



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

**Volume 6**

**Proposed Ribble Crossing**

**Chapter 14: Communities and Health**

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**Water for the North West**



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Haweswater Aqueduct Resilience Programme - Proposed Marl Hill Section

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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](http://www.jacobs.com)

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## **14. Communities and Health**

### **14.1 Introduction**

- 1) This chapter presents an assessment of the likely significant effects of the Proposed Ribble Crossing on Communities and Health.
- 2) The chapter begins by defining the scope of the topic and the assessment areas for the communities and health assessment. The nature, value and sensitivity of the existing baseline environment are then identified before an assessment is made of the potential effects on Communities and Health for the Proposed Ribble Crossing. Mitigation measures have been proposed to avoid, reduce or offset any potential effects and these embedded mitigation measures have been taken into account in the assessment, which are mentioned in Chapter 3: Design Evolution and Development Description and Chapter 20: Environmental Mitigation. Further good practice measures are set out in the Construction Code of Practice (CCoP) outlined in Volume 2: Appendix 3.2.
- 3) This chapter is also informed by the findings of other topic chapters of this ES. The assessments in these chapters have also been made taking into account embedded mitigation and the good practice measures of relevance to their topic area.
- 4) The assessment areas for potential community effects in the vicinity of the Proposed Ribble Crossing have been defined by local and regional community areas:
  - The Regional Community Assessment Area (RCAA) considers local authority areas within 1 km of the Proposed Ribble Crossing. For the purposes of this assessment, the RCAA comprises Ribble Valley Borough Council
  - The Local Community Assessment Area (LCAA) consists of all Parish Boundaries which are within a 1 km boundary of the Proposed Ribble Crossing. The LCAA for the Proposed Ribble Crossing consists of three parishes (hereafter referred to as community areas): West Bradford, Waddington and Clitheroe.
- 5) This chapter is presented under the following subheadings:
  - Disturbance effects (assessed for the LCAA)
  - Severance effects (assessed for the LCAA)
  - Tourism accommodation effects (assessed for the RCAA)
  - Health effects (assessed for the RCAA).
- 6) This chapter is supported by the following figures:
  - Figure 14.1: Regional Community Assessment Area (RCAA) Boundary
  - Figure 14.2: LCAA Boundary and Community Areas
  - Figure 14.3: Community and Health Receptors.

### **14.2 Scoping and consultations**

#### **14.2.1 Scoping**

- 7) A Communities and Health chapter was included within the EIA Scoping Report Addendum which was submitted to the relevant planning authorities for comment in February 2021.

Ribble Valley Borough Council provided a Scoping Decision, which included feedback from statutory and non-statutory stakeholders, and this has been reviewed and incorporated into the assessment. Scoping comments and responses are outlined in Volume 4 Appendix 4.1.

#### **14.2.2 Consultation**

- 8) During the course of this assessment, consultation has taken place with relevant statutory and non-statutory consultees, stakeholders and third parties, through both correspondence and teleconferences. This has been summarised in Volume 4 Appendix 4.1.

#### **14.3 Key Legislation and Guidance**

- 9) The legislation and planning policies relevant to Communities and Health are considered in Volume 2 Section 14.3.

#### **14.4 Assessment Methodology and Criteria**

- 10) The assessment methodology and criteria relevant to the communities and health assessment are presented in Volume 2 Section 14.4.

##### **14.4.1 Embedded Mitigation and Good Practice Measures**

- 11) Embedded mitigation is inherent to the design, and good practice measures are standard industry methods and approaches used to manage commonly occurring environmental effects. The assessments presented in Section 14.6 of this chapter are made taking into account embedded mitigation and the implementation of good practice measures. Good practice measures contained in Volume 2, Appendix 3.2: CCoP include some of particular relevance to Communities and Health. As set out in Appendix 3.2, the contractor would develop a 'Stakeholder and Customer Communications Management Plan' to help to facilitate a good working relationship between the community and the contractor by providing a mechanism to discuss and mitigate community effects should they arise.

#### **14.5 Baseline Conditions**

- 12) This section details the baseline community conditions within the RCAA and LCAA assessment areas. Baseline data were collated through a
- desk based assessment (as summarised in Tables 14.1 to 14.4).

### 14.5.1 Information Sources

- 13) Key data sources used to inform the baseline include the statistics published by the Office for National Statistics (ONS)<sup>1</sup>, the Ministry of Housing, Communities and Local Government<sup>2</sup>, AddressBase data provided by the Ordnance Survey<sup>3</sup>, and tourism data from Visit Britain<sup>4</sup>.

### 14.5.2 RCAA Baseline Conditions

- 14) The RCAA is defined as the Ribble Valley Borough Council administrative area. Baseline information related to the RCAA is provided in Table 14.1.

**Table 14.1: RCAA Baseline Data**

Indicator	Ribble Valley Borough Council
Tourism assets <sup>5</sup>	A substantial part of the rural area of the authority is classified as part of the Forest of Bowland Area of Outstanding Natural Beauty. The Forest of Bowland is designated as an area of outstanding natural beauty covering 803 km <sup>2</sup> . The natural environment serves tourist activities such as walking, cycling, star gazing, photography and 'family fun' events. Tourism attractions within Ribble Valley also include Clitheroe Castle Museum and Browsholme Hall, together attracting 43,000 visitors annually <sup>6</sup> .
Tourism accommodation <sup>7</sup>	Total bed space stock in serviced accommodation in Ribble Valley in 2016 was 3,290. This includes hotels, guest houses and bed and breakfasts.

### 14.5.3 LCAA Baseline Conditions

- 15) The communities in the LCAA considered in this assessment include Waddington, West Bradford and Clitheroe. Baseline conditions for these communities are set out in Tables 14.2-14.4 below.

#### **Waddington**

- 16) Waddington is characterised as a rural community area home to approximately 1,000 residents. Located north west of Clitheroe, the community is composed of approximately 500 residential properties mainly clustered in Waddington village, with a smaller group of properties to the north along Mill Lane. There are approximately five farms scattered around the community area and a number of social and commercial operations located mainly in the village of Waddington including Waddington Almshouses which offers sheltered community housing for elderly women. Notably, Shireburn Caravan Park is located in the south of the community area, which offers holiday homes and residential park homes for the over-55's, retired or semi-retired.
- 17) The baseline characteristics of Waddington are summarised in Table 14.2.

<sup>1</sup> ONS (2021). Central Data Source. Available at: <https://www.ons.gov.uk/>

<sup>2</sup> Ministry of Housing, Communities & Local Government (2019). English Indices of Deprivation. Available at: <https://www.gov.uk/government/statistics/english-indices-of-deprivation-2019>

<sup>3</sup> Ordnance Survey (2021). AddressBase Data. Available at: <https://www.ordnancesurvey.co.uk/business-government/products/addressbase>

<sup>4</sup> Visit Britain (2020). Accommodation Stock Audit. Available at: <https://www.visitbritain.com/gb/en>

<sup>5</sup> OpenStreetMap Contributors (2020). OpenStreetMap. Available at: <https://www.openstreetmap.org/>. Accessed May 2020.

<sup>6</sup> Lancashire County Council (2020). Visitor attendance in Lancashire 2018 and 2019/20. Available at: <https://www.lancashire.gov.uk/media/899052/visitorattendance.pdf>. Accessed May 2020

<sup>7</sup> Visit Britain Visit England (2016). Accommodation Stock Audit. Available at: <https://www.visitbritain.org/accommodation-stock>. Accessed May 2020.

**Table 14.2: Waddington Baseline Data**

Indicator	Waddington
Population <sup>8</sup>	Usual resident population is 1,028.
Population density <sup>9</sup>	Population density is 1.22 people per hectare compared to 1.0 in the RCAA.
Deprivation <sup>10</sup>	The parish is located in Lower Super Output Area <sup>11</sup> (LSOA) Ribble Valley 001D. This LSOA is ranked in IMD decile 9 <sup>12</sup> and is within the least deprived 20 % of neighbourhoods in England.
Residential properties	The community is comprised of approximately 489 residential properties.
Social infrastructure	Approximately 28 social receptors have been identified including Waddington Hospital Cottages (sheltered housing), Waddington Methodist Church, Waddow Hall Girlguiding Activity Centre, Waddington and West Bradford Primary School, and Waddington Social Bowling Club.
Agricultural activity	Five farms have been identified including Twitter Bridge Farm, Sandersons Farm and Chancery Farm.
Commercial operations	Approximately 24 commercial operations have been identified. Local businesses include Country Kitchen Café, Shireburn Kennels, Waddington Fell Quarry (Armstrongs Group Stone Suppliers), and a builders yard.
Travel to work <sup>13</sup>	Approximately 9 % of employed residents work in Blackburn and 6 % in Burnley. Both are accessible via the B6478 road to Clitheroe.

### West Bradford

- 18) West Bradford is characterised as a rural community area located two miles north of Clitheroe on the River Ribble. The community comprises approximately 363 residential properties with a usual resident population of approximately 788. Most of the village settlement is clustered around the roads to Clitheroe over the River Ribble and to the neighbouring villages of Waddington and Grindleton. The community area is home to Pillings Residential Home, Three Rivers Woodland Park and West Bradford Village Hall. Commercial receptors also include Three Millstones Hotel and the Dove Skye Nursery.
- 19) The baseline characteristics of West Bradford are summarised in Table 14.3.

**Table 14.3: West Bradford Baseline Data**

Indicator	West Bradford
Population <sup>14</sup>	Usual resident population is 788.

<sup>8</sup> Census (2011a). KS101EW- Usual residential population. Available at: <https://www.nomisweb.co.uk/>

<sup>9</sup> Census (2011a). *op. cit.*

<sup>10</sup> Ministry of Housing, Communities & Local Government (2019). English Indices of Deprivation. Available at: <https://www.gov.uk/government/statistics/english-indices-of-deprivation-2019>

<sup>11</sup> Lower Layer Super Output Areas (LSOA) are a geographic hierarchy designed to improve the reporting of small area statistics in England and Wales.

<sup>12</sup> Deprivation deciles are based on the Index of Multiple Deprivation 2019 which is the official measure of relative deprivation. Decile 1 represents the most deprived 10% (or decile) of neighbourhoods in England and Decile 10 represents the least deprived 10% (or decile) of neighbourhoods in England.

<sup>13</sup> Census (2011b). WF01BEW - Location of usual residence and place of work (OA level). Available at: <https://www.nomisweb.co.uk/>

<sup>14</sup> Census (2011a). *op. cit.*

Indicator	West Bradford
Population density <sup>15</sup>	Population density is 1.0 people per hectare. This is the same as the population density of the RCAA.
Deprivation <sup>16</sup>	Ribble Valley 001D and Ribble Valley 001E are both located within the parish boundary. These LSOAs are ranked in IMD deciles 9 and 8 respectively. The parish is therefore within the least deprived 30 % of neighbourhoods in England.
Residential properties	The community is comprised of approximately 363 residential properties.
Social infrastructure	Three social receptors have been identified: Pillings Residential Home, Three Rivers Woodland Park and West Bradford Village Hall.
Agricultural activity	The community area is comprised of approximately 15 agricultural properties.
Commercial operations	Commercial receptors include Three Millstones Hotel, Dove Skye Nursery and Eaves hall
Travel to work <sup>17</sup>	Approximately 9 % of employed residents work in Blackburn and 4 % in Burnley.

### Clitheroe

- 20) The Clitheroe community area is a built-up area, home to approximately 16,000 residents. Clitheroe is a regional market town with over 530 businesses including local newsagents, hairdressers, takeaways and other high street shops. One of the town's most notable buildings is Clitheroe Castle located in the centre of the community area. Clitheroe contains approximately 57 social receptors including Moorland Private School, Clitheroe Community Hospital and Clitheroe Royal Grammar School. The area is well connected by public transport links with hourly services to Blackburn and Manchester. The baseline characteristics of Clitheroe are summarised in Table 14.4.

**Table 14.4: Clitheroe Baseline Data**

Indicator	Clitheroe
Population <sup>18</sup>	Usual resident population is 14,765.
Population density <sup>19</sup>	Population density is 15.3 people per hectare compared to 1.0 in the RCAA.
Deprivation <sup>20</sup>	Clitheroe parish contains 10 LSOAs with varying levels of deprivation. Ribble Valley 002C is ranked in IMD decile 10 and is the least deprived LSOA within the parish. The most deprived LSOA, Ribble Valley 003C, is ranked in IMD decile 4. The mean decile for the 10 LSOAs located within the parish is 7.

<sup>15</sup> Census (2011a). *op. cit.*

<sup>16</sup> Ministry of Housing, Communities & Local Government (2019). *op. cit.*

<sup>17</sup> Census (2011b). *op. cit.*

<sup>18</sup> Census (2011a). *op. cit.*

<sup>19</sup> Census (2011a). *op. cit.*

<sup>20</sup> Ministry of Housing, Communities & Local Government (2019). *op. cit.*



Indicator	Clitheroe
Residential properties	The community is comprised of approximately 7,774 residential properties.
Social infrastructure	The community of Clitheroe contains approximately 57 social receptors including Moorland Private School, Clitheroe Community Hospital and Clitheroe Royal Grammar School.
Agricultural activity	The community area comprises approximately 6 agricultural properties.
Commercial operations	Clitheroe is a built-up area with approximately 532 commercial receptors including local newsagents, hairdressers, takeaways and high street shops.
Travel to work <sup>21</sup>	Approximately 9 % of employed residents work in Blackburn and 5 % in Burnley.

## 14.6 Assessment of likely significant effects

- 21) The following section describes the effects of the Proposed Ribble Crossing on Communities and Health.

### 14.6.1 Enabling Works

- 22) The following section presents the potential effects on the communities surrounding the Proposed Ribble Crossing during the enabling phase of the project. Enabling works would include the set-up of construction compounds and welfare facilities, site clearance, service diversions and fencing. A summary of enabling works effects is provided in Table 14.9.

#### **Disturbance effects**

##### Waddington

- 23) During enabling works, minor disturbance effects are expected on 3 residential properties located on West Bradford Road and Clitheroe Road as a result of minor noise and minor/moderate and major visual impacts. Moderate disturbance effects are also expected on Waddington and West Bradford C of E Primary school as a result of major noise and major visual impacts.
- 24) Table 14.5 presents a summary of disturbance effects in the Waddington community during enabling works.

<sup>21</sup> Census (2011b). *op. cit.*

**Table 14.5: Disturbance effects during enabling works – Waddington**

	No disturbance effect	Minor disturbance effect	Moderate disturbance effect	Major disturbance effect
Residential properties	486	3	0	0
Social Infrastructure	27	0	1	0
Agricultural activities	5	0	0	0
Commercial Operations	24	0	0	0
<b>Total community receptors</b>	<b>542</b>	<b>3</b>	<b>1</b>	<b>0</b>

- 25) Overall, Waddington is likely to experience some disturbance effects during enabling works as a result of a combination of noise and visual impacts.
- 26) As stated in Chapter 17: Noise and Vibration, temporary noise hoardings/barriers are to be installed around work sites prior to work commencing. At Waddington and West Bradford Church of England (C of E) Primary School, larger and more substantial noise barriers could be installed to further mitigate noise impacts and block the line of sight from the school buildings to the construction activities. Similarly, works at areas closest to the school would be programmed outside of school hours.
- 27) Given that the community area contains over 500 receptors and only four experience disturbance impacts which are mostly minor, the likely effect on the community of Waddington is assessed as negligible and not significant.

West Bradford

- 28) During enabling works, minor disturbance effects are expected for four residential properties located on Meadowcroft as a result of minor noise and moderate visual impacts.
- 29) Table 14.6 presents a summary of disturbance effects in the West Bradford community during enabling works.

**Table 14.6: Disturbance effects during enabling works – West Bradford**

	No disturbance effect	Minor disturbance effect	Moderate disturbance effect	Major disturbance effect
Residential properties	359	4	0	0
Social Infrastructure	3	0	0	0
Agricultural activities	15	0	0	0
Commercial Operations	3	0	0	0
<b>Total community receptors</b>	<b>380</b>	<b>4</b>	<b>0</b>	<b>0</b>

- 30) Overall, West Bradford is likely to experience some disturbance effects during enabling works as a result of a combination of noise and visual impacts. Given that the community area contains over 380 receptors and only four experience disturbance impacts, the likely effect on the community of West Bradford is assessed as negligible and not significant.

Clitheroe

- 31) During enabling works, minor disturbance effects are expected on one residential property and one agricultural property, located on West Bradford road, as a result of minor noise and moderate visual impacts.
- 32) Table 14.7 presents a summary of disturbance effects in the Clitheroe community during enabling works.

**Table 14.7: Disturbance effects during enabling works – Clitheroe**

	No disturbance effect	Minor disturbance effect	Moderate disturbance effect	Major disturbance effect
Residential properties	7773	1	0	0
Social Infrastructure	57	0	0	0
Agricultural activities	5	1	0	0
Commercial Operations	532	0	0	0
<b>Total community receptors</b>	<b>8367</b>	<b>2</b>	<b>0</b>	<b>0</b>

- 33) Overall, Clitheroe is likely to experience some disturbance effects during enabling works as a result of a combination of noise and visual impacts. Given that the community area contains over 8,300 receptors and only two experience disturbance impacts, the likely effect on the community of Clitheroe is assessed as negligible and not significant.

**Severance effects**

- 34) Severance is defined as the extent to which members of communities are able (or not able) to move around their community and access services/facilities. This includes the ability of users to access land, property, infrastructure, businesses, and community facilities. Severance effects for all communities during enabling works are considered in Table 14.8.

**Table 14.8: Community Severance Effect**

Severance	Community severance effect	Significance
<b>Traffic Volume, Severance, Driver Delay, Pedestrian Delay.</b>	During enabling works associated with the Proposed Ribble Crossing, the associated traffic is not expected to be of a significant volume to result in significant effects on severance, driver delay or pedestrian delay. Therefore, community severance effects are assessed as negligible.	Slight – Not Significant
<b>Public Rights of Way (PRoW)</b>	As reported in Chapter 13: Public Access and Recreation, during enabling and construction works, three PRoW would experience slight/moderate effects due the alignment of the Proposed Ribble Crossing.  Footpath 3-43-FP 22 and 3-43-FP-23, both located within the Waddington community area, represent key pedestrian routes from Waddington and West Primary C of E primary School to Clitheroe in the south. Users would experience an increase in journey length of	Slight – Not Significant

Severance	Community severance effect	Significance
	<p>up to 1 km via Waddington Road and Clitheroe Road B6478. Consultation with PRow officers and local groups would be carried out so that all closures and diversions can be agreed, publicised and the disturbance minimised to residents. Alternative routes are available, therefore, overall severance effect is assessed as minor.</p> <p>There are no PRow within the West Bradford or Clitheroe community areas which would experience significant impacts as a result of the Proposed Ribble Crossing. Therefore, severance effects are not applicable in these communities.</p>	
<p><b>Agricultural Land</b></p>	<p>The Proposed Ribble Crossing is located in agricultural land within the community areas of Waddington, West Bradford and Clitheroe. During enabling and construction works, the alignment of the Proposed Ribble Crossing results in some areas of agricultural land being isolated from the larger land holding. Embedded mitigation has been adopted to keep the route to the periphery of field boundaries where possible. Gated crossing points would be provided for landowners and tenants to enable access to land that the haulage route crosses. As adequate accessibility would be provided, the overall severance effect for all community areas is assessed as minor.</p>	<p>Slight – Not Significant.</p>

**Tourism effects**

- 35) The total supply of serviced and non-serviced establishments in the RCAA (Ribble Valley District) is approximately 3,300. During enabling works, the peak number of workers is not expected to result in adverse effects on tourism accommodation. Given the plentiful supply of bed spaces available in the RCAA, and the short duration of enabling activities, it is considered that there is enough capacity to absorb the additional workforce. Effects on tourism accommodation are therefore assessed as negligible and not significant.

**Health effects**

- 36) The health assessment identifies health determinants likely to be affected by the Proposed Ribble Valley Crossing. Where significant residual effects are reported by other topics in Volume 6, these are assessed within the health assessment. The health assessment has then followed a source-pathway-receptor model to identify potential health effects, only reporting effects through which there is a clear pathway between the source and the receptor and using evidence to support the conclusions. Significant residual effects have been identified within Chapter 6: Landscape and Arboriculture and Chapter 17: Noise and Vibration. The subsequent health effects are considered below.

Noise effects

- 37) In 2018, the WHO stated that ‘Environmental noise is a threat to public health, having negative impacts on human health and wellbeing’.<sup>22</sup> Whilst exposure to high levels of noise can lead to direct injury such as hearing loss, there are also non-auditory effects which can occur at levels far below those causing hearing impairment if experienced over the long term. These are the

<sup>22</sup> World Health Organisation. (2018). Environmental Noise Guidelines for the European Region. Available at: <https://www.euro.who.int/en/health-topics/environment-and-health/noise/publications/2018/environmental-noise-guidelines-for-the-european-region-2018>

results of psychological and physiological stress reactions and include annoyance, poor sleep, cardiovascular and metabolic effects. There is also strong evidence of a relationship between noise exposure and children's cognitive ability when noise effects are experienced long term<sup>23</sup>.

- 38) The relationship between environmental noise exposure and non-auditory human health impacts is very complex and depends not only on basic measurements of the physical noise in an area but also on non-acoustic factors, such as attitudinal, situational, and socio-demographic factors.
- 39) The assessment presented in Chapter 17: Noise and Vibration has identified potential significant noise and vibration effects at Waddington & West Bradford C of E Primary School (building), where moderate/major noise impacts are predicted for a maximum of four weeks.
- 40) As stated in Chapter 17: Noise and Vibration, temporary noise hoardings/barriers are to be installed around work sites prior to work commencing. Similarly, at Waddington and West Bradford C of E Primary School, in order to mitigate the significant impact at the school buildings it is proposed that the noisiest activities are programmed to occur before and after the school day where practicable.
- 41) Based on the strength of the scientific literature linking noise impacts and adverse human health outcomes, and the sensitivity of the population which could be exposed to noise impacts, it is concluded that there is potential for adverse health outcomes to be experienced on a short term basis, however, these are expected to be reversible. With the application of mitigation measures as outlined above, health effects are assessed as not significant.

#### Landscape and Visual effects

- 42) There is evidence to suggest that spending time in high quality natural environments can contribute to improved health and wellbeing, with exposure to natural environments associated with improved mental health.<sup>24</sup>
- 43) As stated in Chapter 6: Landscape and Arboriculture, during enabling works, moderate/major visual effects are expected on residents of Healings Farm, properties on West Bradford Road, Waddow Grove and properties on the settlement edge in Waddington. Moderate visual effects are also expected on Waddington and West Bradford C of E Primary School.
- 44) The existing environment is of a high quality with the River Ribble contributing to the tranquil and settled character of the valley landscape. Therefore, during enabling works residents are likely to perceive the environment as more stressful and of reduced quality which could contribute to adverse health effects.
- 45) Whilst the sensitivity of the population is assessed as high, the scientific evidence linking the quality of the existing environment with adverse effects on health is weak. Similarly, the enabling works would be of a relatively short duration and any associated health effects (such as annoyance and stress) would be reversible. Therefore, the health outcome is assessed as neutral and not significant.

#### **Summary of Enabling Works Effects**

- 46) A summary of enabling works effects is provided in Table 14.9.

<sup>23</sup> World Health Organisation (2018) *Op. Cit.*

<sup>24</sup> European Environment Agency (2020). Healthy environment, healthy lives: how the environment influences health and well-being in Europe. Available at: <https://www.eea.europa.eu/publications/healthy-environment-healthy-lives> [Accessed: 02/02/2021]

**Table 14.9: Summary of Enabling Works Effects**

Community	Value / Sensitivity	Effect	Nature of effect	Magnitude	Significance of Effect
LCAA - Waddington	High	Disturbance effects	Disturbance to residential properties, social infrastructure, agricultural activities and commercial operations as a result of noise, traffic and visual impacts.	Three receptors experience minor effects, one receptor experiences moderate effects.	Negligible – Not Significant
		Severance effects	Severance to community facilities as a result of traffic volume, driver delay, pedestrian delay, impacts on PRow and agricultural land.	Negligible effects on traffic volume, severance, driver delay and pedestrian delay. Minor effects on PRow and agricultural land.	Slight – Not Significant
LCAA - West Bradford	High	Disturbance effects	Disturbance to residential properties, social infrastructure and agricultural activities as a result of noise, air quality, traffic and visual impacts.	Four receptors experience minor effects.	Negligible – Not Significant
		Severance effects	Severance to community facilities as a result of traffic volume, driver delay, pedestrian delay, impacts on PRow and agricultural land.	Negligible effects on traffic volume, severance, driver delay and pedestrian delay and PRow. Minor effects on agricultural land.	Slight – Not Significant
LCAA - Clitheroe	High	Disturbance effects	Disturbance to residential properties, social infrastructure and agricultural activities as a result of noise, air quality, traffic and visual impacts.	Two receptors experience minor effects.	Negligible – Not Significant

Community	Value / Sensitivity	Effect	Nature of effect	Magnitude	Significance of Effect
		Severance effects	Severance to community facilities as a result of traffic volume, driver delay, pedestrian delay, impacts on PRoW and agricultural land.	Negligible effects on traffic volume, severance, driver delay and pedestrian delay and PRoW. Minor effects on agricultural land.	Slight – Not Significant
RCAA	High	Demands on tourism accommodation	Potential impacts on tourism accommodation due to demands from workers during enabling works.	Negligible given the plentiful supply of bed spaces within the RCAA	Negligible – Not Significant
RCAA	High	Health (noise effects)	Potential for adverse health outcomes as a result of noise impacts.	There is potential for adverse health outcomes short term due to annoyance, stress and nuisance effects however, with the application of mitigation measures in agreement with Ribble Valley Borough Council and West Bradford C of E Primary School the health outcome is assessed as not significant.	
		Health (Visual effects)	Adverse health outcomes as a result of visual impacts.	The health outcome is assessed as neutral and not significant.	

### 14.6.2 Construction Works

47) The following section presents the potential effects on the communities surrounding the Proposed Ribble Crossing during the construction phase of the project.

#### Disturbance effects

##### Waddington

48) During construction works, minor disturbance effects are expected on two residential properties as a result of minor noise and moderate/major visual impacts. One residential property (Lillands Cottage) experiences moderate disturbance effects as a result of moderate noise and major visual impacts. Moderate disturbance effects are also expected on Waddington and West Bradford C of E Primary school as a result of major noise and major visual impacts.

49) Table 14.10 presents a summary of disturbance effects in the Waddington community during construction.

**Table 14.10: Disturbance effects during construction – Waddington**

	No disturbance effect	Minor disturbance effect	Moderate disturbance effect	Major disturbance effect
Residential properties	486	2	1	0
Social Infrastructure	27	0	1	0
Agricultural activities	5	0	0	0
Commercial Operations	24	0	0	0
<b>Total community receptors</b>	<b>542</b>	<b>2</b>	<b>2</b>	<b>0</b>

50) Overall, Waddington is likely to experience some disturbance effects during construction works as a result of a combination of noise and visual impacts.

51) As stated in Chapter 17: Noise and Vibration, temporary noise hoardings/barriers are to be installed around work sites prior to work commencing. At Waddington and West Bradford C of E Primary School, larger and more substantial noise barriers could be installed to further mitigate noise impacts. Similarly, where practicable, works at areas closest to the school would be programmed outside of school hours.

52) Given that the community area contains over 500 receptors and only four experience disturbance impacts which are mostly minor, the likely effect on the community of Waddington is assessed as negligible and not significant.

##### West Bradford

53) During construction the disturbance effects are expected to be the same as those reported for the enabling works phase (Section 14.6.1). The likely effect on the community of West Bradford is assessed as negligible and not significant.

##### Clitheroe

54) During construction the disturbance effects are expected to be the same as those reported for the enabling works phase (Section 14.6.1). The likely effect on the community of Clitheroe is assessed as negligible and not significant.



### **Severance effects**

- 55) No new construction phase effects have been identified and therefore severance effects are consistent with effects identified within the enabling works phase (Section 14.6.1) and are assessed as slight and not significant.

### **Effects on tourism accommodation**

- 56) As stated in Volume 2 Chapter 14, the estimated peak construction workforce at each compound is 111. The total supply of bed spaces in serviced and non-serviced establishments in the Ribble Valley district is approximately 3,300. Assuming a peak occupancy level of 55 %, the demand for accommodation by construction workers equates to approximately 6.1 % of total headroom suggesting that there is enough capacity in the RCAA to absorb the additional workforce. The number of construction workers required for the Proposed Ribble Crossing is assumed to be lower than the Proposed Marl Hill Section. Therefore, effects on tourism accommodation are assessed as negligible and not significant.

### **Health effects**

- 57) During construction, significant residual effects have been identified within Chapter 6: Landscape and Arboriculture and Chapter 17: Noise and Vibration and Chapter. The subsequent health effects are considered below.

#### Noise effects

- 58) As stated above in Section 14.6.1, exposure to long term noise impacts can lead to adverse health outcomes such as annoyance, poor sleep, cardiovascular and metabolic effects and cognitive impairment in children.<sup>25</sup>
- 59) The assessment presented in Chapter 17: Noise and Vibration concludes that during construction works significant adverse noise effects are expected on Waddington & West Bradford C of E Primary School and Ribble View. These effects would be above the Significant Observed Adverse Effect Level (SOAEL) which is the point at which significant effects are possible on health and quality of life and would last up to 12 weeks.
- 60) Construction works would be carried out in accordance with Best Practicable Means (BPM) for mitigating noise emissions. Similarly, temporary noise hoardings/barriers are to be installed around work sites prior to work commencing. At Waddington and West Bradford C of E Primary School, larger and more substantial noise barriers would be installed to further mitigate noise impacts on sensitive receptors. Similarly, where practicable, works at areas closest to the school would be programmed outside of school hours.
- 61) The relationship between environmental noise exposure and non-auditory human health impacts is very complex. Based on the strength of the scientific literature linking noise impacts and adverse human health outcomes, the sensitivity of human receptors, and the potential for the noise effect to cross the SOAEL, the assessment concludes that there is potential for adverse health outcomes. However, as noise effects would be temporary and the size of the population exposed would be limited, with the application of mitigation measures as outlined above, health effects are assessed as not significant.

<sup>25</sup> European Environment Agency. (2020). Healthy Environment, healthy lives: how the environment influences wellbeing in Europe. Available at: <https://www.eea.europa.eu/publications/healthy-environment-healthy-lives>

Landscape and Visual effects

- 62) As stated above in Section 14.6.1, there is evidence to suggest that spending time in high quality natural environments can contribute to improved health and wellbeing, with exposure to natural environments associated with improved mental health, cognitive function, reduced cardiovascular morbidity, reduced prevalence of type 2 diabetes<sup>26</sup>.
- 63) During construction works moderate/major visual effects are expected on residents on West Bradford Road, Healings Farm, Lillands Cottage and Brungerley Farm. Major / moderate effects are also expected on Waddington and West Bradford C of E Primary School. Construction works in these locations would become a noticeable feature of the view with uncharacteristic features apparent across a moderate part of the view.
- 64) During construction, health outcomes consistent with effects identified within the enabling works phase (Section 14.6.1). Whilst the sensitivity of the population is assessed as high, the scientific evidence linking the quality of the existing environment with adverse effects on health is weak. Similarly, the works would be of a relatively short duration and any associated health effects (such as annoyance and stress) would be reversible. Therefore, the health outcome is assessed as neutral and not significant.

**Summary of Construction Works Effects**

- 65) A summary of construction works effects is provided in Table 14.11.

**Table 14.11: Summary of Construction Phase Effects**

Community	Value / Sensitivity	Effect	Nature of Effect	Magnitude	Significance of Effect
LCAA - Waddington	High	Disturbance	Disturbance to residential properties, social infrastructure, agricultural activities and commercial operations as a result of noise, traffic and visual impacts.	Two receptors experience minor effects, two receptors experience moderate effects.	Negligible – Not Significant
		Severance	Severance to community facilities as a result of traffic volume, driver delay, pedestrian delay, impacts on PRow and agricultural land.	Negligible effects on traffic volume, severance, driver delay and pedestrian delay. Minor effects on PRow and agricultural land.	Slight – Not Significant
LCAA - West Bradford	High	Disturbance	Disturbance to residential properties, social infrastructure, agricultural activities and commercial operations as a result of noise, traffic and visual impacts.	Four receptors experience minor effects.	Negligible – Not Significant
		Severance	Severance to community facilities as a result of traffic volume, driver delay, pedestrian delay, impacts on PRow and agricultural land.	Negligible effects on traffic volume, severance, driver delay and pedestrian delay and PRow. Minor effects on agricultural land.	Slight – Not Significant

<sup>26</sup> European Environment Agency (2020). *Op Cit.*

Community	Value / Sensitivity	Effect	Nature of Effect	Magnitude	Significance of Effect
LCAA - Clitheroe	High	Disturbance	Disturbance to residential properties, social infrastructure, agricultural activities and commercial operations as a result of noise, traffic and visual impacts.	Two receptors experience minor effects.	Negligible – Not Significant
		Severance	Severance to community facilities as a result of traffic volume, driver delay, pedestrian delay, impacts on PRoW and agricultural land.	Negligible effects on traffic volume, severance, driver delay and pedestrian delay and PRoW. Minor effects on agricultural land.	Slight – Not Significant
RCAA	High	Demands on tourism accommodation	Potential impacts on tourism accommodation due to demands from workers during construction works.	Negligible given the plentiful supply of bed spaces within the RCAA	Negligible – Not Significant
RCAA	High	Health (Noise)	Potential for adverse health outcomes as a result of noise impacts.	There is potential for adverse health outcomes short term due to annoyance, stress and nuisance effects however, with the application of mitigation measures in agreement with Ribble Valley Borough Council and West Bradford C of E Primary School the health outcome is assessed as not significant.	
		Health (Visual Effects)	Adverse health outcomes as a result of visual impacts.	The health outcome is assessed as neutral and not significant.	

### 14.6.3 Operational Works

66) The following section presents the potential effects on the communities surrounding the Proposed Ribble Crossing during the operational phase of the project. During operation, construction vehicles for the Proposed Marl Hill Section would travel from the A59 along West Bradford Road, using the Proposed Ribble Crossing to access the B678 in Waddington. A summary of effects during the operational phase is provided in Table 14.14.

#### Disturbance effects

##### Waddington

- 67) During operation, minor disturbance effects are expected on one residential property (The Healings) located on West Bradford Road as a result of minor traffic and moderate visual impacts. Moderate disturbance effects are expected on one further residential property (Lillands Cottage) as a result of minor traffic, minor noise and moderate visual impacts. Minor disturbance effects are also expected on Waddington and West Bradford C of E Primary school as a result of minor traffic and minor noise impacts.
- 68) Table 14.12 presents a summary of disturbance effects in the Waddington community during enabling works.

**Table 14.12: Disturbance effects during enabling works – Waddington**

	No disturbance effect	Minor disturbance effect	Moderate disturbance effect	Major disturbance effect
Residential properties	487	1	1	0
Social Infrastructure	27	1	0	0
Agricultural activities	5	0	0	0
Commercial Operations	24	0	0	0
<b>Total community receptors</b>	<b>542</b>	<b>2</b>	<b>1</b>	<b>0</b>

- 69) Overall, Waddington is likely to experience some disturbance effects during operation of the Proposed Ribble Crossing as a result of a combination of traffic, noise and visual impacts.
- 70) As stated in Chapter 17: Noise and Vibration, temporary noise hoardings/barriers are to be installed around work sites prior to work commencing. At Waddington and West Bradford Church of England (C of E) Primary School, larger and more substantial noise barriers could be installed to further mitigate noise impacts and block the line of sight from the school buildings. Similarly, works at areas closest to the school would be programmed outside of school hours.
- 71) A mitigation strategy is proposed to reduce potentially slight impacts over a short period of time in locations which are most sensitive to an increase in traffic. Measures include a Construction Traffic Management Plan (CTMP) (RVBC-MH-APP-007-02), an Interim Travel Plan and a Highway Stakeholder Group with the aim to ensure that effects on local receptors are limited.
- 72) Given that the community area contains over 500 receptors and only three experience disturbance impacts which are mostly minor, the likely effect on the community of Waddington is assessed as negligible and not significant.

West Bradford

- 73) During operation, no disturbance effects are expected for community receptors within the West Bradford community area. The overall effect is assessed as negligible and not significant.

Clitheroe

- 74) During operation, no disturbance effects are expected for community receptors within the Clitheroe community area. The overall effect is assessed as negligible and not significant.

**Severance effects**

- 75) Severance effects for all communities during the operational phase are considered in Table 14.13.

**Table 14.13: Community Severance Effect**

Severance	Community severance effect	Significance
Traffic Volume, Severance, Driver Delay,	As stated in Chapter 16: Transport Planning, during construction of the Proposed Marl Hill Section, slight residual effects may be experienced on West Bradford Road and Clitheroe Road due to an increase in construction traffic. It is likely that the volume of	Slight – Not Significant

Severance	Community severance effect	Significance
<b>Pedestrian Delay.</b>	additional vehicle movements could generate negative perceptions by local residents within the Waddington community area. A mitigation strategy is proposed to reduce potentially slight impacts over a short period of time in locations which are most sensitive to an increase in traffic. Measures include a CTMP (RVBC-MH-APP-007-02), an Interim Travel Plan and a Highway Stakeholder Group with the aim to ensure that effects on local receptors are limited. With the application of mitigation measures as outlined in Chapter 16, the severance effect is assessed as minor.	
<b>Public Rights of Way (PRoW)</b>	No new effects have been identified during operation and therefore severance effects are consistent with effects identified within the enabling works phase (Section 14.6.1).	Slight – Not Significant
<b>Agricultural Land</b>	No new effects have been identified during operation and therefore severance effects are consistent with effects identified within the enabling works phase (Section 14.6.1).	Slight – Not Significant.

**Effects on tourism accommodation**

- 76) During operation, the workforce would be limited to maintenance and security staff. Given the plentiful supply of bed spaces available in the RCAA, it is considered that there is enough capacity to absorb the operational workforce. Effects on tourism accommodation are therefore assessed as negligible and not significant.

**Health effects**

- 77) During operation, significant residual effects have been identified within Chapter 6: Landscape and Arboriculture.
- 78) The assessment concludes moderate adverse visual effects are expected on residents of Lillands Cottage, Healings Farm and those on West Bradford Road. Similarly, moderate adverse effects are expected on Waddington and West Bradford C of E school. These residents would experience short distance open views of traffic using the Proposed Ribble Crossing resulting in noticeable and uncharacteristic features visible across a moderate part of the view.
- 79) Whilst the sensitivity of the population is assessed as high, the scientific evidence linking the quality of the existing environment with adverse effects on health is weak. Alternative areas of green space are available locally and the health effects are also considered to be reversible. Therefore, the health outcome is assessed as neutral and not significant.

**Summary of Operation Works Effects**

- 80) A summary of effects during operation is provided in Table 14.14.

**Table 14.14: Summary of effects during operation**

Community	Value / Sensitivity	Effect	Nature of Effect	Magnitude	Significance of Effect
LCAA - Waddington	High	Disturbance	Disturbance to community receptors as a result of the operation of the Proposed Ribble Crossing.	Negligible – minor disturbance effects expected on two residential receptors.	Negligible – Not Significant
		Severance effects	Severance to community facilities as a result of traffic volume, driver delay, pedestrian delay, impacts on PRow and agricultural land.	Minor effects on traffic volume, severance, driver delay and pedestrian delay. Minor effects on PRow and agricultural land.	Slight – Not Significant
LCAA - West Bradford	High	Disturbance	Disturbance to community receptors as a result of the operation of the Proposed Ribble Crossing.	Negligible – no community receptors are expected to experience disturbance effects.	Negligible – Not Significant
		Severance effects	Severance to community facilities as a result of traffic volume, driver delay, pedestrian delay, impacts on PRow and agricultural land.	Minor effects on traffic volume, severance, driver delay and pedestrian delay and PRow. Minor effects on agricultural land.	Slight – Not Significant
LCAA - Clitheroe	High	Disturbance	Disturbance to community receptors as a result of the operation of the Proposed Ribble Crossing.	Negligible – no community receptors are expected to experience disturbance effects.	Negligible – Not Significant
		Severance effects	Severance to community facilities as a result of traffic volume, driver delay, pedestrian delay, impacts on PRow and agricultural land.	Minor effects on traffic volume, severance, driver delay and pedestrian delay and PRow. Minor effects on agricultural land.	Slight – Not Significant

Community	Value / Sensitivity	Effect	Nature of Effect	Magnitude	Significance of Effect
RCAA	High	Demands on tourism accommodation	Potential impacts on tourism accommodation due to demands from workers during construction works.	Negligible given the plentiful supply of bedspaces within the RCAA.	Negligible – Not Significant
RCAA	High	Health	Adverse health outcomes because of visual impacts.		The health outcome is assessed as neutral and not significant.

#### **14.6.4 Decommissioning**

- 81) During decommissioning, the road would be fully removed, and the land reinstated once the works at the main compounds serving tunnel construction have been completed.

##### **Disturbance effects**

###### Waddington

- 82) During decommissioning the disturbance effects are expected to be the same as those reported for the construction works. The likely effect on the community of Waddington is assessed as negligible and not significant.

###### West Bradford

- 83) During decommissioning the disturbance effects are expected to be the same as those reported for the enabling and construction works. The likely effect on the community of West Bradford is assessed as negligible and not significant.

###### Clitheroe

- 84) During decommissioning the disturbance effects are expected to be the same as those reported for the enabling and construction works. The likely effect on the community of Clitheroe is assessed as negligible and not significant.

##### **Severance effects**

- 85) No new severance effects have been identified during the decommissioning phase and therefore severance effects are consistent with effects identified within the enabling works phase. By the end of the reinstatement phase, the road would be fully removed and the land reinstated. Therefore, any severance effects would be negligible.

##### **Effects on tourism accommodation in the RCAA**

- 86) During decommissioning, effects on tourism accommodation are expected to be the same as those reported for the construction works. Effects on tourism accommodation are assessed as negligible and not significant.

##### **Health effects in the RCAA**

- 87) During decommissioning, significant residual effects have been identified within Chapter 6: Landscape and Arboriculture and Chapter 17: Noise and Vibration and Chapter.

###### Landscape and visual effects

- 88) During decommissioning, the assessment presented in Chapter 6: Landscape and Arboriculture concludes major adverse visual impacts on the Healings Farm, Lillands Cottage, Waddington and West Bradford C of E school, and properties on West Bradford Road.

- 89) The assessment concludes moderate adverse visual effects are expected on residents of Lillands Cottage, Healings Farm and those on West Bradford Road. Similarly, moderate adverse effects are expected on Waddington and West Bradford C of E school. These residents would experience short distance open views of construction traffic resulting in noticeable and uncharacteristic features visible across a moderate part of the view.

- 90) Health effects are therefore consistent with those identified in Section 14.4.2 and are assessed as neutral and not significant.



Noise effects

- 91) As stated in Chapter 17: Noise and Vibration, it is assumed that the noise impacts would be of a similar magnitude to the main construction phase. Health effects are therefore consistent with those identified in Section 14.6.2 and are assessed as adverse but not significant.

**Summary of effects during the decommissioning phase**

A summary of effects during the decommissioning phase is provided in Table 14.15.

**Table 14:15: Summary of effects during the decommissioning phase**

Community	Value / Sensitivity	Effect	Nature of Effect	Magnitude	Significance of Effect
LCAA - Waddington	High	Severance	Severance to community facilities as a result of traffic volume, driver delay, pedestrian delay, impacts on PRow and agricultural land.	Negligible effects on traffic volume, severance, driver delay and pedestrian delay. Minor effects on PRow and agricultural land.	Slight – Not Significant
		Disturbance	Disturbance to residential properties, social infrastructure and agricultural activities as a result of noise, air quality traffic, visual impacts.	One receptor experiences a minor effect, four receptors experience moderate effects.	Negligible – Not Significant
LCAA - West Bradford	High	Severance	Severance to community facilities as a result of traffic volume, driver delay, pedestrian delay, impacts on PRow and agricultural land.	Negligible effects on traffic volume, severance, driver delay and pedestrian delay and PRow. Minor effects on agricultural land.	Slight – Not Significant
		Disturbance	Disturbance to residential properties, agricultural activities and commercial operations as a result of noise, air quality traffic, visual impacts.	Four receptors experience minor effects, two receptors experience moderate effects.	Negligible – Not Significant
LCAA - Clitheroe	High	Severance	Severance to community facilities as a result of traffic volume, driver delay, pedestrian delay, impacts on PRow and agricultural land.	Two receptors experience minor effects.	Negligible – Not Significant
		Severance	Severance to community facilities as a result of traffic volume, driver delay, pedestrian delay, impacts on PRow and agricultural land.	Negligible effects on traffic volume, severance, driver delay and pedestrian delay. Minor effects on PRow and agricultural land.	Slight – Not Significant
RCAA	High	Demands on tourism accommodation	Potential impacts on tourism accommodation due to demands from	Negligible given the plentiful supply of bedspaces within the RCAA	Negligible – Not Significant

Community	Value / Sensitivity	Effect	Nature of Effect	Magnitude	Significance of Effect
			workers during decommissioning works.		
RCAA	High	Health (Noise)	Adverse health outcomes as a result of noise impacts.	There is potential for adverse health outcomes however, with the application of mitigation measures health effects are assessed as not significant.	
RCAA	High	Health (Visual Effects)	Adverse health outcomes as a result of visual impacts.	The health outcome is assessed as neutral and not significant.	

### 14.7 Mitigation and Residual Effects

- 92) Mitigation is most effective if considered as an integral part of the Proposed Ribble Crossing design in order to avoid, reduce or offset any adverse effects on the Communities and Health or the wider environment.
- 93) Measures that would serve to mitigate the adverse effects of the Proposed Ribble Crossing are presented in Chapter 20: Environmental Mitigation, Appendix 20.1: Mitigation Schedule, Appendix 20.2: Environmental Masterplan, the CCoP and the CTMP (RVBC-MH-APP-007-02). All of these measures relate to the various sources of effects considered by other technical chapters (e.g. Chapter 6: Landscape and Arboriculture, Chapter 16: Transport Planning, Chapter 17: Noise and Vibration and Chapter 18: Air Quality). Given that this chapter draws upon the effects reported in these chapters, they are not repeated here.
- 94) No additional essential mitigation for Communities and Health has been identified over and above the measures contained within the chapters referenced in this assessment.

### 14.8 Cumulative Effects

- 95) The following section considers the potential cumulative effects from different proposed developments and land allocations, in combination with the Proposed Ribble Crossing (i.e. inter-project cumulative assessment). It is recognised that Chapter 14 itself appraises intra-development effects i.e. different types of effect associated with the Proposed Ribble Crossing that impact on a specific receptor or receptor group.
- 96) Data on proposed third party developments and land allocations contained in development plan documents were obtained from various sources, including local planning authority websites, online searches, and consultations with planning officers. Proposed development data were then reviewed with a view to identifying schemes or land allocations whose nature, scale and scope could potentially give rise to significant environmental effects when considered in combination with the likely effects arising from the Proposed Ribble Crossing.
- 97) The over-arching cumulative effects of the Proposed Programme of Works i.e. the five proposed replacement tunnel sections in combination, are considered in Chapter 19: Cumulative Effects. In addition, Chapter 19 examines the cumulative effects associated with the outcomes from Volume 2 (delivery and operation of the main construction compounds, tunnel, and construction traffic routes), Volume 5 (proposed off-site highways works and satellite compounds), and Volume 6 (Proposed Ribble Crossing).

- 98) Based on professional judgement, it was concluded that there are no proposed third party developments or land allocations in local development plan documents which could potentially give rise to likely significant cumulative effects. No cumulative assessment was therefore undertaken for Communities and Health in the context of the Ribble Crossing.

#### **14.9 Conclusion**

- 99) This chapter of the ES considered the potential Community and Health impacts associated with construction and operation of the Proposed Ribble Crossing. Disturbance and severance effects were assessed across three community areas, Waddington, West Bradford and Clitheroe. Health effects and demands on tourism accommodation were assessed for the RCAA.
- 100) All community areas are expected to experience some disturbance effects on community receptors as a result of a combination of visual, noise and vibration, and traffic impacts however based on the mitigation proposed within the CCoP and CTMP (RVBC-MH-APP-007-02) and the proportion of each community area expected to be impacted, the overall disturbance effect for all community areas was assessed as negligible or slight and not significant during all phases of works.
- 101) The assessment also considered the potential for changes in access to land, property, infrastructure, businesses, and community facilities, which could result from the proposed infrastructure itself, or from potential road closures or delays imposed by traffic management measures. For all communities, severance effects were assessed as slight and not significant during all phases of works.
- 102) Effects on tourism were also assessed as negligible for all phases of work based on the large supply of bed spaces within the RCAA and the small demand required by the Proposed Ribble Crossing construction workforce.
- 103) Finally, the assessment considered the key health determinants likely to be affected by the Proposed Ribble Crossing. Significant residual effects were reported by Chapter 6: Landscape and Arboriculture and Chapter 17: Noise and Vibration and Chapter. Whilst there is potential for adverse health outcomes as a result of noise effects, based on the proposed mitigation measures and the temporary nature of effects, the overall health outcomes are assessed as not significant.

#### **14.10 Glossary and Key Terms**

- 104) Key phrases and terms used within this technical chapter relating to Communities and Health are defined within Appendix 1.2: Glossary and Key Terms.