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**Haweswater Aqueduct Resilience Programme -  
Proposed Bowland Section  
Environmental Statement Volume 5 Part II:  
Off-Site Highways Works – Ecology Assessment TR4**

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## Haweswater Aqueduct Resilience Programme - Proposed Bowland Section

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# 1. Ecology Assessment of Off-Site Highway Works

## 1.1 Introduction

- 1) United Utilities plc is seeking planning consent for the Haweswater Aqueduct Resilience Programme (HARP), which is a proposal to replace the underground tunnel sections of the existing 110 km Haweswater Aqueduct.
- 2) As part of the construction works, a number of compounds will be established. Transport routes to and from these compounds have been identified, and highway works will be required to improve safety for general road users along the route. Further detail about the works can be found in the Environmental Statement Volume 5 Part I: Off-Site Highways Works.
- 3) This report assesses the transport routes of TR4 associated with the Proposed Marl Hill Section and the Proposed Bowland Section that fall within Ribble Valley Borough Council (RVBC). The majority of the proposed works would be required for both of these sections with the exception of road widening locations RW21 to RW28 inclusive and passing places PP01 and PPO2, these are all north of Waddington Fell Quarry and not required for the Proposed Marl Hill Section.
- 4) Volume 5 Part II includes two assessment documents of which this is one of them. Additional off-site highways works are required within Lancaster City Council (LCC) planning authority to facilitate access to the reception compound (Lower Houses Compound) for the Proposed Bowland Section. The assessment of these works is provided within document LCC\_RVBC-BO-ES-V5-P2-001.01.

## 1.2 Assessment Methodology

- 5) The Off-site Highways Works comprise the establishment of temporary compounds, construction of temporary passing places and sections of road widening. The assessment is based on the following:
  - All passing places would be classed as temporary and would be reinstated on completion of the main construction and commissioning works at the main construction compounds
  - All road widening works which fall within highways limits of deviation would be retained following completion of the works
  - All road widening works which encroach onto third party land would be reinstated back to pre-works alignment and condition on completion of the HARP construction programme.
- 6) A high-level assessment of potential ecological effects that may arise as a result of the highways works has been undertaken. The assessment was informed by the following desk based studies undertaken by TEP Ltd and field surveys completed by Bowland Ecology, Ricardo and RSK Biocensus:
  - Desk Based Study (citations for Wildlife Designations are provided in Technical Appendix 1)
  - Phase 1 Habitat Survey
  - Hedgerow Survey
  - GWDTE Survey
  - Bat Tree Roosting Assessment
  - Aquatic Ecology Walkover Surveys
  - White-clawed Crayfish Surveys
- 7) Results of the Desk-based and field surveys are presented at the following figures:
  - Figure 1 - Ecological Statutory Designations with 5 km
  - Figure 2 - Ecological Non-Statutory Designations with 2 km
  - Figure 3 - Priority Habitats and Ancient Woodland within 1 km

- Figure 4 - Desktop Data
- Figure 5 - Phase 1 Habitat Survey

### 1.2.1 Assumptions

- 8) The assessment of potential effects on ecology has taken into account the following assumptions and limitations:
- The extended phase 1 habitat survey area included a 50 m buffer beyond the red line boundary
  - The Water Environment specialists identified a 100 m zone of influence from the works and accordingly the site Ground Water Dependent Terrestrial Ecosystems (GWDTE) survey area included a 100 m buffer beyond the red line boundary, effects beyond this buffer are therefore scoped out
  - Currently the assessment of effects on groundwater is pending and therefore this document does not include a complete assessment of effects on off-site GWDTEs, however the 100 m zone of influence is used to take a precautionary approach to identify potential effects on GWDTEs within designations
  - The ecology data search extended to 1 km for priority habitats, 2 km for species records, 2 km for non-statutory designations and 5 km for statutory designations
  - Where seasonal restrictions prevented confident assignment of habitat types, a precautionary approach has been taken in determining potential for effects on priority habitats
  - Loss of woodland and trees is considered under the Landscape and Arboriculture assessment, however, the effect of these losses on species or designations is covered by the ecology assessment
  - Removal of drystone walls is considered under the landscape assessment, however, the effect of these losses on species is covered by the ecology assessment
  - The potential for significant effects to arise takes account of embedded and best practice mitigation detailed within the Construction Code of Practice
  - Direct loss of habitats outside the red line boundary will be prevented (the Arboriculture assessment identifies trees outside of the redline boundary that are at risk due to proximity)

## 1.3 Baseline Information

### 1.3.1 Designated Sites

- 9) There is one statutorily designated wildlife site of international importance located within 5 km of the off-site highways works associated with the proposed Bowland and Marl Hill Sections. This is North Pennine Dales Meadows SAC approximately 3.9 km north of the works.
- 10) There are three statutorily designated wildlife sites of national importance located within 5 km of the off-site highways works associated with the proposed Marl Hill Section. These are Bell Sykes Meadows SSSI, Field Head Meadow SSSI and Langcliff Cross Meadow SSSI (all are associated with the aforementioned SAC).
- 11) There are 5 other statutorily designated wildlife sites of national importance located within 5 km of the off-site highways works associated with the proposed Bowland and Marl Hill Sections. The interest features of all five SSSIs are geological in nature and therefore impacts upon these SSSIs are not considered further as part of this ecology assessment.
- Clitheroe Knoll Reefs SSSI

- Coplow Quarry SSSI
  - Hodder River Section SSSI
  - Little Mearley Clough SSSI
  - Salthill and Bellmanpark Quarries SSSI
- 12) There are 32 non-statutorily designated wildlife sites within 2km of the off-site highways works associated with the proposed Bowland and Marl Hill Sections. Of these Bowland Fells Important Bird Area, Cross Hill Quarry LNR and ten BHS designations fall within 200 m.
- 13) A summary of the site features of the designations described above is presented at Table 1. Reasonably we wouldn't expect any impacts to occur to any locally designated sites beyond 200 m of the works, therefore only non-statutorily designated sites within 200m of the works have been included in Table 1. The location of these sites is illustrated on Figures 1 and 2. Further information relating to these sites (including full citations) is provided at Appendix 1.

**Table 1: Designated Wildlife Sites**

Wildlife Site	Proximity to closest off-site highways works	Summary Features	Valuation
<b>Statutorily Designated Wildlife Sites Within 5 km of the off-site highways works associated with the Marl Hill Section</b>			
North Pennine Dales Meadows SAC	3.9 km north of TR4/RW20 18.9 ha	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 rare and local meadow species. The grasslands included show very limited effects of agricultural improvement and have good conservation of structure and function	International
Bowland Fells SPA	3.85 km northwest of TR4/RW28 16007.8 ha	The Bowland Fells SPA is important for the Annex I upland breeding birds hen harrier and merlin. It also supports an internationally important population of breeding lesser black-backed gulls which is proposed as an additional feature of the site. The Bowland Fells SPA encompasses the main upland block within the area of Lancashire known as the Forest of Bowland.	International
Bell Sykes Meadows SSSI	4.61 km north of TR4/RW20 13.8 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	National

Wildlife Site	Proximity to closest off-site highways works	Summary Features	Valuation
Bowland Fells SSSI	3.85 km north of TR4.RW28 15,759 ha	The SSSI Unit closest to the Proposed Bowland Section comprises unit 1011820, which was last reported to be in 'favourable' condition. The main habitat present is upland bogs.	National
Field Head Meadow SSSI	4.65 km northeast of TR4/RW20 3.3 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.	National
Langcliff Cross Meadow SSSI	3.93 km northeast of TR4/RW20 5.3 ha	An area of northern hay meadow containing 19 grass species. Forms part of the North Pennine Dales Meadows SAC	National
Myttons Meadows SSSI	2.89 km north of TR4.RW28 10.0 ha	Last reported to be in 'favourable' condition, the SSSI represents one of the best examples of the few remaining species-rich meadow grasslands in the county. Forms part of the North Pennine Dales Meadows SAC	National
Standridge Farm Pasture SSSI	4.48 km northeast of TR4/RW28 4.4 ha	The site consists of an unimproved enclosed herb-rich flushed pasture on a north-facing slope. Represents one of the few remaining unimproved herb-rich pastures present in this part of Lancashire.	National
<b>Non-Statutorily Designated Wildlife Sites within 200 m of the off-site highways works associated with the Marl Hill Section (the location of all designations up to 2 km are shown on Figure 2)</b>			
Cross Hill Quarry LNR	Adjacent to Park and Ride and within 50m of HGV parking 9.6 ha	Cross Hill is a good example of natural change on a man-made site and has since become an exceptional refuge for wildlife. Once quarrying ceased, the thin soils and exposed rock became revegetated through stages of succession from flower-rich grasslands, to hawthorn scrub and finally woodland. Examples of each stage can still be seen within the site.	County
Bowland Fells IBA	Within various sites (TR4/RW08 to TR4/RW20)	An important landscape for upland birds including hen harrier, ring ouzel, whinchat, curlew, golden plover,	County

Wildlife Site	Proximity to closest off-site highways works	Summary Features	Valuation
	Extensive coverage which lies contiguous with the Forest of Bowland AONB.	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).	
Bean Hill Wood and Grassland BHS	Adjacent to TR4/RW02 1.1 ha	The site comprises a north and northeast facing bluff slope to the south of the River Ribble. The habitats on the site comprise two blocks of deciduous woodland separated by field slope of species-rich grassland.	County
Bellman Farm Marsh BHS	40 m north of TR4/RW01 6.0 ha	The site comprises the land adjoining Pimlico Brook from near Pimlico Link Road to the wet fields associated with Bellman Farm. The site also includes the area around the old kiln and the adjacent embankment. The wet fields have an underlying peaty soil, indicative of a historical wetland habitat. Formerly managed as meadowland, their vegetation is essentially fen meadow. The wet fields flood in winter attracting mallard, teal, snipe and water rail with lesser whitethroat sedge warbler and reed bunting present through the summer. The site is considered an important moult and roost site for passerines.	County
Bradford Fell, Easington Fell and Harrop Fell BHS	Within TR4/RW23 518.0 ha	Extensive area of upland heath and mire.	County
Coplow Quarry and Pimlico Road Grasslands BHS	160 m northwest of TR4/RW01 6.2 ha	The site comprises of areas of species-rich, semi-natural calcareous grassland and developing scrub at Coplow Quarry. The site includes Coplow Quarry geological SSSI.	County
Cross Hill Quarry BHS	Adjacent to Clitheroe Park and Ride 10.3 ha	The site comprises of the disused Cross Hill limestone quarries and the adjoining Brungerley Park and supports a mosaic of semi-natural habitats including limestone	County



Wildlife Site	Proximity to closest off-site highways works	Summary Features	Valuation
		grassland, scrub and woodland. The site includes Cross Hill Quarry LNR.	
Hospital Wood BHS	170 m east of TR4/RW08  8.5 ha	Semi-natural clough woodland listed in the Lancashire Inventory of Ancient Woodland (Provisional), (English Nature, 1994). The site adjoins Feazer Wood BHS.	County
River Ribble from London Road Bridge Preston, in West, to County Boundary, in East BHS (referred to hereafter as River Ribble BHS)	Within TR4/RW03 298.1 ha	The site comprises the River Ribble and associated semi-natural habitats from the county boundary at Paythorne downstream to London Road Bridge, Walton-le-Dale, Preston. Throughout the length of the River Ribble the General Quality Assessment is Very Good and Good (A and B) with a localised section with the Fairly Good (C) classification. The river is important for salmon, sea trout, otter and water vole. Along the riverbanks sandy cliffs provide nesting habitat for sand martin and kingfisher, and single banks provide suitability for nesting waders such as oystercatcher, common sandpiper, little ringed-plover and ringed plover. Much of the land associated with the river comprises woodland, grassland and, locally, swamp and tall-herb communities. UK BAP Priority Habitats & Species include Lowland Mixed Woodland, Wet Woodland, Lowland Meadow, Fen, Water Vole, Otter and Reed Bunting. A single record of freshwater pearl-mussel dated 1974 came to light in 2003 for a section of the river upstream of Clitheroe.	County
Waddington Fell and Browsholme Moor BHS	Within TR4/RW17 268.0 ha	Extensive area of moorland with upland heath, blanket bog, acid grassland and mires.	County
Waddington Fell Road, Roadside Verges	Within TR4/RW27 0.22 ha	No description provided in citation but qualifies under Artificial Habitats Ar2 and boundaries correspond to grassland verges.	County
West Clough Wood BHS	200 m northwest of TR4/RW06 9.5 ha	Ancient semi-natural woodland listed in the Lancashire Inventory of Ancient Woodland (Provisional), (English Nature, 1994). The site is in the Forest	County

Wildlife Site	Proximity to closest off-site highways works	Summary Features	Valuation
		of Bowland Area of Outstanding Natural Beauty (AONB).	

### 1.3.2 Habitats

- 14) Table 2 summarises the habitat features present within the off-site highways works. The habitat extent areas in ( ) relate to locations north of Waddington Fell Quarry which are only required for the Proposed Bowland Section. All other locations are required for both the Proposed Marl Hill Section and the Proposed Bowland Section. The location of the habitats is illustrated on Figure 4.

**Table 2: Habitat present across the TR4 off-site highways works**

Habitat	Extent (Area ha/length m)	Habitat of Principal Importance (HPI) or Lancashire BAP Habitat (LBAP)	Valuation
Wet dwarf shrub heath	<0.01 ha	Potential Heathland HPI and LBAP	County (within BHS)
Acid dry dwarf shrub heath	0.01 ha	Potential Heathland HPI and LBAP	County (within BHS)
Amenity grassland	0.01 ha	N/A	Immediate site
Poor semi-improved grassland	1.37 ha (+0.02 ha)	N/A	Less than Local
Semi-improved acid grassland	0.04 ha (+0.02 ha)	Potential Lowland Dry Acid Grassland HPI	Local
Semi-improved neutral grassland	0.17 ha (+0.09 ha)	N/A	Local
Marsh/marshy grassland	0.06 ha	Potential Fen, Marsh & Swamp (broad habitat) HPI	Local
Semi-natural broad-leaved woodland	<0.01 ha	Potential Lowland Mixed Deciduous Woodland HPI and LBAP	County
Plantation coniferous woodland	0.01 ha	N/A	Local
Scattered broad-leaved trees	See Vol. 5 Part I	N/A	County
Dense/continuous scrub	0.02 ha	N/A	Less than Local
Bare ground	0.05 ha	N/A	Less than Local
Hardstanding	0.32 ha (+0.06 ha)	N/A	Immediate site
Running water	1m and <0.01 ha	Watercourses crossed by existing road. Potential Rivers HPI and LBAP	Local
Native species-rich hedge and trees	55 m	Hedgerow HPI	Local
Native species-rich intact hedge	267 m (+129 m)	Hedgerow HPI	Local
Species-poor intact hedge	(+35 m)	Hedgerow HPI	Local

Habitat	Extent (Area ha/length m)	Habitat of Principal Importance (HPI) or Lancashire BAP Habitat (LBAP)	Valuation
Wall	595 m	N/A	Immediate site

#### 1.4 Summary of Effects

- 15) The following table (Table 3) provides a summary of notable ecological issues for each Road Widening, Passing Place or Compound.

**Table 4: TR4 - Summary of notable ecological issues**

TR4 - Summary of notable ecological issues				
Local Authority	Site Name	Protected Species	Priority Habitats	Designated Sites
RVBC	PP01 (Not required for Marl Hill)	N/A	BHS may contain GWDTEs within 100 m of works, potential for loss or degradation of habitat	Waddington Fell and Browsholme Moor, and Bradford Fell, Easington Fell & Harrop Fell adjacent to site - Impacts would generally be avoided with best practice measures but effects on GWDTE associated with the site could arise.
RVBC	PP02 (Not required for Marl Hill)	N/A	N/A	
RVBC	RW01	N/A	BHS may contain GWDTEs within 100 m of works, potential for loss or degradation of habitat	Bellman Farm Marsh BHS within 50 m of the site - Impacts would generally be avoided with best practice measures but effects on GWDTE associated with the site could arise.
RVBC	RW02	<p>White clawed crayfish – the River Ribble provides optimal white clawed crayfish habitat. No evidence of white clawed crayfish identified during the survey of the watercourses. No significant impacts identified.</p> <p>Otter - Evidence of otter was observed along the River Ribble in the form of a spraint and footprints. Several trees along the reach provide potential otter holts amongst their roots. No significant impacts identified.</p> <p>Fish - Multiple areas of suitable salmonid habitat identified; suboptimal lamprey habitat present. No significant impacts identified</p>	Permanent loss of hedgerow priority habitat.	Bean Hill Wood and Grassland BHS adjacent to site - Impacts can be avoided with best practice measures.

TR4 - Summary of notable ecological issues				
Local Authority	Site Name	Protected Species	Priority Habitats	Designated Sites
RVBC	RW03	<p>Bats – works lie adjacent to two trees with moderate bat roosting potential = potential permanent loss of roosting habitat</p> <p>White clawed crayfish – the River Ribble provides optimal white clawed crayfish habitat. No evidence of white clawed crayfish identified during the survey of the watercourses. No significant impacts identified.</p> <p>Otter - Evidence of otter was observed along the River Ribble in the form of a spraint and footprints. Several trees along the reach provide potential otter holts amongst their roots. No significant impacts identified.</p> <p>Fish - Multiple areas of suitable salmonid habitat identified; suboptimal lamprey habitat present. No significant impacts identified</p>	<p>River Ribble HPI adjacent to site - Impacts can be avoided with best practice measures.</p> <p>No BHS GWDEs identified within 100 m of works, potential for loss or degradation of habitat unlikely</p>	<p>River Ribble BHS adjacent to site (designation overlaps bridge crossing) - Impacts can be avoided with best practice measures.</p>
RVBC	RW04	<p>White clawed crayfish – the River Ribble provides optimal white clawed crayfish habitat. No evidence of white clawed crayfish identified during the survey of the watercourses. No significant impacts identified.</p> <p>Otter - Evidence of otter was observed along the River Ribble in the form of a spraint and footprints. Several trees along the reach provide potential otter holts amongst their roots. No significant impacts identified.</p> <p>Fish - Multiple areas of suitable salmonid habitat identified; suboptimal lamprey habitat present. No significant impacts identified</p>	<p>River Ribble HPI adjacent to site - Impacts can be avoided with best practice measures.</p> <p>No BHS GWDEs identified within 100 m of works, potential for loss or degradation of habitat unlikely</p>	<p>River Ribble BHS adjacent to site - Impacts can be avoided with best practice measures.</p>
RVBC	RW05	N/A	N/A	N/A
RVBC	RW06	<p>Bats – works lie adjacent to two trees with moderate and one tree with low bat roosting potential = potential permanent loss of roosting habitat</p>	<p>Permanent loss of hedgerow priority habitat.</p>	N/A

TR4 - Summary of notable ecological issues				
Local Authority	Site Name	Protected Species	Priority Habitats	Designated Sites
RVBC	RW07	N/A	N/A	N/A
RVBC	RW08	Bats – works lie in proximity to two trees with moderate bat roosting potential = potential permanent loss of roosting habitat	N/A	N/A
RVBC	RW09	Bats – works lie adjacent to several trees with moderate bat roosting potential = potential permanent loss of roosting habitat	Permanent loss of hedgerow priority habitat.	N/A
RVBC	RW10	Bats – works lie in proximity to several trees with moderate bat roosting potential = potential permanent loss of roosting habitat	N/A	N/A
RVBC	RW11	Bats – works lie adjacent to two trees with low bat roosting potential = potential permanent loss of roosting habitat	Permanent loss of hedgerow priority habitat.	N/A
RVBC	RW12	Bats – assumed loss of tree with low bat roosting potential = potential permanent loss of roosting habitat.	Permanent loss of hedgerow priority habitat.	N/A
RVBC	RW13	N/A	Permanent loss of hedgerow priority habitat.	N/A
RVBC	RW14	N/A	N/A	N/A
RVBC	RW15	N/A	N/A	N/A
RVBC	RW16	<p>White clawed crayfish – Unnamed Watercourse 434 provides optimal white clawed crayfish habitat. No evidence of white clawed crayfish identified during the survey. No significant impacts identified.</p> <p>Otter - Evidence of otter was observed along the Unnamed Watercourse 434 in the form of spraints and one potential couch at the base of a tree trunk. No significant impacts identified.</p>	<p>BHS may contain GWDTEs within 100 m of works – Significant impacts would be avoided with best practice measures</p>	<p>Waddington Fell and Browsholme Moor BHS lies adjacent to the site on the opposite side of the road - Impacts would generally be avoided with best practice measures but effects on GWDTE associated with the site could arise.</p>

TR4 - Summary of notable ecological issues				
Local Authority	Site Name	Protected Species	Priority Habitats	Designated Sites
RVBC	RW17	<p>White clawed crayfish –Waddington Brook provides suitable white clawed crayfish habitat. No evidence of white clawed crayfish identified during the survey of the watercourse No significant impacts identified.</p> <p>Otter - was recorded in the form of spraint and footprints. Habitat was not considered to be of high suitability for otter. No significant impacts identified.</p> <p>Fish – Waddington Brook provides suitable habitats for a range of fish species. No significant impacts identified</p>	<p>Permanent loss of potential priority habitat.</p> <p>BHS may contain GWDTEs within 100 m of works, potential for loss or degradation of habitat</p>	<p>Waddington Fell and Browsholme within the site. Permanent loss of habitat associated with this BHS. Effects on GWDTE associated with the site could also arise.</p>
RVBC	RW18	<p>White clawed crayfish –Waddington Brook provides suitable white clawed crayfish habitat. No evidence of white clawed crayfish identified during the survey of the watercourse No significant impacts identified.</p> <p>Otter - was recorded in the form of spraint and footprints. Habitat was not considered to be of high suitability for otter. No significant impacts identified.</p> <p>Fish – Waddington Brook provides suitable habitats for a range of fish species. No significant impacts identified</p>	<p>BHS may contain GWDTEs within 100 m of works – Significant impacts would be avoided with best practice measures</p>	<p>Waddington Fell and Browsholme Moor BHS within 50m of working area on the opposite side of the road – Impacts would generally be avoided with best practice measures but effects on GWDTE associated with the site could arise.</p>

TR4 - Summary of notable ecological issues				
Local Authority	Site Name	Protected Species	Priority Habitats	Designated Sites
RVBC	RW19	<p>White clawed crayfish –Waddington Brook provides suitable white clawed crayfish habitat. No evidence of white clawed crayfish identified during the survey of the watercourse No significant impacts identified.</p> <p>Otter - was recorded in the form of spraint and footprints. Habitat was not considered to be of high suitability for otter. No significant impacts identified.</p> <p>Fish – Waddington Brook provides suitable habitats for a range of fish species. No significant impacts identified</p>	N/A	N/A
RVBC	RW20	N/A	N/A	N/A
RVBC	RW21 (Not required for Marl Hill)	N/A	BHS sites may contain GWDTEs within 100 m of works, potential for loss or degradation of habitat	Waddington Fell and Browsholme Moor BHS, and Bradford Fell, Easington Fell & Harrop Fell BHS (opposite side of the road) lie within 50m of the site - Impacts would generally be avoided with best practice measures but effects on GWDTE associated with these sites could arise.



TR4 - Summary of notable ecological issues				
Local Authority	Site Name	Protected Species	Priority Habitats	Designated Sites
RVBC	RW22 (Not required for Marl Hill)	<p>Otter – Bonstone Brook and Unnamed Watercourse 2096 are likely to be used intermittently by foraging otter due to presence of downstream waterbodies.</p> <p>Fish - Bonstone Brook and Unnamed Watercourse 2096 are in the River Hodder Catchment. The River Hodder catchment supports populations of Atlantic salmon, brown trout, bullhead, lamprey species, and European eel. Due to the high proportion of the fish community comprising Atlantic salmon, bullhead, and brown trout the fish community of watercourses within the catchment are considered to be highly sensitive to reductions in water quality and increases in sedimentation</p> <p>Potential for significant impacts to fish, macroinvertebrate, and macrophyte communities due to increased sediment mobilisation during construction of RW22. There is potential for long term changes to fine sediment input due to bank destabilisation during the proposed road widening works. Without appropriate mitigation this has potential to permanently alter the fish macroinvertebrate, and a macrophyte communities this would have a significant impact on the aquatic receptors present in the watercourse. Mitigation required including bank reinstatement, silt control, a pre-commencement survey for otter, restrictions on timing of in river works, and biosecurity.</p>	<p>Permanent loss of potential priority habitat.</p> <p>BHS may contain GWDEs within 100 m of works, potential for loss or degradation of habitat</p>	<p>Bradford Fell, Easington Fell &amp; Harrop Fell BHS lies within 50m of the site on the opposite side of the road - Impacts can be avoided with best practice measures.</p>

TR4 - Summary of notable ecological issues				
Local Authority	Site Name	Protected Species	Priority Habitats	Designated Sites
RVBC	RW23 (Not required for Marl Hill)	<p>Otter – Bonstone Brook is likely to be used intermittently by foraging otter due to presence of downstream waterbodies.</p> <p>Fish - Bonstone Brook is in the River Hodder Catchment. The River Hodder catchment supports populations of Atlantic salmon, brown trout, bullhead, lamprey species, and European eel. Due to the high proportion of the fish community comprising Atlantic salmon, bullhead, and brown trout the fish community of watercourses within the catchment are considered to be highly sensitive to reductions in water quality and increases in sedimentation</p> <p>Potential for significant impacts to fish, macroinvertebrate, and macrophyte communities due to increased sediment mobilisation during construction of RW22. There is potential for long term changes to fine sediment input due to bank destabilisation during the proposed road widening works. Without appropriate mitigation this has potential to permanently alter the fish macroinvertebrate, and a macrophyte communities this would have a significant impact on the aquatic receptors present in the watercourse. Mitigation required including benk reinstatement, silt control, a pre-commencement survey for otter, restrictions on timing of in river works, and biosecurity.</p>	<p>Permanent loss of potential priority habitat.</p> <p>BHS may contain GWDEs within 100 m of works, potential for loss or degradation of habitat</p>	<p>Bradford Fell, Easington Fell &amp; Harrop Fell BHS within site. Permanent loss of habitat associated with a BHS.</p> <p>Waddington Fell and Browsholme Moor BHS lie within 50m of the site on the opposite side of the road - Impacts can be avoided with best practice measures.</p>
RVBC	RW24 (Not required for Marl Hill)	Bats – assumed loss of tree group with moderate potential to support roosting bats = potential permanent loss of roosting habitat	Permanent loss of hedgerow priority habitat	N/A

TR4 - Summary of notable ecological issues

Local Authority	Site Name	Protected Species	Priority Habitats	Designated Sites
RVBC	RW25 (Not required for Marl Hill)	Bats – works lie adjacent to one tree with low bat roosting potential = potential permanent loss of roosting habitat	Permanent loss of hedgerow priority habitat	N/A
RVBC	RW26 (Not required for Marl Hill)	N/A	Potential permanent loss of hedgerow priority habitat	N/A
RVBC	RW27 (Not required for Marl Hill)	N/A	Permanent loss of potential priority grassland habitat	Waddington Fell Road, Roadside Verge BHS - within site. Permanent loss of habitat associated with a BHS.
RVBC	RW28 (Not required for Marl Hill)	Bats – assumed loss of tree with low potential to support roosting bats = potential permanent loss of roosting habitat.  Works lie adjacent to two trees with moderate bat roosting potential = potential permanent loss of roosting habitat	Permanent loss of hedgerow priority habitat	N/A
RVBC	Clitheroe Park & Ride	N/A	N/A	Adjacent to Cross Hill Quarry LNR and BHS - Impacts can be avoided with best practice measures.
RVBC	Clitheroe HGV Holding Area	N/A	N/A	Within 50 m of Cross Hill Quarry LNR and BHS on opposite side of the road - Impacts can be avoided with best practice measures.

## 1.5 Description of Effects

### Potentially Significant Effects

- 16) The following commentary considers effects on ecology at each Road Widening, Passing Place and Compound sites and combines these effects at multiple locations along the same road network to determine if there will be significant adverse effects.

### Designations

- 17) There are no impacts on any internationally or nationally designated sites.
- 18) Of the 31 non-statutory designated sites within 2 km of the proposals, five sites fall within the redline boundary of the off-site highways works. The sites comprise Bowland Fells IBA, River Ribble BHS, Waddington Fell and Browsholme Moor BHS, Bradford Fell, Easington Fell and Harrop Fell BHS and Waddington Fell Road Roadside Verges BHS.
- 19) Of these five designation three (River Ribble BHS, Waddington Fell and Browsholme Moor BHS and Bradford Fell, Easington Fell and Harrop Fell BHS) list habitats likely to be groundwater dependent within their citations. One further designation falls within the 100 m GWDTE potential zone of influence; Bellman Farm Marsh BHS.
- 20) Bowland Fells IBA lies within 13 of the Road Widening works (TR4/RW08, 09, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19 and 20). While the site is noted to be of international importance for breeding upland birds, waders and gulls as well as being a breeding stronghold of hen harrier, bird species will be habituated to the existing road use. The road-widening works are relatively localised and have a short-term construction period.
- 21) A very small proportion of the boundary of River Ribble BHS falls within the working area associated with TR4/RW03, however this is in the location of a bridge crossing which is overlapped by the designation. No riverine habitats will be impacted by the works, therefore no direct impacts on this designation are anticipated. Best practice and embedded mitigation will avoid significant effects on riverine species. The BHS citation includes GWDTE habitats swamp, wet woodland and fen. None of these habitats appear to be present within 100m of the works therefore significant effects are assumed highly unlikely (pending the GWDTE assessment).
- 22) A small proportion of the boundary of Waddington Fell and Browsholme Moor BHS falls within the working area of TR4/RW17. The small loss of roadside habitats (comprising semi-improved grassland and scattered scrub) associated with these works is unlikely to have a significant adverse effect on this designation or the habitats and species it supports. Two other working areas lie on the opposite side of the road (TR4/RW16 and TR4/RW18) but all three fall within the GWDTE potential zone of influence however habitats within this zone lie uphill of the works and appear to comprise of heathland habitats rather than a potential GWDTE habitat. Given only a small proportion of the BHS falls within 100 m of the works and much of this does not appear to contain any GWDTE habitats, significant effects are assumed highly unlikely (pending the GWDTE assessment).
- 23) A small proportion of the boundary of Bradford Fell, Easington Fell and Harrop Fell BHS falls within the working area of TR4/RW23. The small loss of roadside habitats associated with these works is unlikely to have a significant adverse effect on this designation or the habitats and species it supports. Passing place PP01 is adjacent and two other working areas lie on the opposite side of the road (TR4/RW21 and TR4/RW22) but all three fall within the GWDTE potential zone of influence however PP01 is an existing area of hardstanding. A great area of this BHS falls within 100 m of the various works than any other designation, however, it is a relatively large BHS and significant effects on the designation as a whole are thought unlikely (pending the GWDTE assessment). All works within the influence of this designation are only required for the Proposed Bowland Section.
- 24) Waddington Fell Road, Roadside Verges BHS comprises 0.2 ha across the verges on both sides of a stretch of road. TR4/RW27 working area covers approximately one quarter of the designated road verge

on the east side. Permanent loss of this habitat (c 13% of designation) could represent a significant effect on this designation. These works are only required for the Proposed Bowland Section.

- 25) A small proportion of the boundary of Bellman Farm Marsh BHS falls within the 100 m GWDTE potential zone of influence of TR4/RW01 working area. The habitats that fall within the zone comprise semi-natural broad-leaved woodland which is not a GWDTE habitat. Potential GWDTE habitats appear to be over 350 m from the proposals. Given only a small proportion of the BHS falls within 100 m of the works and much of this does not appear to contain any GWDTE habitats, significant effects are assumed highly unlikely (pending the GWDTE assessment).
- 26) Bean Hill Wood and Grassland BHS is located adjacent to the working area of TR4/RW02. The BHS is noted for its woodland and grassland habitats and these can be protected using best practice and embedded mitigation measures.
- 27) Cross Hill Quarry LNR and BHS is located adjacent to the Clitheroe Park & Ride and HGV holding locations. Both proposals would use existing hard surfaced areas that are already actively used parking and HGV areas. If additional lighting is required measures can be employed to prevent light spilling onto adjacent woodland habitat and disturbing wildlife.
- 28) The only other designations with 200m of proposals are Coplow Quarry and Pimlico Road Grasslands BHS (calcareous grasslands 160 m away), Hospital Wood BHS (semi natural ancient woodland 170 m away) and West Clough Wood BHS (semi natural ancient woodland 200 m away). Significant effects on both of these could be avoided with embedded mitigation and best practice measures.

#### **Habitats**

- 29) The majority of habitats impacted by the works are common and widespread in the area. The largest area of habitat impacted is associated with poor semi-improved grassland (1.37 ha for the Proposed Marl Hill Section and an additional 0.02 ha for the Proposed Bowland Section) and drystone walls (595 m).
- 30) Hedgerows are common across the lowland central area of the route. Small sections of hedgerow habitat is likely to be impacted by Road Widening works, this will result in a worst-case scenario loss of 322 m of hedgerow habitat within the redline boundary for the Proposed Marl Hill Section and an additional 64 m for the Proposed Bowland Section. Impacts are associated with TR4/RW09, 10, 11, 12 and 13 along Slaidburn Road (B6478) as well as TR4/RW06 on West Bradford Road. The small loss of hedgerow associated with West Bradford Road is insignificant and equates to approximately 30 m. The losses associated with Slaidburn Road (B6478) all occur along a north/south direction and equates to approximately 292 m, however physical losses are anticipated to be less but will result in some fragmentation of the linear features bounding both sides of the road. Although these losses would be permanent without additional mitigation, given the breadth of nearby woodland linear features and other hedgerow field boundaries also adopting a north/south orientation across the landscape this loss is relatively small and is unlikely to represent a significant adverse effect.
- 31) Based on the redline boundary of the works, a small area of wet dwarf shrub heath (<0.01 ha) will be impacted by TR4/RW20 and TR4/RW17. For TR4/RW17 impacts are unlikely to occur as this habitat is on the opposite side of a wall and the redline boundary appears to run along the edge of the wall. In relation to TR4/RW20, this is a very small area of habitat that lies along the road verge which is part of a larger parcel of wet dwarf shrub heath. It is envisaged impacts to this habitat could be avoided through micro-siting, nevertheless loss of this habitat is unlikely to represent a significant adverse effect.
- 32) Trees form important features in the landscape. Many of the proposed off-site highways works locations have trees falling either within or adjacent to the planning application boundaries. Following a worst-case scenario approach the AIA has resulted in many trees and tree groups being identified as at risk of removal. Loss of these habitats represents a Significant Adverse Effect.
- 33) No construction activities would take place within watercourses or their banks as proposed passing places and road widening avoid watercourse crossings. Potential for effects on water quality would be avoided through best practice and embedded mitigation. As such, no significant effects on watercourses are predicted.

### Species

- 34) Embedded mitigation measures would avoid death or injury to animals and due to the short-term construction period at any one location, disturbance to species from noise, lighting and human activity is unlikely to have a significant effect. The potential for significant effects on animals is largely limited to the loss or degradation of habitats on which they rely.
- 35) There are no waterbodies that could be used by amphibians within influencing distance of the works. There will be no significant adverse effects on amphibian populations as a result of the works.
- 36) There are 19 trees with bat roosting potential within or directly adjacent to the redline boundary of the works. Of these, six trees have low bat roosting potential and thirteen trees have moderate bat roosting potential. Taking a reasonable worst-case scenario approach it is assumed that all of these trees will require removal as part of the works. Given the breadth of trees in the wider landscape the loss of 19 trees with bat roosting potential associated with the proposed Marl Hill off-site highways works is unlikely to have a significant adverse effect on the local bat population.
- 37) Based on the worst-case scenario of total loss of habitats within the redline boundary, localised losses of hedgerows, woodland, scrub and trees from across the off-site highways works could result in the reduction of foraging habitat or localised fragmentation of foraging habitat and commuting routes. However, given the breadth of woodland features and other hedgerow field boundaries across the wider landscape running in all directions, loss of habitat associated with the proposed Marl Hill off-site highways works is unlikely to have a significant adverse effect on the local bat population.
- 38) No badger setts were identified within the redline boundary or within 30 m although the land could be used for foraging. Terrestrial habitats could provide shelter or foraging for birds, amphibians and reptiles. Accounting for embedded and best practice measures, the relatively narrow footprint of the works and their association with the existing highway, significant effects on these species groups are unlikely to arise.
- 39) The proposed location of highway improvement works avoid any loss of riverine habitats. However, it is envisaged that the off-site TR4 highways works may account for significant effects to the macrophyte, fish, and macroinvertebrate communities, and otter and white clawed crayfish populations in Bonstone Brook and Unnamed Watercourse 2096 associated with two highways works areas (TR4/RW22 and 23). Potential impacts from increased sedimentation and a reduction in water quality, and disturbance during site clearance, creation of road widening and are considered to be temporary, medium term and reversible.

### Summary of Effects

- 40) Table 5 summarise the predicted significant adverse effects associated with the off-site highways works. For clarity where significant GWDTE effects on designations have been considered highly unlikely they have been listed in Table 5 (*italic font used*) but ruled out and will be checked and reviewed when the GWDTE assessment is available.

**Table 5: Summary of significant effects**

Ecological Feature	Effect	Valuation	Significance of Effect
River Ribble BHS	<i>Potential changes to groundwater are unlikely to affect GWDTE</i>	County	<i>Significant Adverse Effects are unlikely (pending GWDTE assessment)</i>
Waddington Fell and Browsholme Moor BHS	<i>Small permanent losses insignificant. Potential changes to groundwater are unlikely to affect GWDTE</i>	County	<i>Significant Adverse Effects are unlikely (pending GWDTE assessment)</i>
Bradford Fell, Easington Fell & Harrop Fell BHS	<i>Small permanent losses insignificant. Potential changes to groundwater which could affect GWDTE</i>	County	Significant Adverse Effect (precautionary pending GWDTE assessment)

Ecological Feature	Effect	Valuation	Significance of Effect
			<b>Not required for Marl Hill</b>
Waddington Fell Road, Roadside Verges BHS	Permanent loss of habitat	County	Significant Adverse Effect <b>Not required for Marl Hill</b>
Bellman Farm Marsh BHS	<i>Potential changes to groundwater are unlikely to affect GWDTE</i>	County	<i>Significant Adverse Effects are unlikely (pending GWDTE assessment)</i>
Scattered broad-leaved trees and woodland	See Arboricultural Assessment (Vol 5 Part I)	County	Significant Adverse Effect (see Vol 5 Part I)
Macrophyte, fish, and macroinvertebrate communities, and otter and white clawed crayfish	Populations in Bonstone Brook and Unnamed Watercourse 2096 . Potential impacts from increased sedimentation and a reduction in water quality, and disturbance during works (temporary, medium term and reversible).	Local to County	Significant Adverse Effect

## 1.6 Additional Mitigation and Residual Effects

- 41) If the GWDTE assessment confirms significant effects on any designations then it is anticipated that site specific essential mitigation would be designed to reduce these effects to insignificant. Measures could include reducing top soil stripping, utilising construction methods with less ground disturbance and/or changing the extent or location of works. At the time of writing this is uncertainty on these issues and therefore a precautionary approach currently assumes effects remain significant at the local level (unless already considered highly unlikely within Table 5).
- 42) The loss of important habitat at Waddington Fell Road, Roadside Verges BHS could be reduced either by micro-siting works or by collecting any important turfs or seeds to reinstate important plant species to retained areas when works are complete.
- 43) Mitigation options for tree and woodland planting is detailed under Volume 5 Part I. In general, where potential tree impacts are anticipated, these would be re-appraised at the detailed design stage in consultation with relevant LPA officers. Once agreed with officers, tree protection measures and reinstatement plans (for associated tree loss) would be reported in an arboricultural method statement to be prepared by the contractor. A precautionary approach currently assumes residual effects remain significant at least at the local level.
- 44) The majority of highways works here are road widening and permanent but some reinstatement would occur reducing effects on this habitat. Ideally, permanent losses of hedgerows and tree lines to road widening would be mitigated by planting realigned hedgerows/trees within the retained verge at the earliest opportunity. However, delivery of this is currently uncertain.
- 45) The proposed mitigation identified for works at the watercourses with potential for significant effects to aquatic ecology includes silt control measures, best practice biosecurity measures, timing of works to avoid sensitive periods for crayfish and salmonid fish, pre-works checks for protected species, and ECoW supervision for vegetation clearance and in river works. These mitigation measures are considered to be sufficient to reduce the significance of potential impacts in the watercourses on the fish, macrophyte, macroinvertebrate (including white clawed crayfish), and otter communities of Bonstone Brook and Unnamed Watercourse 2096.
- 46) A summary of local or greater significant residual effects is presented in Table 6. This is a precautionary assessment and if further avoidance of impacts through micro-siting and construction methods and/or



if replacement planting can be agreed for otherwise permanent losses then these effects could be further reduced.

**Table 6: Summary of residual effects**

Ecological Feature	Effect	Significance of Residual Effect
Bradford Fell, Easington Fell & Harrop Fell BHS	Potential changes to groundwater which could affect GWDTE	Significant Adverse Effect at the Local Level (precautionary pending GWDTE assessment) <b>Not required for Marl Hill</b>
Waddington Fell Road, Roadside Verges BHS	Permanent loss of habitat	Significant Adverse Effect at the Local Level <b>Not required for Marl Hill</b>
Scattered broad-leaved trees and woodland	Temporary and permanent physical loss of habitats	Significant Adverse Effect at the Local Level (see Vol 5 Part I)

## 1.7 Compensation and Offsetting

- 47) Replacement planting for loss of mature trees is considered compensation not mitigation due to the prolonged timeframes for habitats to mature. Similarly, any planting at new locations (if required due to insufficient space to replant on site) would be compensation for identified residual effects.
- 48) United Utilities has committed to achieving a 10% net gain in biodiversity across the scheme, including the Highways Improvement areas. Full details are provided within the BNG strategy for works within Ribble Valley Borough Council (RVBC-BO-APP-008 and RVBC-MH-APP-008).
- 49) In addition to the defra BNG metric, any residual impacts on locally designated sites would be implemented through consultation with the relevant LPA.