

A57 Link Roads

TR010034

9.73 Environmental Management Plan

(First Iteration)

Annex C.1: Design Approach Document

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A57 Link Roads

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1. Introduction

1.1. Introduction

- 1.1.1. In accordance with Part 5.26 of the National Highways Licence, the A57 Link Roads Scheme (hereafter referred to as 'the Scheme') must have due regard to relevant principles and guidance on good design, to ensure that the development of the network takes account of the geographical, environmental and socio-economic context. This Outline Design Principles Document discusses how different engineering and environmental constraints identified throughout design development and assessments have influenced the design.
- 1.1.2. The Scheme is a Nationally Significant Infrastructure Project (NSIP); therefore this document has been developed in support of National Highways' application for a Development Consent Order (DCO) to authorise construction, operation and maintenance of the Scheme. An Environmental Impact Assessment (EIA) has been carried out for the Scheme and is reported in the Environmental Statement (ES).
- 1.1.3. This document should be read in conjunction with the following plans and reports included with the DCO application:
- Environmental Statement Chapter 2 The Scheme (REP2-005)
 - Scheme General Arrangement (ES Figure 2.2 (APP-074))
 - Environmental Masterplan (ES Figure 2.4 (APP-074))
 - Works Plans (REP5-002)
 - Streets, Rights of Way and Access Plans (REP5-003)
 - Scheme Layout Plans (REP5-004)
 - Engineering Drawings and Sections (REP5-005)
 - Culverts and Drainage Plans (REP1-008)
 - Case for the Scheme (REP2-016)
 - Drainage Design Strategy Report (APP-188)
 - Environmental Management Plan (EMP) (First iteration) (REP6-015)
 - Register of Environmental Actions and Commitments (REAC) (REP6-008)
 - Outline Carbon Management Plan (REP5-023)
 - Outline Landscape and Ecology Management and Monitoring Plan (REP6-013)
- 1.1.4. This document is included in Annex C 'Environmental Method Statements' of the EMP (First iteration).
- 1.1.5. This Outline Design Principles Document presents how the Scheme has had due regard to good design principles and the local environment has been an integral part of the Scheme. The report has been produced in accordance with the

principles outlined in the Design Manual for Roads and Bridges (DMRB) GG103 “Introduction and general requirements for sustainable development and design” (Revision 0, July 2019) and National Highways’ ‘The Road to Good Design’ (January 2018). It discusses how different engineering and environmental constraints identified throughout design development and assessments influenced the design. It also sets out the aims of the objectives and the design vision for the Scheme.

1.2. Securing commitments

- 1.2.1. This Outline Design Principles Document will be updated by the appointed Principal Designer and Contractor into a detailed Design Principles Document, as appropriate and necessary, prior to commencement of works in accordance with Requirement 4 in Schedule 2 of the draft Development Consent Order (dDCO) (REP6-002). As detailed in Action GEM1.1 of the REAC (REP6-008), the detailed Design Principles Document will be one of a number of documents that will be annexed to the EMP (Second Iteration) under Requirement 4.
- 1.2.2. The Applicant has, and will continue to, maintain dialogue with the relevant local authorities, the local highway authority and the Environment Agency in relation to the development of the plans which will be included in the EMP (Second iteration). In any event, Requirement 4(1) expressly requires those authorities and the Environment Agency to be consulted on the EMP (Second iteration) before it is submitted to the Secretary of State for Transport for approval. As the Design Approach Document will be appended to the EMP, it will be included within this requirement.

2. Good design

2.1. Policy context

- 2.1.1. Whilst the National Policy Statement for National Networks (NPSNN) is the primary source of policy under which the Scheme application will be considered, policy within the National Planning Policy Framework (NPPF) advocates for good design, as do the Design Principles for National Infrastructure, and the design principles stated within The Road to Good Design. How the Scheme considers these is summarised below.

National Policy Statement for National Networks (NPSNN)

- 2.1.2. Appendix B of the Case for the Scheme (REP2-016) provides full details of the Schemes compliance with the NSPNN. Below summaries how the Scheme considers the importance placed on good design.
- 2.1.3. Paragraphs 4.28-4.35 emphasise the importance placed on ensuring good design in the development of infrastructure projects. Government statements emphasise the importance placed on ensuring good design in development.
- 2.1.4. The Scheme design aligns with the importance placed on good design in a number of ways, primarily by responding to setting, place and people. This has been achieved through a thorough appreciation of the site context in order to fully understand and appreciate the receiving environment's physical and cultural makeup. This appreciation has helped to inform the design of the route and its associated landform, planting, materials and components to ensure they are sympathetic to the locale and fit into this context as appropriately as possible.
- 2.1.5. This has included the integration of locally appropriate habitats and water features, including sustainable drainage provision; by creating networks of green spaces and encouraging walking and cycling through a more connected local environment, by promoting safety and security with safe legible and well-lit wayfinding; and in responding to local place, character and identity by incorporating natural features which reflect the local context, including landforms, woodlands, scrublands, grasslands and hedgerows which will seek to follow local species and patterns. The design also reflects local receptors in protecting sensitive views and respecting the local landscape character wherever possible.
- 2.1.6. Paragraph 5.160 refers to the minimisation of adverse landscape and visual effects through appropriate siting of infrastructure, design and landscaping schemes.
- 2.1.7. The landscape design principles for the Scheme reflect the specific landscape context in terms of creating sympathetic landform and slope profiles which reflect those found in the locale, which is a Pennine fringe landscape of rising undulating topography, characterised by pastoral farmland, interspersed with residential settlements and some industry. The planting patterns and species will also be designed to reflect the local context and have been developed to ensure they are appropriate and sensitive to the wider landscape setting to help minimise adverse impacts on landscape character. The landscape design delivers a blend of openness and enclosure to maintain a mix of open views

whilst protecting and screening other views from sensitive receptors, via landform, fencing and planting. Planting will also provide habitat for wildlife and contribute towards biodiversity with a range of habitats provided across the scheme, including different types of woodland and grassland as well as scrub and extensive new hedgerows. The road is set in earthworks cuttings or false cuttings along much of the length, which will help to reduce the associated impacts on landscape character as well as noise and visual impacts.

The National Planning Policy Framework (NPPF)

- 2.1.8. The NPPF was updated in July 2021. The biggest change to the NPPF is that the updated version places greater emphasis on beauty. The revised policies also demonstrate a focus on place-making, the environment, sustainable development and the importance of design codes. The key sections of the NPPF applicable to the Scheme design are set out below along with how the Scheme considers these.
- 2.1.9. Paragraph 7 (Chapter 2: Achieving Sustainable Development) includes reference to the UK Government's signing up to the 2030 Agenda for Sustainable Development and achieving the 17 Sustainable Development Goals. The Scheme does not conflict with these Sustainable Development Goals including building resilient infrastructure and promoting sustained, inclusive, and sustainable economic growth.
- 2.1.10. Paragraph 8(b) (Chapter 2: Achieving Sustainable Development) refers to fostering well-designed, beautiful and safe places. The Scheme includes appropriate landscape mitigation measures as illustrated in ES Figure 2.4 Environmental Masterplan (APP-074) that shows the landscape design strategy, which is integral to the Scheme design.
- 2.1.11. Paragraph 96 (Chapter 8: Promoting Healthy and Safe Communities) states that local planning authorities should work proactively with public infrastructure providers including further education colleges, hospitals etc. to resolve key planning issues before applications are submitted. Although this is not directly relevant to the Scheme, it should be noted that the Project has undertaken extensive consultation on the development of the Scheme. This is reported in full in the Consultation Report (APP-026) and its appendices (APP-027-APP-052).
- 2.1.12. Paragraph 110 (Chapter 9: Promoting Sustainable Transport. Considering Development Proposals), relates to assessing sites that may be allocated in plans, or specific applications for development. That is (c) the design of streets, parking areas, other transport elements and the content of associated standards reflecting current national guidance, including the National Design Guide and the National Model Design Code.
- 2.1.13. The National Design Guide and National Model Design Codes are for use by local planning authorities as a basis for the production of design codes and guides and in decision making, so are not strictly relevant to the Scheme. However, similar principles have been adopted for the design of the Scheme as it follows the guidance set out in the National Highways publication 'The Road to Good Design'. Similar themes of the Road to Good Design and the National Design Guide include:

- The importance of context, that is ensuring that road design is sensitive to the landscape, heritage and the local community.
 - The need to achieve an environmentally sustainable design.
 - Bringing lasting value.
- 2.1.14. How the Scheme considers the principles set out in the Road to Good Design is set out in section 2.2 of this report.
- 2.1.15. Paragraph 131 (Chapter 12: Achieving Well Designed Places) refers to requirements around new streets and trees. This specifically addresses new streets in urban environments. The Scheme does not create any 'new streets' in urban environments. Notwithstanding this, Chapter 7, Landscape and Visual Effects of the Environmental Statement (ES) (APP-063) explains that the design of the Scheme includes a comprehensive landscape strategy including mitigation tree and hedgerow planting.
- 2.1.16. Paragraph 134 (Chapter 12: Achieving Well Designed Places) states the requirement for planning authorities to refuse development that is not well designed, especially where it fails to reflect local design policies and government guidance on design. Whilst this is relevant, the NPSNN remains the primary policy framework for the Scheme and Appendix A of this document sets out how the Scheme complies with the NPSNN's requirements around good design, which also apply here.
- 2.1.17. Paragraph 161 (Chapter 14: Meeting the challenge of climate change, flooding and coastal change) state that opportunities provided by new development and improvements in green and other infrastructure should be used to reduce the causes and impacts of flooding making as much use as possible of natural flood management techniques as part of an integrated approach to flood risk management. A Flood Risk Assessment (FRA) (REP6-014) has been produced for the Scheme. The FRA draws on a range of disciplines and designs, including, drainage, earthworks, culverts, and previous hydrological and hydraulic modelling to ensure all sources of flood risk are assessed as part of the FRA. The FRA describes the existing flood risks for all flood risk sources, followed by an assessment of flood risks to the Scheme, mitigation measures and lastly residual flood risk.
- 2.1.18. The Drainage Design Strategy Report (APP-188) provides the drainage strategy for the Scheme. Section 6.1 describes the basis of the drainage design.
- 2.1.19. Paragraph 176 (Chapter 15: Conserving and Enhancing the Natural Environment) explains that development within the setting of National Parks, the Broads and Areas of Outstanding Natural Beauty should be sensitively located and designed to avoid or minimise adverse impacts on the designated areas. The Scheme does not fall within any AONBs, National Parks or the Broads but lies within the setting of the Peak District National Park (PDNP). The Landscape and Visual Effects (Chapter 7) of the ES (REP6-006) includes the effect on visual receptors at select locations within the PDNP as this was specifically requested, and the locations agreed, by the PDNPA. The effect on the landscape setting of the PDNP was not a specific request of the PDNPA.

2.2. Overarching design principles

Design Principles for National Infrastructure

2.2.1. The National Infrastructure Commission provides expert, impartial advice to the government on national infrastructure needs and solutions. The National Infrastructure Commission's Design Group was established in 2019 to inspire renewed ambition for the quality of the UK's infrastructure and subsequently published in February 2020, its Design Principles for National Infrastructure. The four principles, as listed below, aim to guide the planning and delivery of future major infrastructure projects:

- Climate - Mitigate greenhouse gas emissions and adapt to climate change
- People - Reflect what society wants and share benefits widely
- Places - Provide a sense of identity and improve our environment
- Value - Achieve multiple benefits and solve problems well

2.2.2. Organisations and sectors are encouraged to build upon this approach by developing their own design vision, ambition and plan that embraces all the principles. For National Highways, this is addressed in their document, *The Road to Good Design* as set out below.

The Road to Good Design

2.2.3. National Highways published 'The Road to Good Design' in January 2018, which sets out ten design principles for delivering projects with the aspiration to '*deliver safer, better, beautiful roads which connect people and connect our country*'. The Scheme design is underpinned by these ten principles so that it connects people, places and processes to achieve better outcomes.

- Connecting People – Good road design
 1. makes roads safe and useful
 2. is inclusive
 3. makes roads understandable
- Connecting places – Good road design
 4. fits in context
 5. is restrained
 6. is environmentally sustainable
- Connecting processes – Good road design
 7. is thorough
 8. is innovative
 9. is collaborative
 10. is long-lasting

2.2.4. Appendix A of this document explains how the design of the Scheme has been developed to respond to these overarching principles.

3. Design vision and principles for the Scheme

3.1. Design standards, guidance and good practice

- 3.1.1. The design has been developed to comply with current standards and with reference to relevant guidance and good practice. DMRB standards are applied regard to cover the engineering elements of the Scheme, including, but not limited to: structures; infrastructure for walkers, cyclists and horse riders (WCH); highways lighting; and, highways drainage.
- 3.1.2. With regard to the environmental elements of the Scheme, including planting and biodiversity measures, the following DMRB standards have been applied, but are not limited to:
- GG 103 Introduction and general requirements for sustainable development and design.
 - LD 117 Landscape design.
 - LD 118 Biodiversity design.
 - LD 119 Roadside environmental mitigation and enhancement.
 - LA 113 Road drainage and the water environment.

3.2. Scheme design

Design narrative

- 3.2.1. Throughout the design process, focus has been given to the interplay between the design and the neighbouring environment, this has been achieved through on-going close collaboration between the project design team and the environmental technical experts. As a result, the Scheme design has been an iterative process that has considered environmental mitigation measures and buildability along with the National Highways licence requirements to develop an economic solution and a good road design that is sensitive to the context of its surroundings and the communities that surround it.
- 3.2.2. A key approach to realising this has been through the development of a scheme-specific landscape strategy, which has been designed to integrate the Scheme into the surrounding landscape, mitigate the loss of existing vegetation, and reduce the visual impacts through screening views of the Scheme. The strategy has also been developed to enhance biodiversity and habitat where possible and to help maintain local vegetation patterns and create sympathetic landform.
- 3.2.3. Figure 2.4 Environmental Masterplan of the ES (APP-074) shows the landscape design strategy, which is integral to the Scheme design. The landscape proposals are designed to integrate the Scheme into the surrounding landscape, mitigate the loss of existing vegetation, and reduce the visual impacts through screening views of the Scheme. The strategy has also been developed to enhance biodiversity and habitat where possible and to help maintain local vegetation patterns and create sympathetic landform. This design will adhere to DMRB LD 117 Landscape design and the Specification for Highways Works set

out in Series 3000 (Landscape and Ecology) of the Manual of Contract Documents for Highway Works¹.

3.2.4. The Environmental Masterplan also shows mitigation measures, such as new landscape planting, watercourse enhancements, noise barriers and ecological habitats that have been created or restored. These mitigation measures have been developed through an iterative design process with a multidisciplinary team responding to a complex range of environmental and engineering constraints found within and adjacent to the Scheme and following feedback through consultation. The key environmental mitigation measures included within the Environmental Masterplan will:

- Assist with integrating the Scheme into the surrounding landscape, creating a sympathetic planting strategy
- Reduce visual impact by screening and filtering views of the Scheme
- Reduce noise impacts associated with the Scheme (e.g. noise barriers)
- Mitigate for the loss of existing vegetation
- Create new areas of ecological habitat and maximise opportunities to improve biodiversity within the permanent land take as part of the Highways England policy objective of achieving no net loss and to progress towards the target of delivering a net gain in biodiversity by 2040
- Ensure the connectivity of PRoW and other routes used by pedestrians and cyclists are maintained
- Provide for the storage, treatment and discharge of road runoff, and provide features for the mitigation of flooding risks.

Design vision

3.2.5. The design vision aims to:

- Integrate the Scheme into the surrounding environment whilst enhancing the landscape where pedestrian and cyclist facilities are being improved.
- Understand the components and characteristics that make up the landscape and incorporate into the design in terms of materiality, layout and maintenance.
- Respect and protect environmentally designated areas and ensure that they are protected and/or enhanced by the Scheme.
- Ensure that provision for pedestrians and cyclists (including mobility impaired) is maintained or further improved, with any potential conflicts identified, and considered during the detail design process.

3.2.6. The Scheme design has been an iterative process that has considered environmental mitigation measures and buildability along with the Highways England licence requirements to develop an economic solution and a good road design that is restrained and sensitive to the context of its surroundings and the

communities that surround it. This has resulted in a design which meets the Scheme objectives that can be achieved within the existing constraints and limitations of the site and surrounding and without having a detrimental effect on the environment.

- 3.2.7. As part of the Preliminary Design stage, the design has been refined and changed in response to the following:
- On-going assessment and consultation with the public and stakeholders
 - Ongoing environmental assessment by environmental specialists working in close iterative collaboration with the engineers responsible for the design of the Scheme
 - Continual assessment of the evolving Scheme against the good design principles as outlined in 'The Road to Good Design'.
- 3.2.8. Refer to Appendix A for further details.

3.3. Overarching Scheme design principles

- 3.3.1. The various elements of the Scheme have not been developed in isolation, they have taken in the much wider design principles as set out in section 2 embracing key issues such as landscape, sustainability, buildability and inclusivity. The following design principles cover the designs general approach for each of the main components of the Scheme.
- 3.3.2. The engineering solutions / details / materials for each of the bridges and structures remain in development and are not currently available but they will take these principles into consideration. They will seek to deliver sustainable, low carbon infrastructure elements, which are attractive easy to build and maintain and appear as a family of structures.
- 3.3.3. The design principles for these bridges and structures will consider simplicity and elegance to be visually appealing within the landscape with sensitive ground modelling and planting around them to soften impacts and to help integrate them into their wider setting. The desire is to achieve restrained engineering solutions that are also sustainable and easy to build in order to reduce impacts and the amount of time and disruption on site for the local community.

M67 Junction 4

- 3.3.4. This largely comprises of modifications to an existing large junction where the design principles will be to focus on minimal loss of existing mature vegetation and to provide a legible and safe functioning interchange which is well lit and signed. Junction design principles will ensure that new road spur connections meet the existing road grades within engineered geometry that accounts for safe visibility and legibility, regarding radius and approaches for all vehicles and pedestrians. All street furniture, lighting, signage and traffic signal installations will be sited and selected to meet the appropriate standards and to ensure safe, visible wayfinding. Lighting will use attractive and sustainable light fittings, using downlighters and appropriate spacing and height of columns to reduce glare and potential adverse impacts on wildlife.

- 3.3.5. The landscape design will seek to integrate the junction to achieve a balance between road and pedestrian safety, visual screening and integration of the junction into the landscape, through sympathetic landform and planting, to help reduce its visual prominence.

Old Mill Farm underpass

- 3.3.6. The Old Mill Farm underpass wing walls and structural design principles will seek to create simple, legible and welcoming access, blended into the landform and surrounding approach paths. This underpass lies beneath a dualled section of carriageway, under 4 lanes and a wide central reserve. The underpass will be designed to minimise impacts and intrusion into the wider landscape setting through careful elevational profiling to reduce the amount of visible wall in the landscape. Ground modelling and planting around the walls will also aid integration.
- 3.3.7. Final choice of materials is to be determined but the general approach will be to soften the visual impact of any wingwalls within the landscape. Artificial lighting will be designed to provide safe, welcoming and attractive access to encourage repeated use.

Roe Cross Road overbridge

- 3.3.8. The principles are to create an overbridge which is sympathetic to its surroundings with simple, elegant and restrained forms to help minimise the impacts and intrusion into the wider landscape setting in order to create a positive feature in the local environment. Wingwalls will be designed to reduce the amount of visible wall with sympathetic ground modelling and planting around the walls to aid integration. Parapets will be selected to appear lightweight wherever possible.

Mottram Underpass

- 3.3.9. The design principles for Mottram Underpass are similar to Roe Cross Road Overbridge in that they are to create an underpass which is sympathetic to its surroundings with simple, elegant and restrained forms, as well as being for use by local footpath users and farm access.
- 3.3.10. The roof of the underpass will also deliver a new green space for the local community and the design principles here will be to ensure it is attractive, useful and safe, providing new links for walking and cycling with appropriately detailed soft landscape design, which will reflect its suburban surroundings. In this way it can be a newly integrated place for people within Mottram.

Mottram Moor junction

- 3.3.11. The design principles for Mottram Moor junction are to provide a legible and safe functioning interchange which is well lit and signed and has its own identity as a new gateway. Junction design principles will ensure that all new connections meet the existing road grades within engineered geometry that accounts for safe visibility and legibility, regarding radius and approaches for all vehicles and pedestrians.

- 3.3.12. The landscape / public realm, street furniture, lighting, signage and traffic signal design principles will be similar to M67 Junction 4. However, the planting is likely to contain more mature stock sizes and formal lines to reflect the more urbanised nature of this junction.

The Carrhouse Farm underpass

- 3.3.13. The Carrhouse Farm underpass design principles will be to create a simple, legible and welcoming access for local footpath users, blended into the landform and surrounding approach paths. This underpass will be shorter than the Old Mill Farm one as it lies beneath a single carriageway section of the route. The underpass will be designed to minimise impacts and intrusion into the wider landscape setting through careful elevational profiling to reduce the amount of visible wall in the landscape. Ground modelling and planting around the walls will also aid integration. Final choice of materials is to be determined but the general approach will be to soften the visual impact of any wingwalls within the landscape. Artificial lighting will be designed to provide safe, welcoming and attractive access to encourage repeated use.

River Etherow Bridge

- 3.3.14. The River Etherow Bridge design principles will take into account its impact on the river and its wider setting. The principles will consider simplicity and elegance to be visually appealing within the landscape with sensitive ground modelling and planting to soften impacts and to help integrate the structure into the wider setting. The current design has considered the structural span to avoid impacting directly on the water course improving on a previous iteration.

Woolley Bridge junction

- 3.3.15. The design principles for Woolley Bridge junction will be similar to Mottram Moor junction. The landscape / public realm, street furniture, lighting, signage and traffic signal design principles will also be similar to Mottram Moor junction and M67 Junction 4. However, also like the Mottram Moor junction the planting is likely to contain more mature stock sizes and formal lines to reflect the more urbanised nature of this junction.

3.4. Engineering design principles

Earthworks and drainage

- 3.4.1. To achieve the required profile, there are various locations where the route goes into cutting or is on embankment. The earthworks will be designed to deliver a cut/fill balance on the Scheme. Any material which is deemed to be unsuitable for use in structural fill would be treated on site and used in the landscape false cuttings, as shown on Figure 2.4 Environmental Masterplan of the ES (APP-074).
- 3.4.2. The preliminary drainage design has been developed in accordance with the CG 501 Design of Highway Drainage Systems standard². The requirements of the NPSNN and the NPPF have also been considered in the design process,

alongside advice from the technical specialists. This includes the use of Sustainable Drainage Systems (SuDS) measures throughout the design along with natural storage and treatment prior to outfall.

- 3.4.3. The drainage works supporting the new highway proposals involves the creation of three new attenuation ponds which will be designed as retention ponds containing aquatic planting and associated drainage facilities. The ponds will be accessed for any maintenance activities from specific access tracks included in the Scheme proposals. The locations of the three attenuation ponds are also illustrated on the Figure 2.4 Environmental Masterplan of the ES (APP-074) and Work Plans (REP5-002).
- 3.4.4. As well as the attenuation and water treatment provided by these ponds, the highway drainage design also includes the following provisions, which are detailed further in the Drainage Design Strategy Report (APP-188):
- Attenuation using oversized pipes
 - Treatment via grassed swales
 - Narrow filter drains
 - Trapped gully pots
 - Surface water channels
 - Combined kerb drainage units
 - Catchpits
 - Flow control units prior to outfall.
- 3.4.5. The preliminary design includes fourteen culverts and pipes carrying watercourses and ditches under proposed highways, access tracks and other features.

Structures

- 3.4.6. Piling associated with the new proposed structures will be required. Such techniques can introduce pathways for contaminants in pore water to migrate into underlying groundwater. Appropriate techniques will be reviewed, and appropriate design will be included to safeguard the underlying groundwater regime to ensure that groundwater quality is not compromised. Deep foundations extending beneath the groundwater table would be designed in accordance with industry standards. A piling risk assessment will ensure the selected piling method does not introduce contamination pathways into the aquifer and to ensure groundwater flood risk upgradient is not increased.
- 3.4.7. Mitigation principles to managing this risk during both construction and operation has included designing the Drainage Design Strategy Report (APP-188) to allow for management of groundwater contributions to surface water flow and design of longitudinal piling taking into account local groundwater conditions. A Hydrogeological risk assessment (REP3-025) has been undertaken to inform the Detailed Design stage for works associated with Mottram Underpass.

- 3.4.8. The footprint of structures and junctions have been designed to be as compact as practicable, ensuring minimal land use change and materials use. For example:
- Mottram Underpass has been moved to the east retaining Old Hall Lane on its current alignment and therefore reducing severance on the residential properties along Old Hall Lane. Roe Cross Road will now run over the western end of the underpass on a bridge.
 - The alignment of Mottram Moor Junction repositions the existing A57 Mottram Moor further away from noise sensitive receptors located within a Noise Important Area. The change in horizontal alignment of the existing A57 Mottram Moor in addition to the bypassing of Mottram-in-Longdendale reduces road traffic noise contributions from this road within the Noise Important Area.
- 3.4.9. A clear-span design would be utilised as part of the River Etherow Bridge, to avoid impacts to the banks and retain aquatic connectivity within this area. The single span structure will be designed in such a way as to minimise (as far as reasonably practicable) disruption to the river and riparian zone, as detailed in DMRB CD 356: Design of Highways Structures for Hydraulic Action³. This includes setting abutments well back from the bank edge to allow the river to function naturally and to maintain a wildlife corridor along the banks and designing the bridge deck to lie perpendicular to the watercourse (where practicable) to reduce shading.
- 3.4.10. Culverts will be designed so as to maximise the longitudinal connectivity with the open watercourse, following best practice guidance.

Lighting

- 3.4.11. The requirement for lighting on the Scheme has been developed following the TD 501 Road Lighting Design standard⁴, in consultation with the relevant local authorities. The lighting design would seek to minimise intrusive light pollution which can lead to sky glow, glare to road users, local residents and other observers as well as light trespass. The design of the lighting will also consider potential landscape and ecological effects. The recommendations from the Bat Conservation Trust and the Institution of Lighting Professionals, titled 'Guidance Note 8 Bats and Artificial Lighting'⁵ have been followed when designing the lighting proposals. The strategy also promotes the National Highways Sustainable Development Plan⁶ by reducing carbon emissions by using more energy efficient lighting, in the form of Light Emitting Diodes (LED).

Low-carbon and carbon reduction design

- 3.4.12. The Scheme will be planned around low-carbon construction principles and targets. Low-carbon target setting is embedded into the whole lifecycle of the

³ [REDACTED]

project. The appointed Principal Designer and Contractor have set the following Scheme specific target:

- Support reductions in carbon emission by adhering to the principles of the PAS 2080:2016 – Carbon Management in Infrastructure Verification certification. This will help the Scheme reduce its carbon emissions across the whole value chain through effective and innovative design, construction and use. It would also ensure that carbon is consistently and transparently quantified at the key stages of the design process.

- 3.4.13. The PAS 2080 process will be used to identify opportunities for carbon savings at Detailed Design stage, and it is the intent that the lowest carbon solution will be progressed as the preferred choice for detailed design.
- 3.4.14. An Outline Carbon Management Plan (CMP) (REP5-023) has been prepared for the Scheme to set out how whole life carbon emissions will be managed and reduced during the Detailed Design stage, to ensure that the objectives are met or exceeded. The Scheme's carbon management approach is aligned with PAS 2080: 2016⁷ – Carbon Management in Infrastructure technical standard which ensures that carbon reduction is fully integrated into the project team's culture.
- 3.4.15. A Detailed CMP will be produced at the Detailed Design stage to assess carbon use for the whole lifecycle of the project, to promote embodied carbon management and to report on the carbon reductions achieved.
- 3.4.16. The CMP demonstrates how the Scheme will implement the carbon reduction hierarchy, as set out in PAS 2080, which specifies:
- **Build nothing:** evaluate the basic need for an asset and/or programme of works and explore alternative approaches to achieve outcomes set by the asset owner/manager
 - **Build less:** evaluate the potential for re-using and/or refurbishing existing assets to reduce the extent of new construction required
 - **Build clever:** consider the use of low carbon solutions (including technologies materials and products) to minimise resource consumption during the construction, operation and user's use stages of the asset or programme of work
 - **Build efficiently:** use techniques (e.g. construction, operational) that reduce resource consumption during the construction and operation phases of an asset or programme of work 'Build nothing' and 'build less' are the two primary carbon reduction mechanisms.
- 3.4.17. The carbon reduction hierarchy specifies 'build nothing' and 'build less' as the two primary carbon reduction mechanisms. For example, the removal of Cricket Ground Roundabout and Roe Cross Road junction, as well as the conversion of Mottram Moor junction from a roundabout, has resulted in a reduced need for materials associated with such junctions. The design modifications during the Preliminary Design stage have resulted in reduced number of compound areas and less land uptake.

3.4.18. Value engineering at the Preliminary Design stage was therefore applied to the baseline scenario as options were explored to build minimum (the 'build less' principle) rather than use of low-cost materials (the 'build clever' principle). The 'build clever' and 'build efficiently' principles will be fully integrated into the design with the implementation of the Detailed CMP.

3.5. Environmental design principles

3.5.1. The Environmental Masterplan includes new landscape design where land is required permanently to build and operate the Scheme. The temporary land taken for construction purposes would be reinstated and restored to its original condition.

3.5.2. The Scheme will provide specific mitigation as follows:

- A dedicated ecological mitigation structure for bats to mitigate for the potential loss of common pipistrelle roosts. The structure will be located in the Showground area, nearby to suitable habitat.
- Bat hop-overs will be created at strategic locations along the Scheme, which would consist of tall vegetation planted on either side of a road. The aim is to guide bats across roads at a safe height above traffic.
- Two artificial badger setts to compensate for the disturbance to and permanent loss of badger setts. Both setts will be planted with a meadow mix and scrub to provide suitable habitat and cover for badgers.
- Barn owl 'fly-overs' and taller screen planting would be created at strategic locations around the Scheme.
- New habitat creation, including 6.5 ha of mixed deciduous largely native woodland planting, adapted to a wide range of climatic conditions, to mitigate for the loss of broadleaved woodland and provide a significant increase in deciduous woodland cover.
- Mammal passes will be installed along the road network to increase the permeability of the Scheme for badgers and other mammals (brown hare and hedgehogs) and reduce the barrier effect. The entrances would be 'softened' through the use of appropriate planting to encourage badgers and other mammals to use these crossing points.
- The design has ensured that opportunities to improve biodiversity have been maximised within the permanent land-take within the DCO boundary. Off-site enhancement opportunities will also be explored during the detailed design.
- Approximately 3.3km of hedgerow habitat will be lost due to the Scheme. However, to help maximise biodiversity across the Scheme, approximately 6km of new hedgerow habitat will be provided, which is a gain of approx. 2.7km. New hedgerow planting would be species-rich, comprising a range of native species (including hawthorn, blackthorn, holly, and dog rose) of local provenance adapted to a wide range of climatic conditions, maximising their resilience. Hedgerows would be largely linked to provide a network of habitats to aid connectivity for species such as bats and birds.

- One new flood compensation area, located in close proximity to River Etherow Bridge to provide flood storage and mitigate the increase in flooding caused by works being undertaken in the flood zone. This will also create wet grassland habitat integrated with the riverine habitat.
- Design of the Scheme to minimise road traffic noise level, including alignment of Mottram Moor junction and arrangement of cuttings and embankments for the Mottram Moor Link Road and A57 Link Road
- Low noise road surfacing on the A57 Link Road and Mottram Moor Link Road (except bridges)
- Permanent environmental noise barriers located at the eastern and western portals of the Mottram Underpass, Mottram Moor junction, and along the A57 Link Road in proximity to Carrhouse Lane and Tara Brook Farm.

4. Engagement on design matters

4.1. Project team engagement

- 4.1.1. Regular calls at the Preliminary Design stage, which included the design, construction, and environmental disciplines, have been held. These have led to a more thorough understanding of the environmental and engineering constraints across the team, and identified opportunities to challenge design options, leading to a better considered design. The discipline leads attended weekly online design meetings where design developments were communicated to the team and discussions around constraints and opportunities could be held. This allowed the team to draw on experienced team members, whilst contributing to driving efficiencies and ensuring the Good Design Principles are embedded into the decision-making process.
- 4.1.2. A highly experienced design team, with experience from other relevant and comparable schemes, has been involved from the start of the design process. An Environmental Lead has coordinated a multidisciplinary team of specialists and design champions across all the key disciplines, so that the design has not been driven by the highway design but responds to various important driving influences including landscape design, drainage design, ecology, sustainability and heritage. These disciplines have been in close and regular contact to develop the proposals to date. The appointed Principal Contractor has also been a key part of the project team during the Preliminary Design stage, which is not normal for a major infrastructure project such as this. This has brought additional benefits, such as ensuring buildability and deliverability issues have been considered at an early design stage. This approach will reflect the multifarious aspects of this complex environment to deliver a robust thoughtful and multi-faceted design response.

4.2. Stakeholder engagement

- 4.2.1. As part of the consultation process the Applicant has discussed the Scheme with multiple stakeholder groups to ensure the design provides as much benefit as possible. A significant amount of consultation has been undertaken over the years, either as part of the wider TPU package or for the present A57 Link Roads Scheme, which has been key to its development from the outset. This included a wide range of media and communication methods to ensure it reached as many organisations, groups and individuals as possible including Local Authorities, Councils, and Non-Motorised User groups as well as local residents. For the Statutory Consultation (05 November – 17 December 2020) a Stakeholder mapping workshop was held identifying different groups and ensured there was a way of reaching everybody. These consultations have helped to shape the proposals. This will continue as close collaboration is ongoing with external parties, in the Detailed Design and construction phases, working closely with Tameside Metropolitan Borough Council (MBC), High Peak Borough Council and Derbyshire County Council, for example, to agree Scheme proposals on the single carriageway section and junctions, and also with Transport for Greater Manchester in terms of the new junction design.

4.3. Design Council review

- 4.3.1. This Scheme was presented to the Design Council for review at an appropriate stage of the Preliminary Design (July 2020), before the Scheme was put to public consultation later in 2020. The presentation was led by a Chartered Landscape Architect, familiar and experienced with road infrastructure projects, with a focus on the project team's understanding of place, people and context and how the Scheme sought to reflect this in the emerging design. The Scheme was selected by the Design Panel for review so they could advise on guidance and standards which would aid the wider role of embedding best practice across the design. As part of the feedback received The Design Council stated that "*The analysis and appreciation of landscape character along the road corridor was impressive and detailed*".

5. Development of the detailed design

5.1. Detailed Design framework

- 5.1.1. Method-led construction is a framework developed by the Principal Designer and Contractor which is being used on the Scheme to align method and design to ensure the optimal solution is developed and delivered on the project. By using method-led construction to structure the project in pre-construction, the project team can ensure ideas for innovation are considered as early as possible during the asset's lifecycle during solutions development. This will be driven by low-carbon and carbon reduction considerations. It also provides a platform to ensure constraints and constructability are considered in suitable detail before designs are finalised and construction begins.
- 5.1.2. The design will be developed in the same way it has originated, through continual cross discipline dialogue with a focus on place making and people. This will ensure that the ensuing details will recognise the multifarious contributors and factors that will help to deliver a successful design outcome. The design will be driven by a desire to create a corridor which is respectful of its landscape setting, the rich ecology and heritage of the area and the functional needs of drainage, sight lines, access, buildability and all sustainability criteria. Key planting and landform proposals will be developed and detailed to reflect the locale and great attention will be paid to the final slope profiles and gradients as well as the planting mixes, which will reflect local successful species and take account of future pressures that climate change and resilience will bring. These will also be developed to consider our partners and stakeholders views.

5.2. Engagement with local authorities and local highway authorities

- 5.2.1. Please refer to section 1.2 of this document, which explains the commitments for engaging with relevant authorities and how these will be secured for the Detailed Design stage.
- 5.2.2. The proposed finishes and street furniture will be agreed with the local authorities Tameside MBC, High Peak Borough Council and Derbyshire County Councils through the approval process required by Article 12 of the dDCO (REP6-002) which will cover the Scheme details.
- 5.2.3. A significant amount of consultation with the local authorities has already been undertaken to inform and update on design progress. These links are well established and will be maintained throughout the consent process to ensure agreement and approvals are gained.
- 5.2.4. The design for the area above Mottram Underpass and the detrunking plans for the existing A57 trunk road have yet to be finalised. Discussions are currently underway to agree the detail with Tameside MBC.

Appendices

Appendix A. Scheme response to the Road to Good Design principles

A.1 Application of Design Principles

A.1.1 The iterative design process has responded to a range of environmental and engineering constraints. The following table provides examples of where the multi-disciplinary design team have worked together to develop the proposed design, both in response to context and through the design principles embedded within the proposals.

Road to Good Design principles	How the Scheme has considered and applied the design principles
<p>Good road design makes roads safe and useful</p>	<p>Overall</p> <ul style="list-style-type: none"> • Scheme Safety objective focused on all user groups and forms a key part of the design. It aims at improvement vs current performance for road users and reduces risk to as low as its reasonably practicable (ALARP) for road workers. • A Walking, Cycling and Horse-riding Assessment Report (WCHAR) was undertaken to inform the design. • Prohibition of Non-Motorised Users (NMUs) from the Dual Carriageway and Local Safety Improvements around existing junctions (Gun Inn). • Deer fencing strategy considered. • Overall number of accidents and casualties within the modelled network will be reduced (COBALT). • As part of the Statutory Consultation, discussions were held with multiple stakeholders to ensure the design is 'useful' for all. • Traffic flows on the existing congested A57 will be reduced by up to 75% in the design, significantly improving journey times through Mottram.

Road to Good Design principles	How the Scheme has considered and applied the design principles
	<p>Structures</p> <ul style="list-style-type: none"> • Within the Structures Options Reports, Health and Safety has been considered (part of the scoring matrix) for the construction and future maintenance of the structures and the impact on the network and road users. • Suicide prevention measures have been considered for the Roe Cross Road Overbridge and Mottram Underpass and will be further reviewed at detailed design stage. • The two underpasses will be lit to improve safety for users. <p>Junctions</p> <ul style="list-style-type: none"> • Pedestrian provision will be enhanced at the existing junctions at M67 Junction 4, Mottram Village crossroads and the Gun Inn Junction as well as the new junctions at Mottram Moor and Wooley Bridge. • Three signalised junctions will be created throughout the scheme including a new horse crossing and new bridleway. This provides improved access for NMUs and makes the junctions safer for users, as well as ensuring the Scheme is inclusive and safe access for all users has been considered. • Safe controlled crossings will be provided as an integral part of the overall junction design. <p>Crossings</p> <ul style="list-style-type: none"> • Crossing will be improved and upgraded in several locations as well as tightening junction geometry at Tavern Road T-junction with A57 Woolley Lane. • Freestanding pedestrian crossings will be provided in the local network particularly where traffic calming will be added as part of the scheme. <p>Footways, cycleways and bridleways</p> <ul style="list-style-type: none"> • A combined footway and cycleway will be installed on the proposed new link road between Mottram Moor and Woolley Bridge, creating a connection route with the existing Sustrans National Route 62 and Trans Pennine Trail and a tie-in with the Hyde to Hollingworth cycle route scheme. This will increase the usefulness of the walking and cycling routes while making them safer. • New bridleway connection will be introduced from Old Hall Lane to Mottram Moor.

Road to Good Design principles	How the Scheme has considered and applied the design principles
<p>Good road design is inclusive</p>	<p>Consultation</p> <ul style="list-style-type: none"> • Consultation process and stakeholder engagement ensures design reflects all users and the community. • Consultation designed to reach all corners of the community despite Covid 19 with mix of activities including: brochure distributed to over 20,000 homes; interactive webinars; Q&A sessions; telephone Tuesdays followed up on Thursdays; animated flythrough with voice over, everyone was able to email and write in; stakeholder meetings; local press, social media coverage etc; Over 1500 responses to the consultation forms. • All material for consultations was done with people with disabilities in mind to make it as user friendly as possible. All material was available in 8 different languages. • Working with Local Authorities, NMU groups, local cycling groups, and the British Horse society. <p>Active travel</p> <ul style="list-style-type: none"> • In line with the WCHAR new footways, cycleways and bridleways will be added alongside sections of the route to encourage people to walk and cycle. The design is aiming to increase the attractiveness of the routes as well as making the routes safer. • The WCHAR also assessed the existing rights of ways and how they can be improved for the design. The proposals were presented to NMU groups and comments were taken and addressed within the Scheme design. • Separate Pegasus crossing added to Mottram Moor Junction to allow safe crossing facilities for walking, cycling and horse-riding. Improved access for non-road users, makes the junction safer for users. Changes made in response to better understanding of local needs through consultation, ensures the Scheme is inclusive and access for all users has been considered.
<p>Good road design makes roads understandable</p>	<p>Road layout</p> <ul style="list-style-type: none"> • The scheme is legible, intuitive and understandable in terms of urban design from road user and NMU perspectives. • The road design has also incorporated the DMRB standards thus providing good road user experience. <p>Junctions</p> <ul style="list-style-type: none"> • The simplification of Mottram Moor junction from a roundabout to a signalised junction will support ease of understanding and driving experience for road users.

Road to Good Design principles	How the Scheme has considered and applied the design principles
	<p>Signage</p> <ul style="list-style-type: none"> • A clear and straightforward layout and signing strategy has been developed which aligns to the existing signing within the Trunk Road and Local Authority network signing. • Changes such as the through-about at Hattersley Junction (M67 J4) will be mitigated through signage, with the rationale for the through-about being to improve traffic flow, and so driving experience is ultimately smoother.
<p>Good road design fits in context</p>	<p>Road alignment</p> <ul style="list-style-type: none"> • The team has ensured the design integration of the road corridors into the local environment. • Mottram underpass layout allows Old Hall Lane, Old Road and Roe Cross to remain in their current alignment. • The Scheme has been designed to be sensitive to landscape, heritage, biodiversity and the community. <p>Landscape and ecology</p> <ul style="list-style-type: none"> • In line with DMRB LA 107 Landscape and visual effects, the Statutory Consultation included an exercise to identify what the public perceive to be valuable in relation to the landscape. The design of the Scheme has been developed to account for these elements which consultees considered valuable in the local area. • The team has ensured the landscape design, including landform and planting, fits as naturally as possible in the existing design context and aims to reduce visual impacts. • The Scheme wherever possible has aimed to reduce impacts on existing vegetation, including habitat creation for curlews, which was helped by design iteration changes to Mottram underpass. • The overall footprint of all structures and their locations have been reviewed to reduce the impacts on the surrounding landscape and changes made such as reducing the overall length of River Etherow bridge and Carrhouse Lane underpass. • The Mottram underpass location has changed through design review, which has significantly reduced the length/size of the approach walls to the eastern portal. Mottram cutting includes proposals for heather and scree on slopes of underpass. • Bat structure proposals have been designed to match existing features, such as stone access structures. • Long range views are included in the design to improve the driver experience.

Road to Good Design principles	How the Scheme has considered and applied the design principles
	<ul style="list-style-type: none"> Impacts to rivers will be minimised by making watercourse crossings as short as possible. Proposals include reinstatement of the habitats and improving it where possible through biodiversity net gain.
<p>Good road design is restrained</p>	<p>Lighting</p> <ul style="list-style-type: none"> The lighting design has considered the potential landscape and ecological effects as informed by a high-level assessment of the changes to the landscape and visual receptors resulting from the introduction of the Scheme lighting. The lighting design aims to minimise light pollution which can result in sky glow, glare and light trespass by using LED luminaires as they have a much tighter beam control of lighting against traditional lamps, so lighting spillage outside the highway boundary is less likely, as well as reducing energy use. The designed lighting will also have no upward light. The amount of light on the verges has been limited, which will help reduce bat disturbance. Design assessment has resulted in the removal of lighting from the Dual Carriageway link between junctions. In locations where wildlife could be affected by the introduction of lighting, colour temperatures selected for luminaires will be sympathetic to wildlife by limiting the blue component of emitted light, as well as using restricted column heights. Lighting design has been amended to the carriageway crossing point of the River Etherow as studies have shown optimum mounting heights and luminaires to minimise impact of lighting on the river below. <p>Landscape bunds</p> <ul style="list-style-type: none"> Minimising impact on existing vegetation and landowners by reducing the extent of the landscape bunds on the single carriageway section. <p>Construction</p> <ul style="list-style-type: none"> Minimising demolition requirements for Mottram underpass for sensitive receptors and the elimination of Mottram underpass diaphragm walls will reduce extent of works and working space required. Reduction in the in the infrastructure required for the UU aqueduct crossing.
<p>Good road design is environmentally sustainable</p>	<p>Sustainability</p>

Road to Good Design principles	How the Scheme has considered and applied the design principles
	<ul style="list-style-type: none"> • Taken an integrated team approach to setting sustainability targets using a Project Sustainability Framework Tool (SFT). • The SFT was developed to align with National Highway’s sustainability requirements as detailed in: Design Manual for Roads and Bridges (DMRB) GG103 Introduction and general requirements for sustainable development and design; Sustainable Development Strategy (SDS); and The Road to Good Design. • In addition, the sustainability priorities of Tameside MBC, Derbyshire County Council, High Peak Borough Council and Elmbridge Borough Council have also been considered in the SFT. • A sustainable development workshop was conducted including all the key design and environmental discipline leads as well as environment and sustainability leads from the appointed Principal Designer and Contractor, and representatives from National Highways. <p>Low carbon design</p> <ul style="list-style-type: none"> • Carbon Management Plan implemented, committing the Scheme to the PAS 2080 process to identify opportunities for carbon saving. • Lowest carbon solutions will be progressed as the preferred choice for detailed design. <p>Maximising biodiversity</p> <ul style="list-style-type: none"> • Opportunities to improve biodiversity have been maximised within the permanent land-take within the DCO boundary. Off-site enhancement opportunities will also be explored during the detailed design. <p>Environmental mitigation</p> <ul style="list-style-type: none"> • Design is sensitive to landscape, heritage, biodiversity and the community, following early involvement of landscape, ecology and heritage survey teams to inform the design as well as comprehensive stakeholder engagement. <p>Sustainable Drainage (SuDS)</p> <ul style="list-style-type: none"> • Three attenuation ponds will be included in the Scheme and these have provided opportunities to introduce aquatic habitat, to serve as wetlands, and help attract aquatic associated fauna such as willow tits, curlews and otters. <p>Cut and fill</p> <ul style="list-style-type: none"> • Modification of slope angles within Mottram cutting to achieve cut/fill balance.

Road to Good Design principles	How the Scheme has considered and applied the design principles
	<p>Lighting</p> <ul style="list-style-type: none"> • Lighting installations will incorporate variable dimming technology, which will enable maintaining agents to adopt the implementation of variable lighting levels to suit the traffic flows encountered. This will result in a reduced running cost with the consequent reduction in greenhouse gas emissions and enable the lighting to meet the ongoing requirements should traffic flows increase/decrease. • Luminaires will be manufactured in the UK helping to reduce emissions through transport emissions of final product. • All existing luminaires will be disposed of according to the WEEE (Waste Electrical and Electronic Equipment) directive and proposed luminaires will be WEEE compliant. • Proposed column materials can be recycled and where existing cable will be removed, the copper can be recycled. • Design proposes LED luminaires that require very little maintenance to be used (typically an electrical test done every 6 years). By lowering maintenance requirements, there is an indirect social benefit to road users as they are less affected by maintenance traffic management.
<p>Good road design is thorough</p>	<p>Specialist driven design</p> <ul style="list-style-type: none"> • All disciplines working together to meet required standards and guidelines. • Landscape and ecology design is integrated and iterative. • The project team has had an overall intent to reduce the footprint of the Scheme to reduce the impact on stakeholders, landowners and residents. • All design leads attended a Sustainable Development Workshop, which ensured that the design of all elements of the road environment were considered together and integrated into a responsive design. • The approach of embedding sustainability in the Scheme design has fostered consideration of Scheme performance regarding a thorough design as a formal objective. This ensured a robust design process, creating a continual cycle of improvement for optimal results. <p>Consultation</p> <ul style="list-style-type: none"> • Audit trail of assumptions, decisions, and stakeholder engagement.

Road to Good Design principles	How the Scheme has considered and applied the design principles
	<ul style="list-style-type: none"> • Feedback from the stakeholder engagement was recorded and carefully considered as part of the Scheme’s development. This helped inform the overall design to ensure connectivity is improved and reduced the impact on the village itself. • Consultation with cycling, horse riding, walking and Local Authorities have led to improvements of pedestrian and cyclist facilities around junctions and the introduction of the new bridleway connecting Mottram Moor junction to Old Hall Lane and the tie-in with Tameside’s Hyde to Hollingworth cycle route. <p>Design iterations</p> <ul style="list-style-type: none"> • Several design iterations were produced to ensure the design meets the required standards and guidelines as well as consideration of the stakeholder engagement feedback. • A design decisions log has been maintained, allowing for design decisions to be recorded and understood by future project teams, ensuring that the design taken forward to the next stage is carried out in a consistent way. • Design elements have been progressed to a greater level of detail than normally expected at stage 3 to minimise risk of change including Mottram Underpass, Junction layouts. • Old Mill Farm underpass and Carrhouse Lane underpass have been developed to maintain farm access and provide a safe route for walkers, cyclists and horse riders. • The arrangement of the M67 Junction 4 roundabout was changed to a ‘through-about’, to enhance the performance and to improve traffic flows. • Following the Design Panel Review and landowner consultation at Carrhouse Lane, options will be considered at a later design stage to minimise the impact on this property by providing an alternative farm access.
<p>Good road design is innovative</p>	<p>Consultation</p> <ul style="list-style-type: none"> • Remote consultation using alternative methods to engage with stakeholders and the community as a result of Covid. <p>Design iterations during the Preliminary Design stage</p> <ul style="list-style-type: none"> • Mottram Underpass was originally a tunnel, and Roe Cross link road, junction and Cricket Ground roundabout removed from the Scheme, without compromising the improvements to traffic levels. This was changed to an underpass to blend in better with the landscape; be cheaper, quicker and easier to construct, a decrease in maintenance commitments, reduce the carbon footprint and reduce disruption to the local community.

Road to Good Design principles	How the Scheme has considered and applied the design principles
	<ul style="list-style-type: none"> • Proposed Mottram Moor roundabout replaced with a signal-controlled junction. The traffic modelling suggested that a crossroads with traffic lights would achieve future reserve capacity, improving journey times, by reducing delays. This change reduces land take, as well as the impacts of the scheme on wildlife and views from neighbouring properties • Alignment to the east of the Scheme was moved to accommodate a proposed housing development, ensuring the Scheme is integrated with future communities. • Improved crossing facilities on the A57 from the M67 Junction 4 include a combined cycleway and footpath alongside the new A57(T) to A57 link road between Mottram Moor and Woolley Bridge. Providing safe controlled crossings as an integral part of the overall junction design, as it provides appropriate segregation for walkers and cyclists • Reduction of proposed construction compound sites from three areas to one area. Less disruption and noise to the community, reduced land take, reduced the impacts on wildlife and watercourses. • Opportunities for facilities for cyclists, pedestrians, equestrians and walkers were identified through work with local authorities and Transport for Greater Manchester (TfGM). All junctions designed to include a horse crossing. Provisions encourage people to walk and cycle and increase the attractiveness of the routes while making the walking routes safer. Following consultation with Tameside MBC it ensures that the Scheme would tie in with their proposed cycle scheme from Hyde to Hollingworth in the future. • Mottram Underpass design revised, moving it 20 m to the east, to span the fault line. This significantly reduces the risks involved. Other changes included replacing the proposed diaphragm wingwalls with less extensive secant pile walls. Simplified design using earthworks instead of concrete; reducing the length of the wing walls; reducing depth of the cutting itself; and retaining Old Hall Lane on its current alignment. The design blends in better with landscape; and is cheaper, quicker and easier to construct with reduced carbon footprint and reduction in disruption to the local community. • Removal of flood channel from River Etherow crossing design, shortening length to 42 m from 60 m, and removal of the supporting structure. Updated hydraulic modelling of the River Etherow confirmed flood risks could be managed by subtly reshaping the channel and the surrounding floodplain itself. • Carrhouse Lane Underpass design updated, relocating it 10m closer to the existing road. Improved access for local residents through provision of an inclusive facilities that increase the attractiveness of the routes while making them fit within the context of their surroundings.

Road to Good Design principles	How the Scheme has considered and applied the design principles
	<ul style="list-style-type: none"> • Old Mill Farm Underpass updated to link up better to the local footpaths, minimising impacts on farmer’s access route severed by the Scheme. • Environmental benefits: minimises impacts on farmers access route severed by the Scheme • In response to recommendations from the landscape team, earthworks embankments along the A57 Link Road between the Mottram Moor and Woolley Bridge junctions were reduced and modified to reflect the existing surroundings and ensure more of the existing woodland could be retained. Profile shapes and habitat created would make these features look more naturalistic. The right blend between screening and integration with the local surroundings ensures future obligations for maintenance during the operation phase are minimised. • Signal phasing modifications at Hattersley Roundabout, Gun Inn junction and Mottram Junction were updated to reflect changes in junction priority and pedestrian and cyclist facilities. <p>Construction</p> <ul style="list-style-type: none"> • The current program is targeted at 18 months which was previously 24 months and where possible electric vehicles, offsite manufacturing will be looked at. • Engagement between the appointed Principal Designer and appointed Principal Contractor during the Preliminary Design stage has brought about more challenge to the design process at an earlier stage, as the project team are designing what they are actually going to build. This has brought about positive collaboration and innovative design decisions.
<p>Good road design is collaborative</p>	<p>Project design team</p> <ul style="list-style-type: none"> • One integrated team – everyone engaged, in the loop and pulling together – ensures best practice and constructive challenge. • Principal Designer and Principal Contractor appointed by National Highways during the Preliminary Design stage, therefore working together at an early design stage and during the DCO process, rather than at the Detailed Design stage. • Internal collaboration through delivery using digital tools. • The discipline leads attended weekly online design meetings where design developments were communicated to the team and discussions around constraints could be held, leading to a better considered design.

Road to Good Design principles	How the Scheme has considered and applied the design principles
	<ul style="list-style-type: none"> • The environmental assessment process fed into the design through workshops, design meetings and continual contact and feedback, resulting in the design discussion absorbing a wide range of professional opinions to influence and determine the final design. • Key members of the team are local to the Scheme and understand the local issues and requirements. <p>Wider consultation</p> <ul style="list-style-type: none"> • Working with key stakeholders including National Highways, Transport Authorities, Local Authorities, Utilities, and TfGM for consultation and throughout the design process. • Coordinating consultation with TfGM Clean Air Zone. • From the consultation feedback, every response was reviewed, coded and analysed so the design team could see if they need to consider these comments in relation to the design. Comments were reflected in how we responded in the consultation report to see how these have been dealt with • Examples of collaborative influence to the design include: changes to the M67 Junction 4 roundabout layout, to include a through-about, improving facilities for pedestrians and cyclists; additional pedestrian crossing facilities at Gun Inn junction; additional facilities at all proposed signalised junctions. • Also consultation has led to changes to ensure that: the Scheme can maximise opportunities to minimise disruption on future farming activities; the proposal aligns with the Thameside MBC cycle scheme which is currently being designed; and the Wooley Bridge design fits into a future Derbyshire County Council housing development. • Continual interaction between project team disciplines, and consultation with Thameside MBC, as well as National Highways, has enabled the incorporation of connectivity improvements for NMUs in and around Mottram, in particular the connection to the TransPennine Trail and national cycle routes. • Install more 'on-street' parking at Mottram Moor, following consultation, as this is considered to require less ongoing maintenance, and provided additional space for soft landscaping. The design fits into the context of its surroundings and provides additional function and facilities for local residents. • New bridleway linking in with the local PRoW introduced from Old Hall Lane, on top of the cutting and linking back in with Mottram Moor Junction. This was in response to various walking, cycling and horse-riding consultees requested that a bridleway was provided along the proposed Glossop Spur. These bridleways will help to link the Trans Pennine and Pennine Bridleway National Routes, without road riding.

Road to Good Design principles	How the Scheme has considered and applied the design principles
<p>Good road design is long lasting</p>	<p>Whole life cost considerations</p> <ul style="list-style-type: none"> • A balance has had to be maintained between whole-life costing and other major considerations, such as construction cost and practical maintenance complications. • Whole life cost considerations include robust pavement foundation design to minimise long term maintenance. • Adhering to long term design life requirements for structures, drainage and traffic modelling where the preferred option favours durability over total costs. • All structures will be designed to current standards with a 120 year design life. Any proposed joints will be strengthened for 25 years beyond the structure design life (being 145 years total). • The preliminary design explored options to build minimum rather than use of low-cost materials. • Quality materials have been carefully detailed to be maintenance friendly. <p>Flooding</p> <ul style="list-style-type: none"> • For pluvial flood risk on the road surface, 20% climate change allowance has been used for the preliminary design as per DMRB CG501 and as discussed with National Highways. A higher value, 40% allowance, for climate change will be assessed during detailed design once further information is available. • A climate change allowance has also been applied to fluvial flows for the design of the flood compensation areas (to determine their volume) and to determine the distance needed between the soffit of structures and the design flood water level of the rivers being crossed. <p>Landscape</p> <ul style="list-style-type: none"> • The proposed landscape design will aim to futureproof the Scheme in terms of climate change. This will include diversifying planting species as much as possible, including drought tolerant species, whilst still having regard to the local character, and generally planting only native species. • The focus has been on local species which have some resilience to avoid alien landscape features. This has been achieved through selecting locally successful plant species and adopting climate resilient ones based on current guidance to address warmer wetter winters and hotter drier summers. <p>Resilience</p> <ul style="list-style-type: none"> • The structures designed into the Scheme have been designed to be resilient to impacts arising from current weather events and climatic conditions and designed in accordance with current planning, design and

Road to Good Design principles	How the Scheme has considered and applied the design principles
	<p>engineering practice and codes (e.g. the Environment Agency's guidance on allowances for rainfall and flood probability due to climate change, within the context of flood risk assessments). The Scheme has also been designed to include the wind loading standards which incorporate site specific criteria, based on a number of factors including wind direction, altitude and topography.</p> <ul style="list-style-type: none">• The design of the proposed Mottram Underpass will incorporate appropriate design measures/requirements, to ensure that the structural integrity and long-term performance of the underpass is not compromised.• The design will ensure structures can adapt to expected future variations in temperature. The Eurocodes used for the two bridges in the Scheme stipulate design to a temperature range of -18°C to 34°C which is adjusted to take account of altitude, material type and depth of surfacing thickness.

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