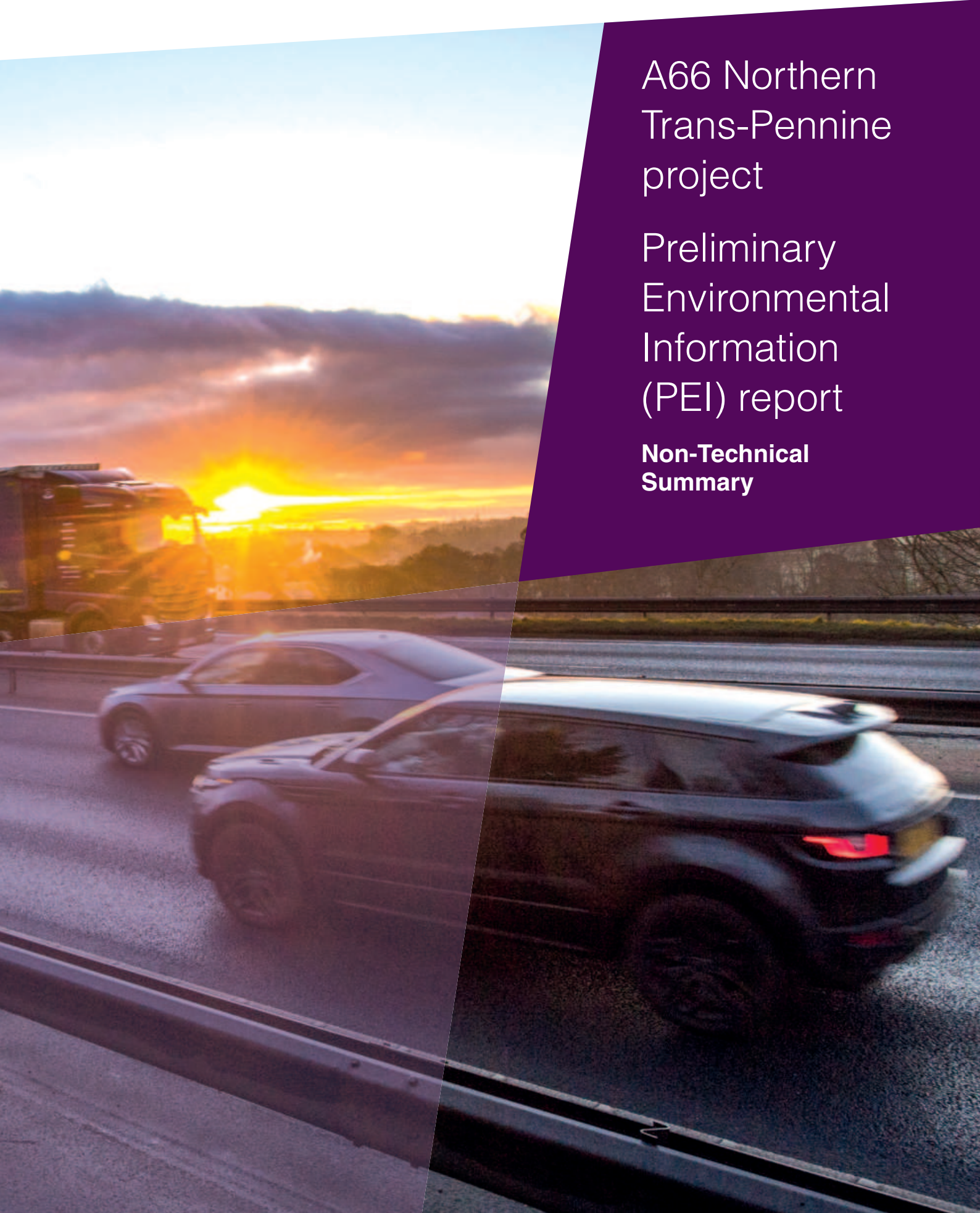


A66 Northern  
Trans-Pennine  
project

Preliminary  
Environmental  
Information  
(PEI) report

**Non-Technical  
Summary**



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## 1 Introduction

- 1.1.1 Highways England proposes to improve the A66 between M6 junction 40 at Penrith and the A1(M) at Scotch Corner. The project is a Nationally Significant Infrastructure Project (NSIP) under the Planning Act 2008. This means that an application will need to be made to the Secretary of State for permission to construct the project. This permission is called a Development Consent Order (DCO).
- 1.1.2 Before an application for a DCO is submitted, the local community and other stakeholders must be formally consulted on the proposals including:
- a description of the proposed project and the reasonable alternatives considered
  - the environmental setting
  - the likely significant environmental effects based on the preliminary environmental information available at the time
  - the measures proposed to date to avoid or reduce such effects
- 1.1.3 This is to support consultees in developing an informed view of the likely significant environmental effects of the project.
- 1.1.4 As well as undertaking this consultation, we are continuing to collect and assess information about environmental effects to inform decision making, a process known as Environmental Impact Assessment (EIA).
- 1.1.5 While the EIA is ongoing, we have prepared a Preliminary Environmental Information (PEI) Report to provide sufficient information to help consultees develop an informed view of the project and its likely significant environmental effects. The PEI Report has been developed for the purposes of this consultation and contains available information from the ongoing EIA.
- 1.1.6 The information contained within the PEI Report is preliminary and this, along with feedback received from the consultation, will help to shape and develop the findings for the Environmental Statement (ES). The ES, presenting the full results of the EIA, will be submitted as part of the DCO application.
- 1.1.7 This Non-Technical Summary (NTS) presents a summary of the information and preliminary environmental assessment undertaken to date, as set out in the more detailed PEI Report.





## 2 Why is the scheme needed?

- 2.1.1 The existing A66 is a key national and regional strategic link; it carries high levels of freight traffic, as well as being an important route for tourism and providing vital connectivity for nearby communities. There are no direct rail alternatives for passenger or freight movements along the corridor. Despite the strategic importance of the A66, the route between the M6 at Penrith and the A1(M) at Scotch Corner is only intermittently dualled. It has six separate sections of single carriageway over the total road length of 80km.
- 2.1.2 The route also carries local slow moving agricultural and non-motorised traffic making short journeys which can have an impact on other users, especially on the single carriageway sections. The A66 is also an important route for tourism, providing access to the North Pennines Area of Outstanding Natural Beauty (AONB), the Yorkshire Dales and the Lake District National Park. The mix of road standards, together with the lack of available diversionary routes when incidents occur, affects road safety, reliability, resilience and attractiveness of the route.
- 2.1.3 If the existing A66 route is not improved, it will constrain national and regional connectivity and threaten the transformational growth envisaged by the Northern Powerhouse agenda.
- 2.1.4 The project forms part of the UK Government's 'Project Speed' announced as part of A New Deal for Britain<sup>1</sup>, which aims to bring forward proposals to deliver public investment projects more strategically and efficiently. Project Speed aims to ensure that the right things are built better.
- 2.1.5 If the DCO is granted, construction is planned to start in the first quarter of 2024 and the project is due to open to traffic in 2029.

## 2.2 The Applicant

- 2.2.1 Highways England is the Applicant and the strategic highways company appointed by the Secretary of State under the Infrastructure Act 2015 being charged with operating, maintaining and improving England's motorways and major A roads, known as the strategic road network, on behalf of the Department for Transport.
- 2.2.2 On 20<sup>th</sup> August 2021 it was announced that Highways England would be changing its name to National Highways. The name change reflects the role of the strategic road network – to connect the nation's regions – and the part it plays in setting highways standards across the UK. We have continued this consultation under the Highways England branding to avoid confusion but will be rebranding this project as of 8 November 2021. The remit of the organisation has not changed and we will continue to operate and maintain England's motorways and A roads.

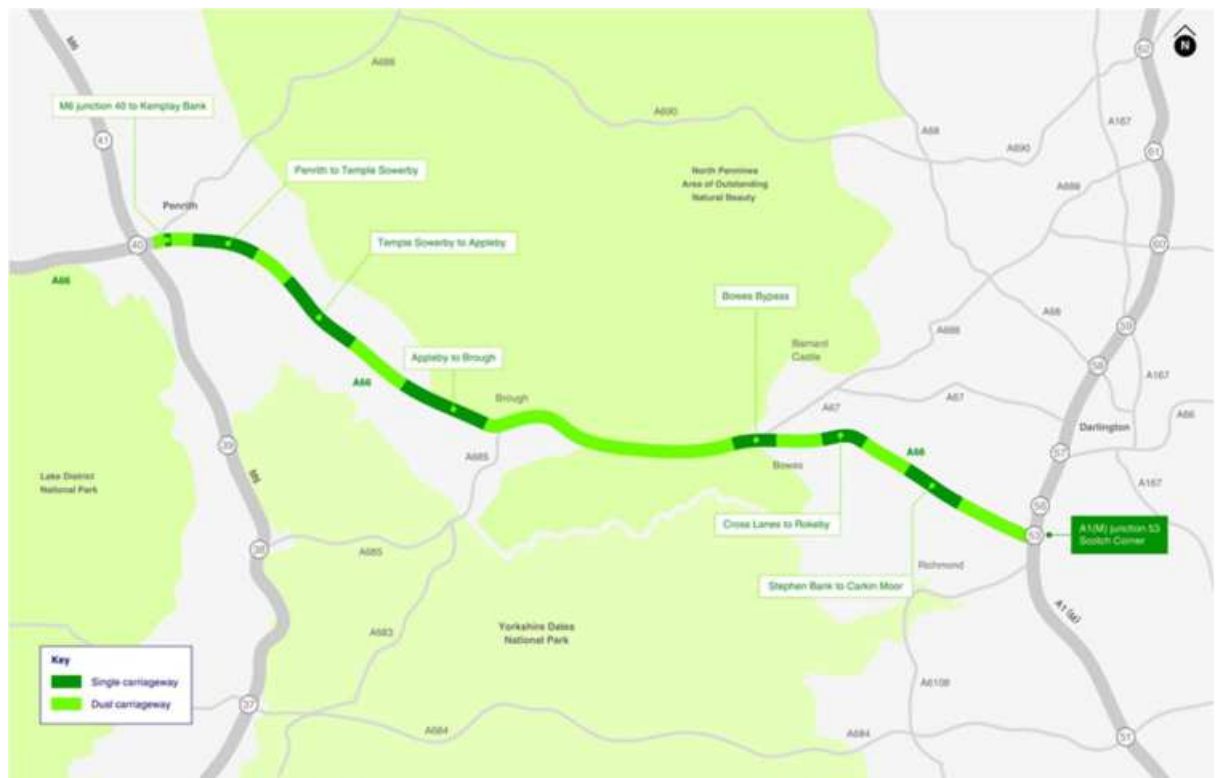
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<sup>1</sup> Prime Minister's Office, 10 Downing Street (2020), *Press Release: A New Deal for Britain*, available at: <https://www.gov.uk/government/news/pm-a-new-deal-for-britain>

## 3 The project

### 3.1 Description of the project

- 3.1.1 The project comprises the improvement of the A66 between the M6 at Penrith and the A1(M) at Scotch Corner.
- 3.1.2 The project has been split into eight schemes. It includes upgrading the existing six single lane sections to dual two-lane all-purpose roads with a speed limit of 70mph, with the exception of a section of the A66 from the M6 junction 40 through Kemplay Bank, which will have a speed limit of 50mph. The project also includes amendments to existing junctions and accesses within these sections.



- 3.1.3 Some of the eight schemes involve online widening (i.e. using the existing carriageway) of the carriageway and some are offline (i.e. new sections of road that follow a different route but reconnect into the main A66 alignment). Along with dualling six sections of existing single carriageway, other improvements will be made along the route, such as junction improvements at the M6 junction 40 and minor improvements to the existing dual carriageway sections of the A66 within the existing highway boundary (for example new signs or road markings).
- 3.1.4 The eight individual schemes are as follows and are described in **Error! Reference source not found.** and **Error! Reference source not found.**:
- M6 junction 40 to Kemplay Bank
  - Penrith to Temple Sowerby
  - Temple Sowerby to Appleby
  - Appleby to Brough
  - Bowes Bypass
  - Cross Lanes to Rokeby
  - Stephen Bank to Carkin Moor

- A1(M) Junction 53 Scotch Corner

## Scheme details

- 3.1.5 The design of the proposed project is ongoing. As detailed in Chapter 2: The Project of the PEI Report, the PEI Report reports on the assessment of the alternative alignments for certain schemes that have been considered since the Preferred Route Announcement (PRA) for the project. A summary description of each of the schemes is provided below including alternative alignment routes that have been assessed.

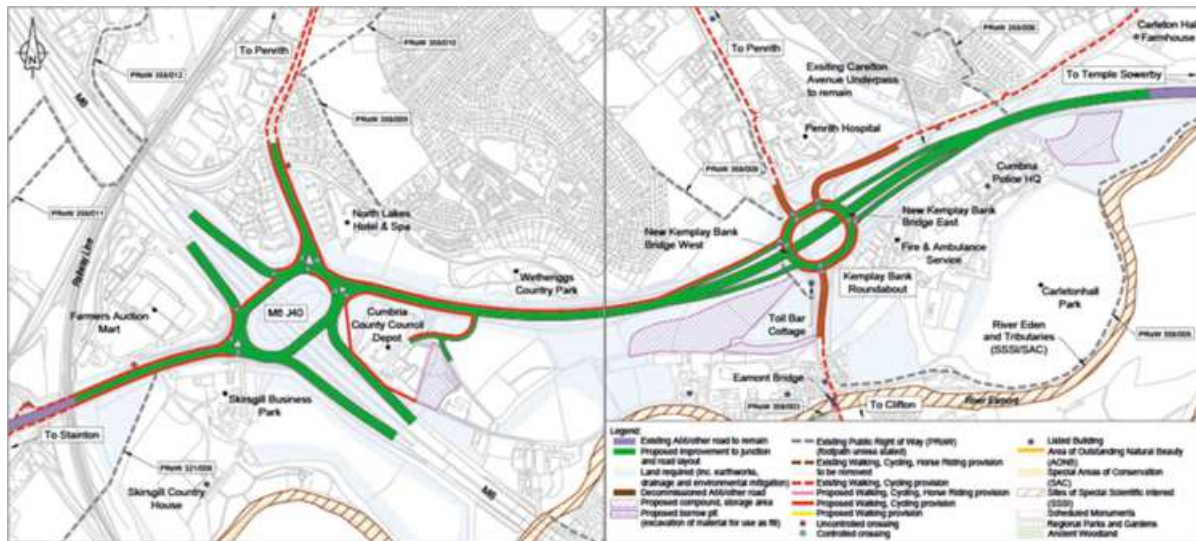
Table 3-1 Alternative alignments assessed

Scheme	Alternatives
<b>M6 junction 40 to Kemplay Bank</b>	Preferred Route with design refinements
<b>Penrith to Temple Sowerby</b>	Preferred Route with design refinements
<b>Temple Sowerby to Appleby</b>	Blue Route (Evolved Preferred Route) Orange (Online Alternative) Red (Offline Alternative)
<b>Appleby to Brough</b>	Black (Evolved Preferred Route) Blue Alternative Section Orange Alternative Section
<b>Bowes Bypass</b>	Preferred Route with design refinements
<b>Cross Lanes to Rokeby</b>	Black (Evolved Preferred Route) Cross Lanes – Blue Alternative junction Rokeby – Red Alternative junction
<b>Stephen Bank to Carkin Moor</b>	Preferred Route with design refinements
<b>A1(M) junction 53 Scotch Corner</b>	Added to the project since Preferred Route Announcement

- 3.1.1 The following legend applies to all of the scheme diagrams below. Note these diagrams, with further explanation can also be found in the consultation brochure. Where zoom in bubbles are shown, the junction details can be found in the consultation brochure.

<b>Legend:</b>		
Existing A66/other road to remain	Existing Public Right of Way (PRow) (footpath unless stated)	Listed Building
Proposed improvement to junction and road layout	Existing Walking, Cycling, Horse Riding provision to be removed	Area of Outstanding Natural Beauty (AONB)
Land required (inc. earthworks, drainage and environmental mitigation)	Existing Walking, Cycling provision	Special Areas of Conservation (SAC)
Decommissioned A66/other road	Proposed Walking, Cycling, Horse Riding provision	Sites of Special Scientific Interest (SSSI)
Proposed compound, storage area	Proposed Walking, Cycling provision	Scheduled Monuments
Proposed borrow pit (excavation of material for use as fill)	Proposed Walking provision	Regional Parks and Gardens
	Uncontrolled crossing	Ancient Woodland
	Controlled crossing	

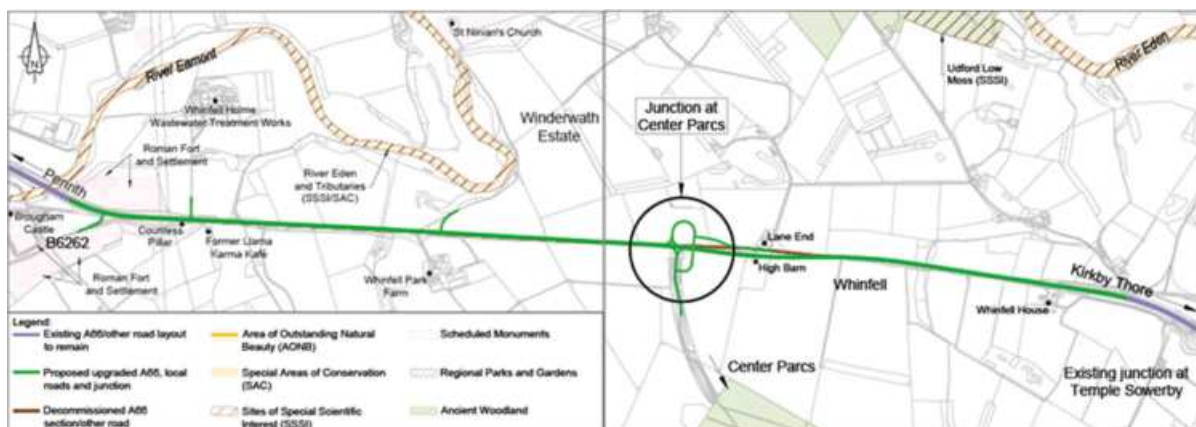
## M6 Junction 40 to Kemplay Bank



### 3.1.2 The key features of this scheme are:

- Three-lane circulatory carriageway and new road markings on the existing M6 junction 40 roundabout.
- Widening of the A66 eastern arm from two to three lanes in each direction between the junction 40 and Kemplay Bank roundabout.
- Widening of the M6 North, M6 South, A66 East, A66 West, and A592 Ullswater Road approach arms to provide additional lanes and a dedicated left turn facility.
- New on-slip and off-slip roads at the A6 and A686.
- New underpass beneath Kemplay Bank roundabout.
- The underpass off Carleton Avenue will be retained and extended to accommodate the widening of the A66.
- New controlled crossings for existing shared cycle/footway connections that cross the scheme.
- All existing accesses and cycleways and footways will be accommodated either through being retained or will be rerouted close by.
- Reduced speed limit to 50mph between junction 40 and Kemplay Bank roundabout.

## Penrith to Temple Sowerby





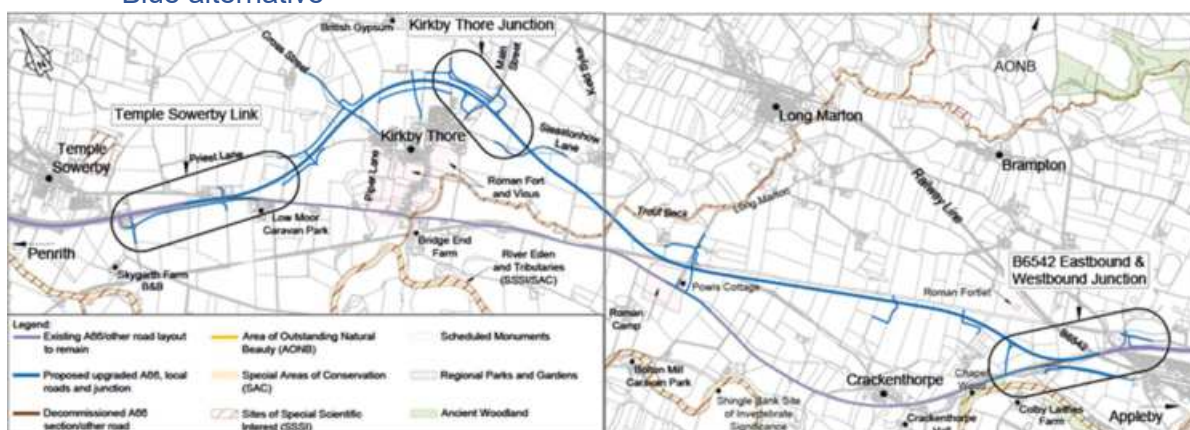
### 3.1.3 The key features of this scheme are:

- Full dualling of the existing A66 single carriageway between Penrith and Temple Sowerby.
- Widening of the existing carriageway to form one side of the new dual carriageway and constructing the second side of the carriageway north of the existing A66.
- Removal of existing crossing points over the existing A66 but maintaining access for agricultural vehicles via two new private access structures, and for landowners through new access tracks north and south of the route.
- New junction to replace the Centre Parks junction.
- New left-in/left-out junctions with associated acceleration and deceleration lanes at the B6262, the access to the Whinfell Holme Wastewater Treatment Works, and the access to St Ninian's Church.
- Amenity parking area with footway access to the Countess Pillar historic monument.

## Temple Sowerby to Appleby

### 3.1.4 This scheme has three alternative alignments that have been considered and are described below.

#### Blue alternative

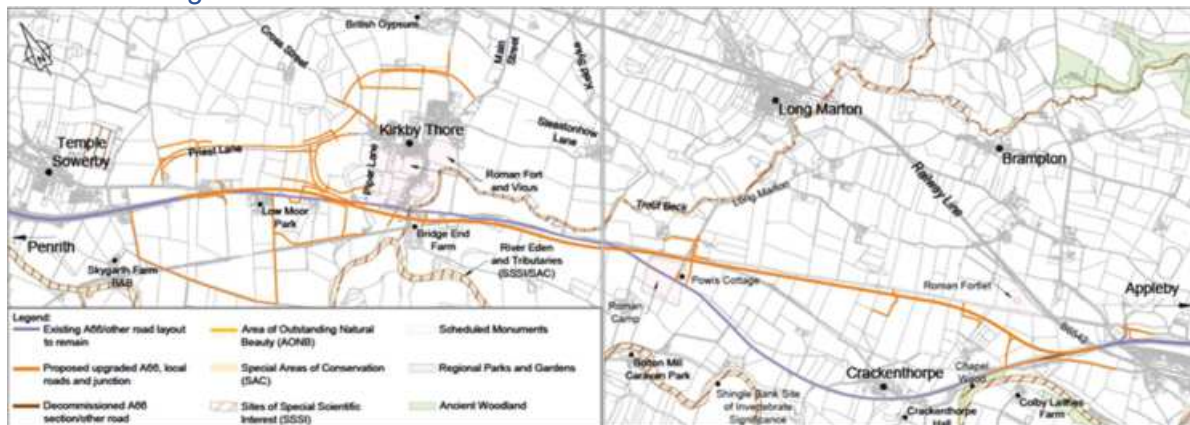


### 3.1.5 The key features of this scheme are:

- A new offline bypass around the north of Kirkby Thore.
- A new bypass to the north of Crackenthorpe.
- Follows the PRA alignment from the western end of Kirkby Thore to the junction at the British Gypsum site to the north of Kirkby Thore.
- A multi-span viaduct over the Trout Beck and its floodplain.
- A number of new junctions, bridge structures and improvements throughout the route.



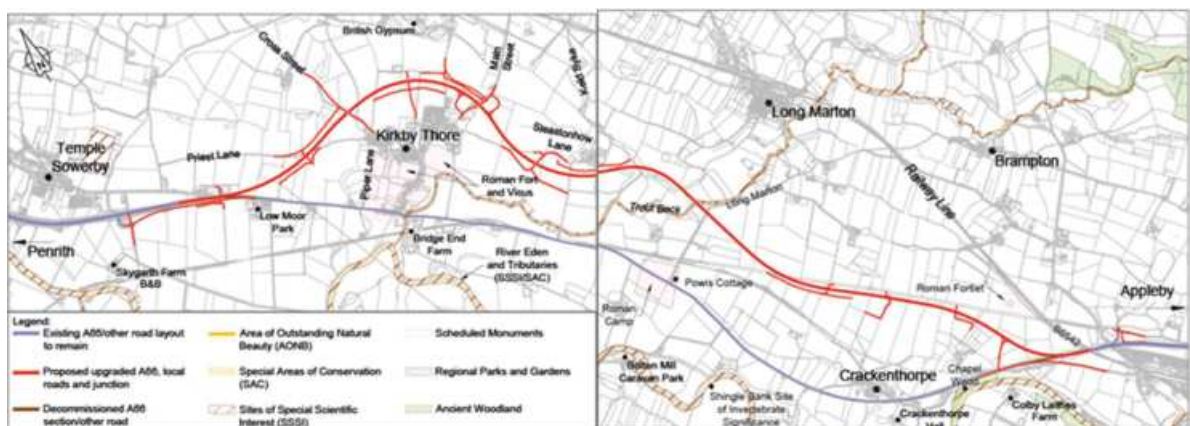
### Orange alternative



#### 3.1.6 The key features of this scheme are:

- Bypass falls slightly to the south of the existing A66 and then follows a similar alignment to the existing A66 through Kirkby Thore.
- Trout Beck crossing at Bridge End.
- A new bridge associated with the new A66.
- Follows the PRA alignment from Long Marton junction to north of Crackenthorpe.
- Upgrade Priest Lane to a 6m wide carriageway.

### Red alternative



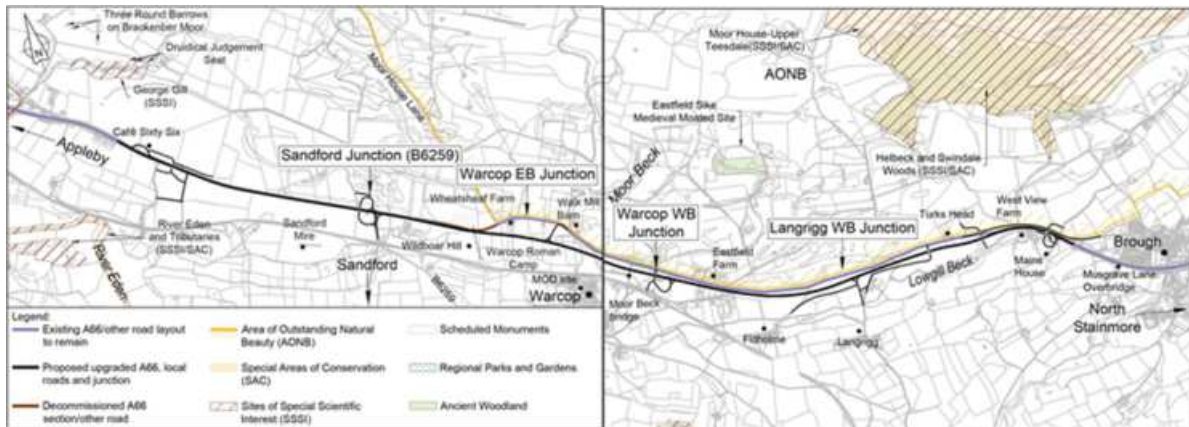
#### 3.1.7 The key features of this scheme are:

- Follows the PRA alignment design from the western end of Kirkby Thorpe and up to Sleastonhowe Lane.
- 250m watercourse crossing of the Trout Beck.
- Watercourse crossing over Keld Syke.
- New junction at Long Marton.
- Follows the PRA alignment design to the north of Crackenthorpe.

### Appleby to Brough

#### 3.1.8 This scheme has been split into three sections (western, central and eastern) and alternative alignments have been considered for the central and eastern sections, as described below. It should be noted that the alternatives for each section could be brought together in any combination, forming four route alternatives.

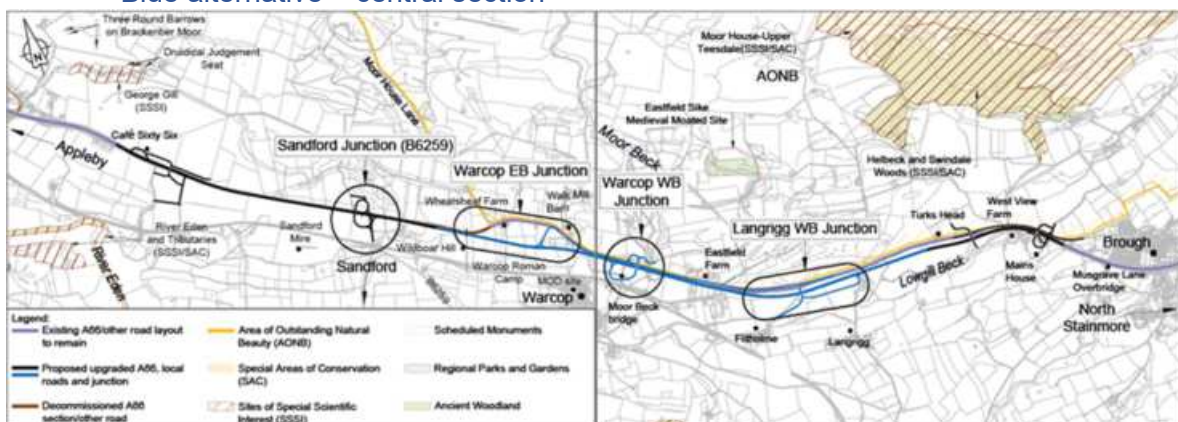
### Black-Black-Black (evolved version of the Preferred Route announced in Spring 2020)



#### 3.1.9 The key features of this scheme are:

- Online widening with a new westbound carriageway to the south of the existing carriageway between Coupland Beck and Brough.
- De-trunking of sections of the existing A66.
- A new left-in/left-out junction at Café 66 on the A66 westbound carriageway.
- A new junction to link the B6259 to Sandford/Warcop.
- New left-in/left-left out priority junctions at Warcop on the westbound and eastbound carriageways.
- A left-only T-junction at Langrigg with appropriate diverge and merge tapers on the westbound carriageway.
- New local roads to the south of the new A66 alignment to link with Flitholme and to the south of the new A66 from Langrigg Lane to the west to link with a new overbridge.
- New underpasses at New Hall Farm, Far Bank End, Wheatsheaf Farm and east of Moor Beck.
- New overbridge for walkers, cyclists and horse-riders near West View Farm within the AONB.

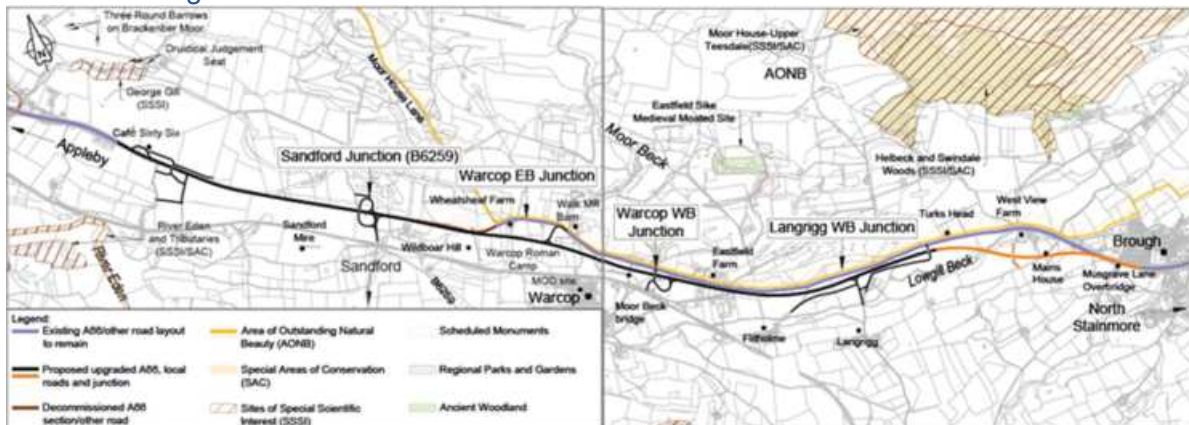
#### Blue alternative – central section



#### 3.1.10 The key features of this scheme are:

- An alternative central section of the Black Route, shifting 50m south from Wheatsheaf Farm.
- New A66 eastbound carriageway along the existing A66.
- A new westbound carriageway directly south of the existing alignment.
- New crossing structure across the Moor Beck.
- A new underpass to the east of Walk Mill Barn.

#### Orange alternative – eastern section



#### 3.1.11 The key features of this scheme are:

- An alternative eastern section of the Black Route.
- New dual carriageway south of West View Farm adjacent to the existing A66.
- New crossing structure across the Lowgill Beck.
- Ties back into the existing A66 at Musgrave Lane Overbridge.
- A new farm access underpass on the south side of the new A66.
- De-trunking of the existing A66 with a two-way connection into Main Street at Brough.

#### Bowes Bypass



#### 3.1.12 The key features of this scheme are:

- Widening of the existing A66 to the north of Bowes.

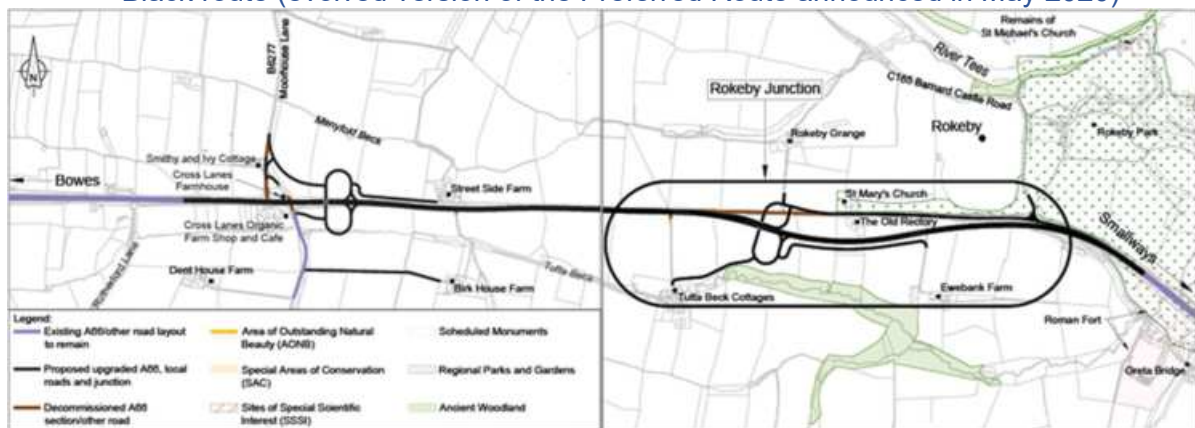


- A new adjacent eastbound carriageway to the north between the Clint Lane Overbridge and the eastern scheme extents.
- Widening of the A67 to create a staggered junction and a right turn lane for the eastbound slip road.
- Realign the existing eastbound slip road to the north.
- Minor improvements to the existing westbound slip road.
- Upgrade of the Bowes junction to a grade separated junction.
- Extension of Lyndale Farm Underpass and Blacklodge Farm Underpass.
- New access overpass at East Bowes.

## Cross Lanes to Rokeby

- 3.1.13 This scheme has two main junctions (Cross Lanes and Rokeby) and alternative junction arrangements have been considered for each of them, as described below. It should be noted that each of the junction alternatives could be brought together in any combination, forming four route alternatives.

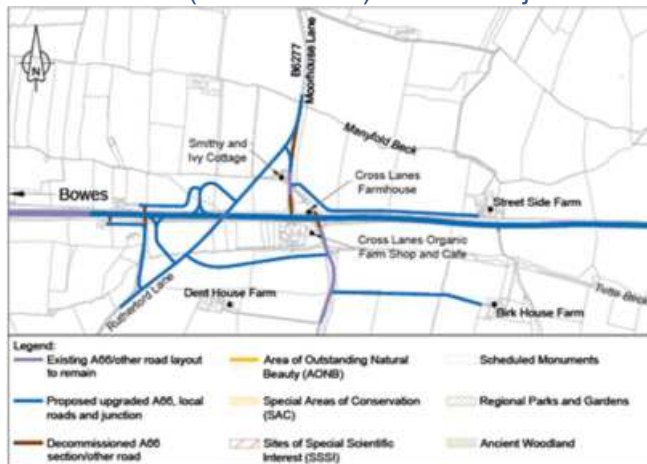
### Black route (evolved version of the Preferred Route announced in May 2020)



- 3.1.14 The key features of this scheme are:
- Dualling of the A66 with a new adjacent westbound carriageway to the south between the B6277 junction at Cross Lanes and the existing Tutta Beck Cottage access.
  - New carriageways will be routed to the south of The Old Rectory and St Mary's Church, re-joining the existing A66 at Rokeby.
  - Upgrade of the existing Cross Lanes junction to a new compact grade separated junction.
  - Realigning of the B6277 Moorhouse Lane to connect to the new Cross Lanes junction.
  - De-trunking of the existing A66 west of St Mary's Church to Barnard Castle Road.
  - A new compact grade separated junction at Barnard Castle Road.
  - A new junction at to the west of The Old Rectory and St Mary's Church.
  - A new culvert to accommodate Tutta Beck.



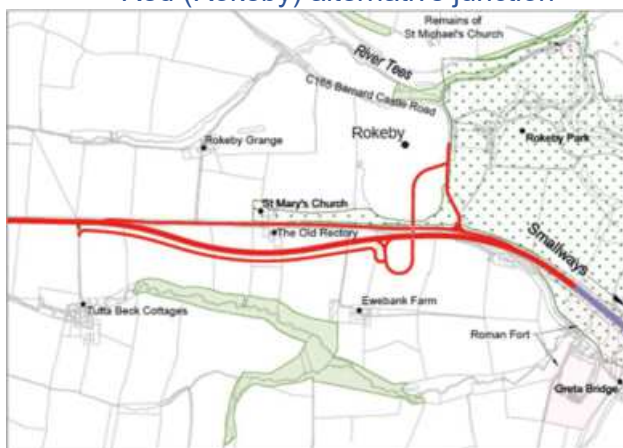
### Blue (Cross Lanes) alternative junction



3.1.15 The key features of this scheme are:

- A new link road west of the existing Cross Lanes priority junction to link Rutherford Lane to the south and the B6277 Moorhouse Lane to the north.
- Realignment of a section of Rutherford Lane.
- Another new link road to connect Moorhouse Lane to the proposed link road west of Cross Lanes.
- A new culvert to accommodate Tutta Beck.

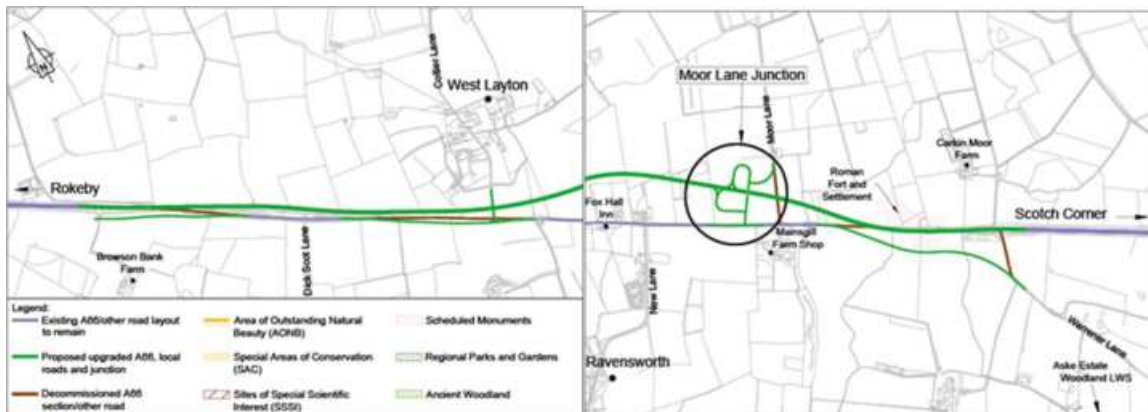
### Red (Rokeby) alternative junction



3.1.16 The key features of this scheme are:

- A66 alignment leaves the existing A66 carriageway diverting south around The Old Rectory.
- A new junction to pass underneath the A66 to the Barnard Castle Road.
- A new eastbound slip road (merge) on the north side to connect the de-trunked A66 to the A66 mainline.
- Modification of the existing priority junction (to the north) to accommodate new slip road.

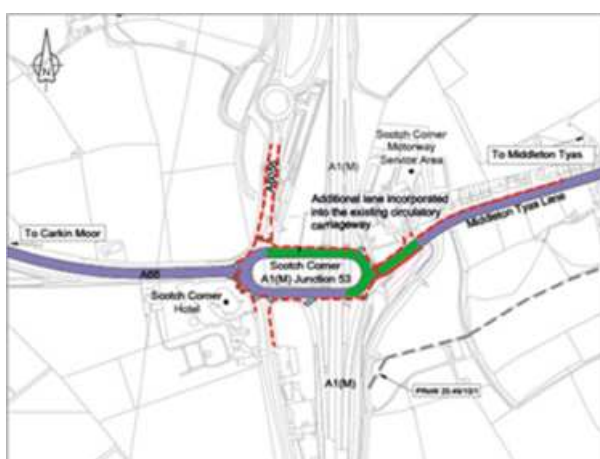
## Stephen Bank to Carkin Moor



3.1.17 The key features of this scheme are:

- A new dual carriageway section between Stephen Bank and Carkin Moor Farm to the north of the existing A66.
- A new access underpass to the north of Dick Scott Lane.
- A new bridleway underpass to the north of Warrener Lane.
- De-trunking of the existing A66 to be used as a collector road with a new overbridge to facilitate the revised vertical realignment of Collier Lane.
- A new grade separated junction to the western boundary of the existing alignment of Moor Lane.
- Realigning of the southern section of Moor Lane and placed into a cutting beneath the proposed mainline to connect to the de-trunked existing A66.
- Rerouting of the existing bridleway rerouted along the proposed realigned section of Moor Lane and along the Western Boundary of Mainsgill Farm.
- A new link road to Moor Lane grade separated junction.

## A1 (M) Scotch Corner



3.1.18 The key features of this scheme are:

- Widening of the Middleton Tyas Lane approach to the A1(M) junction 53 at Scotch Corner roundabout, from one lane to two lanes.

## 3.2 Alternatives history

3.2.1 Proposals for the improvement of the A66 between M6 junction 40 at Penrith and the A1(M) at Scotch Corner have been the subject of extensive study and consultation since 2017. The process of options identification and route selection leading to the proposed project is summarised in Chapter 3: Alternatives Considered of the PEI Report. The process involved the following stages:

- Corridor identification and initial sifting of corridors
- Development of route options within preferred corridors
- Route options appraisal and sifting to identify options to take forward for further appraisal
- The selection of route options, which were taken to non-statutory public consultation in Summer 2019
- The selection of the Preferred Route which was announced by the Secretary of State in May 2020
- Preliminary design stage assessment comprising further development of the Preferred Route, as well as some additional appraisal of alternative alignment routes for a number of the schemes



3.2.2 Throughout the process, a range of options for each scheme have been investigated and assessed against a range of engineering, economic, financial and environmental criteria. Part of this decision making is the preference expressed through consultation and engagement processes by members of the public, organisations and statutory bodies and the themes which emerged from their feedback.

3.2.3 This feedback has been used to inform further design and development work on some elements of the project. Further engagement identified that there were opportunities to improve the design and its deliverability through further design refinement. Engagement with affected landowners and ongoing environmental assessment has also informed the amendments made.

- 3.2.4 Collaboration between the environmental disciplines and design engineers has been an integral part of this design development process. This has sought to avoid and reduce environmental impacts of the design, whilst taking into account responses received during the non-statutory consultation.
- 3.2.5 Details of the options taken to non-statutory public consultation can be found in the A66 Northern Trans-Pennine Project Options Consultation Report (Highways England, 2020) available at [https://highwaysengland.citizenspace.com/cip/a66-northern-trans-pennine/results/options\\_consultation\\_report\\_aw\\_lo\\_res.pdf](https://highwaysengland.citizenspace.com/cip/a66-northern-trans-pennine/results/options_consultation_report_aw_lo_res.pdf)
- 3.2.6 Details of the Preferred Route, the results of the public consultation, and main reasons for the selection of the Preferred Route are presented in the A66 Northern Trans-Pennine Project Preferred Route Announcement (Highways England, Spring 2020) available at [https://highwaysengland.citizenspace.com/cip/a66-northern-trans-pennine/results/pr\\_a\\_report\\_aw\\_lo\\_res.pdf](https://highwaysengland.citizenspace.com/cip/a66-northern-trans-pennine/results/pr_a_report_aw_lo_res.pdf)
- 3.2.7 Further to the announcement of the Preferred Route, further work and refinement has been undertaken as part of the ongoing preliminary design stage. This has included further development of the design of the Preferred Route, as well the identification of alternative alignment routes considered in response to further work undertaken to understand the baseline environment and having regard to consultation and engagement responses.
- 3.2.8 Subsequent to the PRA it was determined that works are also required to the junctions with the M6 at Penrith (J40) and the A1(M) at Scotch Corner, in order to ensure the entire route achieves consistent standards and meets the project objectives.
- 3.2.9 Details of the design refinements and alternative alignment routes considered since the PRA are provided in Chapter 3: Alternatives Considered of the PEI Report. These design refinements and alternative alignments are summarised in Table 3-2 and 3-3 below. Further details on the options considered are set out in the consultation document A66 Northern Trans-Pennine Route Development Report<sup>2</sup>.

Table 3-2 Route Refinements

Scheme	Summary of Refinements to Preferred Route
<b>M6 junction 40 to Kemplay Bank</b>	Traffic modelling identified the need to upgrade junction 40 of the M6. Upgrade options considered included widening of both bridges over J40, and the use of a combination of improvements to traffic signals, widening of slip roads and use of road markings. The selected refinement comprises improvements to traffic signal arrangement, widening of slip roads and use of spiral road markings.
	Multiple design alternatives to the proposed underpass beneath the Kemplay Bank roundabout, which would require the removal of an existing A66 underpass that is a critical connection from Carleton Avenue into the emergency services compound, were considered. Options included an overpass over the new road, a replacement underpass further to the east of the location of the existing, a single access of the new roundabout, and an alternative involving a reduction in the speed limit to 50mph to allow the proposed Kemplay Bank roundabout underpass alignment to be adjusted to

<sup>2</sup> The Route Development Report is available as part of the consultation material on <http://www.highwaysengland.co.uk/A66-NTP>



Scheme	Summary of Refinements to Preferred Route
	retain the existing access. A reduction in the speed limit to 50mph through the Kemplay Bank section of the A66 was selected as the preferred option.
<b>Penrith to Temple Sowerby</b>	Underpass and overbridge options considered in order to maintain connectivity for a landowner to land within central reservation. Overbridge selected as the preferred option.
	Alignment to be moved north of High Barn rather than south, to provide an alignment closer to the existing A66 and thereby reducing land take for landowner.
	Amendment to grade-separated junction arrangement at the Centre Parcs junction to better fit the new alignment.
	Overbridge and underpass options were considered at Winderwath Estate to provide improved landowner access. Overbridge with associated linked tracks was selected for inclusion in the design.
<b>Bowes Bypass</b>	Alternative alignment outside of North Pennines AONB considered but discounted as alternative would require more land take to the north of the alignment, thereby increasing potential impacts upon deciduous woodland and agricultural land in comparison with the Preferred Route design. Preferred Route design has been taken forward on the basis that it involves minimal works within the AONB (largely affecting land within the highways boundary) and greater environmental effects would occur for the alternative that remains outside the AONB.
	Consideration given to relocation of the westbound diverge at the end of The Street/Low Road which would allow diverging Heavy Goods Vehicles (HGVs) to access a local business without needing to travel through Bowes village. Environmental factors were taken into consideration alongside stakeholder engagement, and engineering and buildability factors and on balance it was determined that the Preferred Route design would be taken forward.
<b>Stephen Bank to Carkin Moor</b>	Alternative new link from Warrener Lane incorporated to avoid potentially dangerous U-turn manoeuvres at adjacent breaks in the central reserve. Design avoids Roman fort and prehistoric enclosed settlement 400m west of Carkin Moor Farm.
	Alternative grade separation at Collier Lane to place the A66 into a cutting to provide protection against side winds and reduce visual impact incorporated. Overbridge to be provided for Collier Lane.
	Options considered due to the need to incorporate a culvert to the watercourse immediately to the east of Moor Lane. These included raising the A66 alignment sufficiently whilst keeping the current grade-separated arrangement and placing Moor Lane in a cutting beneath the proposed A66 alignment. The option to switch the grade separation and place Moor Lane beneath the A66 was selected as preferred.
	Three alternative designs considered at Moor Lane following feedback from local parish council on the Preferred Route design. The selected alternative will provide a new grade-separated all movement junction to the western boundary of the existing alignment of Moor Lane, providing connectivity between the de trunked A66 and the proposed mainline.

Scheme	Summary of Refinements to Preferred Route
	Amendment to lift the vertical alignment of the A66 in the vicinity of Carkin Moor Scheduled Monument, to reduce the overall height of the retaining structures required thereby minimising impacts on the Scheduled Monument.
<b>A1(M) junction 53 Scotch Corner</b>	Traffic modelling was carried out to see whether upgrades are needed. The Middleton Tyas Lane approach is to be widened from one lane to two lanes junction

Table 3-3 Development of Alternative Alignments

Scheme	Alternatives considered
<b>Temple Sowerby to Appleby</b>	<p>A number of alternative routes have been considered to reduce the impact on Trout Beck watercourse. Fifteen options were developed and shortlisted taking into account potential environmental impacts, project design principles, impacts on landowners, and design safety. Eleven options were subsequently discounted, with three alternative route alignments falling to be assessed in the PEI Report:</p> <ul style="list-style-type: none"> <li>• Blue Route (Evolved version of the Preferred Route announced in Spring 2020)</li> <li>• Orange (Online Alternative)</li> <li>• Red (Offline Alternative)</li> </ul> <p>As set out in the Route Development Report, Highways England's preferred alignment for this scheme is the Blue Route.</p>
<b>Appleby to Brough</b>	<p>A number of alternative routes have been considered in relation to the required land take within the North Pennines AONB designated area. The route was divided into three sections (western, central and eastern) and alternatives developed for each: three alternatives for the central section, and two for the eastern section. Two potential options in the central section (Black and Blue), and two potential options in the eastern section (Black and Orange) have been assessed in the PEI Report:</p> <ul style="list-style-type: none"> <li>• Black (Evolved version of the Preferred Route announced in Spring 2020)</li> <li>• Blue Alternative Central Section</li> <li>• Orange Alternative Eastern Section</li> </ul> <p>Where relevant these alternatives have been considered in the following combinations, reflecting that the second colour listed in each case refers to the alignment for the central section (blue or black), and the third colour listed is the eastern section (orange or black):</p> <ul style="list-style-type: none"> <li>• Black-Black-Black</li> <li>• Black-Blue-Black</li> <li>• Black-Black-Orange</li> <li>• Black-Blue-Orange</li> </ul> <p>As set out in the Route Development Report, Highways England's preferred alignment for this scheme is the Black-Blue-Black Route.</p>
<b>Cross Lanes to Rokeby</b>	<p>A number of alternative routes have been considered following consultation with statutory bodies and local groups regarding potential impacts upon traffic flows, safety and heritage assets. Alternatives were developed for two sections of this scheme: Cross Lanes and Rokeby. For Rokeby two of</p>

Scheme	Alternatives considered
	<p>the options considered moved the mainline closer to the existing A66. Both would require the demolition of The Old Rectory, a heritage asset connected with the setting of the Registered Park and Gardens and these two options were therefore discounted. One alternative option (Red) to the preferred route at Rokeby, and one alternative option to the preferred route at Cross Lanes (Blue) have been assessed in the PEI Report:</p> <ul style="list-style-type: none"> <li>• Black (Evolved version of the Preferred Route announced in Spring 2020)</li> <li>• Cross Lanes – Blue Alternative junction</li> <li>• Rokeby – Red Alternative junction</li> </ul> <p>Where relevant these alternatives have been considered in the following combinations (the first colour referring to the Cross Lanes junction and the second referring to the Rokeby junction):</p> <ul style="list-style-type: none"> <li>• Black-Black (evolved Preferred Route)</li> <li>• Blue-Black (Cross Lanes alternative junction and Black evolved Preferred Route)</li> <li>• Black-Red (Black evolved Preferred Route and Rokeby alternative junction)</li> <li>• Blue-Red (Cross Lanes alternative junction and Rokeby alternative junction)</li> </ul> <p>As set out in the Route Development Report, Highways England's preferred alignment for this scheme is the Blue Alternative junction at Cross Lanes and the Black evolved Preferred Route junction at Rokeby (Blue-Black).</p>

**3.2.10 The design of the project is ongoing, as detailed in Chapter 2: Project Description of the PEI Report.**



## 4 Preliminary environmental assessment

### 4.1 Introduction

- 4.1.1 Under the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017, the project is defined as the type and scale of development that automatically requires an EIA to be undertaken. Accordingly, an EIA is being undertaken to meet the requirements of the relevant planning policy and legislation and assess the effects of the project on the environment.
- 4.1.2 The EIA considers impacts during the construction and operation of the project. In order to preliminarily identify the likely significant effects of the project on the environment, an understanding of the environment that would be affected by the project (the 'baseline conditions') has been established through desk-based research, site surveys and engagement with stakeholders. The baseline conditions are not necessarily the same as those that exist at the current time; they are also the conditions (referred to as future baseline) that would exist in the absence of the project either at the time that construction is expected to start, or the time that the project is expected to open to traffic.
- 4.1.3 Preliminary likely significant environmental effects of the project have been identified through a process by which the sensitivity of the receptor, and the level and type of change are considered to determine the significance of effect.
- 4.1.4 The project comprises eight individual schemes. This complexity means that, where relevant, the preliminary assessments have considered identification of effects and proposed mitigation specific to each scheme (including any options for those schemes) as well as considering the potential for routewide effects.
- 4.1.5 For the purposes of the assessment, the start of construction is assumed to be early 2024 and the opening year when the project is to become operational, i.e. fully open to traffic, is assumed to be 2029. The traffic data used for the operational phase modelling is based on an opening year (2031) later than that used throughout PEI Report (2029) as the traffic modelling was based on an earlier construction programme of seven years. Updated traffic modelling using an opening year of 2029 will underpin the assessments presented in the ES. This difference is not expected to lead to any new or different significant effects being identified.
- 4.1.6 During construction, the project's potential adverse impacts will be avoided or reduced by the implementation of industry standard practice and control measures, which will be contained within an Environmental Management Plan (EMP). An outline of the EMP is included in Appendix 4.1 of the PEI Report.
- 4.1.7 Mitigation measures that might be required to reduce the effects of the construction and operation of the upgraded road are being developed. The topic chapters within the PEI Report give an indication of the sorts of mitigation measures that could be used. In each case these are being further developed and will be reported in the ES and other application documents.
- 4.1.8 At the current stage, potential mitigation such as replacement habitats and landscape planting, has been identified through surveys, assessment and consultation. Surveys are ongoing and the design will continue to develop. As such the Mapbooks<sup>3</sup> provide an overview of mitigation that is being considered based on a number of assumptions

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<sup>3</sup> The Mapbooks are available as part of the consultation material on <http://www.highwaysengland.co.uk/A66-NTP>



(so not all of the mitigation shown will definitely be required). This will be developed further in response to survey findings, design development, consultation and further assessment.

- 4.1.9 This section provides an overview of the preliminary findings of the environmental assessment. It is important to note that not all potential likely significant effects identified occur for every scheme alternative. Unless otherwise stated in the technical chapters, the preliminary likely significant effects are summarised on a scheme by scheme basis (including any alternatives for those schemes) in the table at the back of this NTS.
- 4.1.10 Further work continues to be undertaken as part of the EIA process to confirm the preliminary findings presented below. The final assessment of environmental impacts will be presented in the ES that will be submitted with the DCO application.

## 4.2 Air quality

- 4.2.1 This section summarises the preliminary assessment findings at this point in the EIA process for air quality, based on PEI Report Chapter 5: Air Quality.



### Baseline

- 4.2.2 Air quality in the area around the project is considered to be good. This is confirmed by the fact that there are no Air Quality Management Areas (AQMA) close to the project, with the nearest being over 30km from the A66 (Durham and Chester-le-Street AQMA). Eden District Council have been considering the potential for a future AQMA to be declared at Castlegate, Penrith for NO<sub>2</sub>. AQMA are areas which the local authority has identified as requiring management to achieve desired air quality objectives.
- 4.2.3 The predicted Defra background concentrations along the project route are well below the annual mean objectives for NO<sub>2</sub> and PM<sub>10</sub>. For particulate matter (PM<sub>10</sub> and PM<sub>2.5</sub>) there are no AQMAs designated or likely to be designated for an exceedance of Air Quality Objectives (AQO) and Air Quality Limit Value (LV) thresholds in the air quality study area. There are also no exceedances of the annual mean NO<sub>2</sub> AQO and LV threshold within the air quality study area.

- 4.2.4 Although the area around the project is predominantly rural, there are houses, schools, hospitals and ecological designated species and habitats which could be affected by changes in air quality.

### Construction

- 4.2.5 During construction, potential air quality effects may arise from emissions of construction dust and PM<sub>10</sub>. These emissions occur as a result of construction activities such as demolition, earthworks, construction and trackout<sup>4</sup>. The quantities of each depend on the scale and intensity of the construction works.
- 4.2.6 Dust has the potential to cause nuisance to property, and very high levels of soiling can affect plants and ecosystems. There is the potential for dust impacts to receptors within 200m of construction and haulage routes associated with the project.
- 4.2.7 There are a number of people which could be directly affected by dust nuisance associated with the project or construction vehicle traffic. Best practice construction dust control measures and standard mitigation measures can limit these effects.
- 4.2.8 Detailed information on construction activities was not available at the time of writing, and the assessment is based on high level information about likely construction activities and key construction locations such as compounds. The Construction Method Statement (a first draft of which was produced after the assessment was completed and is available as part of the consultation materials) will be used to inform the detailed assessment for construction dust to be presented in the ES.

#### Preliminary construction assessment

##### **Construction dust**

- Mitigation to reduce construction dust impacts to a negligible level will be included in the EMP. This includes development of a dust management plan with measures to monitor effectiveness of mitigation, daily on site and off site inspections and keeping a record of complaints/exceptional dust events. With appropriate best practice mitigation measures in place the potential impacts from construction are considered to be not significant.

##### **Construction traffic**

- Whilst the construction phase is temporary in nature, due to the likely number of construction vehicles that will be required, duration of works and the presence of sensitive human and ecological receptors near to roads likely to be affected, there is the potential for significant effects to occur. Further work will be undertaken to characterise these potential impacts as part of the EIA as more detailed data becomes available.

### Operation

- 4.2.9 During operation, changes to the road network will result in changes to traffic flow, speed and fleet composition. Traffic flows are likely to increase due to the improved desirability of the route, however speeds are likely to increase due to increased capacity and reduced congestion. These changes will impact on emissions of NO<sub>x</sub> and PM<sub>10</sub>. As a result, pollutant concentrations at receptors within the air quality study

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<sup>4</sup> The term 'trackout' refers to the movement of dust and dirt from a construction/demolition site onto the public road network, where it may be deposited and then re-suspended by vehicles using the network.

area will be affected by the project. These changes may result in permanent improvements and deteriorations in local air quality depending on location.

#### Preliminary operation assessment

##### *Human receptors*

- A small number of receptors are predicted to experience a small adverse change in air quality, however no likely significant effects are anticipated as the level of change and the number of receptors affected is lower than the level of significant effect defined in relevant guidelines. The locations of these receptors are detailed within Section 5.10 of PEI Report Chapter 5: Air Quality.

##### *Habitat sites*

- Likely significant adverse effect due to nutrient nitrogen deposition at Stephen Bank Road Verge Local Wildlife Site (LWS)
- Likely significant beneficial effect due to a reduction in nutrient nitrogen deposition at Chapel Wood Ancient Woodland (AW)
- Possible likely significant increases in nutrient nitrogen deposition are predicted at 15 designated ecological sites, subject to further assessment.

These sites include:

- North Pennine Moors Special Protection Area (SPA)
- North Pennine Moors Special Area of Conservation (SAC)
- Argill Woods and Pasture Site of Special Scientific Interest (SSSI)
- Augill Valley Pasture SSSI
- Bowes Moor SSSI
- Pallet Hill LWS
- Stephen Bank Road Verge LWS
- Augill Beck Wood AW
- Augill Bridge Wood AW
- Deepdale Wood AW
- Graham's Gill/Jack-Wood AW
- Newbiggin Wood AW
- Oglebird Plantation AW
- Raughtonguill Wood AW
- Thorgill Wood AW

4.2.10 Highways England is developing a tool for determining the additional contribution of ammonia (NH<sub>3</sub>) emissions from vehicles to deposited nitrogen. It is expected that this method will be available for use at the ES stage and therefore the potential ecological impacts will be updated accordingly.

4.2.11 The ongoing EIA will consider appropriate mitigation, which might include things like a dust management plan to control dust emissions during construction, to address likely significant effects identified at this preliminary assessment stage.

## 4.3 Biodiversity

4.3.1 This section summarises the preliminary assessment findings at this point in the EIA process for biodiversity, based on PEI Report Chapter 6: Biodiversity.

### Baseline

4.3.2 There are four SACs, one SPA, nine SSSIs and one Local Nature Reserve (LNR) within the 2km biodiversity routewide study area, alongside 16 non-statutory designated sites.



- 4.3.3 There are two additional SAC (North Pennine Moor and Asby Complex), one SPA (North Pennine Moors), four SSSIs (Argill Woods and Pastures, Augill Valley Pasture, Bowes Moor and Crosby Ravensworth Fell), which are situated within 200m of the Affected Road Network (ARN)<sup>5</sup>.
- 4.3.4 The desktop study identified nine Priority Habitat types within the draft DCO boundary of the routewide project: deciduous woodland (broadleaved and mixed), rivers and streams, good quality semi-improved grassland (lowland meadows and pastures), lowland fens, upland heath purple moor-grass and rush pastures, lowland dry acid grassland, coastal and floodplain grazing marsh (floodplain grazing marsh only) and traditional orchards. There are also multiple Phase 1 habitat types within the draft DCO boundary.
- 4.3.5 Surveys for protected and Priority Species are ongoing and the complete baseline will be included in the ES. The habitats present support opportunities for the following protected and Priority Species; Bats (roosting in structures and trees), Bats (activity), Red squirrel (*Sciurus vulgaris*), Otter (*Lutra lutra*), Water vole (*Arvicola amphibius*), Badger (*Meles meles*), Pine marten (*Martes martes*), Polecat (*Mustela putorius*), Brown hare (*Lepus europaeus*), Hedgehog (*Erinaceus europaeus*), Deer, wintering and breeding birds, reptiles, amphibians, fish, white clawed crayfish, terrestrial invertebrates, aquatic invertebrates and macrophytes.

## Construction

- 4.3.6 The highways design has fully considered designated sites and priority habitats and seeks to avoid habitat loss of high conservation value. The alignment width will also be minimised at water crossings to minimise potential impacts.

<sup>5</sup> The ARN comprises roads where one or more of the following is true: road alignment will change by 5 metres or more, daily traffic flows will change by 1,000 annual average daily traffic (AADT) flow or more, heavy-duty vehicle (HDV) flows will change by 200 AADT or more, daily average speed will change by 10 kilometres per hour or more and peak hour speed will change by 20 kilometres per hour or more) and adjoining roads within 200m



- 4.3.7 Temporary and permanent habitat loss will occur routewide during construction. The types of habitat lost permanently are predominantly improved grassland, arable land, hedgerows, woodland and semi-improved grassland.
- 4.3.8 Construction of the project will cause temporary and permanent habitat fragmentation both directly through habitat loss, severance, and through disturbance. This will have the greatest impact for those schemes which are all or partially offline. Noise and temporary lighting from construction compounds and vehicle movements along haul routes may increase disturbance effects and also deter species from crossing an area to reach an important resource.
- 4.3.9 Habitats within or adjacent to the schemes, and those which are hydrologically connected (areas connected by surface water or groundwater), may be at increased risk of damage and degradation through sediment run-off, water pollution, dust and vehicle emission deposits.
- 4.3.10 Construction has the potential to injure and kill a wide range of species through the following activities; vegetation clearance, topsoil stripping, tree felling and in-channel works to waterbodies.
- 4.3.11 Temporary construction traffic and vehicle diversions may also increase the chance of a road traffic collisions, on other species including badger, otter, deer, polecat, hedgehog, bats and barn owl.
- 4.3.12 The amount of land needed for the project will be kept to a minimum and construction impacts have been designed out or minimised as far as possible, for example locating access tracks, haul roads, site compounds and material storage areas outside of ecologically sensitive sites and habitats. This is an ongoing process and ecological constraints will continue to be fully considered during preliminary and detailed design.
- 4.3.13 The preliminary assessment of likely significant effects is based on the preliminary information currently available regarding the likely presence of the habitat or species incorporating data from surveys to end of June 2021 and the current stage of design. A precautionary approach has been applied assuming presence of a protected/notable species, where the habitat is suitable, in the absence of survey data.
- 4.3.14 A full impact assessment including assessment of magnitude/level of impact will be undertaken for the ES.

#### [Preliminary construction assessment](#)

- 4.3.15 There is the potential for likely significant effects to occur on the following during construction, subject to further survey and mitigation design:
- Statutory designated sites
  - Non-statutory designated sites
  - Terrestrial Habitats
  - Rivers and streams
  - Bat roosts
  - Bat activity
  - Red squirrel
  - Wintering birds
  - Breeding birds
  - Barn owl
  - Reptiles
  - Terrestrial invertebrates
  - Macrophytes

- 4.3.16 The ongoing EIA will further develop mitigation design to address likely significant effects identified at this preliminary assessment stage.

### Operation

- 4.3.17 During the operational phase, the project will result in permanent habitat fragmentation through severance from traffic movements. The east-west alignment of the project will result in loss of ecological connectivity for north-south movements, which has potential implications for ecosystem and species resilience. However, with habitat creation and enhancement along the route, east-west dispersal and commuting opportunities are likely to be increased for many species.
- 4.3.18 Habitat severance may result in species crossing the new carriageway to access foraging and breeding resources. This is likely to result in injury and direct mortality and an increased risk of road traffic accidents through vehicle collision.
- 4.3.19 Habitats within or adjacent to the operational project, and those which are hydrologically connected, will be at risk of indirect damage and degradation through permanent changes to drainage, pollution from road-run off, changes to vehicle emissions and nitrogen deposition.
- 4.3.20 Operational traffic noise and lighting may have permanent effects on how species use foraging, commuting and breeding resources. Lighting at junctions may adversely affect nocturnal species such as bats. Lighting along watercourse crossings and underpasses along the road can also affect mammals such as otter.
- 4.3.21 Increased deposition of nitrogen and other airborne pollutants arising from increased traffic volumes in the wider road network and/or diversions, may also affect the integrity of vegetation communities.
- 4.3.22 Roads and associated infrastructure may also increase levels of human disturbance, through access to recreation areas, which were not previously accessible.
- 4.3.1 Mitigation measures including underpasses and crossing point installations for a range of mammal species will be incorporated into the design at appropriate locations. These will be comprehensively determined based on data from the ongoing surveys and preliminary design. Lighting will be minimised across the project. Where lighting is required, for example at junctions, suitable lighting choices or adaptations will be designed in to avoid light spill to sensitive habitats. Drainage design will ensure road run-off is channelled into a suitable system to protect retained and newly created habitats.
- 4.3.2 The preliminary assessment of likely significant effects is based on the preliminary information currently available regarding the likely presence of the habitat or species and the current stage of design. A full impact assessment will be undertaken as part of the ongoing EIA and will be reported within the ES.

#### Preliminary operation assessment

- 4.3.3 There is the potential for likely significant effects to occur on the following during operation, subject to further survey and mitigation design:
- Statutory designated sites
  - Non-Statutory designated sites
  - Bat roosts
  - Bat activity
  - Red squirrel

- Other terrestrial mammals (polecat, brown hare, deer, hedgehog)
- Wintering birds
- Breeding birds
- Barn owl
- Reptiles
- Amphibians
- Terrestrial invertebrates
- Macrophytes

4.3.4 Ecology surveys are ongoing and will be completed to inform full impact assessment to be reported in the ES. The ongoing EIA will further develop mitigation design to address likely significant effects identified at this preliminary assessment stage.

## 4.4 Climate

4.4.1 This section summarises the preliminary assessment findings at this point in the EIA process for climate (Greenhouse Gas (GHG) Emissions Assessment), based on PEI Report Chapter 7: Climate.



### Baseline

- 4.4.2 For the impact of the project on climate, the baseline conditions relate to current and future anticipated conditions, with regards to GHG emissions, without implementing the project. Baseline is split into the historic baseline, setting out current conditions and the future baseline, which sets out future conditions based upon there being no schemes.
- 4.4.3 The primary source of historic emissions data is the UK GHG Inventory<sup>6</sup> and the most recent dataset (2019) estimates total UK GHG emissions at 454.8 million tonnes of

<sup>6</sup> Government (2021) UK Greenhouse Gas Inventory, 1990 to 2019: Annual Report for submission under the Framework Convention on Climate Change, available at: [https://naei.beis.gov.uk/reports/reports?section\\_id=3](https://naei.beis.gov.uk/reports/reports?section_id=3)

carbon dioxide equivalent (MtCO<sub>2</sub>e)<sup>7</sup>. The largest emitting sector was transport, accounting for 122.1 MtCO<sub>2</sub>e (26% of national emissions). Current road user emissions (vehicles using the highways infrastructure) is 198,668 tCO<sub>2</sub>e, the predicted emissions for the opening year of the project (2031) is 191,236 tCO<sub>2</sub>e, the modelled future year (2046) emissions is 211,279 tCO<sub>2</sub>e, and over the assumed project lifetime (60 years) the modelled emissions is 12,997,413 tCO<sub>2</sub>e.

- 4.4.4 For the climate change resilience assessment, the baseline conditions relate to the current and future anticipated climatic conditions. Both summer and winter temperatures are projected to increase due to climate change. The largest increases in temperature are projected to be in the mean daily maximum summer temperatures. Mean precipitation rates in the area surrounding the project are also anticipated to change significantly throughout the next century.

## Construction

- 4.4.5 Total routewide emissions associated with construction are estimated to be 905,588 tCO<sub>2</sub>e – 1,400,052 tCO<sub>2</sub>e. These estimated emissions would represent 0.05%-0.07% of the Fourth Carbon Budget (2023-2027) and 0.05%-0.08% of the Fifth Carbon Budget (2028-2032), respectively. Therefore, this is not considered significant as the proposed project in isolation would not have a material impact on the ability of the government to meet its carbon budgets.
- 4.4.6 The largest source of emissions during the construction phase of the project is expected to arise from construction materials. Minimising GHG emissions through design is a core principle of Highways England's standards, the UK Government's Infrastructure Carbon Review and PAS 2080. This includes delivering measures such as material recovery and using recycled materials; reducing construction traffic; and using renewable energy. These measures will be set out in the EMP for the project.
- 4.4.7 With regards to the climate change resilience assessment, it has been assumed that the EMP and other associated risk management and site safety procedures deployed during the construction phase will be implemented effectively and successful in mitigating climate change risk during the construction of the project. Taking this into consideration, the UKCP18 climate projections for the construction phase (2020s) also suggest that there is unlikely to be significant changes in climatic conditions within this period such that a likely significant effect could occur. As such, a detailed assessment of climate change resilience in construction has not been taken forward.

### Preliminary construction assessment

- No likely significant effects anticipated from the impacts of the project on climate (GHG emissions) during the construction phase of the project.
- No likely significant effects anticipated due to the vulnerability of the project to climate change during the construction phase of the project.

## Operation

- 4.4.8 During the operational phase of the project, the total routewide operational GHG emissions over the 60-year assumed project lifetime are estimated to result in an additional (net increase of) 2,981,603 – 2,986,043 tCO<sub>2</sub>e. Estimated emissions would represent 0.3% of the Sixth Carbon Budget and so are not considered significant as

<sup>7</sup> MtCO<sub>2</sub>e refers to million tonnes of carbon dioxide equivalent. This is a consistent measure of assessing the contribution of greenhouse gases to global warming.



the proposed project in isolation would not have a material impact on the ability of the government to meet its carbon budgets.

- 4.4.9 For the climate change resilience assessment, the preliminary assessment has found that most climate change risks during the operational phase of the project were 'not significant' due to effective embedded mitigation measures in the existing project design (for example, the design of attenuation ponds and drainage design with allowances for climate change) or through monitoring and maintenance regimes assumed to be in place throughout operation.

#### Preliminary operation assessment

- No likely significant effects anticipated from the impacts of the project on climate (GHG emissions) during the operational phase of the project.
- No likely significant effects anticipated due to the vulnerability of the project to climate change during the operational phase of the project.

## 4.5 Cultural heritage

- 4.5.1 This section summarises the preliminary assessment findings at this point in the EIA process for cultural heritage, based on PEI Report Chapter 8: Cultural Heritage. Cultural heritage includes archaeology, historic buildings/structures and historic landscapes.



### Baseline

- 4.5.2 The existing A66 runs through a landscape of considerable historical interest, with archaeological evidence present from prehistoric times up to the Second World War. The landscape comprises historical assets including scheduled monuments, listed buildings, a Registered Park and Garden and conservation areas in addition to non-designated sites ranging from find scatters to a rifle range.

- 4.5.3 Ongoing surveys are being undertaken as part of the EIA to enhance the understanding of the historic environment and to inform the assessment of archaeological potential.

### Construction

- 4.5.4 Construction of the project has the potential for adverse impacts upon cultural heritage resources, including:
- Partial or total removal of heritage resources, including archaeological remains, within the project footprint
  - Compaction of archaeological deposits by construction traffic and structures
  - Temporary impacts upon the settings of heritage resources
  - Permanent impacts upon the setting of heritage resources
  - Changes to key views and sight lines
  - Impacts to paleoenvironmental deposits as a result of hydrological changes
- 4.5.5 Mitigation of construction impacts will take the form of measures to reduce direct impacts (physical damage), and indirect impacts (changes to setting that affect the significance of the resources). Where significant effects have been identified on designated assets, including Listed Buildings, Scheduled Monuments and Registered Parks and Gardens (RPG) as a result of permanent changes to their settings during construction, options for mitigation will be further considered in the design process and will be reported in the ES.
- 4.5.6 Mitigation of direct impacts on archaeological remains would take the form of 'preservation by record', that is, the investigation of archaeological remains prior to construction, and the analysis of artefacts and publication of results following the construction of the project.

#### Preliminary construction assessment

- Permanent significant adverse effects are anticipated at the scheduled monument of the Ring ditches at Brougham
  - Permanent significant adverse effects are anticipated to affect the Site of the Hartshorn Tree and associated cropmarks
  - Permanent significant adverse effects are anticipated at the scheduled monuments of the Kirkby Thore Roman fort and vicus and the Roman camp at Redlands Bank
  - Permanent significant adverse effects are anticipated at the Warcop Roman Camp and Length Of Roman Road, 285m South West Of Moor House
  - Permanent significant adverse effects are anticipated to affect the Ring Ditch, 120m north-east of Poundergill
  - Permanent significant adverse effects are anticipated to affect the Roman vicus at Carkin Moor Fort
  - Permanent significant adverse effects are anticipated at the Roman Fort and Prehistoric enclosed settlement 400m west of Carkin
  - Permanent significant adverse effect is anticipated to affect the Grade II\* Registered Park and Garden at Rokeby Park
- 4.5.7 Not all potential likely significant effects listed above will occur for every scheme alternative. The summary table at the back of this NTS presents the preliminary likely

significant effects on a scheme-by-scheme basis (including any alternatives considered for those schemes).

## Operation

- 4.5.8 The operational phase of the project has the potential to result in both beneficial and adverse impacts on the setting of cultural heritage resources due to traffic noise and the visibility of moving vehicles on the road. Impacts could include changes to the settings of monuments or changes to key views.
- 4.5.9 There would be no physical impacts on below-ground archaeology during operation, as these would have occurred during the construction phase.

### Preliminary operation assessment

- No significant effects are expected to arise from the operation of the project.

## 4.6 Geology and soils

- 4.6.1 This section summarises the preliminary assessment findings at this point in the EIA process for geology and soils, based on PEI Report Chapter 9: Geology and Soils.



### Baseline

- 4.6.2 The ground conditions of the project comprise natural superficial deposits, which cover most of the area routewide, including alluvium (loose clay, silt, sand, or gravel), river terrace deposits and a multitude of various types of glacial deposits. Peat deposits exist locally, but only in a small number of locations.
- 4.6.3 Some localised recent and historical made ground deposits exist in discrete areas where prior development or highway construction has occurred.
- 4.6.4 Routewide the underlying bedrock comprises the Stainmore and Alston Formations in the west, which are made up of repeating layers of sandstone, siltstone and

mudstone with thin limestone and some coal. The Penrith Sandstone Formation is also present routewide.

- 4.6.5 Agricultural Land Classification (ALC) grades 2, 3a, 3b and 4 (but predominantly 3) exist in many of the schemes, as well as soils supporting SACs or SSSIs.
- 4.6.6 Some areas of surface quarrying exist within the draft DCO boundary and some underground mining is recorded in some localities, especially within the Kirkby Thore scheme. No underground mining is known to be ongoing.
- 4.6.7 Two geodiversity sites: George Gill SSSI and the UNESCO North Pennines AONB Global Geopark are located in proximity to the project, with some areas of the Geopark located within the DCO boundary areas for the Appleby to Brough and Bowes Bypass schemes.

## Construction

- 4.6.8 Construction works are to be widespread routewide, associated with new stretches of carriageway, bridges, embankments, re-grading existing embankments, excavation of drainage ponds, installation and re-routing of buried and overhead services.
- 4.6.9 The ongoing EIA will further develop appropriate mitigation and enhancement measures to address likely significant effects identified at this preliminary assessment stage.

### Preliminary construction assessment

- 4.6.10 Potential likely significant effects have been identified in some or all schemes, as follows:
  - Likely significant effects due to the potential permanent land take and loss of high and medium value agricultural soil resource (Grade 2, 3a and 3b agricultural land)
  - Likely significant effects on soils supporting SACs and SSSIs

## Operation

- 4.6.11 During operation, each of the schemes are to see high volumes of road traffic, and lesser amounts of other activity which may have potential impacts on identified receptors.

### Preliminary operation assessment

- 4.6.12 Potential likely significant effects have been identified as follows:
  - Potential beneficial significant effects on the UNESCO Global Geopark due to the potential for enhancement if cuttings or earthworks offer an opportunity to permanently expose geology of scientific interest.

## 4.7 Landscape and visual

- 4.7.1 This section summarises the preliminary assessment findings at this point in the EIA process for landscape and visual impact, based on PEI Report Chapter 10: Landscape and Visual.

## Baseline

- 4.7.2 The project area is predominantly rural. Penrith is the largest settlement with other key settlements including Temple Sowerby, Kirkby Thore, Appleby, Warcop, Brough,



Bowes and Barnard Castle. There are many smaller villages and hamlets including Long Marton, Bolton, Crackenthorpe, Sandford, Flitholme, Brignall, West Layton and East Layton. The intervening valley landscapes, although rural, are relatively well settled with farmsteads and single houses and groups of dwellings. Beyond the influence of the existing A66 there is a strong rural character and sense of place.



4.7.3 The following sites are located within 7km of the project:

- The Lake District National Park
- The English Lake District World Heritage Site
- The North Pennines AONB
- The Yorkshire Dales National Park
- Dales Fringe Area of High Landscape Value (AHLV), a non-statutory locally designated landscape in County Durham
- Several inventoried RPG
- A number of conservation areas including the Settle to Carlisle conservation area and East Layton conservation area.

4.7.4 In terms of accessibility of the landscape and its use for recreation, in the west of the project area there are public rights of way (PRoW) around Penrith and along the River Eamont that give access to the countryside and local attractions such as Mayburgh Henge and Brougham Castle scheduled monuments. To the east of Penrith the holiday village of Center Parcs is a focus of recreation with PRoW to the north and south. Between Temple Sowerby and Appleby the PRoW network is denser with a notable bridleway following a historic Roman road between Powis House and Appleby.

4.7.5 In the central part of the project area the North Pennines AONB provides open access land and PRoW that ascend the south-west facing slopes of the hills affording walkers panoramic views of the Eden valley in which the project will be located. The Pennine

Way national trail passes through the central part of the study area crossing hill tops such as Knock Old Man and Great Dun Fell and notable passes such as High Cup Nick in addition to deviating into the Eden valley where it becomes A Pennine Journey.

- 4.7.6 The Pennine Way is also present in the eastern part of the project area at Bowes where a network of PRoW extends north and south into the North Pennines AONB and south into the Yorkshire Dales National Park. East of Bowes and between Rokeby Park RPG and Scotch Corner there is a regular network of PRoW that follow river valleys as well as broad ridges in the landscape and occasionally crossing the A66.
- 4.7.7 The Lakes and Dales cycle route passes through the project area as do several local cycle routes in Eden District Council and National Cycle Network routes 68, 70, 71, 165 and 715.

## Construction

- 4.7.8 During construction there will be direct physical impacts on landscape character features and elements such as trees, woodland, hedges, drystone walls and alteration of features such as field pattern, size and shape and changes to topography, landform and rural lanes and byways.
- 4.7.9 There will be impacts on historic strip field patterns at Bowes and on blocks of woodland and stone walls at West Layton.
- 4.7.10 There will be loss of vegetation alongside the existing A66 which will change the character of the existing road corridor, potentially reducing the degree of landscape integration and potentially increasing visibility of the road corridor from nearby areas.
- 4.7.11 There will also be temporary changes resulting from the presence of construction compounds, site offices, construction plant, earthmoving and use of cranes to build structures.
- 4.7.12 There will be temporary diversions to PRoW and road diversions which will change the pattern of vehicle movement in the study area.

### Preliminary construction assessment

- Likely significant effects on landscape character units (LCU) in a localised or limited part of each LCU
- Likely significant effects on a limited part of the North Pennines AONB
- Likely significant effects on a small number of residential properties at the southern edge of Penrith, at Kirkby Thore and Bowes
- Likely significant effects on a number of rural properties primarily within 250m of the project
- Likely significant effects on a number of PRoW and cycle routes including PRoW in the North Pennines AONB
- Likely significant effects on a short section of the Pennine Way national trail at Bowes
- Likely significant effects on visitors to Wetheriggs Country Park, Mayburgh Henge, the vicinity of Brougham Castle, Center Parcs Holiday Village, Eden Valley Railway, Brough Castle, Rokeby Park RPG, the Church of St. Mary, Cross Lanes Organic Farm, Fox Hall Inn and Mainsgill Farm Shop

## Operation

- 4.7.13 During operation the project will increase the amount of road infrastructure in the landscape. These infrastructure components will not be wholly uncharacteristic of the baseline where the majority of the project is online. However, the increase in scale of infrastructure and the addition of new grade separated junctions, detention ponds and new link roads will increase the amount of infrastructure in the locality with potentially significant effects in a limited area.
- 4.7.14 Where the project is offline there is greater potential for significant effects as it will be a new feature in the landscape and uncharacteristic of the baseline. Traffic using the project will potentially introduce noise, light and movement into a baseline environment where and movement is limited or intermittent. While vehicle lights will be focussed within the road corridor there is potential for some light spill.
- 4.7.15 At year 1 potential effects will reduce in some instances compared to those at construction. Mitigation planting will not yet be established and earthworks and traffic will be visible during the first year.
- 4.7.16 At year 15 mitigation planting will have reached a height of between six and eight metres thereby achieving a degree of landscape integration and visual screening of the project. However, significant effects are still predicted for some receptors at year 15 due to the change relative to the baseline, particularly where the alignment is offline.

### Preliminary operation assessment

#### Year 1

- Likely significant effects on localised parts of LCUs
- Likely significant effects on a limited part of the North Pennines AONB
- Likely significant effects on a small number of residential properties at the southern edge of Penrith and at Kirkby Thore
- Likely significant effects on a number of rural properties primarily within 250 m of the project
- Likely significant effects on a number of PRow including PRow in the North Pennines AONB
- Likely significant effects on visitors to Wetheriggs Country Park, Center Parcs Holiday Village, Eden Valley Railway, Brough Castle, the Church of St. Mary, Rokeby Park RPG, Cross Lanes Organic Farm and Mainsgill Farm Shop.

#### Year 15

- Likely significant effects on localised parts of LCUs
- Likely significant effects on a limited part of the North Pennines AONB
- Likely significant effects on a small number of residential properties at Kirkby Thore
- Likely significant effects on a number of rural properties primarily within 250m of the project
- Likely significant effects on a number of PRow including PRow in the North Pennines AONB at Bowes only
- Likely significant effects on visitors to Center Parcs Holiday Village, Eden Valley Railway, Brough Castle, the Church of St. Mary, Cross Lanes Organic Farm and Mainsgill Farm Shop

## 4.8 Material assets and waste

- 4.8.1 This section summarises the preliminary assessment findings at this point in the EIA process for material assets and waste, based on PEI Report Chapter 11: Material Assets and Waste.
- 4.8.2 At this stage, the material assets and waste assessment within the PEI Report has been presented at a routewide level only. The ES will present the assessment findings at both an individual scheme and routewide level.



### Baseline

- 4.8.3 Two interrelated study areas have been identified for the material assets and waste routewide assessment. The first study area (study area 1) is related to the area of the project where construction materials will be consumed, comprising the area within the draft DCO boundary. The second study area (study area 2) is related to the area where the main construction materials will be sourced and construction waste will be treated or disposed, comprising regions of the North East, the North West, and Yorkshire and The Humber.

#### Material assets

- 4.8.4 The project will consume large quantities of materials increasing demand on the existing UK supply chain. The baseline includes the availability of assets including construction materials and aggregate reserves.
- 4.8.5 Cumbria County Council, Durham County Council and North Yorkshire County Council have all established a number of different types of Mineral Safeguarded Areas close to the project.
- 4.8.6 There are no existing peat resources sites (commercial peat extraction) present within study area 1.



#### Waste

- 4.8.7 Information from the Environment Agency has shown that there is waste infrastructure capacity available across study area 2.

### Construction

#### Material assets

- 4.8.8 With respect to material resources, the project's environmental impacts relate to the extraction of primary raw materials and the production of construction materials. The project also has the potential to constrain existing or future use and extraction of materials.

#### Sterilisation of mineral safeguarding sites and peat resources

- 4.8.9 Due to the number of Mineral Safeguarding Areas and mineral sites that cross or are in close proximity to the project, there is potential for the project to substantially constrain or prevent existing and potential future extraction of materials. Therefore, based on this preliminary worst-case scenario a large likely significant effect has been identified. The sterilisation of mineral sites will be assessed further in the ES.

- 4.8.10 The project will not sterilise any peat resources.

#### Importation of aggregates to site

- 4.8.11 The project has adopted a target that aggregates (raw materials) imported to site will have a recycled content of at least 31% as this is the regional percentage target set out in Highways England's standards. The ES will set out the full detailed assessment of the likelihood of the project meeting this target.

#### Recycling and recovery rate of construction and demolition waste

- 4.8.12 Based on preliminary data, the recycling and recovery of construction and demolition waste across the project will not generate a likely significant effect (based on a minimum 70% target, as set out in the Waste Framework Directive, as it has now been incorporated into UK law). The ES will set out the full detailed assessment of the likelihood of the project meeting this target.

#### Waste

- 4.8.13 In terms of waste, potential environmental impacts are primarily related to the production, movement, transport, processing and disposal of waste from the project.

#### Waste infrastructure capacity in study area 2

- 4.8.14 Based on preliminary data, the assessment of future inert, non-hazardous and hazardous landfill capacity in 2024 has identified a slight and non-significant effect across the waste management infrastructure in study area 2. The waste management infrastructure will be assessed further in the ES.

#### Disposal of construction and demolition waste outside study area 2

- 4.8.15 Based on preliminary data, the project would not produce a likely significant effect in relation to the disposal of construction and demolition waste outside study area 2. The disposal of construction and demolition waste outside study area 2 will be assessed further in the ES.

#### Preliminary construction assessment

- Likely significant effects (construction) due to the potential to substantially constrain or prevent existing and potential future extraction of materials due

to the number of Mineral Safeguarding Areas and mineral sites crossing and close to the project.

- Likely significant effects (construction) cannot be ruled out at this stage with regards to aggregates imported to site. The potential for likely significant effects arising from importation of aggregates with low recycled content will be assessed in the ES when more detailed information becomes available.

## Operation

### Material assets

- 4.8.16 It is not anticipated that the project will consume material assets to a significant degree during its operation and therefore only the first year of operation has been included as part of the preliminary assessment.
- 4.8.17 It is anticipated that during operation, the material consumption will be substantially lower than during the construction phase. Therefore, based on preliminary data the project would not produce a likely significant effect in relation to material assets during operation. The operational material assets will be assessed further in the ES.

### Waste

- 4.8.18 During the operation of the project, waste is expected to be limited. Therefore, only the first year of operation is included in the assessment to capture any effects arising from waste generated from the final phases of construction and handover, and assess any potential for effects arising from operational activities.
- 4.8.19 Based on preliminary data the project would not produce a likely significant effect in relation to waste during operation. The operational waste will be assessed further in the ES.

### Preliminary operation assessment

- There would be no likely significant effects related to materials assets or waste during operation.

## 4.9 Noise and vibration

- 4.9.1 This section summarises the preliminary assessment findings at this point in the EIA process for noise and vibration, based on PEI Report Chapter 12: Noise and Vibration.

### Baseline

- 4.9.2 The acoustic environment of the project is primarily characterised by road traffic noise. Additional noise sources include occasional aeroplane noise near to Warcop and trains. In addition to residential buildings, there are many other sensitive receptor types within relatively close proximity of the existing A66, such as the North Pennines AONB, North Pennine Moors SPA and SAC, the River Eden SAC, several Scheduled Monuments, PRowS, community facilities and schools.

### Construction

- 4.9.3 The construction of the project has the potential to result in temporary noise impacts at the closest receptors to the development. At the time the assessment was undertaken detailed construction information was not available to inform a detailed assessment of noise and vibration impacts. A full noise and vibration assessment will

be undertaken and reported within the ES. A Construction Method Statement<sup>8</sup> has since been produced and provides more information about the types of activity that would be expected during construction.



- 4.9.4 The potential for significant adverse effects is primarily dependent on the noise level of construction activities, and the distance between receptors and construction works. Therefore, it can be assumed that receptors closest to the project are most likely to experience significant adverse effects during the construction phase.
- 4.9.5 Significant effects will be temporary and will not be experienced by receptors for the full duration of the construction period. Instead, the period of time which receptors will experience significant effects will depend on the duration of the individual task being undertaken and its location to the receptor.
- 4.9.6 The potential effects of construction activities will be minimised by the use of 'best practicable means' of noise and vibration control during all construction activities. Mitigation measures will be recommended within the ES when the details of the construction programme are known.

#### Preliminary construction assessment

- There is potential for likely significant effects across the project. The location and duration of these effects are yet to be determined and will depend on the construction programme. Effects will be temporary and localised depending on the specific activity and construction stage.

### Operation

- 4.9.7 The potential impacts associated with the project are likely due to the noise emissions associated with the new roads and changes in traffic flows in the wider road network.

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<sup>8</sup> The Construction Method Statement is available as part of the consultation material on <http://www.highwaysengland.co.uk/A66-NTP>

- 4.9.8 These changes may result in permanent adverse or beneficial likely significant effects arising from noise emissions depending on location.
- 4.9.9 Appropriate noise mitigation will be considered at receptors where a likely significant adverse effect has been predicted and will be detailed within the ES. Mitigation of operational road traffic noise may include (but not be limited to) screening (i.e. noise barriers and/or earth bunds) or low-noise surfacing or a combination of these.

**Preliminary operation assessment**

- There is the potential for both adverse and beneficial likely significant effects on residential and non-residential receptors across the project depending on location.

## 4.10 Population and human health

- 4.10.1 This section summarises the preliminary assessment findings at this point in the EIA process for population and human health, based on PEI Report Chapter 13: Population and Human Health.



### Baseline

- 4.10.2 The area surrounding the project varies from the urban settlement of Penrith at the western extents of the project, to being predominately rural in nature with large areas of agricultural land and sparsely distributed communities such as Temple Sowerby, Kirkby Thore and Warcop. There are multiple residential, community and business receptors within these communities, particularly within Kirkby Thore.
- 4.10.3 Penrith, at the western end of the project, is the main location for residential, community and business receptors along the length of the project. Key receptors include Center Parcs, British Gypsum, Cumbria Constabulary Police Headquarters, North West Ambulance Station, Helbeck Quarry, Hulands Quarry and the Ministry of Defence Training Establishment at Warcop.



- 4.10.4 There is an extensive PRow network (including bridleways, footpaths, National Cycle Network) within the vicinity of the project. These routes serve a wide range of users, including horse-riders, pedestrians and cyclists providing connectivity between key communities and the North Pennines AONB.
- 4.10.5 The health and social characteristics of the population in the area surrounding the project are generally in line with or better than the national average in terms of social deprivation and health status. However, there are some areas of deprivation and poor health. Additionally, certain groups that are known to be more vulnerable to health effects are prevalent in some areas. This includes areas with a high proportion of older people, particularly in rural areas, people who are unemployed or on low incomes and people with existing health conditions or disabilities.

### Construction

- 4.10.6 During construction, a number of residential, community and business receptors will be demolished and/or require land take to accommodate the project. A number of housing and employment land allocations will also be impacted as a result of the project due to land take.
- 4.10.7 Potential impacts on agriculture relate primarily to the loss of agricultural land and soils and the possible loss, severance and fragmentation of agricultural holdings. There are also possible impacts on walkers, cyclists and horse riders (WCH) due to temporary closures or diversions during construction.
- 4.10.8 The project will also bring both temporary and permanent effects on open space land (including Common Land and Country Park).
- 4.10.9 The design of the project has been developed to minimise residential, community, business and agricultural land take as far as reasonably practicable. Mitigation measures during construction will include temporary diversions and signage to limit the impacts of any temporary closures of PRow and agricultural accesses. Access to businesses and residential properties will also be maintained and managed.
- 4.10.10 There will be a range of effects on environmental conditions caused by the project during construction that may impact on the health and wellbeing of local communities. This includes noise, visual effects and construction traffic. Those most likely to experience negative effects will include older people, children, people with existing poor health and/or disability and people on low incomes. There are likely to be temporary negative effects on wellbeing, including increased annoyance and reduced enjoyment of outside space. Those affected will include residents of impacted properties and people from the wider community who regularly use local footpaths and public spaces. Negative health effects may also be caused by severance and accessibility impacts due to the temporary closure of road lanes and pedestrian routes, affecting access to local services and community facilities, access to green space and opportunities for physical activity.
- 4.10.11 The construction phase may provide employment opportunities through the creation of direct construction jobs and increased demand for local suppliers and facilities such as shops and cafés. This will have a potential positive effect on the physical and mental health of people in the study area, through improved earnings and opportunities for employment and training.
- 4.10.12 The EMP will set out the procedures to be followed to ensure that impacts from noise, dust, lighting and construction traffic are reduced as far as reasonably practicable, to minimise impacts on local communities. It will include specified working hours and

construction traffic routes, and an appropriate induction to be given to ensure contractors act considerately in relation to local residents and businesses.

#### Preliminary construction assessment

- Permanent adverse likely significant effects due to temporary and permanent land take of businesses, community facilities, open space
- Permanent adverse likely significant effects on land allocated for housing or employment
- Temporary and permanent adverse likely significant effects on community land and assets in close proximity to the project
- Temporary and permanent adverse likely significant effects effect on multiple agricultural holdings due to extent of land take
- Temporary adverse likely significant effects on the WCH due to PRow diversions in the study area
- Potential temporary negative health effects identified in relation to construction lighting and noise, and visual amenity
- Potential negative health effects identified in relation to access of community facilities, shops and opportunities for physical activity

### Operation

- 4.10.13 Once operational, the project is anticipated to bring beneficial effects in terms of overall accessibility and connectivity for the local community, businesses and for those visiting the area. The project will include new routes to maintain existing agricultural and business accesses and maintain and improve the connectivity of the local PRow network. There will also be improvements to the safety of existing routes for WCH.
- 4.10.14 Operation of the project should not require any further land from residential or private properties, community land and assets as well as development land and businesses located within the study area. Changes to the local environment could occur, such as changes to the local noise environment or sense of tranquillity.
- 4.10.15 During the operation of the project the nearby population may be exposed to both increased and decreased levels of traffic noise at residential properties, schools, community facilities and open spaces. The presence of the new road infrastructure may also result in adverse visual and lighting impacts giving rise to negative effects on sleep disturbance and changes in neighbourhood amenity and the perceived quality of the local environment.
- 4.10.16 Potentially significant beneficial effects have been identified, resulting from decreases in NO<sub>2</sub> concentrations at locations along the existing A66 where traffic is diverted on the new route further away from sensitive receptors. This may give rise to potential effects on health and wellbeing including positive effects on respiratory health.
- 4.10.17 Improved traffic flows along the A66 as a result of the project will improve access to local services and facilities for the population along the route, reduce stress associated with traffic congestion and improve quality of life. This is likely to result in a positive health effect.

#### Preliminary operation assessment

- Potentially beneficial significant effects associated with the establishment and improvement to the facilities provided for WCH including formal crossing points across the A66

- Permanent beneficial likely significant effects for local communities, businesses, visitors and agricultural land holdings due to increased accessibility
- Potential negative health effects identified in relation to increases in traffic noise and visual amenity.
- Potential positive health effects identified in relation to transport and connectivity, community facilities and employment and economy.

## 4.11 Road drainage and the water environment

- 4.11.1 This section summarises the preliminary assessment findings at this point in the EIA process for road drainage and the water environment, based on PEI Report Chapter 14: Road Drainage and the Water Environment, which considers the potential effects on the quality and quantity of surface and ground waters, geomorphology and flood risk that may result from construction activities and operational road drainage.



### Baseline

- 4.11.2 The water environment comprises the road drainage system, surface water features, groundwater resources and flood risk within the study area. The links between the surface water, groundwater and flood risk creates a very complex environmental setting.
- 4.11.3 The land within the M6 junction 40 to Kemplay Bank, Penrith to Temple Sowerby, Temple Sowerby to Appleby and Appleby to Brough schemes drain into the River Eden via a number of main rivers and ordinary watercourses of varying value.
- 4.11.4 The Bowes Bypass, Cross Lanes to Rokeby, Stephen Bank to Carkin Moor and A1(M) junction 53 Scotch Corner schemes drain into the River Greta and then the River Tees, via a number of main rivers and ordinary watercourses of varying value.

- 4.11.5 There are areas at risk of flooding across the schemes, most significantly within the M6 junction 40 to Kemplay Bank, Temple Sowerby to Appleby, and Appleby to Brough scheme study areas.
- 4.11.6 The underlying geology of the M6 junction 40 to Kemplay Bank, Penrith to Temple Sowerby, Temple Sowerby to Appleby and Appleby to Brough schemes is Penrith Sandstone, which transitions over to Carboniferous Limestones at Appleby to Brough and underlies the Bowes Bypass, Cross Lanes to Rokeby, Stephen Bank to Carkin Moor and A1(M) junction 53 Scotch Corner schemes. The Temple Sowerby to Appleby study area includes gypsum (a rapidly dissolving mineral compound) beds, which are significant for groundwater interactions. Limestone karst features are also present within the study area of Bowes Bypass. Springs, abstractions, and discharges are present across the schemes, and all dwellings downstream from the schemes have been assumed to use groundwater abstraction as a precautionary approach.

### Construction

- 4.11.7 During construction, there would be the potential for adverse impacts on the quality and flow of surface water receptors. This is due to major earthworks near to watercourses and a changing of surface water flow routes. Physical changes to the watercourses and longer-term changes associated with sediment deposition has the potential to impact the hydro-morphological and ecological quality of surface waters.
- 4.11.8 Impacts to groundwater levels, flows and quality arising from construction activities, primarily dewatering, earthworks and intrusive investigation works creating new flow paths for groundwater, have the potential to occur.
- 4.11.9 Flood risk may be affected during the construction phase as a result of construction works and temporary storage areas within a floodplain that may temporarily affect the floodplain function, resulting in an increase in flood risk at that location or elsewhere.
- 4.11.10 There are established construction practice guidelines to manage pollution risks during construction. It is assumed that the Environment Agency's Pollution Prevention Guidelines and Guidelines for Pollution Prevention will be adhered to in conjunction with a surface water management plan. Environmental monitoring of the water environment would also be undertaken throughout construction.

#### Preliminary construction assessment

- No likely significant effects are anticipated on the basis that the project construction design and EMP will incorporate the recommendations for mitigation that will be based on detailed modelling where relevant.

### Operation

- 4.11.11 During operation, there is the potential for permanent impacts to the hydro-morphological and ecological quality of surface water receptors caused by the introduction of barriers that may alter natural processes. This potential impact is most relevant at Temple Sowerby to Appleby and Appleby to Brough. Mitigation will be embedded into the design of the crossings following detailed geomorphological modelling.
- 4.11.12 The rates and volumes of surface water runoff have the potential to change due to the increase in impermeable area or changes to the existing drainage regime, and additional crossings and infrastructure in the flood plain leading to a potential increase in flood risk to the project and to surrounding areas.



- 4.11.13 Without mitigation, operation of the road could lead to pollution impacts on surface water and groundwater from road run-off. Road drainage for the schemes is being developed to protect the water environment from highway pollution and to prevent increases in flood risk. A sustainable drainage system will be developed that would discharge into a series of road drainage attenuation basins to provide treatment before allowing water to gradually soak into the ground or flow into a watercourse. This approach would control pollution from road run-off to higher standards than for the current road.
- 4.11.14 There is the potential for increased dissolution of gypsum from road drainage in the Kirkby Thore area of the Temple Sowerby to Appleby scheme where gypsum is present, leading to potential ground instability. Mitigation will be embedded into the design, including any attenuation ponds and drainage in this area being fully lined to minimise any increase in infiltration.
- 4.11.15 There may also be a change in the rate of recharge of aquifers due to change in ground surface cover and introduction of new drainage systems, and a reduced dilution and/or dispersion of consented discharges to groundwater and treated sewage effluent due to reduced or redirected groundwater flow paths.

**Preliminary operation assessment**

- No likely significant effects are anticipated on the basis that the project design will incorporate the recommendations for mitigation that will be based on detailed modelling where relevant.

## **4.12 Cumulative and combined effects**

- 4.12.1 As detailed in PEI Report Chapter 15: Cumulative and Combined Effects, an assessment is being undertaken of cumulative effects arising from the following:
- The combined effects from the proposed project on a single receptor from a number of individual environmental impacts, for example noise, dust and traffic.
  - Proposed developments in the vicinity of the project that are in planning or have been consented, combined with the effects of the project.
- 4.12.2 Combined impacts from the action of a number of different impacts upon a single resource/receptor will be considered within the environmental factor chapters of the ES.
- 4.12.3 Data is being gathered regarding other proposed developments to facilitate the assessment of likely cumulative effects. A preliminary review of planning applications and allocations within the area around the project has been undertaken to identify any other developments which may result in a cumulative effect together with the project, which may result in a greater, new or different significant effect than would result from the project on its own. The search area for these other developments was the largest combined area based on the likely distances from which developments could influence each environmental topic. Based on an initial review, planning applications and applications that may have the potential to generate cumulative impacts with the project are presented in Figure 15.1 within Chapter 15: Cumulative and Combined Effects.
- 4.12.4 The cumulative effects will be assessed when the conclusions of individual environmental factor assessments have been reached and reported. A full cumulative effects assessment will be included within the environmental factor chapters of the ES.

## 5 Summary of likely significant environmental effects

- 5.1.1 As part of the ongoing EIA work, we are continuing to consider mitigation measures, and where appropriate, any proposed monitoring arrangements.
- 5.1.2 Taking into consideration any mitigation measures proposed at this point of the assessment as discussed in section 4 of this document and the technical chapters, a summary of the preliminary assessment of likely significant environmental effects is presented in the tables below at a routewide and scheme by scheme level. Where results are subject to further mitigation design and assessment, this is detailed in the tables.



## Route wide

Table 5-1: Summary of preliminary assessment of likely significant environmental effects - Route wide

Factor	Preliminary assessment of likely significant environmental effects	
	Construction stage	Operation stage
Air Quality*	<ul style="list-style-type: none"> <li>Potential for likely significant effects from construction-related traffic movements (in terms of flows and routes taken) or diverted local traffic, due to a deterioration in air quality for human receptors or as a result of elevated nitrogen deposition at designated ecological receptors. A particular concern would be if construction-related vehicles affected or diverted local traffic within the currently proposed Penrith Castlegate Air Quality Management Area (AQMA) or other locations with sensitive receptors close to these routes approaching the Air Quality Objective (AQO). This will be assessed further in the ES and mitigation developed.</li> </ul>	<ul style="list-style-type: none"> <li>There are 15 designated ecological sites as follows where nutrient nitrogen deposition is anticipated to fall as a consequence of the project. These locations have the potential to experience likely significant effects<sup>9</sup>. <ul style="list-style-type: none"> <li>North Pennine Moors Special Protection Area (SPA)</li> <li>North Pennine Moors Special Area of Conservation (SAC)</li> <li>Argill Woods and Pasture Site of Special Scientific Interest (SSSI)</li> <li>Augill Valley Pasture SSSI</li> <li>Bowes Moor SSSI</li> <li>Pallet Hill Local Wildlife Site (LWS)</li> <li>Stephen Bank Road Verge LWS</li> <li>Augill Beck Wood Ancient Woodland (AW)</li> <li>Augill Bridge Wood AW</li> <li>Deepdale Wood AW</li> <li>Graham's Gill/Jack-Wood AW</li> <li>Newbiggin Wood AW</li> <li>Oglebird Plantation AW</li> <li>Raughtonguill Wood AW</li> <li>Thorsgill Wood AW</li> </ul> </li> </ul>

<sup>9</sup> Highways England is developing a tool for determining the additional contribution of ammonia (NH<sub>3</sub>) emissions from vehicles to deposited nitrogen. It is expected that this method will be available for use at the ES stage and therefore the potential ecological impacts will be updated accordingly.

Factor	Preliminary assessment of likely significant environmental effects	
	Construction stage	Operation stage
		<ul style="list-style-type: none"> <li>Thirty-five veteran and ancient trees have been identified within 200m of the ARN. Likely significant effects at these locations cannot be ruled at this stage. This will be reviewed as part of the EIA stage.</li> </ul>
Biodiversity	<ul style="list-style-type: none"> <li>Potential likely significant effects anticipated during construction for the following, subject to further survey and mitigation design: <ul style="list-style-type: none"> <li>Habitats</li> <li>Bat roosts</li> <li>Bat activity</li> <li>Terrestrial mammals, including Red squirrel</li> <li>Wintering and breeding birds</li> <li>Barn owl</li> <li>Reptiles</li> <li>Amphibians</li> <li>Terrestrial invertebrates</li> <li>Macrophytes</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Potential likely significant effects anticipated during operation for the following, subject to further survey and mitigation design: <ul style="list-style-type: none"> <li>Habitats</li> <li>Bat roosts</li> <li>Bat activity</li> <li>Terrestrial mammals, including Red squirrel</li> <li>Wintering and breeding birds</li> <li>Barn owl</li> <li>Reptiles</li> <li>Amphibians</li> <li>Terrestrial invertebrates</li> <li>Macrophytes</li> </ul> </li> </ul>
Climate	<ul style="list-style-type: none"> <li>No likely route wide significant effects anticipated.</li> </ul>	<ul style="list-style-type: none"> <li>No likely route wide significant effects anticipated.</li> </ul>
Cultural Heritage	<ul style="list-style-type: none"> <li>No likely route wide significant effects anticipated.</li> </ul>	<ul style="list-style-type: none"> <li>No likely route wide significant effects anticipated.</li> </ul>
Geology and Soils	<ul style="list-style-type: none"> <li>Likely significant effects due to the potential permanent land take and loss of high and medium value agricultural soil resource (Grade 2, 3a and 3b agricultural land).</li> <li>Likely significant effects on soils supporting the River Eden SAC, River Eden and Tributaries SSSI.</li> </ul>	<ul style="list-style-type: none"> <li>No likely route wide significant effects anticipated.</li> </ul>
Landscape and Visual Effects	<ul style="list-style-type: none"> <li>No likely route wide significant effects anticipated.</li> </ul>	<ul style="list-style-type: none"> <li>No likely route wide significant effects anticipated.</li> </ul>



Factor	Preliminary assessment of likely significant environmental effects	
	Construction stage	Operation stage
Material Assets and Waste*	<ul style="list-style-type: none"> <li>A likely significant effect is anticipated in relation to the sterilisation of Mineral Safeguarding Sites.</li> <li>Likely significant effects cannot be ruled out at this stage with regards to aggregates imported to site. The potential for importation of aggregates with low recycled content will be assessed in the ES when information becomes available.</li> </ul>	<ul style="list-style-type: none"> <li>No likely route wide significant effects anticipated.</li> </ul>
Noise and Vibration	<ul style="list-style-type: none"> <li>There is potential for significant effects across the project route wide. Effects will be temporary and localised depending on the specific activity and construction stage, and will be assessed further in the ES.</li> </ul>	<ul style="list-style-type: none"> <li>Significant adverse effects are predicted to 979 residential receptors and 37 non-residential receptors. Subject to on-going mitigation design and further assessment.</li> <li>Significant beneficial effects are predicted to 530 residential receptors and 79 non-residential receptors.</li> </ul>
Population and Human Health	<ul style="list-style-type: none"> <li>There is potential for significant effects on agricultural land holdings due to loss of land.</li> <li>There is potential for temporary significant effects to private property and housing, community land and assets, and development land and businesses, due to disruption to access.</li> <li>There is potential for temporary significant effects due to construction related nuisance and distribution.</li> <li>There is a potential for positive health effects resulting from jobs created during construction, though at the current stage it is not known how many jobs will be created.</li> </ul>	<ul style="list-style-type: none"> <li>There is a potential for positive health effects resulting from the economic benefits of reduced severance and shorter commuting times.</li> </ul>
Road Drainage and the Water Environment	<ul style="list-style-type: none"> <li>No likely route wide significant effects anticipated.</li> </ul>	<ul style="list-style-type: none"> <li>No likely route wide significant effects anticipated.</li> </ul>

\*At this stage the air quality assessment and material assets and waste assessment within the PEI Report has been presented at a route wide level only. The ES will present the assessment findings at an individual scheme and route wide level.

## M6 Junction 40 to Kemplay Bank

Table 5-2: Summary of preliminary assessment of likely significant environmental effects - M6 Junction 40 to Kemplay Bank

Factor	Preliminary assessment of likely significant environmental effects	
	Construction stage	Operation stage
Air Quality	<ul style="list-style-type: none"> <li>Preliminary assessment for air quality has been undertaken on the basis of the whole route (see route wide table above).</li> </ul>	<ul style="list-style-type: none"> <li>Preliminary assessment for air quality has been undertaken on the basis of the whole route (see route wide table above).</li> </ul>
Biodiversity	<ul style="list-style-type: none"> <li>There is potential for likely significant adverse effects to Skirsgill Wood County Wildlife Site (CWS), Yanwath Wood CWS, Myers Beck (Mardale Road) CWS, Lowther Bridge Site of Invertebrate Significance, due to habitat loss and air quality, subject to further assessment and design.</li> <li>Effects will be the same as route wide table above on habitats - improved grassland, woodlands, semi-improved neutral grasslands, hedgerows, rivers and streams.</li> <li>Effects will be the same as route wide table above on bat roosts and bat activity, barn owls, reptiles, common toad, terrestrial invertebrates and macrophytes, subject to ongoing surveys.</li> <li>Effects will be the same as route wide table above on red squirrel and other terrestrial mammal species due to habitat loss and possible fragmentation impacts.</li> </ul>	<ul style="list-style-type: none"> <li>There is potential for likely significant adverse effects to the River Eden SAC and River Eden and Tributaries SSSI, Asby Complex SAC, Crosby Ravensworth Fell SSSI, Skirsgill Wood County Wildlife Site (CWS), Yanwath Wood CWS, Myers Beck (Mardale Road) CWS, Newbiggin Wood Ancient Woodland (AW), Raughtongill Wood AW and Lowther Bridge Site of Invertebrate Significance relating to air quality, subject to further assessment.</li> <li>Effects will be the same as route wide table above on habitats - improved grassland, woodlands, semi-improved neutral grasslands, hedgerows, rivers and streams.</li> <li>Effects will be the same as route wide table above on bat roosts and bat activity, wintering birds, breeding birds, barn owls, reptiles, common toad, terrestrial invertebrates and macrophytes, subject to ongoing surveys.</li> <li>Effects will be the same as route wide table above on red squirrel and other terrestrial mammal species due to habitat loss and possible fragmentation impacts.</li> </ul>
Climate	<ul style="list-style-type: none"> <li>No likely significant effects anticipated.</li> </ul>	<ul style="list-style-type: none"> <li>No likely significant effects anticipated.</li> </ul>

Factor	Preliminary assessment of likely significant environmental effects	
	Construction stage	Operation stage
Cultural Heritage	<ul style="list-style-type: none"> <li>No likely significant effects anticipated.</li> </ul>	<ul style="list-style-type: none"> <li>No likely significant effects anticipated.</li> </ul>
Geology and Soils	<ul style="list-style-type: none"> <li>Likely significant effects due to the potential permanent land take and loss of high value agricultural soil resource (Grade 3a agricultural land).</li> <li>Likely significant effects on soils supporting SAC or SSSI.</li> </ul>	<ul style="list-style-type: none"> <li>No likely significant effects anticipated.</li> </ul>
Landscape and Visual Effects	<ul style="list-style-type: none"> <li>Likely significant, temporary effects: <ul style="list-style-type: none"> <li>In a localised part of 6: Intermediate Farmland landscape sub-type</li> <li>On residents of Clifton Road</li> <li>On users of Wetheriggs Country Park</li> <li>On users of visitors to Mayburgh Henge</li> <li>On users of PRow to the south of the scheme</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Likely significant effects at year 1: <ul style="list-style-type: none"> <li>In a localised part of 6: Intermediate Farmland landscape sub-type</li> <li>On residents of Clifford Road</li> <li>On users of Wetheriggs Country Park</li> </ul> </li> <li>Likely significant effects at year 15: <ul style="list-style-type: none"> <li>None</li> </ul> </li> </ul>
Material Assets and Waste	<ul style="list-style-type: none"> <li>Preliminary assessment for material assets and waste has been undertaken on the basis of the whole route (see route wide table above).</li> </ul>	<ul style="list-style-type: none"> <li>Preliminary assessment for material assets and waste has been undertaken on the basis of the whole route (see route wide table above).</li> </ul>
Noise and Vibration	<ul style="list-style-type: none"> <li>There is potential for significant effects across the scheme. Effects will be temporary and localized depending on the specific activity and construction stage.</li> <li>The location and duration of these effects are yet to be determined and are subject to further assessment.</li> </ul>	<ul style="list-style-type: none"> <li>Significant adverse effects predicted to 117 residential receptors. Subject to on-going mitigation design and further assessment.</li> </ul>
Population and Human Health	<ul style="list-style-type: none"> <li>Walkers, cyclists and horse riders (WCH) – likely significant effects due to the severance of PRow and other WCH provisions due to the land required for the construction of the project.</li> </ul>	<ul style="list-style-type: none"> <li>Walkers, cyclists and horse riders – potential for beneficial significant effects if additional formal crossing points are introduced across the A66, that will bring improvements to WCH journey times, in some cases. However, there is also the potential for adverse</li> </ul>

Factor	Preliminary assessment of likely significant environmental effects	
	Construction stage	Operation stage
	<ul style="list-style-type: none"> <li>• Agricultural land holdings - likely significant effects due the loss of or damage to key characteristics, features or elements of the agricultural holding and potential effect of this change on viability.</li> <li>• Skirsgill employment allocation, at land adjacent to Skirsgill Depot – potential likely significant effects due to permanent loss of allocated land.</li> <li>• Kingdom Hall of Jehovah's Witnesses – potential likely significant effects due to permanent land take.</li> <li>• Wetheriggs Country Park – potential likely significant effects due to land take required for construction of the scheme, including the woodland edge of the park to be felled.</li> <li>• Skirsgill Park – potential likely significant effects due land take. This potentially could affect access to this section of the park.</li> <li>• Happy Hooves Riding Centre – potential likely significant effects due to permanent land take required. Construction nuisance and disruption could impact the Centre's ability to function due to potential effects upon the animals.</li> <li>• Study area population (including vulnerable groups) – potentially negative health effect due to increased HGV movements on the local road network.</li> <li>• Local residents and users of local footpaths, Wetheriggs Country Park, Carleton Heights, Wetheriggs and Pategill Open Spaces - potentially negative health effect due to construction noise.</li> </ul>	<p>significant effects due to increased journey times dependent upon the permanent scheme design.</p> <ul style="list-style-type: none"> <li>• Local residents, users of local footpaths, Wetheriggs Country Park and Pategill Open Space - potentially negative health effect due to increased traffic noise.</li> <li>• Local residents and users of Wetheriggs Country Park - potentially negative health effect due to the visual impact of vegetation clearance and new road infrastructure.</li> <li>• Residents to the south of Penrith - potentially positive health effect due to improved access to community facilities due to improved traffic flows around Kemplay Bank Roundabout.</li> </ul>



Factor	Preliminary assessment of likely significant environmental effects	
	Construction stage	Operation stage
	<ul style="list-style-type: none"> <li>Local residents and users of local footpaths and Wetheriggs Country Park - potentially negative health effect due to the visual impact of vegetation clearance and construction activities.</li> <li>Local residents - potentially negative health effect due to night-time construction lighting and noise.</li> <li>Residents to the south of Penrith - potentially negative health effect due to temporary traffic delays at Kemplay Bank Roundabout affecting journeys to Penrith Hospital, and emergency vehicles exiting the Community Fire and Ambulance Station.</li> <li>Residents to the south of Penrith - potentially negative health effect due to temporary traffic delays at Kemplay Bank Roundabout reducing access by car/bus to community facilities in Penrith.</li> <li>Residents to the north of Carleton Avenue - potentially negative health effect due to temporary disruption of pedestrian access to Carleton Hall Park via the Carleton Avenue underpass.</li> </ul>	
Road Drainage and the Water Environment	<ul style="list-style-type: none"> <li>No likely significant effects anticipated.</li> </ul>	<ul style="list-style-type: none"> <li>No likely significant effects anticipated.</li> </ul>

## Penrith to Temple Sowerby

Table 5-3: Summary of preliminary assessment of likely significant environmental effects - Penrith to Temple Sowerby

Factor	Preliminary assessment of likely significant environmental effects	
	Construction stage	Operation stage
Air Quality	<ul style="list-style-type: none"> <li>Preliminary assessment for air quality has been undertaken on the basis of the whole route (see route wide table above).</li> </ul>	<ul style="list-style-type: none"> <li>Preliminary assessment for air quality has been undertaken on the basis of the whole route (see route wide table above).</li> </ul>
Biodiversity	<ul style="list-style-type: none"> <li>There is potential for significant adverse effects on River Eden SAC and River Eden and Tributaries SSSI relating to habitat loss, subject to further design and assessment.</li> <li>There is potential for adverse effects at Whinell Forest CWS relating to Red squirrel.</li> <li>Effects will be the same as route wide table above on habitats (due to loss of Priority Habitats).</li> <li>Effects will be the same as route wide table above on bat roosts and bat activity, barn owls, amphibians (common toad and Great Crested Newts), reptiles, terrestrial invertebrates and macrophytes, subject to ongoing surveys.</li> <li>Effects will be the same as route wide table above on red squirrel and other terrestrial mammal species due to habitat loss and possible fragmentation impacts.</li> </ul>	<ul style="list-style-type: none"> <li>There is potential for significant adverse effects on River Eden SAC and River Eden and Tributaries SSSI relating to air quality, subject to further assessment.</li> <li>Potential significant beneficial effects on Whinell Forest CWS subject to ecology mitigation design and agreement.</li> <li>Effects will be the same as route wide table above on habitats.</li> <li>Effects will be the same as route wide table above on bat roosts and bat activity, breeding birds and wintering birds, barn owls, amphibians (common toad and Great Crested Newts), reptiles, terrestrial invertebrates and macrophytes, subject to ongoing surveys.</li> <li>Effects will be the same as route wide table above on red squirrel and other terrestrial mammal species due to habitat loss and possible fragmentation impacts.</li> </ul>
Climate	<ul style="list-style-type: none"> <li>No likely significant effects anticipated.</li> </ul>	<ul style="list-style-type: none"> <li>No likely significant effects anticipated.</li> </ul>
Cultural Heritage	<ul style="list-style-type: none"> <li>Permanent significant adverse effects are anticipated at the scheduled monuments of the Ring ditches at Brougham.</li> <li>Permanent significant adverse effects are anticipated to affect the Site of the Hartshorn Tree and associated cropmarks.</li> </ul>	<ul style="list-style-type: none"> <li>No likely significant effects anticipated.</li> </ul>

Factor	Preliminary assessment of likely significant environmental effects	
	Construction stage	Operation stage
Geology and Soils	<ul style="list-style-type: none"> <li>Likely significant effects due to the potential permanent land take and loss of high value agricultural soil resource (Grade 2 and 3a agricultural land).</li> </ul>	<ul style="list-style-type: none"> <li>No likely significant effects anticipated.</li> </ul>
Landscape and Visual Effects	<ul style="list-style-type: none"> <li>Likely significant, temporary effects: <ul style="list-style-type: none"> <li>In a localised part of 6: Intermediate Farmland landscape sub-type</li> <li>In a localised part of 8b: Broad Valleys landscape sub-type</li> <li>In a localised part of 10: Sandstone Ridge landscape sub-type</li> <li>On residents of Brovacum, Dinglefield, Foxgloves and Lightwater Cottages, Whinfell Park, Lane End, Woodside and Whinfell House</li> <li>On users of PRoW</li> <li>On visitors to Center Parcs Holiday Village</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Likely significant effects at year 1: <ul style="list-style-type: none"> <li>In a localised part of 6: Intermediate Farmland landscape sub-type</li> <li>In a localised part of 8b: Broad Valleys landscape sub-type</li> <li>In a localised part of 10: Sandstone Ridge landscape sub-type</li> <li>On residents of Brovacum, Foxgloves and Lightwater Cottages, three cottages at Whinfell Park and Lane End</li> <li>On users of PRoW 311004</li> <li>On visitors to Center Parcs Holiday Village</li> </ul> </li> <li>Likely significant effects at year 15: <ul style="list-style-type: none"> <li>In a localised part of 8b: Broad Valleys landscape sub-type</li> <li>In a localised part of 10: Sandstone Ridge landscape sub-type</li> <li>On residents of Lightwater Cottages, Whinfell Park and Lane End</li> <li>On users of PRoW 311004</li> <li>On visitors to Center Parcs Holiday Village</li> </ul> </li> </ul>
Material Assets and Waste	<ul style="list-style-type: none"> <li>Preliminary assessment for material assets and waste has been undertaken on the basis of the whole route (see route wide table above).</li> </ul>	<ul style="list-style-type: none"> <li>Preliminary assessment for material assets and waste has been undertaken on the basis of the whole route (see route wide table above).</li> </ul>
Noise and Vibration	<ul style="list-style-type: none"> <li>There is potential for significant effects across the scheme. Effects will be temporary and</li> </ul>	<ul style="list-style-type: none"> <li>Significant adverse effects are predicted to 12 residential receptors. Subject to on-going mitigation design and further assessment.</li> </ul>

Factor	Preliminary assessment of likely significant environmental effects	
	Construction stage	Operation stage
	<p>localized depending on the specific activity and construction stage.</p> <ul style="list-style-type: none"> <li>The location and duration of these effects are yet to be determined and are subject to further assessment.</li> </ul>	<ul style="list-style-type: none"> <li>Significant beneficial effects are predicted to four residential receptor and one non-residential receptors.</li> </ul>
Population and Human Health	<ul style="list-style-type: none"> <li>Walkers, cyclists and horse riders – potential for likely significant effects due to the severance of PRoW and other WCH provisions due to the land required for the construction of the project.</li> <li>Agricultural land holdings – potential for likely significant adverse effects due to the loss of or damage to key characteristics, features or elements of the agricultural holding and potential effect of this change on viability.</li> <li>Property would require acquisition and demolition as part of the scheme. At this stage potential significant effects cannot be ruled out</li> <li>Center Parcs Whinfell Forest - potential for likely significant effects due to disruption to the local road network which may impact visitors accessing the facility.</li> <li>Residents of rural properties, potentially negative health effects on wellbeing and quality of life due to noise and visual effects.</li> <li>Rural communities – potentially negative health effect due to severance caused by construction activities and traffic, leading to reduced access to services and facilities.</li> </ul>	<ul style="list-style-type: none"> <li>Walkers, cyclists and horse riders – potential for beneficial significant effects if additional formal crossing points are introduced across the A66, that will bring improvements to WCH journey times, in some cases. However, there is also the potential for adverse significant effects due to increased journey times dependent upon the permanent scheme design.</li> <li>Center Parcs Whinfell Forest - potential for likely significant effects due improved access due to the provision of a new junction.</li> <li>Residents of rural properties - potentially negative health effects due to impacts on quality of life from noise effects</li> <li>Rural communities - potentially positive health effect due to improved access to community facilities resulting from improved traffic flows on the A66.</li> </ul>
Road Drainage and the Water Environment	<ul style="list-style-type: none"> <li>No likely significant effects anticipated.</li> </ul>	<ul style="list-style-type: none"> <li>No likely significant effects anticipated.</li> </ul>



## Temple Sowerby to Appleby

Table 5-4: Summary of preliminary assessment of likely significant environmental effects - Temple Sowerby to Appleby

Factor	Preliminary assessment of likely significant environmental effects	
	Construction stage	Operation stage
Air Quality	<ul style="list-style-type: none"> <li>Preliminary assessment for air quality has been undertaken on the basis of the whole route (see route wide table above). Assessment at ES stage will be undertaken at a local geographic level.</li> </ul>	<ul style="list-style-type: none"> <li>Preliminary assessment for air quality has been undertaken on the basis of the whole route (see route wide table above). Assessment at ES stage will be undertaken at a local geographic level.</li> <li></li> </ul>
Biodiversity	<p>Blue alternative</p> <ul style="list-style-type: none"> <li>There is potential for significant adverse effects on River Eden SAC and River Eden and Tributaries SSSI, Chapel Wood CWS, Ross Wood CWS, Dowpits Wood CWS, Temple Sowerby Shingle Banks, Oglebird Scar, Acorn Bank and Bolton Shingle Bank Sites of Invertebrate Significance, relating to habitat loss. Subject to further design and mitigation.</li> <li>There may also be significant effects on habitats (Oglebird Plantation AW, Chapel Wood AW, Ross Wood AW, Dowpits Wood AW, Veteran trees, Woodland, Hedgerow, Ponds, Open Mosaic habitat) due to loss of habitat or fragmentation.</li> <li>Effects will be the same as River Eden SAC for rivers and streams.</li> <li>Effects will be the same as route wide table above on bat roosts and bat activity, barn owls, amphibians, reptiles, terrestrial invertebrates and macrophytes, subject to ongoing surveys.</li> <li>Effects will be the same as route wide table above on red squirrel and other terrestrial</li> </ul>	<p>Blue alternative</p> <ul style="list-style-type: none"> <li>There is potential for significant adverse effects on River Eden SAC and River Eden and Tributaries SSSI, Chapel Wood CWS, Ross Wood CWS, Dowpits Wood CWS, Temple Sowerby Shingle Banks, Oglebird Scar, Acorn Bank and Bolton Shingle Bank Sites of Invertebrate Significance relating to air quality. Subject to further assessment</li> <li>There may also be significant effects on habitats (Oglebird Plantation AW, Chapel Wood AW, Ross Wood AW, Dowpits Wood AW, Veteran trees, Woodland, Hedgerow, Ponds, Open Mosaic habitat) due to degradation of ancient woodland.</li> <li>Effects will be the same as route wide table above for rivers and streams.</li> <li>Effects will be the same as route wide table above on bat roosts and bat activity, barn owls, wintering birds and breeding birds, amphibians, reptiles, terrestrial invertebrates and macrophytes, subject to ongoing surveys.</li> <li>Effects will be the same as route wide table above on red squirrel and other terrestrial mammal species due to habitat loss and possible fragmentation impacts.</li> </ul>

Factor	Preliminary assessment of likely significant environmental effects	
	Construction stage	Operation stage
	<p>mammal species due to habitat loss and possible fragmentation impacts.</p> <p><b>Orange alternative</b></p> <ul style="list-style-type: none"> <li>The effects of the Orange alternative are expected to be similar to those described for the Blue alternative, with the following differences:</li> <li>Greater construction risks to the River Eden SAC/SSSI due to the closer proximity to the main river.</li> <li>Greater potential for losses to scattered semi-mature and mature trees (some of which may be veteran trees).</li> <li>Localised impacts to Temple Sowerby SSSI with the potential to support great crested newts.</li> </ul> <p><b>Red alternative</b></p> <ul style="list-style-type: none"> <li>The effects of the Red alternative are expected to be similar to those described for the Blue alternative, with the following differences:</li> <li>Additional shading of Keld Sike, which is not within the River Eden SAC/SSSI but is functionally linked.</li> <li>Greater loss and severance impacts to Chapel Wood CWS.</li> <li>Greater loss of semi-mature to mature trees.</li> </ul>	<p><b>Orange alternative</b></p> <ul style="list-style-type: none"> <li>The effects of the Orange alternative are expected to be similar to those described for the Blue alternative, with the following differences:</li> <li>Localised impacts to Temple Sowerby SSSI with the potential to support great crested newts.</li> </ul> <p><b>Red alternative</b></p> <ul style="list-style-type: none"> <li>The effects of the Red alternative are expected to be similar to those described for the Blue alternative, with the following differences:</li> <li>Additional shading of Keld Sike, which is not within the River Eden SAC/SSSI but is functionally linked.</li> </ul>
Climate	<ul style="list-style-type: none"> <li>No likely significant effects anticipated from all alternatives.</li> </ul>	<ul style="list-style-type: none"> <li>No likely significant effects anticipated from all alternatives.</li> </ul>
Cultural Heritage	<p><b>Blue alternative</b></p> <ul style="list-style-type: none"> <li>Permanent significant adverse effects are anticipated at the Roman Camp, 350m east of Redlands Bank.</li> </ul>	<ul style="list-style-type: none"> <li>No likely significant effects anticipated from all alternatives.</li> </ul>

Factor	Preliminary assessment of likely significant environmental effects	
	Construction stage	Operation stage
	<p><b>Orange alternative</b></p> <ul style="list-style-type: none"> <li>Permanent significant adverse effects are anticipated at the Kirkby Thore Roman fort and associated Vicus, and the Roman Camp east of Redlands Bank.</li> </ul> <p><b>Red alternative</b></p> <ul style="list-style-type: none"> <li>No likely significant effects anticipated.</li> </ul>	
Geology and Soils	<p><b>Blue alternative</b></p> <ul style="list-style-type: none"> <li>Likely significant effects due to the potential permanent land take and loss of high value agricultural soil resource (Grade 2 and 3a agricultural land).</li> <li>Likely significant effects on soils supporting SAC or SSSI.</li> </ul> <p><b>Orange alternative</b></p> <ul style="list-style-type: none"> <li>Likely significant effects due to the potential permanent land take and loss of high value agricultural soil resource (Grade 2 and 3a agricultural land).</li> <li>Likely significant effects on soils supporting SAC or SSSI.</li> </ul> <p><b>Red alternative</b></p> <ul style="list-style-type: none"> <li>Likely significant effects due to the potential permanent land take and loss of high value agricultural soil resource (Grade 2 and 3a agricultural land).</li> </ul>	<ul style="list-style-type: none"> <li>No likely significant effects anticipated from all alternatives.</li> </ul>
Landscape and Visual Effects	<p><b>Blue alternative</b></p> <ul style="list-style-type: none"> <li>Likely significant effects on 8b Broad Valleys Landscape sub-type</li> </ul>	<p><b>Blue alternative</b></p> <ul style="list-style-type: none"> <li>Likely significant effects in year 1 on: <ul style="list-style-type: none"> <li>8b Broad Valleys Landscape sub-type</li> <li>6 Intermediate Farmland Landscape sub-type</li> </ul> </li> </ul>

Factor	Preliminary assessment of likely significant environmental effects	
	Construction stage	Operation stage
	<ul style="list-style-type: none"> <li>• Likely significant effects on 6 Intermediate Farmland Landscape sub-type</li> <li>• Likely significant effects on North Pennines AONB</li> <li>• Likely significant effects on the residents of Kirkby Thore, Spitals Farm, Priest Lane, Low Moor, between Low Moor and Kirkby Thore, between Sleastonhow Farm and Appleby</li> <li>• Likely significant effects on PRoW at Temple Sowerby, Prow at Kirkby Thore, PRoW 341017, PRoW 317008, PRoW 317009, PRoW between Powis House and Appleby</li> </ul> <p>Orange alternative</p> <ul style="list-style-type: none"> <li>• Likely significant effects on 8b Broad Valleys Landscape sub-type</li> <li>• Likely significant effects on 6 Intermediate Farmland Landscape sub-type</li> <li>• Likely significant effects on North Pennines AONB</li> <li>• Likely significant effects on the residents of Kirkby Thore, Spitals Farm, Priest Lane, Low Moor, between Low Moor and Kirkby Thore, between Bridge End Farm and Powis House, between Sleastonhow Farm and Appleby</li> <li>• Likely significant effects on PRoW at Kirkby Thore, PRoW 341017, PRoW 317008, PRoW 317009, PRoW between Powis House and Appleby</li> </ul> <p>Red alternative</p> <ul style="list-style-type: none"> <li>• Likely significant effects on 8b Broad Valleys Landscape sub-type</li> </ul>	<ul style="list-style-type: none"> <li>○ North Pennines AONB</li> <li>○ Residents of Kirkby Thore, Spitals Farm, Priest Lane, Low Moor, between Sleastonhow Farm and Appleby</li> <li>○ PRoW at Temple Sowerby, PRoW at Kirkby Thore, PRoW 341017, PRoW 317008, PRoW 317009, PRoW between Powis House and Appleby</li> <li>• Likely significant effects in year 15 on: <ul style="list-style-type: none"> <li>○ 8b Broad Valleys Landscape sub-type</li> <li>○ 6 Intermediate Farmland Landscape sub-type</li> <li>○ Residents of Kirkby Thore, Spitals Farm, Priest Lane, Low Moor, between Sleastonhow Farm and Appleby</li> <li>○ PRoW at Kirkby Thore, PRoW 341017, PRoW 317008, PRoW 317009, PRoW between Powis House and Appleby</li> </ul> </li> </ul> <p>Orange alternative</p> <ul style="list-style-type: none"> <li>• Likely significant effects in year 1 on: <ul style="list-style-type: none"> <li>○ 8b Broad Valleys Landscape sub-type</li> <li>○ 6 Intermediate Farmland Landscape sub-type</li> <li>○ North Pennines AONB</li> <li>○ Residents of Kirkby Thore, Spitals Farm, Low Moor, between Low Moor and Kirkby Thore, between Bridge End Farm and Powis House, between Sleastonhow Farm and Appleby</li> <li>○ PRoW at Kirkby Thore, PRoW 341017, PRoW 317008, PRoW 317009, PRoW between Powis House and Appleby</li> </ul> </li> <li>• Likely significant effects in year 15 on: <ul style="list-style-type: none"> <li>○ 8b Broad Valleys Landscape sub-type</li> <li>○ Residents of Kirkby Thore, Spitals Farm, Low Moor, between Low Moor and Kirkby Thore, between Bridge End Farm and Powis House, between Sleastonhow Farm and Appleby</li> </ul> </li> </ul>



Factor	Preliminary assessment of likely significant environmental effects	
	Construction stage	Operation stage
	<ul style="list-style-type: none"> <li>• Likely significant effects on 6 Intermediate Farmland Landscape sub-type</li> <li>• Likely significant effects on North Pennines AONB</li> <li>• Likely significant effects on the residents of Kirkby Thore, Spitals Farm, Priest Lane, Low Moor, between Low Moor and Kirkby Thore, between Sleastonhow Farm and Appleby</li> <li>• Likely significant effects on PRoW at Temple Sowerby, PRoW at Kirkby Thore, PRoW 341017, PRoW 317008, PRoW 317009, PRoW between Powis House and Appleby</li> </ul>	<ul style="list-style-type: none"> <li>○ PRoW at Kirkby Thore, PRoW 341017, PRoW 317008, PRoW 317009, PRoW between Powis House and Appleby</li> </ul> <p><b>Red alternative</b></p> <ul style="list-style-type: none"> <li>• Likely significant effects in year 1 on: <ul style="list-style-type: none"> <li>○ 8b Broad Valleys Landscape sub-type</li> <li>○ 6 Intermediate Farmland Landscape sub-type</li> <li>○ North Pennines AONB</li> <li>○ Residents of Kirkby Thore, Spitals Farm, Priest Lane, Low Moor, between Sleastonhow Farm and Appleby</li> <li>○ PRoW at Temple Sowerby, PRoW at Kirkby Thore, PRoW 341017, PRoW 317008, PRoW 317009, PRoW between Powis House and Appleby</li> </ul> </li> <li>• Likely significant effects in year 15 on: <ul style="list-style-type: none"> <li>○ 8b Broad Valleys Landscape sub-type</li> <li>○ 6 Intermediate Farmland Landscape sub-type</li> <li>○ Residents of Kirkby Thore, Spitals Farm, Priest Lane, Low Moor, between Sleastonhow Farm and Appleby</li> <li>○ PRoW at Kirkby Thore, PRoW 341017, PRoW 317008, PRoW 317009, PRoW between Powis House and Appleby</li> </ul> </li> </ul>
Material Assets and Waste	<ul style="list-style-type: none"> <li>• Preliminary assessment for material assets and waste has been undertaken on the basis of the whole route (see route wide table above).</li> </ul>	<ul style="list-style-type: none"> <li>• Preliminary assessment for material assets and waste has been undertaken on the basis of the whole route (see route wide table above).</li> </ul>
Noise and Vibration	<ul style="list-style-type: none"> <li>• There is potential for significant effects across the scheme. Effects will be temporary and localized depending on the specific activity and construction stage.</li> <li>• The location and duration of these effects are yet to be determined and are subject to further assessment.</li> </ul>	<p><b>Blue alternative</b></p> <ul style="list-style-type: none"> <li>• Significant adverse effects are predicted to 256 residential receptors and four non-residential receptors. Subject to on-going mitigation design and further assessment.</li> <li>• Significant beneficial effects are predicted to 124 residential receptor and eight non-residential receptors.</li> </ul> <p><b>Orange alternative</b></p>

Factor	Preliminary assessment of likely significant environmental effects	
	Construction stage	Operation stage
		<ul style="list-style-type: none"> <li>Significant adverse effects are predicted to 20 residential receptors and three non-residential receptors. Subject to on-going mitigation design and further assessment.</li> <li>Significant beneficial effects are predicted to 61 residential receptors and four non-residential receptors.</li> </ul> <p><b>Red alternative</b></p> <ul style="list-style-type: none"> <li>Significant adverse effects are predicted to 260 residential receptors and nine non-residential receptors. Subject to on-going mitigation design and further assessment.</li> <li>Significant beneficial effects are predicted to 120 residential receptors and three non-residential receptors.</li> </ul>
Population and Human Health	<p><b>All alternatives:</b></p> <ul style="list-style-type: none"> <li>Walkers, cyclists and horse riders – potential for likely significant effects due to the severance of PRow and other WCH provisions due to the land required for the construction of the project.</li> <li>Agricultural land holdings – potential for likely significant effects as a result of the loss of or damage to key characteristics, features or elements of the agricultural holdings and potential effect of this change on viability.</li> <li>Local residents – potentially negative effect on wellbeing due to a perceived reduction in the quality of the living environment and concerns about air quality and road safety due to increased HGV movements.</li> <li>Local residents – potentially negative effects on wellbeing, including increased annoyance and</li> </ul>	<p><b>All alternatives</b></p> <ul style="list-style-type: none"> <li>Walkers, cyclists and horse riders – potential for beneficial significant effects if additional formal crossing points are introduced across the A66, that will bring improvements to WCH journey times, in some cases. However, there is also the potential for adverse significant effects due to increased journey times dependent upon the permanent scheme design.</li> <li>Local residents - potentially positive and negative health effects due to impacts on quality of life from noise and visual effects</li> <li>Rural communities - potentially positive health effect due to improved access to community facilities resulting from improved traffic flows on the A66.</li> </ul>

Factor	Preliminary assessment of likely significant environmental effects	
	Construction stage	Operation stage
	<p>reduced enjoyment of outside space due to construction noise.</p> <ul style="list-style-type: none"> <li>Local residents - Potentially negative effects on wellbeing and quality of life due to noise and visual effects.</li> <li>Rural communities – potentially negative health effect due to severance caused by construction activities and traffic, leading to reduced access to services and facilities</li> </ul> <p>Blue alternative</p> <ul style="list-style-type: none"> <li>Common Moss – potential for likely significant effects due to land take.</li> <li>Property would require acquisition and demolition as part of the scheme. At this stage potential significant effects cannot be ruled out</li> </ul> <p>Orange alternative</p> <ul style="list-style-type: none"> <li>Land adjacent to primary school allocation – potential for likely significant effects due to temporary land take as approximately 30% of this allocation lies within the draft DCO boundary.</li> <li>Acorn Bank (National Trust) - potential for likely significant effects as there is potential for a portion of land to be required for this scheme during construction.</li> <li>Common Moss - potential for likely significant effects as there is potential for a portion of land to be required for this scheme during construction.</li> <li>Piper Lane Recreational ground - potential for likely significant effects as there is potential for a</li> </ul>	

Factor	Preliminary assessment of likely significant environmental effects	
	Construction stage	Operation stage
	<p>portion of land to be required for this scheme during construction.</p> <ul style="list-style-type: none"> <li>Property would require acquisition and demolition as part of the scheme. At this stage potential significant effects cannot be ruled out</li> </ul> <p><b>Red alternative</b></p> <ul style="list-style-type: none"> <li>Town housing allocation – potential for likely significant effects as the allocation lies within the draft DCO boundary and will be required for the construction of the scheme.</li> </ul> <p>Common Moss - potential for likely significant effects as there is potential for a portion of land to be required for this scheme during construction.</p>	
Road Drainage and the Water Environment	<ul style="list-style-type: none"> <li>No likely significant effects anticipated from all alternatives.</li> </ul>	<ul style="list-style-type: none"> <li>No likely significant effects anticipated from all alternatives.</li> </ul>

## Appleby to Brough

Table 5-5: Summary of preliminary assessment of likely significant environmental effects – Appleby to Brough

Factor	Preliminary assessment of likely significant environmental effects	
	Construction stage	Operation stage
Air Quality	<ul style="list-style-type: none"> <li>Preliminary assessment for air quality has been undertaken on the basis of the whole route (see route wide table above).</li> </ul>	<ul style="list-style-type: none"> <li>Preliminary assessment for air quality has been undertaken on the basis of the whole route (see route wide table above).</li> </ul>
Biodiversity	<p><b>Black-Black-Black alternative</b></p> <ul style="list-style-type: none"> <li>There is potential for significant adverse effects on River Eden SAC and River Eden and</li> </ul>	<p><b>Black-Black-Black alternative</b></p> <ul style="list-style-type: none"> <li>There is potential for significant adverse effects on River Eden SAC and River Eden and Tributaries SSSI,</li> </ul>



Factor	Preliminary assessment of likely significant environmental effects	
	Construction stage	Operation stage
	<p>Tributaries SSSI relating to habitat loss and potential for pollution of watercourses functionally linked to the site, and on Sandford Mire CWS relating to hydrology. Subject to further design and mitigation.</p> <ul style="list-style-type: none"> <li>• There is the potential for North Pennine Moors SAC and SPA, Argill Woods and Pastures SSSI and Augll Valley Pasture SSSI relating to air quality. Subject to further assessment.</li> <li>• There is potential for significant adverse effects due to loss of Priority Habitats. Subject to further design and mitigation.</li> <li>• Effects will be the same as River Eden SAC for rivers and streams.</li> <li>• Effects will be the same as route wide table above on bat roosts and bat activity, barn owls, amphibians, reptiles, terrestrial invertebrates and macrophytes, subject to ongoing surveys.</li> <li>• Effects will be the same as route wide table above on red squirrel and other terrestrial mammal species due to habitat loss and possible fragmentation impacts.</li> </ul> <p><b>Blue Alternative (central section)</b></p> <ul style="list-style-type: none"> <li>• The effects for the Blue alternative are expected to be similar to the Black alternative within the central section of this scheme.</li> </ul> <p><b>Orange Alternative (eastern section)</b></p> <ul style="list-style-type: none"> <li>• The effects for the Orange alternative are expected to be similar to the Black alternative within the eastern section of this scheme, though the overall loss of habitats (and</li> </ul>	<p>due to habitat loss of watercourses functionally linked to the site.</p> <ul style="list-style-type: none"> <li>• There is the potential for North Pennine Moors SAC and SPA, Argill Woods and Pastures SSSI and Augll Valley Pasture SSSI relating to air quality. Subject to further assessment.</li> <li>• Potential significant adverse effects on Sandford Mire CWS relating to hydrology.</li> <li>• Effects will be the same as route wide table above for rivers and streams.</li> <li>• Effects will be the same as route wide table above on bat roosts and bat activity, barn owls, amphibians, reptiles, terrestrial invertebrates and macrophytes, subject to ongoing surveys.</li> <li>• Effects will be the same as route wide table above on red squirrel and other terrestrial mammal species due to habitat loss and possible fragmentation impacts.</li> </ul> <p><b>Blue Alternative (central section)</b></p> <ul style="list-style-type: none"> <li>• The effects for the Blue alternative are expected to be similar to the Black alternative within the central section of this scheme.</li> </ul> <p><b>Orange Alternative (eastern section)</b></p> <ul style="list-style-type: none"> <li>• The effects for the Orange alternative are expected to be similar to the Black alternative within the eastern section of this scheme, though fragmentation of habitats will be greater due to the offline nature of the alternative.</li> <li>• Shading and habitat impacts expected to be greater for Lowgill Beck than the Black alternative for this section.</li> </ul>

Factor	Preliminary assessment of likely significant environmental effects	
	Construction stage	Operation stage
	<p>associated impacts on protected species) is expected to be greater.</p> <ul style="list-style-type: none"> <li>There is potential for greater shading and habitat loss effects are anticipated through the additional crossing of Lowgill Beck.</li> </ul>	
Climate	<ul style="list-style-type: none"> <li>No likely significant effects anticipated from all alternatives.</li> </ul>	<ul style="list-style-type: none"> <li>No likely significant effects anticipated from all alternatives.</li> </ul>
Cultural Heritage	<p><b>Black-Black-Black alternative</b></p> <ul style="list-style-type: none"> <li>Permanent significant adverse effects are anticipated at the Warcop Roman Camp and Length Of Roman Road, 285m South West Of Moor House.</li> </ul> <p><b>Blue alternative (central section)</b></p> <ul style="list-style-type: none"> <li>No different likely significant effects anticipated as a result of the blue alternative for the central section.</li> </ul> <p><b>Orange alternative (eastern section)</b></p> <ul style="list-style-type: none"> <li>No different likely significant effects anticipated as a result of the orange alternative for the eastern section.</li> </ul>	<ul style="list-style-type: none"> <li>No likely significant effects anticipated from all alternatives.</li> </ul>
Geology and Soils	<p><b>Black-Black-Black alternative</b></p> <ul style="list-style-type: none"> <li>Likely significant effects due to the potential permanent land take and loss of high and medium value agricultural soil resource (Grade 3a and 3b agricultural land).</li> </ul> <p><b>Blue alternative (central section)</b></p> <ul style="list-style-type: none"> <li>No different likely significant effects anticipated as a result of the blue alternative for the central section.</li> </ul> <p><b>Orange alternative (eastern section)</b></p>	<p><b>Black-Black-Black alternative</b></p> <ul style="list-style-type: none"> <li>Potential beneficial significant effects on the UNESCO Global Geopark due to the potential for enhancement if cuttings or earthworks offer an opportunity to permanently expose geology of scientific interest.</li> </ul> <p><b>Blue alternative (central section)</b></p> <ul style="list-style-type: none"> <li>No different likely significant effects anticipated as a result of the blue alternative for the central section.</li> </ul> <p><b>Orange alternative (eastern section)</b></p>

Factor	Preliminary assessment of likely significant environmental effects	
	Construction stage	Operation stage
	<ul style="list-style-type: none"> <li>No different likely significant effects anticipated as a result of the orange alternative for the eastern section.</li> </ul>	<ul style="list-style-type: none"> <li>No different likely significant effects anticipated as a result of the orange alternative for the eastern section.</li> </ul>
Landscape and Visual Effects	<p><b>Black-black-black</b></p> <ul style="list-style-type: none"> <li>Likely significant effects on 8b Broad Valleys Landscape sub-type</li> <li>Likely significant effects on 11a Foothills Landscape sub-type</li> <li>Likely significant effects on North Pennines AONB</li> <li>Likely significant effects on residents at the east of Coupland, Sandford, the Warcop area, the Flitholme area, and west of Brough</li> <li>Likely significant effects on PRoW between Coupland and Sandford, PRoW at Warcop and Flitholme, PRoW to the west of Brough, and PRoW in the North Pennines AONB</li> <li>Likely significant effects on visitors to Eden Valley Railway and Brough Castle</li> </ul> <p><b>Black-blue-black</b></p> <ul style="list-style-type: none"> <li>Likely significant effects on 8b Broad Valleys Landscape sub-type</li> <li>Likely significant effects on 11a Foothills Landscape sub-type</li> <li>Likely significant effects on North Pennines AONB</li> <li>Likely significant effects on residents at the east of Coupland, Sandford, the Warcop area, the Flitholme area, and west of Brough</li> <li>Likely significant effects on PRoW between Coupland and Sandford, PRoW at Warcop and</li> </ul>	<p><b>Black-black-black</b></p> <ul style="list-style-type: none"> <li>Likely significant effects in year 1 on: <ul style="list-style-type: none"> <li>8b Broad Valleys Landscape sub-type</li> <li>11a Foothills Landscape sub-type</li> <li>North Pennines AONB</li> <li>Residents at Sandford, the Warcop area, the Flitholme area, and west of Brough</li> <li>PRoW at Warcop and Flitholme, PRoW 372013 and PRoW 372022, PRoW to the west of Brough, PRoW in the North Pennines AONB</li> </ul> </li> <li>Likely significant effects in year 15 on: <ul style="list-style-type: none"> <li>8b Broad Valleys Landscape sub-type</li> <li>11a Foothills Landscape sub-type</li> <li>North Pennines AONB</li> <li>Residents at Sandford, the Warcop area, the Flitholme area, and west of Brough</li> <li>PRoW at Warcop and Flitholme, PRoW 372013 and PRoW 372022, PRoW to the west of Brough PRoW in the North Pennines AONB</li> </ul> </li> </ul> <p><b>Black-blue-black</b></p> <ul style="list-style-type: none"> <li>Likely significant effects in year 1 on: <ul style="list-style-type: none"> <li>8b Broad Valleys Landscape sub-type</li> <li>11a Foothills Landscape sub-type</li> <li>North Pennines AONB</li> <li>Residents at Sandford, the Warcop area, the Flitholme area, and west of Brough</li> <li>PRoW at Warcop and Flitholme, PRoW 372013 and PRoW 372022, PRoW to the west of</li> </ul> </li> </ul>

Factor	Preliminary assessment of likely significant environmental effects	
	Construction stage	Operation stage
	<p>Flitholme, PRoW to the west of Brough, and PRoW in the North Pennines AONB</p> <ul style="list-style-type: none"> <li>Likely significant effects on visitors to Eden Valley Railway and Brough Castle</li> </ul> <p><b>Black-black-orange</b></p> <ul style="list-style-type: none"> <li>Likely significant effects on 8b Broad Valleys Landscape sub-type</li> <li>Likely significant effects on 11a Foothills Landscape sub-type</li> <li>Likely significant effects on North Pennines AONB</li> <li>Likely significant effects on residents at the east of Coupland, Sandford, the Warcop area, the Flitholme area, and west of Brough</li> <li>Likely significant effects on PRoW between Coupland and Sandford, PRoW at Warcop and Flitholme, PRoW to the west of Brough, and PRoW in the North Pennines AONB</li> <li>Likely significant effects on visitors to Eden Valley Railway and Brough Castle</li> </ul> <p><b>Black-blue-orange</b></p> <ul style="list-style-type: none"> <li>Likely significant effects on 8b Broad Valleys Landscape sub-type</li> <li>Likely significant effects on 11a Foothills Landscape sub-type</li> <li>Likely significant effects on North Pennines AONB</li> <li>Likely significant effects on residents at the east of Coupland, Sanford, the Warcop area, the Flitholme area, and west of Brough</li> </ul>	<p>Brough, and PRoW in the North Pennines AONB</p> <ul style="list-style-type: none"> <li>Visitors to Eden Valley Railway</li> </ul> <ul style="list-style-type: none"> <li>Likely significant effects in year 15 on: <ul style="list-style-type: none"> <li>8b Broad Valleys Landscape sub-type</li> <li>11a Foothills Landscape sub-type</li> <li>North Pennines AONB</li> <li>Residents at Sandford, the Warcop area, the Flitholme area, and west of Brough</li> <li>PRoW at Warcop and Flitholme, PRoW 372013 and PRoW 372022, PRoW to the west of Brough, and PRoW in the North Pennines AONB</li> <li>Visitors to Eden Valley Railway</li> </ul> </li> </ul> <p><b>Black-black-orange</b></p> <ul style="list-style-type: none"> <li>Likely significant effects in year 1 on: <ul style="list-style-type: none"> <li>8b Broad Valleys Landscape sub-type</li> <li>11a Foothills Landscape sub-type</li> <li>North Pennines AONB</li> <li>Residents at Sandford, the Warcop area, the Flitholme area, and west of Brough</li> <li>PRoW at Warcop and Flitholme, PRoW 372013 and PRoW 372022, PRoW to the west of Brough, and PRoW 329001 in the North Pennines AONB</li> <li>Visitors to Eden Valley Railway and Brough Castle</li> </ul> </li> <li>Likely significant effects in year 15 on: <ul style="list-style-type: none"> <li>8b Broad Valleys Landscape sub-type</li> <li>11a Foothills Landscape sub-type</li> <li>North Pennines AONB</li> </ul> </li> </ul>



Factor	Preliminary assessment of likely significant environmental effects	
	Construction stage	Operation stage
	<ul style="list-style-type: none"> <li>• Likely significant effects on PRow between Coupland and Sandford, PRow at Warcop and Flitholme, PRow to the west of Brough, and PRow in the North Pennines AONB</li> <li>• Likely significant effects on visitors to Eden Valley Railway and Brough Castle</li> </ul>	<ul style="list-style-type: none"> <li>○ Residents at Sandford, the Warcop area, the Flitholme area, and west of Brough</li> <li>○ PRow at Warcop and Flitholme, PRow 372013 and PRow 372022, PRow to the west of Brough, and PRow 329001 in the North Pennines AONB</li> <li>○ Visitors to Eden Valley Railway and Brough Castle</li> </ul> <p>Black-blue-orange</p> <ul style="list-style-type: none"> <li>• Likely significant effects in year 1 on: <ul style="list-style-type: none"> <li>○ 8b Broad Valleys Landscape sub-type</li> <li>○ 11a Foothills Landscape sub-type</li> <li>○ North Pennines AONB</li> <li>○ Residents at Sandford, the Warcop area, the Flitholme area, and west of Brough</li> <li>○ PRow at Warcop and Flitholme, PRow 372013 and PRow 372022, PRow to the west of Brough, and PRow 329001 in the North Pennines AONB</li> <li>○ Visitors to Eden Valley Railway and Brough Castle</li> </ul> </li> <li>• Likely significant effects in year 15 on: <ul style="list-style-type: none"> <li>○ 8b Broad Valleys Landscape sub-type</li> <li>○ 11a Foothills Landscape sub-type</li> <li>○ North Pennines AONB</li> <li>○ Residents at Sandford, the Warcop area, the Flitholme area, and west of Brough</li> <li>○ PRow at Warcop and Flitholme, PRow 372013 and PRow 372022, PRow to the west of Brough, and PRow 329001 in the North Pennines AONB</li> </ul> </li> </ul>

Factor	Preliminary assessment of likely significant environmental effects	
	Construction stage	Operation stage
		<ul style="list-style-type: none"> <li>Visitors to Eden Valley Railway and Brough Castle</li> </ul>
Material Assets and Waste	<ul style="list-style-type: none"> <li>Preliminary assessment for material assets and waste has been undertaken on the basis of the whole route (see route wide table above).</li> </ul>	<ul style="list-style-type: none"> <li>Preliminary assessment for material assets and waste has been undertaken on the basis of the whole route (see route wide table above).</li> </ul>
Noise and Vibration	<ul style="list-style-type: none"> <li>There is potential for significant effects across the scheme. Effects will be temporary and localized depending on the specific activity and construction stage.</li> <li>The specific location and duration of these effects are yet to be determined and are subject to further assessment.</li> </ul>	<p><b>Black-Black-Black</b> alternative</p> <ul style="list-style-type: none"> <li>Significant adverse effects are predicted to 58 residential receptors and five non-residential receptors. Subject to on-going mitigation design and further assessment.</li> <li>Significant beneficial effects are predicted to five residential receptors.</li> </ul> <p><b>Black-Blue-Black</b> alternative</p> <ul style="list-style-type: none"> <li>Significant adverse effects are predicted to 42 residential receptors and two non-residential receptors. Subject to on-going mitigation design and further assessment.</li> <li>Significant beneficial effects are predicted to five residential receptors.</li> </ul> <p><b>Black-Black-Orange</b> alternative</p> <ul style="list-style-type: none"> <li>Significant adverse effects are predicted to 75 residential receptors and five non-residential receptors. Subject to on-going mitigation design and further assessment.</li> <li>Significant beneficial effects are predicted to nine residential receptors and one non-residential receptor.</li> </ul> <p><b>Black-Blue-Orange</b> alternative</p> <ul style="list-style-type: none"> <li>Significant adverse effects are predicted to 42 residential receptors and two non-residential receptors.</li> </ul>

Factor	Preliminary assessment of likely significant environmental effects	
	Construction stage	Operation stage
		<p>Subject to on-going mitigation design and further assessment.</p> <ul style="list-style-type: none"> <li>Significant beneficial effects are predicted to nine residential receptors and one non-residential receptor.</li> </ul>
Population and Human Health	<p><b>All alternatives:</b></p> <ul style="list-style-type: none"> <li>Walkers, cyclists and horse riders – potential likely significant effects due to the severance of PRow and other WCH provisions due to the land required for the construction of the project.</li> <li>Agricultural land holdings – potential likely significant effects due to the loss of or damage to key characteristics, features or elements of the agricultural holdings and potential effect of this change on viability.</li> <li>Residents of rural properties, potentially negative health effects on wellbeing and quality of life due to noise effects</li> <li>Rural communities – potentially negative health effect due to severance caused by construction activities and traffic, leading to reduced access to services and facilities</li> </ul> <p><b>Black-Black-Black alternative</b></p> <ul style="list-style-type: none"> <li>Ministry of Defence - potential likely significant effects as a result of potential loss of use/access of land during construction.</li> <li>BW 350/021 - potential likely significant effects as the Bridleway will be severed by the draft DCO boundary.</li> </ul> <p><b>Black-Blue-Black alternative</b></p>	<p><b>All alternatives</b></p> <ul style="list-style-type: none"> <li>Walkers, cyclists and horse riders – potential for beneficial significant effects if additional formal crossing points are introduced across the A66, that will bring improvements to WCH journey times, in some cases. However, there is also the potential for adverse significant effects due to increased journey times dependent upon the permanent scheme design.</li> <li>Residents of rural properties, potentially negative health effects on wellbeing and quality of life due to noise effects</li> <li>Rural communities – potentially negative health effect due to severance caused by construction activities and traffic, leading to reduced access to services and facilities</li> </ul>

Factor	Preliminary assessment of likely significant environmental effects	
	Construction stage	Operation stage
	<ul style="list-style-type: none"> <li>Ministry of Defence - potential likely significant effects as there is potential for loss of use/access of land during construction.</li> <li>BW 350/021 - potential likely significant effects as the Bridleway will be severed by the draft DCO boundary.</li> <li>Potential for permanent land take from properties. At this stage potential significant effects cannot be ruled out</li> </ul> <p>Black-Black-Orange alternative</p> <ul style="list-style-type: none"> <li>Rowan House housing allocation - potential likely significant effects as the majority of the allocation (96%) lies within the draft DCO boundary and there is potential for construction activities to take place directly within this land.</li> <li>Ministry of Defence - potential likely significant effects as there is potential loss of use/access of land during construction.</li> <li>Property would require acquisition and demolition as part of the scheme. At this stage potential significant effects cannot be ruled out</li> </ul> <p>Black-Blue-Orange alternative</p> <ul style="list-style-type: none"> <li>Rowan House housing allocation - potential likely significant effects as the majority of the allocation (96%) lies within the draft DCO boundary and there is potential for construction activities to take place directly within this land.</li> <li>Ministry of Defence - potential likely significant effects as there is potential loss of use/access of land during construction.</li> </ul>	



Factor	Preliminary assessment of likely significant environmental effects	
	Construction stage	Operation stage
	<ul style="list-style-type: none"> <li>Property would require acquisition and demolition as part of the scheme. At this stage potential significant effects cannot be ruled out.</li> </ul>	
Road Drainage and the Water Environment	<ul style="list-style-type: none"> <li>No likely significant effects anticipated from all alternatives.</li> </ul>	<ul style="list-style-type: none"> <li>No likely significant effects anticipated from all alternatives.</li> </ul>

## Bowes Bypass

Table 5-6: Summary of preliminary assessment of likely significant environmental effects – Bowes Bypass

Factor	Preliminary assessment of likely significant environmental effects	
	Construction stage	Operation stage
Air Quality	<ul style="list-style-type: none"> <li>Preliminary assessment for air quality has been undertaken on the basis of the whole route (see route wide table above).</li> </ul>	<ul style="list-style-type: none"> <li>Preliminary assessment for air quality has been undertaken on the basis of the whole route (see route wide table above).</li> </ul>
Biodiversity	<ul style="list-style-type: none"> <li>There is the potential for likely significant effects on North Pennine Moors SAC and SPA and Bowes Moor SSSI relating to air quality. Subject to further assessment.</li> <li>There is potential for likely significant effects due to loss of Priority Habitats.</li> <li>Effects will be the same as route wide table above on bat roosts and bat activity, barn owls, amphibians (including great crested newt), reptiles and terrestrial invertebrates subject to ongoing surveys.</li> <li>Effects will be the same as route wide table above on red squirrel and other terrestrial</li> </ul>	<ul style="list-style-type: none"> <li>There is potential for likely significant effects on North Pennine Moors SAC and SPA, Bowes Moor SSSI and Deepdale Wood AW as a result of air quality impacts. Subject to further assessment.</li> <li>Effects will be the same as route wide table above on bat roosts and bat activity, barn owls, wintering birds, breeding birds, amphibians (including great crested newt), reptiles and terrestrial invertebrates subject to ongoing surveys.</li> <li>Effects will be the same as route wide table above on red squirrel and other terrestrial mammal species due to habitat loss and possible fragmentation impacts.</li> </ul>

Factor	Preliminary assessment of likely significant environmental effects	
	Construction stage	Operation stage
	mammal species due to habitat loss and possible fragmentation impacts.	
Climate	<ul style="list-style-type: none"> <li>No likely significant effects anticipated.</li> </ul>	<ul style="list-style-type: none"> <li>No likely significant effects anticipated.</li> </ul>
Cultural Heritage	<ul style="list-style-type: none"> <li>No likely significant effects anticipated.</li> </ul>	<ul style="list-style-type: none"> <li>No likely significant effects anticipated.</li> </ul>
Geology and Soils	<ul style="list-style-type: none"> <li>Likely significant effects due to the potential permanent land take and loss of medium value agricultural soil resource (Grade 3b agricultural land).</li> </ul>	<ul style="list-style-type: none"> <li>Potential beneficial significant effects on the UNESCO Global Geopark due to the potential for enhancement if cuttings or earthworks offer an opportunity to permanently expose geology of scientific interest.</li> </ul>
Landscape and Visual Effects	<ul style="list-style-type: none"> <li>Likely significant, temporary effects on: <ul style="list-style-type: none"> <li>Dales Fringe Area of High Landscape Value</li> <li>a localised part of Bowes broad character area</li> <li>a localised part of Cotherstone Moor broad character area</li> <li>a localised part of Lower Greta broad character area</li> <li>residents of Bowes: North end of Kilmond View, West End Bungalow, Ivy Hall Cottage and Ivy Hall Farm</li> <li>residents to the south of Bowes and the A66</li> <li>residents along Clint Lane</li> <li>Stone Bridge Farm</li> <li>users of PRoW 6 and 9 around Bowes</li> <li>users of PRoW 3, 7 and 22 in the North Pennines AONB</li> <li>a short section of the Pennine Way National Trail</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Likely significant effects at year 1 on: <ul style="list-style-type: none"> <li>Dales Fringe Area of High Landscape Value</li> <li>A localised part of Bowes broad character area</li> <li>Stone Bridge Farm</li> <li>Users of PRoW 6 around Bowes</li> <li>Users of PRoW 7 and 22 in the North Pennines AONB</li> </ul> </li> <li>Likely significant effects at year 15 on: <ul style="list-style-type: none"> <li>Dales Fringe Area of High Landscape Value</li> <li>A localised part of Bowes broad character area</li> </ul> </li> </ul>
Material Assets and Waste	<ul style="list-style-type: none"> <li>Preliminary assessment for material assets and waste has been undertaken on the basis of the whole route (see route wide table above).</li> </ul>	<ul style="list-style-type: none"> <li>Preliminary assessment for material assets and waste has been undertaken on the basis of the whole route (see route wide table above).</li> </ul>

Factor	Preliminary assessment of likely significant environmental effects	
	Construction stage	Operation stage
Noise and Vibration	<ul style="list-style-type: none"> <li>There is potential for significant effects across the scheme. Effects will be temporary and localized depending on the specific activity and construction stage.</li> <li>The location and duration of these effects are yet to be determined and are subject to further assessment.</li> </ul>	<ul style="list-style-type: none"> <li>Significant adverse effects are predicted to nine residential receptors and one non-residential receptor. Subject to on-going mitigation design and further assessment.</li> </ul>
Population and Human Health	<ul style="list-style-type: none"> <li>Walkers, cyclists and horse riders – likely significant effects due to the severance of PRow and other WCH provisions due to the land required for the construction of the project.</li> <li>Agricultural land holdings – the loss of or damage to key characteristics, features or elements of the agricultural holding and potential effect of this change on viability.</li> <li>Bowes Moor (two areas) – potential loss of use/access of land during construction.</li> <li>Allotment/Community growing Space - Potential loss of use/access of land during construction.</li> <li>Property would require acquisition and demolition as part of the scheme. At this stage potential significant effects cannot be ruled out</li> <li>Residents of rural properties, potentially negative health effects on wellbeing and quality of life due to visual effects</li> <li>Rural communities – potentially negative health effect due to severance caused by construction activities and traffic, leading to reduced access to services and facilities</li> <li>Users of allotments/community growing space located off the Pennine Way – reduced access</li> </ul>	<ul style="list-style-type: none"> <li>Walkers, cyclists and horse riders – Potential for beneficial significant effects if additional formal crossing points are introduced across the A66, that will bring improvements to WCH journey times, in some cases. However, there is also the potential for adverse significant effects due to increased journey times dependent upon the permanent scheme design.</li> <li>Rural communities - potentially positive health effect due to improved access to community facilities resulting from improved traffic flows on the A66.</li> </ul>

Factor	Preliminary assessment of likely significant environmental effects	
	Construction stage	Operation stage
	to green space and outdoor leisure activities due to direct impact on this resource	
Road Drainage and the Water Environment	<ul style="list-style-type: none"> <li>No likely significant effects anticipated.</li> </ul>	<ul style="list-style-type: none"> <li>No likely significant effects anticipated.</li> </ul>

## Cross Lanes to Rokeby

Table 5-7: Summary of preliminary assessment of likely significant environmental effects – Cross Lanes to Rokeby

Factor	Preliminary assessment of likely significant environmental effects	
	Construction stage	Operation stage
Air Quality	<ul style="list-style-type: none"> <li>Preliminary assessment for air quality has been undertaken on the basis of the whole route (see route wide table above).</li> </ul>	<ul style="list-style-type: none"> <li>Preliminary assessment for air quality has been undertaken on the basis of the whole route (see route wide table above).</li> </ul>
Biodiversity	<p><b>Black Cross Lanes – Black Rokeby (PRA)</b></p> <ul style="list-style-type: none"> <li>There is the potential for likely significant effects on Thorsgill Wood LWS and Rokeby Park and Mortham Wood LWS relating to air quality. Subject to further assessment.</li> <li>There is the potential for likely significant effects due to the loss of Priority Habitats, and possibly AW, and air quality. Potential loss of up to five mature sycamore trees. Subject to further design and mitigation.</li> <li>Effects will be the same as route wide table above on bat roosts and bat activity, barn owls, amphibians, reptiles and terrestrial invertebrates subject to ongoing surveys.</li> </ul>	<p><b>Black Cross Lanes – Black Rokeby (PRA)</b></p> <ul style="list-style-type: none"> <li>There is the potential for likely significant effects on Thorsgill Wood LWS and Rokeby Park and Mortham Wood LWS and Waterfall Wood AW relating to air quality. Subject to further assessment.</li> <li>There is the potential for likely significant effects on Priority Habitats, and possibly AW, due to air quality. Subject to further assessment.</li> <li>Effects will be the same as route wide table above on bat roosts and bat activity, barn owls, wintering birds, breeding birds, amphibians, reptiles and terrestrial invertebrates subject to ongoing surveys.</li> <li>Effects will be the same as route wide table above on red squirrel and other terrestrial mammal</li> </ul>



Factor	Preliminary assessment of likely significant environmental effects	
	Construction stage	Operation stage
	<ul style="list-style-type: none"> <li>Effects will be the same as route wide table above on red squirrel and other terrestrial mammal species due to habitat loss and possible fragmentation impacts.</li> </ul> <p>Blue (Cross Lanes) alternative junction</p> <ul style="list-style-type: none"> <li>The effects are as per Black-Black route, though for this junction option there is more loss and severance of habitats at the western end of the scheme, particularly affecting deciduous woodland, hedgerows and semi-improved grassland.</li> </ul> <p>Red (Rokeby) alternative junction</p> <ul style="list-style-type: none"> <li>The effects are as per the Black-Black route, though for this option there is additional severance to ancient woodland at Church Wood, loss and severance to Jones Wood AW and additional loss of Priority Habitats but reduced loss of the mature sycamore trees.</li> </ul>	<p>species due to habitat loss and possible fragmentation impacts.</p> <p>Blue (Cross Lanes) alternative junction</p> <ul style="list-style-type: none"> <li>The effects are as per Black-Black route.</li> </ul> <p>Red (Rokeby) alternative junction</p> <ul style="list-style-type: none"> <li>The effects are as per Black-Black route.</li> </ul>
Climate	<ul style="list-style-type: none"> <li>No likely significant effects anticipated from all alternatives.</li> </ul>	<ul style="list-style-type: none"> <li>No likely significant effects anticipated from all alternatives.</li> </ul>
Cultural Heritage	<p>Black Cross Lanes – Black Rokeby (PRA)</p> <ul style="list-style-type: none"> <li>No likely significant effects anticipated from all alternatives.</li> </ul> <p>Blue (Cross Lanes) alternative junction</p> <ul style="list-style-type: none"> <li>Permanent significant adverse effects are anticipated to affect the Ring Ditch, 120m north-east of Poundergill.</li> </ul> <p>Red (Rokeby) alternative junction</p>	<ul style="list-style-type: none"> <li>No likely significant effects anticipated from all alternatives.</li> </ul>

Factor	Preliminary assessment of likely significant environmental effects	
	Construction stage	Operation stage
	<ul style="list-style-type: none"> <li>Permanent significant adverse effect is anticipated to affect the Grade II* Registered Park and Garden at Rokeby Park.</li> </ul>	
Geology and Soils	<ul style="list-style-type: none"> <li>Likely significant effects due to the potential permanent land take and loss of high value agricultural soil resource (Grade 3a agricultural land) for all alternatives.</li> </ul>	<ul style="list-style-type: none"> <li>No likely significant effects anticipated from all alternatives.</li> </ul>
Landscape and Visual Effects	<p><b>Black Cross Lanes – Black Rokeby (PRA)</b></p> <ul style="list-style-type: none"> <li>Likely significant effects on Barningham, Brignall and Rokeby Broad Character Area</li> <li>Likely significant effects on residents at the west of Tutta Beck Farm, east of Tutta Beck Farm</li> <li>Likely significant effects on PRoW 5 and 8 west of Cross Lanes, PRoW 4, 5, 9 and 10 to the north of the A66, PRoW 3 and 6 to the south of the A66</li> <li>Likely significant effects on visitors to the Church of St. Mary and Cross Lanes Organic Farm</li> </ul> <p><b>Blue (Cross Lanes) alternative junction</b></p> <ul style="list-style-type: none"> <li>Likely significant effects on Boldron and Lartington Broad Character Area</li> <li>Likely significant effects on residents at the west of Tutta Beck Farm, east of Tutta Beck Farm</li> <li>Likely significant effects on PRoW 14, 1, 5, 7, 8, and 19 west of Cross Lanes</li> <li>Likely significant effects on visitors to the Cross Lanes Organic Farm</li> </ul>	<p><b>Black Cross Lanes – Black Rokeby (PRA)</b></p> <ul style="list-style-type: none"> <li>Likely significant effects at year 1 on: <ul style="list-style-type: none"> <li>Barningham, Brignall and Rokeby Broad Character Area</li> <li>Residents at the west of Tutta Beck Farm, School House, and The Rectory</li> <li>PRoW 5 and 8 west of Cross Lanes, PRoW 4, 5, 9 and 10 to the north of the A66, PRoW 3 and 6 to the south of the A66</li> <li>Visitors to the Church of St. Mary and Cross Lanes Organic Farm</li> </ul> </li> <li>Likely significant effects at year 15: <ul style="list-style-type: none"> <li>Barningham, Brignall and Rokeby Broad Character Area</li> <li>Residents at Pounder Gill, Smithy Cottage, Ivy Cottage, The Cottage and Birk House</li> <li>PRoW 5 and 8 west of Cross Lanes, PRoW 4, 5, 9 and 10 to the north of the A66, PRoW 3 and 6 to the south of the A66</li> <li>Visitors to the Church of St. Mary and Cross Lanes Organic Farm</li> </ul> </li> </ul> <p><b>Blue (Cross Lanes) alternative junction</b></p> <ul style="list-style-type: none"> <li>Likely significant effects at year 1 on:</li> </ul>

Factor	Preliminary assessment of likely significant environmental effects	
	Construction stage	Operation stage
	<p><b>Red (Rokeby) alternative junction</b></p> <ul style="list-style-type: none"> <li>• Likely significant effects on Barningham, Brignall and Rokeby Broad Character Area</li> <li>• Likely significant effects on residents at the east of Tutta Beck Farm</li> <li>• Likely significant effects on PRow 13 to the north of the A66, PRow 3 and 6 to the south of the A66</li> <li>• Likely significant effects on visitors to Rokeby Park RPG</li> </ul>	<ul style="list-style-type: none"> <li>○ Boldron and Lartington Broad Character Area</li> <li>○ Residents at the west of Tutta Beck Farm, School House, and The Rectory</li> <li>○ PRow 14, 19, 1, 5, 7 and 8 west of Cross Lanes</li> <li>○ Visitors to Cross Lanes Organic Farm</li> <li>• Likely significant effects at year 15: <ul style="list-style-type: none"> <li>○ Boldron and Lartington Broad Character Area</li> <li>○ Residents at Pounder Gill, Dent House Farm, Smithy Cottage, Ivy Cottage, The Cottage and Birk House</li> <li>○ PRow 1, 5, 7 and 8 west of Cross Lanes</li> </ul> </li> </ul> <p><b>Red (Rokeby) alternative junction</b></p> <ul style="list-style-type: none"> <li>• Likely significant effects at year 1 on: <ul style="list-style-type: none"> <li>○ Barningham, Brignall and Rokeby Broad Character Area</li> <li>○ Residents at the School House, The Rectory, Tack Room Cottage, The Grove, and Ewebank</li> <li>○ PRow 13 to the north of the A66, PRow 3 and 6 to the south of the A66</li> <li>○ Visitors to Rokeby Park RPG</li> </ul> </li> <li>• Likely significant effects at year 15: <ul style="list-style-type: none"> <li>○ Barningham, Brignall and Rokeby Broad Character Area</li> <li>○ Residents at the School House, The Rectory, Tack Room Cottage, The Grove, and Ewebank</li> <li>○ PRow 13 to the north of the A66, PRow 3 and 6 to the south of the A66</li> </ul> </li> </ul>

Factor	Preliminary assessment of likely significant environmental effects	
	Construction stage	Operation stage
Material Assets and Waste	<ul style="list-style-type: none"> <li>Preliminary assessment for material assets and waste has been undertaken on the basis of the whole route (see route wide table above).</li> </ul>	<ul style="list-style-type: none"> <li>Preliminary assessment for material assets and waste has been undertaken on the basis of the whole route (see route wide table above).</li> </ul>
Noise and Vibration	<ul style="list-style-type: none"> <li>There is potential for significant effects across the scheme. Effects will be temporary and localized depending on the specific activity and construction stage.</li> <li>The location and duration of these effects are yet to be determined and are subject to further assessment.</li> </ul>	<p><b>Black Cross Lanes – Black Rokeby (PRA)</b></p> <ul style="list-style-type: none"> <li>Significant adverse effects are predicted to 225 residential receptors and 12 non-residential receptors. Subject to on-going mitigation design and further assessment.</li> <li>Significant beneficial effects are predicted to 216 residential receptors and 64 non-residential receptors.</li> </ul> <p><b>Black Cross Lanes – Red Rokeby</b></p> <ul style="list-style-type: none"> <li>Significant adverse effects are predicted to 14 residential receptors and one non-residential receptors. Subject to on-going mitigation design and further assessment.</li> <li>Significant beneficial effects are predicted to 39 residential receptor and four non-residential receptors.</li> </ul> <p><b>Blue Cross Lanes – Black Rokeby</b></p> <ul style="list-style-type: none"> <li>Significant adverse effects are predicted to 195 residential receptors and eight non-residential receptors. Subject to on-going mitigation design and further assessment.</li> <li>Significant beneficial effects are predicted to 219 residential receptors and 65 non-residential receptors.</li> </ul> <p><b>Blue Cross Lanes – Red Rokeby</b></p>

Factor	Preliminary assessment of likely significant environmental effects	
	Construction stage	Operation stage
		<ul style="list-style-type: none"> <li>Significant adverse effects are predicted to 16 residential receptors and one non-residential receptor. Subject to on-going mitigation design and further assessment.</li> <li>Significant beneficial effects are predicted to 32 residential receptors and four non-residential receptors.</li> </ul>
Population and Human Health	<p>The following effects apply to all alternatives:</p> <ul style="list-style-type: none"> <li>Walkers, cyclists and horse riders – potential likely significant effects due to the severance of PRow and other WCH provisions due to the land required for the construction of the project.</li> <li>Agricultural land holdings – potential likely significant effects due to the loss of or damage to key characteristics, features or elements of the agricultural holding and potential effect of this change on viability.</li> <li>Cross Lanes Organic Farm Shop - potential likely significant effects due to a potential permanent loss of land – direct acquisition of land for the scheme.</li> <li>Residents of rural properties, potentially negative health effects on wellbeing and quality of life due to noise and visual effects</li> <li>Rural communities – potentially negative health effect due to severance caused by construction activities and traffic, leading to reduced access to services and facilities</li> </ul>	<p>The following effects apply to all alternatives</p> <ul style="list-style-type: none"> <li>Walkers, cyclists and horse riders – potential for beneficial significant effects if additional formal crossing points are introduced across the A66, that will bring improvements to WCH journey times, in some cases. However, there is also the potential for adverse significant effects due to increased journey times dependent upon the permanent scheme design.</li> <li>Residents of rural properties, potentially negative health effects due to impacts on quality of life from noise and visual effects.</li> <li>Rural communities - potentially positive health effect due to improved access to community facilities resulting from improved traffic flows on the A66.</li> </ul>



Factor	Preliminary assessment of likely significant environmental effects	
	Construction stage	Operation stage
Road Drainage and the Water Environment	<ul style="list-style-type: none"> <li>No likely significant effects anticipated from all alternatives.</li> </ul>	<ul style="list-style-type: none"> <li>No likely significant effects anticipated from all alternatives.</li> </ul>

## Stephen Bank to Carkin Moor

Table 5-8: Summary of preliminary assessment of likely significant environmental effects – Stephen Bank to Carkin Moor

Factor	Preliminary assessment of likely significant environmental effects	
	Construction stage	Operation stage
Air Quality	<ul style="list-style-type: none"> <li>Preliminary assessment for air quality has been undertaken on the basis of the whole route (see route wide table above).</li> </ul>	<ul style="list-style-type: none"> <li>Preliminary assessment for air quality has been undertaken on the basis of the whole route (see route wide table above).</li> </ul>
Biodiversity	<ul style="list-style-type: none"> <li>There is the potential for likely significant effects due to loss of Priority Habitats. Subject to further design and mitigation.</li> <li>Effects will be the same as route wide table above on bat roosts and bat activity, barn owls, amphibians (including great crested newt), reptiles and terrestrial invertebrates subject to ongoing surveys.</li> <li>Effects will be the same as route wide table above on red squirrel and other terrestrial mammal species due to habitat loss and possible fragmentation impacts.</li> </ul>	<ul style="list-style-type: none"> <li>There is the potential for likely significant effects due to loss of Priority Habitats. Subject to further design and mitigation.</li> <li>Effects will be the same as route wide table above on bat roosts and bat activity, barn owls, wintering birds, breeding birds, amphibians (including great crested newt), reptiles and terrestrial invertebrates subject to ongoing surveys.</li> <li>Effects will be the same as route wide table above on red squirrel and other terrestrial mammal species due to habitat loss and possible fragmentation impacts.</li> </ul>
Climate	<ul style="list-style-type: none"> <li>No likely significant effects anticipated.</li> </ul>	<ul style="list-style-type: none"> <li>No likely significant effects anticipated.</li> </ul>
Cultural Heritage	<ul style="list-style-type: none"> <li>Permanent significant adverse effects are anticipated at the Roman Fort and Prehistoric</li> </ul>	<ul style="list-style-type: none"> <li>No likely significant effects anticipated.</li> </ul>

Factor	Preliminary assessment of likely significant environmental effects	
	Construction stage	Operation stage
	<p>enclosed settlement 400m west of Carkin. Subject to on-going mitigation design and further assessment.</p> <ul style="list-style-type: none"> <li>Permanent significant adverse effects are anticipated to affect the Roman vicus at Carkin Moor Fort. Subject to ongoing design and assessment.</li> </ul>	
Geology and Soils	<ul style="list-style-type: none"> <li>Likely significant effects due to the potential permanent land take and loss of high and medium value agricultural soil resource (Grade 3a and 3b agricultural land).</li> </ul>	<ul style="list-style-type: none"> <li>No likely significant effects anticipated.</li> </ul>
Landscape and Visual Effects	<ul style="list-style-type: none"> <li>Likely significant effects on a localised part of Moors Fringe landscape character type</li> <li>Likely significant effects on residents of West Layton along West Lane, Browson Bank, Dunsa Bank, the Fox Grove Area, Monks Rest Farm and near Carkin Moor Farm</li> <li>Likely significant effects on users of PRoW west of West Layton, PRoW east of West Layton, PRoW south of the A66</li> <li>Likely significant effects on visitors to Mainsgill Farm Shop and Fox Hall Inn</li> </ul>	<ul style="list-style-type: none"> <li>Likely significant effects at year 1 on: <ul style="list-style-type: none"> <li>A localised part of Moors Fringe landscape character type</li> <li>Residents at Browson Bank, Dunsa Bank and Monks Rest Farm</li> <li>Users of PRoW west of West Layton, PRoW east of West Layton, PRoW 20.55/1/1 and 20.55/6/1 south of the A66</li> <li>Visitors to Mainsgill Farm Shop</li> </ul> </li> <li>Likely significant effects at year 15 on: <ul style="list-style-type: none"> <li>A localised part of Moors Fringe landscape character type</li> <li>Residents at Monks Rest Farm</li> <li>Users of PRoW 20.55/1/1 and 20.55/6/1 south of the A66</li> <li>Visitors to Mainsgill Farm Shop</li> </ul> </li> </ul>
Material Assets and Waste	<ul style="list-style-type: none"> <li>Preliminary assessment for material assets and waste has been undertaken on the basis of the whole route (see route wide table above).</li> </ul>	<ul style="list-style-type: none"> <li>Preliminary assessment for material assets and waste has been undertaken on the basis of the whole route (see route wide table above).</li> </ul>

Factor	Preliminary assessment of likely significant environmental effects	
	Construction stage	Operation stage
Noise and Vibration	<ul style="list-style-type: none"> <li>• There is potential for significant effects across the scheme. Effects will be temporary and localized depending on the specific activity and construction stage.</li> <li>• The location and duration of these effects are yet to be determined and are subject to further assessment.</li> </ul>	<ul style="list-style-type: none"> <li>• Significant adverse effects are predicted to 26 residential receptors and one non-residential receptor. Subject to on-going mitigation design and further assessment.</li> <li>• Significant beneficial effects are predicted to eight residential receptors.</li> </ul>
Population and Human Health	<ul style="list-style-type: none"> <li>• Walkers, cyclists and horse riders – potential likely significant effects due to the severance of PRoW and other WCH provisions due to the land required for the construction of the project.</li> <li>• Agricultural land holdings – potential likely significant effects due to the loss of or damage to key characteristics, features or elements of the agricultural holding and potential effect of this change on viability.</li> <li>• FP 20.23/8/1 - potential likely significant effects as the Footpath will be severed by the draft DCO boundary.</li> <li>• BW 20.23/5/1 - potential likely significant effects as the Bridleway will be severed by the draft DCO boundary.</li> <li>• Potentially negative effects on mental wellbeing due to a perceived reduction in the quality of the living environment and concerns about air quality and road safety due to increased HGV movements.</li> <li>• Residents of rural properties, potentially negative health effects on wellbeing and quality of life due to noise effects.</li> <li>• Rural communities – potentially negative health effect due to severance caused by construction</li> </ul>	<ul style="list-style-type: none"> <li>• Walkers, cyclists and horse riders – potential for beneficial significant effects if additional formal crossing points are introduced across the A66, that will bring improvements to WCH journey times, in some cases. However, there is also the potential for adverse significant effects due to increased journey times dependent upon the permanent scheme design.</li> <li>• Residents of rural properties, potentially negative health effects due to impacts on quality of life from noise and visual effects.</li> <li>• Rural communities - potentially positive health effect due to improved access to community facilities resulting from improved traffic flows on the A66.</li> </ul>

Factor	Preliminary assessment of likely significant environmental effects	
	Construction stage	Operation stage
	activities and traffic, leading to reduced access to services and facilities.	
Road Drainage and the Water Environment	<ul style="list-style-type: none"> <li>No likely significant effects anticipated.</li> </ul>	<ul style="list-style-type: none"> <li>No likely significant effects anticipated.</li> </ul>

### A1(M) Junction 53 Scotch Corner

Table 5-9: Summary of preliminary assessment of likely significant environmental effects – A1(M) Junction 53 Scotch Corner

Factor	Preliminary assessment of likely significant environmental effects	
	Construction stage	Operation stage
Air Quality	<ul style="list-style-type: none"> <li>Preliminary assessment for air quality has been undertaken on the basis of the whole route (see route wide table above).</li> </ul>	<ul style="list-style-type: none"> <li>Preliminary assessment for air quality has been undertaken on the basis of the whole route (see route wide table above).</li> </ul>
Biodiversity	<ul style="list-style-type: none"> <li>There is the potential for significant adverse effects on habitats (Deciduous woodland, Hedgerow and Poor semi-improved grassland) due to loss of mature woodland). Subject to ongoing design and mitigation.</li> </ul>	<ul style="list-style-type: none"> <li>There is the potential for significant adverse effects on habitats (Deciduous woodland, Hedgerow and Poor semi-improved grassland) due to loss of mature woodland). Subject to ongoing design and mitigation.</li> </ul>
Climate	<ul style="list-style-type: none"> <li>No likely significant effects anticipated.</li> </ul>	<ul style="list-style-type: none"> <li>No likely significant effects anticipated.</li> </ul>
Cultural Heritage	<ul style="list-style-type: none"> <li>No likely significant effects anticipated.</li> </ul>	<ul style="list-style-type: none"> <li>No likely significant effects anticipated.</li> </ul>
Geology and Soils	<ul style="list-style-type: none"> <li>No likely significant effects anticipated.</li> </ul>	<ul style="list-style-type: none"> <li>No likely significant effects anticipated.</li> </ul>
Landscape and Visual Effects	<ul style="list-style-type: none"> <li>No likely significant effects anticipated.</li> </ul>	<ul style="list-style-type: none"> <li>No likely significant effects anticipated at year 1 or year 15.</li> </ul>
Material Assets and Waste	<ul style="list-style-type: none"> <li>Preliminary assessment for material assets and waste has been undertaken on the basis of the whole route (see route wide table above).</li> </ul>	<ul style="list-style-type: none"> <li>Preliminary assessment for material assets and waste has been undertaken on the basis of the whole route (see route wide table above).</li> </ul>

Factor	Preliminary assessment of likely significant environmental effects	
	Construction stage	Operation stage
Noise and Vibration	<ul style="list-style-type: none"> <li>There is potential for significant effects across the scheme. Effects will be temporary and localized depending on the specific activity and construction stage.</li> <li>The location and duration of these effects are yet to be determined and are subject to further assessment and mitigation design.</li> </ul>	<ul style="list-style-type: none"> <li>Significant adverse effects are predicted to 12 residential receptors one non-residential receptors. Subject to on-going mitigation design and further assessment.</li> </ul>
Population and Human Health	<ul style="list-style-type: none"> <li>Strategic Direction of Growth Area – Scotch Corner Designer Outlet Village – potential for significant effects related to disruption of access to this site during construction cannot be ruled out at this stage.</li> <li>Local residents – potentially negative effects from temporary traffic delays affecting access from rural communities to Middleton Tyas.</li> <li>Rural communities – potentially negative health effect due to severance caused by construction activities and traffic, leading to reduced access to services and facilities.</li> </ul>	<ul style="list-style-type: none"> <li>Moderate beneficial effects for the Strategic Direction of Growth Area – Scotch Corner Designer Outlet Village.</li> <li>Rural communities - potentially positive health effect due to improved access to community facilities resulting from improved traffic flows on the A66.</li> </ul>
Road Drainage and the Water Environment	<ul style="list-style-type: none"> <li>No likely significant effects anticipated.</li> </ul>	<ul style="list-style-type: none"> <li>No likely significant effects anticipated.</li> </ul>



## 6 Consultation and next steps

- 6.1.1 This NTS has been prepared to provide a summary of the information and preliminary environmental assessment undertaken to date, as set out in the detailed PEI Report.
- 6.1.2 The PEI Report and NTS have been prepared to support consultees in developing an informed view of the likely significant environmental effects of the project based on preliminary information available at this time.
- 6.1.3 Highways England invites comments on the project and the environmental issues addressed in the PEI Report.

### 6.2 How to find out more

- 6.2.1 Further details on the consultation and downloadable copies of the PEI Report and NTS, the draft Environmental Masterplan, the consultation booklet and response form, and further information on the project can be downloaded at: <http://www.highwaysengland.co.uk/A66-NTP>

### 6.3 How to have your say

- 6.3.1 There are various ways of providing your consultation responses as follows:
  - Completing the feedback form on the project webpage or virtual consultation room at: [www.highwaysengland.co.uk/A66-NTP](http://www.highwaysengland.co.uk/A66-NTP)
  - Attending a consultation event where you can meet the project team and complete a paper copy. Details of our events can be found at [www.highwaysengland.co.uk/A66-NTP](http://www.highwaysengland.co.uk/A66-NTP)
  - Picking up a hard copy feedback form and freepost envelope at one of our deposit locations, subject to COVID-19 restrictions, which can be posted out to us via freepost at Freepost A66 NORTHERN TRANS-PENNINE PROJECT.
  - Requesting a hard copy of the feedback form via telephone on 0333 090 1192 and sending it to us using the Freepost address below.
  - Alternatively, you can email [A66NTP@highwaysengland.co.uk](mailto:A66NTP@highwaysengland.co.uk), or write to us at Freepost A66 NORTHERN TRANS-PENNINE PROJECT
- 6.3.2 Please submit your responses by 11.59pm on 6 November 2021.

### 6.4 After the consultation

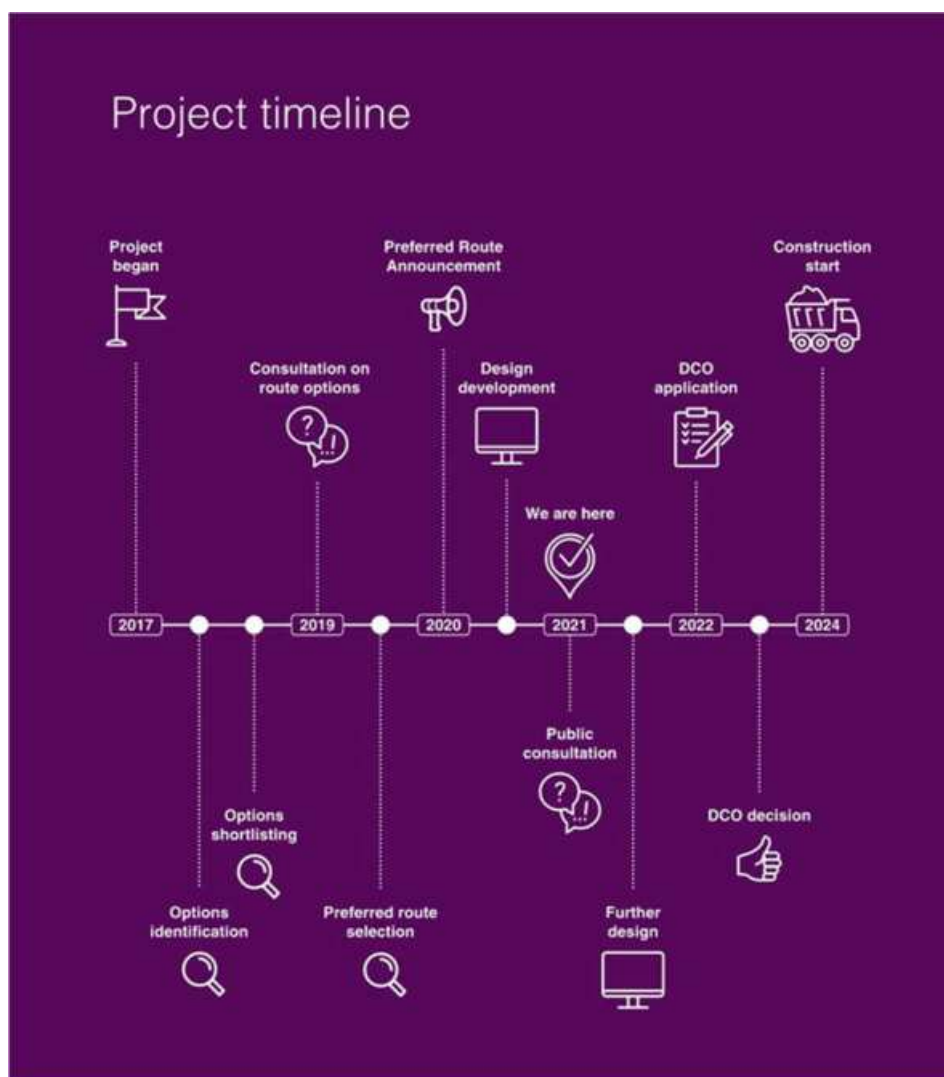
- 6.4.1 Your feedback will inform our continuing development of the project. Once we have taken your feedback into consideration, we plan to submit our application for a DCO in spring 2022. We will also prepare a report on the consultation, recording the feedback and our response, which will be published with our application.
- 6.4.2 Your comments will be analysed by Highways England and any of its appointed agents. Copies may be made available in due course to the Secretary of State, the Planning Inspectorate and other relevant statutory authorities so that your comments can be considered as part of the DCO application process. We will request that your personal details are not placed on public record and will be held securely by Highways England in accordance with the Data Protection Act 1998 and will be used

solely in connection with the consultation process and subsequent DCO application and, except as noted above, will not be passed to third parties.

- 6.4.3 After the consultation period, all responses will be considered in finalising the project design and completing the EIA. Comments will be taken into account when considering the need for further assessment or modification to the project design or mitigation measures.

## 6.5 Next steps

- 6.5.1 If our application for a DCO is accepted by the Planning Inspectorate, there will be an examination of the application during which an Examining Authority (appointed by the Planning Inspectorate) will consider the application and in which the public can participate. This examination will take a maximum of six months. The Examining Authority then has three months to make a recommendation to the Secretary of State, who then has a further three months to make a final decision as to whether consent should be granted for the project. If our application is approved, work on the project is planned to start in the first quarter of 2024 as indicated on the illustrated Timeline below.



- 6.5.2 If you would like any further information on the DCO application process, please visit the Planning Inspectorate's website: <http://infrastructure.planningportal.gov.uk> then

[navigate to the “Guidance and Advice” tab, then “Advice Notes” from the drop down menu and scroll down to Advice Note 8: Overview of the nationally significant infrastructure planning process for members of the public and others.](#)

- 6.5.3 The Planning Inspectorate’s website may also provide some updates on the project’s application process, and will provide access to the submitted application documents once the application is accepted.

## **6.6 Contact us**

- 6.6.1 Visit our webpages for information about the project and how to have your say, call or email us to find out more.

A66NTP@highwaysengland.co.uk

[www.highwaysengland.co.uk/A66-NTP](http://www.highwaysengland.co.uk/A66-NTP)

Via telephone on 0333 090 1192

