

A1 Birtley to Coal House

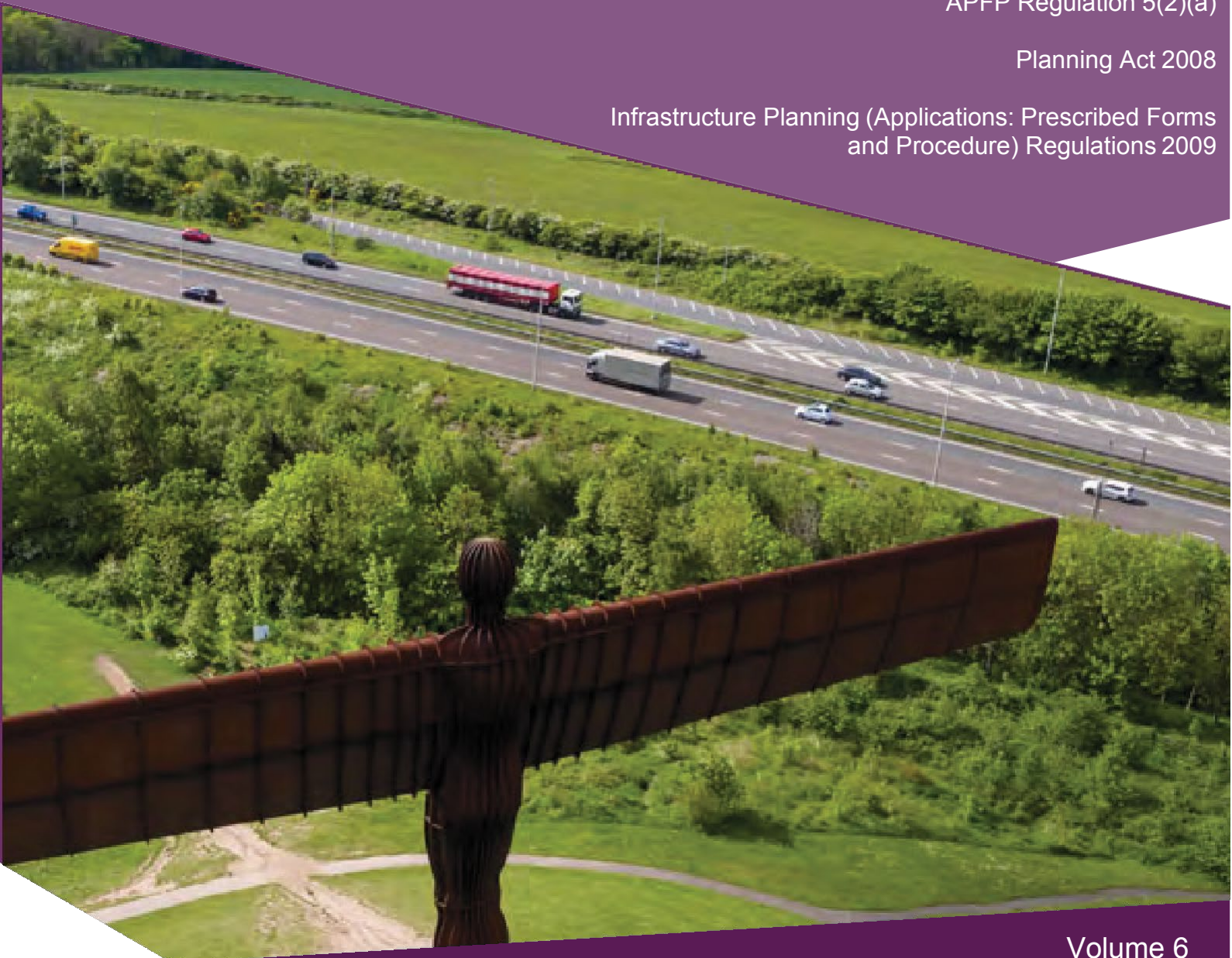
Scheme Number: TR010031

6.1 Environmental Statement Chapter 2 The Scheme

APFP Regulation 5(2)(a)

Planning Act 2008

Infrastructure Planning (Applications: Prescribed Forms
and Procedure) Regulations 2009



Infrastructure Planning

Planning Act 2008

**The Infrastructure Planning
(Applications: Prescribed Forms and
Procedures) Regulations 2009**

**A1 Birtley to Coal House
Development Consent Order 20[xx]**

Environmental Statement

Regulation Reference:	APFP Regulation 5(2)(a)
Planning Inspectorate Scheme Reference	TR010031
Application Document Reference	TR010031/APP/6.1
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Version	Date	Status of Version
Rev 0	14 August 2019	Application Issue

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2. THE SCHEME

2.1. NEED FOR THE SCHEME

- 2.1.1. The Scheme is part of the A1 Newcastle Gateshead Western By-pass (A1 NGWB). The A1 NGWB is important to the economy of the north-east, supporting both regional and local connectivity. The route has some of the most congested highway links in the region and it needs to perform well to support the ambitions for local growth.
- 2.1.2. The A1 NGWB is a critical part of both the national and local road network. Traffic in the region is estimated to grow in the future (**Ref 2.1**), largely due to new housing and employment development planned for the area. This additional traffic demand would further exacerbate the congestion and capacity issues experienced on this stretch of the A1.
- 2.1.3. The Highways Agency A1 NGWB Stage 3 report in 2015 stated that improvements to the A1 NGWB have long been acknowledged as a requirement for economic growth in the region (**Ref 2.2**). The A1 NGWB has been identified by the UK Government as a 'hot-spot' requiring investment to deliver infrastructure improvements (**Ref 2.3**).
- 2.1.4. The Highways England Route Strategy Evidence Report (2017) shows multiple areas of congestion on the network in this and the surrounding area. In particular, three areas of congestion have been identified in the direct vicinity of the Scheme, which are - congestion at Coal House (junction 67), a traffic flow pinch point between Coal House (junction 67) and Birtley (junction 65) at Allerdene Bridge and congestion on the A1 mainline at Birtley (junction 65). The Roads Investment Strategy (RIS) (**Ref 2.4**), has committed to tackle the current congestion and address the forecast impacts of traffic growth and development in this area.
- 2.1.5. Alongside this the existing Allerdene Bridge carrying the A1 over the East Coast Mainline (ECML), which was built nearly 40 years ago, requires regular maintenance works to keep the bridge operational. Regular monitoring and maintenance of the bridge is required which results in road closures and disruption to the travelling public. This structure is also a pinch point on the network and adds to the congestion seen on this route. The structure would be replaced as part of the Scheme which would help reduce local traffic disruption as fewer road closures would be required to carry out maintenance and would lead to significant savings in maintenance costs (approximately £9 million over ten years).
- 2.1.6. **Table 2-1** below sets out a timeline for the history of the development of the Scheme including the various studies undertaken to address congestion and capacity issues on the A1 NGWB.

Table 2-1 – History of Scheme development

Date	Timeline
July 1998	<p>‘A New Deal for Trunk Roads in England’</p> <p>Following a change in Government, this White Paper announced a new approach to the appraisal of different solutions to transport problems. It also provided a framework for taking forward multi-modal studies which included the Tyneside Area Multi-Modal Study (TAMMS) which was commissioned in 2000.</p>
November 2002	<p>TAMMS Report published setting out the outcome of the study. The report identified that the A1 NGWB experiences regular peak hour congestion between Blaydon interchange to the north (A695/A694/A1114) and junction 65 (Birtley) due to the conflict in this area between local and longer distance traffic. The report recommended a number of highway measures for further study on the A1 NGWB which included:</p> <ul style="list-style-type: none"> – A1 NGWB Widening – A1 Junction Rationalisation
May 2010	<p>Access to Tyne and Wear City Region Study (undertaken by Aecom on behalf of Department for Transport (DfT) ONE North East).</p> <p>The study provided a review of transport related issues and challenges in the Tyne and Wear Region. The study highlights the A1 NGWB as experiencing significant network stress with corresponding impacts on the economy, environment and quality of life.</p>
June 2010	<p>North-east Delivering a Sustainable Transport System (DaSTS) Strategic Connectivity Study Report (undertaken by Atkins on behalf of ONE North East)</p> <p>The DfT and its north-east partners identified 16 high level city and regional challenges. One of these challenges was to address congestion problems on the A1 NGWB and the difficulties of large numbers of commuter journeys from south-east Northumberland and North Durham.</p>
July 2012	<p>Newcastle City Deal</p> <p>The DfT announced that it would work with local partners on the development of measures to address congestion on the NGWB, specifically agreeing to refresh the business case for the proposals at Lobley Hill. This subsequently became the A1 Coal House to Metro Centre scheme which was completed in July 2016.</p> <p>The A1 NGWB is identified as a key link for commuter, freight and business journeys across Tyneside. Congestion on the A1 NGWB is identified as a</p>

Date	Timeline
	<p>major constraint in preventing the expansion of the Team Valley Trading Estate (adjacent to junction 67, Coal House) and bringing forward a number of major housing sites needed to accommodate population growth.</p>
<p>March 2013</p>	<p>Highway Agency Pilot Based Strategy Report: A1 West of Newcastle</p> <p>DfT and the Highways Agency undertook a pilot Route Based Strategy of the A1 NGWB. The Strategy identifies considerable delays along the A1 NGWB in its 2019 and 2029 future forecasts including along the Scheme between junction 65 (Birtley) and junction 67 (Coal House) during the weekday morning and evening peaks. The overall condition of Allerdene Bridge is also identified as being of concern, for its long-term serviceability.</p> <p>The Study proposed that future investment is recommended at a number of key locations including Eighton Lodge (junction 66), Coal House (junction 67) and the replacement of Allerdene Bridge.</p> <p>The government subsequently committed to fund the development and delivery of one of the previously identified proposals (Lobley Hill) in the 2012 Autumn Statement and an extension to the scope of the Scheme was announced following the 2013 Autumn Statement.</p>
<p>April 2013</p>	<p>A1 NGWB – Exploration of Dual three-lane Provisions Initial Infrastructure Report</p> <p>The Independent Economic Review report produced by the North East Local Enterprise Partnership identified the need to provide greater capacity and reliability on the A1 NGWB. This report sets out how these improvements could be delivered considering a maximum road width of three lanes and identifying the limitations of the corridor’s existing structures, including Allerdene Bridge, junction 66 (Eighton Lodge) and junction 67 (Coal House). The report recognises the Lobley Hill scheme and requirement for greater provision at the Coal House Interchange.</p>
<p>June 2013</p>	<p>Investing in Britain’s Future (produced by HM Treasury)</p> <p>This report was produced following the 2013 Spending Review and sets out details of the Government’s proposed infrastructure investment across the strategic road network. The report proposes a number of feasibility studies to identify and fund solutions to tackle some of the most notorious and long-standing road hot spots in the country, including the A1 NGWB.</p>
<p>April 2014</p>	<p>Highways Agency Route Based Strategy: Evidence Report: London to Scotland East</p> <p>The strategy identifies this part of the A1 as one of the ten least reliable journey time locations on the route between London and Scotland East.</p>

Date	Timeline
	Allerdene Bridge is identified as requiring significant ongoing maintenance expenditure and possible replacement within the strategy period.

- 2.1.7. A Feasibility Study (**Ref 2.2**) was undertaken in 2014 (and published in 2015) by the Highways Agency to determine the existing issues on the A1 NGWB and to prioritise the sections which most urgently need attention. The Feasibility Study recommended that widening the A1 from two lanes to three lanes between junction 67 (Coal House) and junction 65 (Birtley), including replacement of Allerdene Bridge, would help address current congestion and the forecast traffic demand. These works were proposed to be taken forward in the Road Investment Strategy for delivery in the current road period (2015/16-2019/20), with start of works by March 2020.
- 2.1.8. During Option Selection, traffic modelling work identified an increase in expected flows for the southbound mainline between junctions 67 (Coal House) and junction 65 (Birtley) (see **Section 3.3, Chapter 3 Assessment of Alternatives** of this ES (**Application Document Reference: TR010031/APP/6.1**)). As a result of this traffic modelling, the Scheme is now providing four lanes through junction 66 (Eighton Lodge) compared to three lanes that were proposed in the Road Investment Strategy (RIS).
- 2.1.9. Following the publication of the RIS, which sets out the long-term approach to improve England's motorways and major roads, in 2015 (**Ref 2.4**), opportunities were identified to refine the roads programme and improve the benefits to customers. Details were published in October 2017 in the Delivery Plan Update – Supplementary Annex 2017-2018 (**Ref 2.5**). The delivery plan update identified the A1/A19 Newcastle Gateshead as one of eight routes/regions where the current plan would create unnecessary impact and disruption to the road users. To minimise the impact of simultaneous schemes on the A1 and A19 at the same time, the Scheme was re-programmed from 2019/2020 to 2020/2021 with a start of works commitment by March 2021.

2.2. SCHEME OBJECTIVES

- 2.2.1. The Scheme has been designed with the key following objectives in mind:
- a. Supporting economic growth:** The Scheme forms part of a wider government initiative for growth in the north-east and aims to support economic growth by improving the road to the Newcastle and Tyneside area.
 - b. A safe and serviceable network:** The Scheme aims to reduce accidents and improve journey time reliability which will lead to a reduction in driver stress and delays.

- c. A more free-flowing network:** The traffic model used to design the Scheme predicts that road users travelling through the Scheme will benefit significantly from reduced journey times as a result of the proposal.
- d. Improved environment:** The environmental effects resulting from the Scheme have been considered during previous stages of development. Measures to mitigate potential effects on the local environment have been identified and will be further refined as the Scheme design is finalised. Opportunities to improve the local environment are also being sought as part of the final Scheme design.
- e. An accessible and integrated network:** The Scheme will provide improved connectivity with the local road network. Access and safety for pedestrians, cyclists and horse riders will be considered as part of the Scheme. We are upgrading the road to accommodate abnormal loads which will future proof the route and reduce the impact on the local road network.

2.3. SCHEME LOCATION

- 2.3.1. This Scheme is located on the A1 between a location just south of junction 68 (Lobley Hill) grid reference 423862, 560224 and junction 65 (Birtley), grid reference 428340, 556306, in the metropolitan borough of Gateshead and is approximately 6.5km in length. This is shown on the Scheme Location Plan **Figure 2.1** of this ES (**Application Document Reference: TR010031/APP/6.2**). **Figure 2.1** shows the Order limits within which powers are being sought pursuant to the application for a Development Consent Order (DCO) of which this Environmental Statement (ES) forms part. The Order Limits encompass all the land on which any works are to take place. The term Order Limits is referred to as the 'Scheme Footprint' throughout this ES.

SCHEME FOOTPRINT

- 2.3.2. The Scheme Footprint consists of all the land required to build and operate the Scheme, whether required temporarily for construction purposes or on a permanent basis. The Scheme Footprint is also shown on **Figure 2.2** of the ES (**Application Document Reference: TR010031/APP/6.2**). This figure also shows the environmental constraints within 2km of the Scheme.

OVERVIEW OF SURROUNDING AREA

- 2.3.3. The area within a 1km buffer from the Scheme Footprint, as shown on **Figure 2.2** of the ES (**Application Document Reference: TR010031/APP/6.2**) is characterised by a combination of land uses (residential, rural, industrial, recreational, open space and urban fringe). Much of the area falls within designated Green Belt land, namely the Tyne and Wear Green Belt. The A1 and ECML sever the area and form strong visual and audible elements of the landscape.
- 2.3.4. The area to the north of junction 67 (Coal House) is characterised by Team Valley Trading Estate. To the west and north-west of junction 67 (Coal House) lies Ravensworth

Conservation Area, which includes several listed buildings. This area also includes Lady Park which is made up of a small number of residential properties.

- 2.3.5. To the east of junction 67 (Coal House) lies Allerdene Bridge which carries the A1 over the ECML. This is an engineering constraint to the Scheme due to the vertical and the horizontal clearance requirements for the ECML.
- 2.3.6. The central area between junction 67 (Coal House) and junction 66 (Eighton Lodge) is dominated by the A1. Areas to the north and south of the A1 are designated Green Belt. Longacre Wood Local Wildlife Site (LWS) lies directly south of the A1. Smithy Lane Overbridge crosses the A1 in this location, north of the LWS. Other land uses include Lamesley Conservation Area (and listed buildings) and large areas of agricultural land. Longacre Dene ancient woodland lies close to junction 66 (Eighton Lodge) to the south.
- 2.3.7. The main watercourse in the Scheme location is the River Team. This runs underneath junction 67 (Coal House) and continues to flow in a northerly direction through Team Valley Trading Estate where it is heavily modified and onward to the River Tyne at Dunston. The River Team floodplain occupies areas from the outskirts of Birtley in the south, through Lamesley and around the Coal House roundabout, and continues through Team Valley. The River Team wildlife corridor, largely to the south of, but also crossing, the A1, is made up of Lamesley Pastures LWS, Tyne Marshalling Yard, Lamesley reed beds mine water treatment area, Bowes Railway Scheduled Monument (SM), LWS and bridleway and Longacre Wood LWS.
- 2.3.8. To the north of the central section between junction 67 (Coal House) and 66 (Eighton Lodge) lie the residential areas of Chowdene, Allerdene, Harlow Green and Eighton. Two schools (Harlow Green Primary School and St Anne's Catholic Primary School) lie to the north east of the A1 at this location. To the east lie the Angel of the North, Ravensworth golf course, Angel View Inn public house, Eighton Lodge Care Home and residential properties.
- 2.3.9. Bowes Railway SM is one of the earliest and Area-preserved examples of a rope haulage system. Bowes Railway LWS, crosses the 1km buffer from the north-east to the south-west just south of junction 66 (Eighton Lodge). This route is also a bridleway, known as Longbank Bridleway, for most of its length.
- 2.3.10. The area to the south of junction 66 (Eighton Lodge) is dominated by residential properties in Birtley. Residential properties immediately adjacent to the A1 in this location include North Dene, Crathie, Lockwood Avenue and Birtley Northside. The existing North Dene Footbridge crosses over the A1, adjacent to Crathie. Birtley Conservation Area lies on the edge of the 1km buffer to the south-west.
- 2.3.11. The area to the east and south-east of junction 66 (Eighton Lodge) is designated Green Belt and is dominated by agricultural and recreational land uses. Several footpaths and bridleways cross this area. The Follingsby wildlife corridor, consisting of Sheddons Hill, Dunkirk Pond, Dunkirk Farm west and Bowes Railway, lies largely to the north-east of the A1.

2.3.12. The area to the south-west of junction 65 (Birtley) is dominated by Portobello industrial estate and residential land uses. There are also four primary schools to the south west of the A1 at this location (Birtley East Community Primary School, St Joseph's Catholic Infant School, St Joseph's RC Junior School and Ravensworth Terrace Primary School). The area to the south-east of junction 65 (Birtley) comprises industrial land uses, residential areas of Ayton, Blackfell and Oxclose.

2.4. BASELINE SCENARIO

- 2.4.1. Paragraph 3 of Schedule 4 to the Environmental Impact Assessment (EIA) Regulations requires 'a description of the relevant aspects of the current state of the environment (baseline scenario) and an outline of the likely evolution thereof without implementation of the Scheme as far as natural changes from the baseline scenario can be assessed within reasonable effort on the basis of the availability of environmental information and scientific knowledge'.
- 2.4.2. Future traffic forecasts have been developed using the Northern Regional Transport Model (NRTM), a multi-modal variable demand model. As detailed in the Traffic Assessment Report (**Ref 2.1**) future demand is based on future development considered Near Certain or More than Likely (for housing, employment and infrastructure), in addition to general traffic growth.
- 2.4.3. Traffic forecasts have been developed for two scenarios; a Do Minimum (DM) and a Do Something (DS). The DM represents the future baseline and includes all development categorised as Near Certain or More than Likely, including the A1 Scotswood to North Brunton Improvement scheme (A1 S2NB), but excludes the Scheme. In the DM scenario, there would be some maintenance works, to the A1, but no major works in this area. The DS is nearly identical to the DM, with only the addition of the Scheme.
- 2.4.4. Each scenario has been modelled for two future years. 2023 represents the Opening Year and 2038 represents the Opening + 15 Future Year – (Design Year).
- 2.4.5. A comparison of the present and predicted traffic flows is presented in **Section 2.8** below. The impact of the Scheme on traffic flows is described in more detail in the Transport Assessment Report (**Application Document Reference: TR010031/APP/7.3**).
- 2.4.6. The assessments presented within this ES have compared the DS scenario with both the current and future baseline under a DM scenario. It is considered that the future baseline of the Scheme Footprint would remain relatively unchanged - i.e. land use and the built environment as well as other features are not likely to alter within those limits. The baseline scenario for each environmental topic is discussed within the technical **Chapters 5-14** of this ES (**Application Document Reference: TR010031/APP/6.1**).

2.5. SCHEME DESCRIPTION

OVERVIEW

- 2.5.1. The General Arrangement Plan illustrates the main components of the Scheme (**Application Document Reference: TR010031/APP/2.6**).
- 2.5.2. The Scheme consists of widening the existing carriageway between junction 67 (Coal House) and junction 65 (Birtley) to provide additional lanes and increase capacity. The widening would be mainly online widening, with a short section of realignment (offline) where the A1 crosses the ECML between junction 67 (Coal House) and Smithy Lane Overbridge. The main areas of land take for the replacement of Allerdene Bridge and southbound verge are located between junction 66 (Eighton Lodge) and junction 65 (Birtley). The existing road width would be maintained north of junction 67 (Coal House).
- 2.5.3. New verge mounted traffic signs would be provided north of junction 67 (Coal House). New signs are required due to the changes proposed to the southbound exit slip road layout at junction 67 (Coal House). The proposed works would include installation of the new signs, relocation of some of the existing signs and modifications to the road markings. The Scheme would also look to upgrade existing intelligent transportation systems or install new systems where required. This includes relocation of Variable Messaging Signs (VMS), closed circuit television (CCTV) cameras and Motorway Incident Detection Automatic Signalling (MIDAS). Where the existing technology does not meet current standards, it would be upgraded to current standards to ensure operational expectations are met.
- 2.5.4. Through junction 67 (Coal House) both carriageways would be widened from two lanes to three. Kingsway Viaduct, which carries the A1 over the junction 67 (Coal House) roundabout, would be retained and widened to accommodate the additional lanes south of the existing structure. The existing northern edge of carriageway extents would be maintained.
- 2.5.5. Between junction 67 (Coal House) and junction 66 (Eighton Lodge) the A1 would be widened from two lanes to three with a lane gain/drop arrangement between the junctions on the northbound carriageway; and from two lanes (and a partial climbing lane) to four on the southbound carriageway. Smithy Lane Overbridge would be retained with no works undertaken to it.
- 2.5.6. The A1 would also be realigned to facilitate demolition and replacement of the Allerdene Bridge approximately 40m south of the existing structure. The existing bridge would be kept open during construction to allow continuous provision for drivers and would be demolished once traffic has been diverted onto the new alignment. As described in **paragraphs 2.7.5-2.7.18** two design solutions are proposed for this part of the Scheme.
- 2.5.7. From junction 66 (Eighton Lodge) the A1 would be widened from two lanes (and a partial climbing lane) to four on the southbound carriageway and from two lanes to three on the northbound carriageway. All three of the bridges (Eighton Lodge Slip Road, North, and South underbridges) in this section would be widened. The proposed slip roads at junction

66 (Eighton Lodge) would tie into the existing carriageway so that the current roundabout geometry can be retained.

- 2.5.8. Between junction 66 (Eighton Lodge) and junction 65 (Birtley) both carriageways would be widened from three lanes to four in total. This widening would maintain the existing southern edge of the highway boundary. Of the three bridges in this section North Side Overbridge would be retained, North Dene Footbridge would be demolished and reconstructed and Longbank Bridleway Underpass would be widened.
- 2.5.9. The speed limit for the southbound carriageway would remain 50mph through junction 67 (Coal House) and would change to national speed limit (70mph) to the east of Allerdene Bridge at a similar location to the existing bridge. The existing 50mph speed limit would be maintained for the northbound carriageway for the length of the Scheme.

LIMITS OF DEVIATION AND THE 'ROCHDALE ENVELOPE'

- 2.5.10. The design has been developed to a level of detail that is sufficient to provide confidence during the DCO examination. As expected for Nationally Significant Infrastructure Project (NSIPs), there are aspects of the design that have not yet been fixed. These aspects have been considered within the EIA in accordance with Planning Inspectorate Advice Note 9 'Using the Rochdale Envelope'. Where there are specific areas of uncertainty, or potential alternative designs still under consideration, these are identified within the Scheme description below.
- 2.5.11. For these design aspects, the detailed design will continue to be developed. The Scheme Footprint has been developed to allow for flexibility in the design process and certain optionality in relation to the engineering design of the Scheme, which is described in **Sections 2.7 to 2.10**. Limits of Deviation (LoD) have been set on these uncertain aspects of the works. The EIA has taken the LoD into account and the approach taken is described in **Chapter 4 Environmental Assessment Methodology, paragraph 4.5.4** of this ES (**Application Document Reference: TR010031/APP/6.1**). The LoD for the Scheme are shown on the Works Plan (**Application Document Reference: TR010031/APP/2.3**), and are described in the draft DCO (**Application Document Reference: TR010031/APP/3.1**) and Explanatory Memorandum (**Application Document Reference: TR010031/APP/3.2**).
- 2.5.12. This ES and the assessments within it are based on the works proposed in the DCO (described in Schedule 1 of the Draft DCO (**Application Document Reference TR010031/APP/3.1**), the Works Plan (**Application Document Reference: TR010031/APP/2.3**), Engineering Section Drawings (**Application Document Reference TR010031/APP/2.5**) and General Arrangement Plan (**Application Document Reference: TR010031/APP/2.6**)) and the maximum area of land anticipated to be required, taking into account the LoD for the Scheme. The assessments therefore take into account a realistic "worst case" assessment of the Scheme.

2.6. LAND USE REQUIREMENTS

- 2.6.1. A summary of the permanent and temporary land take is shown below in **Table 2-2**. A total of 85.57 hectares of land would be affected either through permanent acquisition, temporary possession or through the acquisition of rights as a result of the Scheme. The figures presented in **Table 2-2** include land owned by Highways England on the existing A1.

Table 2-2 – Total permanent and temporary land take

Acquisition Type	Permanent / Temporary / Rights	Area (hectares)
Permanent acquisition of land	Permanent	56.66
Temporary possession and use of land	Temporary	24.08
Permanent acquisition of rights over land	Rights	1.07
Acquisition of land except for highway/railway beneath soffit level of bridge	Permanent	0.39
Acquisition of land above ground level and temporary possession and use of land at ground level	Permanent	0.19
Permanent acquisition of rights over subsoil including temporary possession and use of land	Rights + Temporary	3.18

- 2.6.2. Most of the non-highway land surrounding the Scheme is currently in agricultural use, lying primarily to the south of the existing A1 between junctions 66 (Eighton Lodge) and 67 (Coal House) and to the north between junction 65 (Birtley) and junction 66 (Eighton Lodge). There is also some grazing land by junction 67 (Coal House) in the south of the Scheme and between junction 65 (Birtley) and junction 66 (Eighton Lodge) in the north of the Scheme.
- 2.6.3. The 24.08 hectares of temporary land required during construction for temporary works would be needed mainly for the proposed two main construction site compounds as well as two working compounds.
- 2.6.4. It is intended to place the main construction site compound on land south-east of junction 67 (Coal House) and an additional compound in fields north-east of junction 66 (Eighton Lodge). Additional working compounds would be located to the north of Longbank Bridleway Underpass and to the east of Allerdene Bridge. **Figure 2.3** of the ES (**Application Document Reference TR010031/APP/6.2**) contains plans of the proposed construction site compounds. A temporary access/haul road would run from the Allerdene Bridge working

compound eastwards to Woodford. A controlled access point would be provided where the access road crosses the existing public footpath. The land would also be required for demolition and replacement of Allerdene Bridge along with the supporting access/haul road, for temporary storage of topsoil, subsoil and bulk fill material and for the diversion of statutory services. This land would be returned to its existing use after construction is complete.

- 2.6.5. In addition, it would be necessary to divert some statutory undertaker's apparatus (utilities), a gas main, a water main, power and telecommunications cables. The land in the location of these utilities is required to construct temporary works and new permanent diversions. This is included in the temporary land-take requirements described in **paragraph 2.6.3** above. The majority of the diverted utilities would be underground. The temporary land required would be reinstated upon completion (see landscape drawings presented in **Figure 7.6** of the ES (**Application Document Reference: TR010031/APP/6.2**)). The diversion works are being designed and would be undertaken by the statutory undertakers themselves.
- 2.6.6. The effects of this temporary land-take have been considered in this ES.

2.7. DESIGN

PRIMARY DESIGN MITIGATION

- 2.7.1. Primary mitigation measures are those that are an integral part of the Scheme and have been incorporated into the design in order to mitigate environmental impacts and with an aim to achieving environmental enhancement. The Environmental Masterplan presented in **Figure 2.4** of the ES (**Application Document Reference: TR010031/APP/6.2**) shows some of the mitigation measures embedded as integral elements of the Scheme design. The following primary mitigation has been included in the Scheme:
- a. Between junction 66 (Eighton Lodge) and junction 65 (Birtley) the widening of the A1 to accommodate the additional lanes would be undertaken asymmetrically to the north. This has reduced land take to the south of the A1, thus minimising adverse impacts to residential properties especially at North Dene and Crathie.
 - b. The A1 carriageway centreline has been moved further away (to the north) from the residential properties at Lady Park and a retaining wall has been included on the north bound on slip, which has enabled significant parts of the existing junction to be retained and has reduced land take and impacts on trees at this location.
 - c. The 'urban cross section', in accordance with the Highway England's design standard, has been adopted along the A1 northbound carriageway due to the existing 50mph speed limit in place and the highways alignment constraints. The use of the 'urban cross section' has reduced land take along the Scheme length by a minimum of 2m.
 - d. A 2.5m high wooden close-board fence has been included at the footpath over Longbank Bridleway Underpass to shield horses from adjacent traffic on the A1 and ensure a standard 3.0m wide passage is available across the entire width of the headwall of the Underpass.

- e. The new North Dene Footbridge will have a 3.5m (unsegregated) pedestrian/cycle path over the bridge deck and ramp and will have a 1 in 12 (minimum) gradient ramp to provide improved access for walking, cycling and horse riding (WCH) users. Horse riders and cyclists would have to dismount to use the footbridge. Corduroy tactile paving to aid the movement of partially sighted WCH users.
- f. A retaining wall has been included to retain the access road located adjacent to junction 65 (Birtley) southbound exit slip which is a single access point for a number of properties.
- g. An acoustic barrier (approximately 3m in height and 670m long) has been provided along the Highway boundary from just north-west of the intersection with Long Bank to the section of the roadway adjacent to Lockwood Avenue.
- h. The existing noise barrier at Lady Park would be slightly re-positioned at its south end to avoid conflict with the junction 67 (Coal House) realigned northbound on-slip.
- i. The earthworks design has been revised from 1:3 to 1:2 slope to avoid land take from Longacre Wood. The proposed earthworks at this location, are all within existing land in the Applicant's ownership.
- j. An attenuation pond has been included in the location of the former A1 carriageway as shown on the General Arrangement Plan (sheet 3 of 7) (**Application Document Reference: TR010031/APP/2.6**). The attenuation pond would capture water drained from the majority of the catchment (i.e. Eighton Lodge North underbridge to Allerdene Bridge south abutment) and would reduce surface water run-off, allow sediments and pollutants to settle out and prevent contaminated water entering the watercourse by using overflow and isolation systems.
- k. Attenuation in order to reduce the rate of surface water runoff would be provided using oversized pipes and geo-cellular storage.
- l. Oil interceptors have been specified at all outfalls.
- m. Silt control vortex separators have been incorporated into the outfalls to Longacre Dene to minimise sediment issues.
- n. Installation of a Thin Surface Course System (TSCS) for all sections of the A1 and slip roads to the roundabouts but excluding the roundabout circulatory. The TSCS would be a high performance, cut resistant, low noise and skid resistant surface capable of supporting a high volume of traffic with a thickness < 50mm.

STRUCTURES

2.7.2. The following structures would be modified for the Scheme.

Kingsway Viaduct

2.7.3. The existing Kingsway Viaduct, located at junction 67 (Coal House), would be widened to accommodate the new highway alignment. Kingsway Viaduct is the largest bridge structure within the Scheme Footprint. The existing Kingsway Viaduct is a six-span steel composite structure which has a total length of approximately 146m, with equal spans of 24.33m. The existing structure would be widened asymmetrically (to the southern end of A1 northbound

carriageway) to accommodate an additional two lanes of traffic. The overall cross section of the deck would increase from 23.1m to 30.05m.

- 2.7.4. The existing structure would be widened by extending the sub structure elements and the deck. The new superstructure deck section would be stitched to the existing deck and would be made up of longitudinal steel girders supporting a reinforced concrete slab and a concrete parapet edge beam similar to the existing. The substructure would be widened by constructing new reinforced concrete piers/abutments. The geometry and profile of the new substructure would match that of the existing structure.

Allerdene Bridge

- 2.7.5. The existing Allerdene Bridge would be demolished and replaced to the south of the existing structure between junction 67 (Coal House) and Smithy Lane Overbridge on the revised alignment of the A1. The offline realignment of the A1 carriageway is proposed to facilitate replacement of the existing Allerdene Bridge approximately 40m (average centreline to centreline), south of the current structure. The largest distance from the existing carriageway centreline to the proposed carriageway centreline is approximately 60m and the largest distance from the existing toe of the batter to the proposed toe of the batter is approximately 90m. Grouting works to the underlying coal measures would be undertaken beneath the proposed piers and abutment locations.
- 2.7.6. During the development of the preliminary design, analysis based on the ground investigation identified that ground settlement could occur of a magnitude of 600 – 1000mm on the approach to the Allerdene Bridge without implementing ground improvement works. The preliminary design has identified that rigid inclusion (e.g. controlled modulus columns, settlement reducing piles, or other similar system) can be used as the ground improvement option to mitigate the risk of settlement. To retain flexibility for the detailed design stage a multi span viaduct has been considered as an alternative solution. A viaduct option would have the potential benefits of simplifying the proposed NGN diversion works and simplifying work to accommodate existing Allerdene Culvert.
- 2.7.7. To retain flexibility for the detailed design stage two design solutions are proposed for this part of the Scheme as part of the DCO, both include ground improvement to mitigate settlement:
- a.** Allerdene embankment option – a single span bridge supported by embankments which utilises ground improvements in the form of rigid inclusions e.g. controlled modulus columns.
 - b.** Allerdene viaduct option – a multi span viaduct structure supported on piled foundations 40-45m deep which ties into embankment structures at either end.
- 2.7.8. These two design options are both included within the DCO application to provide flexibility to allow further analysis to be conducted when detailed design is carried out. At the detailed design stage, the preferred option would be identified and taken forward into construction.

- 2.7.9. Both options have been assessed in the EIA and have been reported in this ES. The General Arrangement Plan (**Application Document Reference: TR010031/APP/2.6**) also provide details of the replacement Allerdene structure.
- 2.7.10. Further details on each of these options are provided below.

Allerdene Embankment Option

- 2.7.11. As depicted on **Figure 2-1** below, the existing Allerdene Bridge would be replaced with a single span steel bridge (approximately 62m in length) that was two additional lanes wider than the existing in order to improve capacity. The height of the bridge and A1 at this section would also be raised to ensure the bridge meets Network Rail requirements.

Figure 2-1 - Allerdene embankment option - illustration



- 2.7.12. An embankment would be constructed either side of the bridge and extend between the eastern extent of Kingsway Viaduct and the tie-in to the existing alignment to the north of Smithy Lane Overbridge. The proposed embankment would be located adjacent to the existing A1 embankment and extend up to 12m high, with side slopes at a gradient of 1:3.
- 2.7.13. Ground improvement for the embankment in the form of rigid inclusions, would be constructed extending to a depth of 30m below existing ground level. A load transfer platform (likely to be constructed from selected granular fill and basal geogrid) would span across the rigid inclusions, upon which the embankment would be constructed. The embankment would be constructed from standard earthwork materials.
- 2.7.14. Allerdene Culvert is located just east of junction 67 (Coal House), the watercourse eventually flows in open channel through farmland to its confluence with the River Team. As part of these proposed works, Allerdene Culvert would be completely removed and replaced with a new culvert structure measuring 116.5m in length. The proposed culvert would comprise a steel multi-plate pipe arch with concrete headwalls, wingwalls and apron to both the upstream and downstream ends of the structure. The cross section of the new culvert would exceed that of the existing culvert to allow for future increases in hydraulic capacity.

Allerdene Viaduct Option

- 2.7.15. For this option, Allerdene Bridge would be replaced with a viaduct structure – comprising either six spans (with a maximum length of 290m) or seven spans (with a maximum length of 310m) or as shown on **Figure 2-2** (six span) and **Figure 2-3** (seven span) below. The proposed viaduct option would be supported on rigid piled foundations, 40m deep. The structure would have three components as follows:
- a. Superstructure - The north and south bound A1 carriageway would be two structurally independent decks. The main girders would comprise fabricated weathering steel plate sections (not standard beams) that are connected to form the webs/flanges to the main longitudinal girders. The girders would support a reinforced concrete deck.
 - b. Substructure - The intermediate piers would comprise reinforced concrete piers or alternatively a series of columns interconnected via a reinforced concrete cross head beam at the top and a pile cap at the base. The end supports (abutments) would comprise reinforced concrete cantilever construction.
 - c. Foundations - The foundation to the intermediate piers/abutments would comprise reinforced concrete bored pile foundations with a minimum diameter of 900mm and an embedment depth of 40m.
- 2.7.16. Towards the end of the viaduct there would be some earthworks (embankments) required for the A1 to transition from the viaduct to the existing road alignment. The embankments would be significantly smaller than Allerdene embankment option.
- 2.7.17. To mitigate any settlement risks, ground improvement would be provided in the form of rigid inclusions in these proposed embankments.
- 2.7.18. Allerdene Culvert would be diverted under one of the bridge spans as an open ditch.

Figure 2-2 - Allerdene viaduct option (six span) illustration



Figure 2-3 - Allerdene viaduct option (seven span) illustration



Eighton Lodge Slip Road/North/South underbridge

- 2.7.19. Three underbridges at junction 66 (Eighton Lodge Bridges) would be widened on both sides to accommodate the Scheme.

Longbank Bridleway Underpass

- 2.7.20. Longbank Bridleway Underpass would be widened at the north end (southbound carriageway side) by up to 16m to accommodate the highway widening.

North Dene Footbridge

- 2.7.21. The existing North Dene Footbridge (including ramps) would be replaced in its entirety in approximately the same location. The new footbridge would be a single span bowstring truss with a 3.5m clear width throughout and provision of a new 1 in 12 ramp to the west side.

Retaining Walls

- 2.7.22. Ten new retaining wall structures would be required to accommodate the improvements to the A1 highway alignment. Six retaining walls are required along the mainline (adjacent to the A1 southbound/northbound carriageway verges), and four retaining walls are required within the central reserve to accommodate the level difference between the northbound and southbound carriageway.

Drainage

- 2.7.23. The existing Scheme is currently drained by a combination of gully/pipe network and filter drains. The pipe network drains into various ditches and watercourses which run parallel with the existing highway boundary.
- 2.7.24. There are currently 14 outfalls; the major catchments contributing to the River Team, Leyburnhold Gill, Bowes View, Longacre Dene and an ordinary watercourse near to Smithy Lane. Allerdene Culvert forms the major drainage outfall to the River Team. Alterations to Allerdene Culvert are described above in **paragraph 2.7.14** and **paragraph 2.7.18** for Allerdene embankment option and Allerdene viaduct option respectively.

- 2.7.25. The Scheme would be drained by a combination of collection systems including combined kerb and drainage units (CKDU), drains, gullies and surface water channels.
- 2.7.26. All collection systems would connect into a carrier drain network and utilise the existing outfalls.
- 2.7.27. The sub-surface pavement drainage would be drained via narrow fin drains, which also connect into the proposed carrier drain network.
- 2.7.28. As the highway contributing area is increased due to larger extent of the road surfacing and reduced greenfield areas, the proposed drainage network is designed to maintain or provide betterment on the existing run-off rates during the various storm events. The design has incorporated an allowance of 20% increase in river flows in line with Planning Policy Statement 25 (PPS25) to account for the effect of climate change on flood risk.
- 2.7.29. Attenuation would be provided using oversized pipes, geo-cellular storage and balancing ponds which are designed to surcharge during storm events. Control orifices would be provided in manholes to control discharge.
- 2.7.30. An attenuation pond would be provided in the location of the former A1 carriageway as shown on the General Arrangement Plan (sheet 3 of 7) (**Application Document Reference: TR010031/APP/2.6**). The proposed attenuation pond would capture water drained from the majority of the catchment (i.e. Eighton Lodge North underbridge to Allerdene Bridge south abutment). This would reduce the rate of the surface water run-off which would have flowed freely ultimately into the River Team. The pond would provide storage for surface water run-off during peak flow (i.e. heavy rainfall) and slowly release the water after the peak flow has passed.
- 2.7.31. The attenuation pond would allow sediments and pollutants to settle out and would protect against spillage events reaching Allerdene Culvert or the River Team. The attenuation pond and other storage facilities would be designed with overflow and isolation systems to prevent contaminated water entering the watercourse.
- 2.7.32. Bypass oil interceptors have been specified to capture and control flows for the majority of storm events. The oil interceptors would be alarmed to ensure that oil that has accumulated within the tanks to be emptied at an appropriate frequency to ensure the interceptors work effectively.

Road Surface

- 2.7.33. The existing road surface consists of flexible asphalt material comprising of a combination of hot rolled asphalt and a TSCS.
- 2.7.34. The new road surface would use TSCS along the length of the Scheme which would provide noise reduction advantages.
- 2.7.35. The Scheme works would require widening to both nearside verge and central reserve sections. The pavement structure would as far as possible match the existing to ensure free subbase drainage and facilitate future maintenance options.

Gantries and Signs

- 2.7.36. The highway upgrade would involve installation of new advanced direction signage (ADS) along the Scheme. A total of 34 signs would be installed. This would include a combination of 14 gantry mounted and 20 post mounted signs.
- 2.7.37. Based on current ground condition data and the constrained nature at each location it is expected that piled foundations would be required at all the gantry locations.

Lighting and Cabling

- 2.7.38. Lighting would be designed to minimise light spill onto adjacent areas through the use of low energy light-emitting diode (LED) fittings with a zero-upward spill above 95 degrees (in accordance with Highways England requirements to utilise full cut off luminaires on the strategic road network).
- 2.7.39. The main carriageway road lighting would include columns of 12m height positioned at intervals of 35-45m. Lighting columns would incorporate a 1.5m bracket arm and LED Luminaires. Slip road lighting columns would be 10m height positioned at intervals of 35-45m. Lighting columns would incorporate a post top mounted LED luminaire mounted in a single sided arrangement in the verge.
- 2.7.40. All power supplies would be derived from verge mounted feeder pillars via a private cable network utilising an underground ducted system.

Diversion of Utilities

- 2.7.41. The following statutory services would require diversion as part of the Scheme. The details of these diversions would be developed further at detailed design.
- a. Telecommunications: Virgin, Openreach, Instalcom and Vodafone
 - b. Power: Northern Power Grid
 - c. Water: Northumbrian Water
 - d. Gas: NGN
- 2.7.42. Openreach, Northern Power Grid, Northumbrian Water and Virgin apparatus are located in the footway adjacent to Kingsway Viaduct north abutments. The roundabout circulatory carriageway would be realigned to allow space for the widening of Kingsway Viaduct. This would require the existing footway to be excavated. The apparatus would be diverted through the roundabout central island to avoid any clashes with the Scheme.
- 2.7.43. Northern Power Grid, Virgin, Vodafone, and Instalcom apparatus are located along the ECML in the verge. The construction of the new abutments for the Allerdene Bridge could affect some of the apparatus which would need to be diverted.
- 2.7.44. Northumbrian Water strategic water main (37" diameter) is located under the A1 carriageway at Smithy Lane Overbridge. The current assumption is that a diversion of the water main would be required.

- 2.7.45. Openreach, Northern Power Grid, Northumbrian Water, Virgin and Vodafone apparatus are located adjacent to Eighton Lodge North underbridge earthworks (north of the A1 carriageway). Due to the A1 widened carriageway, the existing earthworks are to be extended which would require the apparatus currently located at the toe of the existing embankment to be moved.

Northern Gas Networks

- 2.7.46. NGN apparatus would be diverted and relocated to the south of the Scheme on a site previously used by NGN as a gas storage array which was dismantled and reinstated approximately ten years ago. The diversion works would be undertaken by NGN.

NGN are currently in discussion with Gateshead Council with regards to securing these works under the Town and Country Planning Act 1990. They are also discussing the option with Gateshead Council of this work being agreed under Permitted Development Rights as opposed to a formal planning application. However, to ensure that the NGN works can be delivered with certainty, the works are also included in this application.

- 2.7.47. A new Above Ground Installation (AGI) would be constructed to the south of the Scheme. The AGI would comprise of two sets of regulators to carry out pressure reduction across two tiers, new filters, a boiler house package, new heat exchangers, a backup generator and electrical and instrumentation (E and I) kiosk. A new access road to serve the AGI would be created off Lamesley Road. The AGI would be bounded by a 2.4m high steel security fence with a further timber post and wire fence surrounding this.
- 2.7.48. A new DG (District Governor) would be installed within the existing AGI compound to the north of the Scheme to manage the local distribution connections that come from the existing site.
- 2.7.49. The intermediate pressure gas main would be diverted through the installation of a new main by micro tunnelling using a slurry drive. The low-pressure gas main which currently goes underneath the northbound access and southbound exit slip roads would be diverted through the Coal House roundabout (junction 67) using a combination of open cut trenches and trenchless techniques. The new low pressure gas main would be routed between the new foundations for the bridge. Work involving the abandonment and routing of the high, intermediate, medium and low-pressure mains affected by the Scheme would be carried out. The site would be reinstated on completion and the existing Regulator building at Lamesley would be demolished.

Landscape

- 2.7.50. The landscape mitigation design for the Scheme addresses the requirement to mitigate both landscape and ecological effects identified within the assessment. The landscape mitigation design has focused on the retention or replacement of vegetation potentially removed by the Scheme during the construction phase, ecological enhancement and landscape integration and screening.

- 2.7.51. Replacement vegetation would be of local origin i.e. north-east of England, and would be a combination of native species as defined by the Forestry Commission's Regions of Provenance map (**Ref 2.6**) reflecting those already present within the area.
- 2.7.52. Vegetation would be planted in swathes to reflect existing landscape patterns, including woodland, woodland edge, linear belts of trees, scattered trees and mixed species hedgerows. In accordance with DMRB guidance Volume 10, Section 1, Part 2, Chapter 12 (**Ref 2.7**), trees would not be planted within 5m of the kerb line and shrubs not within 3m to avoid root heave and canopies overhanging the carriageway. Planting would also avoid sightlines and the constraints of nearby utilities.
- 2.7.53. Enhancement measures would include woodland management to improve the quality of existing woodland, enhancements to the planned attenuation pond north of the proposed Allerdene Bridge through planting, and pruning close to the Angel of the North to provide greater visibility of the sculpture in views from the A1 corridor and more widely within the surrounding landscape.
- 2.7.54. The landscape design is described in more detail in **Chapter 7 Landscape and Visual** of this ES (**Application Document Reference: TR010031/APP/6.1**) and shown on **Figure 7.6** (**Application Document Reference: TR010031/APP/6.2**).

Walking, Cycling and Horse-Riding Facilities

- 2.7.55. The Scheme would affect provisions for WCH. **Figure 12.1** of this ES (**Application Document Reference: TR010031/APP/6.2**) shows existing bridleways and public footpaths.
- 2.7.56. North Dene Footbridge, which is designated as "a National Cycle Network off-road cycle path" and is identified as Route 11, a "Regional Cycle Network", would be replaced in the same location. The new footbridge would have a 3.5m (unsegregated) pedestrian/cycle path over the bridge deck and ramp and would have a 1:12 (minimum) gradient ramp to provide improved access for WCH users. Corduroy tactile paving to aid the movement of partially sighted users, and direction signage to advise non-motorised users of available routes or destinations, would be provided. A diversion would be provided during the removal and construction of North Dene Footbridge.
- 2.7.57. A fence would be provided to restrict access to the northbound carriageway for pedestrians and animals between the Northside Overbridge and the A1.
- 2.7.58. A higher wooden close-board fence treatment would be provided to ensure that horses are not exposed to oncoming traffic and ensure a standard 3m wide passage is available across the entire width of the headwall of Longbank Bridleway Underpass.
- 2.7.59. During the widening of Longbank Bridleway Underpass a diversion path would be created to maintain pedestrians' access.

- 2.7.60. At Eighton Lodge Slip Road, traffic signage would be provided and the height increased to more than 2.0m above ground level, in order to improve the visibility sight-lines for pedestrians thus increasing road safety for WCH users.
- 2.7.61. **Chapter 12 Population and Human Health** of this ES (**Application Document Reference: TR010031/APP/6.1**) provides an assessment of the proposed WCH provision and their potential impacts. This assessment has been informed by the WCHAR Report within **Appendix 12.1** of this ES (**Application Document Reference: TR010031/APP/6.3**) which discusses the alternatives that were considered.

Safety Barriers

- 2.7.62. The Scheme design includes safety barriers on the edge of the carriageway and central reserve. All safety barriers would be constructed in accordance with DMRB standards and would likely be of metal or concrete.

Noise Barrier

- 2.7.63. A noise barrier (approximately 3m high and 670m long) would be provided along the Highway boundary just north-west of Long Bank to in line with the north end of Lockwood Avenue.
- 2.7.64. The existing noise barrier at Lady Park would be slightly re-positioned at its south end to avoid conflict with the junction 67 (Coal House) realigned northbound on-slip.

2.8. CHANGES TO TRAFFIC FLOWS

- 2.8.1. As explained in **paragraph 2.4.3** above, future traffic forecasts have been developed using the NRTM, a multi-modal variable demand model. A comparison of the flows is presented in **Table 2-3** which shows that in the DS scenario flows are consistently higher than in the DM scenario, but particularly between junctions 66 (Eighton Lodge) and 67 (Coal House) where there is an increase in flows of 12% in 2023 and 25% in 2038. **Table 2-3** shows the difference between the DM and DS in Annual Average Daily Traffic (AADT) as a percentage.
- 2.8.2. The table shows that in the DS scenario, flows are consistently higher than in the DM scenario, but particularly between junctions 66 (Eighton Lodge) and 67 (Coal House), with a 12% increase in 2023 and a 25% increase in 2038.

Table 2-3 - Percentage difference Do Something AADT (two-way, vehicles) relative to Do Minimum AADT

Location	2023 DS change relative to DM	2038 DS change relative to DM
South of junction 65	2%	4%
Between junction 65 and junction 66	5%	10%

Location	2023 DS change relative to DM	2038 DS change relative to DM
Between junction 66 and junction 67	12%	25%
North of junction 67	3%	2%

2.8.3. The impact of the Scheme on traffic flows is described in more detail in the Transport Assessment Report (**Application Document Reference TR010031/APP/7.3**).

2.9. CONSTRUCTION, OPERATION AND LONG TERM MANAGEMENT

CONSTRUCTION

2.9.1. The Scheme would be constructed by an appointed contractor. and it is not yet possible to predict the techniques and technologies to be adopted with absolute certainty. However, the approaches described below allow a reasonable worst-case assessment of the construction of the Scheme.

Programme

2.9.2. The assessment has assumed the following indicative timeframes for the construction of the Scheme are illustrated in **Table 2-4**.

Table 2-4 - Indicative construction programme

Activity	Timeframe
NGN diversion works	Spring 2020 – Spring/Summer 2021
Site mobilisation	Winter 2020/21
Main construction works	Winter 2020/1 – Winter 2023/4
Site demobilisation and reinstatement	Winter 2023/24

Phasing

2.9.3. The main construction works are split into eight aspects:

- a. NGN Works
- b. Site mobilisation
- c. Works on the ECML
- d. To and through the approach at junction 67 (Coal House)
- e. Allerdene Bridge
- f. East of Allerdene Bridge to junction 65 (Birtley)
- g. Tie-in works

- h.** Removal of Allerdene Bridge and approaches
- i.** Site demobilisation

2.9.4. These aspects are identified separately as each has a different Traffic Management (TM) strategy to enable the works to be constructed.

2.9.5. The following aspects cover the full length of the Scheme:

- a.** To and through the approach at junction 67 (Coal House)
- b.** Tie-in works
- c.** Removal of Allerdene Bridge and approaches

2.9.6. The timings for the main phases of the construction works are provided in **Table 2-5** below.

Table 2-5 - Main phases of construction work

Phase	Description	Start Date	End Date
Area 1	Site Mobilisation	25/02/2021	17/05/2021
Area 2	Works on the ECML	20/05/2021	29/06/2023
	Construction of New Allerdene Bridge	20/05/2021	10/01/2022
	Demolition of Existing Allerdene Bridge	20/08/2021	29/06/2023
Area 3	CH.0300 - CH.1200 On-Line North of Allerdene Bridge	13/05/2021	02/09/2022
Area 4	CH.1200 - CH.1700 Off-Line at Allerdene Bridge	20/05/2021	16/09/2022
Area 5	CH.1700 to CH.5000 South of Allerdene Bridge	20/05/2021	25/11/2022
Area 6	Tie-ins over Allerdene Bridge	26/11/2022	24/04/2023
Area 7	Removal of Existing Allerdene Bridge and Approaches	30/03/2023	15/12/2023
Area 8	Site Demobilisation	26/11/2022	09/02/2024

NGN Works

- 2.9.7. The exact construction programme for the NGN works is not yet known but the assessment has assumed that works would take place from Spring 2020 to Spring/Summer 2021.
- 2.9.8. The NGN construction phasing is driven by the civil elements of the Scheme namely construction of the AGI and micro tunnelling, and pits for the intermediate pressure gas main diversion. The section of the intermediate pressure gas main diversion beneath the existing carriageways would comprise a micro-tunnel constructed using a slurry drive due to the ground conditions and the minimal amount of settlement associated with this technique. A preformed concrete sleeve would be jacked behind the tunnelling machine to achieve the 155m long crossing between two sheeted pits. The new pipeline would then be fabricated above ground and pulled into the newly formed tunnel, preferably in a single operation with the annulus grouted using a controlled cement based fill.
- 2.9.9. The rest of the intermediate pressure gas main pipeline would be installed using a simple open cut trenching technique, with larger “bell-holes” or pits formed at tie-in points to allow for connections to be safely made. It is assumed that this material would be re-used on site where possible as selected backfill. Where this isn’t possible, reuse as part of the final landscaping solution of the Scheme would be investigated.
- 2.9.10. The DG would be required to manage the pressure from the connections. The civils works for the DG would be carried out once the intermediate pressure gas main reception pit has been reinstated which would be undertaken once the intermediate pressure gas main has been installed within the new tunnel.
- 2.9.11. The existing low-pressure main would be diverted into the junction 67 (Coal House) roundabout. This would be undertaken through a combination of open cut trenches and two crossings between the inner and outer areas of the roundabout. The low pressure main diversion is independent of the rest of the Scheme, and as such can be carried out at any time.
- 2.9.12. The new AGIs would be constructed via a means of simple concrete slabs with prefabricated skids or assemblies installed on top of them. These assemblies would be fabricated at the same time as the pipeline and then assembled on site.
- 2.9.13. There would be some excavation works, with sections of pipework being installed below ground, but the majority of the new AGIs would be above ground. Glass-reinforced plastic (GRP) buildings would be fabricated off site and installed in a one-day operation. All pipework would be painted using a four-coat system and a new fence would be installed around the sites. There would also be some electrical, instrumentation and cathodic protection installed across each of the sites once the mechanical elements are in place.
- 2.9.14. Upon completion of all major works, the new pipelines would be pressure tested and then commissioned. The site would be reinstated and the existing Regulator Building at Lamesley would be demolished using excavators. It is intended that the material from the demolition would be re-purposed to reprofile the site.

Site Mobilisation

- 2.9.15. It is anticipated that site mobilisation would include construction of the main site compound, provision of access and egress from the local road network, site clearance, drainage and infrastructure, car park and offices and connections by statutory undertakers. It is anticipated that site mobilisation would take approximately twelve weeks.
- 2.9.16. **Figure 2.3** of the ES (**Application Document Reference: TR010031/APP/6.2**) shows the indicative location of the main site compound within the Scheme Footprint, which is located south-east of junction 67 (Coal House). The second compound is located at junction 66 (Eighton Lodge). Two working compounds are also required, one to the north-east of Allerdene Bridge (to support demolition of the existing bridge) and the other to the north-west of Longbank Bridleway Underpass. The compounds would be required to facilitate construction of the roads, bridges and WCH facilities.

Works on the ECML

- 2.9.17. This includes works on the ECML that are required for the demolition and replacement of Allerdene Bridge. Allerdene Bridge and the associated carriageway would be demolished and replaced approximately 40m south of the existing structure. This covers works on the ECML that are required in advance of the demolition and replacement of Allerdene Bridge (see text below on Removal of Allerdene Bridge and approaches). Allerdene Bridge carries the A1 over the ECML. Specialist overhead line equipment (OLE) works to the existing bridge would be required in advance of the construction of the new Allerdene Bridge.
- 2.9.18. In order to demolish the existing bridge, support would be required for the catenary system while the existing beams are removed. New posts on new foundations would be provided to replace the hangers on the existing bridge. The construction of the new posts would run concurrently with the construction of the on-track post foundations required for the new bridge. Most of the new posts in this location can only be placed as the existing bridge is demolished. Works would therefore be programmed concurrently with the existing bridge demolition for Allerdene Bridge as required.

To and through the approach at Junction 67 (Coal House)

- 2.9.19. This covers junction 67 (Coal House) including Kingsway Viaduct and the new retaining walls associated with the junction 67 (Coal House) on and off slip roads up to chainage 11200.
- 2.9.20. Works are divided into five phases which are described below:

Phase 1

- 2.9.21. The central reserve would be hardened across junction 67 (Coal House). The works would be planned to take place over a long weekend (where possible), with the A1 closed at Kingsway Viaduct.
- 2.9.22. Works would also be required for Allerdene Culvert. These works have been described separately for Allerdene embankment option and Allerdene viaduct option below.

Allerdene Embankment Option

- 2.9.23. Activities would include the extension of Allerdene Culvert to run beneath the A1 west of the new Allerdene Bridge, and realignment of the watercourse associated with Allerdene Culvert to the south of the existing A1. The existing culvert would be cleaned out to reduce water levels and assist construction of the culvert extension. This is programmed early in the works to allow for the new junction 67 (Coal House) northbound off-slip to be constructed.
- 2.9.24. The proposed A1 realignment would require the conveyance of the existing surface water flows which are currently carried by the Allerdene Culvert. The alignment of the existing culvert would be maintained by constructing an open channel through forming a sloped excavation to the former A1.

Allerdene Viaduct Option

- 2.9.25. Allerdene Culvert will be realigned, and an option provided for the culvert to accommodate the new viaduct construction. The construction of the Allerdene viaduct will be undertaken in 5 stages:
- 2.9.26. Preliminary Works: Site clearance over the footprint of the works would be carried out followed by the establishment of haul roads and laydown areas for the works. Grouting works to the underlying coal measures would then be undertaken beneath the proposed piers and abutment locations. Temporary driven sheet piling would be required to retain the existing carriageway at the Southern and Northern extents of the Viaduct, followed by excavation in front of these piles. Piling platforms (500mm deep) would be installed, allowing access for bored piling rigs for the installation of 900mm diameter piles at the piers and abutments.
- 2.9.27. Abutment Works: Following installation of piling, abutment construction would proceed with the construction of reinforced concrete pile caps. Abutment wall construction would follow with the erection of temporary access scaffolding. Concreting of the abutment would be undertaken using a 32m concrete pump and, following curing, the formwork shall be removed by mobile crane.
- 2.9.28. Viaduct Pier works: Access scaffolding would be erected allowing installation of a reinforcement cage then erection of a proprietary formwork system by 80t mobile crane. Concrete to the piers shall be carried out with a 32m concrete pump and following curing, formwork shall be stripped with the 80t crane.
- 2.9.29. Viaduct Deck Works: The form of the deck comprises steel beams with an in situ concrete deck. The steel beams shall be factory fabricated and brought to site where a 500t crane shall offload the individual beams where they shall be paired together then lifted into position as braced pairs. On completion of the bridge beam installation, Omnia deck panels and cantilever formwork shall be erected using a 100t crane. Following this operation, deck reinforcement and formwork shall be placed, with the assistance of a 100t service crane. Deck concreting may then proceed using a 32m concrete pump, with concreting being

undertaken in the sequence prescribed. On curing, finishing works may then be undertaken to include waterproofing, kerbing, parapets and surfacing. The cantilever formwork components may then be removed by crane.

- 2.9.30. Tie In Works: Final tie in works between the existing embankment and the new abutment walls would be completed. These works would include the installation of rigid inclusions and the earthworks tie in installed in compacted layers with a dozer and pneumatic compaction roller. Imported 6N granular material would be placed immediately behind the abutment. On completion of the earthworks, drainage, roadworks and finishes may be completed.

Phase 2

- 2.9.31. The new alignment of the junction 67 (Coal House) northbound on-slip and off-slip would be constructed. The retaining walls for the northbound on and off-slips would be constructed. This would enable temporary slip road construction and traffic diversions required for northbound traffic. Significant road construction and earthworks would also be required.
- 2.9.32. The existing six span Kingsway Viaduct would be widened by approximately 7m to the nearside of the northbound carriageway and the roundabout underneath would be realigned to accommodate the revised highway alignment on the A1. Works would include the construction of piers, abutments, widening of the bridge deck and associated works to the carriageway. The River Team would be culverted temporarily to the west of Kingsway Viaduct to allow access across for piling plant, piling works and pile-cap construction. Overnight works would be required to place bridge beams, for concrete deck pours and for removal of temporary works.
- 2.9.33. To accomplish the widening of the Kingsway Viaduct, partial demolition of the existing structure would need to be undertaken. This would involve the removal of the existing parapet, string course, kerbing, steel edge beam and a section of the existing surfacing and concrete deck. Protection measures would be used to prevent demolition debris from entering the watercourse of the River Team and the existing surface of carriageway.

Phase 3

- 2.9.34. The northbound widening works would be completed and the southbound verge works, including junction 67 (Coal House) southbound off-slip and retaining wall, would commence.

Phase 4

- 2.9.35. Once verge works are complete, structural works to the central reservation area would be undertaken.

Phase 5

- 2.9.36. Construction would be complete, and the Scheme open to traffic.

Allerdene Bridge

- 2.9.37. This covers the offline construction of Allerdene Bridge including the north and south embankments and the A1 carriageway above.

- 2.9.38. Temporary works required by Network Rail would be carried out early in the construction programme. This would include activities to protect the ECML beneath.
- 2.9.39. Grouting of the coal workings would be carried out beneath the new foundations for Allerdene embankment option and Allerdene viaduct option. Following completion of grouting, the construction of the new Allerdene Bridge would commence. During construction of the new Allerdene Bridge, the existing Allerdene Bridge would be used to keep two lanes of traffic open. The traffic would then be shifted to the new bridge in phases whilst the existing bridge continues to be used in parts. Once the new Allerdene Bridge is constructed, the sections between Smithy Lane and junction 65 (Birtley) would be completed so that the new carriageway becomes available for all traffic.
- 2.9.40. Construction of the Allerdene embankment option and Allerdene viaduct option are detailed separately in the sections below.

Allerdene Embankment Option

- 2.9.41. Both abutments would be constructed concurrently with a slight delay to allow resources to be shared between the two moving from the north abutment to the south abutment.
- 2.9.42. Beams would be lifted into place over the ECML taking approximately 17 weekends, including contingency.
- 2.9.43. The reinforced concrete deck including concreting, parapets, waterproofing, surfacing and joints would be constructed. This activity would take approximately three months. The temporary works used for supporting the edge beam construction would also be removed from over the ECML which would take approximately six weekends, including contingency.
- 2.9.44. Once complete, traffic would be diverted onto the new A1 alignment to allow the existing Allerdene Bridge to be demolished.

Allerdene Viaduct Option

- 2.9.45. Temporary works (embedded sheet pile retaining wall) would be installed at the interface/tie-in between the existing and proposed new offline embankment.
- 2.9.46. Ground improvements (rigid inclusions) would be installed to the approach embankments.
- 2.9.47. Piled foundations would be constructed at the abutment and intermediate bridge pier location. The embedment depth of piles for Allerdene viaduct option would be 40m.
- 2.9.48. Reinforced concrete intermediate piers/abutments would be constructed including backfilling to abutments and installation of bearings upon which new bridge girders would be seated.
- 2.9.49. The approach embankments would then be built up/constructed.
- 2.9.50. The girders for the new viaduct would be constructed off-site and fabricated to lengths that would be readily transported to site. Once on site the girders would be spliced together and lifted into position as required. Girders would be lifted in pairs for stability. Lifting of the new bridge girders for the rail bridge span over the ECML would be undertaken during a series

of weekend possessions. Depending on the crane position it is anticipated the girders to the other bridge spans could potentially be installed during normal working hours.

- 2.9.51. The reinforced concrete deck including concreting, parapets, waterproofing, surfacing and joints would be constructed.
- 2.9.52. Once complete, traffic would be diverted onto the new A1 alignment to allow the existing Allerdene Bridge to be demolished.

East of Allerdene Bridge to junction 65 (Birtley)

- 2.9.53. This covers east of Allerdene Bridge to junction 65 (Birtley). The southbound carriageway would be widened asymmetrically, the central reserve would be hardened and the retaining walls would be constructed. Works on five bridge structures would also be carried out, including deck alterations, abutment alterations and demolition and footpath construction.
- 2.9.54. This aspect would be divided into three phases which are described below:

Phase 1

- 2.9.55. The central reserve would be hardened across junction 66 (Eighton Lodge). The works would be planned over a long weekend where possible, with the A1 closed at junction 66 (Eighton Lodge) with a diversion in place.

Phase 2

- 2.9.56. All works associated with the southbound verge widening followed by the northbound verge widening of the A1 for the full length of the carriageway would be carried out in this phase.
- 2.9.57. The A1 carriageway would be widened asymmetrically between junction 65 (Birtley) on-slip and junction 66 (Eighton Lodge). Eighton Lodge junction has three underbridges which carry traffic above the circulatory. The underbridges would all require widening to accommodate the widened highway cross section on the A1. To accomplish this widening, partial demolition of the existing structures would be undertaken. This would involve the removal of the existing parapet, kerbing, concrete edge beam and a section of the existing surfacing and concrete deck. There is also the requirement in some locations to demolish the existing wing walls in order to carry out the planned widening works. Prior to the main demolition activities being undertaken, preparatory works and advance works would be carried out, including the traffic management. The deck concrete would be sawn longitudinally to separate the deck to be retained from the demolition zone. The wing walls and foundations would be demolished using excavator mounted crushing or breaking attachments and the arising's removed to an offsite recycling facility.
- 2.9.58. Longbank Bridleway Underpass would be extended to the north allowing a widened southbound A1 carriageway to be constructed above the structure. The underpass would be closed during the extension works but would be open whilst works on the A1 are ongoing. Users of the underpass would be diverted to the west of the bridge via junction 66 (Eighton Lodge).

- 2.9.59. The existing deck of the three span North Dene Footbridge would be removed and the supporting structures in the verges and central reserve would be demolished. A new bridge would then be constructed spanning the central reserve with new foundations in the verges. The intention would be to re-use the structure elsewhere on the highway network if at all possible and this would be explored further during subsequent stages in the design and through to construction.
- 2.9.60. To remove the footbridge deck and tubular support columns, a full northbound and southbound closure of the A1 would be established. Following this a 500t mobile crane would be assembled on the carriageway in a position that would allow removal of the deck sections. The underside of the deck shall be removed and the crane rigged to lift the deck sections. The three sections spanning the carriageway would be removed sequentially and lowered onto trailers for removal off site for re-use or recycle. The remaining two western approach ramp sections would then be removed in a similar manner and removed off site.
- 2.9.61. Works would be programmed as late as possible to allow the existing bridge to continue to be used. The foundations and approach ramps would be constructed concurrently with a lag to allow efficiencies of plant labour and materials. The deck would be prefabricated and lifted into position during an overnight closure of the A1.
- 2.9.62. Works would also be undertaken to widen the A1 at the offline section where the new carriageway starts to diverge to the new Allerdene Bridge.

Phase 3

- 2.9.63. All works associated with the hardening of the central reserve would be carried out during this phase. A hard surface and a rigid concrete barrier (RCB) would be installed for the full length of the central reserve. This would minimise the requirement for future maintenance work in the centre of the road, which has benefits for road worker safety. Oil interceptors would be fitted with a monitoring alert system therefore reducing the number of interventions. Works to retaining walls are also required but construction details are not known at this time.

Tie-in works

- 2.9.64. This includes the tie-in works required to move the traffic flow from the existing Allerdene Bridge to the new structure. Phased traffic management arrangements would be in place to switch drivers from the on-line to off-line structure.

Removal of Allerdene Bridge and Approaches

- 2.9.65. The existing Allerdene Bridge and its earthwork embankment approaches would be demolished once traffic has been diverted onto the new A1 alignment. The bridge would be demolished in five main stages including preparatory works, main span removal, replacement of overhead line equipment support, removal of back spans and piers and removal of bank seat abutments

- a. Excess weight would be removed from the bridge earthworks and everything above concrete deck level would be removed. This would include surfacing on the decks and central reserve barrier, kerbs and the verge fill. This would reduce the lift weights for the main span removal (and thereby the crane size to a minimum) and reduce the work required for the back span demolition.
- b. Temporary works to maintain the integrity of the bridge would be installed. Access would be provided for heavy lifting cranes including construction of a crane platform.
- c. During overnight weekend possessions of the ECML, the existing bridge beams would be removed.
- d. The existing overhead line equipment is supported from hangers on the underside of the existing Allerdene Bridge beams. Before the hangers are removed a replacement, support arrangement would be provided. The methodology for overhead line equipment support would be discussed and agreed with Network Rail but can be expected to comprise standard overhead line engineering approaches.
- e. Back spans, cantilever supports, piers and abutments would be demolished using traditional plant. This removes the majority of the bridge impinging on the railway envelope whilst minimising trackside works.

Site Demobilisation

2.9.66. On completion of the construction of the Scheme the construction compounds would be demolished and reinstated to the existing condition. The site compound at junction 66 (Eighton Lodge) would be demobilised on completion of all the roadworks. At this stage, the tie-in works and demolition of the existing Allerdene Bridge and approaches would be the only works remaining. These final works would be managed from the main site compound at junction 67 (Coal House) and the working compound at Allerdene Bridge. The construction compounds would then be reinstated to the existing condition.

Outline Construction Environmental Management Plan

2.9.67. A Construction Environmental Management Plan (CEMP) would be prepared to describe the measures to be implemented in order to manage potential environmental impacts from the Scheme during construction. The contractor would be responsible for producing, maintaining, implementing and monitoring the requirements contained in the CEMP. An Outline CEMP has been produced in support of the DCO Application (**Application Document Reference: TR010031/APP/7.4**). The structure of the Outline CEMP is as follows:

- a. Introduction and background to the Scheme
- b. Project team roles and responsibilities
- c. Record of Environmental Actions and Commitments (REAC)
- d. Consents and permissions
- e. Environmental asset data and as built drawings
- f. Details of maintenance and environmental monitoring requirement
- g. Induction, training and briefing procedures for staff

OPERATION AND LONG TERM MANAGEMENT

- 2.9.68. Following completion of construction, the contractor would be responsible for defects over a set period (generally five years). After this period has lapsed, all roads, bridges, footways and other infrastructure associated with the Scheme would be adopted and fall within the Applicant's routine schedule of maintenance and inspections. Towards the end of the construction period the CEMP would be developed as Handover Environmental Management Plan (HEMP) which would include the monitoring and management arrangements going forward during future maintenance and operation.
- 2.9.69. Maintenance of the trunk road network is the responsibility of the Applicant, whilst maintenance of the local road network is the responsibility of the local authorities. These arrangements would apply to the Scheme, meaning that the A1 mainline, and its link/slip roads would be maintained by the Applicant. The A1231 over junction 65 (Birtley) and the roundabout circulatory at junction 66 (Eighton Lodge) and junction 67 (Coal House) are maintained by Gateshead Council. The roads across the local authority boundary to the east are maintained by Sunderland City Council.
- 2.9.70. Short-term maintenance and repair activities are likely to comprise inspections on the new works and installed assets, and any unplanned works due to damage to assets in events such as road traffic incidents. Longer term maintenance and repair works would include measures such as road restraint systems and traffic and road markings.
- 2.9.71. There would also be on-going (annual) inspections and general routine maintenance works such as debris removal, sweeping, litter picking and weed killing would still be required.
- 2.9.72. In the longer term, expected planned maintenance would include activities such as resurfacing the road and replacement of assets when they become life expired.

Maintenance Philosophy

- 2.9.73. The Scheme has been designed for maintenance; this has been achieved by:
- a. Complying with the Construction Design and Management Regulations 2015.
 - b. Applying Interim Advice Note (IAN) 69/15 'Designing for Maintenance' to ensure that maintenance is considered during the design and construction of roads, roadside structures, and associated technology. This is to enable maintenance to be carried out safely and cost effectively while ensuring that any future maintenance interventions which expose road workers to risk are minimised so far as is reasonably practicable (SFAIRP). All identified health and safety risks relating to design decisions are documented in the designer's Construction Design and Management (CDM) risk register.
- 2.9.74. The Applicant would apply Highways England's 'Aiming for Zero' strategy for further positive action to reduce the risk to road workers during maintenance and operation. One part of the strategy aims to eliminate all fatalities and serious injuries to road workers maintaining Highways England's road network including eliminating lane crossing by promoting zero exposure to live lane crossing.

- 2.9.75. There should be minimal impact with respect to how ongoing maintenance activities are undertaken once access to the site has been gained and appropriate enabling measures undertaken, such as temporary traffic management or task lighting. During maintenance, pedestrian access to the road assets would be sought from the local network where possible, minimising the number of interventions and land closures needed on the carriageway, thus reducing the risks to road workers and users.
- 2.9.76. All existing maintenance procedures specific to the Scheme would be reviewed by the Applicant and updated as necessary to incorporate the changes needed to support this Scheme. There would also be a number of new assets introduced by the Scheme and the maintenance and access to these new assets have been detailed in the Maintenance and Repair Strategy Statement (MRSS) (**Ref 2.8**).

2.10. DEMOLITION (PHASE)

- 2.10.1. Details of demolition associated with construction of the Scheme are set out in **Section 2.9** above. This section related to the demolition associated with end of design life.
- 2.10.2. The Scheme would have a design life of 120 years, as such it is highly unlikely that the Scheme would be demolished before the end of its design life as the road is likely to have become an integral part of the infrastructure in the area. Demolition would not be either feasible or desirable and is therefore not considered further within this ES.

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Ref 2.8 Maintenance and Repair Strategy Statement (MRSS) (2018). Document reference: HE551462-WSP-GHS-ZZ-RP-ZS-00509.

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