A66 Northern Trans-Pennine Project
TR010062

3.2 Environmental Statement
Chapter 2 The Project

APFP Regulations 5(2)(a)

Planning Act 2008

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

Volume 3

June 2022

Infrastructure Planning

Planning Act 2008

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

A66 Northern Trans-Pennine Project Development Consent Order 202x

3.2 ENVIRONMENTAL STATEMENT CHAPTER 2 THE PROJECT

Regulation Number:	Regulation 5(2)(a)
Planning Inspectorate Scheme Reference	TR010062
Application Document Reference	3.2
Author:	A66 Northern Trans-Pennine Project Team, National Highways

Version	Date	Status of Version
Rev 1	13 June 2022	DCO Application

CONTENTS

FIGURES (VOLUME 2)

TECHNICAL APPENDICES (VOLUME 3)

2 The Project

2.1 Introduction

2.1.1 This chapter of the Environmental Statement (ES) provides an overview of the Project location and context, and a detailed description of the Project. It also identifies the key embedded environmental mitigation measures that have been incorporated into the Project, the construction, operation and long-term management (section 2.8) and the decommissioning of the scheme (section 2.10).

2.1.2 The Project is shown illustratively in the General Arrangement Drawings (Application Document 2.5). These drawings are not secured under the DCO and are provided to illustrate how the Project can be delivered within the Order Limits and controls set out in the DCO. The Works Plans (Application Document 5.16) and Engineering Section Drawings: Plan and Profiles (Application Document 5.17) and Engineering Section Drawings: Cross-sections (Application Document 2.18) are secured under the DCO and define the works to be delivered, the centreline of the Project and the Limits of Deviation within which the Project must be delivered.

2.2 Need for the scheme

2.2.1 The A66 Northern Trans-Pennine Project (NTP) ('the Project') is proposed by National Highways. Options appraisal has been undertaken through a staged process (see Chapter 3: Assessment of Alternatives) and a Preferred Route was announced in March 2020. The design has been developed, assumptions tested and validated, and an Environmental Impact Assessment (EIA) undertaken in support of an application for a Development Consent Order (DCO).

2.2.2 The existing route is a key national and regional strategic transport corridor and link for a range of travel movements. It carries high levels of freight traffic and is an important route for tourism and connectivity for nearby communities. There are no direct rail alternatives for passenger or freight movements along the corridor.

2.2.3 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 and has six separate sections of single carriageway. The route also carries local slow moving agricultural vehicles and other traffic making short journeys, which can have an impact on other users, especially on the single carriageway sections. The variable road standards, together with the lack of available diversionary routes when incidents occur, affects road safety, reliability, resilience and attractiveness of the route.

2.2.4 If the existing A66 route is not improved, it will constrain national and regional connectivity and may threaten the transformational growth envisaged by the Northern Powerhouse initiative (Transport for the

North, 2019)[1] and the achievement of the Government levelling up agenda.

2.2.5 The A66 forms part of the most direct route between the Tees Valley, north, south and west Yorkshire, the East Midlands, eastern England, north Cumbria, and the central belt of Scotland and Cairnryan (for access to Ireland). The recent improvements to bring the A1(M) carriageway to motorway standards between Leeming Bar and the A66(M) is also expected to increase the attractiveness of south-to-north movements along the A66.

2.2.6 The need for improvements to the A66 corridor was identified in the Northern Trans-Pennine Routes (NTPR) Strategic Study announced as part of the first *Road Investment Strategy 1 (RIS1)* in December 2014 (Department for Transport, 2015a)[2]. The study was one of six national strategic studies. Funding for the A66 corridor improvements was committed to in the *Road Investment Strategy 2 (RIS2)* in March 2020 (Department for Transport, 2020)[3].

2.2.7 Subsequently to the Preferred Route Announcement (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 - these also form part of the Project.

2.3 Scheme objectives

2.3.1 National Highways has been appointed by the Secretary of State (SoS) to be the strategic highways company and therefore highway authority, traffic authority and street authority for the Strategic Road Network (SRN) through the Highways England Licence (Department for Transport, 2015)[4] (now the National Highways Licence following a change of the organisation's name in 2021) and pursuant to the Infrastructure Act 2015. The A66 forms part of the SRN and therefore falls under the remit of National Highways. As such National Highways has set the objectives for the project which are presented by theme in Table 2-1: A66 Project objectives.

Table 2-1: A66 Project objectives

Theme	Project Objectives
Economic	Regional: Support the economic growth objectives of the Northern Powerhouse and Government levelling up agenda.
	Ensure the improvement and long-term development of the SRN through providing better national connectivity including freight.
	Maintain and improve access for tourism served by the A66.
	Seek to improve access to services and jobs for local road users and the local community.

[1] Transport for the North (2019) Strategic Transport Plan
[2] Department for Transport (2015a) Road investment strategy: 2015 to 2020
[3] Department for Transport (2020) Road investment strategy: 2020 to 2025
[4] Department for Transport (2015) Highways England Licence

Theme	Project Objectives
Transport	Improve road safety, during construction, operation and maintenance for all, including road users, non-motorised users (NMU), road workers, local businesses and local residents.
	Improve journey time reliability for road users.
	Improve and promote the A66 as a strategic connection for all traffic and users.
	Improve the resilience of the route to the impact of events such as incidents, roadworks and severe weather events.
	Seek to improve NMU provision along the route.
Community	Reduce the impact of the route on severance for local communities.
Environment	Minimise adverse impacts on the environment and where possible optimise environmental improvement opportunities.

2.3.2 Part 4 Aims and Objectives of *Highways England: Licence* (Department for Transport, 2015b)[5] states that National Highways has a duty to *"minimise the environmental impacts of operating, maintaining and improving its network and seek to protect and enhance the quality of the surrounding environment" and "conform to the principles of sustainable development".*

2.4 Project location

2.4.1 The A66 lies within three local planning authority administrative areas: Eden District, Durham County and Richmondshire District as illustrated in Figure 1.1: A66 Location and Overview Plan, in Chapter 1: Introduction.

2.4.2 The A66 runs through the North Pennines Area of Outstanding Natural Beauty (AONB) between Brough and Bowes. The Lake District National Park is approximately 2km south-west of Penrith and the Yorkshire Dales National Park is located approximately 3.5km south of the A66.

2.4.3 The A66 lies within an area of rolling landscape. From Penrith the road corridor generally passes through gentle valleys characterised by large regular fields and areas of deciduous woodland. The road generally follows a similar route to the River Eamont and the River Eden as far as Appleby-in-Westmorland. Moving east the elevation rises rapidly from approximately 170m above ordnance datum (AOD) at Brough to a high point of approximately 440m AOD as it passes over Bowes Moor, before gradually descending again to an elevation of approximately 150m AOD at Scotch Corner.

2.4.4 The A66 roughly follows the line of a Roman Road and as a result is straight in alignment for large sections, but, with notable deviations as it passes around key settlements along the route, including, Penrith, Temple Sowerby, Kirkby Thore, Appleby In-Westmorland, Brough, Bowes, Greta Bridge and Scotch Corner.

[5] Department for Transport (2015b) Highways England: Licence

2.4.5 The majority of the surrounding land is agricultural with a number of farms lying adjacent to and having direct accesses onto the A66. Some of this land is classified as being Grade 2 which is defined as 'very good' agricultural land.

2.4.6 There are a number of historic features along the route including conservation areas, Scheduled Monuments and a large number of Grade I, II* and II listed buildings, many of which lie directly adjacent to the A66. These are presented on Figures 8.1: Designated Assets within 1km to Figure 8.3: Historic Landscape Character Areas (Application Document 3.3).

2.4.7 The North Pennine Moors Special Protection Area (SPA) and Special Area of Conservation (SAC) are encompassed within the North Pennines AONB. The River Eden SAC and its tributaries which run adjacent to and underneath the A66 are also a key consideration. These sites are all important at European level and are presented in Figure 6.1: Designated Sites (Application Document 3.3)

2.4.8 The River Eden (designated a main river) crosses the A66 at Coupland Viaduct and 3km south-east of Appleby-In-Westmorland. Flood Zones 2 and 3 associated with the River Eden, its tributaries and other watercourses are located along the route and are presented in Figures 14.1: Surface Water Features to Figure 14.8: Groundwater Flooding Susceptibility (Application Document 3.3).

2.5 Project description

Overview

2.5.1 The Project comprises eight schemes to improve the A66 between M6 J40 at Penrith and A1(M) J53 at Scotch Corner. The Project would involve improving the junctions on the M6 and A1 as well as improving six separate single carriageway lengths of road to dual carriageway standard and making improvements to the junctions within each of those lengths. The nature of the planned improvements includes online widening (adjacent to the existing road) of the carriageway as well as offline construction (new lengths of road following different routes but reconnecting into existing lengths of the A66 that are already dualled).

2.5.2 The eight schemes are identified as follows:

- 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

2.5.3 A description of each scheme is presented in Section 2.6 of this document and is shown in Application Document 2.5 General Arrangement Drawings.

2.5.4 The development of the Project was informed by knowledge of environmental, engineering and traffic constraints, as well as the environmental appraisal of emerging design proposals combined with and incorporating feedback from consultation and engagement with landowners and stakeholders. The accompanying Environmental Statement (Application Document 3.2) and the assessments within it are based on the works proposed in the DCO (described principally in Schedule 1 and shown on the works plans (Application Document 5.16), and the engineering section drawings: plan and profiles; cross-sections (Application Documents 5.17 and 5.18)). The works proposed in the DCO must be carried out within the Order limits, taking into account the proposed limits of deviation (LoDs) for each scheme, which are provided for in the DCO to ensure a proportionate degree of flexibility to accommodate the detailed design process. The standard LoD for the Project are set out in Table 2-2 Standard Limits of Deviation across the Project.

Table 2-2 Standard Limits of Deviation across the Project

Upwards vertical LoD	Downwards vertical LoD	Lateral LoD for linear works	Linear work commencement / termination points
Levels may deviate by up to 1 metre	Levels may deviate by up to 1 metre	Centreline of linear work (as shown on the works plans) may deviate by up to 3 metres in either direction	Points of commencement / termination (as shown on the works plans) may deviate by up to 3 metres in either direction
(from the levels shown on the engineering section drawings)			

2.5.5 LoDs which deviate from the standard limits are specifically referenced in the relevant scheme descriptions

2.5.6 The DCO will secure the Order Limits within which the development of the Project will take place. It will also set out Limits of Deviation (LoD), which will allow some flexibility for the final design (in order to address any issues arising from pre-construction surveys or detailed design) whilst ensuring that the project is delivered within an approved 'envelope' and within the Order Limits. The approach to this, and how it will be addressed in the ES is set out in Chapter 4: Environmental Assessment Methodology.

2.5.7 Figures 2.1: M6 Junction 40 to Kemplay Bank Order Limits to Figure 2.8: A1(M) Junction 53 Scotch Corner Order Limits (Application Document 3.3) also present the Order Limits. The Order Limits includes land that will be required for the project both permanently and temporarily including land required to deliver mitigation identified through the environmental assessment.

2.5.8 Figures 2.9: M6 Junction 40 to Kemplay Bank Indicative Site Clearance Boundary to 2.16: A1(M) Junction 53 Scotch Corner Indicative Site Clearance Boundary (Application Documnet 3.3) show the site clearance boundary assumed for assessment. This boundary is derived from the indicative scheme design and the indicative construction working areas, and is used in the assessment as a reasonable worst-case assumption for the extent of vegetation and top soil clearance. The remainder of the Order Limits is land included for environmental mitigation, and therefore it is assumed that important receptors (e.g.

hedgerows, mature trees) will be retained in this area. It is recognised, however, that the DCO will theoretically allow the full area within the Order Limits to be cleared, therefore chapters that consider specific receptors have assessed the impact of clearance on those receptors as a worst case, as there may be changes to the proposed construction areas. Where the assessment is area based (e.g. looking at area of vegetation or topsoil lost) the indicative site clearance boundary is used for the assessment, as it represents the reasonable worst case. This assumption is set out in the Project Design Principles (Application Document 5.11).

2.5.9 Figures 2.17 M6 Junction 40 to Kemplay Bank Indicative Construction Areas to 2.24: A1(M) Junction 53 Scotch Corner Indicative Site Construction Areas (Application Document 3.3) show the indicative construction compounds, haul roads and working areas that have formed the basis for assessment. The assessment assumes that construction activities could occur anywhere within the Order Limits, but that the greatest activity (especially in terms of plant use and movement) will be within these areas as well as the main scheme construction area, as defined by the DCO Works Plans (Application Document 5.16).

2.5.10 The remainder of this chapter describes the overall design principles being adopted for the Project, the key components of each scheme and any key embedded mitigation in the form of design measures that have been incorporated to avoid or reduce likely significant effects on the environment.

2.5.11 This description is intended to provide an overview of the key design features to aid understanding of the potential impacts arising from the Project.

2.5.12 The Order Limits have been refined through the ongoing design development compared to the draft DCO boundary indicated in the request for the Scoping Opinion. Figure 2.4 shows the draft DCO boundary at Scoping stage, and the proposed Order Limits.

Traffic modelling

2.5.13 The design of the project is underpinned by traffic modelling, which has demonstrated the need for the proposed upgrades and informed the alignment of the routes and junctions. The traffic modelling undertaken to date is set out in the Combined Modelling and Appraisal Report (Application Document 3.8).

2.5.14 A full Transport Assessment has been completed and is presented in the Transport Assessment Report (Application Document 3.7). The modelling demonstrates the changes in traffic that would be expected on the A66 as a direct result of the Project. It also considers the changes that would occur as a result of the Project on the wider Strategic Route Network and the local road network (together, referred to as the Affected Route Network, or ARN). The environmental impact assessment assesses the environmental effects that will arise as a result of both the direct changes to traffic on the route itself, and the effects that will arise as a result of changes in the ARN.

2.5.15 Appendix 2.1 Traffic Modelling Data provides schematics showing the predicted change between Do Minimum (without the project) and Do Something (with the project) scenarios for the opening year (2029) and the design year (future operational year) (2044) for the Annual Average Daily Traffic.

2.5.16 Where this ES considers the environmental effects of the change in traffic, the data that has been used to inform that assessment is described and presented in detail within the relevant chapter and its appendices, in Chapter 5: Air Quality, Chapter 12: Noise and Vibration and Chapter 7: Climate.

Overall design principles

2.5.17 Further details in terms of defined key principles that must be applied to the detailed design are included in the Project Design Principles (Application Document 5.11).

Highway and junction design

2.5.18 Overall the highway has been designed to achieve a full standard rural cross-section. In certain situations however, narrow verges or retaining structures are required to minimise impacts on adjacent land.

2.5.19 Typically, each carriageway will comprise two standard 3.65m wide lanes in each direction, 1m hardstrips and a central reserve. Unless there are specific constraints at a location, a minimum verge width of 2.5m will be provided, increased as required to provide adequate visibility splays, highway drainage, communication ducts and street furniture. Where sections of the existing route are to be replaced on a new alignment, the replaced section of road will be de-trunked.

2.5.20 Where possible, the central reserve will be grass with appropriate allowance for surface water channels and barriers. Large areas of hardstanding within the central reserve will be avoided where possible.

2.5.21 All side roads included in the design to replace existing access will be designed as left in/left out junctions with no central reservation crossings proposed. Existing side roads and private means of access will be combined into single access points onto the A66 where appropriate to minimise the number of direct accesses onto the A66.

2.5.22 A number of ‘all movement’ junctions (junctions that allow movement to/from all side roads onto both the eastbound and westbound carriageways of the A66) are proposed as compact grade-separated junctions.

Climate Change Adaptation

2.5.23 The Project design has taken into account the potential effects of climate change, in order to ensure a resilient strategic road network despite the challenge of a changing climate. The key climate change considerations that have been considered during the preliminary dsign stage are related to flood risk, extreme weather events and potential for material deterioration.

2.5.24 Section 10(3)(a) of the Planning Act requires Secretary of State to have regard to the desirability of mitigation, and adapting to, climate change in designating National Policy Statements. Within *NNNPS* the responsibilities of the Applicant are set out in paragraphs 4.40-4.47.

2.5.25 Each of these requirements has been addressed and an assessment is included within Chapter 7: Climate, and where applicable also set out in other chapters.

Drainage strategy and drainage design

2.5.26 Highway drainage for trunk and side roads has been designed in accordance with the *Design Manual for Roads and Bridges (DMRB) CG 501 Design of highway drainage systems (DMRB CG 501)* (Highways England, 2020a)[6] and *DMRB LA 113 Road drainage and the water environment (DMRB LA 113)* (Highways England, 2020b)[7].

2.5.27 The A66 mainline and slip road drainage systems will be adopted and maintained by National Highways. The side road drainage systems will be adopted and maintained by the local highway authority. Road drainage for the project for both the mainline and side roads will be managed using a series of attenuation basins (ponds).

2.5.28 Proposed locations and layouts of ponds are shown on Figures 2.1: M6 Junction 40 to Kemplay Bank to Figure 2.8: A1(M) Junction 53 Scotch Corner (Application Document 3.3). The design of the ponds will be refined through detailed design within the limitations set out in the DCO and certified documents.

Flood risk

2.5.29 All sources of flood risk to and from the project, including the impact of a changing climate on flood risk, have been assessed as part of a Flood Risk Assessment (FRA) which has informed the EIA (see Chapter 14: Road Drainage and the Water Environment).

2.5.30 The Project has been designed to manage fluvial flooding for a 1 in 100-year return period event plus an allowance of 94% for climate change. The drainage design will manage a capacity for 1 in 5 year surface water flooding event plus 40% climate change allowance. The drainage design is in accordance with DMRB LA113[7] which includes the climate change allowances as recommended by the Environment Agency.

2.5.31 Flood modelling indicates that flood compensation areas are required. Land has been included in the Order Limits for the provision of flood compensation storage on Temple Sowerby to Appleby, Appleby to Brough, and Bowes Bypass. These locations have been included within the Order Limits and taken into consideration within the assessments and are likely to be refined through further modelling exercises during detailed design.

[6] Highways England (2020a) Design Manual for Roads and Bridges CG 501 Design of highway drainage systems
[7] Highways England (2020b) Design Manual for Roads and Bridges LA 113 Road drainage and the water environment

Walking, cycling and horse-riding

2.5.32 A network of Public Rights of Way (PRoW) exists around the A66 corridor. The network comprises mainly of footpaths and a small number of bridleways and restricted byways, however safe crossing points are limited where these routes interface with the existing A66.

2.5.33 Mitigation required, and opportunities for enhancement of the PRoW network, have been explored and included in the design where possible.

2.5.34 Overall, the project aims to ensure that routes remain accessible for the community and visitors to the area.

Lighting

2.5.35 The requirement for street lighting is an important consideration within the Project and its specification will be in line with best practice and appropriate safety assessments, as well as accounting for any mitigation identified in this ES with respect to human and ecological receptors that may be affected by it.

2.5.36 From the outset the design intention has been to minimise the amount of lighting throughout the Project, given its mostly rural setting. The motorway junctions (M6 Junction 40 and A1 (M) Scotch Corner) and Kemplay Bank Roundabout are already lit, and where necessary the lighting will be adjusted to account for the upgrades. Lighting around the existing Center Parcs junction will be removed as the upgrade of the junction will result in an improvement to safety, removing the need for lighting. Lighting elsewhere in the project will be limited to only locations identified by road safety audits and traffic assessments where it is required for safety purposes. The only locations where additional lighting has been identified as being required for safety purposes are away from the main A66 at the new Bowes junction and the new roundabout at Rokeby on the detrunked A66/ C165.

Vehicular restraint barriers

2.5.37 Vehicle restraint barriers are proposed in the central reserve between the two carriageways and in the verges to protect traffic from potential hazards.

Boundary Treatment

2.5.38 There will be fencing around the highway boundary that will generally comprise of timber post and four-rail fencing. In certain locations, dry stone wall and hedgerows may be appropriate based on local landscape requirements.

2.5.39 At certain locations, noise fencing and/or stockproof treatments are required to mitigate noise impacts and/or prevent local fauna crossing/penetrating the fence line. This may include mammal-proof fencing or the landscape-led elements identified above such as hedgerows and dry stone walls.

Road signs and markings

2.5.40 Large advanced direction signs and local direction signs (ADS/LDS) are proposed in advance of the junctions on the main A66 and associated side roads, within the junctions, and at isolated locations along the route for destination information. Warning signs and regulatory signs will be provided within the junctions and the side roads. The large ADS/LDS signs will be unlit but the smaller regulatory and warning signs such as speed limit, give way, stop, roundabout ahead, etc. will be lit.

Technology

2.5.41 The project includes limited technology to support the maintenance and operation of the A66 to meet the future needs of National Highways Maintenance, Operations and Technology teams. For example, this includes the replacement or provision of variable message signs, CCTV and emergency roadside telephones.

The Existing A66

2.5.42 The de-trunked sections of the existing A66 will be used for local access to surrounding villages and properties. Further detail regarding de-trunked sections is provided in the sections below.

Embedded mitigation principles

2.5.43 Mitigation is based upon the mitigation hierarchy with an intention for no net loss of biodiversity across the project, and an intention for reinstatement wherever possible. Impacts upon environmental factors have been avoided through design in the first instance. Embedded mitigation which has been included as part of the scheme design is set out in the sections below. Section 2.7 below provides further detail regarding mitigation which has been factored into the assessment and how it is secured.

2.6 Project description (scheme-by-scheme)

M6 Junction 40 Penrith

2.6.1 The M6 Junction 40 to Kemplay Bank scheme would provide a three-lane circulatory carriageway with spiral markings, within the footprint of the current roundabout at M6 Junction 40. The A66 eastern arm of the roundabout would be widened to three lanes in each direction between M6 Junction 40 and Kemplay Bank Roundabout to increase capacity for local movements around Penrith. Widening would be required on the following five approach arms to M6 Junction 40 to provide additional lanes and a dedicated left turn facility, each controlled under its own signal phase: M6 North, M6 South, A66 East, A66 West, and A592 Ullswater Road.

2.6.2 All existing local accesses would be accommodated and it is proposed to relocate the existing access to Skirsgill Depot by approximately 95m to the east of its existing access. This scheme would also include signal

controlled crossings serving the existing shared cycle/footway connection on the western side.

2.6.3 All existing pedestrian and cycle connections would be retained on the Penrith South Bridge western side alongside Skirsgill Business Park. This would also be the case for the Skirsgill North-West pedestrian and cycle connections. The existing cycle/pedestrian route to Skirsgill Depot would be directed through a signal controlled crossing at the roundabout, to provide a safer replacement for the existing uncontrolled crossing of the A66 Eastern Arm. This would be an improvement to the walking and cycling safety of this route.

2.6.4 The existing police platform located on the Penrith North Bridge to the eastern side, between the M6 off slip and A592, is to be retained in its current location. The existing police platform on the Penrith South Bridge western side would be relocated further into the widened verge to allow for the new dedicated left-hand lane from the M6 off slip.

2.6.5 Further to the east, at Kemplay Bank Roundabout, the scheme would pass beneath the existing roundabout via two underpass structures that would carry the circulatory carriageway. This would comprise a new dual carriageway under Kemplay Bank Roundabout allowing free-flowing east-west traffic, reducing congestion and improving access to Penrith and the A6.

2.6.6 This scheme would include new on-slip and off-slip roads with the A6 and A686 allowing users to safely join and leave the A66 in both directions, serving the local road network with links to Penrith, Eamont Bridge and other local settlements. Minor realignment of the A6 and A686 arms would be required to accommodate the new slip roads serving the local road network.

2.6.7 It is proposed that the speed limit between M6 Junction 40 and Kemplay Bank would be reduced from the National Speed Limit to 50mph in both directions (approximately 2.3km). This allows for the retention and extension of an existing underpass from Carleton Avenue which provides access to the Police and Fire site to the south of the existing A66. As this is a critical access requirement, retaining it has avoided the need to construct a replacement underpass or overbridge to maintain access (therefore reducing construction impacts and reducing embodied carbon). This existing underpass would be extended to accommodate the widening of the A66. The reduced speed limit is considered acceptable for this section of the route due to the proximity to key junctions with the A6, A686 and M6 and associated safety considerations.

2.6.8 A police observation point would be included on the Kemplay Bank overbridges for speed enforcement purposes.

2.6.9 Signalisation of the Kemplay Bank Roundabout would be retained to facilitate safe crossing at all five arms. Cycleways and footways currently located through the centre of the roundabout would be re-routed around the roundabout. The existing emergency exit from the fire station linked with the existing traffic signals would be maintained

throughout construction and would remain in place once the works are complete.

2.6.10 A replacement layby would be provided on the eastbound carriageway between the M6 Junction 40 and Kemplay Bank Roundabout. The existing layby on the westbound carriageway between Kemplay Bank Roundabout and M6 Junction 40 would be removed and would not be replaced due to the proximity of adjacent junctions.

2.6.11 Replacement land would be provided to compensate the local community for land take from public open space alongside Wetheriggs Park, as a result of widening the existing A66 to the north.

2.6.12 The scheme would include lighting provision, extending and in some locations replacing the current provision.

2.6.13 Three ponds would be required for this scheme for the purpose of drainage of the road network and to manage water quality before the water is discharged into the surrounding watercourses. The western-most of these ponds is proposed to be located to the south of the existing A66 to the east of the West Coast Mainline, the second is proposed to be located to the south of the A66 in the open fields between the M6 and the A6, and the eastern-most pond is situated to the south of the A66 to the east of the Fire, Police and Ambulance site. Access tracks would be constructed to allow vehicular access to facilitate the maintenance of these ponds. The locations of these ponds have been selected to ensure effective drainage, minimise impacts on future proposed development in the area, and minimise environmental impacts.

2.6.14 Utility works would be required for gas, electricity, water and communications providers services throughout the length of the scheme.

2.6.15 No demolition of property is required as part of this scheme. The scheme would involve minor demolition works, such as roadside features, drainage and kerbing associated with the upgrading of the existing A66.

2.6.16 There are no deviations from the standard LoDs (which are set out in the table above).

Penrith to Temple Sowerby

2.6.17 The Penrith to Temple Sowerby scheme would provide full dualling of the existing 5.2km length of single carriageway A66 between Penrith and Temple Sowerby. The scheme would predominantly involve online widening using the existing carriageway to form the westbound half of the dual carriageway. The second carriageway would be constructed to the north of the existing carriageway to form the new eastbound carriageway.

2.6.18 A new grade-separated junction would be constructed to replace the existing junction to Center Parcs to connect the local road network and Center Parcs with the new alignment of the A66. The northern side of

this junction would have shallower graded embankment slopes in order to integrate the junction more appropriately into the surrounding landscape. The extent of this grading would allow the land to be returned to agriculture following construction. The junction would cater for all movements on and off the A66, making it easier and safer for users to join the A66 and preventing tail backs at peak times.

2.6.19 New left-in/left-out junctions would be provided to the B6262 and to St Ninian's Church on the Winderwath Estate, with associated merge and diverge lanes to enable safe access to homes and businesses. Improved parking provision would be provided for access to St Ninian's Church to enhance accessibility to this heritage asset.

2.6.20 An existing access serving Whinfell Holme Wastewater Treatment Works would be converted to left-in/left-out. This access is proposed to be relocated to the east of its current location, to minimise the need for widening over the existing Shell Oil high pressure gas pipeline which crosses the A66 in a north-south direction.

2.6.21 Works to widen the carriageway would reduce the current parking provision at the National Highways A66 Information Hub (formerly the Llama Karma Kafe). It is proposed that this area be converted to an amenity parking area with a new footpath providing access to the Countess Pillar historic monument to the east of this site, to provide an enhancement and accessibility for the public to an important heritage feature along the route. Landscape and biodiversity mitigation planting would take the Countess Pillar and its prominence along the A66 route into consideration to ensure it continues to be a known feature.

2.6.22 The scheme removes existing at-grade crossing points of the A66. An overpass and one underpass have been included to facilitate the safe crossing of the A66. The overbridge, which would serve as an agricultural access and as a Public Right of Way, is proposed to be situated approximately 260m to the east of the existing junction with the B6262, and the underpass is proposed to be situated approximately 180m to the east of the existing entrance to Whinfell Park.

2.6.23 An east/west walking and cycling link, connecting Penrith with Temple Sowerby, would be provided along the length of this scheme (predominantly to the north of the A66) which would also be utilised as an access track for pond maintenance as well as serving as a local access route for landowners. All other pedestrian, cyclist and horse-rider facilities that would be severed by the scheme are to be reconnected via grade-separated crossings.

2.6.24 New layby facilities would be provided on the proposed A66 mainline in both eastbound and westbound directions to replace existing provision which would be lost due to the implementation of the scheme. Observation platforms will be included in the eastbound layby at chainage 22400 and in the westbound layby

2.6.25 No lighting would be provided on the length of the scheme.

2.6.26 Seven ponds are proposed at low points in the scheme to attenuate drainage and run-off from the road in order to manage the water quality

before it is discharged into the surrounding watercourses. Shared and dedicated access tracks would be provided to the north and to the south of the road to facilitate access to ponds for maintenance purposes and to accommodate landowner movements.

2.6.27 Utility works would be required for gas, electricity, water and communications providers services throughout the length of the scheme.

2.6.28 The existing farm buildings at High Barn are proposed to be demolished to accommodate the offline section of the A66 to the east of the new grade-separated junction. The proposals also include the demolition of the Lightwater Cottages to the south of the A66 to facilitate and accommodate a replacement left-in/left-out access to the Winderwarth Estate. The scheme would involve minor demolition works, such as roadside features, drainage and kerbing associated with the existing A66 and other local roads.

2.6.29 Table 2-3 Exceptions to standard LoDs on Penrith to Temple Sowerby below sets out the LoDs which, as exceptions to the standard LoDs (above), are proposed to apply to specific numbered works, as shown on the works plans and the engineering section drawings for this scheme.

Table 2-3 Exceptions to standard LoDs on Penrith to Temple Sowerby

Work No.	Downwards vertical LoD	Reason
03-1A	0m	To protect potential archaeology associated with Brougham Roman Camp (as agreed with Historic England); and to minimise risk of damage to Shell ethylene pipeline that crosses under the A66
03-8A	0m	

Temple Sowerby to Appleby

2.6.30 The Temple Sowerby to Appleby scheme would comprise a new offline bypass around the north of Kirkby Thore, and then pass to the north of Crackenthorpe parallel to the old Roman road before tying into the existing Appleby Bypass. This route would include a number of new junctions and improvements throughout its length to connect the scheme to the existing road network. The existing 8.5km A66 would be de-trunked.

2.6.31 The new A66 diverts from the existing A66 in a north-easterly direction from the end of Temple Sowerby Bypass, crossing over Priest Lane and under Station Road before turning south after passing north of the village. Continuing in a southerly direction, the route would pass under Fell Lane where a new grade separated junction would be provided. Main Street would be stopped up just to the south of the new route with a new link from Main Street to Fell Lane to the north of the route to reconnect the village.

2.6.32 The scheme then continues under the realigned Sleastonhow Lane where a new overbridge would be provided. The realignment of Sleastonhow Lane avoids and runs to the south of the veteran oak tree.

The new A66 would then cross the SAC and SSSI designated Trout Beck and its associated floodplain on a new multi-span viaduct before heading in a south-easterly direction towards Crackenthorpe.

2.6.33 A false bund would be created on the south side of the new A66, around the north of Kirkby Thore. The false bund, formed by creating an embankment above existing ground levels, would increase the depth of cutting to visually screen the road and to reduce noise impacts to the village of Kirkby Thore. These embankments would be graded out on the village side to allow them to fit better into the surrounding landscape and to enable the land on which they are constructed to be returned to agricultural use following construction.

2.6.34 A new compact grade-separated junction is proposed to be provided at Long Marton. In order to facilitate this junction, the route of Long Marton Road would require some realignment. This realignment would move the road away from the Roman Camp, 350m to the east of Redlands Bank Scheduled Monument. This route would provide full access to the new A66 and maintain the existing link between the communities of Bolton and Long Marton. East of Long Marton the route would run in a south-easterly direction and has been designed to follow the line of the Roman Road towards Appleby. The scheme would connect to the existing A66 Appleby Bypass at the eastern end of the scheme.

2.6.35 The existing eastbound diverge slip road linking to the B6542 close to the Appleby Fair field would be maintained to allow access into Appleby. The existing westbound merge slip road at this location would be changed to a two-way road to allow traffic from Appleby to access the de-trunked (old) A66 and head west to the new Long Marton junction and beyond.

2.6.36 In order to improve local connectivity at the western end of the scheme, the existing junction at the eastern end of the Temple Sowerby bypass would be improved. The improved junction would provide connections between the existing A66 and the local road network. A short section of road would connect from Temple Sowerby Bypass junction to the existing A66, allowing access for local traffic and other road users from Temple Sowerby to Crackenthorpe and to wider settlements.

2.6.37 A new grade-separated junction would be provided at Fell Lane to the north of Kirkby Thore. Fell Lane would pass over the proposed A66 alignment on a bridge structure. This junction would maintain the key local connection onto the A66 at Kirkby Thore and also provide access for communities to the north as well as the British Gypsum site. This would contribute to a reduction in the number of Heavy Goods Vehicles (HGV) movements through Kirkby Thore. New merge and diverge lanes would be incorporated as part of this junction to enable users to safely join and leave the A66 in both directions. A connector road, on the northern side of the new A66, would also be constructed which would provide a link from the new junction to Main Street. The property Whinthorn House, together with an agricultural barn, would need to be demolished to accommodate the route at this location.

2.6.38 Accommodation works would be undertaken to ensure that access to properties is suitably maintained. The existing underpass would be widened and undergo redesign to maintain access for Spittals Farm. A new accommodation overbridge would be used to carry an existing bridleway over the new A66 at its north-westernmost extent and to maintain access for Crossfell House Farm. To the eastern extent of the route, a new accommodation overbridge would maintain access over the new A66 for Rogerhead Farm.

2.6.39 New layby facilities would be provided on the proposed A66 mainline in both eastbound and westbound directions to replace existing provision which would be lost due to the implementation of the scheme.

2.6.40 No lighting would be provided on the length of the scheme.

2.6.41 15 ponds are proposed at low points in the scheme to attenuate drainage and run-off from the road in order to manage the water quality before it is discharged into the surrounding watercourses. Shared and dedicated access tracks are proposed to be provided to the north and to the south of the road to facilitate access to ponds for maintenance purposes and to accommodate landowner movements.

2.6.42 Utility works would be required for gas, electricity, water and communications services throughout the length of the scheme.

2.6.43 An east to west walking and cycle route is proposed to be provided along the length of the de-trunked existing A66, utilising the verge and adjacent land where necessary, providing connectivity for users between Temple Sowerby and Appleby. All other pedestrian, cyclist and horse-rider facilities that would be severed by the scheme are to be reconnected via grade-separated crossings.

2.6.44 Two residential properties (Winthorn and Dunelm) and two barns located opposite (but not associated with) Spittals Farm and on the north-eastern side of Main Street would require demolition. The scheme would involve minor demolition works, such as roadside features, drainage and kerbing associated with the existing A66 and other local roads.

2.6.45 Table 2-4 Exceptions to standard LoDs Temple Sowerby to Appleby below sets out the LoDs which, as exceptions to the standard LoDs (above), are proposed to apply to specific numbered works, as shown on the works plans and the engineering section drawings for this scheme.

Table 2-4 Exceptions to standard LoDs Temple Sowerby to Appleby

Work No.	Upwards vertical LoD	Downwards vertical LoD	Lateral/ horizontal LoDs	Reason
0405-1A	3m	3m	Standard	To minimise environmental impact and cross-fall on bridge whilst enabling cut and fill balance to be achieved.

Work No.	Upwards vertical LoD	Downwards vertical LoD	Lateral/ horizontal LoDs	Reason
0405-2A	3m	3m	Standard	
0405-4B	Standard	Standard	Order limits	To ensure that new cycle track is delivered on the alignment of and within the boundaries of the de-trunked A66.
0405-5	Standard	2m	Standard	To increase / ensure sufficiency of headroom in underpass.
0405-18	Standard	0m	Order limits	To protect potential archaeology associated with Roman Camp Scheduled Monument (as agreed with Historic England)
0405-19	Standard	Standard	Order limits	To ensure that new cycle track is delivered on the alignment of and within the boundaries of the de-trunked A66.

Appleby to Brough

2.6.46 The Appleby to Brough scheme comprises dualling an 8.3km length of single carriageway between Coupland Beck and Brough. A number of junction improvements are proposed to enable access on and off the A66 to improve user safety and reduce congestion.

2.6.47 The western extent of the scheme comprises 2.6km of online widening with a new eastbound carriageway to the north of the existing carriageway. The westbound carriageway would follow the line of the existing A66. The dualled section includes junction improvements to enable access on and off the A66 to improve user safety and reduce congestion.

2.6.48 An improved left-in/left-out junction from the eastbound carriageway would be provided at Café 66. This would loop to the rear of the building and also serve as access to agricultural land at the western end of the scheme.

2.6.49 A replacement underpass would be provided for New Hall Farm and Far Bank End. A left in/left out junction would be provided on the westbound carriageway. Access tracks would link the underpass and each carriageway, providing access to the A66 in all directions for farms, properties and land at this location.

2.6.50 A new compact grade-separated junction would provide a link to the B6259 to Sandford/Warcop as well as providing links for Public Rights of Way. A new underpass is proposed to facilitate access to agricultural land on the south side of the new A66 and for footpath connectivity to be provided adjacent to Wheatsheaf Farm.

2.6.51 From Wheatsheaf Farm the central length of the scheme is proposed to be located approximately 50m to the south of the existing A66. It would follow an alignment utilising the line of the existing A66 as the eastbound carriageway and a new westbound carriageway would be constructed directly to the south of the line of the existing A66 alignment in order to reduce the extent of construction within the designation of the North Pennines Area of Outstanding Natural Beauty.

2.6.52 New viaducts would be provided to cross over Moor Beck and Cringle Beck together with a new bridge on the Warcop westbound junction. These are being provided to minimise any effects on the becks as they have been found to be functionally linked to the River Eden Special Area of Conservation downstream and support multiple species protected by this designation. Land has also been identified in the area in order for flood compensation areas to be provided.

2.6.53 A new local road would be provided to the north of the new A66 dual carriageway, in this central section, in order to maintain local access and facilitate movement on and off the A66 to both Warcop and the Ministry of Defence (MoD) facility.

2.6.54 This scheme encroaches up to 150m into the AONB, and results in the demolition of the MoD tank storage and refuelling compound which would be replaced within an extension to the MoD's existing landscape maintenance compound located approximately 600m further east.

2.6.55 Land from two residential properties on the north side of the existing A66 would be required to facilitate the construction of the new local access road through this section.

2.6.56 The central section of the scheme would pass through the existing Brough Hill Fair site and this would need to be replaced on a like for like basis. A replacement site has been identified adjacent to the current site making use of the MoD bivvy (camping) site. A level of remediation of the bivvy site would be required to facilitate the Brough Hill Fair.

2.6.57 New junctions would be provided at Warcop on the westbound and eastbound carriageways facilitating access to the A66 in both directions and providing access to the village of Warcop and the realigned existing A66. These junctions would maintain access to the village of Warcop, the relocated MoD facility, side roads, properties and land to the north and south of the A66 via a new overbridge located to the east of Moor Beck bridge.

2.6.58 A local road would be provided to the south of the new A66 connecting Flitholme and Langrigg allowing residents a connection to the new westbound carriageway and local roads to the south via Musgrave Lane.

2.6.59 The proposed left-in/left-left out priority junctions would be approximately 0.6km apart and designed to utilise existing side road connections and minimise earthworks.

2.6.60 The eastern length of the scheme would continue to follow an alignment to the south of the existing A66 before tying into the Brough Bypass.

2.6.61 The de-trunked sections of the existing A66 would enable use for access to the local road network west of Warcop and a new local road would be provided to the north from Turks Head into Brough. This would encroach approximately 130m into the AONB. A left-only T-junction with appropriate diverge and merge tapers on the westbound carriageway would be provided to maintain access to agricultural land and properties on the south side of the new dual carriageway. Eastbound local movements to Brough would be via the accommodation bridge to join with the local road into Brough.

2.6.62 A new access road and an overbridge for farm traffic, walkers, cyclists and horse-riders would be provided at the eastern end of the scheme near West View Farm, providing access to land on the north side of the A66 from the farm located to the south, as well as providing footpath and bridleway connectivity. This overbridge and access road connection does fall within the AONB and would therefore be designed to minimise the footprint and visual impact. There would be an encroachment of up to 134m into the AONB.

2.6.63 New layby facilities would be provided on the proposed mainline in both eastbound and westbound directions to replace existing provision which would be lost due to the implementation of the scheme. Observation platforms will be included in the eastern most of the eastbound laybys and in the westbound layby

2.6.64 No lighting would be provided on the length of the scheme.

2.6.65 18 ponds are proposed at low points in the scheme to attenuate drainage and run-off from the road in order to manage the water quality before it is discharged into the surrounding watercourses. Shared and dedicated access tracks are proposed to be provided to the north and to the south of the road to facilitate access to ponds for maintenance purposes and to accommodate landowner movements.

2.6.66 Utility works would be required for electricity, water and communications providers services throughout the length of the scheme.

2.6.67 An east to west walking and cycle route is being provided along the length of this scheme, providing connectivity for users between Appleby and Brough. All pedestrian, cyclist and horse-rider facilities that would be severed by the scheme are to be reconnected via grade-separated crossings.

2.6.68 The MoD tank storage and refuelling compound would be demolished and replaced within the MOD's existing landscape compound located 600m to the east. The scheme would involve minor demolition works, such as roadside features, drainage and kerbing associated the existing A66 and other local roads.

2.6.69 Table 2-5 Exceptions to standard LoD for Appleby to Brough below sets out the LoDs which, as exceptions to the standard LoDs (above), are proposed to apply to specific numbered works, as shown on the works plans and the engineering section drawings for this scheme.

Table 2-5 Exceptions to standard LoD for Appleby to Brough

Work No.	Upwards vertical LoD	Downwards vertical LoD	Lateral/ horizontal LoDs	Reason
06-1B	Standard	0m	Standard	To protect potential archaeology associated with Roman Camp Scheduled Monument (as agreed with Historic England)
06-1C	0m	No downwards LoD (i.e. 'to any extent downwards as may be necessary')	Standard	To enable the provision of appropriate mitigation for authorised development within flood plain.
06-2A	2m	2m	Standard	To accommodate detailed design of the junction in a way that will minimise impacts on adjacent fen landscape.
06-2B	2m	2m	Lateral LoD shown by fine green dashed line on Works Plans (Sheet 2 of 6).	
06-7A	Standard	Standard	Centreline of linear work (shown on sheet 5 of the works plans) may deviate by up to 40 metres northwards, and by 3 metres (standard LoD) southwards	To allow development of detailed design of proposed junction and associated attenuation pond in a way which minimises impacts on environmental features (including fen landscape) in the vicinity of Flitholme/Langrigg
06-7B	Standard	Standard	Westwards lateral LoD shown by fine green dashed line on Works Plans (Sheet 5 of 6). Centreline of linear work (shown on sheet 5 of the works plans) may deviate by up to 40m northwards, and by 3 metres (standard LoD) southwards	To allow development of detailed design of proposed junction and associated attenuation pond in a way which minimises impacts on properties local to Langrigg and on environmental features (including fen landscape) in the vicinity of Flitholme/Langrigg
06-7C	Standard	Standard	The commencement point of Work No. 06-7C may deviate laterally westwards and northwards to any extent necessary to accommodate the location of Work No. 06-7B within the westward	To allow development of detailed design of proposed junction and associated attenuation pond in a way which minimises impacts on properties local to Langrigg and on environmental features (including fen landscape) in the vicinity of.

			lateral limits of deviation for Work No. 06-7B	To accommodate a movement northwards of the link leading to the attenuation pond avoiding the fen local to Flitholme/Langrigg

Bowes Bypass

2.6.70 The Bowes Bypass scheme would closely follow the existing A66 alignment to the north of the village of Bowes over a length of 3km. The current line of the existing A66 would form the westbound dual carriageway, with a new adjacent eastbound carriageway constructed to the north.

2.6.71 The existing A66 to the west of Bowes passes through the North Pennines AONB. At the westernmost end of this scheme, the AONB boundary abuts the existing edge of pavement of the westbound A66 (i.e. the existing highway verge falls within the AONB boundary). Work to connect the new dual carriageway with the existing dual carriageway falls approximately 10m within the AONB boundary at this location for a length of approximately 300m.

2.6.72 Clint Lane overbridge would be reconstructed to accommodate the upgraded (wider) A66 dual carriageway. This structure would be replaced like-for-like to ensure all access and existing facilities are maintained.

2.6.73 Lyndale Farm Underpass would be extended under the new carriageway to maintain access to Lyndale Farm.

2.6.74 At the junction with the A67, a bridge would carry the new eastbound carriageway over the A67. The eastbound diverge slip road would be relocated north to make way for the new eastbound A66 carriageway. Two new slip roads would accommodate traffic travelling to and from the east providing access to and from the A67 and Bowes village. The A67 would be widened at the junction to accommodate a new right turn lane for the eastbound on-slip. The existing westbound on-slip road would have minor improvements made to create a safer merge.

2.6.75 Ruins (former Bowes Railway Station) and a barn structure immediately north-east of the junction would be removed. Black Lodge Farm underpass would be extended to the north under the new eastbound carriageway.

2.6.76 Access from Bowes to the A66 (via the Roman road known as The Street, and locally known as Low Road) would be stopped up. The upgraded grade-separated Bowes junction would provide safer access to the A66 for local traffic.

2.6.77 The existing westbound layby to the west of the existing Low Road access would be relocated to the easternmost extent of the scheme.

2.6.78 East of Bowes an accommodation overbridge would be constructed to allow Low Broats Farm and High Broats Farm to have continued access to the A66 via the improved junction with the A67. Additionally, a parallel accommodation access would be provided to ensure Mid Low Fields

Farm, East Low Fields Farm and Bowes Cross Farm have continued access to the A66 again via the improved junction with the A67.

2.6.79 The house at Low Broats Farm and three associated farm buildings are proposed to be demolished to facilitate the new eastbound carriageway.

2.6.80 Access to and from Hulands Quarry would be made safer by closure of the existing central reserve gaps on the A66 and by upgrading the junction geometry. The existing central reserve gap at Bowes Cross Farm would be closed, along with access from the premises onto the A66, in order to improve safety.

2.6.81 The scheme would include lighting provision, extending and in some locations replacing the current provision.

2.6.82 Six ponds are proposed at low points in the scheme to attenuate drainage and run-off from the road in order to manage the water quality before it is discharged into the surrounding watercourses. Shared and dedicated access tracks are proposed to be provided to the north and to the south of the road to facilitate access to ponds for maintenance purposes and to accommodate landowner movements.

2.6.83 Utility works would be required for electricity, water and communications providerservices throughout the length of the scheme.

2.6.84 The ruins of the former Bowes Station and Low Broats Farm buildings would be demolished. The scheme would involve minor demolition works, such as roadside features, drainage and kerbing associated with the existing A66 and other local roads.

2.6.85 Table 2-6 Exceptions to standard LoDs for Bowes Bypass below sets out the LoDs which, as exceptions to the standard LoDs (above), are proposed to apply to specific numbered works, as shown on the works plans and the engineering section drawings for this scheme.

Table 2-6 Exceptions to standard LoDs for Bowes Bypass

Work No.	Upwards vertical LoD	Downwards vertical LoD	Lateral/ horizontal LoDs	Reason
07-1B	Standard	1.5m	Standard	To allow for: potential widening of accommodation bridge structure to enable mitigation of impacts on bat foraging habitat; and management of consequential effects on the alignment of the mainline A66 beneath widened accommodation bridge.
07-2B	Standard	1.5m	Standard	

Cross Lanes to Rokeby

2.6.86 The Cross Lanes to Rokeby scheme would mostly follow the 4.4km existing A66 alignment, with a new adjacent westbound carriageway constructed to the south between the B6277 at Cross Lanes and the existing Tutta Beck Cottage access. Both carriageways would then be

routed to the south of the Old Rectory and St Mary's Church, re-joining the existing dualled A66 at Rokeby.

2.6.87 A new compact grade-separated junction would be constructed at Cross Lanes, west of the Organic Farm Shop and Café. An overbridge would carry a new single carriageway link between the B6277 Moorhouse Lane (to the north) and Rutherford Lane (to the south). Traffic would be able to leave and join the A66 via new priority junctions, maintaining all movements. The existing accesses from the B6277 and Rutherford Lane onto the A66 would be stopped up. Moorhouse Lane (to the south) would be stopped up and realigned to connect the new grade-separated Cross Lanes Junction.

2.6.88 Access to the Cross Lanes Organic Farm Shop and Café from the Cross Lanes Junction would be provided via the realigned Moorhouse Lane. An accommodation access would spur from Moorhouse Lane and run parallel to the A66, would lead to Birk House Farm.

2.6.89 Access to Ivy and Smithy Cottages, Cross Lanes Farmhouse and Streetside Farm would be provided by a connection to the new junction link road on the north. North Bitts Farm would also connect to the new Cross Lanes Junction via an accommodation access.

2.6.90 The junction at Cross Lanes has been designed to minimise impact upon existing woodland, land parcels and watercourses. Tutta Beck would be realigned through the Cross Lanes Junction.

2.6.91 Access to Poundergill would be maintained via Rutherford Lane.

2.6.92 The new A66 dual carriageway would mostly follow the existing A66 alignment between Cross Lanes and Rokeby junctions. Layby provision along this section would be maintained by the construction of new laybys serving the eastbound and westbound carriageways either side of Streetside Farm. Streetside Farm's existing access onto the A66 would be stopped up and an accommodation access parallel to the A66 (to the north), would lead to the Cross Lanes Junction.

2.6.93 The existing Tutta Beck Cottages access onto the A66 would be stopped up. Here, the new A66 dual carriageway would divert to the south of the Old Rectory before realigning with the existing A66 at Rokeby. A new three arm compact grade-separated junction would be constructed west of the Old Rectory allowing westbound traffic to leave and join the A66, and eastbound traffic to leave the A66. The Rokeby Junction would be constructed in an underbridge arrangement with the westbound loop passing beneath the predominantly at grade A66. The junction has also been located to avoid impacts upon a number of veteran trees where possible, located to the north of the junction.

2.6.94 Accommodation accesses would spur off from the new Rokeby Junction to maintain access to Tutta Beck Cottages and Ewe Bank Farm (to the south) and Rokeby Grange (to the north).

2.6.95 The new Rokeby Junction would maintain HGV access to Barnard Castle via the C165 Barnard Castle Road.

2.6.96 The existing A66 would be de-trunked west of the Grade II* listed Church of St Mary along its length to the C165 Barnard Castle Road. A roundabout would manage traffic movements between the de-trunked A66, C165 and the new eastbound merge local to the Rokeby Park Registered Park and Gardens (RPG). A new eastbound merge would ensure all movements are possible at Rokeby (when the provision at Rokeby Junction is considered).

2.6.97 The existing access from Tack Room Cottage onto the A66 (to the south) would be stopped up. Access would be replaced via an accommodation access to the new Rokeby Junction. The access track has been designed with a 15m offset from Jack Wood Ancient Woodland to minimise impact to the woodland which is located directly to the south. The Tack Room Cottage existing access to/from Greta Bridge would be maintained. A new cycleway would connect Greta Bridge to the Tack Room Cottage access route, and thus the Rokeby Junction, allowing cyclists to travel to/from Barnard Castle and Greta Bridge more safely.

2.6.98 New layby facilities would be provided on the proposed mainline in both eastbound and westbound directions to replace existing provision which is lost due to the implementation of the scheme. Both laybys would include observation platforms.

2.6.99 No lighting would be provided on the length of the scheme.

2.6.100 Six ponds are proposed at low points in the scheme to attenuate drainage and run-off from the road in order to manage the water quality before it is discharged into the surrounding watercourses. Shared and dedicated access tracks are proposed to be provided to the north and to the south of the road to facilitate access to ponds for maintenance purposes and to accommodate landowner movements.

2.6.101 Utility works would be required for electricity, water and communications provider services throughout the length of the scheme.

2.6.102 No demolition of property is required as part of this scheme. The scheme would involve minor demolition works, such as roadside features, drainage and kerbing associated with the upgrading of the existing A66.

2.6.103 Table 2-7 Exception to standard LoDs for Cross Lanes to Rokeby below sets out the LoDs which, as exceptions to the standard LoDs (above), are proposed to apply to specific numbered works, as shown on the works plans and the engineering section drawings for this scheme.

Table 2-7 Exception to standard LoDs for Cross Lanes to Rokeby

Work No.	Upwards vertical LoD	Downwards vertical LoD	Lateral/ horizontal LoDs	Reason
08-1B	Standard	2m	Standard	To allow for: potential widening of accommodation bridge structure to enable mitigation of impacts on bat foraging habitat; and management of consequential effects on the alignment of the mainline A66

Work No.	Upwards vertical LoD	Downwards vertical LoD	Lateral/ horizontal LoDs	Reason
				beneath widened accommodation bridge (Work Nos 08-4A and 08-4B: see below).
08-4A	Standard	2m	Standard	To accommodate related non-standard LoD applying to the A66 mainline (Work No. 08-1B) to enable provision of mitigation for impacts on bat habitat (e.g. bat bridge).
08-4B	Standard	2m	Standard	

Stephen Bank to Carkin Moor

2.6.104 The 5km Stephen Bank to Carkin Moor scheme would comprise a new offline dual carriageway section between Stephen Bank and Carkin Moor Farm. The new dual carriageway would pass to the north of the existing A66 and the properties at Fox Hall and Mainsgill Farm, re-joining the existing A66 alignment to the east of Mainsgill Farm. The existing A66 would be de-trunked and would be used in part as a collector road for local access to surrounding villages and properties.

2.6.105 A new accommodation underpass would be provided to the north of Dick Scot Lane to allow access to land to the north of the scheme. This underpass would also allow the existing Hutton Magna 12 bridleway, which currently ends at the A66 to the west, to pass beneath the proposed A66 alignment.

2.6.106 New layby facilities would be provided on the proposed mainline in both eastbound and westbound directions to replace existing provision which would be lost due to the implementation of the scheme. Both laybys would include observation platforms

2.6.107 To maintain access to Collier Lane, a section of the existing A66 to the west of Ravensworth Lodge would be realigned over a distance of approximately 600m to facilitate connection to the new Collier Lane Overbridge. New drainage ponds would be provided to the west of Ravensworth Lodge and to the East of Fox Hall Cottages. The proposed alignment of the A66 in this location has been designed to be in cutting at this location.

2.6.108 Mains Gill Junction, which is a proposed new compact grade-separated junction to the west of Moor Lane, would provide connectivity between the de-trunked A66 and the proposed mainline of the new A66. This new junction is proposed to be placed in a cutting beneath the proposed alignment of the A66 and connects to the de-trunked A66 to the west of Mainsgill Farm.

2.6.109 The southern section of Moor Lane would be stopped up and the highway realigned to connect to the Mains Gill Junction link road. The existing bridleway 20.23/5/1, which currently ends at the A66, would be

diverted to the west to allow it to be rerouted along the proposed realigned section of Moor Lane and beneath the A66 via Mains Gill Junction. It would then connect with a realigned bridleway 20.55/6/1 which passes to the south of the de-trunked A66 along the western boundary of Mainsgill Farm. The existing route of bridleway 20.55/6/1 which proceeds through the busy entrance of Mainsgill Farm would be extinguished as part of this diversion.

2.6.110 Two new drainage ponds are proposed to be provided in the vicinity of Mainsgill Farm, one to the western boundary and one to the north of the existing A66 alignment.

2.6.111 The proposed alignment passes through the current cutting formed by the existing A66 at the Carkin Moor Scheduled Monument. To minimise the impact on the monument, the vertical alignment of the road is proposed to be lifted within the existing cutting and a retaining structure is proposed to be provided to the southern boundary.

2.6.112 The existing connection between the A66 and to Warrener Lane would be removed, and a new link provided between Warrener Lane and the de-trunked A66, allowing vehicles travelling from Hartforth to access the proposed A66 alignment via Mains Gill Junction. The alignment of this new link road is proposed so as to avoid the footprint of the scheduled remains of the Roman fort and prehistoric enclosed settlement at Carkin Moor.

2.6.113 A further 3 ponds would be provided at the eastern extent of the scheme in between the existing A66 and the new Warrener Lane link. One of these ponds is a replacement for an existing attenuation pond which is proposed to be removed to accommodate the earthworks needed for the scheme, whilst the other two offer storage for water run-off from both the A66 and also the new Warrener Lane link. Shared and dedicated access tracks are proposed to be provided to the north and to the south of the road to facilitate access to ponds for maintenance purposes and to accommodate landowner movements.

2.6.114 A new bridleway underpass would be provided to allow bridleway 20.30/8/1, which currently crosses the A66 at grade in the vicinity of the junction with Warrener Lane, to be grade-separated.

2.6.115 This new bridleway, which is to be provided alongside the de-trunked A66, would also be linked with the existing Hutton Magna 12 bridleway at the western end of the scheme.

2.6.116 Utility works would be required for electricity, water and communications services throughout the length of the scheme.

2.6.117 No lighting would be provided on the length of the scheme.

2.6.118 No demolition of property is required as part of this scheme. The scheme would involve minor demolition works, such as roadside features, drainage and kerbing associated with the existing A66 and other local roads .

2.6.119 Table 2-8 Exceptions to standard LoDs for Stephen Bank to Carkin Moor below sets out the LoDs which, as exceptions to the standard

LoDs (above), are proposed to apply to specific numbered works, as shown on the works plans and the engineering section drawings for this scheme.

Table 2-8 Exceptions to standard LoDs for Stephen Bank to Carkin Moor

Work No.	Upwards vertical LoD	Downwards vertical LoD	Lateral/ horizontal LoDs – north of centreline	Lateral/ horizontal LoDs – south of centreline	Reason
09-1B	Standard	3m	5m	5m	To allow flexibility to facilitate potential realignment of A66 mainline to accommodate potential adjustments to alignment of new local access road Work No. 09-3B (alongside new and improved A66 mainline, Work No. 09-1B).
09-3B	Standard	No downwards LoD (i.e. 'to any extent downwards as may be necessary')	Lateral LoD shown by fine green dashed line on Works Plans (Sheet 2 of 6).	Lateral LoD shown by fine green dashed line on Works Plans (Sheet 2 of 6).	To allow flexibility to facilitate potential realignment of new local access road, Work No. 09-3B, to include re-use of existing A66 mainline carriageway post de-trunking
09-1D	Standard	4m	Order Limits	Standard	To facilitate appropriate vertical alignment through setting of Scheduled Monument (objective of flexibility is to retain height of monument relative to road).
09-2D	Standard	Standard	0m	5m	To avoid impacts on / incursion into setting of Scheduled Monument.
09-5	Standard	3m	Standard	Standard	Linked to LoDs for Work Nos. 09-1B and 09-3B – i.e. to allow flexibility for potential realignment of new local access road (on route of de-trunked A66) and new/improved A66.

A1(M) Junction 53 Scotch Corner

2.6.120 The A1(M) Junction 53 Scotch Corner scheme would widen the existing Middleton Tyas Lane approach at Scotch Corner roundabout from one lane to two lanes. A length of existing footway and existing signage and lighting columns would be relocated to the edge of the widened carriageway, and road markings would require amendment to tie in with the existing arrangement.

2.6.121 An additional lane would also be provided on the northern bridge of the circulatory carriageway, increasing the provision in this area to three

lanes. No structural amendments are envisaged to be required to the existing structure to accommodate the additional lane. Some amendment to the existing traffic signal arrangement would be required to allow poles to be located in new verges.

2.6.122 Utility works would be required for gas, electricity, water and communications services throughout the length of the scheme.

2.6.123 No demolition of property is required as part of this scheme. The scheme would involve minor demolition works, such as roadside features, drainage and kerbing associated with the existing A66 and other local roa ds.

2.6.124 There are no deviations from the standard LoDs on this scheme.

2.7 Environmental mitigation

2.7.1 Measures identified through the EIA process to further prevent, reduce and, where possible, offset adverse effects on the environment are described in the relevant topic chapters of this ES. These essential mitigation measures, where related to a management action, are secured through the Environmental Management Plan (EMP) for the Project, a draft of which is submitted as part of the DCO Application (Application Document 2.7).

2.7.2 Essential mitigation that is delivered through the design is secured through the Project Design Principles (PDP) (Application Document 5.11) document. This sets out key design principles that have underpinned the design of the scheme, including design related environmental mitigation, and that must be retained into the detailed design process.

2.7.3 Where the Project design and the parameters included in the DCO allow for flexibility in the detailed design or how aspects of the Project are constructed, the EMP and PDP specify the mitigation objective to be achieved and any specific constraints on the design, construction or operation that need to be implemented. Where relevant, illustrative layouts of the key mitigation principles are shown on the visual Environmental Mitigation Maps (Application Document 2.8).

2.7.4 It is important to note that the precise content of the Environmental Mitigation Maps is not intended to be ‘secured’ by way of the DCO – instead, they present illustrative layouts to show how the relevant mitigation measures could be implemented so as to be effective in terms of mitigating effects. However, as detailed design progresses it may be the case that the layout indicated on the Environmental Mitigation Maps needs to be altered. Importantly, this could only be done insofar as the layout complies with the EMP and the PDP.

2.7.5 Prior to the commencement of the construction works, the EMP will be refined by the contractor, in line with *DMRB LA 120 Environmental management plans (DMRB LA 12)* (Highways England, 2020c)[8].

[8] Highways England (2020c) Design Manual for Roads and Bridges LA 120 Environmental management plans

2.7.6 A Mitigation Schedule (Application Document 2.9) is provided with the DCO application as a signposting document to assist the Examining Authority, Secretary of State and stakeholders with understanding how each aspect of environment mitigation is secured under the DCO.

2.8 Construction, operation and long-term management

2.8.1 A description of the proposals for construction of the Project is included below. It is important to note that the planning of the construction phase of the Project is ongoing, and specific details of methodologies will not be finalised until the detailed design is complete. Where construction methodologies are not yet fixed, the EIA considers the full range of approaches that could be taken or considers the worst case for environmental effects. For example, exact piling techniques and locations will not be fixed until the detailed foundation design for structures is complete and further Ground Investigation undertaken. The ES therefore assumes a worst case that piling will be required at each structure (e.g. the peirs or abutments of bridges) and that the most disruptive techniques could be used (unless specified otherwise in the EMP in order to protect sensitive receptors). The approach taken and assumptions made are set out in each technical chapter of this ES (Chapters 5-15).

2.8.2 The purpose of this description is to enable decision makers, local communities and other interested parties to understand the works and the various potential construction activities associated with the Project. It is intended to be informative for those who are less familiar with construction and the methods, processes and procedures that will be implemented to deliver the Project.

2.8.3 Specific data utilised in the ES will be included in the relevant chapters.

Overall construction programme

2.8.4 Subject to securing a DCO, works are planned to commence in 2024, with all schemes to be completed by 2029 or earlier. For an indicative high-level programme of key milestones, see Table 2-9: High level programme of key milestones .

Table 2-9: High level programme of key milestones

Milestone	Target date
SoS DCO Decision	September 2023
DCO Judicial Review period ends	October/November 2023
Site establishment	Late 2023
Start of main works	January 2024
Full Scheme open to traffic	2029

2.8.5 Construction durations will be reflective of the challenge in undertaking several complex infrastructure schemes both online (close proximity to live traffic) and offline, with various different construction phases to ensure the A66 remains ‘live’ (as in, the existing A66 can continue to be

used as the new alignment or additional carriageways are constructed), and the workforce remains safe.

2.8.6 The outline high level programme plans to have the project completed within a five year period, with the individual schemes being staggered to optimise resources, traffic management demands/impacts and best utilise the cut and fill balance requirements on and between schemes.

2.8.7 Offsite manufacturing will be utilised across the schemes where practicable, to minimise works on the A66 and reduce programme durations. Offsite manufacture of concrete and or steel structural elements could be used across all schemes, and could present significant opportunities for those schemes requiring large structures across watercourses and floodplains, such as the Temple Sowerby to Appleby and Appleby to Brough schemes. The construction traffic assessment does not make specific allowance for offsite construction as it is not yet known what could be constructed offsite or where it would come from. Any offsite construction will be subject to whole life sustainability assessment to determine the option with lowest overall environmental imnpacts (including carbon, noise, traffic disruption).

Construction activities

2.8.8 The Project comprises dualling of the remaining single carriageway sections of the A66 between Penrith and Scotch Corner, by the widening of the original carriageway in places, with new or improved underpasses or overbridges, and the construction of new sections of road for offline sections (away from the existing A66).

2.8.9 To facilitate the construction works, the Project will be divided into phases as detailed below. This will enable parts of the new road to be constructed in sequence, to minimise disruption to road users.

2.8.10 Overbridges, depending on their size, will be constructed from steel or concrete girders/beams with a variety of reinforced concrete or retained earth solutions being used for the abutments. Underpasses will most likely be constructed from reinforced concrete, with earth retained elements to accommodate the surrounding ground. For the road widening, upgrades or new construction elements, material recovered from the site will be used where suitable to profile the new vertical and horizontal geometry, with imported aggregate, cementitious/asphalt bound aggregate or pre-cast products used for the road construction.

2.8.11 Throughout the Project, material will need to be excavated and placed to construct the road alignments. Each scheme has been designed as far as practicable to minimise the need to move material between schemes, however this has not been possible in all cases. Suitable haul routes have been identified to minimise impacts of moving the material on stakeholders and the environment. Where practicable all excavated material will be reused in the construction of the road itself or included in the landscaping proposals to reduce the environmental effects of the Project.

2.8.12 The Project also includes improvements to the management of surface water runoff from the A66, with each scheme being designed to minimise the impacts on the local water environment using features such as dedicated attenuation ditches and storage ponds incorporated into the design.

2.8.13 The works will be undertaken within the Order Limits, including site compounds, material storage/movement along with the construction/upgrade of the new A66 and associated connections. The final Order Limits will incorporate all land required for construction of the Project. The only exception to this is a noise barrier proposed to the east of Bowes Bypass, which is outside the Order Limits but within the existing highway verge owned by National Highways (see Chapter 12: Noise and Vibration for further details). Plate 2-1: Proposed construction dates details the proposed construction dates for each scheme.

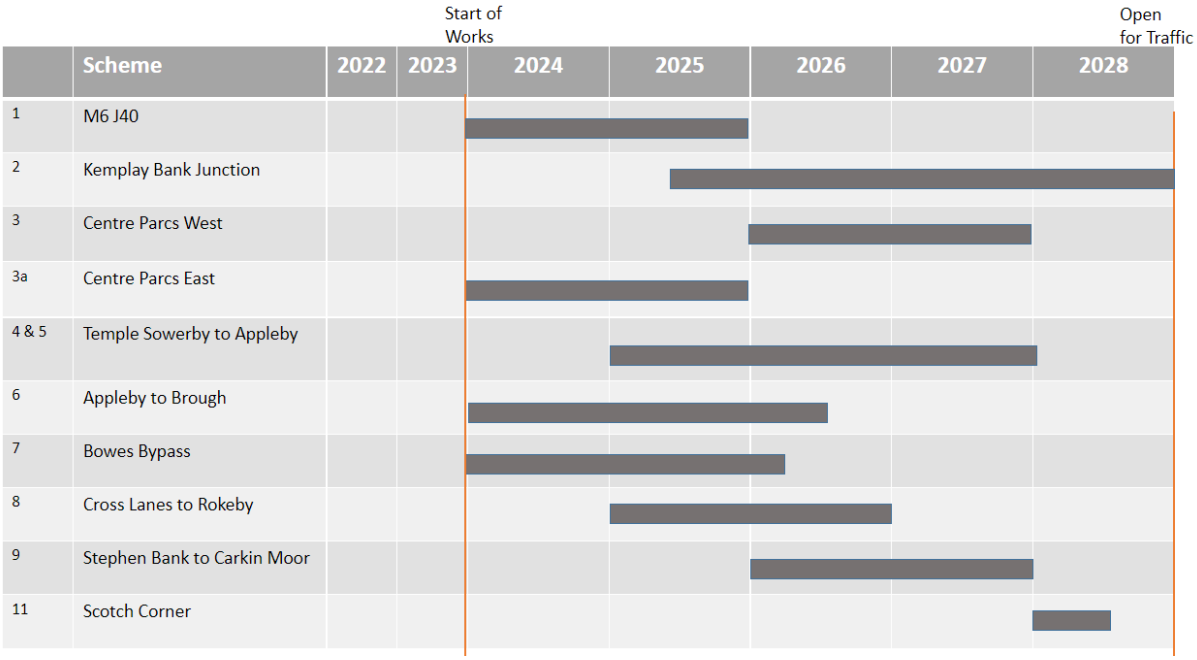

Plate 2-1: Proposed construction dates

Works phasing

2.8.14 As introduced above, works for the Project will be phased to reduce the total duration of the works and potential disruption to road users and local stakeholders. Traffic management logistics, including expected diversion routes are detailed in the Construction Traffic Management Plan (Annex B13 to the Environmental Management Plan, Application Document Reference 2.7). Construction of the Project is divided primarily into two main phases; enabling (preparatory) works and main works.

2.8.15 Enabling works include establishing site access points, access roads, compounds and utilities diversion or protection measures. Following this, it is likely that work will be undertaken to establish mainline diversion routes, traffic management and demolition or ground remediation as required. Ground investigation and archaeology investigation will be undertaken early in the project to identify any

challenges with resopect to the permanent works design and proposed layout. These works will help inform the detailed design process.

2.8.16 Main works will commence once the main traffic management is in place and will include both online and offline works as introduced below.

2.8.17 Online works include but are not limited to the following activities:

- Access points off the A66
- Some service diversions
- Changes to central reserve areas for traffic management
- Installation and changes to traffic management
- Deep drainage connections and central reserve drainage
- Underpass connections
- Bridge beam and deck installations
- Road connections.

2.8.18 Offline works include but are not limited to the following activities:

- Haul roads
- Compounds
- Service diversions
- Embankment structures
- Abutments and piers
- Underpasses
- Deep drainage
- Main road construction.

2.8.19 Following construction, temporary access points, access roads, compounds and any temporary utilities connections will be demobilised and the areas reinstated during final landscaping works.

Working hours

2.8.20 Most construction works will be undertaken during standard day working hours of 07:30 until 18:00 Monday to Friday, and 07:30 until 13:00 on Saturdays. In some instances, it may be essential to undertake works at night or on Sundays and Bank Holidays due to traffic management restrictions, with additional traffic management or closures required for works such as road connections or interface points, bridge beam lifts and deck pours.

2.8.21 Where work is required outside of the core working hours, the Principal Contractor(s) (PC) will liaise with the relevant Local Authority to agree the procedures for notifying local residents and any site-specific constraints that need to be applied. This process is set out in the EMP (Application Document 2.7).

Workforce

2.8.22 The workforce on site will vary over the course of the construction phase and over the geographical extent of the Project. The maximum monthly workforce has been assumed to be around 540 staff based on the indicative phasing and staffing extimates for each scheme (i.e. this is the highest staff number estimated in any single month based on the

phasing of the projects). Each scheme has a peak workforce at a different time due to the varying programmes. A summary of the predicted maximum monthly workforce and the timings of the estimated peak (based on the information currently available at this time) are set out below:

- M6 Junction 40 to Kemplay Bank – around 20 staff in August 2024 for M6 Junction 40; around 40 staff in October 2026 for Kemplay Bank
- Penrith to Temple Sowerby – around 90 staff in April/May 2025
- Temple Sowerby to Appleby – around 225 staff in March 2025
- Appleby to Brough – around 245 in July 2024
- Bowes – around 90 staff in May 2024 and May 2025
- Rokeby – around 125 staff in June 2025
- Stephen Bank to Carkin Moor – around 125 staff in March/April 2026
- A1(M) Scotch Corner - no additional staff anticipated, as workforce likely to come from Rokeby and Stephen Bank to Carkin Moor teams.

Construction compounds, welfare facilities and site access

2.8.23 For a project of this scale, several access points and independent haul routes, work areas and compounds will need to be established. It is expected that most schemes will have a site compound established, the size of which will vary depending on a number of factors as outlined below.

2.8.24 It is proposed to establish three main compounds across the project which are to be situated within the extents of the M6 Junction 40 to Kemplay Bank, Temple Sowerby to Appleby and Stephen Bank to Carkin Moor schemes. These will form the main locations for site offices, material storage and plant. These are expected to help service, and be supported by satellite compounds on the other schemes and construction working areas at key locations.

2.8.25 Where larger works are being undertaken, for example construction of overbridges, underpasses and culverts, more plant and materials will be required and thus larger work areas are to be expected, potentially exceeding 40,000m^2 at the largest structures. These construction working areas will act as satellite compounds and will feature large temporary welfare buildings and suitable parking provision for cars and traffic management vehicles to minimise impacts on local stakeholders. They will also be used for the storage of materials for key activities.

2.8.26 Other, smaller satellite compounds, which in some cases include earthworks material storage areas, are likely to range from 2,000m^2 to 10,000m^2 in area. These will provide temporary welfare and site parking with some waste and new material storage facilities. It is expected that smaller satellite compounds will be located near most structures, remaining in place for the duration of the structure build period.

2.8.27 Current proposals for main and satellite compound locations for each of the schemes are presented in Table 2-10: Compound locations. They are also shown on Figure 2.3: Indicative Construction Areas.

2.8.28 Note that compound locations are not fixed at this time pending completion of detailed construction logistics. It is possible that compound locations may be relocated within the Order Limits (in particular for the smaller material storage areas or compounds). The size and number are also subject to final evaluation based on detailed temporary works design. The assessment has assumed compound locations as indicated on Figure 2.3, however the assessment also considers the impacts if compounds and main construction works were located elsewhere within the Order Limits (e.g. the noise and air quality assessments identify potentially sensitive receptors and the impacts that they could experience during construction if particularly noisy or dust generating activities wer ecarried out close to the Order Limits boundary adjacent to their location).

Table 2-10: Compound locations

A66 Compound Locations			
Scheme / Chainage	**Location Descriptor**	**Compound Type**	**Approximate Duration**
M6 Junction 40 to Kemplay Bank	Skirsgill Depot, utilising existing access from A66	Main compound	61 months (full construction duration, with early establishment expected in late 2023)
Penrith to Temple Sowerby	North of junction to Center Parcs, temporary access off the existing A66 to be constructed during works	Satellite compound	48 months (likely less as only required for land-form works)
Temple Sowerby to Appleby	Western extent of scheme, south of A66, accessed via existing junction on A66	Main compound	48 months
Appleby to Brough	Centre of scheme south of MoD turning area, accessed via existing road from A66	Satellite compound	36 months
Bowes Bypass	North of A67 junction, adjacent to A67, accessed via A67	Satellite compound	24 months
Cross Lanes to Rokeby	North of A66, adjacent to B6277, access off B6277	Satellite compound	24 months
Stephen Bank to Carkin Moor	North of A66 close to Moor	Main compound	48 months

A66 Compound Locations			
Scheme / Chainage	**Location Descriptor**	**Compound Type**	**Approximate Duration**
	Lane, accessed off Moor Lane		
A1(M) Junction 53 Scotch Corner	No compound required	n/a	n/a

2.8.29 To minimise the impacts on the environment, where practicable the proposed compound locations have been identified where existing hardstanding areas and facilities can be utilised, where reduced earthworks will be required, and where nearby utilities can be utilised to prevent running elements 'off grid', significantly reducing potential carbon emissions and disruption to stakeholders. The identified potential locations of the three main compounds also provide close access and egress points to the existing A66, in order to minimise disruption and increasing efficiency during construction.

2.8.30 As part of the site establishment works, utilities provision will be required and where practicable key utilities will be diverted from identified locations and redirected to the compounds where possible. This will help prevent off-grid power generation and onsite water or wastewater storage, helping to improve the environmental impacts of the works whilst also mitigating additional vehicle movements and noise for stakeholders.

2.8.31 Main compounds will be likely connected to mains power, with smaller compounds and other works areas requiring power to use generators or hybrid power solutions. Construction water requirements will likely be fulfilled by a combination of mains water supply, groundwater extraction, and rainwater harvesting and grey water systems. Either permanent (if associated with main works) or temporary drainage systems will be installed at each location at the earliest possible opportunity. Drainage systems will incorporate surface water storage, treatment facilities and separation of drainage from areas potentially containing contaminating materials. Consultation will be undertaken with the relevant authorities and utility providers to ensure required agreements and consents are in place, as set out in the EMP.

2.8.32 On completion of the permanent works, the welfare facilities will be removed and the stone and asphalt areas within the compounds, excavated. Where practicable, the excavated aggregate will be reused elsewhere on the project. Compound locations will then either be incorporated into the schemes, completely removed and either reinstated and returned to previous use or the soils would be restored and the area planted as part of the landscaping and ecological mitigation (depending on the location and the identified end use).

Material reuse and recycling

2.8.33 With the growing demand for construction products and the ever-increasing pressure to reduce the environmental impacts of depleting

natural resources, a significant percentage of modern construction materials are produced from recycled material. In the case of concrete, it is common for 20% of the material by volume to be secondary sourced material, which can be increased beyond 40% depending on the mix, workability and strength gain requirements. In the case of steel, most of the steel sourced for bridge beams or ground support solutions is made from over 90% recycled steel. In relation to drainage products, there are now many drainage products on the market that incorporate over 60% recycled content, most notably with plastic drainage products and kerbs. Materials utilised for the Project will use the highest practicable recycled content, where practicable and appropriate.

2.8.34 In some instances, it is not environmentally sustainable to source recycled materials due to the damaging effects of the transport distance. In such instances, whole lifecycle assessments will be undertaken on quarried products which present a viable solution where there is an unavoidable demand. Subject to suitability, where material can be locally recovered from a scheme as part of demolition or clearance works, such material will be processed on site and utilised over virgin (newly quarried) aggregates.

2.8.35 When evaluating site won material in comparison to imported material, it is noted that due to large scale earthworks across the scheme and minimal structures, the percentage of site won material is likely to be over 98% by volume. This will vary by scheme, in relation to the structures, new road construction and associated earthworks.

2.8.36 The earthworks for the Project have been designed (and will continue to be refined through detailed design with this objective) to achieve a balance within each scheme where possible. The primary objective is to achieve a balance within each scheme in order to avoid unnecessary vehicle movements associated with movement of materials. Where this is not practicable due to the nature of the scheme (e.g. significant cuttings or embankments), requirement for particular materials or programme, material will be moved between schemes (with a priority being placed on re-use in the closest possible scheme). Any surplus material that cannot be reused within the project will be made available through appropriate processes for reuse at other locations as close to the scheme as possible. The last resort will be disposal of material as waste.

2.8.37 Ground investigation works to date indicates that the majority of material will be suitable for reuse, though further ground investigation will be undertaken prior to construction. Despite detailed geo-environmental procedures and treatments that are available to improve soils, which will be employed on the Project, it is expected that there will still be a very small percentage of unsuitable or contaminated material generated that cannot be reused. Such material will be transported to licensed waste management facilities for safe handling and disposal.

2.8.38 It is also anticipated that there will be excess topsoil generated by the Project. This will be reused in landscaping within the Project where possible, with any excess likely to be sold locally for reuse.

2.8.39 Chapter 7: Climate and Chapter 11: Materials and Waste provide details of the potential cut and fill balance for each scheme, based on the illustrative design. These chapters assume a worst case that any excess material on each scheme will be exported off site, and any shortage will require import of materials (in order to assess the worst case impacts from a waste capacity, materials use and Greenhouse Gas emissions perspective). Chapter 5: Air Quality and Chapter 12: Noise and Vibration utilise traffic movement data based on a range of construction scenarios, which consider the reuse of materials between schemes (i.e. a worst case in terms of dust, emissions and noise for receptors located close to the project) and export/import of materials to the Project.

2.8.40 Where the overall Project has a deficit of re-usable material (either due to the design, the timing of the construction of each scheme, or the nature of the material excavated) borrow pits will be required. Two borrow pit locations have been identified within the Order Limits for the Project. Within the M6 Junction 40 to Kemplay Bank scheme, an area of land south-west of Kemplay Bank has been included in the Order Limits to produce material required to construct the early elements of the Kemplay Bank scheme. This borrow pit will be backfilled with arisings from the cutting to form the underpass. Within the Penrith to Temple Sowerby scheme, an area of land to the north of the proposed junction at Center Parcs will be used to provide material to allow the junction to be constructed before being backfilled with material from the Kemplay Bank cutting later in the programme. Both areas of land will be fully restored and either returned to agricultural use or incorporated into the landscape and ecological planting for the Project.

2.8.41 Further information on likely material movements and management is set out below. Measures to be implemented to protect the environment during earthworks are secured in the EMP (Application Document 2.7).

Material movements

2.8.42 Plant and material movements will vary on each scheme due to the volume of earthworks, landscaping, new road construction, and number and type of structures required.

2.8.43 Movements will be coordinated to mitigate impacts to stakeholders and road users on the existing A66. Where movements are required close to sensitive areas or stakeholders, additional mitigation measures are likely to be required (such as selection of low noise plant, restriction on number or speed of movements of vehicles or specific timing of works). These measures will be secured through the Noise and Vibration Management Plan (NVMP) as part of the EMP (Application Document 2.7).

2.8.44 The most notable movements on each scheme will be the movement of excavated materials to meet cut and fill requirements described above. This will most likely be undertaken with dump trucks, eight-wheeled road wagons or a combination of the two, depending on the most accessible route and the location of the existing A66.

2.8.45 Generally, these bulk earthworks movements will take place on the new A66 route (prior to being opened) to limit the impacts on local stakeholders and A66 road users. Where there are limitations or where material is required to be stored or stockpiled a distance from where it is being excavated, dedicated haul routes will be considered and established. Potential haul routes are shown in Figure 2.3 Indicative Construction Areas.

2.8.46 On some schemes, it will be necessary to use parts of the existing A66 for movement of bulk earthworks materials where haul roads cannot be established. Traffic management, additional protection measures for stakeholders and road users, and designated access and egress points will be established to enable construction traffic to safely interact with A66 traffic. This will be managed through the Construction Traffic Management Plan (CTMP), as required by the EMP (Application Document 2.7).

2.8.47 For some schemes, bulk earthwork material that is unable to be placed at a fill requirement location will be taken to identified material storage areas, where it will be safely stored ready for use or incorporated into landscaping elements.

2.8.48 Delivery of imported materials is likely to be by a variety of means, including concrete wagons, eight-wheeled road wagons and heavy goods vehicles depending on the type, size and shape of material.

2.8.49 Some larger items such as prefabricated or precast bridge beams, may be transported to site as oversized abnormal loads. These will generally be delivered directly to the required works area. The management of movement of such loads, and the measures required to ensure the safety of road users and minimise disruption will be set out and implemented through the CTMP (as required by the EMP, Application Document 2.7). Other key materials that will likely be delivered close to the works areas of each scheme include quarried and recycled stone, formwork and shuttering, ready-mix concrete and asphalt-based products.

2.8.50 Smaller materials associated with for example, drainage, ducting, lighting and communications are likely to be delivered to larger compound locations. These will then be distributed to works areas using appropriately sized transport.

Material storage and stockpiles

2.8.51 Materials, both imported and site-won, will be stored correctly to prevent deterioration and subsequent waste, as well as to minimise environment impacts. Where practicable, materials will look to be stored close to the required work area, but due to transport logistics there will be a need to store some materials in compound locations ready for redistribution to sites.

2.8.52 Material movements will be carefully programmed to reduce storage periods and subsequent double handing of the material, with a focus on

placing material in its final required location rather than storing and moving material repeatedly.

2.8.53 Chemicals, fuels, oils and other hazardous materials will be kept within locked storage areas with access restricted. For the storage of fuels and oils, adequate containment and, where required, secondary containment will be used. Bulk storage tanks will be integrally bunded and located within compound areas, away from general traffic movements and surface water drains and secured against unauthorised discharge. Adequate provisions of spill protection measures will be provided at work and compound locations.

2.8.54 Where materials are required to be stored on site or within the compounds, the impacts on stakeholders and sensitive receptors will always be considered. Any dust generating activities will look to be closely controlled and materials stored at appropriate heights to prevent intrusion. In some instances, it is likely that long term earthworks storage will be utilised to help reduce the visual impacts of the construction works for stakeholders.

2.8.55 Management of materials, including stockpile design and maintenance, will be subject to controls to minimise risk of pollution or dust and ensure quality of materials is maintained. The required controls are set out in the EMP (Application Document 2.7) and will be implemented via a Materials Management Plan and Soils Management Plan (expanded essay plans of which are provided at Annexes B8 and B9 of the EMP).

Plant, vehicles and equipment

2.8.56 Construction of the Project will require a large quantity of plant and equipment. The types of equipment to be used will likely include a variety of excavators including 360s, earthworks and road construction rollers and graders, bowsers, stabilising plant, bulldozers, piling rigs, telehandlers, ready-mix concrete wagons, concrete pumps, dump trucks (often referred to as ‘dumpers’), eight-wheel road wagons, wheel- and track-mounted mobile cranes, and asphalt paving machines.

2.8.57 Plant numbers and usage will be determined by the final construction methodology and programme, and plant and material movements will vary on each scheme due to the amount of earthworks, landscaping, new road construction and number of structures required. For the purposes of assessment, preliminary plant lists have been used to consider construction noise effects (see Chapter 12: Noise and vibration).

2.8.58 Plant movement will be undertaken to facilitate the establishment of the main working areas on each scheme, with plant delivered via traffic management access points. There will be several small vehicles that access the schemes on a daily basis, to transport the workforce along with the smaller materials to be distributed from the main compounds as described above.

Traffic management during construction

2.8.59 Traffic management during construction of the Project will be planned to accommodate traffic on the existing A66 and surrounding road network whilst permitting construction works to be undertaken safely. As detailed designs are developed on each scheme, bespoke traffic management plans will be produced acknowledging current A66 traffic flows, turning requirements and stakeholder access needs. Where local access is required to be maintained, traffic management plans will look to be adapted, with the construction teams working closely with the stakeholders, local councils and blue light services.

2.8.60 Further information on traffic management during construction can be found in the Construction Traffic Management Plan (Annex B13 of the EMP (Application Document 2.7)). As part of the traffic management selection process, all route options are considered taking account of nearby services, road widths, weight restrictions, impact on stakeholders and safety.

2.8.61 Key principles of traffic management for the duration of the Project are outlined below:

- **Formation of access points** – Localised traffic management is likely to be required to enable Principal Contractors to safely form access points off the A66 to enable haul roads, work areas or service diversions to be undertaken. It is likely to require off-peak lane closures and/or temporary traffic signals to facilitate such works.
- **Offline works** – Where practicable, schemes will be programmed and planned to optimise offline working, maintaining construction traffic away from the existing A66 route for as long as possible. Traffic management will be required around the tie-in points between the new and existing carriageways, or where the offline works may be too close to the existing A66 to carry out works without any protection.
- **Traffic navigation in traffic management areas** – Traffic will be guided through the traffic management zones, with the available road space being maximised to enable the compliant lane widths whilst also looking to generate more working space to construct key structures close to the existing A66.
- **Traffic navigation on new road sections** – On completion of the first major phase of offline works on each scheme, it will be essential to switch the traffic to enable the second phase of offline works to take place, with traffic moved onto the newly built sections of temporary relief road or new carriageway.
- **Online working during less busy periods** – To safely install, switch and remove traffic management in single lane sections, and areas where the existing road widths do not allow for a safe working, full closures of the A66 will be required. Such closures will occur during less busy periods (such as overnight) and for large construction elements, weekend closures may also be required. For some of the online work areas, it may not be possible to undertake some work activities such as drainage, kerbing and vehicle restraint works, safely thus closures during less busy times may also be needed.
- **Large activity road closures** – For some of the structures on the scheme, it will be essential to coordinate longer traffic management

periods to safely install bridge beams and deck elements with no live traffic. In these instances, diversion routes will be set up with significant communication and press releases to ensure drivers and stakeholders are well informed.

- **Traffic management at junctions** – Traffic management will be used to complete online works such as junctions and road tie-in points, with closures during less busy periods potentially required where road reconstruction or service crossings are needed to be undertaken.
- **Keeping traffic moving** – The traffic management will be designed to allow traffic to travel through the works at the highest safe speed permissible. This speed should be no lower than is required to maintain road user and pedestrian safety. Where practicable, the Project will look to maintain a 60mph speed limit during the works, although lower limits may be applied where working widths are tight or there are particular safety concerns.
- **Deliveries** – Products and materials for construction will be delivered to required locations throughout the Project. Such materials include concrete, bitumen, aggregates, pipes and steel. Some deliveries, such as large construction plant or prefabricated bridge elements will arrive as abnormal loads, with appropriate traffic management in place to enable safe transport.

Statutory Utilities

2.8.62 Construction of the Project will require the diversion, relocation or protection of several existing utility assets including water, wastewater, electricity, gas and telecommunications. Throughout Preliminary Design, utility diversions and relocations have been avoided where practicable, and those that remain will be further refined during detailed design upon receipt of further survey information.

2.8.63 These works form an integral part of the design, planning and construction process and in some instances will require the implementation of additional traffic management measures to enable the works to be undertaken safely.

2.8.64 Wherever possible, services will be diverted or protected early in the project to mitigate potential programme delays, with disconnection and reconnection undertaken in the shortest practicable time to minimise service disruption.

2.8.65 In some instances where carriageway crossings are required, it may be more efficient to deploy traffic management early and in isolation of the main works. This will help ensure that phased works are not affected or restricted. Any works in the road or in close proximity, will be coordinated and managed to reduce disruption and maintain traffic flows where possible.

2.8.66 The affected statutory utilities infrastructure is predominately located alongside existing roads. The main exceptions are high voltage electricity cables and water mains, which commonly run directly between fixed points, often through fields. In consultation with statutory utility providers, land has been included within the Order Limits to allow for

diversion or relocation of these assets. Such diversions and protection measures will be undertaken by Utility Providers or under agreement by approved Principal Contractor(s) as per the indicative methodologies outlined below.

2.8.67 National Highways is aware of the impacts caused by disruption to services, therefore stakeholders, blue light services and local councils would be kept informed of works to be undertaken on services and the potential impacts. Mitigation measures will always look to be implemented to reduce the impacts and through continued communication, the effects of the work will also look to be minimised. Existing services anticipated to be affected by the Project are summarised below in Table 2-11.

Table 2-11: Known existing utilities within each scheme

Scheme	Existing utilities
M6 Junction 40 to Kemplay Bank	Wastewater (including pressurised foul sewer), water mains, medium and low pressure gas, underground 11kV electricity, telecommunications.
Penrith to Temple Sowerby	Wastewater (including pressurised foul and combined sewers), water mains, two high pressure feeder gas mains, underground low voltage electricity, overhead 11kV and low voltage electricity, telecommunications and nationally important Shell pressurised gas pipeline (refer to Project Development Overview Report Section 5.3 for further information).
Temple Sowerby to Appleby	Wastewater, water mains, intermediate pressure gas, underground low and medium voltage electricity, overhead 33kV and 11kV electricity, telecommunications.
Appleby to Brough	Wastewater, water mains and trunk mains, underground low voltage and 11kV electricity, electricity substation, telecommunications.
Bowes Bypass	Wastewater (combined sewer), water mains, underground low voltage electricity, overhead 20kV electricity, telecommunications.
Cross Lanes to Rokeby	Waterwater (combined sewer), water mains, underground low voltage electricity, overhead 20kV electricity, telecommunications.
Stephen Bank to Carkin Moor	Water mains, underground low voltage electricity, overhead 20kV electricity, telecommunications.
A1(M) Junction 53 Scotch Corner	Low pressure gas main, underground low voltage electricity, telecommunications.

Demolitions

2.8.68 Any requirement for demolition of existing structures is identified in the scheme specific description presented above. Any properties or business facilities that require demolition for the Project will be subject to replacement or compensation, to be agreed.

2.8.69 Demolitions have the potential to be noise and dust generating and will therefore only be undertaken during daytime hours. Measures will be put in place to limit disturbance to any nearby residents or sensitive receptors. Where the existing road is to be upgraded, there may also need to be demolition of road infrastructure, planning of surfaces and

removal of existing drainage, signs etc. This will be managed as part of the wider construction programme and controls to manage environmental effects implemented through the EMP (Application Document 2.7).

Table 2-12: Demolitions proposed within each scheme

Scheme	Elements to be demolished
M6 Junction 40 to Kemplay Bank	No demolitions expected
Penrith to Temple Sowerby	High Barn Farm – commercial, agricultural building Lightwater Cottages – residential properties
Temple Sowerby to Appleby	Dunelm house – residential Winthorn House – residential Green Barn buildings– agricultural
Appleby to Brough	New Hall Farm underpass – farm access underpass Sandford Retaining Wall – existing A66 retaining wall Moor Beck bridge – conveys old local road to Warcop over beck MOD tank park- buildings, hardstanding and fuel station Existing MOD landscape compound buildings & Existing MOD Bivvy site buildings and infrastructure Toddygill Bridge – conveys Crooks Beck under existing A66
Bowes Bypass	Clint Lane Bridge Eastbound off-slip Underpass – farm access Farm building at old railway station Two ruins – ruins Four farm building associated with Low Broats Farm Low Broats Farmhouse
Cross Lanes to Rokeby	No demolitions expected
Stephen Bank to Carkin Moor	Existing slurry tank
A1(M) Junction 53 Scotch Corner	No demolitions expected

Illustrative construction methodologies for key features

2.8.70 The following are illustrative examples of construction methodologies that could be used to construct different elements of the Project. It should be noted that due to variance between schemes (e.g., ground conditions, type of road being constructed and desired use), that construction methologies may vary between schemes.

Site access and egress points

2.8.71 To construct a typical site access or egress point, existing kerbs will be removed followed by the required bell-mouth area being excavated out to a suitable level, inspected and compacted where required. Once to depth,

new kerbing will be installed to tie in with existing kerbs and the area will be filled with imported aggregate and compacted. This will then be overlaid with asphalt or concrete surface course to complete the access or egress point.

Site compounds

2.8.72 To construct the compounds, areas of existing vegetation will be removed and topsoil stripped. This will be stored locally on site ready for reinstatement. The ground will then be excavated and profiled to the desired level with services being installed where required. Once the ground is prepared and compacted, imported stone will be placed and compacted across the area to form a hardstanding, followed by installation of foundations for cabins and other temporary compound structues. These foundations will either be constructed from ready-mix concrete or proprietary concrete flagstones depending on the required cabin size and ground conditions. Once the foundations are complete, the welfare facilities will be lifted into position. For long-term compounds, parking areas may receive an additional asphalt layer to improve durability and reduce dust and noise for stakeholders.

Haul routes

2.8.73 To construct a typical haul route away from the A66, vegetation, topsoil and subsoil will be excavated along the desired route, with the vegetation and topsoil stored locally. Once down to the required level, the surface will be checked for suitability and compacted prior to importing granular material to form the main road construction. The imported stone (quarried or recycled) will then be levelled and compacted in layers. This will be built up to form the final road surface. On completion of the haul route, it is likely that drainage ditches will be cut out of the ground to control surface runoff.

New road construction

2.8.74 Typical road construction works will start with removal of vegetation, topsoil and excavation of subsoil to the required dimensions. In some cases, fill material may be required to bring the new carriageway up to the desired level. The main drainage elements such as manholes and pipework will then be installed, followed by deposition of imported stone which will be compacted in layers. A bituminous layer will be applied, followed by kerbing, road drainage, markings and associated furniture.

Overbridges

2.8.75 Several new overbridges are to be constructed across the Project to carry roads over the A66, as well as locations where the A66 itself is carried on a bridge or crossing over a watercourse or existing local access road. Across the Project there a variety of overbridges of varying span lengths dependent on the angle the access road crosses over the A66 or the new A66 crosses an existing feature. As part of the typical construction, they will incorporate a deck supported by abutments with

or without the addition of further central piers, which are all supported by foundations.

2.8.76 For most schemes, overbridges are expected to be single or two-span overbridges, typically crossing over local roads, the new A66 or smaller watercourses. Larger overbridges will be required on the Temple Sowerby to Appleby and Appleby to Brough schemes, featuring multispan solutions to cover distances of over 200m across floodplains and larger, designated watercourses. Works within or near to the River Eden SAC will be controlled by a method statement, setting out the exact methodologies and controls to be implemented (as secured within the EMP). An expanded essay plan setting out what will be included in the method statement is provided at Annex B1 of the EMP (Application Document 2.7).

2.8.77 To facilitate construction, works areas will be created in each verge and potentially one in the central reserve, depending on the structure span and support arrangements. On some schemes, where multiple spans are required, groundworks will be required at all pier locations.

2.8.78 Foundations installed will be dependent on a number of factors inclusing ground conditions and size of structure to be supported. Typical overbridge foundations include pile rafts, individual piles or a mass fill concrete base.

2.8.79 When considering the abutments or pier construction methodology, these could be constructed from precast units or reinforced concrete columns that are surrounded by earth retained solutions (abutments only).

2.8.80 To form the bridge deck, it is likely that steel or precast concrete beams will be manufactured offsite and brought to the required location via large road transport vehicles. The beams would then be lifted into position using a crane from a dedicated lift site on or off the A66 road. During such key lifts, it is likely that the A66 and associated connecting roads will require road closures to ensure the safe installation.

2.8.81 Depending on the bridge deck design and size, an onsite pre-casting facility may be considered if it forms a viable construction solution with added environmental benefits. Infrastructure requirements must also be taken into consideration when evaluating this option, noting any additional impacts on stakeholders.

2.8.82 Depending on the number of beams, their width and spacing, it is likely that precast panels will be placed between the beams to formulate the deck. It is then likely that steel reinforcement will be fixed on the newly formed surface and concrete placed, to integrate the beams and support formwork. Once the deck is complete, drainage, surfacing and road markings will be installed.

Underpasses

2.8.83 Throughout the Project, underpasses are to be constructed to carry roads under the new A66. In addition, existing underpasses require

extension to allow existing assets to remain following widening of the A66 carriageway over them.

2.8.84 Underpasses are constructed in a similar manner to overbridge construction, but the structure is situated below ground level. An underpass features foundations, retaining walls and a deck-type roof structure. The construction of these walls and deck are likely to follow a similar methodology to that outlined above for overbridge abutment walls.

2.8.85 To construct an underpass, excavation works will reduce the level of the land. Depending on the foundations to be installed, the areas could then have a piling platform installed to facilitate a piling rig to install reinforced concrete piles or have a large deep excavation formed to enable a mass fill concrete foundation to be constructed. A typical underpass could be constructed from cast insitu or pre-cast box culverts dependent on design, ground conditions and suitability.

Retaining wall and embankment construction

2.8.86 Retaining wall or steep retained embankments will be required where there is insufficient land available to conventionally grade the land at a shallow slope angle between two level differences.

2.8.87 Construction of retaining walls or steep retained embankments will be dependent on ground conditions, topography, access, retained height requirements, retained length requirements and required design life. Typical constructions include: continuous bored reinforced concrete pile walls, steel sheet pile driven walls, reinforced concrete cantilevered walls, and mechanically stabilised or earth-retained walls.

2.9 Operation

2.9.1 Maintenance will be authorised under the DCO. As required by DMRB, industry-standard control measures will be applied and encapsulated in the EMP at the end of construction to inform the handover process. This will ensure key requirements are met during operation and that the mitigation implemented continues to be effective.

2.9.2 With the implementation of these measures no likely significant effects from maintenance are considered likely that will not already be considered for the construction phase. Maintenance activities are therefore not considered separately in this ES.

2.10 Decommissioning

2.10.1 The traffic assessment demonstrates that the proposed improvements will operate adequately in the Design Year of 2044 (15 years after opening). Typically, highways projects are designed to have a materials lifespan of between 20 and 40 years before any significant maintenance and upgrading is required, dependent on material properties, maintenance and usage. Elements including structural concrete and steelwork have extended design lives of up to 120 years.

2.10.2 It is considered highly unlikely that the Project will be decommissioned as the road is likely to become an integral part of the infrastructure in the area. Decommissioning will not be either feasible or desirable. Decommissioning activities are therefore not considered further in this ES.

2.11 References

Transport for the North (2019) Strategic Transport Plan

Department for Transport (2015a) Road investment strategy: 2015 to 2020

Department for Transport (2020) Road investment strategy: 2020 to 2025

Highways England (2017) Strategic Road Network Initial Report

Department for Transport (2015b) Highways England: Licence

Highways England (2021b) Local Traffic Report

Highways England (2020a) Design Manual for Roads and Bridges CG 501 Design of highway drainage systems

Highways England (2020b) Design Manual for Roads and Bridges LA 113 Road drainage and the water environment

Highways England (2020c) Design Manual for Roads and Bridges LA 120 Environmental management plans