



**Haweswater Aqueduct Resilience Programme - Proposed Marl Hill
Section**

Environmental Statement

Volume 4

Appendix 20.1: Schedule of Mitigation

June 2021



Haweswater Aqueduct Resilience Programme - Proposed Marl Hill Section

Project No: B27070CT
Document Title: Proposed Marl Hill Section Environmental Statement
Volume 4 Appendix 20.1: Schedule of Mitigation
Document Ref: RVBC-MH-TA-020-001
Revision: 0
Date: June 2021
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1. Introduction

- 1) The following appendix summarises the essential mitigation that has been proposed in the various technical chapters of the ES (Volume 2). These topic-specific measures have been identified through the environmental assessment process and are referred to as 'essential mitigation' to differentiate them from the embedded mitigation and good practice measures which were already part of the Proposed Marl Hill Section proposals as assessed in the ES.
- 2) The schedule of mitigation links into an Environmental Masterplan (EMP) for the Proposed Marl Hill Section (Figure 20.1). The EMP comprises a series of drawings illustrating the locations at which site-specific mitigation measures are proposed.
- 3) This schedule of mitigation follows the same order of EIA topics as presented in Volume 2. As noted in paragraph 1, the essential mitigation measures set out in this schedule are additional to the embedded mitigation and good practice measures:
 - As described throughout the ES, the design of the Proposed Marl Hill Section has been informed by the EIA process, and embedded mitigation measures have been incorporated to take account of identified environmental constraints and considerations
 - Good practice approaches and actions have also been identified to avoid or reduce potential impacts during construction are already covered in Appendix 3.2: Construction Code of Practice (CCoP) and are not repeated further in this document.
- 4) To bring together all elements of essential mitigation that have been identified for the Proposed Marl Hill Section, this appendix also includes specific mitigation identified in Volume 5 (off-site highways) and in Volume 6 (the Proposed Ribble Crossing).
- 5) The appendix captures the essential mitigation proposals as they presently stand, however it is acknowledged that some may continue to evolve and be further enhanced during the planning determination process and in the development of planning conditions.

2. Landscape and Arboriculture

Table 1.1: Landscape and Arboriculture Schedule of Mitigation

Location	Phase	Mitigation Item ID	Mitigation
<p><i>Embedded mitigation, forming part of the design, and good practice measures as set out in the CCoP, are considered to provide appropriate mitigation for potential effects on landscape character, visual amenity and arboriculture. No further topic-specific essential mitigation is therefore required.</i></p>			
<p><i>As explained in Chapter 20: Environmental Mitigation, and mitigation shown on Figure 20.1: Environmental Masterplan, the CCoP contains a range of good practice measures to assist in delivering sustainable development. Of particular importance to Landscape and Arboriculture is the requirement in the CCoP to specify tree protection measures in a Site Specific Arboricultural Method Statement (SS-AMS), and to prepare a Tree Protection Plan (TPP) in conjunction with the SS-AMS. The TPP would show areas of existing trees and vegetation within the construction site to be retained (and protected), and those to be removed. Tree removal would be implemented in line with recommendations of Appendix 6.7: Arboricultural Impact Assessment (AIA) and as indicatively shown on Figure 6.6: Preliminary Trees at Risk Plan (in Volume 3 of the ES).</i></p>			

3. Water Environment

Table 1.2: Water Environment Schedule of Mitigation

Location	Phase	Mitigation Item ID	Mitigation
<i>The essential mitigation measures listed below are additional to embedded mitigation forming part of the design, and good practice measures as set out in the CCoP</i>			
Fluvial Geomorphology			
Sandy Ford Brook (W530)	Enabling Works and Construction	WE1 to WE12	<ul style="list-style-type: none"> ▪ Augment sediment (WE1) ▪ Traffic management (WE2) ▪ Culvert lengthening (WE3) ▪ Reinstatement the natural bed and augment the sediment (WE4) ▪ Stabilise the bank (WE5) ▪ Reinstatement work be supervised by a geomorphologist or Ecological Clerk of Works with experience of channel restoration (WE6) ▪ Bank protection (WE7) ▪ Erosion monitoring (WE8) <p>Remediation following commissioning flows (as required)</p> <ul style="list-style-type: none"> ▪ Reinstatement the natural bed and augment the sediment with coarser material, to promote bed stability and reduce the risk of channel incision and instability (WE9) ▪ Place coarse material along the bank toe to stabilise the bank (WE10) ▪ Use a decomposable geotextile on the upper banks to allow for vegetation re-establishment along the upper and mid-banks and to aid bank re-stabilisation (WE11) ▪ Reinstatement work be supervised by a geomorphologist or Ecological Clerk of Works with experience of channel restoration (WE12).
Unnamed Watercourse 430 (W520)	Enabling Works and Construction	WE1 to WE6	<ul style="list-style-type: none"> ▪ Augment sediment (WE1) ▪ Traffic management (WE2) ▪ Culvert lengthening (WE3) ▪ Reinstatement the natural bed and augment the sediment (WE4) ▪ Stabilise the bank (WE5)

Location	Phase	Mitigation Item ID	Mitigation
			<ul style="list-style-type: none"> Reinstatement work be supervised by a geomorphologist or Ecological Clerk of Works with experience of channel restoration (WE6).
Unnamed Watercourse 463 (W557)	Enabling Works and Construction	WE1 to WE6	<ul style="list-style-type: none"> Augment sediment (WE1) Traffic management (WE2) Culvert lengthening (WE3) Reinstate the natural bed and augment the sediment (WE4) Stabilise the bank (WE5) Reinstatement work be supervised by a geomorphologist or Ecological Clerk of Works with experience of channel restoration (WE6).
Unnamed Watercourse 433 (W523)		WE1, WE4, WE5	<ul style="list-style-type: none"> Augment sediment (WE1) Reinstate the natural bed and augment the sediment (WE4) Stabilise the bank (WE5).
Bashall Brook (W556)		WE13	<ul style="list-style-type: none"> Geomorphological monitoring and adaptive management strategy (WE13).
Unnamed Watercourse 402 (W483)	Enabling Works and Construction	WE18 to WE12	<ul style="list-style-type: none"> Erosion monitoring (WE8) Remediation following commissioning flows (as required) Reinstate the natural bed and augment the sediment with coarser material, to promote bed stability and reduce the risk of channel incision and instability (WE9) Place coarse material along the bank toe to stabilise the bank (WE10) Use a decomposable geotextile on the upper banks to allow for vegetation re-establishment along the upper and mid-banks and to aid bank re-stabilisation (WE11) Reinstatement work be supervised by a geomorphologist or Ecological Clerk of Works with experience of channel restoration (WE12).
Surface Water Quality			
Bashall Brook (W556)	Enabling Works and Construction	WE14, WE15	<ul style="list-style-type: none"> Environmental Clerk of Works and specialist oversight to monitor commissioning flows ensuring applicable water quality standards within discharge watercourse receptors are maintained (WE14)

Location	Phase	Mitigation Item ID	Mitigation
			<ul style="list-style-type: none"> Water quality monitoring plan for decommissioning flows (WE15).
Private Water Supplies			
PWS4-1, PWS4-3, PWS4-4 and PWS4-6	Enabling Works, Construction, Operational and Decommissioning	WE16-WE18	<ul style="list-style-type: none"> Site visit and landowner meeting to confirm location and nature of source and associated infrastructure (WE16) Monitoring of flow and quality during the proposed work (WE17) Replacement water supply (temporary or permanent) if indicated by monitoring. Repair or replacement of associated infrastructure if required (WE18).
Watercourses			
Bonstone Brook (W498) Cow Hey Brook (W535) Unnamed Watercourse 403 (W484)	Enabling Works and Construction	WE219	<ul style="list-style-type: none"> Monitoring Strategy should be developed and implemented in consultation with the Environment Agency. The Monitoring Strategy would determine the nature and duration of monitoring at each location. The Monitoring Strategy would also identify, should any detrimental effects be detected, what additional measure could be taken to reduce these impacts (WE19).
GWDTEs			
New Laithe	Enabling Works and Construction	WE20 to WE25, WE28	<p>Mitigation measures to increase the likelihood of recovery of the GWDTE as above (WE20 – WE25)</p> <ul style="list-style-type: none"> Stagger topsoil stripping activities, i.e. smaller sections at a time rather than the whole compound footprint (WE20) Monitor weather forecasts, including rainfall / flood warnings and alerts (WE21) Monitor suspended solids concentrations in the groundwater monitoring network pre, during and post-construction (WE22) Set trigger levels for suspended solids concentrations (WE23) Reduce dewatering durations (WE24) Minimise footprint of topsoil stripping and vegetation clearance wherever possible (WE25) Spreading the load of heavy vehicles and plant to reduce compaction effects associated with the Bonstone Compound access area (WE28).

Location	Phase	Mitigation Item ID	Mitigation
Braddup House	Enabling Works and Construction	WE20 to WE27, WE30	<ul style="list-style-type: none"> ▪ Mitigation measures to increase the likelihood of recovery of the GWDTE as above (WE20 – WE25) ▪ Minimise topsoil stripping in the Braddup Compound, and any activity that would have a direct impact on habitats within Braddup House (WE26) ▪ Moving the overflow pipe and connection (associated with the Braddup Compound) further north, to avoid the need for excavation and reduce potential dewatering impacts (WE27) ▪ Use of clay bunds to prevent backfilled open-cut trenches from acting as a groundwater drain within the Braddup Compound (WE30).
Whinny Lane East	Enabling Works and Construction	WE20 to WE25, WE28	<ul style="list-style-type: none"> ▪ Mitigation measures to increase the likelihood of recovery of the GWDTE as above (WE20 – WE25) ▪ Spreading the load of heavy vehicles and plant to reduce compaction effects associated with the Braddup Compound access area (WE28).
Slaidburn Road West	Enabling Works and Construction	WE20 to WE25, WE29	<ul style="list-style-type: none"> ▪ Mitigation measures to increase the likelihood of recovery of the GWDTE as above (WE20 – WE25) ▪ Widening the existing access road to the south to avoid topsoil stripping in the Braddup Compound access area, and any activity that would have a direct impact on habitats within Slaidburn Road West (WE29).
Proposed Ribble Crossing (Volume 6 of the ES)	Enabling Works, Construction, Commissioning and Decommissioning	WE-RC1 to WE-RC4	<p>Fluvial Geomorphology</p> <p>To mitigate the impact on fluvial geomorphology from the Proposed Ribble Crossing the following essential mitigation would be required:</p> <ul style="list-style-type: none"> ▪ Where necessary reinstate natural bed features to counteract smothering of features by fine sediment during the enabling, construction and decommissioning phases on the River Ribble, Coplow Brook and Greg Sike (WE-RC1) ▪ Use a biodegradable geotextile on the banks to allow for vegetation re-establishment along the upper and mid-banks and to aid bank re-stabilisation during reinstatement on the River Ribble, Coplow Brook and Greg Sike (WE-RC2) ▪ Ensure riparian vegetation re-establishment is prioritised during reinstatement works on the River Ribble, Coplow Brook and Greg Sike to minimise the risk of bank destabilisation (WE-RC3) ▪ Reinstatement work to be supervised by a geomorphologist or Environmental Clerk of Works with experience of channel restoration. This would be of particular importance where bridge crossings would be removed which could result in bank destabilisation on Coplow Brook and Greg Sike, and where sediment augmentation is necessary (WE-RC4).

Location	Phase	Mitigation Item ID	Mitigation
		WE-RC5	Groundwater <ul style="list-style-type: none"><li data-bbox="728 405 2128 501">▪ To mitigate the impact on bedrock and alluvial aquifers a piling risk assessment would be carried out to assess these potential impacts and identify mitigation measures (if required) during detailed design of the Proposed Ribble Crossing (WE-RC5).

4. Flood Risk

Table 1.3: Flood Risk Schedule of Mitigation

Location	Phase	Mitigation Item ID	Mitigation
<i>The essential mitigation measures listed below are additional to embedded mitigation forming part of the design, and good practice measures as set out in the CCoP</i>			
Commissioning outfall into Sandy Ford Brook and Unnamed Watercourse 402	Enabling Works and Construction	FR1 and FR2	<ul style="list-style-type: none"> ▪ Further detailed analysis to assess the actual level of flood risk impacts to the receiving watercourse and receptors downstream to determine appropriate discharge rates; for example, to determine trigger levels at which there would be a risk of flooding downstream such as bank levels or the soffit levels of downstream watercourse crossings (FR1) ▪ Design changes to restrict maximum discharge rates and / or monitoring of downstream water levels and a system in place to restrict discharges during high water levels in the receiving watercourse (FR2).
Proposed Ribble Crossings (Volume 6 of the ES)	Enabling Works and Construction	FR-RC1	<ul style="list-style-type: none"> ▪ Undertake hydraulic modelling to confirm the baseline flood risk. This would then inform the optimisation of the design to reduce the impacts on flood risk (FR-RC1). If, following design optimisation, impacts on flood risk remain, additional mitigation options would be developed.

5. Ecology

Table 1.4: Ecology Schedule of Mitigation

Location	Phase	Mitigation Item ID	Mitigation
<p><i>The essential mitigation measures listed below are additional to embedded mitigation forming part of the design, and good practice measures as set out in the CCoP 'ET' references relate to aquatic ecology, and 'EA' references relate to terrestrial ecology.</i></p>			
Scheme-wide / Generic	Enabling and Construction Phases	ET1 to ET5	<p>Additional site-specific mitigation approaches required for impacts on habitats:</p> <ul style="list-style-type: none"> ▪ 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 Ecological Clerk of Works (ECoW) prior to works commencing (ET1) ▪ To protect retained habitats and features, working areas would be segregated from adjacent habitats using appropriate fencing or other appropriate form of demarcation with informative warning signs attached (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 (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 (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 (ET5).
Braddup Compound	Enabling and Construction Phases	ET6	<p>Braddup Compound access road would be micro-sited as far as reasonably practicable to avoid the loss of 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 (ET6).</p>
Braddup Compound	Enabling and Construction Phases	EA1	<p>No in-river work would be undertaken in tributaries of Bashall Brook during the main salmonid breeding season between October and May inclusive.</p>
Bonstone Compound	Enabling and Construction Phases	ET7 to ET10	<p>Visual / acoustic screening to be implemented to reduce effects on species using Gibb's Wood and Bonstone Wood BHS from prolonged noise / light disturbance (ET7).</p>

Location	Phase	Mitigation Item ID	Mitigation
			<p>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. Works would be restricted to a narrow strip adjacent to the verge of the existing track (ET8).</p> <p>Disturbance to ground nesting and over wintering birds along the access route would be monitored and additional mitigation such as visual and / or acoustic screening used as necessary (ET9).</p> <p>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 (ET10).</p>
Bonstone Compound	Enabling and Construction Phases	EA2	No in-river work would be undertaken in tributaries of the River Hodder during the main salmonid breeding and migration season between October and May inclusive. (EA2)
GWDTE at Braddup and Bonstone Compounds	Enabling and Construction Phases	ET11 to ET16	<p>Additional site-specific groundwater mitigation measures for marshy grassland and mire habitats would include the following:</p> <ul style="list-style-type: none"> ▪ Reduce encroachment of access roads into adjacent marshy grassland habitats (ET11) ▪ Reduce the area that needs to be topsoil stripped (ET12) ▪ Staggering topsoil stripping activities (ET13) ▪ Careful consideration in the selection of the backfilling material(s) (ET14) ▪ Keeping dewatering durations to the absolute minimum (ET15) ▪ Reinstatement with a meadow seed mixture for wetlands (ET16).
Scheme-wide / Generic	Commissioning Phase	ET17 to ET19	<p>Habitat re-instatement and restoration to be implemented delivering at least like for like (quantity and quality) for all valued habitats and habitat features requiring permanent or temporary removal.</p> <ul style="list-style-type: none"> ▪ Methods and timings for habitat reinstatement and creation / enhancement would vary according to the target habitat (ET17)

Location	Phase	Mitigation Item ID	Mitigation
			<ul style="list-style-type: none"> ▪ Planting plans would be produced utilising locally appropriate / native species, matching existing botanical diversity and seeking, where possible, to increase diversity would be used (ET18) ▪ Dry stone wall reinstatement using original stones, thus preserving any lichen or bryophyte interest (ET19).
Veteran Trees at Braddup and Bonstone Compounds	Commissioning Phase	ET20	<p>The potential loss of two veteran trees and a precautionary approach to carefully managing the fate of a further three veteran trees would be offset by a compensation package to be agreed with the LPA and relevant statutory consultees. Consultations will continue with tree officers regarding veteran trees and other tree features at risk within the Braddup Compound and Bonstone Compound planning application boundaries. It is anticipated that a revised and updated Arboricultural Impact Assessment will be submitted in due course which will incorporate current design thinking and aim to achieve embedded mitigation solutions for one or more of the veteran trees.</p>
Braddup Compound	Commissioning Phase	ET21 and ET22	<p>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 (ET21).</p> <p>A new hedgerow would replace the fence line currently present in the southwest of the Braddup compound (ET22).</p> <p>Additional mitigation measures to reduce impacts to geomorphology, surface water quality, and sediment management identified in Water Environment Chapter 7, also provide mitigation for potential impacts to aquatic receptors in Sandy Ford Brook.</p>
Bonstone Compound	Commissioning Phase	ET23 and ET24	<p>Neutral semi-improved grassland along the Bonstone access route would be reinstated with a meadow mix in line with NVC community MG9a <i>Holcus lanatus-Deschampsia cespitosa</i> grassland (<i>Poa trivialis</i> sub-community) (ET23).</p> <p>A new hedgerow would replace the fence line with scattered scrub and trees currently present in the eastern half of the Bonstone Compound (ET24).</p> <p>Pre enabling works checks for otter resting places are required for tributaries of the River Hodder</p>

Location	Phase	Mitigation Item ID	Mitigation
			Additional mitigation measures to reduce impacts to geomorphology, surface water quality, and sediment management identified in Water Environment Chapter 7 , also provide mitigation for potential impacts to aquatic receptors in Unnamed Watercourse 402.
Scheme-wide / Generic	N/A	ET25	A Biodiversity Net Gain strategy would be implemented to offset areas of permanent habitat loss or habitat change and also to provide 10% net gain in biodiversity utilising opportunities for advanced, additional and / or enhanced habitat creation on offsite locations within United Utilities ownership (ET25).
Proposed Ribble Crossings (Volume 6 of the ES)	Enabling works, construction and decommissioning phases	EA-RC1 – EA-RC4	<p>In locations identified as important for salmonid fish, the River Ribble and tributaries, no in-river work would be undertaken during the main breeding season between October and May inclusive (EA-RC1).</p> <p>Piling, which would produce high noise and vibration levels, should not be undertaken during the peak salmon migration period and breeding season October to May inclusive. (EA-RC2)</p> <p>Piling and any high noise and vibration works in and adjacent to rivers should only be undertaken during daylight to reduce the potential for disturbance of fish migration and allow passage of fish species during the night-time without hinderance or additional stress. (EA-RC3)</p> <p>Pre commencement monitoring surveys are required to determine the level of use of the potential otter holts and couches identified on the south bank of the River Ribble (EA-RC4)</p>

6. Cultural Heritage

Table 1.5: Cultural Heritage Schedule of Mitigation

Location	Phase	Mitigation Item ID	Mitigation
<i>The essential mitigation measures listed below are additional to embedded mitigation forming part of the design, and good practice measures as set out in the CCoP</i>			
Bonstone Compound and Braddup Compound	Prior to Enabling Works	CH1 with potential for CH2-CH4	<p>Prior to the enabling works, archaeological trial trenching would be undertaken in line with the Chartered Institute for Archaeologists (CIfA) <i>Standard and guidance for archaeological field evaluation</i> (CIfA, 2020). This would target both known archaeological remains and areas of archaeological potential for unknown remains arising from the geophysical survey undertaken from 31 March to 1 April 2021 on the Proposed Bonstone Compound (Appendix 10.3 in Volume 4) and on the Proposed Braddup Compound from 14 to 15 April 2021 (Appendix 10.4 in Volume 4) (CH1).</p> <p>Following archaeological trial trenching (CH1), archaeological mitigation to make a permanent record of any affected previously unknown archaeological remains could include:</p> <ul style="list-style-type: none"> ▪ Detailed archaeological excavation (CH2) ▪ Strip, map and sample (CH3) ▪ Archaeological recording during construction ('watching brief') (CH4).
Proposed Ribble Crossings (Volume 6 of the ES)	Prior to Enabling Works	CH-RC1 with potential for CH-RC2 to CH-RC5	<p>Prior to the enabling works, once details of the construction easement within the planning application boundary have been finalised, a staged programme of archaeological investigation would be undertaken. This may comprise an archaeological geophysical survey undertaken in line with the Chartered Institute for Archaeologists (CIfA) <i>Standard and guidance for archaeological geophysical survey</i> (CIfA, 2020a¹) (CH-RC1). Following on from the geophysical survey (Mitigation Item CH1) archaeological trial trenching may be undertaken in line with the CIfA <i>Standard and guidance for archaeological field evaluation</i> (CIfA, 2020b²) (CH-RC2). This would target both known archaeological remains, and areas of archaeological potential for unknown remains arising from the geophysical survey (CH-RC1).</p> <p>Following archaeological trial trenching (CH-RC2), archaeological mitigation to make a permanent record of any affected previously unknown archaeological remains could include:</p> <ul style="list-style-type: none"> ▪ Detailed archaeological excavation (CH-RC3)

¹ Chartered Institute for Archaeologists (2020a) *Standard and guidance for archaeological geophysical survey* [Online] Available from: https://www.archaeologists.net/sites/default/files/CIfAS%26GGeophysics_3.pdf [Accessed April 2021]

² Chartered Institute for Archaeologists (2020b) *Standard and guidance for archaeological field evaluation* [Online] Available from: https://www.archaeologists.net/sites/default/files/CIfAS%26GFieldevaluation_3.pdf [Accessed April 2021]

Location	Phase	Mitigation Item ID	Mitigation
			<ul style="list-style-type: none"><li data-bbox="712 347 1133 376">▪ Strip, map and sample (CH-RC4)<li data-bbox="712 387 1608 416">▪ Archaeological recording during construction ('watching brief') (CH-RC5).

7. Soils, Geology and Land Quality

Table 1.6: Soils, Geology and Land Quality Schedule of Mitigation

Location	Phase	Mitigation Item ID	Mitigation
<i>Embedded mitigation forming part of the design and good practice measures set out in the CCoP are considered to provide appropriate mitigation for potential effects on Soils, Geology and Land Quality. No further topic-specific essential mitigation is therefore required.</i>			

8. Materials and Waste

Table 1.7: Materials and Waste Schedule of Mitigation

Waste type	Phase	Mitigation Item ID	Mitigation
<i>Embedded mitigation forming part of the design and good practice measures set out in the CCoP are considered to provide appropriate mitigation for potential effects on Materials and Waste. No further topic-specific essential mitigation is therefore required.</i>			

9. Public Access and Recreation

Table 1.8: Public Access and Recreation Schedule of Mitigation

Location	Phase	Mitigation Item ID	Mitigation
<i>Embedded mitigation forming part of the design and good practice measures set out in the CCoP are considered to provide appropriate mitigation for potential effects on Public Access and Recreation. No further topic-specific essential mitigation is therefore required.</i>			

10. Communities and Health

Table 1.9: Communities and Health Schedule of Mitigation

Location	Phase	Mitigation Item ID	Mitigation
<p><i>Embedded mitigation forming part of the design and good practice measures set out in the CCoP provide appropriate mitigation for potential effects on Communities and Health. United Utilities has developed Construction Traffic Management Plans (CTMP), outlining measures to be implemented to further mitigate community disturbance. Through ongoing consultation with local people, local councils and highways authorities, United Utilities will continue to develop and refine mitigation proposals. A community liaison officer would be appointed to act as a point of contact for community engagement prior to the commencement of the enabling works and during the construction phase. No further topic-specific essential mitigation is therefore required.</i></p>			

11. Major Accidents

Table 1.10: Major Accidents Schedule of Mitigation

Location	Phase	Mitigation Item ID	Mitigation
<i>The essential mitigation measures listed below are additional to embedded mitigation forming part of the design, and good practice measures as set out in the CCoP</i>			
Bonstone Compound and Braddup Compound	Enabling Works, Construction and Commissioning	MA1	The contractor would seek practicable measures through selection of plant and equipment and/or methods of operation to reduce the maximum diesel fuel storage on site (MA1).
	Enabling Works, Construction and Commissioning	MA2	Estimated fuel storage requirements would be defined during detailed design together with anticipated controls to ensure that risk of a pollution incident is as low as reasonably practicable. These would be submitted and agreed with the Environment Agency (MA2).
Proposed Ribble Crossings (Volume 6 of the ES)	Enabling Works	MA3	A design solution would be developed to enable the Proposed Ribble Crossing to be constructed safely over the existing ethylene pipeline without compromising the safe day-to-day operation of the infrastructure. The essential mitigation objective is to develop a design solution and formally agree this with the pipeline operator (Mitigation Item MA3). Once a solution has been formally agreed with the pipeline operator this would become embedded mitigation as it would be delivered as an integral part of the engineering design of the dedicated haulage route.
Proposed Ribble Crossing, Park and Ride, HGV Holding Area (Ribblesdale Cement Works)	Enabling Works, Construction and Operation	MA4	Although it is not anticipated that the Johnson Matthey site in Clitheroe would pose any specific risks to construction, operation or decommissioning of the Proposed Ribble Crossing (Volume 5) or park and rise and HGV holding areas, United Utilities will engage with the site operators to exchange relevant construction and operational data and identify any necessary action plans. This will enable United Utilities to either validate the current working assumption that no embedded mitigation would be required to mitigate risks from the industrial facility (Mitigation Item MA4), or confirm next steps

12. Transport Planning

Table 1.11: Transport Planning Schedule of Mitigation

Location	Phase	Mitigation Item ID	Mitigation
<p><i>Embedded mitigation forming part of the design and good practice measures set out in the CCoP are considered to provide appropriate mitigation for potential effects on Transport Planning. No further topic-specific essential mitigation is therefore required.</i></p>			
<p>A Construction Traffic Management Plan (CTMP) is necessary to minimise the likely effects of HGV traffic during the construction of the Proposed Marl Hill Section. It provides the framework for the management of construction traffic to the proposed compounds and mine grouting areas. It outlines mitigation embedded in the design of the Proposed Marl Hill Section and details additional mitigation measures prescribed in the ES for each section covering the following aspects:</p> <ul style="list-style-type: none"> ▪ Proposed vehicle routing ▪ Proposed peak traffic flows ▪ Other road users ▪ Traffic management. 			

13. Noise and Vibration

Table 1.12: Noise and Vibration Schedule of Mitigation

Location	Phase	Mitigation Item ID	Mitigation
<p><i>Embedded mitigation forming part of the design and good practice measures set out in the CCoP are considered to provide appropriate mitigation for potential effects on Noise and Vibration. No further topic-specific essential mitigation is therefore required.</i></p>			
<p><i>Appendix 17.2 presents available information on technical knowledge and reasonable assumptions regarding likely activities, typical plant and equipment, and anticipated timing and durations. This provides a robust basis for construction noise and vibration assessment, which considers the worst-case construction phases in terms of potential for effects to occur. Therefore, the Noise and Vibration assessment is made incorporating the Construction Assessment Approach & Scenarios in Appendix 17.2 as part of embedded mitigation.</i></p>			
Bonstone Compound and Braddup Compound	Enabling Works and Construction	NV1	Temporary barriers during the use of rock breakers, access road construction and enabling and reinstatement works (inc. works in the vicinity of New Laithe Farm and Bookers Farm) (NV1).
Braddup Compound	Enabling Works and Construction	NV2	Construction works at the Braddup Compound would be programmed so to avoid concurrent construction works at the laydown area and access road (NV2).
Proposed Ribble Crossings (Volume 6 of the ES)	Enabling Works and Construction	NV-RC1 to NV-RC4	<p>Specific noise control measures that would be used by the contractor would comprise:</p> <ul style="list-style-type: none"> Temporary noise hoardings/barriers installed around work sites prior to works commencing. A resulting conservative 5 dB reduction has been assumed at all locations. Depending on the outcome of the detailed design process, there are more sophisticated noise mitigation solutions which will be explored by the contractor with the primary school (NV-RC1). For example, more substantial tall noise barriers (providing 10 dB noise reduction) could be installed between the compound and laydown area at the northern end of the route and Waddington and West Bradford C of E Primary School, to interrupt the line of sight and noise emissions from the construction activities to the school buildings Where practicable, works at the areas closest to the school would be programmed around school hours, and to occur during school holidays where this is practicable. It is noted that the construction of the route itself could occur from late June to late August. If practicable, construction could be programmed to occur during the school holidays. Also, where practicable, the noisiest items of plant would be programmed for use outside of school hours, particularly the road sweeper and larger excavators (NV-RC2)

Location	Phase	Mitigation Item ID	Mitigation
			<ul style="list-style-type: none">▪ During the enabling works, smaller, lower noise emitting (70 dBA @ 10 m), excavators would be used to establish the site compound at the north end of the route, this has been included within the assessment presented (NV-RC3)▪ Pneumatic hand tools would be fitted with efficient silencers (NV-RC4).

14. Air Quality and Climate Change

Table 1.13: Air Quality Schedule of Mitigation

Location	Phase	Mitigation Item ID	Mitigation
<i>Embedded mitigation forming part of the design and good practice measures set out in the CCoP are considered to provide appropriate mitigation for potential effects on Air Quality and Climate Change. No further topic-specific essential mitigation is therefore required.</i>			