



**Haweswater Aqueduct Resilience Programme - Proposed Bowland
Section**

Environmental Statement

Volume 5

Newton-in-Bowland and Marl Hill Compounds Highways Works

Part I: Environmental Assessment (excluding Ecology)

June 2021



Haweswater Aqueduct Resilience Programme - Proposed Bowland Section

Project No: B27070CT
Document Title: Proposed Bowland Section ES, Volume 5
Newton-in-Bowland and Marl Hill Compounds Highways Works
Part I: Environmental Assessment (excluding Ecology)
Document Ref.: RVBC-BO-ES-V5-P1-001
Revision: 0
Date: June 2021
Client Name: United Utilities Water Ltd

Jacobs U.K. Limited

5 First Street
Manchester M15 4GU
United Kingdom
T +44 (0)161 235 6000
F +44 (0)161 235 6001
www.jacobs.com

© Copyright 2021 Jacobs U.K. Limited. The concepts and information contained in this document are the property of Jacobs. Use or copying of this document in whole or in part without the written permission of Jacobs constitutes an infringement of copyright.

Limitation: This document has been prepared on behalf of, and for the exclusive use of Jacobs' client, and is subject to, and issued in accordance with, the provisions of the contract between Jacobs and the client. Jacobs accepts no liability or responsibility whatsoever for, or in respect of, any use of, or reliance upon, this document by any third party.

Contents

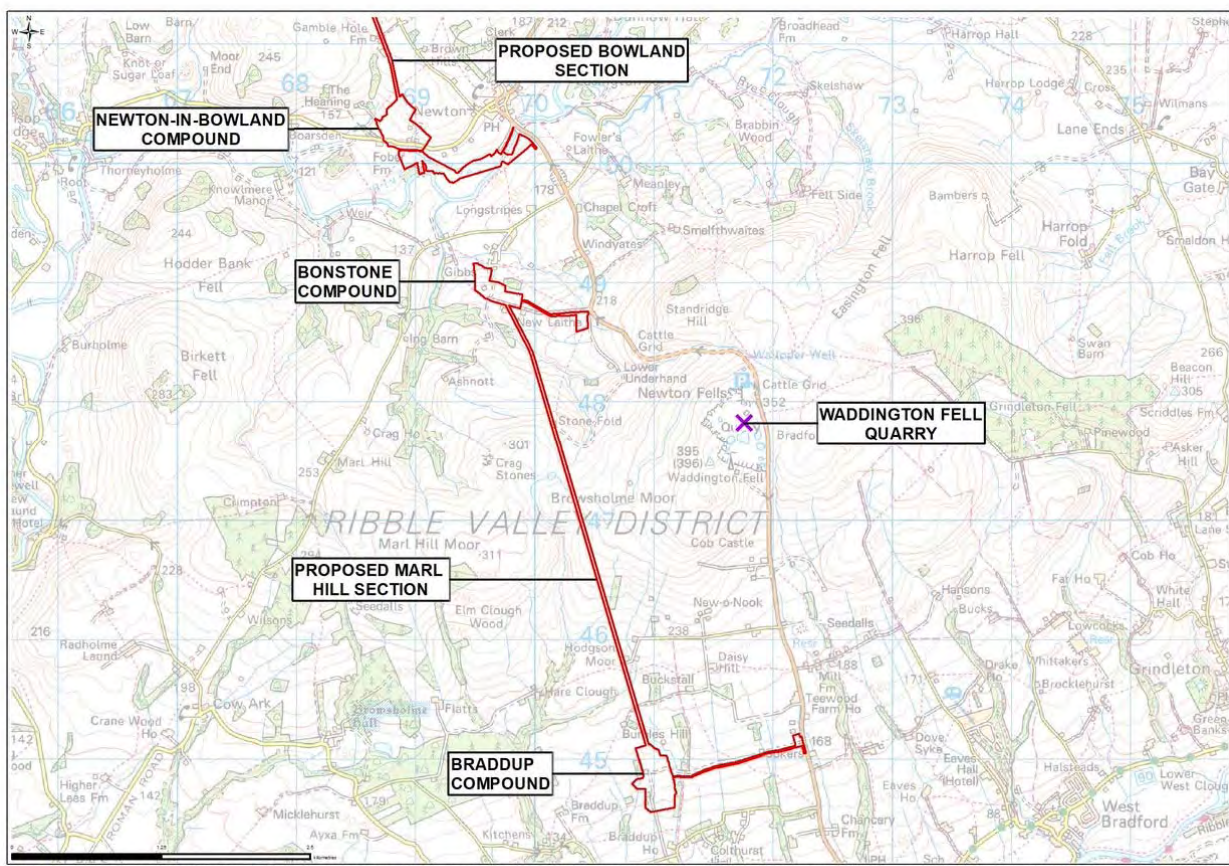
1.	Off-Site Highways Works	1
1.1	Introduction	1
1.2	Design Evolution	3
1.3	Development Description	5
1.4	Construction Programme.....	7
2.	Assessment Methodology	8
2.1	Introduction	8
2.2	Basis of Assessment.....	8
2.3	Proportionate EIA.....	9
2.4	Screening, Assumptions and Technical Limitations	9
2.5	Reporting Approach.....	14
3.	Assessment of Effects	18
3.1	Likely Significant Effects.....	18
3.2	Residual Effects	19
3.3	Cumulative Effects.....	20

1. Off-Site Highways Works

1.1 Introduction

1) This report forms the main text document of Volume 5 Part I of the Proposed Bowland Section Environmental Statement (ES). It explains the outcome of an environmental assessment of a programme of off-site highways works¹ which are proposed to enable the safe passage of construction vehicles serving the Proposed Bowland Section, specifically the Newton-in-Bowland, Bonstone and Braddup compounds from the strategic road network (see Illustration 1 below). The off-site highways works are also required to promote general road safety for other road users during the HARP construction programme.

Illustration 1: Location of the Newton-in-Bowland, Bonstone and Braddup Compounds serving the Proposed Bowland Section and Proposed Marl Hill Section



- 2) The suite of documents that make up Volume 5 Part I of the Proposed Bowland Section ES comprise:
- Part I: Environmental Assessment (excluding Ecology) (RVBC-BO-ES-V5-P1-001) - this report
 - Figure P1.1: Master Plan (RVBC-BO-FIG-V5-P1-001) - an overview key plan identifying the specific locations of each of the off-site highways works locations
 - Figure P1.2: Environmental Assessment Figures (RVBC-BO-FIG-V5-P1-002, Pages 1-33) - a set of detailed environmental assessment reporting sheets covering each of the off-site highways works locations.

¹ The term 'off-site highways works' is used to describe proposed works away from the main construction compounds that are required to enable the safe movement of HARP-related construction traffic and other road users on the public highway network serving the main compounds. In many cases these proposed works would be temporary, being reinstated following completion of the main HARP-related construction works. In other cases, and only with the agreement of relevant local highways authority and planning authority, individual off-site highways works could be retained following completion of the main HARP construction, commissioning and reinstatement works.

- 3) Volume 5 Part II comprises an ecological assessment of the proposed off-site highways works and is presented under separate cover as part of the planning submission.
- 4) To ensure a robust and accessible ES, any likely significant effects identified in this report have been included in the concluding sections of each topic chapter of the main ES (Volume 2) and have also been taken into account in the main ES (Volume 2) Chapter 19: Cumulative Effects. Any additional essential mitigation requirements identified in this report are incorporated into the main ES (Volume 4) in Appendix 20.1: Schedule of Mitigation.
- 5) The off-site highways works primarily involve road widening and the construction of passing places, to enable construction vehicles to pass each other and other road users without the need to either reverse or manoeuvre onto the verge - both of which are regarded as potentially unsafe. The proposed off-site highways works also entail junction improvements to enable construction vehicles, some carrying abnormal loads, to undertake safe manoeuvres from one road onto another.
- 6) In many cases, the highways works would be delivered within existing highways land (known as the 'limits of deviation' of the highway) that is under the ownership and management of the local highway authority. In other cases, it is anticipated that private, third party land would be required to deliver some elements of work that cannot be constructed within the limits of deviation.
- 7) A brief description of the proposed construction traffic routes is provided in ES Volume 2 Chapter 3: Design Evolution and Development Description. The traffic routes serving the Braddup and Bonstone compounds are also shown on Figure 3.1A (ES Volume 3). This ES Volume 5 Part I report, in conjunction with its supporting appendix and figures, provides more detailed information in relation to the off-site highways works design and an assessment of associated construction related environmental effects (excluding ecology). As previously highlighted, ES Volume 5 Part II comprises an ecological assessment of the proposed off-site highways works and is provided under separate cover.
- 8) Table 1 summarises the sections of the Proposed Programme of Works for which off-site highways works would be required. This report relates to an environmental assessment of the highways works associated with the Proposed Bowland Section; separate reports (also forming Volume 5 of their corresponding ESs) have been produced for the Proposed Marl Hill Section and the Proposed Swarther Section.

Table 1: Transport Routes Where Highways Works are Required

Construction Traffic Route (TR)	Replacement Aqueduct Section	Local Planning Authority	Number of Proposed Off-site Highways Works ²
Newton-in-Bowland and Marl Hill Compounds Access Routes 1 and 2 (Haulage Routes 1 and 2)	Proposed Marl Hill Section Proposed Bowland Section	Ribble Valley Borough Council (RVBC)	<ul style="list-style-type: none"> • 2 passing places • 28 road widening sections (including 2 junction modifications) • 2 construction compounds • 1 temporary parking restriction • Total TR length approximately 13.9 km

- 9) The locations of all the proposed off-site highway works for the Proposed Bowland Section are presented in ES Volume 5, Figure P1.1: Master Plan (RVBC-BO-FIG-V5-P1-001). ES Volume 5, Figure P1.2: Environmental Assessment Figures (RVBC-BO-FIG-V5-P1-002, Pages 1-33) comprise a series of environmental assessment reporting sheets, with each individual highway works activity being generally presented on an individual sheet. In cases where individual proposed highways works extend over a greater distance, for example, some road widening activities, assessment reporting may extend over

² The locations of some individual off-site highways works may coincide with other proposed highways works. For example, a passing place may be proposed along a section of highways earmarked for road widening. In this instance, two separate off-site highways works would be assessed and reported.

several sheets. For definitive details of the planning application boundaries associated with each of the highways works, the reader is referred to the relevant 'Series 12' drawings for each proposed section prepared in support of the planning applications.

- 10) It is anticipated that the works would fall within the programme for the enabling works contract, thereby in most cases being constructed prior to the commencement of the core construction works and tunnelling activities at the two main compounds. This in turn has an important bearing on the cumulative environmental effects of the highways proposals, which are considered further in this report.

1.2 Design Evolution

- 11) This section explains the approach adopted for the engineering design of the proposed off-site highways works. It is acknowledged that while the proposed works have been developed to a sufficient level of detail for the purposes of a full planning application and to enable an environmental assessment of their likely significant effects, there is further detailed design development to be undertaken. At certain locations, therefore, it is likely that the extent of the construction areas and construction easements assessed in this report may be greater than will be required. This represents a reasonable worst case approach for the environmental assessment, though it does create some uncertainty around the exact nature and scope of impacts and losses at some locations along the construction access route.

1.2.1 Design Refinement

- 12) The engineering design process for this scale of project requires ongoing development and refinement to achieve the design submitted with the planning applications. To assist the EIA process and provide a mechanism for environmental input into design, a series of 'design freezes' was established. These snapshots of the developing design enabled all environmental specialists to review the proposals and provide feedback to the engineering design team to inform ongoing design evolution.
- 13) The design evolution of the project was characterised by two key stages and have been split as:
- Scoping Design
 - EIA Design Freeze.

Scoping Design

- 14) The proposed Newton-in-Bowland Compound along with the associated compounds with the separate Proposed Marl Section are all in close proximity to the B6478 to the north of Clitheroe. The timing of the majority of the proposed construction activities would coincide, consequently it is anticipated that a significant proportion of the access routes for the Newton-in-Bowland and Marl Hill compounds would be shared.
- 15) The Newton-in-Bowland and Marl Hill compounds traffic route options centred on access from Junction 31 of the M6 and along the A59, as the primary arterial route serving the study assessment area. It was not considered viable for construction vehicles to gain access to the Newton-in-Bowland or Marl Hill compounds from the north due to the constrained nature of the local highway network. On this basis, the focus of the options appraisal exercise was to identify the most suitable route(s) for construction vehicles between the A59 and the B6478 (Slaidburn Road) north of Waddington.

EIA Design Freeze

- 16) In order to determine the traffic routes to the Newton-in-Bowland and Marl Hill compounds, United Utilities undertook a detailed assessment of all potential options. The type and volume of traffic requiring access to the Newton-in-Bowland and Marl Hill compounds is detailed in the Transport Assessments for the Proposed Bowland and Marl Hill Sections (Appendix 16.1 of the respective ESs). This information was used to assess the suitability of potential routes, according to physical, environmental and community constraints and guided by the advice of the Highway Authority (Lancashire County Council).
- 17) A total seven routes from the A59 to the B6478 to the north of Waddington were assessed for the Newton-in-Bowland and Marl Hill Compounds and three routes from the A683 to the Lower Houses

Compound. Further evaluation of these traffic routes resulted in identification of preferred traffic routes, which were initially presented in March 2020. Following feedback and further consultation with the Highway Authority, preferred traffic routes were identified and presented in July 2020 as part of a virtual exhibition. In respect of the Newton-in-Bowland and Marl Hill compounds, following concerns raised by members of the local community during consultation on the proposed route options, a further feasibility study was carried out in an attempt to identify potential alternative routes, resulting in the inclusion of a second haulage route option (the Proposed Ribble Crossing). The Proposed Ribble Crossing is assessed in Volume 6 of the ES. Volume 5 considers the impacts associated with routes to the Newton-in-Bowland and Marl Hill compounds solely via the existing highway network (referred to as route option 1 in Volume 2 Chapter 3 of the Proposed Bowland and Marl Hill Section ESs). A number of the off-site highway works assessed in Volume 5 would also be required to facilitate haulage route option 2 (i.e. those between the northern extent of the Proposed Ribble Crossing and the proposed Newton-in-Bowland Compound).

Newton-in Bowland and Marl Hill Compounds Traffic Routes

- 18) The selected traffic routes to and from the Newton-in-Bowland and Marl Hill compounds would be as follows:
- Haulage Route 1: Vehicles up to 3.5 m in height, would use this route, accessing the compound from the A59 via Pimlico Link Road, Chatburn Road and through Waddington to the Bonstone and Newton-in-Bowland compounds.
 - Haulage Route 2: Vehicles over 3.5 m in height would access the site along route 2 via Pimlico Link Road, Chatburn Road, and through Chatburn, Grindleton and West Bradford.
- 19) Refer to Volume 4 Appendix 3.1 for further details on the above routes options.
- 20) Haulage Route 1 was considered the most direct route to the compounds utilising higher classes of roads and minimising impact to residential areas that could accommodate the majority of the anticipated construction traffic. The alternative routes considered were the same as the preferred route but considered alternative links from the A59 to the low railway bridge on the B6478 in Clitheroe.
- 21) Haulage Route 2 was considered the most direct route to the compounds avoiding the height constraint on the B6478 whilst utilising the widest of the alternative existing roads and minimising impact to residential areas. The alternative routes considered were the same as the preferred route but considered alternative links from the A59 to Waddington Road to the west of West Bradford. These included the West Bradford Road Ribble Crossing (considered unsuitable for the size of vehicles anticipated) and the Sawley Bridge Ribble Crossing (potential to impact a higher number of communities and require a greater extent of road works).

1.2.2 Engineering Design Approach

- 22) Swept path analysis was completed on receipt of confirmation of the routes to / from compounds and maximum construction vehicle sizes to operate along the selected routes.
- 23) On two-lane highways the following design criteria was applied:
- At locations where two lanes narrow to a single lane (i.e. at bridges or between building), an assessment would be made to determine whether there is sufficient stopping sight distance and room for vehicles to pass either side of the pinch point. The assessment would identify any road widening / sight line improvements to be provided as necessary.
 - At locations where overall road width narrows to less than 6.5 m, an assessment would be made to determine whether there is sufficient stopping sight distance and room for vehicles to pass either side of the pinch point/narrow section. Subsequent road widening / sight line improvements would be provided as necessary including widening to achieve a minimum width of 6.5 m and local widening at bends determined on an individual basis. In general where localised road widening along narrow sections of two-lane highway was identified, inter-visible widened sections would be provided a maximum spacing of around 200 m. Engineering judgement would be utilised to finalise locations.

- The passing place design would provide a minimum overall road width of 6.5 m over a length of 37 m long (including 5 m tapers provided at each end).
- 24) On single-lane highways, the following design criteria was applied:
- The passing place design would provide a minimum overall road width of 6.5 m over a length of 37 m long (including 5 m tapers provided at each end).
 - Inter-visible passing places would be provided on single track roads at a maximum spacing of around 200 m. Engineering judgement would be utilised to finalise locations.
- 25) Input from United Utilities environmental team was provided to review and modify the initial indicative locations of passing places and road widenings to mitigate unnecessary disruption to the existing environment and community, whilst maintaining visibility lines where possible. This included relocating passing places which would have obstructed residential property accesses or junctions and selecting existing gaps between individual or groups of trees wherever practicable. Often interventions involved moving the passing place to the opposite side of the road. Focus was given to ensuring there was no conflict between highways works and sensitive land uses, particularly given the location of the highway works within the boundaries of the Forest of Bowland Area of Outstanding Natural Beauty (AONB). Where possible, passing place locations were also relocated to avoid excessive cut and fill earthworks necessary to facilitate to construction.
- 26) Proposed planning application 'red line boundaries' were drawn around the proposed highway works to provide a working area for the Contractor's construction plant, materials laydown and workforce to safely construct the passing places, road widening and junction improvements. A conservative buffer was used to allow the construction methodology to be developed as the design evolves.
- 27) It should be noted that utility plans were not obtained in time for the design freeze of the red line boundaries and proposed locations of the passing bays and road widenings. As we move through the determination period and as the design evolves, it is anticipated that further detail will be provided on required utility protection and / or diversions necessary to facilitate construction of the highway works.

1.3 Development Description

- 28) As previously shown in Table 1, there would be two main construction traffic routes serving the Proposed Marl Hill Section compounds (the Braddup and Bonstone compounds) and the Newton-in-Bowland compound. There would also be two main construction traffic routes serving the Lower House compound for the proposed Bowland Section. The traffic routes incorporate highways works which include passing places and road widening on the public highway. These highways works are required to be constructed during the enabling works phase, allowing the safe passage of construction vehicles and other road users towards both the Marl Hill and Bowland Section compounds. This section provides a description of these highways works.
- 29) It is anticipated that the highways works along the combined traffic routes to the Newton-in-Bowland and Marl Hill compounds would involve works at a total of approximately 30 locations, comprising 2 passing places and 28 sections of local road widening (including carriageway widening, widening associated with two junctions, and realignment and widening of the approaches to the existing Grindleton Bridge Ribble crossing). A total of two temporary compounds would also be established along the routes to facilitate construction of the off-site highways works. As noted above, Lancashire County Council's highway department have been kept informed of the need for, and the scope of, the highways works as such details have developed. The locations of the highways works and development envelopes associated with the passing places, road widening and temporary compounds for the routes are shown on ES Volume 5, Figure P1.1: Master Plan (RVBC-BO-FIG-V5-P1-001) and Figure P1.2: Environmental Assessment Figures (RVBC-BO-FIG-V5-P1-002, Pages 1-33).
- 30) The works associated with all of the routes are considered in further detail in Sections 1.3.1 below.

1.3.1 Newton-in-Bowland and Marl Hill Compounds Traffic Route Highways Works

- 31) The proposal uses two alternative routes to access the B6478 at the north of Waddington from the A59 south of Clitheroe. One for construction vehicles that can pass beneath a low railway bridge on the B6478 in Clitheroe (3.5m height restriction) (Haulage Route 1) and the other for vehicles over 3.5m high (Route 2). The proposed highways works are required along Haulage Route 2 and the B6478 from the north of Waddington to Hallgate Hill in Newton-in-Bowland. Measured from the junction of Pimlico Link Road and the A59 to the proposed Hallgate Hill junction, the route is approximately 13.9 km long. The proposed road widening works (excluding passing places) would extend along approximately 1.1 km of the route.
- 32) The highways works for this route would be located completely within the Ribble Valley Borough Council area and are anticipated to comprise construction of 2 passing places (passing place references PP01 to PP02) and 28 sections of local road widening (road widening section references RW01 to RW28). Of the 28 sections of local road widening, two are associated with two junctions (road widening section references RW01 and RW05), and two with realignment of the approaches to the existing Ribble crossing Grindleton Bridge (road widening references RW03 and RW04). Please refer to ES Volume 5, Figure P1.1: Master Plan (RVBC-BO-FIG-V5-P1-001) and Figure P1.2: Environmental Assessment Figures (RVBC-BO-FIG-V5-P1-002, Pages 1-33) for further details of the passing places, sections of road widening and temporary compound locations.
- 33) Also within the scope of the off-site highways works, two satellite compounds in Clitheroe are proposed. One is a proposed construction vehicle holding area within the curtilage of the Ribblesdale Cement Works, referred to as the Clitheroe HGV Holding Area. It is proposed that here some construction vehicles would be held for short periods of time before being released back onto the construction traffic routes towards the Newton-in-Bowland Compound. This could be in response to alleviating traffic flows on the local road network during busier times of the day or delivering plant and materials on a 'just in time' basis. As the Clitheroe HGV Holding Area would utilise developed land within the existing operational boundary of the cement works, minimal physical works would be required to establish the compound. The second satellite compound would be a park and ride facility making use of the existing Ribblesdale Cement Works staff car park on the west side of West Bradford Road, referred to as the Clitheroe Park and Ride. The purpose of the park and ride facility would be to reduce flows of private cars and light good vehicles further north on the local road network by offering a shuttle bus service to and from the Newton-in-Bowland Compound. Again, as the park and ride facility would make use of an existing formal car park with marked bays, minimal physical works would be required to establish the park and ride facility.
- 34) In summary, the proposed highways works along this traffic route comprise:
- Establishment of a temporary compound (typical dimension approximately 50 m x 30 m) to facilitate the construction of the highways works
 - Establishment of two satellite compounds to facilitate construction traffic movements along the routes: The Clitheroe HGV Holding Area within the boundary of Ribblesdale Cement Works and the Clitheroe Park and Ride facility within the staff car park for Ribblesdale Cement Works
 - Junction widening works to provide enough space for larger vehicles when turning from one road onto another
 - Realignment of approaches to Grindleton Bridge that is currently impassable for larger vehicles
 - Construction of sections of limited road widening (typically 1-2 m widening of the existing carriageway) where the highway is presently too narrow to accommodate general construction traffic.
 - Construction of the passing places (typical dimensions approximately 37 m long x 2.8 m wide) to enable oncoming HGVs to pass each other
 - Retaining structures may also need to be constructed to facilitate highways works construction in areas of cut / fill.

- 35) While the majority of the works would be constructed within highways land, some would require access to and / or construction on third party land. This may require the temporary removal of field boundaries such as dry-stone walls, and the removal of trees and hedgerows. Tree and hedgerow reinstatement plans would be developed in conjunction with the landowners and Ribble Valley Borough Council.
- 36) In terms of traffic management, there would be a requirement for short-term parking restrictions on Ribble Lane in Chatburn, although the set times / durations of the restrictions are not known at this stage. The restrictions would be agreed under a temporary traffic regulation order as required. There may also a requirement for phased short-term road closures when constructing the highways works. The detail of when these closures would be required and their duration would be confirmed by the construction contractor following appointment. It would also be the intention to ensure that access to residents would be maintained throughout the construction period of the works.

1.4 Construction Programme

- 37) While the precise details of the timing of the off-site highways works would be determined by the contractor, it is envisaged that the works would commence at an early point in the enabling phase, possibly prior to the establishment of the main construction compounds. This reflects the fact that without the off-site highways works in place, the opportunity to move significant volumes of material and abnormal loads along the access routes could be curtailed for logistical and highways safety reasons.

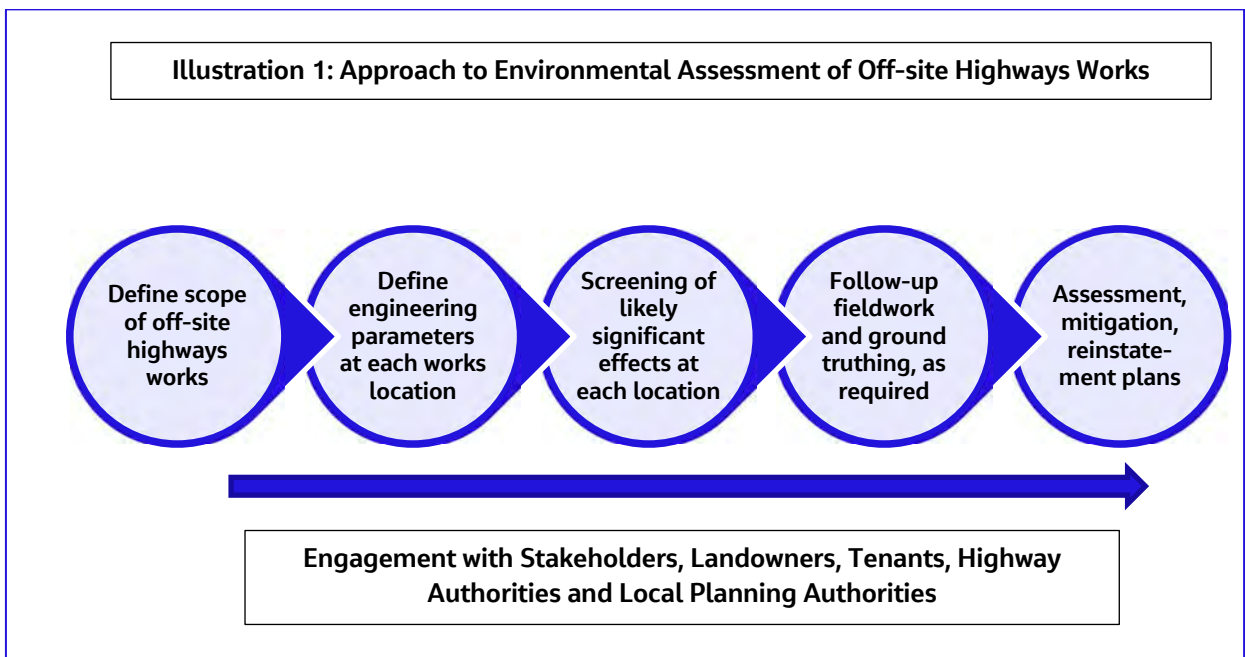
Hours of Working

- 38) It is anticipated that the temporary works locations associated with the passing places, local road widening (including carriageway widening and widening associated with junctions), would adopt the following working hours:
- Monday to Friday 07:00 to 17:00
 - Saturday 07:00 to 13:00
 - Sunday, by exception. No deliveries
 - Bank Holidays, by exception. No deliveries.
- 39) It is anticipated that operations at the Clitheroe HGV Holding Area would adopt the following working hours:
- Monday to Friday 07:00 to 19:00
 - Saturday 07:00 to 13:00
 - Sunday, by exception.
 - Bank Holidays, by exception.
- 40) It should be noted that the Clitheroe HGV Holding Area may also be used as a marshalling area for occasional movements of abnormal loads that would be undertaken overnight to minimise disturbance.
- 41) It is anticipated that the Clitheroe Park and Ride facility would adopt the following working hours:
- Monday to Friday 06:00 to 20:00
 - Saturday 06:00 to 14:00
 - Sunday, by exception.
 - Bank Holidays, by exception.

2. Assessment Methodology

2.1 Introduction

- 42) A high level assessment of potential environmental effects has been undertaken by technical specialists to establish whether the highway works would have likely significant effects, and if so, identify measures to prevent, reduce or offset any significant adverse effects on the environment.
- 43) Each EIA discipline undertook a desk-based assessment to establish the baseline conditions and identify potential changes to environmental receptors or local community assets and resources. In some cases, desk studies were followed by field visits to enable further surveys and ground truthing of desk-based information.
- 44) Illustration 1 summarises the general approach to the environmental assessment. It is notable that within the available timescales it was only possible to enter into a limited iterative design process to allow for design optimisation against identified environmental constraints. This led to the adoption, in many cases, of a parameters-based approach, based on reasonable worst case envelopes for the environmental assessment. This approach has the drawback of over-estimating anticipated likely significant effects in some cases, for example, in relation to estimations of tree losses and consequent landscape impacts. This point is considered further in this section.



2.2 Basis of Assessment

- 45) The basis of assessment is unusual in that the proposed highways works would be delivered on sections of the public highway (and in some cases third party land) that have already been subject to environmental assessment in Volume 2 of the ES. Volume 2 of the ES considers the implications of construction traffic vehicle movements to and from the main construction compounds, while Volume 5 considers the implications of constructing additional highways infrastructure to enable the safe and timely movement of construction vehicle on the transport routes.
- 46) As previously highlighted in Section 1.4, it is envisaged that the works would commence at an early point in the enabling phase, possibly prior to the establishment of the main construction compounds, due to the fact that without the off-site highways works in place, the opportunity to move significant volumes of material and abnormal loads along the access routes could be curtailed for logistical and highways safety reasons.

- 47) The basis of the assessment included the following assumptions concerning the intended use of the different types of highways work:
- 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 – Braddup and Bonstone
 - 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.

2.3 Proportionate EIA

- 48) A feature of the Volume 5 assessment is a focus on proportionate EIA, which has resulted in an alternative reporting approach. On reviewing the nature and scope of the proposed off-site highways works against the known environmental constraints in the general area, it became apparent that there would be relatively few potential interactions between the new infrastructure and sensitive environmental resources. The approach developed therefore reflected the need for environmental assessment reporting of minimal significant effects over a spatially extensive area.
- 49) Careful consideration of options resulted in a 'streamlined' reporting approach, whereby likely significant effects have been identified on a set of illustrative figures. The locations of the off-site highways works are identified on the ES Volume 5, Figure P1.1: Master Plan (RVBC-BO-FIG-V5-P1-001). The relevant, more detailed assessment information corresponding with each of the proposed off-site highways works is then shown on one large scale mapping sheet contained within the ES Volume 5, Figure P1.2: Environmental Assessment Figures (RVBC-BO-FIG-V5-P1-002, Pages 1-33). These more detailed large scale mapping sheets records features of interest on both an aerial image and an Ordnance Survey base plan. Each reporting sheet includes mapping images and narrative to provide details of the environmental features triggering likely significant effects, a general description of the likely significant effects, and approaches to mitigation of these effects.
- 50) Likely significant effects are primarily related to construction of the highways works. By definition, these effects are likely to be generally temporary and of short duration (extending over short time periods of weeks and in some cases months), and reversible (effects associated with construction activities such as noise and impacts on visual amenity stop on completion of the works). In other cases, however, adverse effects could occur over longer periods or be permanent, for example, felling of mature trees.

2.4 Screening, Assumptions and Technical Limitations

- 51) To facilitate proportionate EIA, the EIA technical leads undertook a screening exercise to establish the nature and scope of likely significant environmental effects in relation to their discipline, and to discount specific highways works which did not interact with features of interest. This entailed desk study and fieldwork to screen out individual highways works locations where there were considered to be not reasonably foreseeable adverse environmental or community effects.
- 52) This high-level assessment has considered a reasonable worst case envelope within which the proposed highway works could be delivered. This is based on the limited design information currently available, and the assumptions listed below by the technical disciplines. As further details emerge from ongoing discussions with landowners and stakeholders, the design of each highway works will continue to evolve and moderate impacts to environmental receptors.
- 53) To further assist with developing the scope of work and the streamlined reporting methodology, a series of technical assumptions were incorporated into the assessment. These were complemented by consideration of data limitations that may have influenced the assessment process, or influenced conclusions drawn. Table 2 summaries these technical assumptions and data limitations, in addition to assumptions around embedded mitigation which helped to support the screening exercise.

Table 2: Technical Assumptions, Data Limitations and Embedded Mitigation

Topic	Assessment Assumptions and Limitations
Landscape and Visual	<ul style="list-style-type: none"> ▪ The assessment area for determining landscape and visual effects was set at 500m from the planning application boundary, based on professional judgement. The scale of the activities proposed were assumed to result in no significant effects beyond this distance ▪ Zone of Theoretical Visibility (ZTV) modelling was not undertaken as the modelling points across each of the many proposed off-site highways locations would overlap. Therefore, an approach to identifying landscape character areas and high and medium sensitivity viewpoint receptors within the 500m assessment area was applied for the assessment of landscape and visual effects ▪ It was not possible to access all representative viewpoints, for example, due to some landowners not agreeing access across land or due to restrictions imposed during the COVID-19 pandemic. Where this was the case, the assessment was undertaken from another similar and nearby viewpoint that was accessible during the time of the survey ▪ Where representative viewpoints were located close to receptors of varying sensitivities, the receptor with the highest sensitivity was assessed to represent the reasonable worst case, where possible. However, it was not always possible to assess views from the receptor with the highest sensitivity due to intervening vegetation and access restrictions ▪ The assessment of landscape and visual effects was undertaken based on a reasonable worst case scenario of full clearance of landscape features within the planning application boundary at each location ▪ The assessment was based on a scenario of reinstatement and mitigation measures that would reasonably be expected for works of this nature. Such measures included: <ul style="list-style-type: none"> - Like for like reinstatement of boundary features, including dry-stone walls, hedgerows and fences and other vegetation - Reinstatement of agricultural fields and grassland - Trees reinstated at a minimum ratio of 3:1 for each tree removed - Reinstatement of land to tie-in with surrounding existing levels. ▪ The operation of compounds and highways construction activities would be undertaken during daytime hours only, with no requirement for temporary task lighting during night-time hours.
Arboriculture	<ul style="list-style-type: none"> ▪ The Proposed Bowland Section off-site highways works arboricultural assessment was based upon a fixed design, however there is potential for additional construction details to become available at detailed design stage. Examples of additional elements / construction detail may include: <ul style="list-style-type: none"> - The provision of full topographical survey of existing tree stems and vegetation extents within the assessment area - Location specific detail of new or existing hard surfaced areas to be constructed / improved / demolished including passing places or road widening areas - Location specific detail of new / existing drainage infrastructure be constructed / improved within the planning application boundary - Areas requiring soil level changes within the planning application boundary, i.e. soil stripping activities or earthwork extents - Compound or parking area layout arrangements - The diversion / removal / reinstatement of underground or overground utility services within the planning application boundary

Topic	Assessment Assumptions and Limitations
	<ul style="list-style-type: none"> - Facilitation of access requirements relating to visibility splays, turning circles, new road furniture or signage - Working widths requirements for task-specific construction / demolition activities located within the planning application boundary, e.g. laydown areas or plant access routes - Re-alignment and construction detail of diverted public footpaths - Notification of project commitments e.g. confirmed working width reductions. ▪ It was assumed that the above listed design detail would be positioned outside the constraints of retained tree features to be shown on the reporting sheets, and therefore that no further assessment would be required. ▪ Limitations to the Proposed Bowland Section off-site highways works arboricultural assessment include the following key points: <ul style="list-style-type: none"> - Indicative assessment of tree removal, trees at risk and tree retention are informed by the RAG methodology adopted. The RAG status of a feature and spatial extent of tree removals, 'Removal Risk Aiming to Retain' (RRAtR) trees and 'Retained with Protection Measures' (RwPM) trees are indicatively shown on the reporting sheets. - Tree surveys focus upon trees with a stem diameter of over 75 mm. It is assumed that the assessment of trees lost below this size threshold and other low-level vegetation would be captured by Phase 1 ecology survey data. - The assessment is specific to the Newton-in-Bowland and Marl Hill compounds off-site highways work areas only. The assessment does take into account any potential vegetation clearance or mitigation associated with the Arboricultural Impact Assessments for the Bonstone and Braddup compounds and Newton-in-Bowland compound submitted with the Proposed Bowland Section ES (Volume 4, Appendix 6.6).
Water Environment	<ul style="list-style-type: none"> ▪ For geomorphology and surface water quality a 50m buffer around each of the respective highway works sites was used to identify potential surface water receptors ▪ Existing ditches would be culverted under the passing place / widening, rather than a diversion of such watercourses ▪ Appropriate roadside drainage would be constructed for the permanent road widening areas ▪ Road widening across watercourses would involve a like for like extension of the existing crossing (the impact of which was assumed to be negligible and therefore not significant in the context of the EIA Regulations) ▪ No information on Private Water Supplies (PWS) was available at the time of the assessment and has therefore not been considered. Potential impacts associated with PWS were therefore not addressed in the assessment ▪ No excavation deeper than 0.8 m was deemed to be required to facilitate the highway works, therefore, a dewatering assessment was not undertaken ▪ As no excavation deeper than 0.8 m is anticipated, a 100 m ecological Phase 1 habitat survey buffer was required as per UKTAG Groundwater Dependant Terrestrial Ecosystems (GWDTE) guidance ▪ Should excavation depths increase beyond 1 m depth, then a larger GWDTE assessment area may be needed with additional assessment required ▪ Potential GWDTE impacts have not been assessed in this report but will be addressed in a separate supplemental report ▪ A Water Framework Directive assessment has not been carried out for this assessment.

Topic	Assessment Assumptions and Limitations
Flood Risk	<ul style="list-style-type: none"> ▪ A 50 m buffer around highway works sites has been used to identify potential surface water receptors ▪ Existing ditches would be culverted under the passing place / widening, rather than a diversion of such watercourses ▪ Appropriate roadside drainage would be constructed for the permanent road widening areas ▪ Road widening across watercourses would involve a like-for-like extension of the existing crossing and the impact of which is deemed to be negligible ▪ No flood risk modelling has been undertaken. A detailed flood risk assessment may be required at the permitting stage, once detailed design information is available for the proposed off-site highways works.
Cultural Heritage	<ul style="list-style-type: none"> ▪ The assessment area for identifying baseline features and assets, and for determining cultural heritage effects, was set at 100 m from the planning application boundary ▪ There would be like-for-like replacement undertaken on features such as hedgerows and stone walls in order to maintain historic landscape character ▪ Fields and field boundaries would be returned to pre-construction stage state after the main construction works, commissioning and reinstatement at the main compounds has been completed ▪ The assessment was limited by the lack of access to local archives and libraries due to COVID19 restrictions.
Soils, Geology and Land Quality	<ul style="list-style-type: none"> ▪ The general assessment areas at each location comprised a 250 m buffer beyond the planning application boundary ▪ The minerals assessment applied a 500 m buffer to allow for any expansion of mineral or quarry operations ▪ Where highway works are required beyond the highway boundary, the sensitivity criteria applied for soil quality has been based on Agricultural Land Classification (ALC) grade which assigns a value to soil by its ability to support agricultural uses ▪ The ALC grade was used as a proxy to assign the sensitivity of soil quality in the assessment ▪ The baseline data obtained to support development of the Proposed Bowland Section Site Briefing (Desk Study) Report was used to provide the baseline for the soils, geology and land quality setting of the proposed highway work ▪ Assessments were solely undertaken using desk-based baseline data from a variety of sources. No site visits were carried out and no ground investigation or monitoring data were used in the assessment of likely significant effects from the highways interventions proposed. This was considered to be a reasonable approach given the remote rural locations of the proposed off-site highways works and the reduced likelihood of encountering land contaminated by human activity.
Public Access and Recreation	<ul style="list-style-type: none"> ▪ Public Rights of Way (PRoWs) would be kept open or for safety reasons temporarily diverted wherever practicable during construction of the off-site works, and during operation, closure and reinstatement phases ▪ Signage would be in place in advance of temporary PRoW closures and diversion routes (where appropriate) would be outlined for the duration that the closure would be in place ▪ Reinstatement would be carried out to at least the same condition as the pre-construction PRoW

Topic	Assessment Assumptions and Limitations
	<ul style="list-style-type: none"> ▪ The Construction Traffic Management Plan (CTMP) outlines the good practice mitigation the contractor would implement to manage traffic movements, including pedestrians, cyclists and horse riders on the existing roads and PRowS adjoining the roads where the highway works would be located.
Major Accidents	<ul style="list-style-type: none"> ▪ The assessment of major accidents for the highways works was limited to potential major accident installations (sites or pipelines). Natural hazards were not considered as part of the assessment ▪ A 50 m buffer around the highway works sites were used to identify potential major accident installations (sites or pipelines) ▪ The assessment of major accidents considered a significant effect in the context of a major accident to be a low likelihood but high consequence extreme event that may result in: <ul style="list-style-type: none"> - Serious damage to human populations (multiple serious injuries and/or requirements for medical attention, or death); and / or - Serious damage to the environment (based on extent, severity and duration). ▪ The assessment was based on a qualitative review of existing data sources, with no additional surveys required. ▪ Environmental effects associated with unplanned events that do not meet the definition of a major accident and / or disaster (such as minor spills that can be contained by typical good construction practice) are considered within the respective Volume 2 topic chapters of this ES, and are not within the scope of the highways major accidents assessment.
Noise and Vibration	<ul style="list-style-type: none"> ▪ Predictions of construction noise were made using the best available information at the time of the assessment. However, it should be noted that the plant list and the construction strategy developed to support this assessment may not necessarily reflect that ultimately adopted by the contractor during construction ▪ The same plant items were assumed to be used for the construction of passing places and highways widening works together with reinstatement works on completion of the proposed highway improvement works ▪ Construction works would occur at one location at a time within each of the anticipated multiple separate highways work packages that would be likely to be delivered in parallel (the final number of packages and phasing of the highways works would be determined by the Contractor), with the work moving along the length of each highways works package. As such, it is not expected that a given receptor would be subject to construction noise from multiple work sites at the same time ▪ Compounds and welfare facilities within compounds would be operated during daytime hours only, with no operation of generators or other plant during night-time hours ▪ Given the constraints in the size of the working areas on the highway, no screening between plant and receptors was assumed, due to a potential lack of space to include screening at all identified locations ▪ As the construction timescales were not known for each works location at this stage of assessment, it was assumed that works would exceed 10 or more days in any 15 consecutive days, or a total of 40 days in six consecutive months at each location for a reasonable worst case assessment. Where the timescales can be reduced to below these thresholds then significant impacts could be reduced ▪ Calculations of changes in road traffic noise were made based on road widening at some locations, and these calculations include the following assumptions:

Topic	Assessment Assumptions and Limitations
	<ul style="list-style-type: none"> - There is not expected to be any uplift in road traffic volumes or changes in vehicle composition or speed following construction - The maximum width of any road widening is expected to be of 3 m or less into the verge.

2.5 Reporting Approach

2.5.1 Introduction

- 54) As discussed previously, relatively low potential for likely significant effects was identified during the initial screening exercise. For some EIA topics, such as soils, geology and land quality, and air quality, there were no likely significant effects identified. Once likely significant effects were identified, through professional judgement based on a combination of the sensitivity of receptors and the anticipated magnitude of impacts, these were reported on the relevant large scale mapping sheet contained within the ES Volume 5, Figure P1.2: Environmental Assessment Figures (RVBC-BO-FIG-V5-P1-002). In total, 33 reporting sheet figures were produced covering off-site highways works on the Proposed Bowland Section.
- 55) The reporting approach centres on Geographic Information System (GIS)-based mapping. Details of the proposed highways works were overlaid onto both aerial photography (to assist the reader in understanding the local context of the works) and OS base mapping, with assets or receptors identified during the preceding screening exercise then being mapped onto the figures. Narrative to support the graphics was kept intentionally brief, comprising technical content under three headings: baseline; likely significant effects; and mitigation. Likely significant effects were identified prior to the implementation of good practice and additional essential mitigation. Good practice mitigation proposed to be implemented during construction works is presented in more detail in the Construction Code of Practice (CCoP) (Appendix 3.2 contained within Volume 4 of the ES) and Construction Traffic Management Plan (CTMP) (Planning Application Documents RVBC-BO-APP-007_01 and RVBC-BO-APP-007_02).
- 56) During the course of the assessment, it became apparent that the reasonable worst case-based approach to assessment inevitably identified more tree loss than would likely be required to deliver the works. In turn, this has influenced the conclusions drawn from the landscape and visual impact assessment. This is discussed in more detail in the Arboricultural Impact Assessment section below.
- 57) Similarly, the parameters-based approach at each of the locations gave rise to technical challenges when appraising effects on individual residential properties and business premises. The methodology described in ES Volume 2 Chapter 14: Communities and Health was found to be less applicable to individual properties, simply as the potential disturbance effects were, in many cases, very transient; for example:
- The construction of a passing place near to a residential property would be completed in a couple of weeks before the works progress to a new location.
 - The construction of road widening, to accommodate the largest vehicle movement accessing the compounds, would extend the road - in most cases - up to 1 m in width and each location varies in length, with certain sections >100 m. Where possible, the proposed road widening works have been designed to minimise construction impact on individual properties, however due to site constraints this may not be possible in all cases. Similarly to the passing places, it is expected that construction of the vast majority most of road widening locations will be completed within a couple of weeks, therefore disturbance effects will be expected to be transient rather than continuous.
 - Where areas of extensive cut and fill are required to construct the highways works, or where retaining walls are required, construction could extend for up to a month.
 - Where junction improvements are required, including the approaches to Grindleton Bridge, construction is expected to take a number of months due to level of modification required to make these suitable for heavy construction vehicles.

- Temporary compound areas have been allocated adjacent to Gindleton Bridge and the Braddup Compound entrance for the Newton-in-Bowland and Marl Hill compounds traffic route highways works. These compounds will be used for material laydown areas, site offices and welfare facilities. Where possible, these compounds have been situated where there is flat land, easy accessibility off the road. It is expected that the contractor would use these compounds for a period of up to 12 months, potentially utilising multiple compounds at a time depending on the phasing of the highway works construction.

58) In addition to the short term requirement of many of the proposed highways works, good practice mitigation as described in the CCoP and CTMP would also seek to minimise potential significant community effects.

2.5.2 Arboricultural Impact Assessment

59) Trees and hedgerows form important features on the Proposed Bowland Section, both as environmental assets in their own right, and also for their broader contribution to landscape quality and character. Many of the proposed off-site highways works locations have trees and hedgerows falling either within or adjacent to the planning application boundaries.

60) Arboricultural surveys were undertaken generally in accordance with British Standard BS 5837:2012.³ An interim assessment of potential tree impacts has been informed by spatial data parameters calculated using GIS and application of a 'traffic light' categorisation of impacts – red, amber and green (RAG). The RAG assessment was based on a survey feature's Root Protection Area (RPA) or canopy constraint relative to the indicative planning application boundary:

- **Red features** are trees subject to varying extents of removal based on stem or canopy encroachment within the planning application boundary. It is understood that vegetation clearance plus soil strip would be fully required within the planning application boundary, subject to further design development
- **Amber features** are trees considered to be a 'Removal Risk Aiming to Retain' (RRAtR) and are determined on the basis of encroachment by the planning application boundary. Individual trees are identified as at risk of removal if the planning application boundary encroaches on a tree's total Root Protection Area (RPA) by 20 % or over (in square metres). Contiguous / linear features i.e. tree groups, hedgerows or woodland are identified as at risk based on canopy encroachment within an indicative 'at risk' spatial buffer external to the planning application boundary. The 'at risk' buffer is determined by the RPA of encroached features located outside the planning application boundary. The variable width of this buffer is calculated using the greatest radial RPA value intersected at each separate section of the planning application boundary. RRAtR trees are reported to be removed on a reasonable worst case scenario basis
- **Green features** are considered to be 'Retained with Protection Measures' (RwPM). Encroached RwPM features, considered likely to require protection measures, are identified by an 'E' within the 'AIA' column of the Tree Survey Schedule of Appendix E. Individual trees are identified as RwPM if the planning application boundary encroaches on a total RPA by below 20 % (in square metres). Contiguous / linear features i.e. tree groups, hedgerows or woodland are identified as RwPM if their canopy does not intersect the indicative 'at risk' buffer outlined in the previous bullet point.

61) It is acknowledged that the parameters-based approach to the AIA has resulted in many trees and tree groups being identified 'as at risk of removal' ES Volume 5, Figure P1.2: Environmental Assessment Figures (RVBC-BO-FIG-V5-P1-002, Pages 1-33), when this may not be the case - detailed engineering design of the highways works will not be finalised until the main contractor is appointed. It is also noted that consultations with the local highways authorities and local authority tree officers have continued in parallel to finalising the planning submissions. For these reasons, mitigation and reinstatement plans are not proposed at each location. Instead, where potential tree impacts are indicated on the reporting

³ British Standard 5837: Trees in relation to design, demolition and construction - Recommendations. British Standards Institution (2012)

sheets, these would be re-appraised at the detailed design stage in consultation with relevant LPA officers.

- 62) 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. It is anticipated that this would form a planning condition should the relevant planning applications be granted consent.

2.5.3 Landscape and Visual Impact Assessment

- 63) The proposed off-site highways works are located in sensitive rural landscapes and most are situated within and others adjacent to the Forest of Bowland AONB. The reporting sheets contained in the ES Volume 5, Figure P1.2: Environmental Assessment Figures (RVBC-BO-FIG-V5-P1-002, Pages 1-33) examine the landscape and visual impacts that are predicted to occur while the off-site highways works are being constructed. These impacts occur mainly in relation to views from residential property and from local public rights of way (PRoW). The reporting sheets indicate the location of viewpoints on both the 'baseline' and 'environmental constraints' images.
- 64) It is acknowledged, however, that further landscape and visual effects may occur when taking account of multiple highways works being delivered together along the length of the transport routes. For example, field boundary removal comprising the temporary loss or realignment of dry stone walls, hedgerows and ditches may not constitute likely significant effects at an individual location but could be a significant effect when viewed cumulatively.
- 65) As the reporting sheets consider likely significant effects only for individual works at specific locations, it has also been necessary to consider the cumulative (in-combination) effects of the proposed off-site highways works. The intra-project cumulative effects of the Proposed Bowland Section (i.e. the cumulative effects of the off-site highways works in combination with the landscape and visual effects described in ES Volume 2 (main construction compounds and transport routes serving the main compounds)), are discussed in ES Volume 2 Chapter 19: Cumulative Assessment.
- 66) The highways improvement works and construction activity for the compounds are programmed to occur successively. Therefore, cumulative effects would occur in relation to the landscape of the wider area. Cumulative visual effects would occur in combination (i.e. where the two schemes are visible from the same viewpoint) and sequentially (i.e. where the two schemes are visible along a route (e.g. a local road or a recreational footpath)).
- 67) It is acknowledged that cumulative effects on landscape character and the wider landscape would arise due to disruption to settled rural areas caused by the proposed highways works. It is anticipated that cumulatively, the works would give rise to an increased perception of disruption and contrast with the rural character of the affected landscapes. The cumulative effects from vegetation loss and removal of boundary features such as hedgerows, dry stone walls and fences would also adversely affect the wider landscape.
- 68) In combination visual effects would occur from visual disturbance of construction activity and movement of plant and equipment within the compounds, entering and exiting the compound, and along the nearby local road network. Sequential views would occur for travellers along the local road network and from the footpath network. Travellers along the local roads with proposed highways improvement works would experience frequently sequential views towards the construction of laybys and road widening sections. Some road travellers and footpath users would also experience occasionally sequential views and towards the construction compound.
- 69) On completion of the Proposed Bowland Section, highways works locations would generally be reinstated to original land uses; landscape features and field boundaries would also be reinstated in consultation with affected landowners and local authority officers. An environmental masterplan would be developed jointly with stakeholders at a sufficient level of detail to identify site-specific reinstatement activities at individual works locations, while also addressing the broader, cumulative effects of the total highway works package on the landscape resource.

2.5.4 Communities Impact Assessment

- 70) Individual community assets such as recreation facilities, residential properties and local businesses are reported on the ES Volume 5, Figure P1.2: Environmental Assessment Figures (RVBC-BO-FIG-V5-P1-002, Pages 1-33) under specific EIA topics (e.g. landscape and visual, public access and recreation, and noise). The overall community effects of the proposed off-site highways works are therefore described at a community level in Section 3 of this report, rather than individual properties being considered for assessment on the reporting sheets. For this reason, there is no reference to overarching community effects on the ES Volume 5, Figure P1.2: Environmental Assessment Figures (RVBC-BO-FIG-V5-P1-002, Pages 1-33).

3. Assessment of Effects

- 71) Reporting sheets have been produced for each of the highway works locations identified on the ES Volume 5, Figure P1.1: Master Plan (RVBC-BO-FIG-V5-P1-001, Pages 1-3), and are contained within the ES Volume 5, Figure P1.2: Environmental Assessment Figures (RVBC-BO-FIG-V5-P1-002, Pages 1-123). Each reporting sheet comprises the following information:
- Location of the highway works
 - The engineering works to be carried out, including any mitigation embedded into the works design
 - Identification of key baseline features that would be impacted, causing a likely significant effect
 - Summary of likely significant effects prior to the implementation of good practice and additional essential mitigation
 - Mitigation / reinstatement measures.

3.1 Likely Significant Effects

- 72) The following section summarises the findings of the assessment of likely significant effects and proposed mitigation measures associated with the off-site highways works for the Proposed Bowland Section as reported in the ES Volume 5, Figure P1.2: Environmental Assessment Figures (RVBC-BO-FIG-V5-P1-002, Pages 1-33).

3.1.1 Newton-in-Bowland and Marl Hill Compound Traffic Route Highways Works

- 73) A total of 14 out of the 33 passing place and road widening works locations along the route were identified as having at least one likely significant effect prior to the implementation of good practice and essential mitigation measures. The majority of likely significant effects relate to adverse landscape, visual and arboriculture (tree and hedgerow) impacts. Landscape and visual effects would be significant during construction, operation and reinstatement works due to the potential loss of trees, tree groups and other vegetation together with other features such as dry stone walls and fences. However, these effects are deemed to be of relatively short duration and would be mitigated by the replacement planting and reinstatement of permanent features. The removal of any mature trees would result in a longer term impact. A total of 13 tree and hedgerow features have been assessed to be at risk of removal, along with 22 features assessed to be at risk of partial removal. An additional 17 features were also assessed as being at risk of removal but with the aim of being retained where possible. An arboricultural method statement would assess the impact to individual trees and detail protection measures.
- 74) Prior to mitigation likely significant effects have been identified at Bonstone Brook (Unnamed Watercourse 2096) at one road widening location at RW22. The impact would be due to potential for increased fine sediment input during construction. However, measures included to add coarse sediment where an impact occurs and the reinstatement to be supervised by a geomorphologist or Ecological Clerk of Works.
- 75) Likely significant effects are predicted on the users of public footpaths at two of the road widening locations RW2 and RW4, due to diversion. However, this would be for a short duration during the construction works .
- 76) The highways works would result in likely significant visual effects to PRoW users at one passing place and four road widening locations during construction. However, these effects are of relatively short duration and would be mitigated by the replacement planting and reinstatement of permanent features. There would also be likely significant visual effects to the community of Grindleton during construction of two road widening locations (RW04 and RW05). Residents of properties in the vicinity of four road widening locations (RW08, RW09, RW11 and RW12) would also encounter likely significant visual effects. However, these effects are of relatively short duration and would be mitigated by the replacement planting and reinstatement of permanent features.
- 77) The highways works would give rise to temporary disruption and disturbance to five residential properties and the settlement of Waddington, together with multiple properties along Ribble Lane and

Chatburn, three farms and Clitheroe Community Hospital due to noise during construction and reinstatement. However, measures contained in the CCoP relating to control of construction noise, and in the CTMP, Travel Plan, and / or identified through the Highways Stakeholder Group in relation to construction traffic (as described in Chapter 16: Transport Planning), would mitigate these effects.

- 78) In terms of traffic and transport effects, there may be a requirement for phased short-term road closures when constructing the off-site highways works. The detail of when any such closures would be required and their duration would be confirmed by the construction contractor following appointment. Potential diversionary routes or traffic management measures arising from any short-term road closures required could impact on settlements such as Clitheroe, Chatburn, West Bradford and Waddington, creating short-term traffic impacts in these areas. Generally, any such impacts would arise in locations remote from the compounds. The off-site highways works and implementation of diversion route(s) could also impact on driver delay and severance as roads may be closed for a period of time to undertake the highways works, however these works are unlikely to result in likely significant traffic and transport effects.

3.2 Residual Effects

3.2.1 Landscape, Visual and Arboricultural Residual Effects

- 79) Taking account of the sensitivity of the landscape (especially its AONB status), the dispersed landscape and visual effects associated with the highways works associated with the Newton-in-Bowland and Marl Hill compounds, and the potential for cumulative effects with other elements of the Proposed Marl Hill Section and Proposed Bowland Section, landscape and visual effects are judged to be 'significant' in the context of the EIA Regulations.
- 80) Taking account of the number of trees and tree groups potentially affected by the off-site highways proposals, the number of trees within this total regarded as 'notable', and their general contribution to landscape quality adjacent to and within nationally designated landscapes, impacts on arboricultural resources are judged to be 'significant' in the context of the EIA Regulations.
- 81) Prior to the development of the Environmental Masterplan, and adopting a precautionary approach given the environmental and development context of the proposed highways works, it is anticipated that the residual landscape, visual and arboricultural effects would be significant in the context of the EIA Regulations.

3.2.2 Communities Residual Effects

- 82) While forecast traffic flows during the enabling works phase (which include the off-site highways works) in support of the Newton-in-Bowland and Marl Hill compounds are anticipated to be lower than during the main construction phase, they could still give rise to likely significant effects at locations along the transport routes. Depending on the final transport route solutions through and around the Clitheroe area (refer to Volume 2 Chapter 3), there is potential for disturbance effects in settlements such as Chatburn, Grindleton, West Bradford and Waddington, as well as Clitheroe.
- 83) United Utilities recognises that during the enabling works, some villages and local residential areas would experience disturbance. Disturbance would arise mainly from the movement of heavy goods vehicles through settlements and past individual properties fronting onto the highway. A degree of disturbance is an unavoidable consequence of constructing a major infrastructure project. Some of the community disturbance may be short-term and reversible, while other disturbance could extend into and throughout the duration of the construction phase.
- 84) Some stakeholder groups have already provided feedback to United Utilities expressing their concerns about the level and duration of community impacts. In response to this feedback, United Utilities has developed alternative access proposals for some of the main HARP construction compounds – for example, the Proposed Ribble Crossing could alleviate impacts on communities in the Chatburn, Grindleton and West Bradford areas; the Proposed Hodder Crossing would remove construction traffic from Newton-in-Bowland village centre. In contrast, however, some of these solutions may not fully avoid community disturbance impacts, or could give rise to other impacts.

- 85) In addition to ongoing engineering investigations to alleviate potential impacts on transport routes, 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. It should be recognised that in some community areas, however, it may not be possible to fully eliminate adverse disturbance effects due to the scale of construction operations and associated vehicle movements. A precautionary position is therefore adopted in recognition of the nature, scope and duration of these adverse effects - including off-site highways - and it is anticipated that some communities would experience a disturbance effect that is significant in the context of the EIA Regulations.

3.3 Cumulative Effects

- 86) The cumulative effects associated with the off-site highway works are described in Volume 2, Chapter 19: Cumulative Effects of the Proposed Bowland Section ES.