversity, fragility, typicalness and function within the ecological network. Further extents are offsite, within the non-statutory designation Gibb's Wood and Bonstone Wood BHS &lt;100 m to the south west of the Bonstone Compound.</p>	
Broadleaved plantation woodland	<p>Not present within the Braddup or Bonstone Compounds. A small area of broadleaved plantation woodland is located approximately 80m to the southwest of the Braddup Compound. A generally common and widespread habitat across the wider landscape, typically occurring in patches of varied extents which contribute to the local ecological network.</p>	Less than Local
Coniferous plantation woodland	<p>Not present within the Braddup or Bonstone Compounds. A small area of coniferous plantation woodland is located approximately 80m to the southwest of the Braddup Compound.</p> <p>A generally common and widespread habitat across the wider landscape, typically occurring in patches of varied extents which contribute to the local ecological network.</p>	Less than local
Mixed Plantation Woodland	<p>Not present within the Bonstone Compound. Rare within the Braddup Compound with the access road passing through an area of woodland (0.06 ha). Further areas of mixed plantation woodland are located adjacent to the western boundary of the Braddup Compound and within 50 m of the Bonstone Compound. A generally common and widespread habitat across the wider landscape, typically occurring in patches of varied extents which contribute to the local ecological network.</p>	Less than Local
Scattered scrub	<p>Not present within the Bonstone Compound. Rare within Bonstone Compound (0.01 ha).</p> <p>A generally common and widespread habitat across the wider landscape. Of limited diversity but contributes towards the interest and function of the immediate local ecological network.</p>	Less than Local
Scattered broadleaved trees (veteran trees)	<p>Five veteran Category A3 trees present within the Braddup Compound. One veteran Category A3 tree present within the Bonstone Compound.</p> <p>The broadleaf species are typical in the landscape, with additional mature and veteran trees and areas of Ancient &amp; Semi-Natural Woodland and Ancient Replanted Woodland identified locally.</p>	County
Scattered broadleaved trees (non-veterans)	<p>Relatively frequent in the Braddup Compound, particularly through the centre of the main compound area and along the access track.</p> <p>Less frequent in the Bonstone Compound.</p>	County

Ecological Feature	Description	Value
	The broadleaf species are typical in the landscape. Their value is generated both from individual features and the habitat unit they form within the wider habitat network.	
Semi-improved acid grassland	Not present within the Braddup or Bonstone Compounds. A small area of semi-improved acid grassland is located approximately 110 m to the south of Bonstone Compound. Contributes to the interest and function of the wider local ecological network. Acid grassland is rare within the wider landscape.	County
Semi-improved neutral grassland	Access for the Bonstone Compound passes through an area of semi-improved neutral grassland (2.08 ha). The grassland appears to be relatively species-rich. Rare within the Braddup Compound, restricted to fragments along the access road and where livestock have been fenced-out (0.21 ha). Relatively common and widespread in the local landscape. Contributes to the interest and function of the wider local ecological network.	Local
Poor semi-improved grassland	Extensive within both the Braddup Compound (14.41 ha) and Bonstone Compound (6.93 ha). Common and widespread habitat locally of limited diversity but by virtue of its extent contributes towards the interest and function of the immediate local ecological network.	Less than Local
Improved grassland	Not present within the Braddup or Bonstone Compounds. A small improved grassland field is located approximately 90 m to the north of the Braddup Compound access track. Common and widespread habitat locally of limited diversity although provides permeability within the immediate ecological network for a range of mobile species.	Less than Local
Marshy grassland	<p>Localised within the Braddup Compound (1.14 ha). Rare within the Bonstone Compound (&lt; 0.01 ha), restricted to fragments along the access road. Relatively common in the local landscape, although associated with localised wet ground conditions. Contributes to the interest and function of the wider local ecological network.</p> <p>The most extensive area of marshy grassland within the Proposed Marl Hill Section, identified as Braddup House within the GWDTE Assessment, lies entirely within the Braddup Compound and is assessed to have low groundwater dependency. The Braddup Compound access road passes through two further areas containing marshy grassland habitat, identified as Whinny Lane East and Slaidburn Road West in the GWDTE Assessment, both assessed as having moderate to low groundwater dependency. Whinney Lane West, located approximately 14 m to the north of Braddup Compound and Thornbers, &lt; 10 m to the east of Braddup Compound on the eastern side of the B6478 Slaidburn Road, are assessed as having moderate groundwater dependency.</p> <p>The Bonstone Compound access road passes through an area of semi-improved grassland with marshy grassland extending to the north, identified as New Laithe within the GWDTE Assessment which has low groundwater dependency. Additional areas of marshy grassland assessed to have moderate and high groundwater dependency are located 35 m and 176 m to the north of the access road respectively. Blue Gates, located approximately 25 m to the north of the Bonstone Compound</p>	Local

Ecological Feature	Description	Value
	access road, is assessed as having low groundwater dependency. (Appendix 7.2, Figure 7.7).	
Mire	Not present within the Braddup Compound. Rare within the Bonstone Compound, limited to < 0.01 ha within the access road corridor. The small area of mire and associated habitat falls within the part of the New Laithe GWDTE assessed to have low groundwater dependency.	Local
Amenity grassland	Not present within the Braddup or Bonstone Compounds. Found only within private property to the east of the B6478. Artificial habitat type of negligible value with negligible contribution to immediate, local or wider ecological networks.	Immediate site
Tall ruderals	Rare within the Braddup Compound (0.11 ha), limited to small fragments within the grassland habitats and around the compound periphery. Absent within the Bonstone Compound. A generally common and widespread habitat across the wider landscape. Generally botanically impoverished but provides limited and localised structural and habitat diversity within the immediate habitat mosaic.	Less than Local
Buildings	Rare within the Braddup and Bonstone Compounds, limited to occasional operational or agricultural buildings (0.01 ha and 0.02 ha respectively). Common and widespread habitat across the wider landscape. Artificial habitat type of negligible value with negligible contribution to immediate, local or wider ecological networks.	Immediate site
Bare ground	Rare within the Braddup Compound (0.02 ha), limited to roads, farm tracks and parking areas. Absent from the Bonstone Compound. Common and widespread habitat across the wider landscape. Artificial (access track) habitat type of negligible value with negligible contribution to immediate, local or wider ecological networks.	Immediate site
Running water (mesotrophic)	Two watercourses flow across the Braddup Compound, Sandy Ford Brook which was dry at time of survey and a further small slow flowing stream. Two watercourses flow across the Bonstone Compound, both shallow and slow flowing drainage ditches. The watercourses associated with the Proposed Marl Hill Section are hydrologically connected to the River Hodder and River Ribble which qualify as HPI. Watercourses are common in the wider landscape surrounding both compound areas. Further details, evaluation and assessment of watercourses are presented in Chapter 9B.	Refer to Chapter 9B
Ponds	Rare within the Braddup Compound (< 0.01 ha) with one small scrape/ephemeral pool present partially within the Bonstone Compound access track corridor (0.01 ha). While HPI, the scrapes have been created by the landowner to encourage wildlife and are not historic landscape features. Ponds are relatively rare within the wider landscape. The scrapes largely lie within the Blue Gates GWDTE, assessed as having low groundwater dependency.	Local
Native hedgerows	Very rare from the Bonstone Compound (95.6 m) and isolated where present. Native species-rich hedgerow identified adjacent to the compound and access road was identified as being 'important' under ecological criteria of the Hedgerow Regulations 1997. Rare from the	Local

Ecological Feature	Description	Value
	Braddup Compound (120.4 m) and isolated where present. Relatively common and widespread, with more integrated network, across the landscape.	
Walls	Absent from the Braddup Compound and rare within the Bonstone Compound (210.4 m). Relatively common and widespread across the landscape. Artificial habitat type, relatively common across landscape, of negligible inherent value with limited contribution to immediate, local or wider ecological networks. May provide localised shelter or ranging / dispersal opportunities for some species.	Less than Local
Dry ditch	Rare within both the Braddup Compound and Bonstone Compound (454.3 m and 310.1 m respectively). Relatively common and widespread across the landscape. Artificial habitat type, common across landscape, of negligible inherent value with limited contribution to immediate, local or wider ecological networks. May provide localised foraging or ranging / dispersal opportunities for some species.	Less than Local
Bats: roost sites	No records for confirmed bat roost locations are located within 2 km of the Proposed Marl Hill Section. Suitable roost habitats (buildings and trees) are present within and bordering both the Braddup and Bonstone Compounds. Verbal confirmation of roosting bats within residential and agricultural buildings approximately 60 m to the south of the Bonstone Compound access road. Static bat detector data indicates the potential presence of a common pipistrelle summer roost in the vicinity of Bonstone Compound. Suitable roost habitats (multiple trees and buildings) are present within and bordering the Proposed Marl Hill Section.	Local
Bats: flyways and foraging	<p>Key landscape corridor features are offsite but localised features (hedges, walls, linear trees/scrubs and watercourses) are occasional within both the Braddup and Bonstone Compounds with some connectivity value.</p> <p>Foraging habitat within and immediately surrounding the Braddup compound is of limited diversity, dominated by pasture enclosed by wire and post fence lines.</p> <p>Habitats within the Bonstone Compound are again dominated by pasture, but more varied with scattered trees, scrub, hedgerows, watercourses and ponds which offer more diverse and sheltered foraging opportunities.</p> <p>The bat assemblage recorded to date is broadly typical for the range of habitats present and geographical location. Species diversity and relative activity levels recorded are generally reflected of the habitat diversity present. Relative activity levels recorded would not suggest that habitats present within the Proposed Marl Hill Section are likely to function as part of any significant migratory or dispersal routes.</p>	Local
Badgers	Setts likely to be occasional in wider landscape, absent from the Braddup and Bonstone Compounds and 30 m buffers. Habitats in the Braddup and Bonstone Compounds offer permeability and foraging opportunities, but evidence of use is low. Common and widespread species, statutorily protected for welfare reasons.	Local

Ecological Feature	Description	Value
Brown hare	Confirmed present by incidental observations during Phase 1 survey, likely to be at moderate densities given habitats present across both the Braddup and Bonstone Compounds. Widespread but declining species.	Local
Hedgehog	Known to be present within local landscape, with landowner confirming presence within the vicinity of the Bonstone Compound. Suitable habitats present within both the Braddup and Bonstone Compounds but more optimal habitats occur offsite. Widespread but declining species.	Local
Breeding birds	Moderate assemblages recorded from within habitats present within 100 m of the Bonstone Compound (38 no. species, of which 16 no. are BoCC) and the Braddup Compound (38 no. species, of which 12 no. are BoCC). Several passerine species likely to nest within scrub, tree or hedge habitats within and adjacent to the Bonstone and Braddup Compounds. Ground nesting appears to be limited to meadow pipit within grassland of the Bonstone Compound, but oystercatcher and lapwing were also noted breeding within the wider survey area and so may be present. Barn owl confirmed to nest within 50 m of Bonstone Compound and to roost within 30m of Braddup Compound. Main bird interest appears focussed on offsite habitats (namely, woodlands and marsh).	Local
Wintering birds	No significant numbers of waders, wildfowl, gulls, wintering thrushes, farmland passerines or other notable species were recorded utilising habitats within the Proposed Marl Hill Section on a regular basis. The scrapes outside of the Bonstone Compound but adjacent to the access road supported the most notable winter birds with a peak of 16 snipe, 12 lapwing and two redshank recorded. Peak counts from within the Braddup Compound for fieldfare comprised 32 individuals in October 2019 and 22 for redwing in December 2019. However, none of the species recorded were present in numbers that would be notable at a County level.	Local
Reptiles	No reptile species confirmed within the proposed Marl Hill Section. Optimal habitats within the Braddup and Bonstone Compounds are limited. Any reptile species present likely to be common and widespread and at low density.	Local
Amphibians: breeding ponds	Great crested newts are absent from ponds within the Braddup and Bonstone Compounds and from ponds within 500 m from the Braddup and Bonstone Compounds. Ephemeral ponds / scrapes are present on the boundary and adjacent to the Bonstone Compound access road corridor. Common frog and common toad confirmed as present within the scrapes by the landowner.	Local
Amphibians: terrestrial habitats	Optimal terrestrial habitats within the Braddup and Bonstone Compounds are limited to small areas of marshy grassland and hedgerow habitat, with the poor semi-improved pasture that dominates both compound areas considered sub-optimal. Considering the low density at which suitable breeding habitats are located across the surrounding landscape, densities of terrestrial amphibians are likely to be low.	Local
Terrestrial invertebrates	Habitats with potential to support notable species or assemblages of terrestrial invertebrates (taking account of desktop records returned from LERN), are located outside of the Proposed Marl Hill Section.	Local

Ecological Feature	Description	Value
Non-native invasive species	Not of ecological conservation concern but there is a statutory duty to avoid the introduction or spread of species listed on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended).	n/a

52) In line with the requirement for a proportionate approach to EIA, only ecological features identified as having at least local value are taken forward for individual impact assessment.

## 9.6 Assessment of likely significant effects

### 9.6.1 Enabling Works Phase

#### Proposed Activities

53) Enabling works are anticipated to last a duration of three months (commencing following planning permission in 2023 and ahead of construction in Q2 2024) and would include the following activities that have potential to result in biophysical changes to important ecological features:

- Fencing installation (comprising stock-proof post and wire around open-cut working areas and higher 'heras' type around compounds and lay-down areas)
- Tree, scrub and hedgerow removal, where unavoidable. In accordance with the AIA (Figure 6.6), the following losses would be unavoidable:
  - Trees T144\* (\*veteran), T148 and T150; groups of trees G145, G148, G151, G152, G154, G156 and G162; and hedgerow TR4.H5 within the Bonstone Compound
  - Trees T187\*, T188, T189, T190\*, T192 and T195; and group of trees G189 within the Braddup Compound
- The following losses are currently assumed to be unavoidable (while individual features may be avoidable, degradation or other impacts may still arise if the features can be retained):
  - Trees T153 and T162; and group of trees G157 within the Bonstone Compound
  - Trees T165, T175, T176\* (\*veteran), T177, T178, T180, T182, T183, T184\*, T185\*, T186, T193; groups of trees G170, G174, G177, G178, G179, G181, G184, G188, G190, G191; woodland W171; and hedgerows H167 and H172 within the Braddup Compound
- All other trees, woodlands and hedgerows would be retained and protected in accordance with avoidance and mitigation methods embedded through the CCoP Section 5.2
- Temporary watercourse diversions or crossings, if unavoidable (impacts upon watercourses are described and assessed in Chapter 9B)
- Topsoil and subsoil strip from across compounds and access corridors and temporary storage (within construction areas) for later reinstatement
- Cut and fill operations to generate construction platforms for temporary access, compounds, lay-down areas
- Surface water drainage where required (comprising temporary storage, treatment and discharge features)
- Construction of temporary access tracks (4 m wide with passing places comprising a layer of crushed stone with associated temporary drainage for the Bonstone Compound; upgrade existing track to 7.7 m wide tarmac road for the Braddup Compound)

- Construction of Braddup and Bonstone Compounds, including lay-down areas
- Any advance tree and hedgerow planting.

#### Effects Scoped Out

- 54) No significant fragmentation or isolation effects are anticipated as a consequence of enabling works for the Proposed Marl Hill Section in respect of the position or function that statutory and non-statutory sites have in the local ecological network.
- 55) Potential effects upon North Pennine Dales Meadows SAC and Bowland Fells SPA are detailed within the HRA (RVBC-MH-APP-010). Due to the distance from the Bowland Fells SPA (>4 km), the lack of hydrological linkages and the habitats present at the Proposed Marl Hill Section there would be no disturbance or habitat loss impacts on the qualifying species. Due to the distance from the North Pennine Dales Meadows SAC (>3.5 km) and the lack of hydrological linkages, there would be no effect on the SAC.
- 56) The SSSI report (RVBC-MH-APP-009) confirms Langcliff Cross Meadow SSSI, Bell Sykes Meadows SSSI, Myttons Meadows SSSI, Bowland Fells SSSI and Field Head Meadow SSSI are located sufficiently distant (>3.5 km) from the Proposed Marl Hill Section that no likely significant effects from changes in air quality or hydrology or on the integrity of the local ecological network would be anticipated.
- 57) Similarly, of the 23 BHS identified within 2 km of the Proposed Marl Hill Section, all but two are located over 200 m from the proposed Marl Hill compounds. This is sufficiently distant that no likely significant effects in respect of noise, vibration, light disturbance or the integrity of the local ecological network would be anticipated. Gibb's Wood and Bonstone Wood BHS and Bonston Pastures BHS are located within 100 m and 160 m respectively and are scoped into the assessment.
- 58) Transport Planning (Chapter 16) and Air Quality (Chapter 18) assessments conclude that no significant changes to air quality would arise along the haulage or site traffic routes as a consequence of the site traffic journeys alone during any of the project phases. Effects of increased emissions are therefore scoped out for the enabling phase. Potential effects of increased emissions arising from operation of generators within the compounds remains part of the impact assessment, however these effects would be limited to the construction phase and are therefore scoped out for the enabling phase.
- 59) Degradation in quality or function of habitats resulting from dust deposition during bulk earthworks and generated from bulk soil storage would be avoided or reduced to non-significant levels by embedded mitigation (further details of embedded measures to protect sensitive features from dust deposition are provided within Section 5.11 of the CCoP). Therefore dust impacts are scoped out of this assessment.
- 60) Degradation in quality or function of habitats resulting from surface water changes, site run-off (including sedimentation or wash-out/erosion effects) would be avoided or reduced to non-significant levels by embedded mitigation (further details of embedded measures to protect surface water features, maintain surface water run-off rates and ensure surface and site run-off water quality are provided within Section 5.3 and 5.11 of the CCoP). Potential effects upon watercourses, including construction of temporary outfalls and effects of uncontrolled surface water run-off, are considered in Chapter 9B and consequently watercourses are not considered further as important ecological features within this EclA for Terrestrial Ecology. However, discussion of or reference to watercourses may be included for context in characterising effects upon important (terrestrial) ecological features.
- 61) The important ecological features or impact pathways discussed above are therefore scoped out from the EclA for the enabling works.

#### Effects Carried Forward for Assessment

- 62) In the absence of additional mitigation, potential effects upon other important ecological features would include:
- Physical loss of habitats. The reasonable worst case to facilitate levels, construction platforms and laydown/storage area requirements assumes:



- temporary landtake requiring loss of all habitat areas and features from within the Braddup and Bonstone Compounds, except
  - a) boundary features would be retained with appropriate standoffs (2 m for hedgerows, appropriate root protection for trees as recommended by the AIA (Appendix 6.6)
  - b) watercourse crossings (impacts upon watercourses are described and assessed in Chapter 9B)
- permanent habitat losses would be limited to the footprints of the permanent above ground new structures, comprising the new valve house buildings and associated maintenance tracks; construction of the new valve house buildings and their maintenance tracks would take effect during the construction phase but these habitat losses are accounted for within the overall areas of habitat loss described for the enabling phase
- Damage, degradation or modification of retained habitats including:
  - habitats within Gibb's Wood and Bonstone Wood (93 m south west from the Bonstone Compound) and Bonstone Brook Pastures (0.16 km south from the Bonstone Compound) are potentially at risk from changes in air quality (dust or emissions) or hydrology (surface water runoff, leading to potential sedimentation or erosion)
  - watercourses requiring temporary or permanent new or upgraded culverts or other modifications for crossings and construction of temporary outfalls for the discharge of surface water during the construction phase of both compounds, (impacts upon watercourses are described and assessed in Chapter 9B, but any resulting impacts which have the potential to affect any valued terrestrial features through which the watercourses flow are considered in this chapter)
- Fragmentation and isolation of retained habitats:
  - temporary localised effects until habitat reinstatement is implemented (during the construction and commissioning phases) and habitat becomes re-established
- Habitat loss, exclusion, obstruction of movement and habitat fragmentation affecting mobile species:
  - habitat losses, fragmentation of dispersal / migratory corridor features and installation of barrier effects would prevent access to or between habitats by species using those habitats for foraging, breeding or shelter
  - habitat loss and fragmentation may also contribute to higher mortality in species due to increased exposure from loss of shelter or corridor features leading to higher predation risks or loss of foraging habitat
- Killing, injury or entrapment risk of terrestrial fauna:
  - brown hare, hedgehog, badgers and common reptile and amphibian species that may range across or utilise localised habitats within the Braddup and Bonstone Compounds, passerine birds nesting in trees, scrub and hedgerows, ground nesting birds utilising open grassland habitats and bats roosting in trees would be at risk from vegetation removal and ground works, if present at the onset of works
  - open excavations and mesh or wire fencing may pose an entrapment or entanglement risk to fauna species such as brown hare, hedgehog, badgers, reptiles and amphibians
- Disturbance of species through noise, visual or vibration effects:
  - noise, visual and vibration effects might cause desertion of occupied breeding or shelter sites
  - disturbances might also cause needless expenditure of energy and may expose species to increased risk of predation
- Risk of spreading invasive species:
  - Himalayan balsam and rhododendron are present immediately adjacent to the Braddup Compound and access road at TR4.TN7, TR4.TN9 and TR4.TN11.

- 63) Habitat reinstatement works would be implemented after the construction and during the commissioning phase. This would result in the reversal of the majority of effects arising from habitat loss and fragmentation that occurs during the enabling phase. Following the enabling phase, tunnelling is anticipated to last for approximately 18 months and habitat reinstatement approximately 12 months. Although the commissioning phase (and reinstatement associated with completion of commissioning) may be delayed up to 2029 due to the need for an outage on the aqueduct to facilitate this. Habitat establishment timescales would vary according to the complexity of the target habitat. The majority of habitat losses would comprise improved and semi-improved grassland with smaller areas of marshy grassland as well as species poor hedgerows and scattered trees. Establishment of grassland habitats would be anticipated in one to three years (medium term), while establishment of hedgerows would be anticipated in five years (medium to long term) and woodlands/trees would be anticipated to require more than five years (long term). However, given that habitat losses would occur at the start of the enabling phase and may be absent for at least 3 years before reinstatement, as a precaution the duration of temporary habitat loss impacts to establishment are all classed as long-term.
- 64) Effects arising prior to mitigation (but with due consideration of embedded mitigation as described at Section 9A.6.1) upon the important ecological features are summarised in Table 9A.9. Only those important ecological features where effects have been identified are included in the table.

Table 9A.9: Summary of Enabling Works Effects

Ecological Feature	Value	Potential Effect(s) Prior to Mitigation	Significance (Pre-Mitigation)
Gibb's Wood and Bonstone Wood BHS	County	Degradation in the quality or function resulting from changes to surface water flows or air quality arising from run off or dust deposition during bulk earthworks and generated from bulk soil storage would be avoided or reduced to non-significant levels by embedded mitigation measures, including but not limited to provision of buffers, surface water management and dust suppression measures (further details of which are provided in the CCoP Sections 4.4, 5.6 and 5.11).	Not significant
Bonstone Brook Pastures BHS	County	Degradation in the quality or function resulting from changes to surface water flows or air quality arising from run off or dust deposition during bulk earthworks and generated from bulk soil storage would be avoided or reduced to non-significant levels by embedded mitigation measures, including but not limited to provision of buffers, surface water management and dust suppression measures (further details of which are provided in the CCoP Sections 4.4, 5.6 and 5.11).	Not significant
Bowland Fells IBA	County	Temporary physical loss of approximately 25 ha of habitat to be removed to accommodate the Braddup and Bonstone Compounds. This 25 ha of habitat is entirely situated within the IBA, but represents < 0.01% of the approximately 79,978 ha of habitat within the Bowland Fells IBA.	Not significant
Semi-natural broadleaved woodland	County	Temporary physical loss of < 0.01 ha to be removed to accommodate widened access to Braddup Compound from B6478. This scale of effect is not considered to significantly impact the network of broadleaved woodland present in the landscape locally in terms of overall condition, function or extent. Reversible (with intervention).	Significant Adverse Less than local
Scattered broadleaved trees (veteran)	County	One veteran tree (T144, category A3) is located within the footprint the Bonstone Compound and five veteran trees (T176, T184, T185, T187 and T190, all category A3) are located within the footprint of the Braddup Compound and associated access road. The removal of T144, T187 and T190 has been assessed as unavoidable. The removal of trees T176, T184 and T185 may also be unavoidable subject to levels, requirements for construction access and in consideration of the imperative need to protect the existing aqueduct (water quality). Irreversible effect – veteran trees are irreplaceable features. The assumed loss of six veteran trees (T144, T176, T184, T185, T187 and T190) is based upon a precautionary approach to impact assessment conducted in 2020. Further consideration from an embedded design viewpoint has subsequently been directed at avoiding impacts on these features, although this is not	Significant Adverse Local

Ecological Feature	Value	Potential Effect(s) Prior to Mitigation	Significance (Pre-Mitigation)
		reported in the AIA. A supplemental report will be submitted to address these 'at risk' and notable assets post-submission, and explain the role of embedded mitigation. Retention of these assets would be subject to pre-construction protection measures as specified in a Site Specific Arboricultural Method Statement (SS-AMS) and shown on a Tree Protection Plan (TPP).	
Scattered broadleaved trees (non-veteran)	County	Physical loss of 2 no. trees and 7 no. groups of trees from within the Bonstone Compound would be unavoidable. These trees include two Category B trees or groups of trees (T148 and G151) and seven Category C trees or groups of trees (T150, G145, G148, G152, G154, G156 and G162). Removal of a further 5 no. trees or groups of trees within the Braddup Compound would be unavoidable. These trees include a further 4 no. Category B trees or groups of trees (T189, T192, T195 and G189) and 1 no. Category C tree (T188). Reversible (with intervention).	Significant Adverse Local
Scattered broadleaved trees (veteran and non-veteran)	County	Damage or degradation of trees retained within or adjacent to construction areas (including habitat reinstatement areas) from surrounding enabling activities (e.g. soil compaction, erosion, root or tree damage, wash out etc.) would be avoided by embedded measures outlined in the CCoP (Sections 5.3, 5.6 and 5.7).	Not significant
Semi-improved neutral grassland	Local	Temporary physical loss of 2.08 ha to be removed from Bonstone Compound access road and to a much lesser extent the Braddup Compound (0.21 ha). Reversible (with intervention).	Significant Adverse Less than local
Marshy grassland	Local	Temporary physical loss of 1.14 ha to form the Braddup Compound and associated access road. Additional temporary loss of < 0.01 ha to form the Bonstone Compound access road. Reversible (with intervention).	Significant Adverse Local

Ecological Feature	Value	Potential Effect(s) Prior to Mitigation	Significance (Pre-Mitigation)																				
		<p>In addition to areas experiencing direct loss of marsh habitat from soil stripping, the GWDTE assessment (Appendix 7.2) identified further areas of marsh that would be at risk of impact resulting from changes to groundwater quality originating from the main compound works. Offsite but within potential influence of the Bonstone Compound the New Laithe GWDTE assessment area contains marshy grassland habitat and potential enabling phase effects were identified. Offsite but within potential influence of the Braddup Compound the Braddup House, Whinny Lane East and Slaidburn Road West GWDTE assessment areas all contain marshy grassland and potential enabling phase effects were identified. The source and significance of those effects are summarised as follows:</p> <table border="1" data-bbox="658 683 1939 1061"> <thead> <tr> <th data-bbox="658 683 963 735">Effect Type</th> <th data-bbox="963 683 1205 735">New Laithe</th> <th data-bbox="1205 683 1429 735">Braddup House</th> <th data-bbox="1429 683 1682 735">Whinny Lane East</th> <th data-bbox="1682 683 1939 735">Slaidburn Rd West</th> </tr> </thead> <tbody> <tr> <td data-bbox="658 735 963 890">Intercept flows in short or long term including ground compaction</td> <td data-bbox="963 735 1205 890">Moderate to Large significance</td> <td data-bbox="1205 735 1429 890">Large significance</td> <td data-bbox="1429 735 1682 890">Large significance</td> <td data-bbox="1682 735 1939 890">Large significance</td> </tr> <tr> <td data-bbox="658 890 963 975">Accidental leak / spills of fuels and chemicals</td> <td data-bbox="963 890 1205 975">Slight significance</td> <td data-bbox="1205 890 1429 975">Slight significance</td> <td data-bbox="1429 890 1682 975">Moderate significance</td> <td data-bbox="1682 890 1939 975">Moderate significance</td> </tr> <tr> <td data-bbox="658 975 963 1061">Mobilisation of suspended solids</td> <td data-bbox="963 975 1205 1061">Slight significance</td> <td data-bbox="1205 975 1429 1061">Slight significance</td> <td data-bbox="1429 975 1682 1061">Moderate significance</td> <td data-bbox="1682 975 1939 1061">Moderate significance</td> </tr> </tbody> </table> <p>Marshy grasslands located outside of the compounds which are anticipated to be impacted to varying degrees by changes to groundwater flows / levels or quality may have the result in drying out, such that marshy grassland may revert to a different grassland community (effective loss). Degradation or reduction in extent through partial drying or reduced groundwater quality may also occur. The net extent of habitats potentially effected is not significant in the context of the extent of this resource in the wider area with an additional 8.35 ha of marshy grassland habitat, likely to have varying degrees of groundwater dependency, identified within 200 m of the Proposed Marl Hill Section. None of the GWDTE identified are located within designated sites. Reversible (with intervention).</p>	Effect Type	New Laithe	Braddup House	Whinny Lane East	Slaidburn Rd West	Intercept flows in short or long term including ground compaction	Moderate to Large significance	Large significance	Large significance	Large significance	Accidental leak / spills of fuels and chemicals	Slight significance	Slight significance	Moderate significance	Moderate significance	Mobilisation of suspended solids	Slight significance	Slight significance	Moderate significance	Moderate significance	<p>Significant Adverse Less than Local</p>
Effect Type	New Laithe	Braddup House	Whinny Lane East	Slaidburn Rd West																			
Intercept flows in short or long term including ground compaction	Moderate to Large significance	Large significance	Large significance	Large significance																			
Accidental leak / spills of fuels and chemicals	Slight significance	Slight significance	Moderate significance	Moderate significance																			
Mobilisation of suspended solids	Slight significance	Slight significance	Moderate significance	Moderate significance																			
Mire	Local	<p>Temporary physical loss of &lt; 0.01 ha to be removed to accommodate Bonstone Compound access road. The net extent of habitat potentially effected is considered to be of local significance in the context of the extent of this resource locally. Reversible (with intervention).</p>	<p>Significant Adverse</p>																				

Ecological Feature	Value	Potential Effect(s) Prior to Mitigation	Significance (Pre-Mitigation)
			Less than Local
Ponds	Local	The Bonstone Compound access road has been routed to avoid physical loss of ponds / scrapes. The scrapes largely lie within the Blue Gates GWDTE, assessed as having low groundwater dependency and no impacts. Significant effects arising as a consequence of ground or surface water changes, run-off or dust deposition would be avoided by embedded mitigation measures, including but not limited to provision of buffers, surface water management and dust suppression measures (further details of which are provided in the CCoP Sections 4.4, 5.6 and 5.11).	Not significant
Hedgerows (species poor)	Local	Temporary loss to form compounds and construction access: <ul style="list-style-type: none"> <li>▪ 96 m H5 (species poor) within northwest component of Bonstone Compound</li> <li>▪ 121 m H12 (species poor) to create access road for the Braddup Compound</li> </ul> Reversible (with intervention).	Significant Adverse Less than local
Hedgerows (species-rich and species poor)	Local	All other hedgerows would be retained in line with embedded mitigation. No fragmentation of the local hedgerow network would occur. Significant effects arising as a consequence of run-off or dust deposition would be avoided by embedded mitigation measures, including but not limited to provision of buffers, surface water management and dust suppression measures (further details of which are provided in the CCoP Sections 4.4, 5.6 and 5.11).	Not significant
Bats: roosts	Local	Unavoidable or assumed unavoidable loss of 9 no. trees or groups of trees with high, moderate or low bat roost suitability within the Proposed Marl Hill Section as follows: <ul style="list-style-type: none"> <li>1 no. high suitability group of trees <ul style="list-style-type: none"> <li>▪ G181(BG20) (10 no. trees comprising alder and oak; overall categorisation moderate / high potential) in the Braddup Compound</li> </ul> </li> <li>3 no. moderate suitability trees or groups of trees <ul style="list-style-type: none"> <li>▪ G154(BG8), G157(BT13) and T153(BT20) in the Bonstone Compound</li> </ul> </li> <li>5 no. low suitability trees or groups of trees <ul style="list-style-type: none"> <li>▪ G189(BG1), G190(BG19), T195(BT3) and T165(BT34) in the Braddup Compound</li> <li>▪ T150(BT19) in the Bonstone Compound.</li> </ul> </li> </ul>	Significant Adverse Less than local

Ecological Feature	Value	Potential Effect(s) Prior to Mitigation	Significance (Pre-Mitigation)
		Reversible (with intervention).	
		Disturbance from noise and vibration of known roost at TR4.TN18, located approximately 60 m south from the Bonstone Compound access road, would be avoided by embedded mitigation measures, including but not limited to provision of buffers. Severance or commuting routes as a consequence of vegetation removal considered unlikely.	Not significant
Bats: flyways and foraging	Local	Temporary loss of isolated hedgerows (estimated 217 m), mixed plantation woodland (0.06 ha) and scattered trees or groups of trees (42) in addition to temporary loss of neutral grassland (23.6 ha, the majority being species poor semi-improved), marshy grassland (1.15 ha) and scrub/tall ruderal (0.12 ha) from within the Bonstone and Braddup Compounds in combination. Local reduction of available foraging habitat (mainly species poor sheep pasture) but key landscape features (woodland blocks) and interconnectivity is retained in wider landscape. Reversible (with intervention).	Not significant
Badgers, brown hare, hedgehog, terrestrial amphibians and reptiles	Local	Vegetation clearance, soil stripping and handling, excavations and other enabling phase activities would put species at risk of killing, injury as well as entrapment in excavations or temporary fencing (subject to design). Embedded mitigation measures would prevent any significant effects from this.	Not significant
Badgers, brown hare, hedgehog, terrestrial amphibians and reptiles	Local	Vegetation clearance and other enabling phase activities would result in the loss of foraging and shelter habitats. Reversible (with intervention). Species utilising retained habitats on or offsite could be subject to disturbance from noise, visual or vibration effects, resulting in possible localised displacement from retained habitats. Fenced construction zones may also create localised barrier effects, resulting in exclusion from retained habitats. Reversible (with intervention). Disturbance events, at least until habituation might occur, may also result in needless expenditure of energy and may expose species to increased risk of predation, resulting in increased mortality of individuals. Irreversible (loss of individuals).	Significant Adverse Less than local
Breeding birds	Local	An estimated two BoCC species were confirmed or probable breeders within the Bonstone Compound; curlew (2 no. territories) and lapwing (1 no. territory). An estimated two BoCC species were confirmed or probable breeders within the Braddup Compound; mallard (1 no. territory) and stock dove (1 no. territory).	Significant Adverse Local

Ecological Feature	Value	Potential Effect(s) Prior to Mitigation	Significance (Pre-Mitigation)
		<p>Vegetation clearance could result in destruction or disturbance of nests and while the destruction of nests would be avoided through embedded mitigation the clearance works would result in the loss of nesting habitat (reversible with intervention).</p> <p>A total of 38 no. species were recorded within 100 m of the Bonstone Compound and temporary construction access area. Sixteen of these are BoCC, including common gull (Amber), curlew (SPI, Red; 1 no. probable territory), lapwing (SPI, Red; 1 no. confirmed territory), linnet (SPI, Red; 1 no. probable territory), mallard (Amber), meadow pipit (Amber; 1 no. confirmed and 1 no. probable territory), oystercatcher (Amber; 1 no. confirmed territory), pied flycatcher (Red; 1 no. confirmed territory), redshank (Amber; 1 no. confirmed territory), redstart (Amber), snipe (Amber), spotted flycatcher (SPI, Red; 1 no. confirmed territory), starling (SPI, Red; 1 no. probable territory), stock dove (Amber; 1 no. probable territory), swift (Amber) and willow warbler (Amber). In addition, barn owl (WCA Schedule 1) is known to nest within the agricultural building at TR4.TN19, located approximately 50 m south of the Bonstone Compound.</p> <p>A total of 38 no. species were recorded within 100 m of the Braddup Compound and temporary construction access route. Of these, 12 BoCC species were recorded, including bullfinch (SPI, Amber), curlew (SPI, Red; 1 no. probable territory), dunnock (SPI, Amber), lesser black-backed gull (Amber), mallard (Amber; 1 no. probable territory), mistle thrush (Red; 1 no. confirmed territory), redstart (Amber; 1 no. probable territory), song thrush (SPI, Red; 1 no. probable territory), spotted flycatcher (SPI, Red), starling (SPI, Red), stock dove (Amber; 1 no. probable territory) and willow warbler (Amber; 1 no. probable territory)..</p> <p>Species nesting in retained habitats offsite, or utilising habitats within or surrounding the compounds to support nesting, may be subject to disturbance from noise, visual or vibration effects, resulting in possible localised displacement. Reversible (with intervention).</p> <p>Disturbance events may result in needless expenditure of energy and may expose species to increased risk of predation, resulting in increased mortality of individuals. Irreversible (loss of individuals).</p>	<p>Significant Adverse Local</p>
Wintering birds	Local	<p>No significant numbers of waders, wildfowl, gulls, wintering thrushes, farmland passerines or other notable species were recorded utilising habitats within the Proposed Marl Hill Section on a regular basis. The scrapes outside of the Bonstone Compound but adjacent to the access road supported the most notable winter birds. Vegetation clearance could result in the loss of foraging and shelter habitats. Reversible (with intervention).</p> <p>Species utilising offsite habitats to rest or forage may be subject to disturbance from noise, visual or vibration effects, resulting in possible localised displacement from retained habitats. Reversible (with intervention).</p>	<p>Significant Adverse Less than local</p>



Ecological Feature	Value	Potential Effect(s) Prior to Mitigation	Significance (Pre-Mitigation)
		Disturbance events may result in needless expenditure of energy and may expose species to increased risk of predation, resulting in increased mortality of individuals. Irreversible (loss of individuals).	
Terrestrial invertebrates	Local	<p>Vegetation clearance could result in the loss of foraging and shelter habitats for larval and adult stages of a range of species, with butterflies and moths likely to be the most diverse of assemblages affected. Reversible (with intervention).</p> <p>Species utilising retained habitats on or offsite could be subject to disturbance from noise, visual or vibration effects, resulting in possible localised displacement from retained habitats. Reversible.</p> <p>Disturbance events may result in needless expenditure of energy and may expose species to increased risk of predation, resulting in increased mortality of individuals. Irreversible (loss of individuals).</p>	Significant Adverse Less than local

## 9.6.2 Construction Phase

### Proposed Activities

- 65) Tunnelling activities are anticipated to continue for approximately 18 months (Q2 2024 to Q3 2025) and habitat reinstatement approximately 12 months, commencing after completion of the commissioning phase (timing of which is dependent on outage periods, which may be as late as 2029).
- 66) Activities anticipated during the construction phase which have the potential to give rise to significant ecological effects are summarised as follows:
- Operation of the Braddup Compound, the launch facility (above ground activities may require 24 hrs per working day once tunnelling is underway) with activities including delivery and storage of tunnel sections, operation and storage of plant, machinery and equipment, use and access to welfare facilities and offices, although vehicle movements to and from site would be restricted outside normal construction site working hours
  - Storage and treatment of tunnel arisings at the Braddup Compound before removal from site to Waddington Fell Quarry) and storage of other stockpiles
  - Operation of the Bonstone Compound, the reception facility (recovery and dismantling of tunnel boring machine (TBM) requiring temporary construction works of a smaller scale and duration compared with the Braddup Compound)
  - Vehicle movements and traffic management along access routes, the strategic road network and the Braddup and Bonstone Compounds and lay-down areas, including but not limited to the delivery and removal of plant, machinery or equipment and removal of tunnel arisings
  - Open cut sections comprising multi-line siphon (MLS) connections between new valve houses and existing aqueduct
  - De-watering operations (temporary attenuation and discharge of surface waters)
  - Operation of power supply comprising generators, required 24 hrs a day
  - Operation of artificial lighting for safety reasons and where 24 hr working is required (lights would be located to minimise light spill towards sensitive locations)
  - Construction of permanent new Valve House Building (single storey approximately 11 m wide and 12 m long) and associated maintenance track
  - Air valves would be provided at high points on the aqueduct to release any trapped air. Air valves would be installed in buried chambers with localised ground raising and grass banking around an access cover.
  - Removal of temporary surfaces and structures
  - Habitat reinstatement, including soil handing, topsoil spreading and other ground preparation techniques, seeding, planting and aftercare requirements, installation of a slab cover over the tunnel shafts and backfilling for habitat reinstatement above (excepting for access covers). Methods and timing of habitat reinstatement would vary according to the target habitat and would be agreed with the LPA.

### Effects Scoped Out

- 67) Tunnel boring would take place below ground at 15 m to 120 m depth. The tunnel lining would be installed progressively as the TBM moves forward, leaving only approximately 10 m of tunnel unlined at any one time and so would be very unlikely to give rise to any significant effects upon important (terrestrial) ecological features. Tunnel boring has therefore been scoped out from this EclA for Terrestrial Ecology.
- 68) All habitat losses and fragmentation effects would occur during the enabling phase; these impacts are assessed at Section 9A.6.2. This includes construction of permanent structures (Valve House Buildings,

maintenance routes and other small scale associated surface level structures) as these are located within the compound boundaries. Adverse ecological effects anticipated to arise from the construction phase would therefore primarily comprise disturbance effects upon adjacent and nearby retained habitats or species utilising those offsite habitats.

- 69) Landtake for the construction of the temporary attenuation and discharge structures has been accounted for within the habitat losses calculated for the enabling phase in Section 9A.6.2. De-watering operations during construction would involve attenuation of site runoff from across the compounds and subsequent discharge to existing surface-water features, the effects of which are considered in Chapter 9B, in addition to the removal of the temporary outfalls that were constructed in the watercourses during enabling works. De-watering operations during the construction phase are therefore not considered further in this EclA in respect of watercourses or habitat losses.
- 70) Similarly, the decommissioning of existing aqueduct sections which would include flushing out and subsequent surface discharge of waters used, would utilise existing temporary (constructed during enabling phase) or permanent (pre-existing) outfall structures. Consequently, no additional landtake and resulting habitat losses are anticipated additional to those considered for the enabling phase. Surface water discharges are anticipated into existing surface water features, the potential effects of which are considered in Chapter 9B.
- 71) The potential for significant dust generation during the construction phase, for example as a consequence of temporary storage and removal from site of the tunnel arisings would be avoided through the implementation of embedded mitigation measures including soil stabilisation techniques as detailed in the CCoP Sections 5.6 and 5.11. No significant effects upon any important ecological feature are therefore anticipated to arise during the construction phase as a consequence of dust generation.
- 72) The Air Quality assessment (Appendices 18.1 and 18.2) concludes that no significant changes to air quality would arise as a consequence of the site traffic during any of the project phases. Effects of increased emissions from site traffic are therefore scoped out for the construction phase. Potential effects of increased emissions arising from operation of generators within the compounds were scoped into the Air Quality assessment. As these effects are considered limited to the main compounds the MGAs were scoped out and the assessment considered international valued ecological designations up to 5 km from the compounds and locally to nationally valued ecological features containing nitrogen (N) sensitive habitats up to 200 m from the compounds. However, as the Air Quality Assessment did not identify any sites where potentially significant impacts might occur this impact pathway is scoped out for all ecology features in this assessment.

#### Effects Carried Forward for Assessment

- 73) In the absence of additional mitigation, potential effects upon important ecological features during the construction phase would include:
- Damage, degradation or modification of retained habitats:
    - encroachment within root protection areas of retained hedgerows and trees, whether accidental or required as part of construction methods
    - effects on retained / offsite GWDTE as a result of construction phase activities
  - Killing, injury or entrapment risk of terrestrial fauna:
    - storage of certain arisings e.g. top soil, sub soil, tunnel arisings could create potentially attractive habitat features for a range of species such as badger, hedgehog, reptiles and amphibians. Subsequent removal of these materials and reuse in habitat reinstatement could put such species at risk, were they able to gain access to the stockpiles and be present at the time materials are recovered
    - temporary fencing used to demarcate working or stockpile areas outside of the compounds may pose an entrapment or entanglement risk for terrestrial fauna such as badger, brown hare and hedgehog

- temporary attenuation ponds pose a risk of drowning to terrestrial fauna such as badger, brown hare and hedgehog
  - Disturbance of species through noise, visual, lighting or vibration effects:
    - noise, visual, lighting and vibration effects might cause desertion of occupied breeding or shelter sites in affected adjacent habitats
    - lighting disturbance may cause habitat fragmentation for bats, disrupting commuting routes between roost and foraging sites, and may effect behavioural changes in other nocturnal fauna (certain birds and invertebrates, for example)
    - disturbances might also cause needless expenditure of energy and may expose species to increased risk of predation.
- 74) Habitat reinstatement would occur on completion of the construction phase. This would result in the reversal of the majority of effects arising from habitat loss and fragmentation that occurred during the enabling phase, once habitats become established. The reinstatement of habitats is included in the following construction phase effects, but the timescales considered in this assessment take account of the potential for a pause between the construction and commissioning phase (and associated reinstatement) as a result of needing to wait for an outage.
- 75) In the absence of mitigation, but with due consideration of embedded mitigation measures described at Section 9A.4.5 and detailed in the CCoP, construction effects on the important ecological features are presented in Table 9A.10 below. Only those important ecological features where effects have been identified are included in the table.

Table 9A.10: Summary of Construction Phase Effects

Ecological Feature	Value	Potential Effect(s) Prior to Mitigation	Significance (Pre-Mitigation)
Gibb's Wood and Bonstone Wood BHS	County	Embedded measures outlined in the CCoP (Sections 5.3, 5.6 and 5.7), should be sufficient to prevent most effects, there is a chance that existing proposals (compound layout and fencing and lighting plans) may not avoid all effects on areas of this woodland BHS closest to the Bonstone Compound.	Significant Adverse Local
Bonstone Brook Pastures BHS	County	With the implementation of embedded measures outlined in the CCoP (Sections 5.3, 5.6 and 5.7), no additional construction phase effects are anticipated.	Not significant
Semi-natural broadleaved woodland	County	With the implementation of embedded measures outlined in the CCoP (Sections 5.3, 5.6 and 5.7), no additional construction phase effects are anticipated. Habitat reinstatement would reverse losses incurred during enabling phase, once established in the long term.	Not significant
Scattered broadleaved trees (veteran)	County	Damage or degradation of trees retained veteran trees within or adjacent to construction areas from surrounding construction activities (e.g. soil compaction, erosion, root or tree damage, wash out etc.) would be avoided by embedded measures outlined in the CCoP (Sections 5.3, 5.6 and 5.7).	Not significant
Scattered broadleaved trees (non-veteran)	County	Damage or degradation of trees retained veteran trees within or adjacent to construction areas from surrounding construction activities (e.g. soil compaction, erosion, root or tree damage, wash out etc.) would be avoided by embedded measures outlined in the CCoP (Sections 5.3, 5.6 and 5.7). Habitat reinstatement would reverse (or compensate for mature trees) losses incurred during enabling phase, once established in the long term.	Not significant
Semi-improved neutral grassland	Local	Habitat reinstatement would reverse habitat losses incurred during enabling phase, once established. With the implementation of embedded measures outlined in the CCoP (Sections 5.3, 5.6 and 5.7) to control site run-off and soil stabilisation techniques, no additional adverse effects are anticipated to arise as a consequence of reinstatement works (sub- and topsoil replacement, soil preparation and seeding).	Not significant
Marshy grassland	Local	Local interception of groundwater flows to GWDTE within and surrounding the compounds that were described in the enabling phase continue into the construction phase. In addition overflow dewatering could have a large significance of effect for the Braddup House GWDTE area. This may have the result in drying out, such that marshy grassland may revert to a different grassland community (effective loss). Degradation or reduction in extent through partial drying or reduced groundwater quality may also occur.	Significant Adverse Less than local

Ecological Feature	Value	Potential Effect(s) Prior to Mitigation	Significance (Pre-Mitigation)															
		<p>The net extent of marshy grasslands potentially effected is not significant in the context of the extent of this resource locally. Reversible (with intervention).</p> <table border="1"> <thead> <tr> <th>Effect Type</th> <th>New Laithe</th> <th>Braddup House</th> <th>Whinny Lane East</th> <th>Slaidburn Rd West</th> </tr> </thead> <tbody> <tr> <td>Intercept flows in short or long term including ground compaction</td> <td>Moderate to Large significance</td> <td>Large significance</td> <td>Large significance</td> <td>Large significance</td> </tr> <tr> <td>Overflow dewatering</td> <td>N/A</td> <td>Large significance</td> <td>No impact</td> <td>No impact</td> </tr> </tbody> </table>	Effect Type	New Laithe	Braddup House	Whinny Lane East	Slaidburn Rd West	Intercept flows in short or long term including ground compaction	Moderate to Large significance	Large significance	Large significance	Large significance	Overflow dewatering	N/A	Large significance	No impact	No impact	
Effect Type	New Laithe	Braddup House	Whinny Lane East	Slaidburn Rd West														
Intercept flows in short or long term including ground compaction	Moderate to Large significance	Large significance	Large significance	Large significance														
Overflow dewatering	N/A	Large significance	No impact	No impact														
		Habitat reinstatement would reverse habitat losses incurred during enabling phase, once established. With the implementation of embedded measures outlined in the CCoP (Sections 5.3, 5.6 and 5.7), no additional adverse effects are anticipated to arise.	Not significant															
Mire	Local	Habitat reinstatement would reverse habitat losses incurred during enabling phase, in the long term once established. With the implementation of embedded measures outlined in the CCoP (Sections 5.3, 5.6 and 5.7), no additional adverse effects are anticipated to arise.	Not significant															
Hedgerows (species rich and species poor)	Local	Habitat reinstatement would reverse habitat losses incurred during enabling phase, in the long term once established. With the implementation of embedded measures outlined in the CCoP Sections 5.3, 5.6 and 5.7), no additional adverse effects are anticipated to arise.	Not significant															
Bats: roosts (and roosting habitat)	Local	A presumed roost (anecdotal evidence from tenant farmer) is present offsite at TR4.TN18, located approximately 60 m south from the Bonstone Compound access road. Additional trees and buildings with bat roost potential are located adjacent to the Proposed Marl Hill Section. Potential disturbance of retained roost habitat may result from noise, light or vibration effects during construction activities. Embedded mitigation to reduce light disturbance of bats is outlined in the CCoP Section 5.4.2. Measures outlined in the CCoP relating to noise and vibration may not be effective for ecological features within/adjacent to compounds as these measures are primarily focussed on human features beyond the compounds.	Significant Adverse Less than Local															

Ecological Feature	Value	Potential Effect(s) Prior to Mitigation	Significance (Pre-Mitigation)
		Reversible (with intervention).	
Bats: flyways and foraging	Local	No significant additional habitat losses would occur during operation, but additional disturbance of foraging and commuting bats may result from new temporary artificial lighting introduced during the construction phase. In-combination with the localised habitat fragmentation resulting from the enabling phase, this additional disturbance may result in disruption of foraging or commuting patterns of small numbers of bats. Offsite commuting corridors would remain unaffected by these minor disturbances. Reversible (with intervention)	Significant Adverse Less than Local
Badger, brown hare, hedgehog, terrestrial amphibians and reptiles	Local	Risk of killing, injury, or entrapment as part of construction works that occur within and beyond the fenced compound limits, including soil, vegetation or rock / stone stockpile areas which may create attractive habitat features. Risk of killing or injury on construction roads. Possible entrapment may also occur in any mesh or wire type fences installed. RAMs for avoiding impacts upon badgers and other mammal species which may range into the Proposed Marl Hill Section are detailed in the CCoP (Sections 5.4.1). SUDS basins constructed to attenuate site run-off would create a risk of drowning (for most species, excluding amphibians) and a risk of mortality or injury to amphibians as a consequence of poor water quality or presence of pollutants within the SUDS. The embedded measures outlined in the CCoP for these species would, however, be anticipated to prevent or reduced these risks. Irreversible (loss of individuals).	Not significant
Badger, brown hare, hedgehog, terrestrial amphibians and reptiles, terrestrial invertebrates	Local	Disturbance from noise, light or vibration effects, or visual effects resulting in possible localised displacement from retained habitats. Disturbance events may also result in needless expenditure of energy and may expose species (excluding badger) to increased risk of predation, resulting in increased mortality of individuals. Measures outlined in the CCoP relating to noise and vibration might not be effective for ecological features within/adjacent to compounds, or even surrounding compounds unless there are corresponding human features present. Noise and acoustic screening may be recommended under embedded measures outlined in the CCoP at Section 5.4.2 to reduce disturbance of nesting birds, subject to a watching brief. Embedded mitigation to reduce light disturbance of bats is outlined in the CCoP at Section 5.4.2 and these measures would be anticipated to be at least partially effective to reduce disturbance of other wildlife.	Not significant
Breeding birds, wintering birds	Local	Disturbance from noise, lighting or vibration effects, or visual effects occurring outside the fenced compound limits, resulting in possible localised displacement from retained habitats.	Significant Adverse

Ecological Feature	Value	Potential Effect(s) Prior to Mitigation	Significance (Pre-Mitigation)
		<p>A total of 38 no. species were recorded within 100 m of the Bonstone Compound and temporary construction access area. Sixteen of these are BoCC, including common gull (Amber), curlew (SPI, Red; 1 no. probable territory), lapwing (SPI, Red; 1 no. confirmed territory), linnet (SPI, Red; 1 no. probable territory), mallard (Amber), meadow pipit (Amber; 1 no. confirmed and 1 no. probable territory), oystercatcher (Amber; 1 no. confirmed territory), pied flycatcher (Red; 1 no. confirmed territory), redshank (Amber; 1 no. confirmed territory), redstart (Amber), snipe (Amber), spotted flycatcher (SPI, Red; 1 no. confirmed territory), starling (SPI, Red; 1 no. probable territory), stock dove (Amber; 1 no. probable territory), swift (Amber) and willow warbler (Amber). In addition, barn owl (WCA Schedule 1) is known to nest within the agricultural building at TR4.TN19, located approximately 50 m south of the Bonstone Compound.</p> <p>A total of 38 no. species were recorded within 100 m of the Braddup Compound and temporary construction access route. Of these, 12 BoCC species were recorded, including bullfinch (SPI, Amber), curlew (SPI, Red; 1 no. probable territory), dunnock (SPI, Amber), lesser black-backed gull (Amber), mallard (Amber; 1 no. probable territory), mistle thrush (Red; 1 no. confirmed territory), redstart (Amber; 1 no. probable territory), song thrush (SPI, Red; 1 no. probable territory), spotted flycatcher (SPI, Red), starling (SPI, Red), stock dove (Amber; 1 no. probable territory) and willow warbler (Amber; 1 no. probable territory). Reversible (with intervention)</p> <p>Disturbance events may also result in needless expenditure of energy and may expose species to increased risk of predation, resulting in increased mortality of individuals. Irreversible (loss of individuals).</p>	Local



9.6.3 Commissioning Phase

- 76) Activities during the commissioning phase (including the commissioning of the new aqueduct and the removal of the sections of the existing aqueduct from service) which may potentially give rise to ecological effects are anticipated to be limited to the cleansing of the new aqueduct route prior to it entering service.
- 77) As with the decommissioning of existing aqueduct sections, the commissioning of the new sections would also include flushing out and subsequent discharge of waters used. Discharge is anticipated to utilise existing temporary (constructed during enabling phase) or permanent (pre-existing) outfall structures. Consequently, no additional landtake and resulting habitat losses are anticipated additional to those considered for the enabling phase. Discharges are anticipated into existing surface water features, the potential effects of which are considered in Chapter 9B.
- 78) Other above ground activities which may be required during the commissioning phase, such as access to valve house buildings and maintenance/inspections of the pipeline at well structure points, are unlikely to be of a scale, duration or nature that would give rise to significant ecological effects. These activities are scoped out from the EclA for Terrestrial Ecology.
- 79) Effects relating to habitat reinstatement have been accounted for in the construction phase effects.
- 80) No significant adverse effects upon terrestrial ecology features are therefore anticipated to arise during the commissioning phase.

#### 9.6.4 Operational Phase

- 81) Activities during the operational phase (including the use of the new aqueduct and effects from the decommissioned asset) which may potentially give rise to ecological effects are anticipated to be limited to:
- De-watering of the decommissioned sections of aqueduct, requiring permanent discharge into surface waters
  - Routine maintenance at valve house buildings with access by foot or light vehicle.
- 82) De-watering of the decommissioned but retained sections of aqueduct would require discharges into surface water features via existing outfall structures. Discharges into surface water features are discussed within Chapter 9B and are not considered further in this EclA for Terrestrial Ecology.
- 83) Routine maintenance activities at air valves and Valve House Buildings would require access by foot or light vehicle using existing access points and existing access routes. Maintenance events would be very short term. Temporary disturbance effects that might result upon habitats and species would be no greater than experienced during existing agricultural practices in the landscape or routine maintenance of existing above-ground infrastructure for the retained sections of the aqueduct. Potential ecological effects arising from routine maintenance of new above-ground structures associated with the Proposed Marl Hill Section are therefore unlikely to be of a scale, duration or nature that would give rise to significant ecological effects.
- 84) Effects of the below ground shaft and MLS connection and the backfilling of the open-cut trenches required for the proposed construction overflows could lead to permanent localised alterations in groundwater flows and levels at the site, depending on the use of arisings or granular bedding material. Resulting impacts upon groundwater flows/levels upon the Braddup House GWDTE within the Braddup Compound (categorised assessed as a Slight significance of effect in the GWDTE assessment) are assessed to be of less than local significance, based on the low groundwater dependency of the feature. Other GWDTE in the vicinity of the Proposed Marl Hill Section would not be affected by the below ground shaft and MLS connection and the backfilling of the open-cut trenches.
- 85) No other significant adverse effects upon important (terrestrial) ecology features are anticipated to arise during the operational phase.

## 9.7 Mitigation and Residual Effects

86) Details for embedded mitigation measures, where they describe industry standards for best practice, for example, are outlined in the CCoP (Appendix 3.2). The following sections summarise the suite of additional essential mitigation measures proposed to reduce the significant adverse ecological effects described for enabling and construction phases. These additional essential mitigation measures are collated into the Mitigation Schedule (Appendix 20.1) and illustrated on the Environmental Master Plan (EMP) (Figure 20.1). The mitigation items are described within the Mitigation Schedule (Appendix 20.1).

### 9.7.1 General Measures

87) Embedded measures outlined in the CCoP at Section 5.4.1 would require pre-commencement surveys and monitoring during each development phase to be carried out as part of the watching brief to confirm progress and identify any change on site. Subject to the findings of these surveys and monitoring, updates to the EMP may be appropriate.

### 9.7.2 Designated Sites and GWDTE

88) In addition to the embedded mitigation measures, summarised in Section 9A.4.5 and detailed in the CCoP that would protect designated wildlife sites and GWDTEs against adverse changes in in habitat condition or extent (including from surface or site water run-off, accidental pollution events and dust deposition) Gibb's Wood and Bonstone Wood BHS (which lies approximately 93 m southwest from the Bonstone Compound and comprises woodland which is ancient semi-natural in character), visual / acoustic screening would be implemented to reduce effects on species using this habitat feature from prolonged noise / light disturbance effects as necessary during the construction phase (Mitigation Item ET7).

89) Additional site-specific groundwater mitigation measures for GWDTE habitats within and surrounding the Braddup and Bonstone Compounds would include the following:

- Reduce the area that needs to be topsoil stripped in the vicinity of GWDTE habitats by reducing the size of the compound or where possible excluding areas of GWDTE from the areas requiring topsoil stripping and vegetation clearance (Mitigation Item ET12)
- Careful consideration in the selection of the backfilling material(s) to prevent granular material draining groundwater flows, or clay material creating an impermeable barrier to groundwater flows. Granular backfill with intermittent clay bunds is typically recommended (Mitigation Item ET14)
- Reduce encroachment of the Braddup and Bonstone Compound access roads into adjacent marshy grassland habitats and avoid stripping of topsoil in these areas (Mitigation Item ET11)
- Staggering topsoil stripping activities, i.e., smaller sections would be stripped at any one time rather than stripping an entire whole compound footprint as a single event (Mitigation Item ET13)
- Keeping dewatering durations to the absolute minimum (Mitigation Item ET15)
- Mitigation for direct habitat loss affecting marshy grassland areas would be delivered through habitat restoration measures during the construction phase. These areas would be reinstated with a meadow seed mixture for wetlands. Re-use of the topsoil stored from the same areas would also reintroduce the existing seedbank (Mitigation Item ET16)

### 9.7.3 Habitats

90) In addition to the standard measures incorporated as embedded mitigation, summarised in Section 9A.6.1 and detailed in the CCoP (Sections 5.2 and 5.4), and landscaping proposals in Appendix 20.2, a number of essential mitigation approaches are required for impacts on habitats and trees:

- Temporary construction routes would be finalised to avoid or minimise impacts to hedgerows, trees, watercourses and other sensitive features where practically possible by marking out and micro-siting construction activities with the ECoW prior to works commencing (Mitigation Item ET1).
- Where possible, the Braddup Compound access road would be micro-sited to avoid the loss the small areas of sedge mire and other associated vegetation communities. Where avoidance is not possible, vegetation would be translocated to a suitable retained area (Mitigation Item ET6).
- The field on the south side of the eastern extent of the Bonstone Compound access road has been managed as a traditional hay meadow for over a decade and species diversity has been enhanced during that time. The field is also important for ground nesting birds. Part of the field was identified for temporary works associated with the construction of the access road. Due to the relative value of the field, the works would be restricted to a narrow strip adjacent to the verge of the existing track. Furthermore, reinstatement of this area would be with a suitable seed mix in line with NVC MG6 *Lolium perenne*–*Cynosurus cristatus* grassland (Mitigation Item ET8).
- A new hedgerow would replace the fence line with scattered scrub and trees currently present in the eastern half of the Bonstone Compound and the fence line currently present in the southwest of the Braddup compound (Mitigation Item ET22).
- Working areas (including storage areas and accesses) would be segregated from adjacent habitats using appropriate fencing or other appropriate form of demarcation with informative warning signs attached, to protect retained habitats and features (Mitigation Item ET2).
- Locations for stockpiling cut vegetation arisings (e.g. logs, brash, grass) would be discussed and agreed in advance with the ECoW to avoid degradation of existing valued habitats (e.g. shading out, nitrification) (Mitigation Item ET3).
- Topsoil and subsoil would be conserved where possible and be stored separately (top and sub soils kept separate for each habitat type) for subsequent re-use for habitat reinstatement (Mitigation Item ET4).
- Wherever practicable, arisings from tree lopping or felling and hedgerow or scrub removal would be used to create habitat piles of dead and decaying wood, ground-based and standing dead wood. These would be appropriately sited, as advised by the ECoW, to maximise benefit to wildlife (Mitigation Item ET5).
- There would be prompt reinstatement of habitats to their former condition or better, which could include measures to enhance species diversity
- Methods and timings for habitat reinstatement and creation/enhancement would vary according to the target habitat (Mitigation Item ET17). Planting plans (Appendix 20.3) would be produced for all habitats and habitat features to be reinstated and replaced. Habitat reinstatement and creation/enhancement would utilise locally appropriate native species matching existing botanical diversity and seeking, where possible, to increase diversity. Without reducing habitat quality, seed mixes for reinstatement of agricultural fields would be agreed with landowners but in summary the following approach would be used:
  - Poor semi-improved grassland would be reinstated with a rye grass dominated seed mix
  - Marshy grassland would be reinstated with a meadow seed mix suitable for wetlands
  - Scattered trees and scrub within fields would generally be reinstated within field boundaries unless landowners or landscape considerations specified otherwise
  - Small areas of tall ruderal herb would be reinstated with the surrounding grassland seed mix
- Neutral semi-improved grassland along the Bonstone access route would be reinstated with a meadow mix in line with NVC community MG9a *Holcus lanatus*–*Deschampsia cespitosa* grassland (*Poa trivialis* sub-community) (Mitigation Item ET23).
- Existing trees and areas of woodland to be retained would be subject to protection measures in compliance with BS5837:2012 standards for tree protection detailed within the AMS. The AMS

would consider all aspects of detailed design (drainage, utilities etc.) and would detail the special mitigation measures required to minimise avoid/minimise impacts on the root system and any notable characteristics of the retained trees.

- Any tree loss within the mixed plantation woodland along the Braddup Compound access route would be replaced with species consistent with adjacent existing / retained woodland with the exception of invasive rhododendron which should be replaced with native woodland tree / shrub species (Mitigation Item ET21).
- Based on a reasonable worst case scenario the loss of three veteran trees (T176, T184 and T185) are currently assumed to be unavoidable (while individual features may be avoidable, degradation or other impacts may still arise if the features can be retained) to accommodate the Braddup Compound access road. Where possible, specific consideration would be given to measures to allow the retention of these trees (Mitigation Item ET1).
- The unavoidable loss of three veteran trees (T144, T187 and T190) and assumed unavoidable loss of an additional three veteran trees (T176, T184 and T185) would be offset by a compensation package to be agreed with the LPA and relevant statutory consultees. Compensation may take the form of, for example, reduction, retention as standing dead wood, relocation as standing dead wood, with replacement planting using native species in a suitable location at appropriate ratio (Mitigation Item ET20).
- The assumed loss of up to six veteran trees (T144, T176, T184, T185, T187 and T190) is based upon a precautionary approach to impact assessment conducted in 2020. Further consideration from an embedded design viewpoint has subsequently been directed at avoiding impacts on these features, although this is not reported in the AIA. A supplemental report will be submitted to address these 'at risk' and notable assets post-submission, and explain the role of embedded mitigation. Retention of these assets would be subject to pre-construction protection measures as specified in a Site Specific Arboricultural Method Statement (SS-AMS) and shown on a Tree Protection Plan (TPP).
- Areas of permanent habitat loss or habitat change (including areas above shafts where trees cannot be reinstated), alongside opportunities for advanced, additional and/or enhanced habitat creation on offsite locations within United Utilities ownership are discussed under Section 9.7.12 in relation to the Biodiversity Net Gain strategy (Mitigation Item ET25).

#### 9.7.4 Bats

- 91) Suitable bat roost habitat features have been identified in numerous trees within and adjacent to the Proposed Marl Hill Section, some of which would require removal during the enabling works phase. Embedded measures already described and outlined in the CCoP (Section 5.4) include RAMs for avoiding loss of bat tree roosts, the installation of bat boxes to replace loss of suitable tree roost habitat and general approach to sensitive lighting. Site specific lighting principals have been produced and include the identification of sensitive ecological features (including potential bat roosting, foraging and commuting habitat) describing how lighting would take account of these. If bat roosts are confirmed in any trees requiring removal, mitigation under licence from Natural England would be implemented as appropriate to the species and status of the roost(s). No further mitigation is anticipated to be required in respect of roosting bats.
- 92) Habitat reinstatement measures would replace foraging habitats and flyways used by local bat populations would be effective in the long-term accounting for the time between habitat loss and habitat reinstatement, including establishment periods. Additional site specific measures include a new hedgerow to replace a scattered scrub fence line in the east of the Bonstone Compound and along a fence line in the southwest of the Braddup Compound (Mitigation Item ET22).
- 93) Reasonable avoidance measures (RAMs) would be implemented for the building reported to contain a bat roost located approximately 60 m south from the Bonstone Compound. This would detail measures, as required, to protect the building from noise, light or vibration effects during construction activities, as detailed in the CCoP (Section 4.5 and 5.9) (Mitigation Item ET10).

#### 9.7.5 Badgers

- 94) No setts were identified within or within influence of the Proposed Marl Hill Section. Badger activity levels within the Proposed Marl Hill Section were minimal. Pre-commencement inspections would confirm whether any active setts have been established within the Proposed Marl Hill Section. RAMs for avoiding impacts upon badgers which may range into the Proposed Marl Hill Section (e.g. killing, injury, entrapment or drowning) would be implemented as detailed in the CCoP (Section 5.4.3.4).
- 95) Habitat reinstatement would replace foraging, ranging and sett building habitats for local badger populations. Habitat reinstatement measures would be effective in the long-term accounting for the combined durations of enabling phase and construction phase (the time between habitat loss and habitat reinstatement), including establishment periods.
- 96) No additional essential mitigation measures are therefore required for badgers.

#### 9.7.6 Other Mammals

- 97) Suitable habitats for hedgehog and brown hare occur across the Proposed Marl Hill Section in varied patches. Both species are known to be present. RAMs for hedgehog and brown hare would be implemented as set out in the CCoP (Section 5.4.3.9) to avoid impacts including killing, injury, entrapment or drowning.
- 98) Habitat reinstatement would replace foraging, ranging and shelter habitats for local populations of brown hare and hedgehog. Additional hedge planting would increase habitat availability and permeability for hedgehogs. Habitat reinstatement measures would be effective in the long-term accounting for the time between habitat loss and habitat reinstatement, including establishment periods.
- 99) No additional essential mitigation measures are therefore required for hedgehogs or brown hares.

#### 9.7.7 Nesting and Wintering Birds

- 100) The Proposed Marl Hill Section did not support significant species or assemblages of breeding birds, although small numbers of noteworthy BoCC species were recorded in localised habitats within and adjacent. RAMs to avoid the destruction of nests and the killing/injury or disturbance of nesting birds (passerine and ground nesting species) within and surrounding the Proposed Marl Hill Section would be implemented as detailed in the CCoP.
- 101) The Proposed Marl Hill Section did not support significant species or assemblages of overwintering birds, although small numbers of noteworthy BoCC species were recorded in localised habitats adjacent. Disturbance of retained scrapes, marshy grasslands and other focal habitats for wintering birds would be kept to a minimum. If works are scheduled over the winter period then visual screening (e.g. heras fencing to which visual (150gsm extra heavy duty dark green netting such as Tarpaflex or equivalent) and acoustic (SOUNDEX C2/2 Performance Curtain or equivalent) screening would be attached) may be advised by the ECoW on a localised basis according to monitoring evidence collected during watching briefs (Mitigation Item ET9). Further details for RAMs to avoid noise or visual disturbance of nesting or wintering birds are provided in the CCoP.
- 102) A number of additional measures to improve offsite habitat quality are detailed under Section 9.7.12, because they fall outside the red line boundary and would be secured through landowner agreements, these have not been taken account of when assessing residual effects.
- 103) Habitat reinstatement would replace, nesting, foraging and overwintering habitats for local bird populations. Habitat reinstatement measures would be effective in the long-term accounting for the combined durations of enabling phase and construction phase (the time between habitat loss and habitat reinstatement), including establishment periods.

#### 9.7.8 Terrestrial Amphibians and Reptiles

- 104) Terrestrial amphibians (common frog and common toad) reliant on immediate (<50 m) offsite ponds and reptiles may be present within suitable habitats at the Proposed Marl Hill Section. Suitable habitats

might include hedgerow bases, scrub, tall herb and marshy or rank grassland. RAMs to avoid the killing, injury and entrapment of amphibians and reptiles and the drowning of reptiles within the Proposed Marl Hill Section would be implemented as detailed in the CCoP (Section 5.4.).

105) Habitat reinstatement would replace, shelter, foraging and hibernation habitats for amphibian and reptile populations. Habitat reinstatement measures would be effective in the long-term accounting for the combined durations of enabling phase and construction phase (the time between habitat loss and habitat reinstatement), including establishment periods.

106) No additional essential mitigation measures are therefore required for amphibians or reptiles.

#### 9.7.9 Terrestrial Invertebrates

107) The habitat reinstatement implemented during the construction phase would offset habitat losses for terrestrial invertebrates. Where practical, use of arisings from vegetation would be utilised to create additional habitat for invertebrates, especially dead wood features.

108) No further essential mitigation measures are required.

#### 9.7.10 Biosecurity

109) Two Schedule 9 invasive species are known to be present within or immediately adjacent to the Braddup Compound. Embedded measures for avoiding the spread of Schedule 9 non-native invasive species and general biosecurity measures are outlined in the CCoP (Section 5.4). A site specific invasive species management plan would be produced that would detail any appropriate additional measures, subject to confirmation of location of non-native invasive species in relation to the final construction design and risk of disturbance or spread. Additional essential mitigation includes, but may not be limited to, implementation of control or eradication measures and establishment of exclusion zones.

#### 9.7.11 Residual Effects

110) A summary of the residual ecological effects (beneficial and adverse) is presented in Table 9A.11. Only ecology features identified as having significant effects in Table 9A.9 (enabling phase) and Table 9A.10 (construction phase) are taken forward into this residual effects table. This table summarises the ecological effects anticipated to arise as a consequence of the development proposals, the mitigation and compensation measures to be implemented and confirms whether the residual effect remains significant.

111) The only significant adverse residual ecological effects are the loss of one veteran hawthorn tree (T82) from within the Bonstone Compound, two veteran alder trees (T187 and T190) from within the Braddup Compound and the assumed loss of three additional veteran trees (T176, T184 and T185) from within the Braddup Compound. Loss of T82 is considered unavoidable due to its proximity (11 m) to the proposed open cut section between the new valve house and existing aqueduct. Loss of trees T187 and T190 is considered unavoidable due to their location within the Braddup Compound core working area. Loss of trees T176, T184 and T185 may be avoidable through careful design of the Braddup Compound infrastructure, particularly the use of passing places along the access road. Veteran trees are an irreplaceable habitat.

112) The assumed loss of six veteran trees (T144, T176, T184, T185, T187 and T190) is based upon a precautionary approach to impact assessment conducted in 2020. Further consideration from an embedded design viewpoint has subsequently been directed at avoiding impacts on these features, although this is not reported in the AIA. A supplemental report will be submitted to address these 'at risk' and notable assets post-submission, and explain the role of embedded mitigation. Retention of these assets would be subject to pre-construction protection measures as specified in a Site Specific Arboricultural Method Statement (SS-AMS) and shown on a Tree Protection Plan (TPP).

113) No other significant adverse residual effects are anticipated to arise during any project phase, providing the suite of embedded and essential mitigation measures are implemented as described.

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- 114) Positive residual effects, significant at less than local level would be delivered in the long-term by additional hedgerow planting. These positive effects would have subsequent significant positive effects upon the species / groups which the habitats support including bats, birds, hedgehogs and invertebrates.
- 115) No other significant positive residual effects are identified at this stage, however, the Marl Hill development would achieve 10% net gain through additional habitat creation on offsetting sites and this is discussed further under section 9.7.12 which details compensation and offsetting measures.



Table 9A.11: Summary of Mitigation and Residual Effects

Ecological Feature	Value	Effect Pre-Mitigation	Mitigation	Residual Effect	Significance
Enabling Phase					
Semi-natural broadleaved woodland	County	Temporary loss of < 0.01 ha at the Braddup Compound access from the B6478. No significant effect upon the integrity and interconnectivity of retained woodland network, including ancient woodlands, would result  Reversible (with intervention) Adverse effect significant at less than local level	Habitat reinstatement to be implemented during construction phase on like for like basis (quantity and quality) or better.	Habitat reinstatement after the construction phase would reduce enabling phase effects to non-significant levels in the long term.	Not significant
Scattered broadleaved trees (veteran)	County	Physical loss of at least three and up to six veteran trees. Irreversible adverse effect significant at local level. Embedded measures would retain all other veteran trees present adjacent to the red line.  Irreversible effect significant at the local level	Special construction measures or adjusted working areas could allow some assumed (amber) losses to be reduced.  Further consideration from an embedded design viewpoint has been directed at avoiding impacts on these features, although this is not reported in the AIA. A supplemental report will be submitted to address these 'at risk' and notable assets post-submission, and explain the role of embedded mitigation. Retention of these assets would be subject to pre-construction protection measures as specified in a Site Specific Arboricultural Method Statement (SS-AMS) and shown on a Tree Protection Plan (TPP).	Veteran trees are irreplaceable habitats. Irreversible adverse effect significant at local level. Compensation package required and to be agreed with the LPA.	Significant Adverse Local

Ecological Feature	Value	Effect Pre-Mitigation	Mitigation	Residual Effect	Significance
Scattered broadleaved trees (non-veteran)	Local	Physical loss of 42 no. mature to young trees or groups of trees. Reversible (with intervention) adverse effect significant at local level.  Reversible effect significant at the local level	Special construction measures or adjusted working areas could allow some assumed (amber) losses to be reduced.  Replacement tree planting to be implemented at earliest practical point during construction phase on like for like basis (quantity and quality) or better.	Habitat reinstatement would reduce effect to non-significant levels in the long term (replacement of mature specimens is compensation not mitigation)	Not significant
Semi-improved neutral grassland	Local	Temporary loss of 2.29 ha. Reversible (with intervention) adverse effect significant at less than local level.	ECoW appointment as set out in the CCoP (Ecology: General Measures). Habitat reinstatement to be implemented during construction phase on like for like basis (quantity and quality) or better.	Habitat reinstatement would reduce effect to non-significant levels in the long term.	Not significant
Marshy grassland	Local	Temporary loss of 1.14 ha. Reversible (with intervention) adverse effect significant at local level.	Adjusted working areas could allow some assumed losses to be reduced. Habitat reinstatement to be implemented during construction phase on like for like basis (quantity and quality) or better.	Habitat reinstatement would reduce effect to non-significant levels in the long term.	Not significant
		Effects on offsite GWDTE through changes in groundwater supply and quality. Reversible (with intervention) adverse effect significant at less than local level.	A range of actions including adjusted working areas to create buffer zones, phased soil stripping would reduce effects.	Embedded mitigation and additional essential mitigation measures would prevent significant effects occurring.	Not significant
Mire	Local	Temporary loss of < 0.01 ha. Reversible (with intervention) Adverse effect significant at less than local level	Adjusted working areas could allow retention but if avoidance is not possible, the habitat would be	Habitat translocation or reinstatement would reduce effect to non-significant levels in the long term.	Not significant

Ecological Feature	Value	Effect Pre-Mitigation	Mitigation	Residual Effect	Significance
			translocated to suitable retained area.		
Hedgerows (species rich and species poor)	Local	Temporary loss of 217 m. Reversible (with intervention) adverse effect significant at less than local level.	Habitat reinstatement to be implemented during construction phase on like for like basis (quantity and quality) or better. Additional hedge planting along some field boundaries.	Additional hedge planting would increase net extent of hedgerows and improve inter-connectivity across the local ecological network in the long term.	Significant Positive Less than Local
Bats: roosts	Local	Loss of trees with suitability for bat roosting, most effects are dealt with through embedded mitigation. Reversible with intervention significant at less than local level.	Adjusted working areas could allow some assumed tree losses to be reduced. Any trees with confirmed bat roosts would have bespoke, licensed mitigation packages.	Bespoke mitigation for any confirmed bat roosts would reduce effects to insignificant.	Not significant
Badger, brown hare, hedgehog, terrestrial Amphibians and reptiles	Local	Loss of foraging and shelter habitats. Reversible (with intervention) Adverse effect significant at less than local level.	Habitat reinstatement to be implemented following construction phase on like for like basis (quantity and quality) or better.	Habitat reinstatement would reduce effect to non-significant levels in the long term.	Not significant
		Disturbance effects resulting from enabling phase activities and barrier effects etc. Disturbance effects would generally be reversible, except where this may result in increased energy expenditure or exposure to predators thereby resulting in loss of individuals. Some habituation may be anticipated over time. Adverse effect significant at less than local level	Creation of habitat piles would provide some shelter and foraging.	Creation of habitat piles in addition to some measure of habituation would prevent significant effects occurring.	Not significant

Ecological Feature	Value	Effect Pre-Mitigation	Mitigation	Residual Effect	Significance
Breeding birds	Local	Loss of nesting, foraging and shelter habitats: reversible adverse effect significant at less than local level	No works in the field south of the Bonstone access road (other than a linear area adjacent to the verge. Habitat reinstatement to be implemented during construction phase on like for like basis (quantity and quality) or better.	Essential mitigation measures and habitat reinstatement would reduce effect to non-significant levels in the long term.	Not significant
		Disturbance: reversible adverse effect significant at local level	No works in the field south of the Bonstone access road (other than a linear area adjacent to the verge. Additional visual / acoustic screening if required.	Essential mitigation measures would prevent significant effects occurring.	Not significant
Wintering birds	Local	Loss of foraging and shelter habitats: reversible adverse effect significant at less than local level	No works in the field south of the Bonstone access road (other than a linear area adjacent to the verge. Habitat reinstatement to be implemented during construction phase on like for like basis (quantity and quality) or better.	Essential mitigation measures and habitat reinstatement would reduce effect to non-significant levels in the long term.	Not significant
		Disturbance: reversible adverse effect significant at local level	No works in the field south of the Bonstone access road (other than a linear area adjacent to the verge. Additional visual / acoustic screening if required.	Essential mitigation measures would prevent significant effects occurring.	Not significant
Terrestrial invertebrates	Local	Loss of foraging and shelter habitats: reversible adverse effect significant at less than local level	Creation of habitat piles would provide some shelter and foraging for invertebrates. Habitat reinstatement to be implemented during construction	Creation of habitat piles during the enabling phase and habitat reinstatement following construction would reduce enabling phase effects to non-	Not significant

Ecological Feature	Value	Effect Pre-Mitigation	Mitigation	Residual Effect	Significance
			phase on like for like basis (quantity and quality) or better.	significant levels in the long term.	
Construction Phase					
Gibb's Wood and Bonstone Wood BHS	County	Disturbance effect from light and noise on edge of designation closest to the compound (BHS 93 m from Bonstone Compound). Reversible adverse effect significant at local level	If existing fencing and lighting proposals are not sufficient to mitigate disturbance effects on the woodland the essential measures would be put in place.	Embedded mitigation and additional essential mitigation measures would prevent significant effects occurring.	Not significant
Marshy grassland	Local	Effects on offsite GWDTE through changes in groundwater supply and quality. Reversible (with intervention) adverse effect significant at less than local level.	In addition to the enabling phase mitigation, essential mitigation actions such as appropriate use of fill materials would reduce effects on retained GWDTEs.	Embedded mitigation and additional essential measures would prevent significant effects occurring.	Not significant
Bats: roost habitat	Local	Potential disturbance of retained roost habitat may result from noise or vibration effects during construction activities. Embedded measures to reduce noise / vibration effects may not be of relevance to ecological features retained on / adjacent to the compounds. Reversible (with intervention) Significant adverse effect at less than local level.	Should bat roosts be confirmed during embedded pre-start surveys within the influence of the construction works, additional essential measures would be identified avoid and mitigate disturbance effects. These may also be applied to the offsite building with a potential roost if necessary.	Mitigation would prevent significant effects occurring.	Not significant
Bats: flyways and foraging	Local	Lighting impacts in combination with enabling phase habitat losses could affect habitat, flyways and foraging habitat. Reversible (with intervention)	In addition to the general approach to sensitive lighting, site specific lighting principals have been produced and include the identification of sensitive ecological	Mitigation would prevent significant effects occurring.	Not significant

Ecological Feature	Value	Effect Pre-Mitigation	Mitigation	Residual Effect	Significance
		Significant Adverse effect at less than local level.	features and describing how lighting would take account of these.		
Breeding and wintering birds	Local	Reversible with intervention, significant adverse effect at local level	As described for the enabling phase, works within the field south of the Bonstone Compound access road would be avoided and monitoring of bird disturbance to determine if visual / acoustic barriers are required would be undertaken.	Embedded mitigation and additional essential mitigation measures would prevent significant effects occurring.	Not significant
Commissioning Phase					
All terrestrial ecology features	Local to National	Activities relating to commissioning of the new aqueduct, including discharges, are assessed in Chapter 9B.  Activities which may be required during the commissioning phase, such as access to valve house buildings and maintenance/inspections of the pipeline at well structure points, are unlikely to be of a scale, duration or nature that would give rise to significant ecological effects upon terrestrial ecology features. No significant effects.	No additional essential mitigation required.	No effect	Not significant
Operational Phase					
All terrestrial ecology features	Local to National	Maintenance events would be very short term. Temporary disturbance effects on habitats and species would be no greater than experienced during existing agricultural practices or routine maintenance of existing above-ground infrastructure for the retained sections of the aqueduct. No significant effects.	No additional essential mitigation required.	No effect	Not significant

#### 9.7.12 Compensation and Offsetting Measures

- 116) The residual effects described previously do not take account of the measures detailed in this section. Compensation and offsetting are distinct from the embedded mitigation and essential mitigation measures previously outlined. Where it would not be possible to avoid or mitigate Adverse effects or where difficulty, uncertainty or other risks to achieving net gain would remain, compensation measures provide appropriate and proportionate offsetting and contingencies.

##### Biodiversity Net Gain Compensation

- 117) United Utilities (UU) has committed to delivering Biodiversity Net Gain (BNG) on the HARP scheme. Full details of the BNG assessment and proposals are provided at (RVBC-MH-APP-008) and a summary is detailed in the following paragraphs.
- 118) HARP is committed to achieving a 10% net gain in biodiversity. Baseline value and loss has been measured using Natural England Metric 2.0. The Metric provides a way of measuring and accounting for biodiversity losses and gains resulting from development or land management change. A BNG report, the completed metric, supporting GIS data and long term (30 year) management plan is included in the planning submission.
- 119) Permanent above ground structures are minimal and therefore the overwhelming majority of habitats would be reinstated. However, to achieve the 10% gain and to account for the loss in value (as calculated by the metric) resulting from the reinstatement process, additional habitat creation and / or enhancement measures are required. These are referred to as offsetting sites.
- 120) It has been agreed (and is often the case for similar schemes) that habitats of low and very low distinctiveness are included in the BNG calculations but would not be subject to long term management plans. This largely relates to the reinstatement of low biodiversity value agricultural habitats such as improved and semi-improved grasslands.
- 121) Offsetting sites have been identified on which to deliver net gain, these are primarily on UU land holdings although relevant authorities have been given the opportunity promote alternative locations. Sites have been sought as close to the impact and within the same LPA area wherever possible. Offsetting sites have been shared with local planning authorities (LPAs) and discussions held if there was difficulty finding "in borough" sites.
- 122) Offsetting sites are not included within the planning application development boundary. Planning conditions and s106 agreements would secure the delivery of BNG for these locations and draft conditions and s106 agreements have been shared.
- 123) These offsetting sites could also provide some opportunities for advance habitat creation ahead of enabling phase habitat losses or ahead of construction phase reinstatement.

##### Very High Distinctiveness Habitats

- 124) The BNG metric does not allow consideration of habitats categorised as very high distinctiveness, these must be dealt with separately. Grassland – Upland Hay Meadows habitat of very high distinctiveness was identified; this is reported under the Phase 1 habitat survey as semi-improved neutral grassland. It relates to the field south of the access to Bonstone Compound. It has been assessed previously within this document and essential mitigation measures have been detailed to significantly reduce impacts on this habitat and are included within this assessment.

##### Veteran Trees and Ancient Woodland

- 125) Veteran trees and ancient woodland are excluded from the BNG process. Avoidance and mitigation has been described in earlier sections and embedded and essential mitigation have been taken into account when assessing residual effects. Physical loss of at least three and up to six veteran trees has been confirmed as unavoidable. A bespoke compensation package would be agreed with Ribbles Valley Borough Council. Details are provided in the Arboricultural Impact Assessment (RVBC-MH-TA-006-006).

- 126) The assumed loss of six veteran trees (T144, T176, T184, T185, T187 and T190) is based upon a precautionary approach to impact assessment conducted in 2020. Further consideration from an embedded design viewpoint has subsequently been directed at avoiding impacts on these features, although this is not reported in the AIA. A supplemental report will be submitted to address these 'at risk' and notable assets post-submission, and explain the role of embedded mitigation. Retention of these assets would be subject to pre-construction protection measures as specified in a Site Specific Arboricultural Method Statement (SS-AMS) and shown on a Tree Protection Plan (TPP).

#### Other Habitat Enhancement Measures

- 127) Subject to landowner agreement and therefore not included in the mitigation for the purpose of the assessment, some additional measures are proposed outside the red line planning boundary as detailed below.

- 128) Bonstone Compound:

- Prior to, or during the enabling phase, a new species-rich hedge would be planted along the eastern edge of the Bonstone Compound between the existing blocks of woodland (TR4.TN12 and TR4.TN24) to enhance habitat connectivity, the gap required for the temporary access road would be planted during habitat reinstatement.
- Enhancement of a ditch approximately 150 m to the south of the Bonstone Compound access road in advance of work to encourage. The ditch would be reprofiled to create an open gently sloping edge that chicks can use for feeding. Shallow pools can be created by holding water at 2-4 points along the ditch with soil bunds. Creating additional wet features in these areas prior to the works beginning would encourage waders to nest further away from the area of disturbance.
- A hedge approximately 150 m to the south of the proposed Bonstone Compound access road, in the vicinity of proposed ditch enhancement works described above, would be traditionally laid. This would improve the hedge structure for nesting farmland and woodland birds. Any gaps in the hedgerow would be planted with additional species to improve the hedgerow species diversity.
- Prior to, or during the enabling phase, a new wader scrape would be created north of TR4.TN13 within semi-improved neutral grassland. The scrape would be located away from overhead lines, woodland edges, or areas of potential disturbance from the proposed works.
- Four existing barn owl nest boxes are present on New Laithe Farm in the vicinity of the Bonstone Compound. Installation of two new barn owl boxes and replacement of 20 bird boxes across their land in advance of works.
- Existing wader scrapes (which are subject to successional pressures) would be managed through vegetation removal / excavation to enhance the existing features as appropriate.

- 129) Braddup Compound:

- New fencing to be installed along sections of the watercourses crossed by the access road but outside the redline boundary to enhance habitat quality by preventing livestock poaching.
- A new species-rich hedge would be planted through the western part of the Braddup Compound between the existing blocks of woodland (TR4.TN11 and TR4.TN31) to enhance habitat connectivity (only part of this lies outside the red line boundary).
- Barn owl is also known to roost in the vicinity of the Braddup Compound. Two new barn owl boxes would be installed in the vicinity of the Braddup Compound.

## 9.8 Cumulative Effects

- 130) The following section provides an overview of the potential cumulative effects from different developments, in combination with the Proposed Marl Hill Section (inter-project). For cumulative effects related to the combined action of a number of different environmental topics (intra-project), see Chapter 19 (Cumulative Effects) and supporting Figure 19.1.



- 131) Cumulative effects have been assessed in terms of the additional and combined effects. Other than loss of veteran trees no significant habitat/species impacts are anticipated as a result of the Proposed Marl Hill Section. On this basis, it is assumed that for potential cumulative impacts to occur with regard to impacts on habitats and species, the application would need to be relatively close. Small developments, i.e. residential applications of 10 units or under, single agricultural buildings, certain change of land use applications, have been scoped out. The assessment of cumulative effects focussed on the remaining identified applications and allocations within 5 km of the Proposed Marl Hill Section. Table 9A.12 lists the cumulative effects of the identified developments:

Table 9A.12: Summary of Cumulative Effects

Proposed Development	Nature / Scope of Effects	Commentary on Cumulative Effects
Committed Developments - Applications		
<p>Planning application: 3/2018/1065 Ribble Valley Borough Council</p> <p>3km to the south east of Braddup Compound</p> <p>Advance infrastructure and enabling works to facilitate future industrial development comprising site clearance and preparation works, ground investigation and remediation/removal of any contaminated material, import of new materials, bulk earthworks and soil stabilisation, installation, diversion and/or disconnection of below-ground infrastructure including drainage and statutory utilities, installation of building foundations, piles and retaining walls, and temporary works including provision of a contractor's compound, security fencing and hoarding, material set-down area, access road, car parking and other structures and works incidental to the construction phase of development.</p>	<p>Employment – Industrial</p> <p>Assumed to be constructed by the commencement of works for Proposed Scheme of Works.</p>	<p>Extended Phase 1 Habitat Survey Report (August, 2018)</p> <p>The site comprises two areas of hardstanding separated by a tarmac access road. The only semi-natural vegetation within the site comprises very small areas of species-poor semi-improved grassland at the edges of the site in places, and sparsely scattered ephemeral short perennial vegetation.</p> <p>No significant adverse effects upon statutory or non-statutory designations, notable habitats or protected or notable species.</p> <p>The Application Site is within Clitheroe, approximately 3 km to the south east of the Braddup Compound, and there are no substantial ecological linkages between the two.</p> <p>On the basis of the available information, no cumulative effects in respect of terrestrial ecology would be predicted to arise from this application in combination with the Proposed Marl Hill Section.</p>
<p>Planning application: LCC/2018/0060 Lancashire County Council</p> <p>Variation of condition 1 of planning permission 3/97/636 to extend the mining operations until 31 December 2033 with completed restoration by 31 December 2034</p>	<p>Use of quarry would continue during the construction phase of the Proposed Scheme of Works.</p>	<p>Environmental Statement (November, 2018) Jacobs Consultation Comments (January, 2019) Natural England Comments (January, 2019)</p> <p>The site (31ha) comprised land within a working quarry. The majority of the area consisted of exposed limestone rock, with associated buildings and access roads/tracks, as well as areas of infilled open water. Areas of semi-natural and plantation woodland are also present.</p>

Proposed Development	Nature / Scope of Effects	Commentary on Cumulative Effects
<p>3.11 km to the south east of Braddup Compound</p>		<p>Environmental Statement (ES) does not set out a complete ecological baseline or an impact assessment to allow consideration of any likely significant effects on the environment. No attempt to assess the potential direct and indirect impacts upon nearby designated sites within the ES. No evidence to suggest that protected species surveys have been undertaken.</p> <p>The Application Site is within Clitheroe, approximately 3.11 km to the south east of the Braddup Compound, and there are no substantial ecological linkages between the two.</p> <p>The available information does not allow for the assessment of adverse effects statutory or non-statutory designations, notable habitats or protected or notable species. However, given the application is for the extension of time to the existing operations within a working quarry, it is assessed that no cumulative effects in respect of terrestrial ecology would be likely to arise from this application in combination with the Proposed Marl Hill Section.</p>
<p>Planning application: LCC/2016/0027</p> <p>Lancashire County Council</p> <p>Importation and processing of construction and demolition waste including road planings and reclaimed asphalt pavement (RAP) including the regularisation of the rap hopper</p> <p>3.13 km to the south east of Braddup Compound</p>	<p>Assumed to be constructed by the commencement of works for Proposed Scheme of Works</p>	<p>Planning Statement (March, 2016)</p> <p>The proposed storage of recycled aggregates would take place within the existing stockpile area of the quarry and the RAP hopper has already been constructed onto the asphalt plant, therefore there are no ecological constraints to this proposal.</p> <p>No significant adverse effects upon statutory or non-statutory designations, notable habitats or protected or notable species.</p> <p>The Application Site is within Clitheroe, approximately 3.13 km to the south east of the Braddup Compound, and there are no substantial ecological linkages between the two.</p> <p>On the basis of the available information, no cumulative effects in respect of terrestrial ecology would be predicted to arise from this application in combination with the Proposed Marl Hill Section.</p>
<p>Planning application: 3/2017/0573</p> <p>Ribble Valley Borough Council</p> <p>Application for 36 single and two-storey dwellings (including 11 affordable units), car parking,</p>	<p>Assumed to be constructed by the commencement of works for Proposed Scheme of Works.</p>	<p>Ecological Survey and Assessment (October, 2016)</p> <p>The site (1.34 ha) comprises an improved grassland field, boundary hedgerows, broadleaf trees and shrubs and scrub and tall-herb vegetation.</p>

Proposed Development	Nature / Scope of Effects	Commentary on Cumulative Effects
<p>landscaping and new access from Union Street.</p> <p>3.42 km to the south east of Braddup Compound</p>		<p>No significant adverse effects upon statutory or non-statutory designations, notable habitats or protected or notable species.</p> <p>The Application Site is within Clitheroe, approximately 3.42 km to the south east of the Braddup Compound, and there are no substantial ecological linkages between the two.</p> <p>On the basis of the available information, no cumulative effects in respect of terrestrial ecology would be predicted to arise from this application in combination with the Proposed Marl Hill Section.</p>
<p>Planning application: 3/2019/0877 Ribble Valley Borough Council</p> <p>Erection of 39 dwellings with landscaping, associated works and access from adjacent development site.</p> <p>3.65 km to the south east of Braddup Compound</p>	<p>Appeal currently being determined. Potential for cumulative effects during construction phase.</p>	<p>Ecological Appraisal (August, 2019) Biodiversity Offsetting Calculation (September, 2019)</p> <p>The site (1.8 ha) comprises poor semi-improved grassland with tall ruderal vegetation around its peripheries. Streams run along the north east and north west boundaries. A defunct hedgerow grows on the south west boundary and a stone wall bounds the south east.</p> <p>No significant adverse effects upon statutory or non-statutory designations, notable habitats or protected or notable species.</p> <p>Biodiversity calculation predicts an ecological loss of 0.72 Units. On an area basis the site is therefore 12.12% worse ecologically post development than pre-development.</p> <p>The Application Site is within Clitheroe, approximately 3.65 km to the south east of the Braddup Compound, and there are no substantial ecological linkages between the two.</p> <p>On the basis of the available information, no cumulative effects in respect of terrestrial ecology would be predicted to arise from this application in combination with the Proposed Marl Hill Section.</p>
<p>Planning application: 3/2017/0616 Ribble Valley Borough Council</p> <p>Demolition of existing buildings and construction of 60 dwellings and associated infrastructure.</p> <p>3.75 km to the south east of Braddup Compound</p>	<p>The site is under construction. Assumed to be constructed by the commencement of works for Proposed Scheme of Works.</p>	<p>Extended Phase 1 Habitat Survey and Daytime Building Inspection (December, 2016) Protected Species Surveys (December, 2016) Updated Bat Survey and Mitigation Strategy (June 2017)</p> <p>The site (2.01 ha) comprises amenity grassland, poor semi-improved grassland, scrub, orchard, tall ruderal, bare ground, hedgerows and a spoil mound. Clitheroe Hospital is located within the centre of the site and includes a complex of eight buildings surrounded by areas of hard standing.</p>

Proposed Development	Nature / Scope of Effects	Commentary on Cumulative Effects
		<p>No significant adverse effects upon statutory or non-statutory designations.</p> <p>Loss of two areas of traditional orchard.</p> <p>Bats were confirmed to use two buildings within the site for roosting:</p> <p>Confirmed common pipistrelle <i>Pipistrellus pipistrellus</i> maternity/ satellite roost used by up to 16 bats and suspected brown long-eared <i>Plecotus auritus</i> summer day roost used by a single bat in Building 7 (boiler house)</p> <p>Confirmed additional day roost used by up to 2 common pipistrelle and one brown long-eared bat in Building 3 (second hospital wing)</p> <p>Mitigation proposed for loss of orchard habitat and impacts on roosting bats.</p> <p>The Application Site is within Clitheroe, approximately 3.75 km to the south east of the Braddup Compound, and there are no substantial ecological linkages between the two.</p> <p>On the basis of the available information and recommended planning conditions to be imposed upon the Planning Permission, no cumulative effects in respect of terrestrial ecology would be predicted to arise from this application in combination with the Proposed Marl Hill Section.</p>
<p>Planning application: 3/2018/0236 Ribble Valley Borough Council</p> <p>Erection of 27 light industrial units, 8 office units and associated access, parking and ancillary works. 4.18 km to the south east of Braddup Compound</p>	<p>Assumed to be constructed by the commencement of works for Proposed Scheme of Works.</p>	<p>Extended Phase 1 Habitat Survey and Protected Species Survey / Assessment (March, 2018)</p> <p>The site (1.62 ha) comprises a construction site with excavations and bare earth. A stream and areas of woodland lie adjacent to the site.</p> <p>No significant adverse effects upon statutory or non-statutory designations, notable habitats or protected or notable species.</p> <p>The Application Site is within Clitheroe, approximately 4.47 km to the south east of the Braddup Compound, and there are no substantial ecological linkages between the two.</p> <p>On the basis of the available information, no cumulative effects in respect of terrestrial ecology would be predicted to arise from this application in combination with the Proposed Marl Hill Section.</p>
<p>Planning application: 3/2016/0328 Ribble Valley Borough Council 4.47 km to the south east of Braddup Compound</p>	<p>Residential, 18 units This has been constructed</p>	<p>Ecological Appraisal (March, 2016)</p> <p>The site (0.75 ha) comprises dense scrub/ruderal vegetation which is composed of widespread, opportunistic species. No notable plant species or community were identified within the site. No significant adverse effects upon statutory or non-</p>

Proposed Development	Nature / Scope of Effects	Commentary on Cumulative Effects
<p>Erection of 18 dwellings on land to the rear of Parker Avenue, Clitheroe following the demolition of No 15 Parker Avenue.</p>		<p>statutory designations, notable habitats or protected or notable species.</p> <p>The Application Site is within Clitheroe, approximately 4.47 km to the south east of the Braddup Compound, and there are no substantial ecological linkages between the two.</p> <p>On the basis of the available information, no cumulative effects in respect of terrestrial ecology would be predicted to arise from this application in combination with the Proposed Marl Hill Section.</p>
<p>Planning application: LCC/2017/0077 Lancashire County Council</p> <p>The erection of solar photovoltaic panels and associated works including inverter station, switchgear housing, security fencing and integral connection to the Clitheroe Wastewater Treatment Works existing substation</p> <p>4.66 km to the south of Braddup Compound</p>	<p>Assumed to be constructed by the commencement of works for Proposed Scheme of Works.</p>	<p>Ecological Assessment (September, 2017) Biodiversity management Plan (September, 2016)</p> <p>The site (1.1 ha) comprises heavily grazed improved grassland, species-poor marshy grassland and areas of tall ruderal habitat and is surrounded by agricultural grazed land, with the operational WwTW to the south east. The River Ribble flows south to the west and the tributary Pendleton Brook is located immediately to the north of the site.</p> <p>No significant adverse effects upon statutory or non-statutory designations, notable habitats or protected or notable species.</p> <p>The Application Site is to the west of Clitheroe, approximately 4.66 km to the south of the Braddup Compound, and there are no substantial ecological linkages between the two.</p> <p>On the basis of the available information and recommended planning conditions to be imposed upon the Planning Permission, no cumulative effects in respect of terrestrial ecology would be predicted to arise from this application in combination with the Proposed Marl Hill Section.</p>
<p>Planning application: 3/2018/0008 Ribble Valley Borough Council</p> <p>Demolition of existing dwelling and erection of 34 bungalows for the over 55s with associated access, parking, landscaping and open space.</p> <p>4.75 km to the south east of Braddup Compound</p>	<p>Assumed to be constructed by the commencement of works for Proposed Scheme of Works.</p>	<p>Ecological Appraisal (October, 2017)</p> <p>The site (1.9 ha) comprises poor semi-improved grassland, bound to the South, East and West by intact species-poor hedgerows.</p> <p>No significant adverse effects upon statutory or non-statutory designations, notable habitats or protected or notable species.</p> <p>The Application Site is within Clitheroe, approximately 4.75 km to the south east of the Braddup Compound, and there are no substantial ecological linkages between the two.</p> <p>On the basis of the available information, no cumulative effects in respect of terrestrial ecology would be predicted to arise from this application</p>

Proposed Development	Nature / Scope of Effects	Commentary on Cumulative Effects
		in combination with the Proposed Marl Hill Section.
Committed Developments - Allocations		
<p>Minerals and Waste allocation: MRT4: Ribblesdale Sidings</p> <p>Lancashire County Council Joint Lancashire Minerals and Waste Local Plan</p> <p>3.2 km to the south east of Braddup Compound</p>	<p>Safeguards land for use as a rail sidings. Assumed to be in use during construction phase.</p>	<p>The Application Site is within Clitheroe, approximately 3.2 km to the south east of the Braddup Compound, and there are no substantial ecological linkages between the two. The Application Site lies within an existing rail siding.</p> <p>On the basis of the available information, no cumulative effects in respect of terrestrial ecology would be predicted to arise from this application in combination with the Proposed Marl Hill Section.</p>
<p>Housing allocation for 40 dwellings:</p> <p>HAL4: Land off Hawthorne Place, Clitheroe</p> <p>Ribble Valley Borough Council Housing and Economic Development DPD</p> <p>3.27 km to the south east of Braddup Compound</p>	<p>Delivery timescales for allocation: 2008 – 2028. Potential for cumulative effects during construction phase.</p>	<p>The site is within the defined main settlement of Clitheroe. The site comprises open grazing land interspersed with a number of mature trees. The development area is approx. 1.7ha and the site capacity is 40 dwellings.</p> <p>No significant adverse effects upon statutory or non-statutory designations, notable habitats or protected or notable species are anticipated.</p> <p>The Allocation Site is within Clitheroe, approximately 3.27 km to the south east of the Braddup Compound, and there are no substantial ecological linkages between the two.</p> <p>On the basis of the available information, no cumulative effects in respect of terrestrial ecology would be predicted to arise from this allocation in combination with the Proposed Marl Hill Section.</p>
<p>Housing allocation for 20 dwellings:</p> <p>HAL3: Land at Chatburn Road, Clitheroe</p> <p>Ribble Valley Borough Council Housing and Economic Development DPD</p> <p>3.56 km to the south east of Braddup Compound</p>	<p>Delivery timescales for allocation: 2008 – 2028. Potential for cumulative effects during construction phase.</p>	<p>The site is within the defined main settlement of Clitheroe. The site is open grazing land directly north-east of the last housing development heading eastwards out of Clitheroe and towards Chatburn. The development area excluding the flood zone with a 10m buffer to either side is approx. 0.7 ha and the site capacity is 20 dwellings.</p> <p>No significant adverse effects upon statutory or non-statutory designations, notable habitats or protected or notable species are anticipated.</p> <p>The Allocation Site is within Clitheroe, approximately 3.56 km to the south east of the Braddup Compound, and there are no substantial ecological linkages between the two.</p> <p>On the basis of the available information, no cumulative effects in respect of terrestrial ecology would be predicted to arise from this allocation in combination with the Proposed Marl Hill Section.</p>

Proposed Development	Nature / Scope of Effects	Commentary on Cumulative Effects
<p>Minerals and Waste allocation: BWF23: Salthill Industrial Estate</p> <p>Lancashire County Council Joint Lancashire Minerals and Waste Local Plan</p> <p>3.99 km to the south east of Braddup Compound</p>	<p>Built waste management facility</p> <p>Supports development involving individual local waste management facilities, of a capacity of around 50,000 tonnes per year, for the recycling, transfer, and materials recovery.</p> <p>Assumed to be in use during construction phase.</p>	<p>The Application Site is within Clitheroe, approximately 3.99 km to the south east of the Braddup Compound, and there are no substantial ecological linkages between the two. The Application Site lies within an existing industrial estate.</p> <p>On the basis of the available information, no cumulative effects in respect of terrestrial ecology would be predicted to arise from this application in combination with the Proposed Marl Hill Section.</p>
<p>Housing allocation for 100 dwellings: HAL5: Land at Highmoor Farm, Clitheroe</p> <p>Ribble Valley Borough Council Housing and Economic Development DPD</p> <p>4.4 km to the south east of Braddup Compound</p>	<p>Delivery timescales for allocation: 2008 – 2028.</p> <p>Potential for cumulative effects during construction phase.</p>	<p>The site is adjacent to the defined main settlement of Clitheroe. The site is located to the eastern end of Clitheroe. The north eastern boundary is marked by a hedge and row of trees which partly follow a watercourse.</p> <p>The development area excluding land at Highmoor Farm which has been granted permission for development (Application Ref. 3/2017/1221) and the flood zone with 10m buffer is approx. 5.0 hectares and the site capacity is 100 dwellings.</p> <p>No significant adverse effects upon statutory or non-statutory designations, notable habitats or protected or notable species are anticipated.</p> <p>The Allocation Site is within Clitheroe, approximately 4.4 km to the south east of the Braddup Compound, and there are no substantial ecological linkages between the two.</p> <p>On the basis of the available information, no cumulative effects in respect of terrestrial ecology would be predicted to arise from this allocation in combination with the Proposed Marl Hill Section.</p>
<p>Housing Allocation DS1: Standen Strategic Site for 1040 dwellings</p> <p>Ribble Valley Borough Council</p>	<p>Delivery timescales for allocation: 2008 – 2028.</p> <p>Potential for cumulative</p>	<p>The site is to the south of the defined main settlement of Clitheroe</p> <p>No significant adverse effects upon statutory or non-statutory designations, notable habitats or protected or notable species are anticipated.</p>

Proposed Development	Nature / Scope of Effects	Commentary on Cumulative Effects
Housing and Economic Development DPD 4.4 km to the south east of Braddup Compound	effects during construction phase.	The Allocation Site is approximately 4.4 km to the south east of the Braddup Compound, and there are no substantial ecological linkages between the two.  On the basis of the available information, no cumulative effects in respect of terrestrial ecology would be predicted to arise from this allocation in combination with the Proposed Marl Hill Section.

## 9.9 Conclusion

- 132) Chapter 9A and 9B of the ES together with the Habitats Regulation Assessment and SSSI Report considers the potential terrestrial and aquatic ecology impacts associated with enabling works, construction, commissioning and operational phases along the route of the Proposed Marl Hill Section.
- 133) No significant residual impacts on international, national or local designations are predicted.
- 134) Significant impacts on species would be avoided through embedded mitigation measures and potential impacts would be reduced following habitat reinstatement and through installation of bat boxes to provide alternative roosting habitats. With the potential exception of bats (tree roosts) it is anticipated that no protected species licences would be required.
- 135) Embedded mitigation, best practice measures and essential mitigation will avoid or reduce most adverse effects on habitats to non-significant. Within main compounds habitat loss would be temporary with very small exceptions and the majority of habitats that would be lost and reinstated are common and widespread and these include semi-natural broad-leaved woodland, scattered trees, hedgerows and grassland (semi-improved neutral and marshy). Veteran tree loss is the only significant adverse residual effect predicted on terrestrial ecology as a result of the Proposed Marl Hill Section. Bespoke habitat creation packages agreed with the LPA would be employed to compensate for this loss. A less than local positive residual effect is predicted for hedgerows as a result of additional onsite planting.
- 136) The assumed loss of six veteran trees (T144, T176, T184, T185, T187 and T190) is based upon a precautionary approach to impact assessment conducted in 2020. Further consideration from an embedded design viewpoint has subsequently been directed at avoiding impacts on these features, although this is not reported in the AIA. A supplemental report will be submitted to address these 'at risk' and notable assets post-submission, and explain the role of embedded mitigation. Retention of these assets would be subject to pre-construction protection measures as specified in a Site Specific Arboricultural Method Statement (SS-AMS) and shown on a Tree Protection Plan (TPP).
- 137) In addition to habitat reinstatement, United Utilities is committed to habitat improvements equating to approximately 10% net gain in biodiversity. Baseline value and loss has been measured using Natural England Metric 2.0 and offsetting sites have been sought as close to the impact and within the same LPA area wherever possible.
- 138) No significant effects upon terrestrial ecology features are anticipated during the operation of the new asset. Temporary disturbance effects on habitats and species would be no greater than experienced during existing agricultural practices or routine maintenance of existing above-ground infrastructure for the aqueduct.
- 9.9.1 Off-Site Highways Works and Proposed Ribble Crossing
- 139) This section assesses the likely significant effects associated with enabling works and construction activities required for off-site highways works and the Proposed Ribble Crossing. As explained in Chapter 1, Off-Site Highways Works and the Proposed Ribble Crossing were developed at a late stage in the EIA programme, and are therefore assessed in Volume 5 and Volume 6 respectively.



- 140) The only likely significant residual effect identified within Volume 5 for the proposed off-site highways works is permanent loss of scattered broad-leaved trees and woodland. This would be considered a Significant Adverse Effect at the Local level.
- 141) At the time of writing, the GWDTE assessment is pending and potential temporary or permanent changes to groundwater conditions giving rise to effects on GWDTEs within three Biological Heritage Sites (BHS), River Ribble BHS; Waddington Fell and Browsholme Moor BHS and Bellman Farm Marsh BHS, cannot be ruled out and could potentially have significant adverse effects on the designations although only at the local level. It is expected that even if effects were identified, additional essential mitigation could be designed to reduce any residual effects to not significant.
- 142) Following implementation of embedded, best practice and essential mitigation measures, Volume 6 identified no significant effects upon terrestrial ecology features from the Proposed Ribble Crossing.
- 143) While the overall cumulative effects of each EIA topic are summarised in Chapter 19 it is worth noting here that due to the geographical separation of effects arising from the various elements of the Proposed Marl Hill Section, no cumulative change in significance level is predicted on any International, National or County designation.
- 144) Cumulative effects on habitats could occur if permanent losses were such that the availability of the habitat within the local area or wider was significantly reduced. However, even accounting for the overlapping periods where habitats would be lost, due to reinstatement proposals most habitat effects do not cumulatively increase significance levels overall. Some wet dwarf shrub heath, hedgerow and tree losses associated with the off-site highways would be permanent, however losses of these habitats within the main compounds are low and would not cumulatively increase the effect beyond that identified for off-site highways alone. The size and/or value of other permanent habitat losses are below that where cumulatively significant effects could reasonably occur.
- 145) Cumulative effects on species are unlikely to arise due to avoidance of death/injury impacts through embedded mitigation and best practice measures and due to geographical separation of disturbance, fragmentation and habitat loss impacts.
- 9.10 Glossary and Key Terms
- 146) Key phrases and terms used within this technical chapter relating to Terrestrial Ecology are defined within Appendix 1.2: Glossary and Key Terms.