

Trans-Pennine Routes Feasibility Study

Stage 2 Report

February 2015

1059538/02/F

This report has been prepared for the Highways Agency and the Department for Transport by Mouchel Ltd.



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1 Executive Summary

1.1 Context and Background

- 1.1.1 The Department for Transport has commissioned a number of Feasibility Studies to investigate solutions to some of the most significant and longstanding congestion hotspots in the country. The aim of this feasibility study is to identify the opportunities and understand the case for future investment on trans-Pennine routes that will improve connectivity between Manchester and Sheffield, and that are deliverable, affordable and offer value for money.
- 1.1.2 The study considers the current trans-Pennine road routes which include the A57, A628, A616 and A61 in terms of the strategic road network, as well as the A57, A6, A623, A624, A625, A6187 and A6103 on the local authority road network. The study also includes the Hope Valley railway line.
- 1.1.3 The modal scope of the study is predominantly road-based and considers potential investment proposals on both the strategic and local authority road networks. The study also aims to understand the contributions that current rail investments plans may bring to trans-Pennine connectivity and be aware of and understand further potential proposals that may emerge from other related transport investment planning processes.
- 1.1.4 The feasibility study does not consider specific issues or proposals in relation to other parts of the strategic road network in the vicinity, as the case for further future investment will be considered as part of the Highways Agency's South Pennines Route Strategy, or within other specific feasibility studies.
- 1.1.5 The study has followed three stages and this report provides the outputs from Stage 2 and follows Steps 5 to 9 of the WebTAG Transport Appraisal Process Guidance.

1.2 Summary of the Option Assessment

- 1.2.1 The evidence gathered and analysed as part of Stage 1 of this study provided the basis for identifying current and future issues and challenges which require addressing in order to improve the overall performance of the routes. The identified issues and challenges were used to form a list of intervention specific objectives which, along with the studies overall aims and objectives, formed the basis for the consideration of potential investment options.
- 1.2.2 Options identified throughout this process focused on the strategic highway network, given the location of issues and challenges, but also took into account other Highways Agency and local schemes. A number of historic schemes were considered as part of the process and assessed alongside previously un-explored options in order to provide a fully inclusive option assessment exercise.
- 1.2.3 Historic schemes which have previously been consulted on and taken forward, in some cases, or elements thereof taken forward, were reviewed as part of this process.
- 1.2.4 Throughout the option identification and development process the views of stakeholders have been sought and feedback taken into account with any suggested measures raised included in the assessment process.

- 1.2.5 The methodology adopted in order to conduct the sifting of options has been in line with WebTAG guidance relevant for this stage of consideration of investment opportunities. It identified any 'showstoppers' which could prevent an option progressing at subsequent stages in the assessment process. The process has focused on options which tackle the key problems identified or contribute towards the key objectives, and which were deemed to be feasible and deliverable within the timeframe of available capital investment.
- 1.2.6 As part of this process, an initial sifting tool has been utilised, enabling a qualitative assessment to be made of the scale of impact of each of the 23 initial options against the problems identified and against the objectives, and also against deliverability and feasibility criteria. Following the initial sift, 19 of the initial options were not progressed as, on their own, they did not perform against the evaluation criteria to a satisfactory extent due to deliverability or feasibility issues or due to not being envisaged to represent a desirable level of scale of impact against the identified problems and objectives. 4 options were considered to meet the evaluation criteria through scale of impact and on deliverability and feasibility grounds.
- 1.2.7 The decision was taken to test the packaging together 6 of the options that did not pass the initial sift, in combination with each of the 4 primary options. The 31 combinations resulted in 124 packages (31 x 4 options) which were subjected to a second sift using the same sifting tool. The outcome of this second sift was that 68 packages were not taken forward and 56 packages were taken through, along with the 4 individual options from the first sift, to the final stage of sifting, using the DfT's EAST decision support tool plus 1 further package; (HGV Control scheme, including complimentary sustainable transport measures).
- 1.2.8 Following the EAST assessment, an overall ranking was conducted and 4 packages were identified for further development and assessment, these are:
- Bypass of Mottram, Hollingworth and Tintwistle with A57(T) to A57 Link Road, Climbing Lanes (including Salter's Brook Realignment), Route Safety Improvements Technology Package and Maintenance Strategy;
 - Dual carriageway link road M67 to A57 Mottram Moor (tunnel under Roe Cross and spur connecting to A6018) with A57(T) to A57 Link Road, Climbing Lanes (including Salter's Brook Realignment), Route Safety Improvements Technology Package and Maintenance Strategy ;
 - A57 Mottram One Way with A57(T) to A57 Link Road, Climbing Lanes (including Salter's Brook Realignment), Route Safety Improvements Technology Package and Maintenance Strategy,; and
 - A61 Dualling with A57(T) to A57 Link Road, Climbing Lanes (including Salter's Brook Realignment), Route Safety Improvements Technology Package and Maintenance Strategy.

1.3 Better Performing Options

- 1.3.1 From the EAST assessment the short listed packages of options were developed to a sufficient level of design / specification to be able to distinguish the relative impacts of the packages under consideration.
- 1.3.2 This used the 'Transport Appraisal Process' TAG Transport Business Case criteria Option Assessment Framework, provided within the TAG Unit. The assessment areas were as follows:
- Strategic Fit;
 - Value for Money
 - Financial Case;
 - Delivery Case; and
 - Commercial Case.
- 1.3.3 The assessment of the impacts of each of the packages of options was predominantly qualitative in nature given the availability of a suitable traffic model which adequately covers the full study area and which would enable more quantification / monetisation of impacts.
- 1.3.4 Each of the better performing packages identified had the potential to address the issues of congestion on the strategic route and therefore were expected to improve journey times and journey time reliability. The first three of the better performing options contribute to addressing the severe congestion at the western end of the route and the final option, congestion at the eastern end of the route. Scheme elements at the western end would also be expected to impact, to different extents, the issues of community severance identified in western villages.
- 1.3.5 For all four packages it was considered that the propositions should include a package of secondary / complementary measures as follows:
- A57(T) to A57 Link;
 - Safety measures across the entire route focused on accident cluster sites and areas of concern identified in Stage 1;
 - Climbing lanes on A628 where considered feasible and appropriate to negate the impact of slow moving vehicles across the rural sections of the route. (This includes a Realignment at Salter's Brook which has an additional eastbound climbing lane);
 - Technology package to be applied across the route and the wider area, taking in the motorway network and local routes feeding into the strategic route; and
 - Maintenance strategy to be continued across the strategic route. Extensive infrastructure maintenance improvements already planned on the route will form a sound basis upon which future maintenance regimes can be implemented.
- 1.3.6 For the A61 Dualling it was considered that, given its geographical remoteness from the other elements of the central package, that this option should be assessed as a standalone option and as an element within the central package.

- 1.3.7 For the three options at the western end it is considered that the business case assessment should be centred on the complementary options as these will provide a whole route / central package comprising the measures outlined above with the variant scheme at the western end of the route.
- 1.3.8 This study has focused on options that can be delivered in the short to medium term, it was clear that there were a number of options that stakeholders believe merited further consideration as longer term solutions did have the potential to deliver a step change in the level of connectivity between Sheffield and Manchester, including potential road tunnel options.

2 Introduction and Purpose

2.1 Preamble

- 2.1.1 This report presents the methodology and outputs of the second stage of the trans-Pennine Routes feasibility study. This stage focuses on identifying, generating, assessing and sifting proposed investment options that could address the current problems and future issues that have been identified along the route. It includes the consideration of investment proposals for the strategic and local authority road networks and sets out the approach taken for rail investment options.
- 2.1.2 Challenges identified in stage 1 of the study established the need for intervention and resulted in the development of objectives, as directed by the WebTAG Transport Appraisal Process.
- 2.1.3 The following intervention specific objectives have been developed for the trans-Pennine Routes and agreed in Stage 1:
- **Connectivity** – improving the connectivity between Manchester and Sheffield through reduction in journey times and improved journey-time reliability;
 - **Environmental** – avoiding unacceptable impacts on the natural environment and landscape in the Peak District National Park, and optimising environmental opportunities;
 - **Societal** – improving air quality and reducing noise impacts, and addressing the levels of severance on the Trans-Pennine routes in urban areas;
 - **Capacity** – reducing delays and queues that occur during peak hours and improving the performance of junctions on the routes;
 - **Resilience** – improving the resilience of the routes through reductions in the number of incidents and reduction of their impacts; and
 - **Safety** – reductions in the number of accidents and reductions in their impacts.
- 2.1.4 The output of this first stage of the study was a report which clearly set out the evidence-base, establishing the need for intervention and the specific objectives for intervention.
- 2.1.5 Stage 2, of which this report is the main output(s), sets out the methodology for the identification of potential investment options, sifting criteria used to assess options and the identification of the better performing options that could address the challenges identified on the route and fulfil the aims and objectives of the study. This stage follows the guidance contained in WebTAG steps 5 to 9.
- 2.1.6 Stage 3 of the study will go on to understand the case for future investment solutions on trans-Pennine routes that that will improve connectivity between Manchester and Sheffield, and that are deliverable, affordable and offer value for money.

3 Summary of Stage 1 Findings

3.1 Introduction

3.1.1 Stage 1 of the study presented a list of challenges on the trans-Pennine routes, identified under the headings of:

- Network operation;
- Asset conditions;
- Capacity;
- Safety;
- Social; and
- Environmental.

These challenges have been prioritised where they have an effect on trans-Pennine connectivity.

3.2 Summary of the Current Challenges

3.2.1 Stage 1 identified that the trans-Pennine routes faced a number of operational challenges, primarily focused on road closures, maintenance, availability of technology and alternative routes.

3.2.2 In terms of road closures, these were found to be predominantly related to poor accidents and poor weather, with the HA's A57/A628/A616/A61 and the local A57 being particularly susceptible to weather-related incidents.

3.2.3 Maintenance operations presented operational challenges due to the majority of the trans-Pennine routes being single carriageway. Maintenance operations on single carriageways can reduce operation to one lane, limiting the capacity of the route and causing significant delays on the busiest sections.

3.2.4 Currently, the trans-Pennine routes are felt to lack significant technology systems. This reduces the ability of the HA and local authorities to manage incidents and provide information to travellers. In addition, the condition of the highways assets presents some significant challenges within the trans-Pennine road. Challenges are particularly focused on construction standards, ageing assets and damage from collisions.

3.2.5 Whilst the current traffic flows on the trans-Pennine routes were found to be within the theoretical capacity of the individual highway links, significant delays were apparent due to the number of junctions, particularly the A57/B6174 junction, and the A616/A61 junction at the eastern end of the route. On the local road network, the A57 north of Glossop suffers from congestion, particularly at its junction with Woolley Bridge Road and the A628. In addition, parked cars in the built up areas and slower moving vehicles, with speeds reduced further by significant gradients, cause delays to traffic, particularly where opportunities to pass are limited.

3.2.6 The Stage 1 of the study determined that accidents are a challenge for trans-Pennine routes and lead to issues for journey-time reliability and maintenance. Detailed

analysis was undertaken of the HA's route and revealed that sections of the A628, A616 and A61 have accident rates above the national average. The A628, along with the A61, suffers from a high proportion of accidents during severe weather conditions, while the A628 also experiences a higher than national average rate for accidents at night. The A628 also experiences a high number of pedestrian accidents within the urban section through Tintwistle at its western end. Accidents are primarily focused at junctions, with a number of clusters on the HA's route but also on the non-trunk A57.

- 3.2.7 Social challenges within the trans-Pennine routes primarily focused on severance with particular issues on the A628 in Hollingworth and Tintwistle. In addition stakeholders highlighted more limited severance issues on the A57 in Glossop and on the non-trunk A628 in Millhouse Green and at the Penistone Grammar School.
- 3.2.8 The environmental challenges within the trans-Pennine area were found to be widespread and significant, as the majority of trans-Pennine route passes through the Peak District National Park, which presents significant constraints on improvements. The HA's A57/A628/A616/A61 route is also constrained by six Special Landscape Area designations, seven scheduled monuments, a Special Protection Area, a Special Area for Conservation, three Sites of Special Scientific Interest and six HA Flood Hot spots. The HA's route contributes to nine Defra Important Areas for Noise, one encompassing the route (A57) and eight on the route. The route also passes through four Air Quality Management Areas.

3.3 Future Challenges

- 3.3.1 The Stage 1 report outlined that, the city regions, with their component local authorities, had very significant plans for growth in houses and employment over the coming decade and beyond, with 222,000 homes and 265,000 jobs planned. This level of development was deemed likely to increase demand for travel across the Pennines. The report ascertained that the majority of development would occur on the two sides of the Pennines, rather than alongside the individual trans-Pennine routes. However, developments at Glossop, Mottram and close to Barnsley were highlighted by the respective local authorities as either being reliant on improved connectivity or capacity, or as likely to have significant impacts on the road network.

3.4 Establishing the need for Intervention

- 3.4.1 The challenges identified within Stage 1 were prioritised to ensure that Stage 2 focused on the most important problems faced by the trans-Pennine routes. The high priority challenges identified in Stage 1 were as follows:
- Accidents reduce journey time reliability, with high accident rates on some routes and a number of accident clusters;
 - Severe weather causes road closures which reduce journey time reliability;
 - There is a lack of technology to assist in the operation and management of the routes and provide information for travellers;
 - Maintenance on single carriageway sections reduces journey-time reliability;
 - Asset condition, including the standard, age and damage to infrastructure, reduce journey-time reliability through significant maintenance operations and risk from closures;

- Journey-times are increased by delays at junctions and the geometry and topography of routes; and
- Long term traffic growth will bring some urban sections of routes to their capacity.

3.5 Objectives

3.5.1 The identification of challenges in Stage 1 resulted in the development of objectives, as directed by the WebTAG Transport Appraisal Process.

3.5.2 The following objectives were developed for the trans-Pennine Routes and agreed in Stage 1:

- **Connectivity** – improving the connectivity between Manchester and Sheffield through reduction in journey times and improved journey-time reliability;
- **Environmental** – avoiding unacceptable impacts on the natural environment and landscape in the Peak District National Park, and optimising environmental opportunities;
- **Societal** – improving air quality and reducing noise impacts, and addressing the levels of severance on the Trans-Pennine routes in urban areas;
- **Capacity** – reducing delays and queues that occur during peak hours and improving the performance of junctions on the routes;
- **Resilience** – improving the resilience of the routes through reductions in the number of incidents and reduction of their impacts; and
- **Safety** – reductions in the number of accidents and reductions in their impacts.

4 Identification of Options

4.1 Introduction

4.1.1 This section of the report provides an overview of the processes taken to identify potential options for the study route and identifies the options taken forward to the initial assessment sift.

4.2 Approach

4.2.1 The evidence gathered and analysed as part of Stage 1 of this study provided the basis for identifying the issues and challenges which require addressing in order to improve the overall performance of the route. The identified issues and challenges were used to form a list of key objectives which this study would attempt to achieve, and it is this which formed the basis for the development of options. The challenges, issues and objectives are described in Chapter 3 of this report.

4.2.2 In line with step 5 of WebTAG a range of interventions were identified that could address the key challenges, and the objectives. These were focused on the strategic highway network as the evidence indicated that this was where the key challenges were primarily located. A number of historic investment proposals were considered and assessed alongside previously un-explored options in order to provide a fully inclusive option assessment exercise.

4.2.3 Options considered included measures that may influence the need to travel as well as options that involve capital spend such as infrastructure or revenue spend (regulation). Furthermore options, which include measures that might not provide a complete solution to the identified problem but which can make a contribution towards the objective, were also considered. This is because some options which may be rejected at any early stage when looked at in isolation may add value to other options when packaged together.

4.2.4 Historic schemes which have previously been consulted and taken forward, in some cases, or elements thereof taken forward, were reviewed as part of this process.

4.2.5 A number of scheme options were developed by the Project Team with assistance from maintenance and technology specialists.

4.2.6 Throughout the option development process the views of stakeholders have been sought and feedback taken into account with any suggested measures raised included in the assessment process.

4.2.7 Informal face to face discussions were held with a range of stakeholders to seek initial views on both the process adopted for Stage 2 and the identification of options. stakeholder views were sought regarding those options which have been identified through a review of previous studies, new options developed by the project team and ideas brought forward by stakeholders themselves.

4.2.8 The option generation process considered and took account of how committed and planned highway schemes (on strategic and local roads) and public transport schemes (including rail) would complement options identified.

4.2.9 As evidenced in the stage 1 work this study has been multi-modal in its outlook and the comparisons between road and rail connectivity between Manchester and Sheffield have been made. In terms of identifying possible investment options the study has recognised that potential rail investment options were being considered through other investment planning processes such as that being progressed by the Rail Electrification Task Force and the Higgins work, “Rebalancing Britain” which was considering improvement to east-west connectivity.

4.2.10 The DfT established a new task force to help identify the next generation of schemes that could be electrified as part of the Government’s continued investment in the rail network. This task force was expected to report its findings in early 2015. The routes to be examined relevant to this study include:

- Sheffield – Manchester
- Sheffield – Doncaster
- Templehirst Jn. – Selby – Hull (in conjunction with a Third Party)
- Sheffield – Leeds (via Moorthorpe)

4.2.11 In conjunction with this Electrification study, Network Rail, on behalf of the rail industry, planned to publish in 2015, a ‘refreshed’ Network Route Utilisation Strategy (RUS) for Electrification to outline the priorities for future electrification. The strategy will prioritise routes for further development based primarily on the density of diesel-operated traffic which could be converted to electric operation through the provision of electrification.

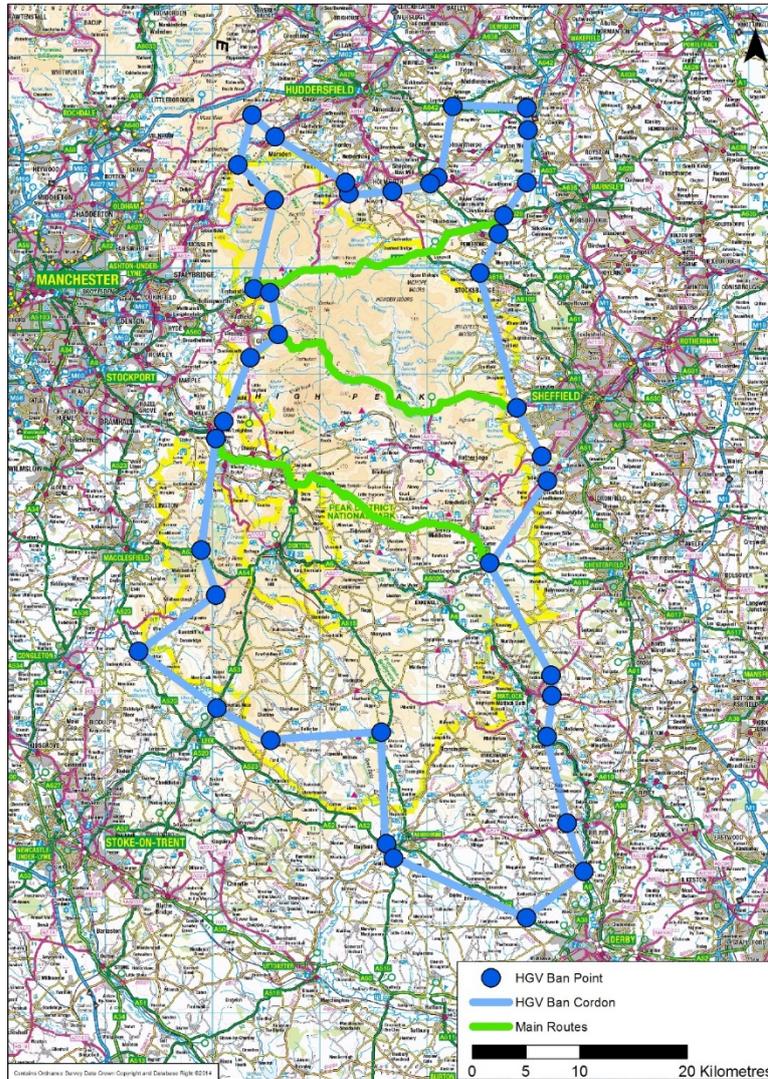
4.2.12 The following section of the report sets out the details of the of the possible investment options identified.

4.3 Regulation, Influencing Travel Behaviour & Demand Management options

4.3.1 Before identification of major infrastructure investment options, the study initially identified a range of potential investment options focussed around a range of smaller scale, sustainable transport options.

Table 4-1 HGV Control Scheme with Complementary Sustainable Transport Measures Option

HGV Control Scheme with Complementary Sustainable Transport Measures



Option Description:

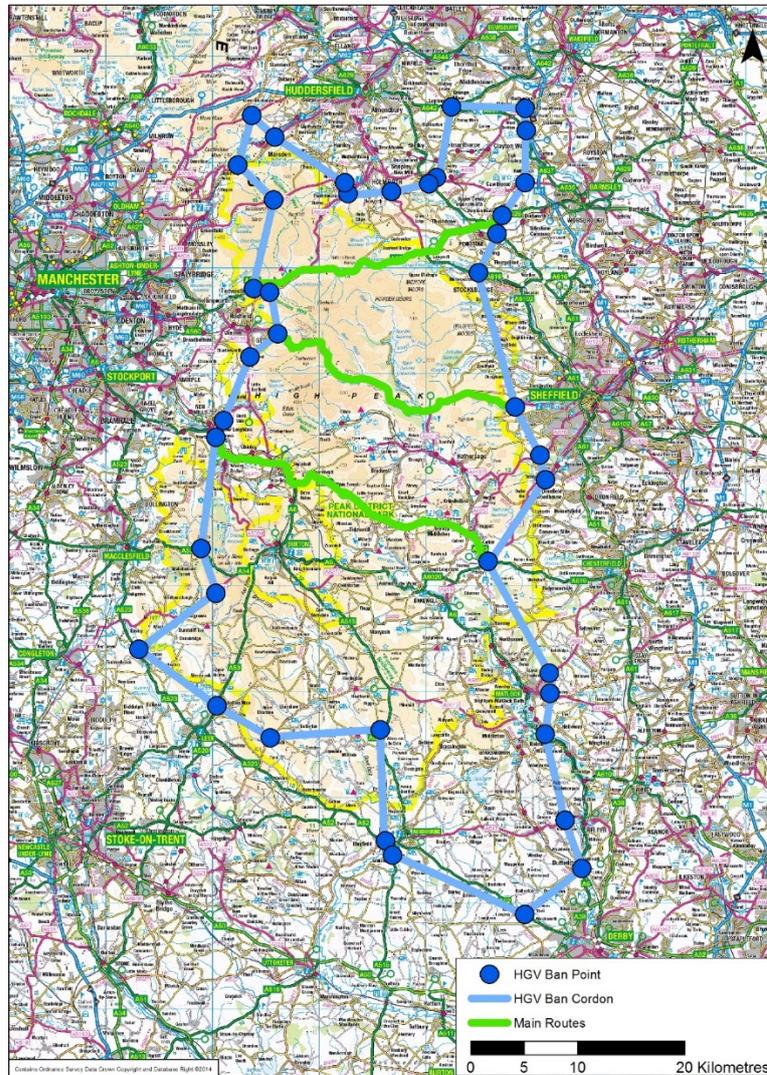
Introduce a 7.5T environmental weight restriction along all Trans-Pennine routes in the National Park routes along with a range of measures designed to improve sustainable transport choice and wellbeing of road users across the route including:

- Streets for people & management of mixed priority routes and safe routes to school;
- 20mph speed limits on residential streets;
- Traffic calming and 30mph speed limits in villages on the route;
- Improvements to cycle infrastructure and cycle training for all;
- Improvements to bus priority provision and increased funding for public transport; and
- Rail improvements such as new station at Gamesley, improvements to other stations and improved access thereto, funding for rail freight projects, subsidised rail cards.

Source: Stakeholders

Table 4-2 Peak Period HGV Control Scheme with Complementary Sustainable Transport Measures Option

Peak Period Only HGV Control Scheme with Complementary Sustainable Transport Measures



Option Description:

Introduce a peak time only 7.5T environmental weight restriction on all Trans-Pennine routes in the National Park along with a range of measures designed to improve sustainable transport choice and wellbeing of road users across the route including:

- Streets for people & management of mixed priority routes and safe routes to school;
- 20mph speed limits on residential streets;
- Traffic calming and 30mph speed limits in villages on the route;
- Improvements to cycle infrastructure and cycle training for all;
- Improvements to bus priority provision and increased funding for public transport; and
- Rail improvements such as new station at Gamesley, improvements to other stations and improved access thereto, funding for rail freight projects, subsidised rail cards.

Source: Stakeholders

Table 4-3 Sustainable Transport Measures Option

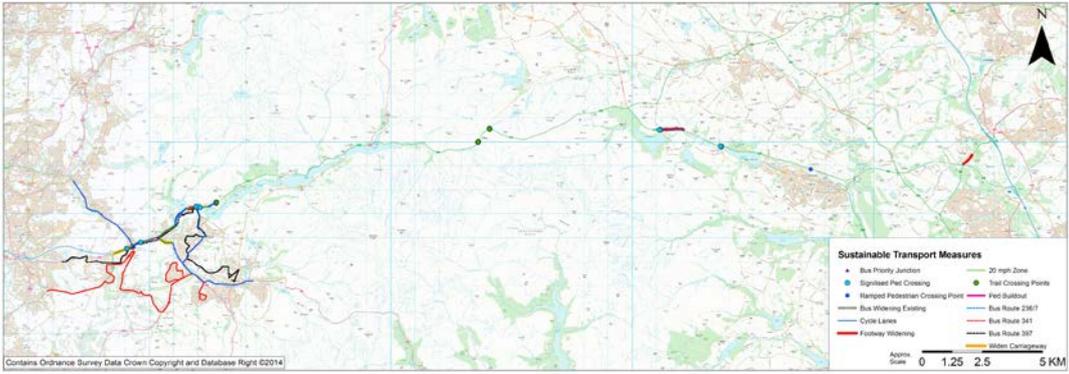
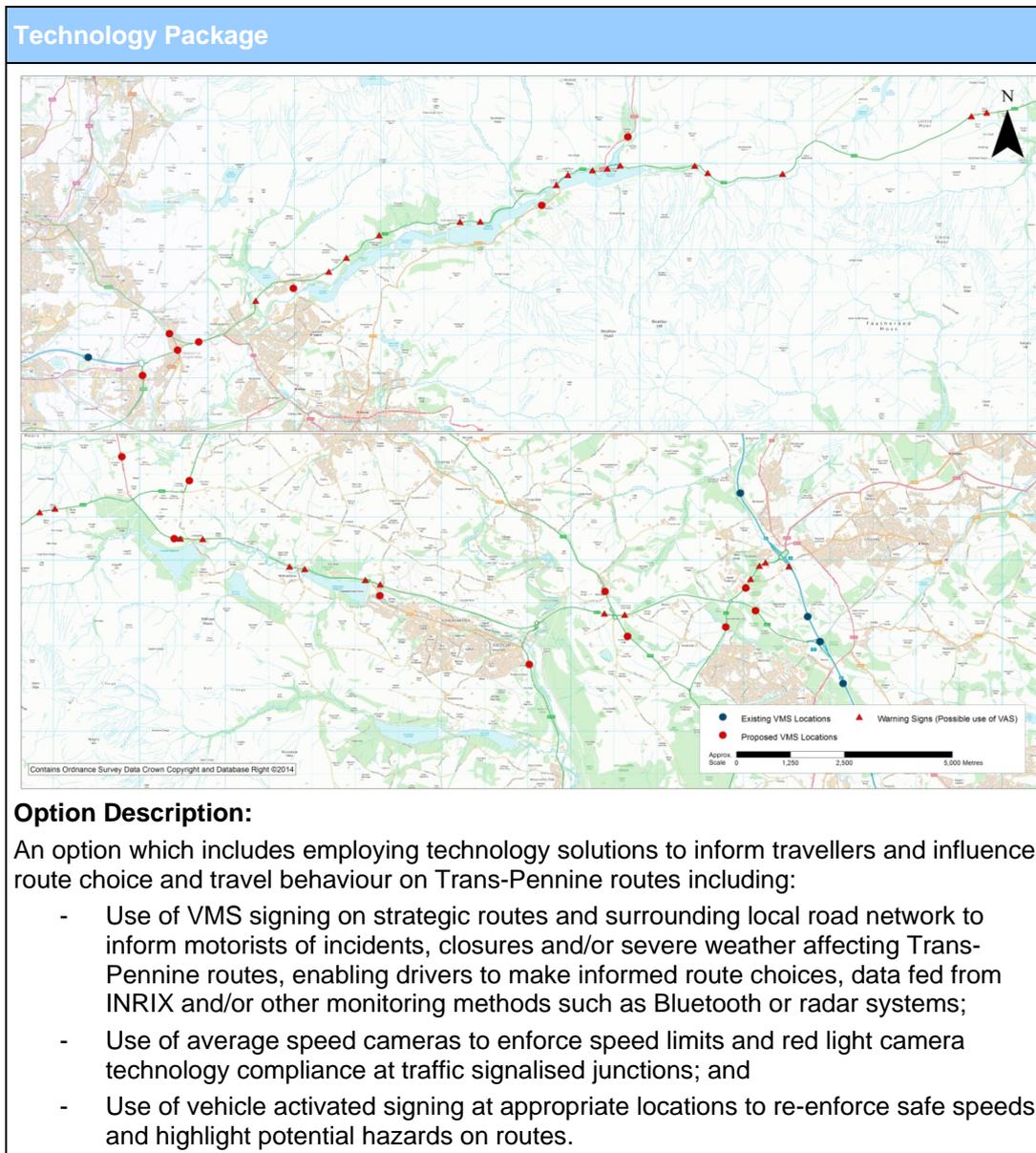
| Sustainable Transport Measures |
|---|
|  <p>Option Description:</p> <p>An option which involves delivering a range of sustainable transport measures to improve sustainable transport choice and wellbeing of road users across the route including:</p> <ul style="list-style-type: none"> - Streets for people & management of mixed priority routes and safe routes to school; - 20mph speed limits on residential streets; - Traffic calming and 30mph speed limits in villages on the route; - Improvements to cycle infrastructure and cycle training for all; - Improvements to bus priority provision and increased funding for public transport; and - Rail improvements such as new station at Gamesley, improvements to other stations and improved access thereto, funding for rail freight projects, subsidised rail cards. <p>Source: Stakeholders and Project Team</p> |

Table 4-4 Technology Package Description



4.4 Infrastructure options

4.4.1 A range of options were developed which looked to improve the infrastructure of the strategic route. In all cases these options consist of the construction of new infrastructure in order to address a number of challenges presented by existing conditions on the route.

4.4.2 The following tables give a brief overview of the options.

Table 4-5 A57 Mottram One Way Option

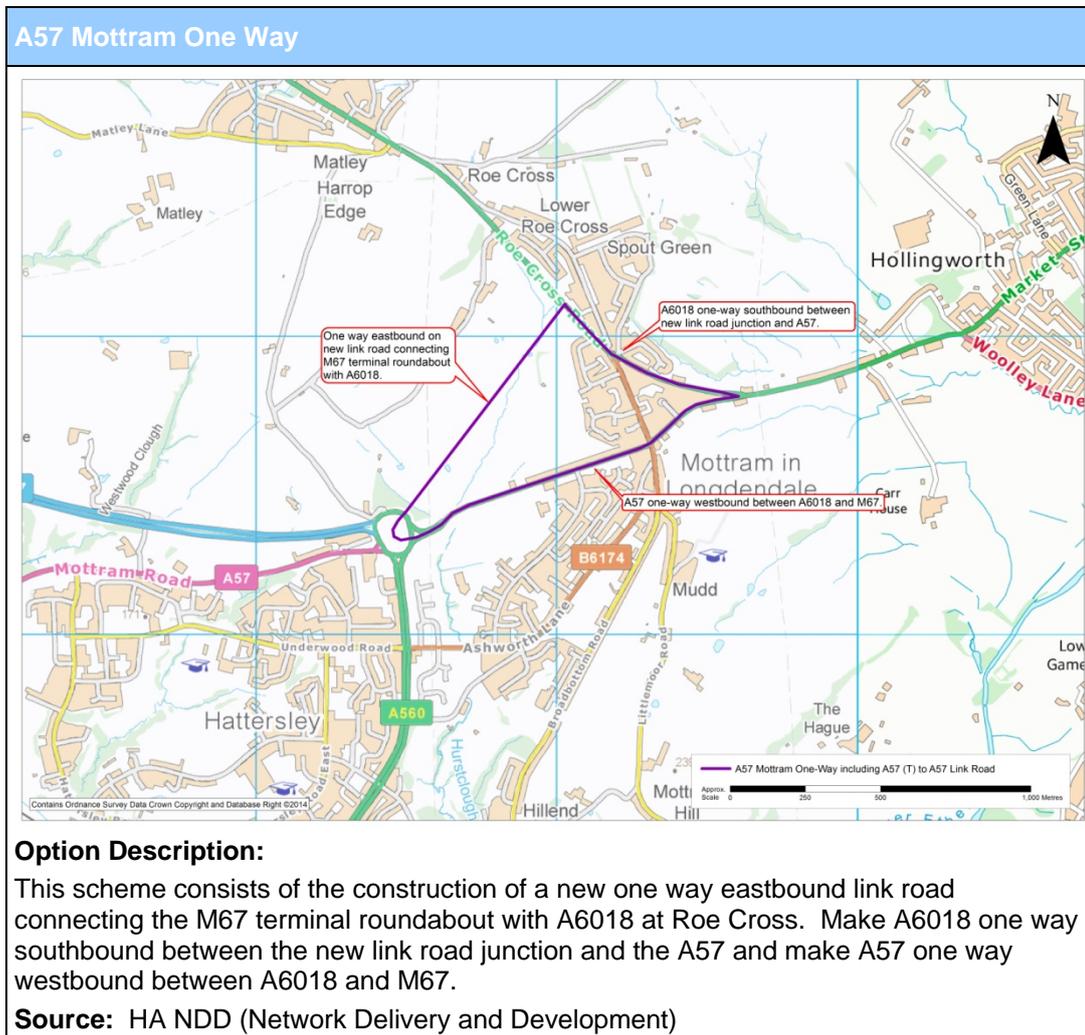


Table 4-6 M67 to A6018 Link Road Option

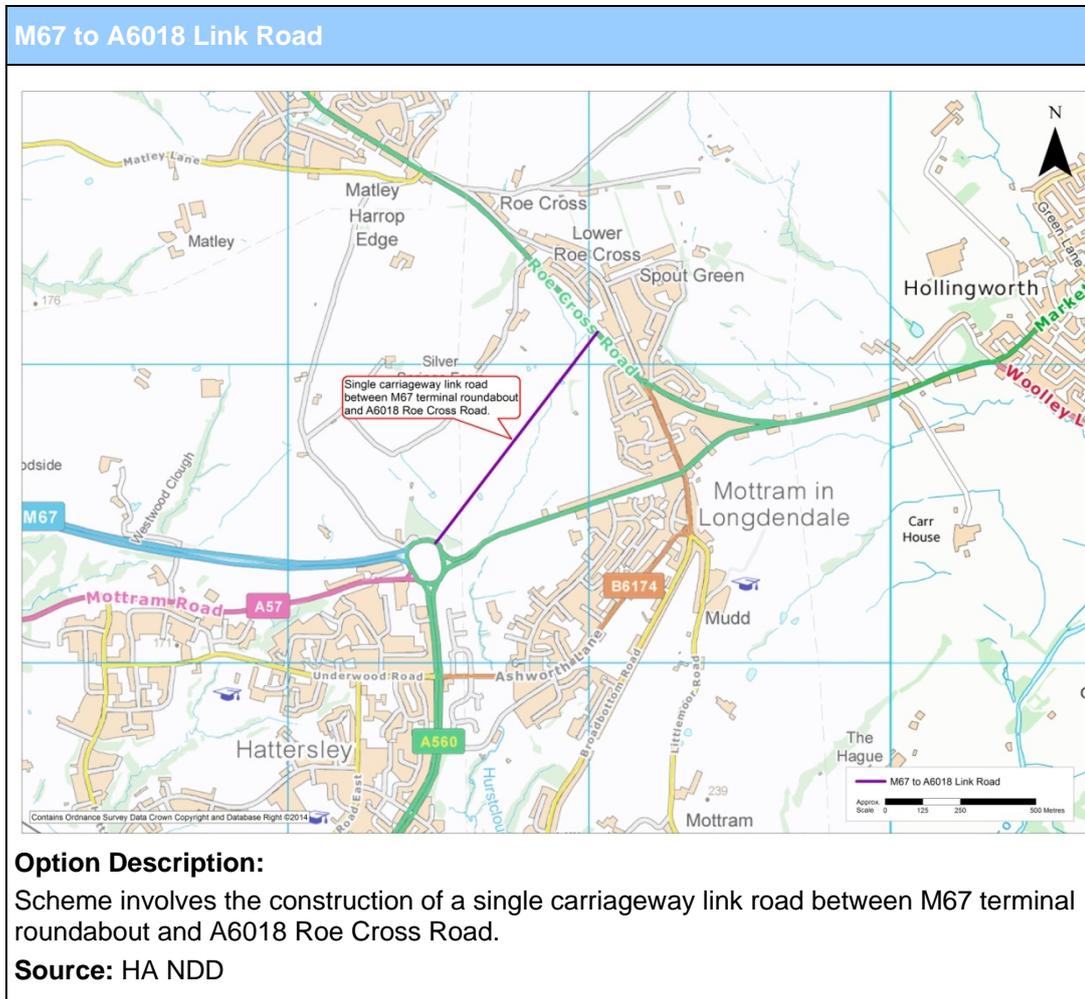


Table 4-7 M67 to A57 Mottram Moor Link Road

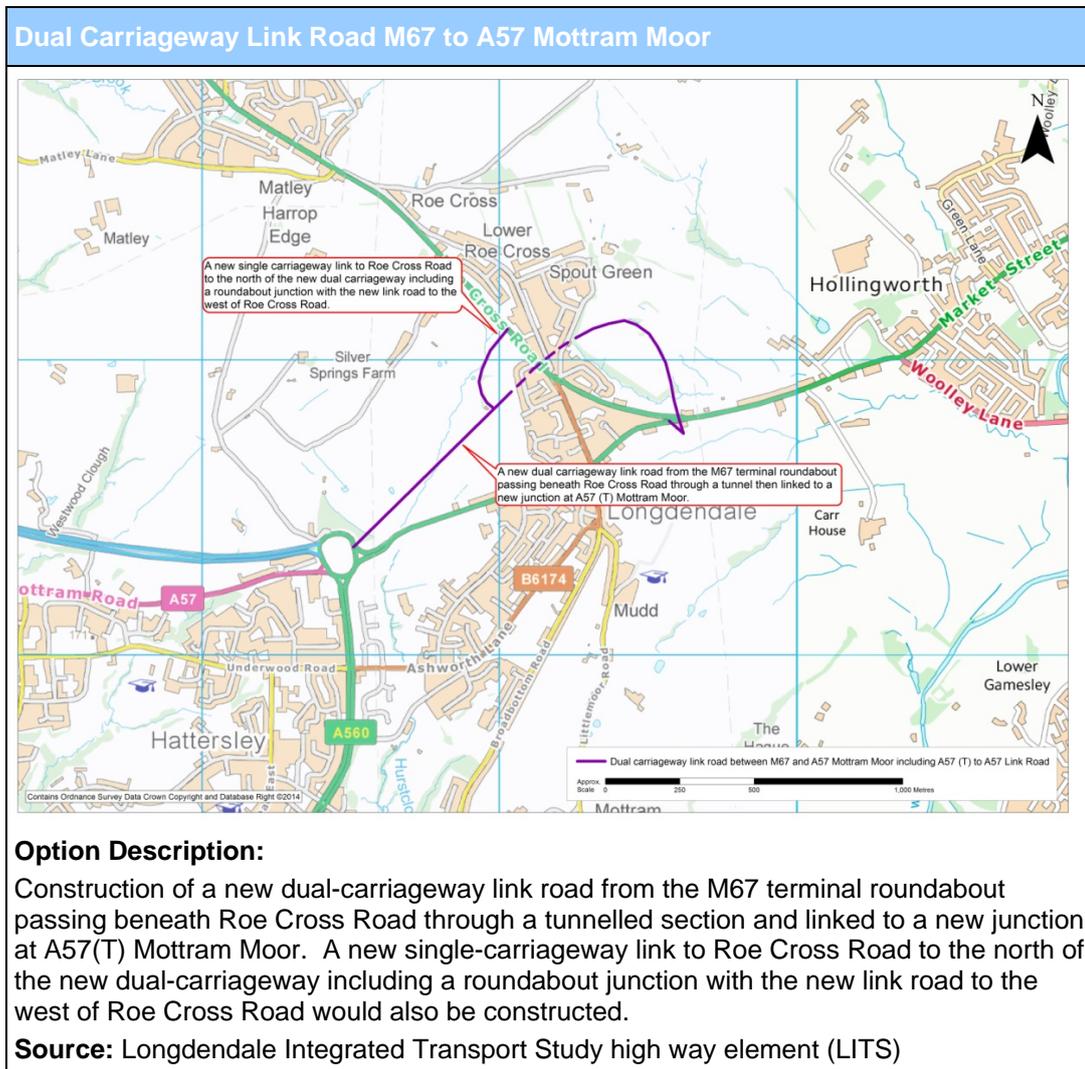


Table 4-8 Bypass of Mottram, Hollingworth and Tintwistle Option

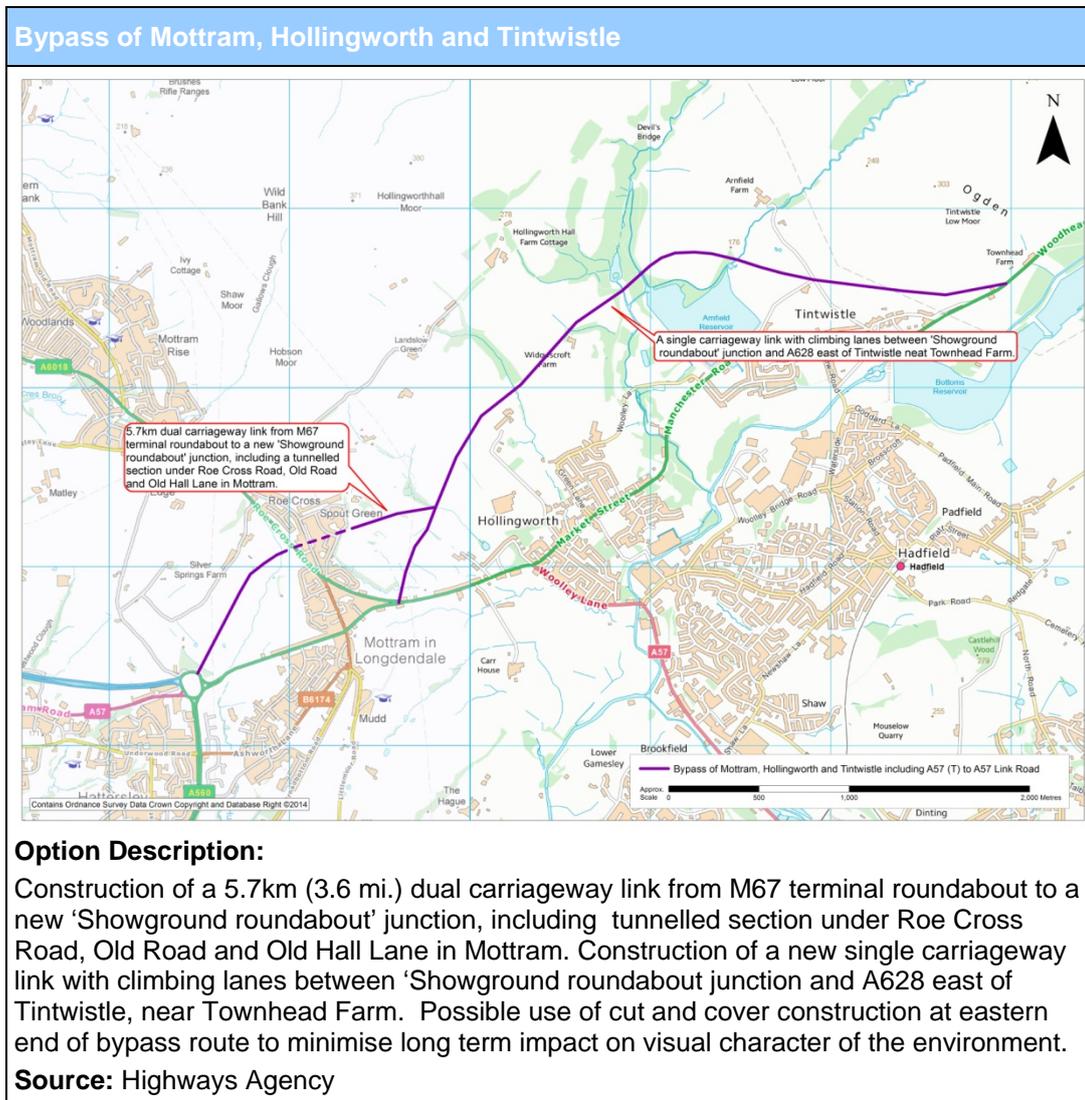


Table 4-9 A57(T) to A57 Link Road Option

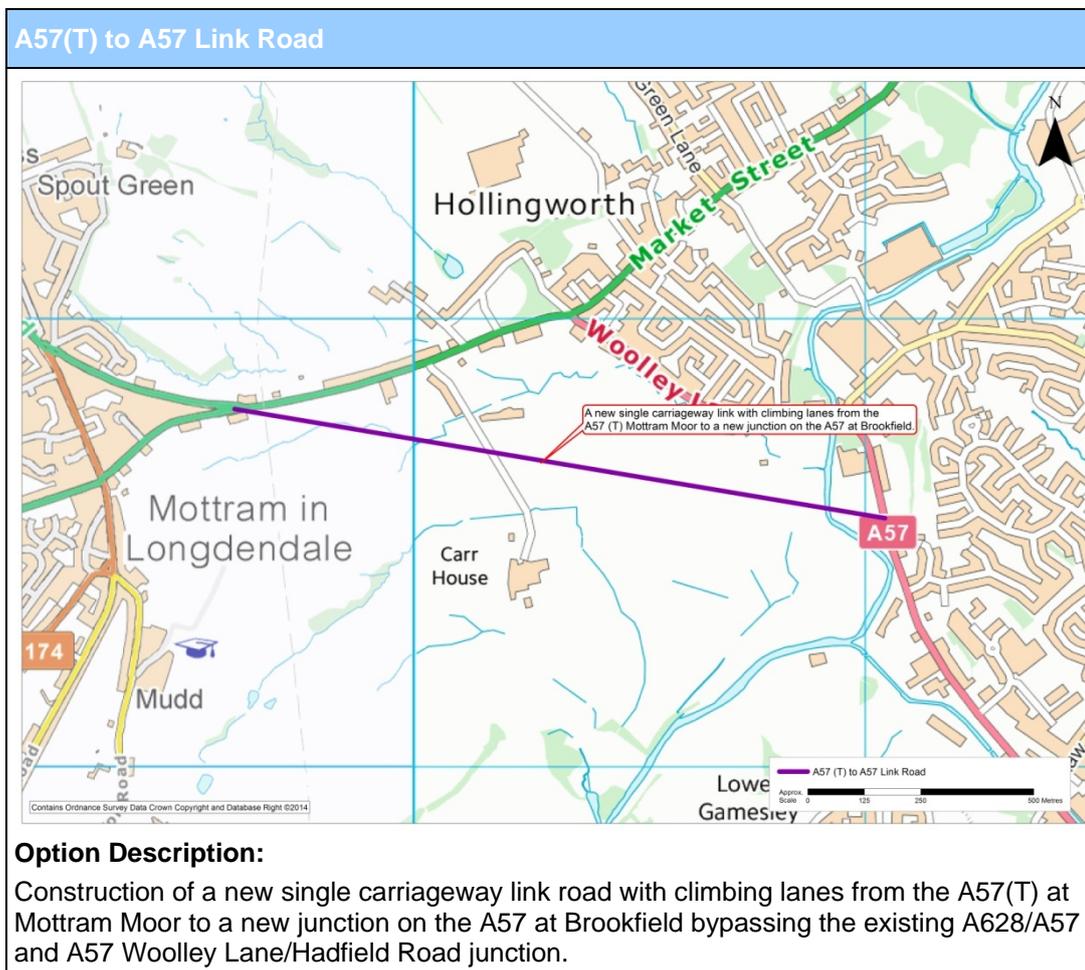


Table 4-10 A628 & A616 Dualling Option

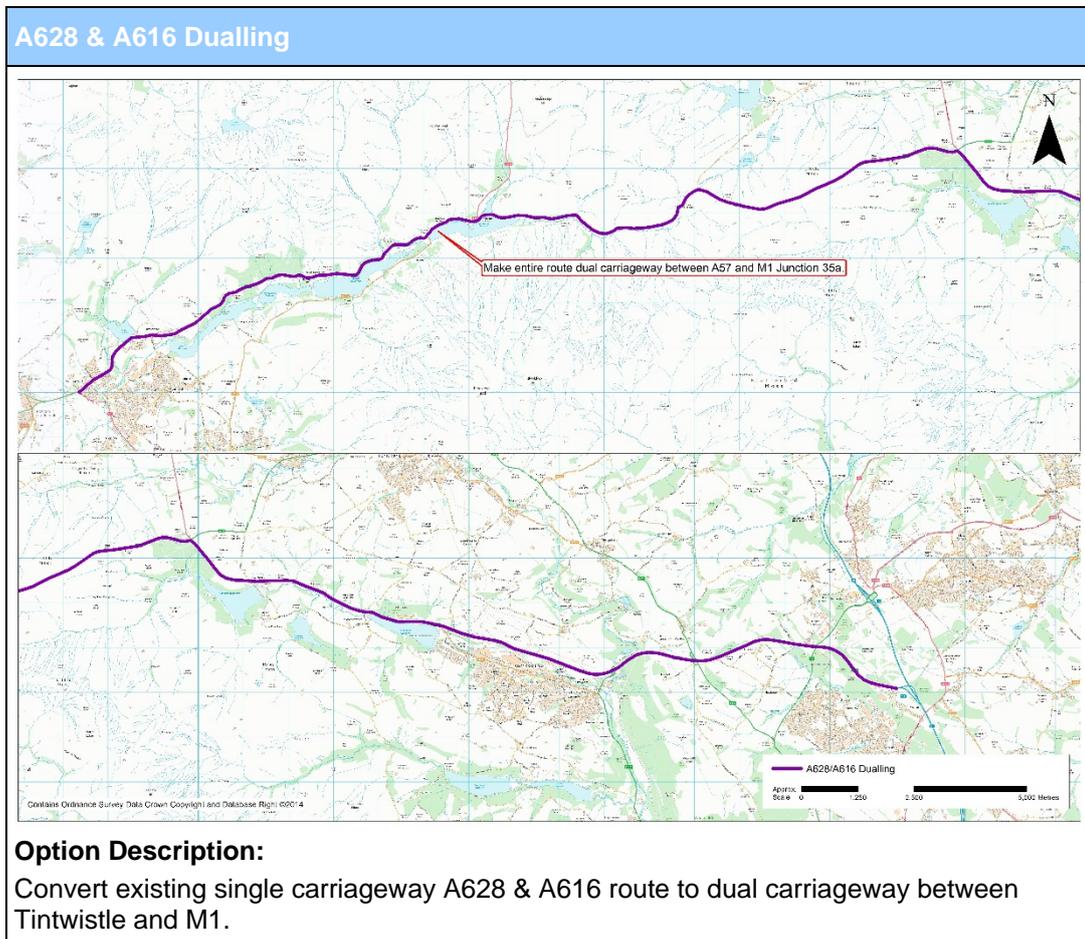


Table 4-11 A61 Dualling Option

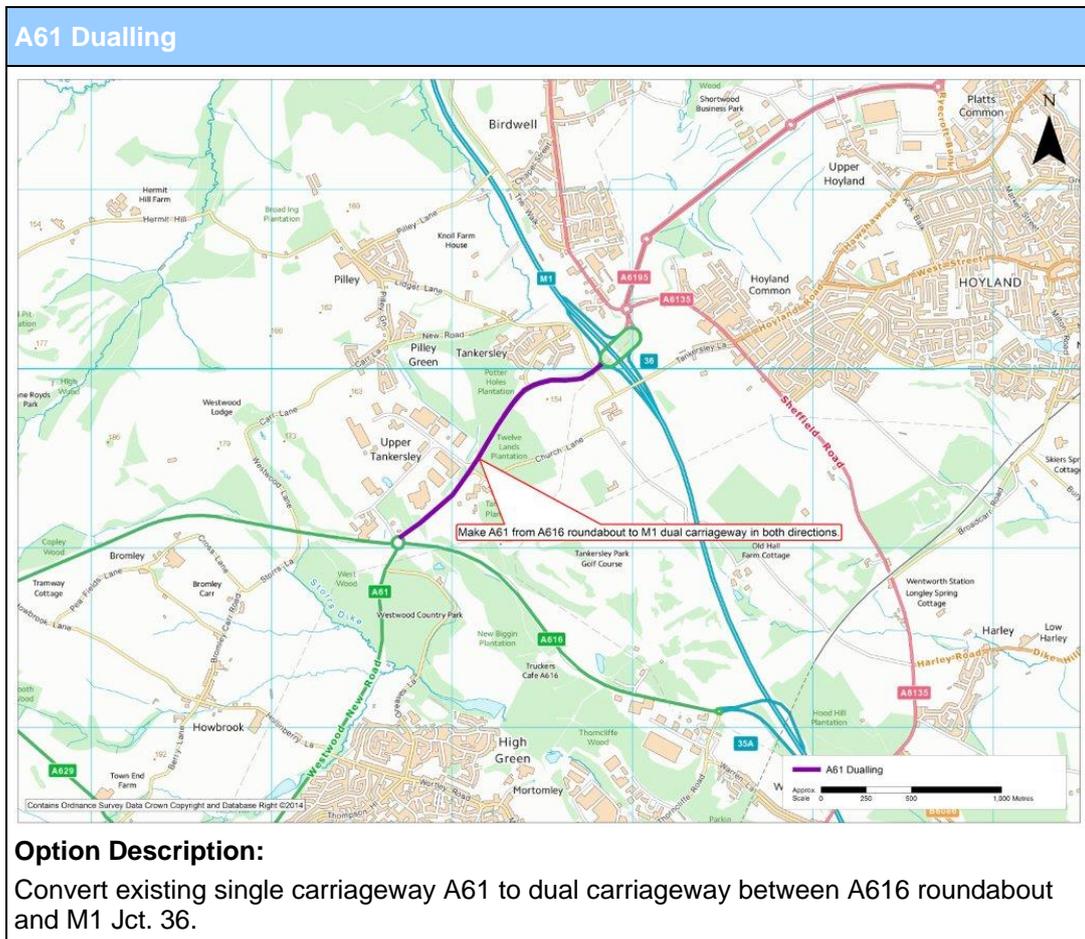


Table 4-12 M67 to M1 Dual Carriageway Link Option

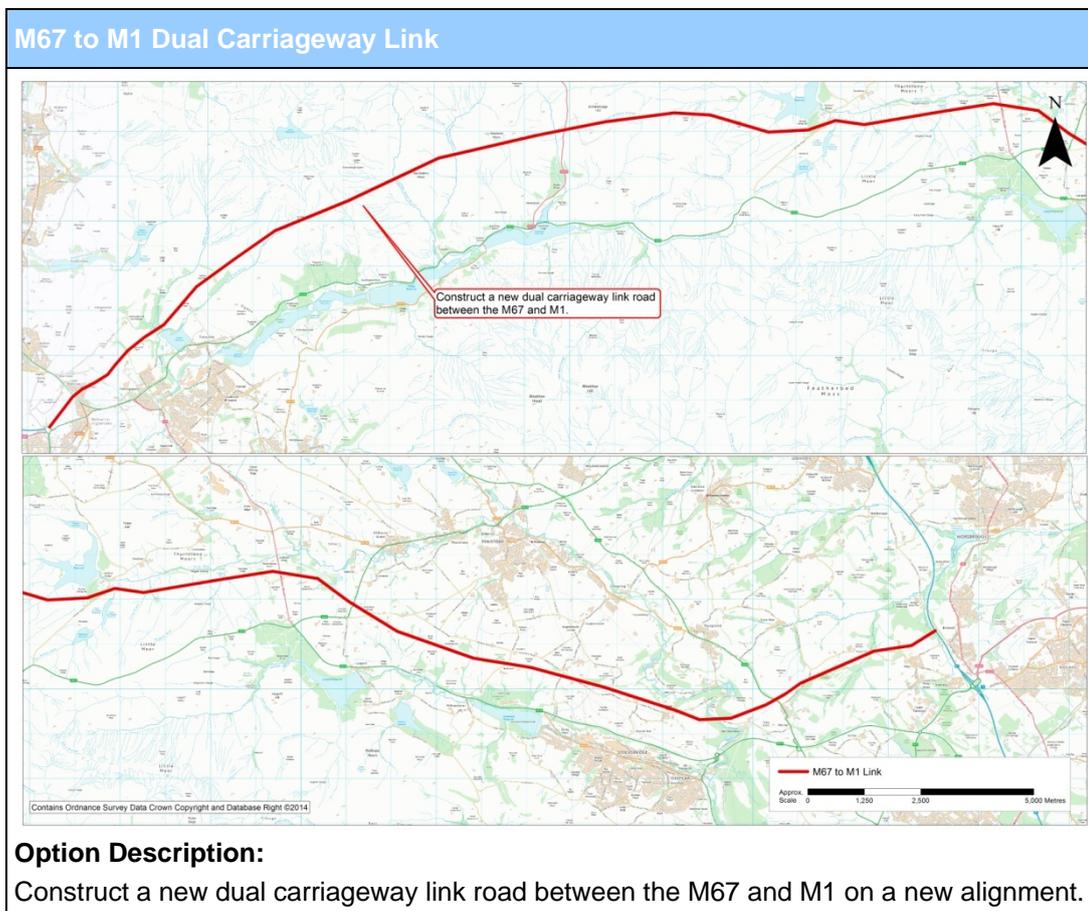


Table 4-13 M67 to M1 Trans-Pennine Tunnel Option

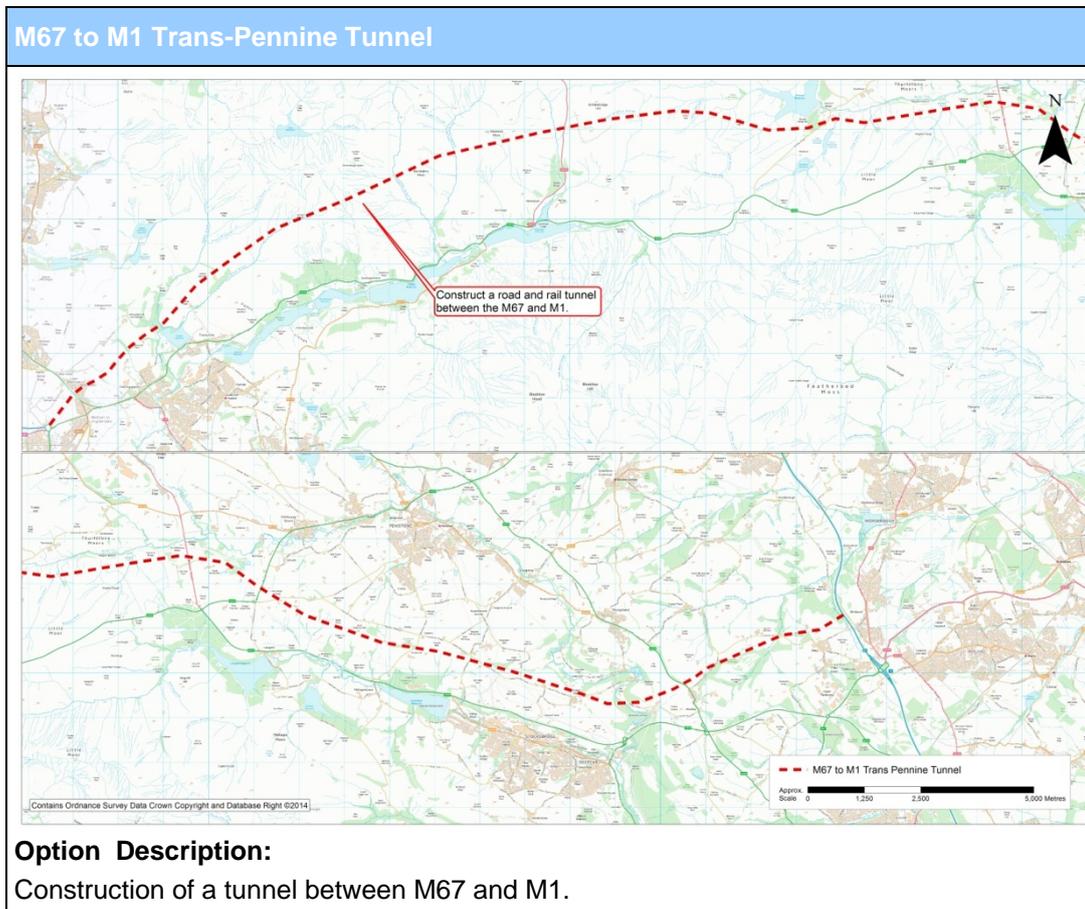


Table 4-14 A628 Peak District Tunnel

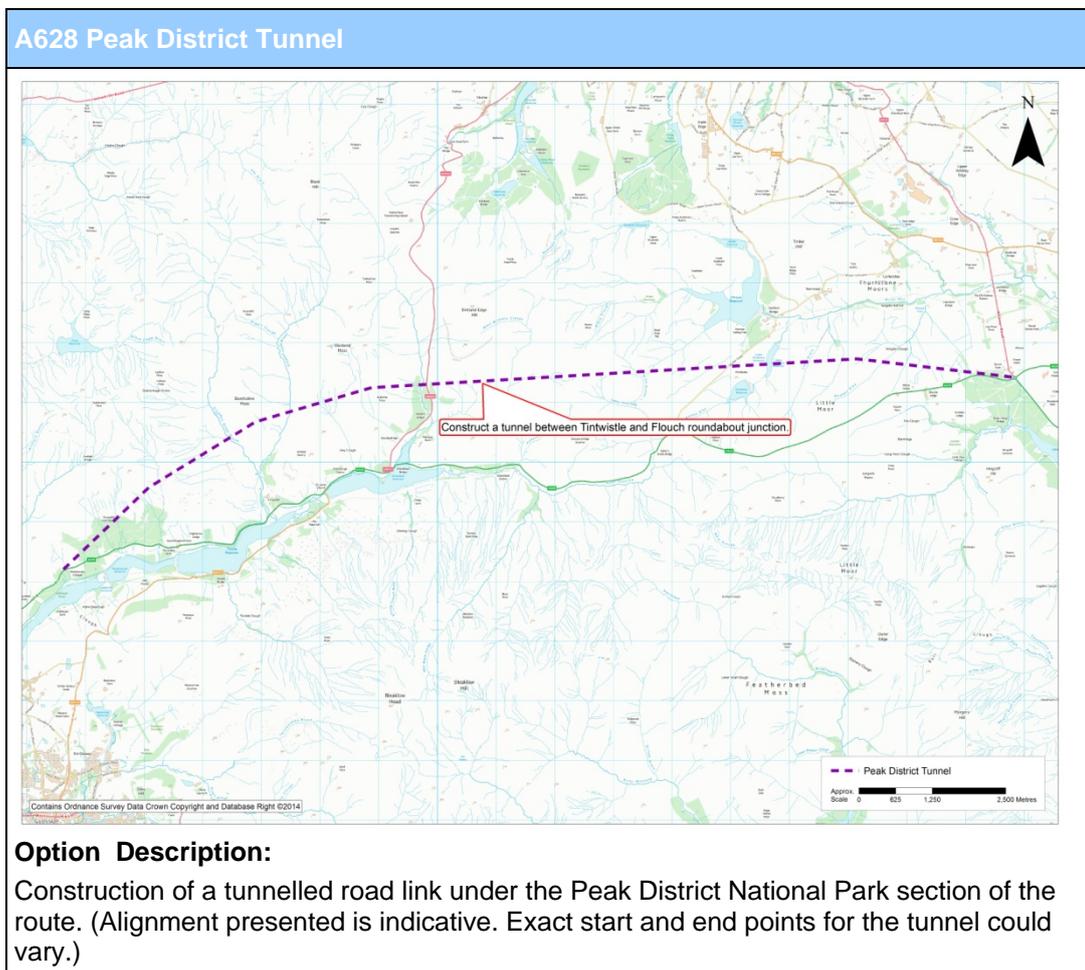


Table 4-15 A628, A616 Selected Dualling Option

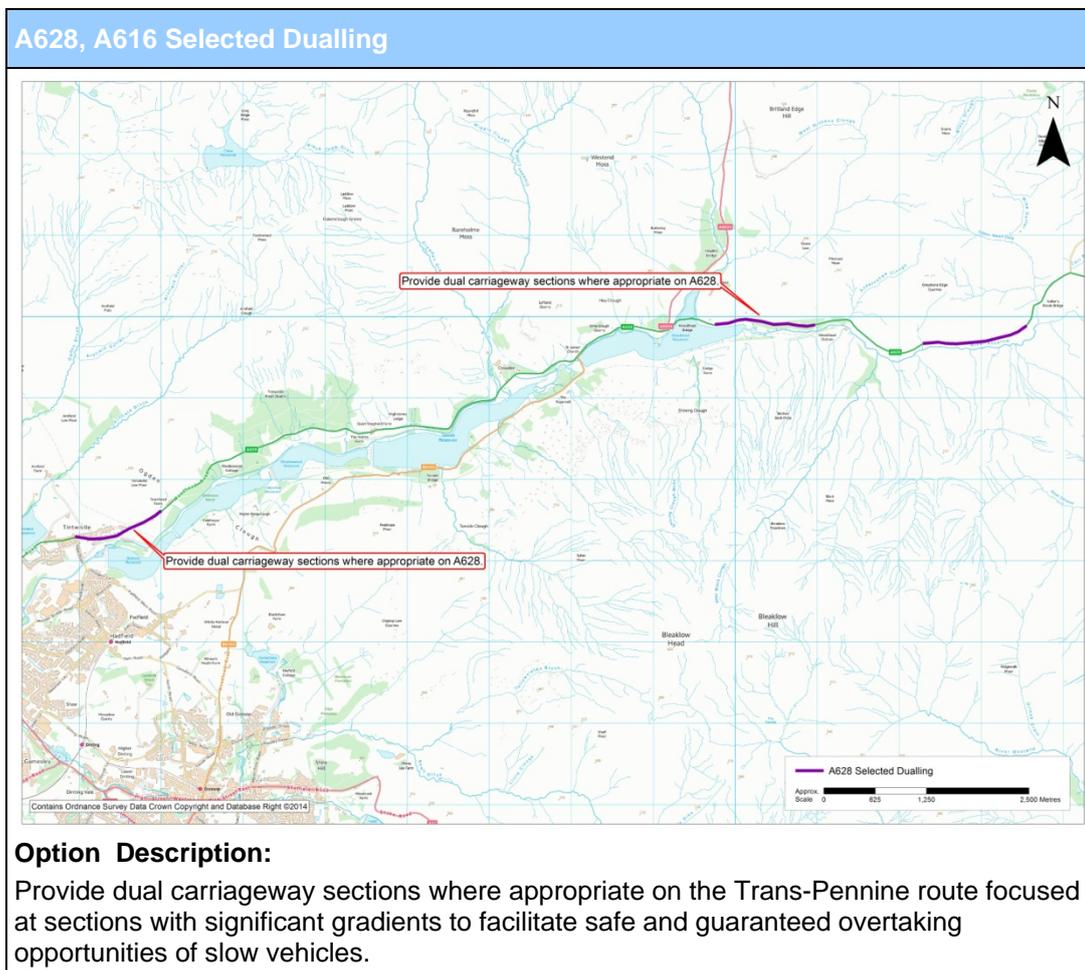


Table 4-16 Climbing Lanes Option

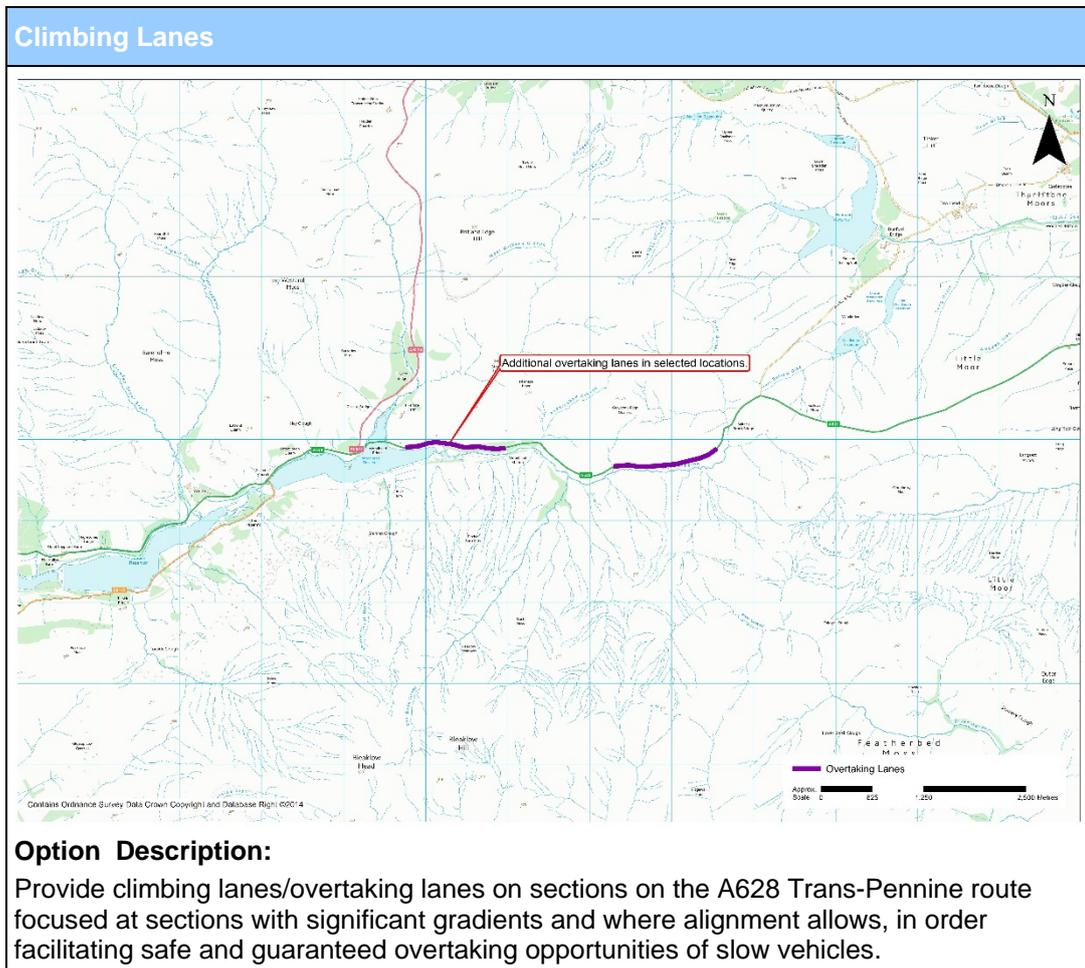


Table 4-17 Slow Vehicle Refuges Option

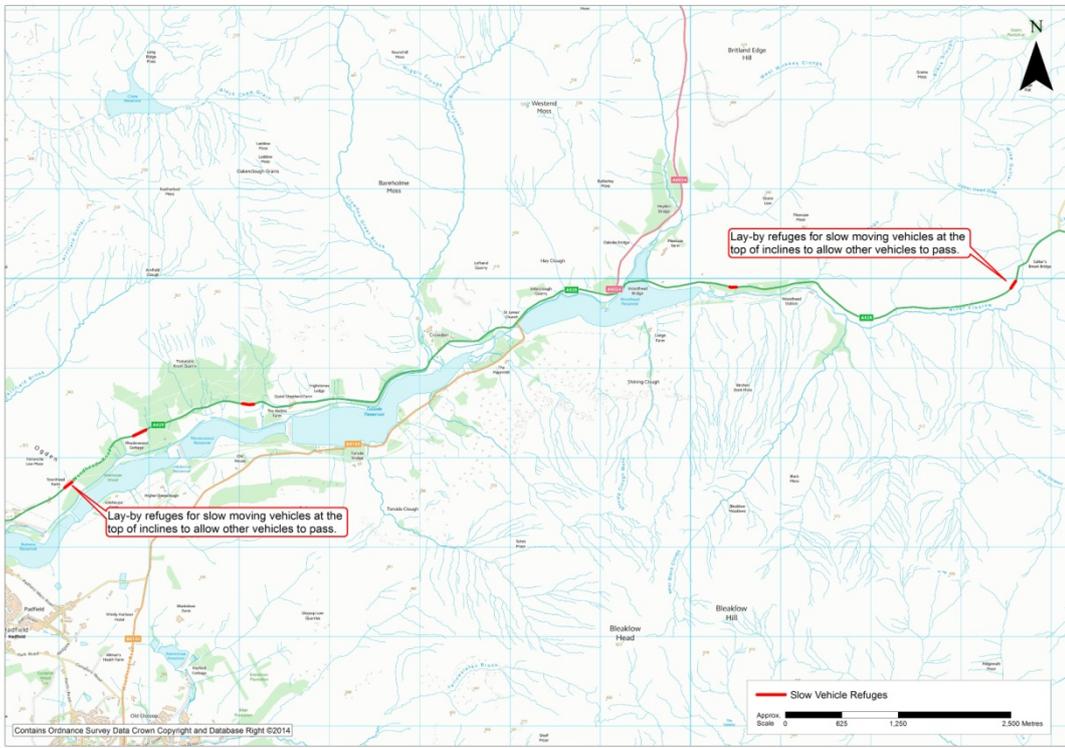
| Slow Vehicle Refuges |
|---|
|  <p>Option Description: Provide lay-by refuges for slow moving vehicles at the top of inclines to allow other vehicles to pass.</p> |

Table 4-18 Maintenance Strategy Option

| Maintenance Strategy |
|--|
| <p>Option Description: A 5 year programme of works is planned on the route to undertake a significant level of maintenance works. These planned works to improve the condition of infrastructure on the route such as retaining walls, carriageway surfacing, drainage and lighting will form a sound basis on which a continued robust maintenance regime can be based. It is proposed that a strategy be put in place which includes an increase in the frequency of inspections on sections considered high risk along the route. Continued delivery of maintenance and monitoring will safeguard the route into the future.</p> |

Table 4-19 Route Safety Improvements Option

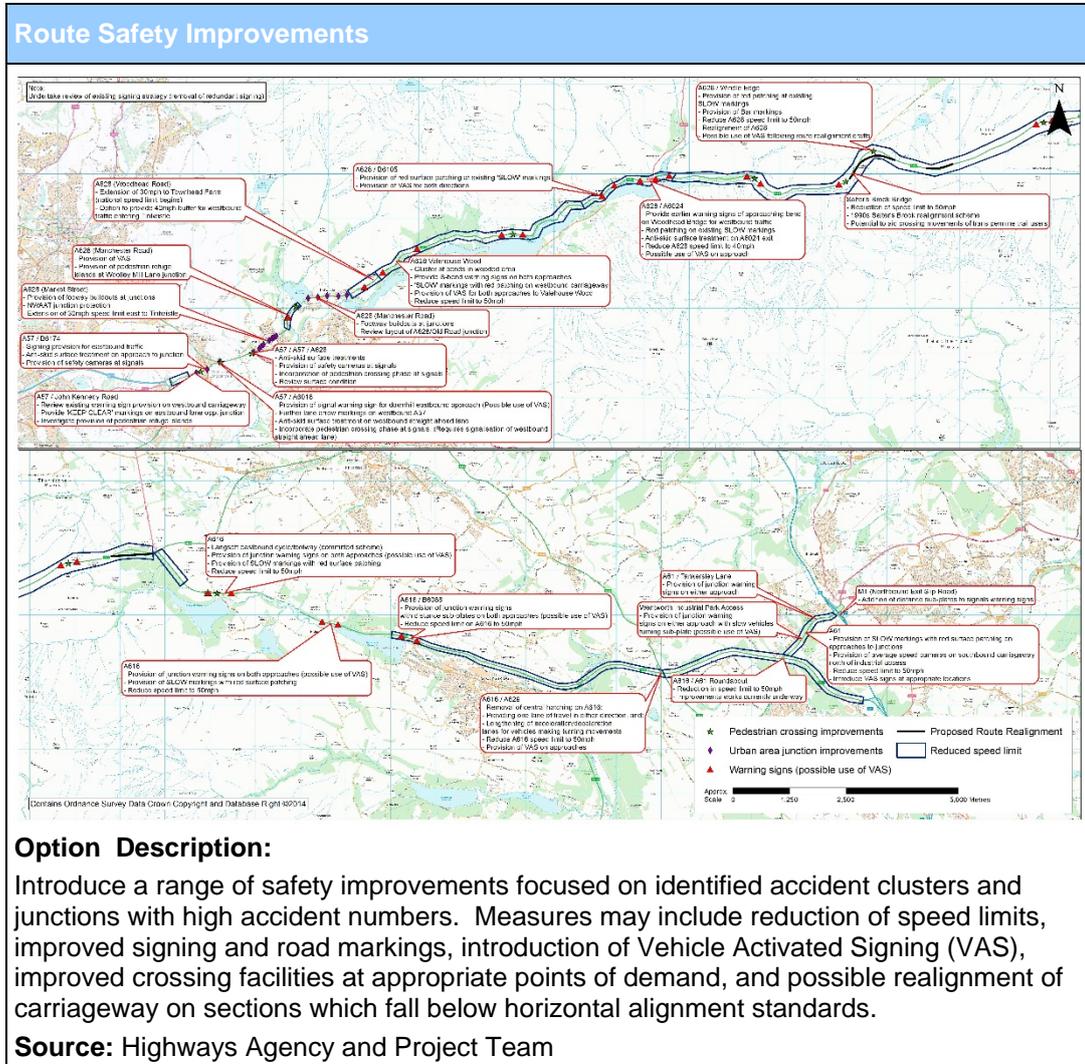


Table 4-20 A616 Widening at Midhopestones Option

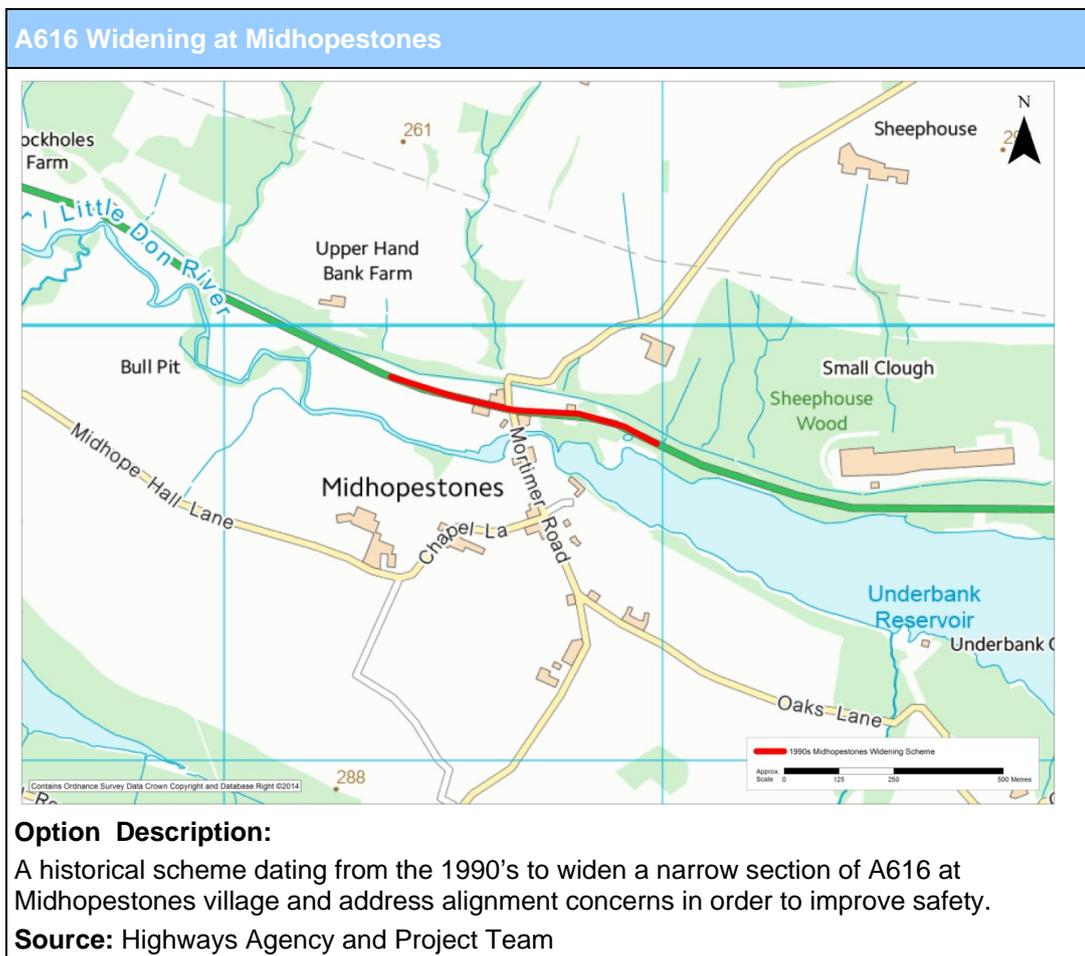


Table 4-21 A616 Widening at Langsetts Option

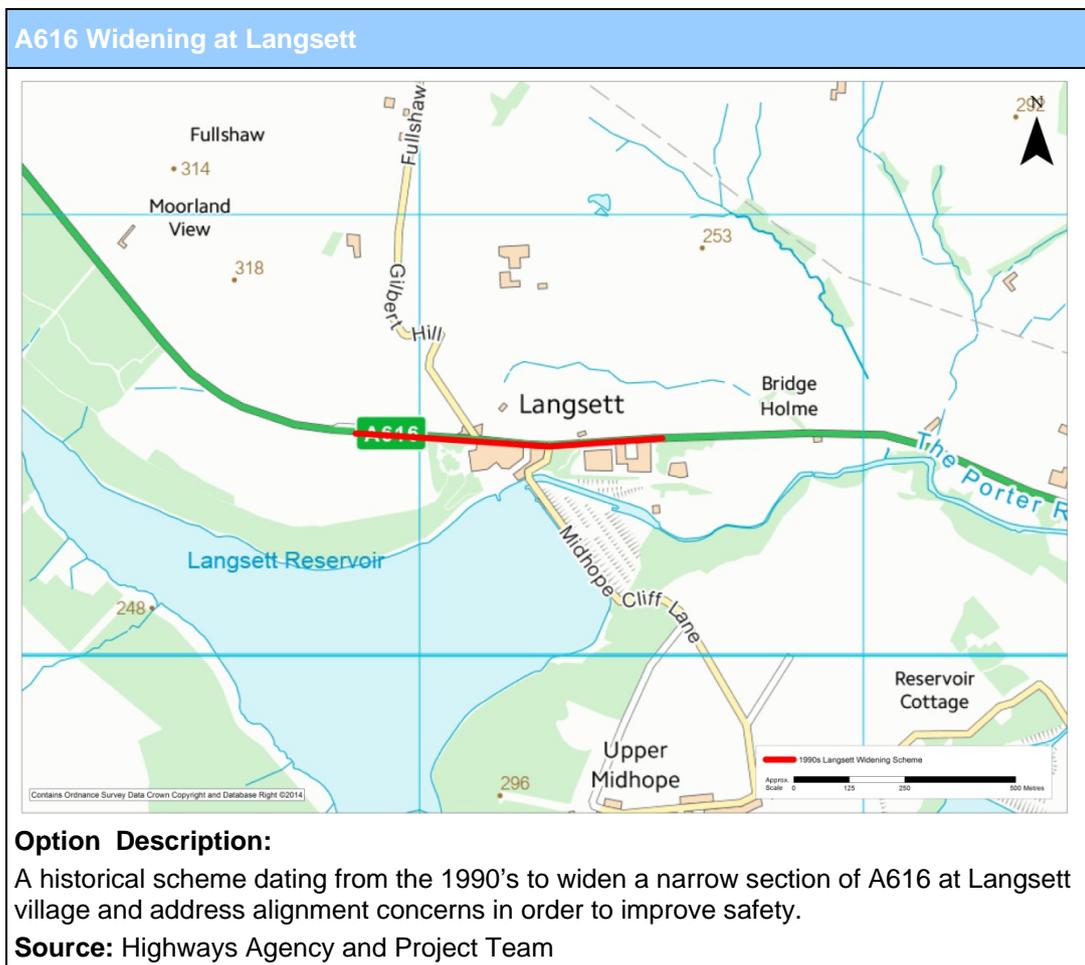


Table 4-22 A616/A628 Flouch Junction Improvement Scheme Option

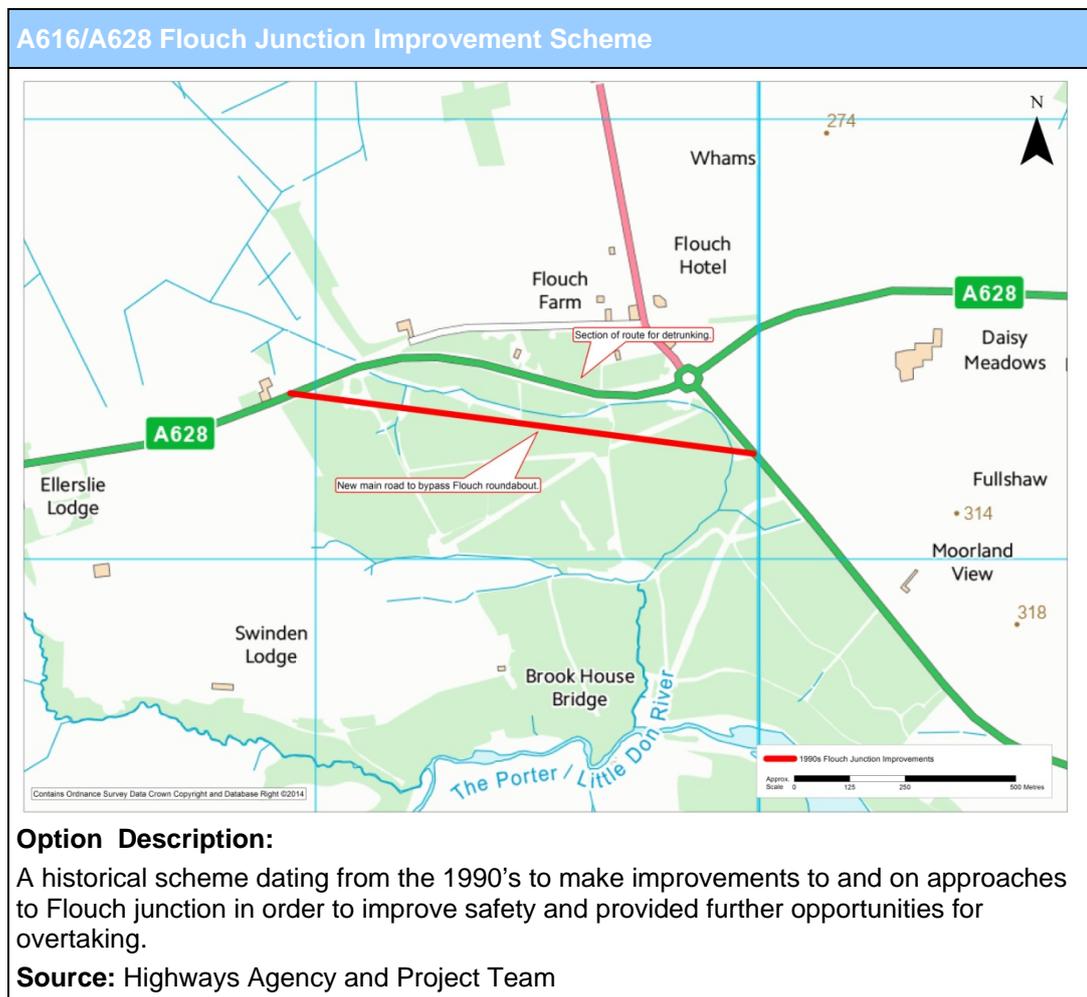
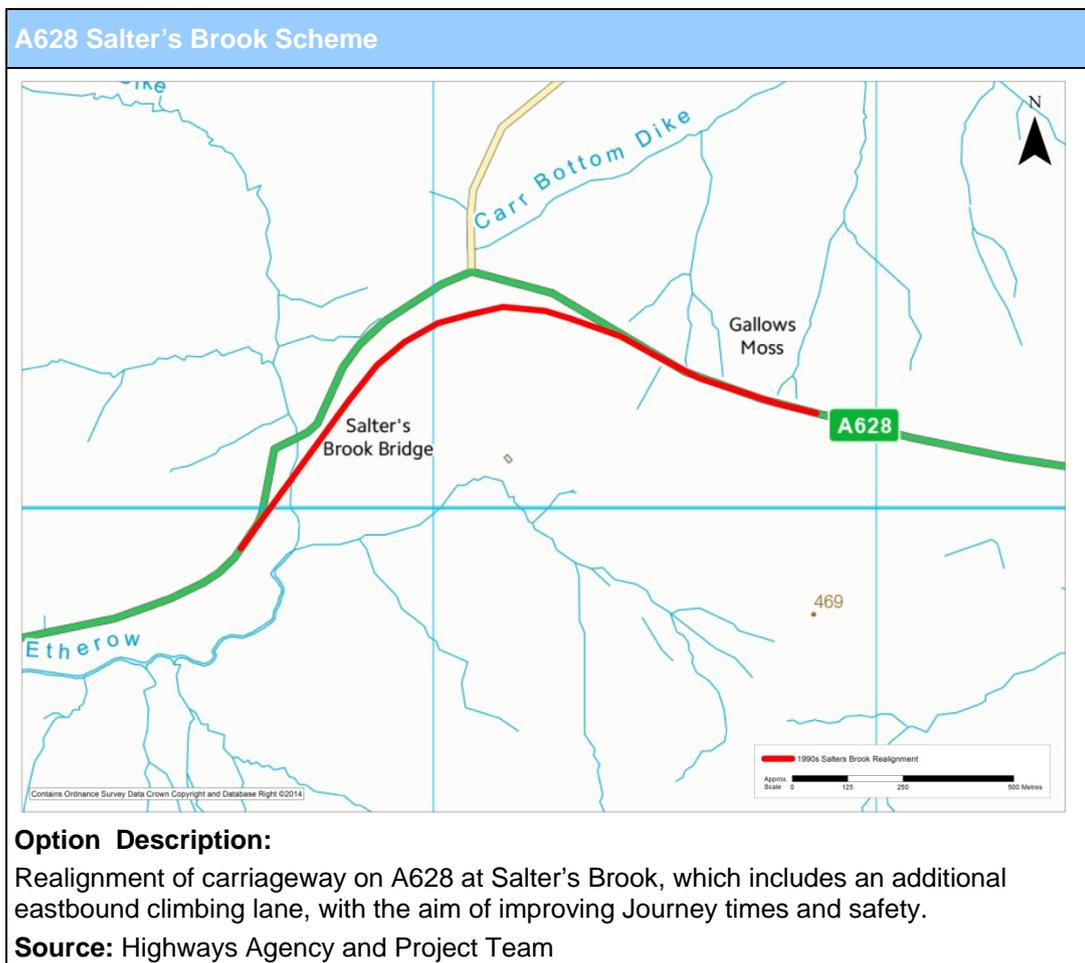


Table 4-23 A628 Salter's Brook Scheme Realignment Option



4.5 Summary

- 4.5.1 This section of the report has identified a range of options which link back to the evidence; meet the challenges facing the study area and look likely to achieve the objectives identified in the previous stage of the study.
- 4.5.2 Options have been developed in line with the guidance outlined in step 5 of WebTAG, with a wide range of options being developed across the following areas:
- Influencing travel behaviour / demand management;
 - Regulation; and
 - Infrastructure.
- 4.5.3 The study has recognised that potential rail investment options were being considered through other investment planning processes such as that being progressed by the Rail Electrification Task Force and the Higgins work, “Rebalancing Britain. Therefore this study has not considered the details of such potential options as part of the stage of the study process.
- 4.5.4 Stakeholders were involved in the option identification process, testing a number of ideas, before the 23 options were finalised.
- 4.5.5 These 23 options were taken forward into the option assessment process, with each of the options assessed and scored against a number of criteria following WebTAG guidance. The approach taken and resulting findings are explained further in the next chapter of this report.

5 Initial Sifting of Options

5.1 Introduction

5.1.1 The 'Transport Appraisal Process' Transport Analysis Guidance (TAG) Unit states that following the generation of options, 'it is possible that some options will have been identified which do not represent sensible solutions'. As such, it is important to conduct an initial sift of the options, in order to identify any 'showstoppers' which are likely to prevent an option progressing at a subsequent stage in the process.

5.1.2 According to the guidance, the process involves not progressing options that:

- would clearly fail to meet the key objectives identified for intervention;
- do not fit with existing local, regional and national programmes and strategies, and do not fit with wider government priorities; and
- would be unlikely to pass key viability and acceptability criteria (or represent significant risk) in that they are unlikely to be:
 - deliverable in a particular economic, environmental, geographical or social context
 - technically sound
 - financially affordable; and
 - Acceptable to stakeholders and the public.

5.1.3 This chapter provides sets out the methodology adopted to conduct the sifting of the options that have been identified, as previously outlined in Chapter 4. The methodology is closely aligned with 'Step 6: Initial Sifting', documented in the 'Transport Appraisal Process' TAG Unit.

5.2 Approach

5.2.1 The key principle of TAG is that potential improvements are driven by identified problems and defined objectives, therefore ensuring that the need for investment can be clearly justified and evidenced. As previously outlined in Chapter 4, there are multiple problems and objectives associated with the trans-Pennine routes.

5.2.2 The 'Transport Appraisal Process' TAG Unit makes reference to the Early Assessment and Sifting Tool (EAST), that has been developed in order to support decision making, enabling the user to quickly summarise and present evidence on options in a clear and consistent format whilst, at the same time, ensuring that a robust audit trail for the option sifting process is maintained. However, a limitation of the EAST, in the context of this feasibility study, is that there is only a single opportunity to provide an assessment against the identified problems and objectives. This means that a single line assessment against problems and objectives could be very subjective and result in difficulties differentiating between the potential benefits of one option versus another option.

5.2.3 In response to this issue, an initial-sifting tool has been utilised. Using the initial-sifting tool, allows a qualitative assessment of the scale of impact of each option against the route problems and objectives and also against a set deliverability and feasibility criteria. The approach quickly reduces the initial list of options by removing the options

that do not make significant contributions to meeting the defined objectives, do not resolve the identified problems, or are not deliverable or feasible. This provides a useful audit trail for the options considered and discounted at an early stage.

Initial Sift

5.2.4 Each of the 23 options, outlined in Chapter 4, have been assessed and scored against a number of criteria using the initial-sifting tool. The first element of the scoring process relates to how well each option tackles the specific problems and objectives identified in the study area, for reference the key problems and objectives are summarised below:

5.2.5 Key Problems

- Accidents reduce journey time reliability, with high accident rates on some routes and a number of accident clusters;
- Severe weather causes road closures which reduce journey time reliability;
- There is a lack of technology to assist in the operation and management of the routes and provide information for travellers;
- Maintenance on single carriageway sections reduces journey-time reliability;
- Asset condition, including the standard, age and damage to infrastructure, reduce journey-time reliability through significant maintenance operations and risk from closures;
- Journey-times are increased by delays at junctions and the geometry and topography of routes; and
- Long term traffic growth will bring some urban sections of routes to their capacity.

5.2.6 Key Transport Objectives developed for the trans-Pennines Routes:

- **Connectivity** – improving the connectivity between Manchester and Sheffield through reduction in journey times and improved journey-time reliability;
- **Environmental** – avoiding unacceptable impacts on the natural environment and landscape in the Peak District National Park, and optimising environmental opportunities;
- **Societal** – improving air quality and reducing noise impacts, and addressing the levels of severance on the Trans-Pennine routes in urban areas;
- **Capacity** – reducing delays and queues that occur during peak hours and improving the performance of junctions on the routes;
- **Resilience** – improving the resilience of the routes through reductions in the number of incidents and reduction of their impacts; and
- **Safety** – reductions in the number of accidents and reductions of their impacts.

5.2.7 For each of the above, a score was allocated based on the anticipated impact of the option being assessed. The scoring system is summarised below:

Table 5-1 Scoring System (Initial sift)

| Score | Qualitative Impact |
|-------|-------------------------|
| 2 | Large Beneficial Impact |
| 1 | Beneficial Impact |
| 0 | Neutral/Marginal Impact |
| -1 | Adverse Impact |
| -2 | Large Adverse Impact |

5.2.8 The total score for each option was then calculated by summing the individual scores for each problem and objective, thus enabling a comparison between options to be made.

5.2.9 The following stage of the initial-sift involved assessing the deliverability and feasibility of each option. In terms of Deliverability, options were scored on the basis of the following levels of deliverability:

- Deliverable in theory;
- Deliverable but with challenges; or
- Very difficult to deliver.

5.2.10 A number of factors were taken into account when considering the appropriate level of deliverability for each option, including:

Table 5-2 Deliverability Consideration

| Deliverability Consideration | |
|--|---|
| Acceptability | <ul style="list-style-type: none"> • Level of stakeholder/political support for the option under consideration • Level of public support for the option under consideration • Significant environmental impacts resulting from the option under consideration |
| Planning | <ul style="list-style-type: none"> • How far through the planning process is the option under consideration (e.g. not started, part-way through, nearing completion)? • Are there any legal issues/risks e.g. CPO? |
| Implementation timescales/funding likelihood | <ul style="list-style-type: none"> • What is the implementation timescale (e.g. short (by end of 2017), medium (between 2017 and end 2021) and long (post 2021))? • What are the likely funding sources? Are they time-dependent? Is there likely to be a funding gap? • Are there likely to be significant mitigation costs over and above the cost of the option itself? |
| Third Party Issues | <ul style="list-style-type: none"> • Is Third Party land required? • Are there any legal issues e.g. CPO? |

5.2.11 An options' feasibility was assessed using a similar method, with each option scored on the basis of the following levels of feasibility:

- Feasible in theory;

- Feasible but with challenges; or
- Not feasible/significant challenges.

5.2.12 Once again, a number of factors were taken into account when considering the appropriate level of feasibility for each option, including:

Table 5-3 Feasibility Consideration

| Feasibility Consideration | |
|-------------------------------|--|
| Physical Constraints | <ul style="list-style-type: none"> • Are there any significant physical constraints that could have a direct impact on the costs and risks associated with the option under consideration e.g. existing structures (viaducts, bridges, retaining walls etc.) or structures required within option design? |
| Land ownership / availability | <ul style="list-style-type: none"> • Will CPO be required? |
| Design standards | <ul style="list-style-type: none"> • Is the option under consideration technically possible from an engineering perspective? |

5.2.13 Once each option had been scored in relation to its impact on the key problems and objectives and an assessment had been conducted regarding the options deliverability and feasibility, a decision was made on whether the option should progress, in its own right, to the next stage of assessment. This decision was based on a set evaluation criteria, outlined below:

- Overall moderate impact against identified Key Problems (total appraisal score >4);
- Overall moderate fit with Key Objectives developed for the Trans-Pennines Routes (total appraisal score >3);
- Must be Deliverable in theory; and
- Must be Feasible in theory.

5.2.14 Section 5.3 documents the results of the initial sift. Section 5.4 details the options that did not meet the initial sift criteria.

Second Sift

5.2.15 Following the initial-sift a number of the options were not progressed as, on their own, they did not tackle the identified problems and objectives in a significant way or were deemed not to be feasible or deliverable. However, in line with the ‘Transport Appraisal Process’ TAG Unit, a selection of these not progressed options were packaged together and reconsidered as part of a second sift.

5.2.16 The decision was taken to test packaging together some of these 19 options in combination with each of the successful options which, had progressed to the EAST stage in its own right. These packages of options were subsequently analysed using the initial-sifting tool. TAG supports an approach, under the statement that “Part of the initial sifting might include packaging together measures which, on their own, would not achieve the desired outcomes, but which might do so when delivered in combination with each other”.

5.2.17 The second-sift continued to make use of the initial-sifting tool and associated scoring system and evaluation criteria, but rather considering options individually, focused on packages of options. The results of the second sifting stage are described in more detail in Section 5.5. Section 5.6 details those packages not progressed and the reasons why they were not taken forward to EAST.

EAST Assessments

5.2.18 Finally, the packages which successfully met the evaluation criteria within the second-sifting process were taken forward to the final stage of sifting, using the Department for Transport (DfT) EAST decision support tool.

5.2.19 EAST has been developed in order to support decision making, enabling the user to quickly summarise and present evidence on potential interventions in a clear and consistent format, whilst ensuring that a robust audit trail for the sifting process is maintained. The tool allows the options/packages to be considered at the early stage of development.

5.2.20 The tool has been designed to be consistent with the DfT's Transport Business Case principles, based around the, best practice, five case model approach. The five cases and the elements within them that EAST considers are summarised below:

- Strategic Case:
 - Scale of impact;
 - Fit with wider transport and government objectives;
 - Fit with other objectives; and
 - Degree of consensus over outcomes.
- Economic Case:
 - Economic growth;
 - Carbon emissions;
 - Socio- distributional impacts and the regions;
 - Local environment;
 - Wellbeing; and
 - Expected Value for Money category.
- Managerial Case:
 - Implementation timetable;
 - Public acceptability;
 - Practical feasibility; and
 - Quality of supporting evidence.
- Financial Case:
 - Affordability;
 - Capital cost;
 - Revenue cost; and
 - Overall cost risk.
- Commercial Case:
 - Flexibility of option; and
 - Level of income generated (if any).

- 5.2.21 The EAST assessment aims to identify, at a high level, the nature and extent of all the economic, environmental and social impacts of the options / packages. As part of the Economic Case, the EAST guidance includes a decision tree in order to provide a guide to the issues that need to be considered when forming a view about the likely impact of each option or package on the economy, carbon emissions, socio-distribution impacts and the regions, local environment and wellbeing.
- 5.2.22 The 'Transport Appraisal Process' TAG Unit states that the EAST "tool does not make an overall recommendation as to whether an option should be progressed, instead, it is for the analyst to identify their own criteria or thresholds for determining which options 'pass' or 'fail' this stage of the process". With this in mind, the approach adopted involved ranking the score, from highest to lowest, for each option or package in terms of the following categories:
- Scale of Impact;
 - Practical Feasibility;
 - Affordability; and
 - Public Acceptability.
- 5.2.23 The results of the EAST sifting process is described further in Section 5.7.

5.3 Initial Sift Results

- 5.3.1 After completing the initial-sift of the 23 options and applying the evaluation criteria outlined in the previous section, 4 better performing options emerged:
- A57 Mottram One Way;
 - Dual Carriageway Link Road M67 to A57 Mottram Moor (tunnel under Roe Cross and spur connecting to A6018) – Mottram Moor Link;
 - Bypass of Mottram, Hollingworth and Tintwistle; and
 - A61 Dualling.
- 5.3.2 Annex 1 presents the results of the initial-sift for the 23 options, highlighting the individual scores for each option against the 7 key problems and 6 key objectives, as well as those for deliverability and feasibility. Table 5-4 below provides a condensed summary of which options successfully met the 4 aspects of the evaluation criteria and those options which did not. As the table indicates the four options listed above met all of the initial sift criteria. Any option achieving a combined score of 4 or more under 'Problems' and more than 3 under 'Objectives' have been indicated by a tick representing an overall moderate impact, anything below those scores receives a cross. Whether an option was considered deliverable and feasible, this is also indicated by ticks or crosses as is the final recommendation to take the option on to EAST.

Table 5-4 Initial Sift Results

| Option Description | Initial Sifting Criteria | | | | Take to EAST |
|--|--------------------------|------------|----------------|-------------|--------------|
| | Problems | Objectives | Deliverability | Feasibility | |
| HGV Control Scheme (Inc. complementary measures) | ✓ | ✓ | ✗ | ✓ | ✗ |
| Peak Period Only HGV Control Scheme (Inc. complementary measures) | ✓ | ✓ | ✗ | ✓ | ✗ |
| Sustainable Transport Measures | ✗ | ✗ | ✓ | ✓ | ✗ |
| Technology Package | ✗ | ✗ | ✓ | ✓ | ✗ |
| A57 Mottram One Way | ✓ | ✓ | ✓ | ✓ | ✓ |
| M67 to A6018 Link Road | ✗ | ✓ | ✓ | ✓ | ✗ |
| M67 to A57 Mottram Moor Link (tunnel under Roe Cross and spur connecting to A6018) | ✓ | ✓ | ✓ | ✓ | ✓ |
| Bypass of Mottram, Hollingworth and Tintwistle | ✓ | ✓ | ✓ | ✓ | ✓ |
| A57(T) to A57 Link Road | ✗ | ✓ | ✓ | ✓ | ✗ |
| A628/A616 Dualling | ✓ | ✗ | ✗ | ✓ | ✗ |
| A61 Dualling | ✓ | ✓ | ✓ | ✓ | ✓ |
| M67 to M1 Dual Carriageway Link Road | ✓ | ✗ | ✗ | ✗ | ✗ |
| M67 to M1 Trans-Pennine Tunnel | ✓ | ✓ | ✗ | ✓ | ✗ |
| A628 Peak District Tunnel | ✓ | ✓ | ✗ | ✓ | ✗ |
| A628/A616 Selected Dualling | ✗ | ✗ | ✗ | ✓ | ✗ |
| Climbing Lanes | ✗ | ✗ | ✓ | ✓ | ✗ |
| Slow Vehicle Refuges | ✗ | ✗ | ✓ | ✓ | ✗ |
| Maintenance Strategy | ✗ | ✗ | ✓ | ✓ | ✗ |
| Route Safety Improvements | ✗ | ✗ | ✓ | ✓ | ✗ |
| A616 Widening at Midhopstones | ✗ | ✗ | ✓ | ✓ | ✗ |
| A616 Langsett Widening Scheme | ✗ | ✗ | ✓ | ✓ | ✗ |
| A616/A628 Flouch Junction Improvement Scheme | ✗ | ✗ | ✓ | ✓ | ✗ |
| A628 Salter's Brook Scheme – Carriageway Realignment | ✗ | ✗ | ✓ | ✓ | ✗ |

5.3.3 Following the completion of the initial-sifting process of the 23 options considered, 19 options failed to successfully meet the evaluation criteria and were consequently not progressed, as highlighted in Table 5-5. The following table summarises the options not progressed and provides an explanation of the key reasons for this. The explanation for two of the options have been grouped together.

Table 5-5 Initial Sift Options not progressed

| Option | Key Reason for not progressing |
|--------------------------|---|
| HGV Control Scheme (Inc. | Whilst the HGV Control options were considered to be feasible, i.e. technically possible and satisfied the evaluation criteria for both key problems and objectives, including large beneficial impacts relating to |
| | |

| Option | Key Reason for not progressing |
|---|---|
| complementary measures) and Peak Period Only HGV Control Scheme (Inc. complementary measures) | <p>safety objectives, together with beneficial impacts for environmental, societal and capacity objectives, connectivity was deemed to be adversely impacted, given the restriction on a specific mode of vehicle between Manchester and Sheffield Regions. Furthermore, whilst journey times for HGVs would be negatively impacted on, other users of the route would see a benefit (by reducing delays at junctions and on steep sections of the route). However, the key reason that these options were not progressed is that the measures were considered difficult to deliver, for a number of reasons.</p> <p>Stakeholder acceptability was anticipated to be an issue, given that the options would negatively impact on connectivity and associated economic growth, as well as increasing carbon emissions, given that HGVs would have to travel longer distances, There could be a risk of objection to any TRO given the constraint on connectivity and likely increase in travel costs associated with the increased distances HGVs would need to travel. Public acceptability is also was also considered to be a potential issue, despite support from residents along the A628, objections are likely from members of the public residing on routes where HGVs are displaced to. The options could place an increased burden and ongoing cost on police/trading standards, who may be required to enforce such an option, particularly given that the option crosses many administrative boundaries. Finally, there could be an increased maintenance liability for LA's given both any de-trunking of the A628 and increased HGV movements on the local network.</p> |
| Sustainable Transport Measures | <p>Whilst the option was deemed to be both feasible and deliverable, it did not satisfy the criteria in terms of impacts on the key problems and objectives. In particular, whilst the option was anticipated to have a beneficial impact on safety and would help to reduce noise and air quality issues in urban area whilst also reducing severance, the impact on the remaining key problems and objectives was deemed to be marginal.</p> |
| Technology Package | <p>Whilst the option was deemed to be both feasible and deliverable, it did not satisfy the criteria in terms of impacts on the key problems and objectives. In particular, whilst the option was anticipated to have a beneficial impact on resilience and connectivity, together with a large beneficial impact on improving technology on the corridor, the impact on the remaining key problems and objectives was deemed to be marginal.</p> |
| M67 to A6018 Link Road | <p>Whilst the M67 to A6018 Link Road was considered to be both deliverable and feasible and satisfied the criteria in terms of its impact on the key objectives, the option did not score sufficiently high enough against the key problems to satisfy the sifting criteria. Despite some beneficial impacts in relation to safety, journey times, journey time reliability and withstanding long term traffic growth, the anticipated impact on the remaining key problems was deemed to be marginal.</p> |
| A57(T) to A57 Link Road | <p>The A57(T) to A57 Link Road was considered to be both deliverable and feasible and satisfied the criteria in terms of its impact on the key objectives, although the option did score sufficiently high enough against the key problems to satisfy the sifting criteria. Despite beneficial impacts in relation to safety, journey times, journey time reliability and withstanding long term traffic growth, the impact on the remaining key problems was deemed to be marginal.</p> |

| Option | Key Reason for not progressing |
|--------------------------------------|---|
| A628/A616 Dualling | <p>Whilst the A628/A616 Dualling was deemed to be feasible and satisfied the criteria in terms of its impact on the key problems, as a result of the large beneficial impacts on safety, journey times and journey time reliability, the option was considered to be very difficult to deliver, given the expected third party land issues and opposition associated with construction in the national park. Furthermore, the option did not satisfy the criteria in terms of its impact on key objectives, despite beneficial impacts on connectivity, capacity, resilience and safety, the option was anticipated to result in a large adverse impact on the environment associated with the carriageway widening construction in the national park. In addition, the significant costs associated with dualling the A628/A616 were likely to be very prohibitive and are expected to be disproportionate to any benefits offered by the scheme.</p> |
| M67 to M1 Dual Carriageway Link Road | <p>Whilst the Dual Carriageway Link Road scored well against the key problems, having a large beneficial impact on journey times, journey time reliability and long term capacity, the option did not satisfy the criteria in relation to its impact on the key objectives, given the anticipated large adverse impact on the environment. Constructing a completely new dual carriageway through the National Park is anticipated to have a considerable negative impact on the environment, particularly the landscape and biodiversity. Furthermore, it was considered that the option would be both very difficult to deliver and present significant feasibility challenges, particularly regarding third party land requirements and opposition associated with construction in the national park, but also in terms of completing such an option in the timeframe which this particular study is looking at. In addition, the significant costs associated with constructing a dual carriageway across the national park were expected to lead to low value for money and are expected to be disproportionate to any benefits offered by the scheme.</p> |
| M67 to M1 Trans-Pennine Tunnel | <p>The Trans-Pennine Tunnel was deemed to be feasible (i.e. technically possible) and successfully met the evaluation criteria in terms of its impact on the key problems and objectives, including large beneficial impacts for connectivity, capacity, societal and resilience objectives and for safety, journey time and journey time reliability related problems, it was concluded that there would be significant challenges in delivering the option, within the timescales being considered by the study. Although the option had an ability to provide a step change in the levels of connectivity, further work would need to test the technical deliverability of such an option as well as further work on determining its potential costs.</p> |
| A628 Peak District Tunnel | <p>Similarly, the Peak District Tunnel was deemed to be feasible and successfully met the evaluation criteria in terms of its impact on the key problems and objectives, including large beneficial impacts for connectivity, and capacity objectives and for journey time and journey time reliability related problems, it was concluded that there would be significant challenges in delivering the option in the timescales of this study. Again further work would need to test the technical deliverability of such an option as well as further work on determining its potential costs.</p> |
| A628/A616 Selected Dualling | <p>Whilst the Selected Dualling was deemed to be feasible, it did not satisfy the criteria in terms of its impact on key problems and objectives and was also considered to be very difficult to deliver,</p> |

| Option | Key Reason for not progressing |
|--|---|
| | given the expected third party land issues and opposition associated with construction in the national park. Whilst beneficial impacts were anticipated for safety, journey times, journey time reliability, connectivity, capacity and resilience, an adverse impact was anticipated with regard to environmental impacts. |
| Climbing Lanes | Whilst the Climbing Lanes option was deemed to be both feasible and deliverable, it did not satisfy the criteria in terms of its impact on the key problems and objectives. The option was deemed to have a beneficial impact on a range of elements, including connectivity, capacity, resilience, safety, journey times and journey time reliability. However, it was concluded that there would be some adverse environmental impact, associated with the carriageway alterations in the national park. The impact on the remaining key problems and objectives was deemed to be marginal. |
| Slow Vehicle Refuges | Whilst the option was deemed to be both feasible and deliverable, it did not satisfy the criteria in terms of its impact on the key problems and objectives. In particular, whilst the option was anticipated to have a beneficial impact on connectivity, capacity, safety and journey times the impact on the remaining key problems and objectives was deemed to be marginal. |
| Maintenance Strategy | Whilst the option was deemed to be both feasible and deliverable, it did not satisfy the criteria in terms of its impact on the key problems and objectives. In particular, whilst the option was anticipated to have a beneficial impact on resilience and a large beneficial impact on journey time reliability (in relation to maintenance/asset condition issues), the impact on the remaining key problems and objectives was deemed to be marginal. |
| Route Safety Improvements | Whilst the Route Safety Improvements were deemed to be both feasible and deliverable, they did not satisfy the criteria in terms of impact on the key problems and objectives. Despite the fact that the option was anticipated to have a large beneficial impact on safety issues and a beneficial impact on journey time reliability the impact on the remaining key problems and objectives of the study was deemed to be marginal. |
| A616 Widening at Midhopestones and A616 Langsett Widening Scheme | Whilst the Widening options were deemed to be both feasible and deliverable, they did not satisfy the criteria in terms of their impact on the key problems and objectives. In particular, whilst the options were anticipated to have a beneficial impact on connectivity, capacity, safety, journey times and journey time reliability the impact on the remaining key problems and objectives of the study were deemed to be marginal. |
| A616/A628 Flouch Junction Improvement Scheme | Whilst the Junction Improvement Scheme was deemed to be both feasible and deliverable, it did not satisfy the criteria in terms of its impact on the key problems and objectives. In particular, whilst the option was anticipated to have a degree of beneficial impact on connectivity, capacity, safety, journey times and journey time reliability, the impact on the remaining key problems and objectives was deemed to be marginal. |
| A628 Salter's Brook Scheme - Carriageway Realignment | Whilst the option was deemed to be both feasible and deliverable, it did not satisfy the criteria in terms of its impact on the key problems and objectives. In particular, whilst the option was anticipated to have a beneficial impact on connectivity, capacity, safety, journey times and journey time reliability the impact on the remaining key problems |

| Option | Key Reason for not progressing |
|--------|--|
| | and objectives was deemed to be marginal. The Salter's Brook realignment would result in loss and fragmentation of a triple designation habitat (Peak District Moors Special Protection Area, South Pennine Moors Special Area of Conservation and The Dark Peak Site of Special Scientific Interest), an area of international and national importance. |

5.4 Second Sift (packages) Results

5.4.1 Following the completion of the initial-sifting exercise, 4 options performed best in meeting the evaluation criteria and were subsequently progressed to the EAST sifting stage and 19 options were not progressed.

5.4.2 A review of the 19 options not progressed beyond the initial sift identified 5 measures which were considered to warrant reconsideration as part of a potential package. Each of the 5 measures were deemed to be both feasible and deliverable but had not met the evaluation criteria in terms of its impact on the defined challenges and/or objectives. The 5 options, now referred to as 'sub-options' include:

- A57(T) to A57 Link Road;
- Climbing Lanes;
- Route Safety Improvements;
- Maintenance Strategy; and
- Technology Package.

5.4.3 It was considered that these sub-options had the potential to offer further additional benefits across the trans-Pennine routes when packaged with one of the four main options.

5.4.4 In addition, the decision was taken to reconsider the HGV Control Scheme (Inc., complementary sustainable transport measures) as part of a package. The option had successfully met the evaluation criteria in terms of its impact on the identified challenges and objectives, and was considered to be feasible. The reason it did not progress in its own right was as a result of it being considered to be potentially difficult to deliver, (as outlined in Table 5-5 previously). However, the option was supported by a number of groups, including Friends of the Peak District, who had conducted some investigations regarding the operation of such a scheme. As such, it was decided to take the option through to the packaging stage for reconsideration, particularly with regard to the deliverability element of the option.

5.4.5 Furthermore the A628 Salter's Brook Carriageway Realignment scheme, although it did not meet the evaluation criteria in terms of its impact on challenges and objectives, was felt to be feasible and deliverable and as such, this option had the potential to warrant further consideration as part of a package when grouped with the climbing lanes. Particularly as the option included a long section of eastbound climbing lane.

5.4.6 As such, a total of 6 individual sub-options were identified as warranting consideration for testing as part of a package. However, it was decided to combine the Maintenance Strategy and Technology Package into one sub-option, thus 5 sub-options were actually taken forward for testing within packages with the 4 main options.

- 5.4.7 Potential sustainable transport measures were considered but did not progress to the packaging stage of the process. Whilst it was considered that implementing sustainable transport measures was both deliverable and feasible, the option did not satisfy the criteria in terms of its impact on key challenges and objectives. Furthermore, the option was not taken forward for packaging as it was felt that a range of complementary sustainable transport measures could be delivered by local authority partners in support of any option that improves the capacity of the route and/or removes traffic from roads through communities. The Highways Agency is already engaging with the various local highway and planning authorities to discuss how further complementary and sustainable options can be delivered in the future.
- 5.4.8 Current congestion and capacity issues experienced on the route results in a significant challenge in terms of delivering sustainable transport improvements, particularly for improvements relating to bus services. Any improvements or provision of bus infrastructure under the current situation would likely require a re-allocation of road space, adding further to congestion and capacity issues already experienced. The introduction of larger scale interventions would enable the provision of complementary public transport measures. The expected increase of available capacity due to anticipated reduced traffic flows on roads, within the western villages particularly, would provide an opportunity for increasing the frequency and coverage of bus services and/or the reallocation of highway capacity to more sustainable modes (cycle lanes, wider footways etc.).
- 5.4.9 The M67 to M1 Trans-Pennine Tunnel and A628 Peak District Tunnel options were not taken forward for consideration as packages. Whilst they both scored well against the challenges and objectives, there were significant doubts over the deliverability of such options in the timeframe for this piece of work, (as outlined in Table 5-5). As such, they were not considered to be appropriate measures to package.
- 5.4.10 In terms of the M67 to M1 Dual carriageway option, this did not meet the evaluation criteria in terms of its impact on the objectives, deliverability and feasibility criteria and was therefore considered to be an inappropriate option for packaging.
- 5.4.11 Similarly, the A628 / A616 Dualling and Selected Dualling options did not satisfy the evaluation criteria in terms of their impact on the key objectives or challenges and the options were also deemed to be very difficult to deliver. These two options were therefore not considered for packaging. It is important to note that the Climbing Lanes option, which was deemed worthy of testing as part of a package, was anticipated to offer a similar level of benefit as the Selected Dualling option, with less adverse environmental impact.
- 5.4.12 In terms of the Slow Vehicle Refuges option, it was anticipated to be both feasible and deliverable but did not meet the evaluation criteria in relation to impact on the defined challenges and objectives. Once again, this meant that the option could potentially warrant further consideration as part of a package. However, the option was not taken forward for testing as it was felt that the Climbing Lanes option offered a better solution to the problem of slow moving HGVs on steep section of the corridor. In particular, in the case of the Slow Vehicle Refuge option, there was no way of ensuring that HGVs actually made use of the refuge.

- 5.4.13 The A616 Midhopstones and Langsett Widening schemes were not taken forward for testing as part of a package. Both schemes were considered to be deliverable and feasible, but did not meet the criteria in relation to their impact on the identified challenges and objectives. In relation to the Midhopstones Widening scheme, previous analysis and consultation on the proposed scheme determined that a number of listed buildings would need to be demolished in order to allow the scheme to be constructed and therefore it was determined that the benefits of such a scheme would not justify the costs. In terms of the Langsett Widening scheme, the option was originally developed to tackle safety issues on the route. Whilst this specific scheme has not been taken forward to the packaging, a number of other safety improvements on this stretch of carriageway have been included as part of the Route Safety Improvements option. Furthermore, it should be noted that a footway/cycleway scheme is already committed for this section of the route.
- 5.4.14 The M67-A6018 Link was not taken through to the packaging. Whilst the option was considered to be both deliverable and feasible it did not satisfy the criteria in terms of its impact on challenges and objectives. Furthermore, three of the four main options that successfully progressed through the initial sift, the bypass of Mottram, Hollingworth and Tintwistle, Mottram Moor Link Road and A57 Mottram One Way options already include a link from the M67 to the A6018 as part of their design. Therefore, it would not make sense to include the M67-A6018 option in these packages.
- 5.4.15 Following the selection of sub-options for packaging, each of the 4 main options was considered in combination with:
- each sub-option individually;
 - every combination of 2 sub-options;
 - every combination of 3 sub-options;
 - every combination of 4 sub-options; and
 - all 5 sub-options.
- 5.4.16 This approach led to the development of 31 individual packages associated with each of the four main options. Therefore, in total, 124 packages of options were considered during the second sifting exercise.
- 5.4.17 The second sifting exercise adopted exactly the same methodology and scoring system as used during the initial-sift, together with the same evaluation criteria, as outlined in Section 5.3.
- 5.4.18 On completion of the second sifting exercise, a total of 56 packages of options successfully met the evaluation criteria and were consequently taken through to the final stage of sifting, utilising the DfT's EAST.
- 5.4.19 Annex 2 presents the results of the second-sift for the 124 packages of options, highlighting the 56 packages that successfully met the criteria and the 68 packages which did not.
- 5.4.20 As above, on completion of the evaluation of the 124 packages of options as part of the second sift, 68 packages were not progressed, (see Annex 2).

- 5.4.21 These packages were not progressed because of the inclusion of the HGV Control Scheme (Inc. complementary sustainable transport measures) sub-option. During the initial-sift it was determined that the HGV Control Scheme (Inc. complementary measures) could be 'difficult to deliver', primarily as a result of the anticipated difficulties in actually enforcing such an option. Despite the reconsideration of the sub-option as part of a package of measures, this key issue regarding deliverability remained unchanged. As the evaluation criteria clearly stipulated that an option (or sub-option within a package) 'must be deliverable in theory', any package of options which included the HGV Control Scheme (Inc. complementary measures) was deemed undeliverable, and hence not progressed.
- 5.4.22 As part of the ongoing dialogue with stakeholders during stage 2 of the study new information was made available to the project team in the form of an updated report from the Friends of the Peak District. This presented updated evidence surrounding an alternative package of measures which the organisation felt could meet all of the study objectives. It was felt that in light of this new information that the HGV Control scheme (Inc. complimentary sustainable transport measures) should be progressed as a standalone package through EAST. This resulted in 57, rather than 56, packages, being considered within the next stage.

5.5 Early Assessment and Sifting Tool (EAST) Results

- 5.5.1 Following the initial-sift of individual options and second sift of packages of options, 4 individual options and 57 packages were taken forward to the final stage of sifting, using EAST.
- 5.5.2 Options / packages that scored highest across these four categories were deemed to be the most successful and topped the rankings. It is important to note that the level of confidence that can be applied to comparisons of the options and packages facilitated by EAST depends on the robustness of the underlying evidence base. As part of the EAST process, an assessment of the quality of supporting evidence was made for each option / package, concluding that they were all 'at a very early stage of development and their impact had not been assessed through a traffic model'. Furthermore, the associated cost estimates were considered to be of 'high risk'.
- 5.5.3 The use of EAST has assessed where instances, packages might be better than individual options. The assessment identified 4 potential packages for further development and assessment, these include:
- Bypass of Mottram, Hollingworth and Tintwistle with A57(T) to A57 Link Road, Climbing Lanes (including a realignment of Salter's Brook), Route Safety Improvements and Maintenance Strategy / Technology Package;
 - Dual carriageway link road M67 to A57 and spur connecting to A6018 (Mottram Moor Link) with A57(T) to A57 Link Road, Climbing Lanes (including a realignment of Salter's Brook), Route Safety Improvements and Maintenance Strategy / Technology Package;
 - A57 Mottram One Way with A57(T) to A57 Link Road, Climbing Lanes (including a realignment of Salter's Brook), Route Safety Improvements and Maintenance Strategy / Technology Package; and

- A61 Dualling with A57(T) to A57 Link Road, Climbing Lanes (including a realignment of Salter's Brook), Route Safety Improvements and Maintenance Strategy / Technology Package.

5.5.4 Annex 3 presents the results of the EAST assessment for the 4 individual options and the 57 packages of options.

5.6 Summary

5.6.1 This section has described the methodology adopted in order to conduct the sifting of options / packages, aimed at identifying any 'showstoppers' which could prevent an option / package progressing at subsequent stages in the assessment process. The process has focused on options and packages which have not been progressed and which fail to tackle the key problems identified or contribute towards the key objectives or are deemed not to be deliverable or feasible.

5.6.2 As part of this process, an initial sifting tool has been utilised, enabling a qualitative assessment to be made of the scale of impact of each of the 23 initial options against the route problems and objectives and also against deliverability and feasibility criteria. Following the initial sift, 19 of the initial options were not progressed as, on their own, they did not achieve the desired outcomes. 4 options successfully met the evaluation criteria.

5.6.3 However, the decision was taken to test packaging together 5 of the options not progressed in combination with each of the 4 successful options. This approach led to the development of 31 individual packages associated with each of the four main schemes. Therefore, in total, 124 packages (31 x 4) of options were considered during the second sifting exercise and subjected to a second sift using the same sifting tool. The outcome of this second sift was that 68 packages were not progressed and 56 packages were taken through to the final stage of sifting, using the DfT's EAST decision support tool, along with the 4 successful individual options from the first sift and 1 further stand-alone package; HGV Control scheme (Inc. complimentary sustainable transport measures).

5.6.4 Following the EAST assessment, an overall ranking was conducted and 4 packages were identified for further development and assessment, these were:

- Bypass of Mottram, Hollingworth and Tintwistle with A57(T) to A57 Link Road, Climbing Lanes (including Salter's Brook Realignment), Route Safety Improvements Technology Package and Maintenance Strategy;
- Dual carriageway link road M67 to A57 and spur connecting to A6018) with A57(T) to A57 Link Road, Climbing Lanes, Lanes (including Salter's Brook Realignment), Route Safety Improvements Technology Package and Maintenance Strategy ;
- A57 Mottram One Way with A57(T) to A57 Link Road, Climbing Lanes (including Salter's Brook Realignment), Route Safety Improvements Technology Package and Maintenance Strategy,; and
- A61 Dualling with A57(T) to A57 Link Road, Climbing Lanes (including Salter's Brook Realignment), Route Safety Improvements Technology Package and Maintenance Strategy.

- 5.6.5 At a Stakeholder Reference Group meeting, held during Stage 2 of the study, the emerging options were broadly supported by stakeholders who noted that any measures that could improve conditions at the western end of the corridor would be welcomed. The A61 Dualling option was also seen as being important, benefiting areas of forecast employment and population growth.
- 5.6.6 Some potential concerns were raised over elements of the packages, with stakeholders noting that measures, such as proposed climbing lanes in the Peak District National Park, would need to be clearly evidenced. In addition, stakeholders were keen to see that improvements on one section of the route did not lead to adverse impacts elsewhere and that they would like to see appropriate levels of mitigation to counter these.
- 5.6.7 A number of stakeholders pointed out that resilience was a key issue and that the trans-Pennine routes needed to be kept open more often, with some stakeholders expressing a wish to see options which could provide a step change in connectivity between the regions, facilitating increased economic growth.

6 Development of Options

6.1 Introduction

6.1.1 The four packages are made up of the four individual 'primary' options identified following the sifting exercise in combination with a 'central package' of options which are common across the four packages. The central package of options common to all four of the packages include:

- A57(T) to A57 link;
- Route Safety Improvements;
- Climbing Lanes (including Salter's Brook Realignment);
- Technology Package; and
- Maintenance Package.

6.1.2 The four potential packages of options recommended for further consideration were:

- Package 1 – Bypass of Mottram, Hollingworth and Tintwistle with the Central Package of Options (A57(T) to A57 Link Road, Climbing Lanes (including Salter's Brook Realignment), Route Safety Improvements, Technology Package and Maintenance Strategy);
- Package 2 – Dual carriageway link road M67 to A57 Mottram Moor (tunnel under Roe Cross and spur connecting to A6018) with the Central Package of Options (A57(T) to A57 Link Road, Climbing Lanes (including Salter's Brook Realignment), Route Safety Improvements Technology Package and Maintenance Strategy);
- Package 3 – A57 Mottram One Way with the Central Package of Options (A57(T) to A57 Link Road, Climbing Lanes (including Salter's Brook Realignment), Route Safety Improvements Technology Package and Maintenance Strategy); and
- Package 4 – A61 Dualling with the Central Package of Options (A57(T) to A57 Link Road, Climbing Lanes (including Salter's Brook Realignment), Route Safety Improvements Technology Package and Maintenance Strategy).

6.1.3 This section of the report sets out the appraisal process and summarises the development of these potential packages to a sufficient level of design / specification to be able to distinguish the relative impacts of the packages under consideration.

6.2 Option Descriptions

6.2.1 A description of the options within the four packages is outlined below.

6.2.2 Bypass of Mottram, Hollingworth and Tintwistle

The Mottram to Tintwistle bypass is a 5.5km long bypass of the villages of Mottram in Longdendale (Mottram), Hollingworth and Tintwistle. The design of this option has been based on the previous scheme that was presented at the public inquiry in 2007. An alternative alignment has also been considered, east of Swallows Wood, which

includes a 'cut and cover' element to the eastern end of the alignment to account for the section which would go through the designated National Park.

The bypass commences at M67 terminal roundabout, west of Mottram, and re-joins the existing trunk road network on the A628(T) Woodhead Road at the eastern boundary of Tintwistle.

6.2.3 **Dual carriageway link road M67 to A57 Mottram Moor (Mottram Moor Link)**

The M67 to A57 link is approximately 3km long bypass of Mottram between the M67 terminal roundabout and the A57 Brookfield Road. This scheme is based on a proposal which was part of Tameside Council's Longdendale Integrated Transport Strategy (LITS).

Commencing at the M67 terminal roundabout the link heads in a north-easterly direction towards Roe Cross Road. This connects with a roundabout junction with a spur road. The link continues in a south-easterly direction, before connecting to the existing A57 at Brookfield with a roundabout junction.

6.2.4 **A57 Mottram One Way**

The A57 Mottram One Way scheme involves alterations to the M67 terminal roundabout and construction of a link road between the roundabout and the A6018 Roe Cross Road.

6.2.5 **A61 Dualling**

The existing A61 between the M1 Junction 36 and Westwood Roundabout is currently dual carriageway for the first 550m west of the M1 Junction and then reduces to a single carriageway for the remaining kilometre. This scheme proposes to widen the single carriageway section so that an urban all-purpose dual carriageway section which continues through to the Westwood Roundabout, which is currently being altered to a throughabout.

6.2.6 **A57(T) to A57 Link Road (relevant to all 4 packages)**

The A57(T) to A57 link element would provide a single carriageway link from A57(T) at Mottram Moor new roundabout or signalised junction 1250m south easterly and connect to the A57 at Brookfield, this could have a benefit of relieving the often congested signalised A57/A628 junction in Hollingworth.

6.2.7 **Climbing Lanes (relevant to all 4 packages)**

Two locations were identified as having steep gradients and alignments that could accommodate widening. Both of these locations are on the A628 (T) within the Peak District National Park. The first suitable location commences approximately 200m east of Woodhead Bridge and continues in an easterly direction for approximately 1300m. The second location commences 1550m west of Salter's Brook Bridge and continues in an easterly direction for approximately 1050m. Both of these climbing lanes would be constructed by cutting into the adjacent ground on the northern side.

A third climbing lane is part of a wider realignment of the A628 including the replacement of the viaduct / bridge at Salter's Brook. The climbing lanes itself commences 500m west of Salter's Brook and continues in an easterly direction for approximately 1.6km.

6.2.8 **Route Safety Improvements (relevant to all 4 packages)**

A package of safety measures based on the analysis of accident data as part of Stage 1 of the study. The proposed measures include a range of treatments including:

- Signing & road marking review;
- Treatments at signalised junctions and signal controlled pedestrian crossings;
- Footway Build outs and pedestrian refuges;
- Traffic Regulation Orders;
- Provision for Public Rights of Way and trail crossings;
- Surface Treatments;
- Junction improvements; and
- Safety Cameras

It should be noted that there may be a degree of flexibility in terms of the scale of the improvements dependent upon which primary scheme is introduced on the route. The proposed safety measures have been developed based on existing accident trends and on a 'do minimum' basis i.e. the measures have been developed based on existing traffic levels and traffic types. If a significant infrastructure scheme were to be taken forward, it may open up the route to more significant improvements in the western villages and more restrictive measures along the Trans-Pennine sections to provide the dual purpose of both safety improvements and route restraint type measures.

6.2.9 **Technology Package (relevant to all 4 packages)**

Several technology based solutions are considered appropriate for use on the Strategic trans-Pennine routes based on three principals of data acquisition, information provision and control. The measures included in this option are:

- VMS (Variable Message Signs) – employed on the wider road network and feeding into the strategic route, in order to convey relevant real-time information to users, and potential users, of the route enabling informed route choices prior to key decision points.
- VAS (Vehicle Activated Signs) - will be provided at points along the route where safety concerns have been identified in order to highlight hazards to motorists. Variable speed limit signs could be fed by data obtained from weather and carriageway surface monitoring systems and at a certain threshold the speed limit on the route could be reduced.

6.2.10 **Maintenance Strategy (relevant to all 4 packages)**

Through liaison with the Highways Agency it has been identified that a significant programme of maintenance work is planned and committed on the strategic trans-Pennine route with a 5 year programme of works in place. The planned works will

include; addressing the condition of retaining walls, drainage and lighting across the route.

The strategy proposed within the trans-Pennine feasibility study will be an enhanced strategy. The adoption of the principles of asset management will optimise the use of available resources and through long term planning take a more preventative approach to maintenance, which may bring efficiency benefits.

The strategy will provide a clear and concise way forward setting out how highway maintenance could be delivered to meet the challenges and objectives of the study. It will cover a number of aspects regarding the planning, delivery and management of highway infrastructure assets and how these are delivered over the short, medium and long term.

6.3 Option Assessment – Approach

Package Fit with Committed and Emerging Schemes

- 6.3.1 As outlined in paragraphs 3.4, there are a number of committed and emerging schemes which will impact on the trans-Pennine routes.
- 6.3.2 The A61 / A616 Westwood Roundabout improvement is anticipated to significantly improve congestion issues at this junction, with the hamburger arrangement providing a straight through movement for vehicles using the A61, reducing journey times for both local and strategic traffic movements. Whilst this measure would fit well with any of the proposed packages, the A61 Dualling measure, within Package 4, would fit particularly well with this improvement, providing an additional benefit in terms of reduced congestion and improved journey times.
- 6.3.3 The proposed LNMS's at the eastern side of the corridor, including the A61 Northbound Footway, A616 Stocksbridge Steps and A616 Langsett Eastbound footway / cycleway will complement the measures which have been proposed as part of the route safety improvements.
- 6.3.4 At the western end of the corridor, both the A57 Hyde Road Widening and M60 Junction 24 improvements will provide additional capacity, reducing congestion and delays currently experienced by users. In combination with a solution to the congestion issues in Mottram, Hollingworth and Tintwistle, Trans-Pennine movements would experience a substantial improvements in linkages to both Manchester City Centre and the M60 motorway network. The potential for a Smart motorway scheme between J24 and J27 would further enhance this improvement to the Tran-Pennine corridor.
- 6.3.5 As outlined in Chapter 3, a number of large rail network schemes are already committed as part of The Northern Hub Improvements, with further measure such as additional rail electrification and the HS2 / HS3 proposals under consideration. These proposed rail improvements would be expected to significantly compliment any highways interventions taken forward.
- 6.3.6 Furthermore, during the recent Stage 2 stakeholder engagement, a number of Local Authorities outlined additional plans that would impact on trans-Pennine routes. TfGM

outlined plans for significant tactical bus priority across Greater Manchester, confirming that such improvements in the Tameside area could be coordinated with any package of measures emerging from the this feasibility study process, thus providing additional benefits.

- 6.3.7 Barnsley MBC identified that, in conjunction with the HA, were working on a number of schemes in the area which would improve conditions for Trans-Pennine journeys. They also noted that they were also investigating implementing a right turn ban at the junction of Gilbert Hill and the A616 near Langsett, to reduce instances of queuing on this section of the corridor.
- 6.3.8 Sheffield City Council highlighted that the A61 Penistone Road improvement scheme, was a key local improvement which would provide benefits for cars, public transport and pedestrians, linking with any package of trans-Pennine improvements.

Option Assessment Framework

- 6.3.9 The 'Transport Appraisal Process' TAG Unit states that the potential options should be assessed against the Transport Business Case criteria using the Option Assessment Framework, provided within the TAG Unit. As such, the remainder of this chapter follows the assessment areas outlined in the Framework, including:
 - Strategic Fit;
 - Value for Money, including:
 - Impact on the Economy;
 - Impact on the Environment;
 - Impact on Society;
 - Public Accounts;
 - Distributional impacts; and
 - Indicative Benefit Cost Ratio (BCR).
 - Financial Case;
 - Delivery Case; and
 - Commercial Case.

6.3.10 Whilst it should be noted that the assessment of the impacts of each of the packages of options is predominantly qualitative in nature given the availability of a suitable traffic model for the quantification/monetisation of impacts, the development of the design of the packages, particularly in relation to the measures included within the Route Safety Improvements and Technology Package, has enabled further, more detailed consideration of each package of measures to take place.

6.3.11 In line with TAG, the appraisals have used a 7 point scale of impacts in providing a qualitative assessment of the scale of impacts. The scale is as follows:

| Seven point scale of impacts | | | | | | |
|------------------------------|---------------------|-------------------|---------|----------------|------------------|---------------|
| Large Beneficial | Moderate Beneficial | Slight Beneficial | Neutral | Slight Adverse | Moderate Adverse | Large Adverse |

6.3.12 Outline costs estimates have been produced to provide an indication of the potential costs of each of the packages of options, however, in the absence of any monetised assessment of the impacts of the packages, it has not been possible to provide a calculated Benefit Cost Ratio, instead a qualitative judgement has been made regarding the likely level of Value for Money.

6.3.13 The remainder of this section of the report considers each aspect of the Option Assessment Framework assessment areas and a summary of the impact of each of the four packages.

6.4 Strategic Fit

Overview

6.4.1 The assessment of Strategic Fit considers, qualitatively, how each of the packages aligns with key national, regional and local policies. Each of the key policy documents was reviewed and consideration given to the overriding vision as well as the headline objectives. Subsequently, a qualitative assessment of how each package of options aligned with the objectives of the policy documents was undertaken, taking into consideration the likely impact of the package outlined. In addition, the assessment of Strategic Fit also reviews how each package is anticipated to perform against the specific objectives, identified during the Stage 1 process.

6.4.2 Table 6-1 summarises the findings of the qualitative assessment of the Strategic fit of each of the four packages.

Table 6-1 – Strategic Fit

| | Package 1 | Package 2 | Package 3 | Package 4 |
|--|-----------|-----------|-----------|-----------|
| Regional Transport and Spatial Strategy and local objectives fit | | | | |
| National Policy Alignment | Lrg. Ben. | Mod. Ben. | Mod. Ben. | Mod. Ben. |
| Regional Policy Alignment | Mod. Ben. | Mod. Ben. | Mod. Ben. | Mod. Ben. |
| Local Policy Alignment | Lrg. Ben. | Mod. Ben. | Mod. Ben. | Mod. Ben. |
| Scheme Objectives Fit | | | | |
| Connectivity | Lrg. Ben. | Mod. Ben. | Mod. Ben. | Sli. Ben. |
| Environmental | Mod. Adv. | Sli. Adv. | Sli. Adv. | Sli. Adv. |
| Societal | Lrg. Ben. | Sli. Ben. | Neutral | Neutral |
| Capacity | Lrg. Ben. | Mod. Ben. | Mod. Ben. | Mod. Ben. |
| Resilience | Lrg. Ben. | Mod. Ben. | Mod. Ben. | Mod. Ben. |
| Safety | Lrg. Ben. | Mod. Ben. | Mod. Ben. | Mod. Ben. |

6.5 Value for Money

Overview

6.5.1 The Value for Money section of the Option Assessment Framework considers a large number of assessment areas grouped into the six key headings, summarised below:

- Impact on the Economy:
 - Business Users and Transport Providers;

- Reliability;
- Regeneration; and
- Wider Impacts.
- Impact on the Environment:
 - Noise;
 - Air Quality;
 - Greenhouse Gases;
 - Landscape;
 - Townscape;
 - Historic Environment;
 - Biodiversity; and
 - Water Environment.
- Impact on Society:
 - Non-Business Users;
 - Physical Activity;
 - Journey Quality;
 - Accidents;
 - Security;
 - Access to Services;
 - Affordability;
 - Severance; and
 - Option Values.
- Public Account Impacts:
 - Cost to Broad Transport Budget; and
 - Indirect Tax Revenues.
- Distributional Impacts, (considering User benefits; Noise; Air Quality; Accidents; Security; Severance; Accessibility; Personal Affordability);
- Indicative Benefit Cost Ratio:
 - Cost to Private Sector;
 - Indicative Net Present Value; and
 - Indicative Economic BCR.

6.5.2 The following sections consider each of the six key impact areas individually and includes: a high level explanation of the assessment areas within each category; an outline of the methodology adopted in order to appraise each package of options against the assessment areas and a table summarising the assessment for each impact area.

Value for Money - Impact on Economy

6.5.3 The assessment of the impact on the Economy includes analysis of:

- Business Users and Transport Providers;
- Reliability;
- Regeneration; and
- Wider Impacts.

6.5.4 Table 6-2 summarises the assessment of the Impact on Economy of each of the four packages. A discussion of the results of this assessment is provided in the following paragraphs.

Table 6-2 – Value for Money – Economy Impacts

| | Package 1 | Package 2 | Package 3 | Package 4 |
|----------------|-----------|-----------|-----------|-----------|
| Economy | | | | |
| Business Users | Lrg. Ben. | Mod. Ben. | Mod. Ben. | Sli. Ben. |
| Reliability | Lrg. Ben. | Mod. Ben. | Mod. Ben. | Sli. Ben. |
| Regeneration | Mod. Ben. | Sli. Ben. | Sli. Ben. | Sli. Ben. |
| Wider Impacts | Mod. Ben. | Sli. Ben. | Sli. Ben. | Sli. Ben. |

Value for Money - Impact on Environment

6.5.5 The Environment Objective aims to provide information to inform the transport appraisal process by assessing the impact of the options on road users / local environs. The Environment Sub-impacts by which the trans-Pennine Packages have been appraised, include:

- To reduce Noise;
- To improve Local Air Quality;
- To improve Greenhouse Gases;
- To protect and enhance the Landscape;
- To protect the Heritage of Historic Resources;
- To support Biodiversity; and
- To protect the Water Environment.

6.5.6 Table 6-3 summarises the assessment of the Impact on Environment of each of the four packages. Background environmental information collated during Stage 1 has informed this appraisal. Information on the methodology adopted for each impact is presented below.

Table 6-3 – Value for Money – Environment Impacts

| | Package 1 | Package 2 | Package 3 | Package 4 |
|--------------------|-----------|-----------|-----------|-----------|
| Environment | | | | |
| Noise | Mod. Ben. | Sli. Adv. | Sli. Adv. | Neutral |
| Air Quality | Lrg. Ben. | Mod. Ben. | Sli. Ben. | Neutral |
| Greenhouse Gases | Neutral | Neutral | Neutral | Neutral |
| Landscape | Mod. Adv. | Sli. Adv. | Sli. Adv. | Sli. Adv. |
| Townscape | Mod. Ben. | Sli. Ben. | Neutral | Neutral |
| Historic Resources | Mod. Adv. | Sli. Adv. | Sli. Adv. | Sli. Adv. |
| Biodiversity | Lrg. Adv. | Sli. Adv. | Sli. Adv. | Sli. Adv. |
| Water Environment | Mod. Adv. | Sli. Adv. | Sli. Adv. | Sli. Adv. |

Value for Money - Impact on Society

6.5.7 The assessment of the impact on the Society considers a large number of factors, including:

- Non-business Users;
- Physical Activity;
- Journey Quality;
- Accidents;
- Security;
- Access to Services;
- Affordability;
- Severance; and
- Option Values.

6.5.8 Table 6-4 summarises the assessment of the Impact on Society of each of the four packages.

Table 6-4 – Value for Money – Society Impacts

| | Package 1 | Package 2 | Package 3 | Package 4 |
|--------------------|-----------|-----------|-----------|-----------|
| Society | | | | |
| Non-Business Users | Lrg. Ben. | Mod. Ben. | Mod. Ben. | Sli. Ben. |
| Physical Activity | Mod. Ben. | Sli. Ben. | Neutral | Neutral |
| Journey Quality | Lrg. Ben. | Mod. Ben. | Mod. Ben. | Mod. Ben. |
| Accidents | Lrg. Ben. | Mod. Ben. | Mod. Ben. | Mod. Ben. |
| Security | Sli. Ben. | Sli. Ben. | Sli. Ben. | Sli. Ben. |
| Access to Services | Sli. Ben. | Neutral | Neutral | Neutral |
| Affordability | Mod. Ben. | Sli. Ben. | Sli. Ben. | Sli. Ben. |
| Severance | Mod. Ben. | Sli. Ben. | Neutral | Neutral |
| Option Values | Neutral | Neutral | Neutral | Neutral |

Value for Money - Impact on Public Accounts

6.5.9 The Impacts on Public Accounts section of the Option Assessment Framework is concerned with the cost to the broad transport budget and the impact of the package on indirect tax revenues.

6.5.10 Table 6-5 summarises the assessment of the Impact on Public Accounts of each of the four packages. Cost estimates are provided as ranges.

Table 6-5 – Value for Money – Public Accounts Impacts

| | Package 1 | Package 2 | Package 3 | Package 4 |
|--------------------------------|----------------|----------------|----------------|----------------|
| Public Accounts | | | | |
| Cost to Broad Transport Budget | £250m to £350m | £150m to £250m | £100m to £200m | £100m to £200m |

| | Package 1 | Package 2 | Package 3 | Package 4 |
|-----------------------|-----------|-----------|-----------|-----------|
| Indirect Tax Revenues | Sli. Adv. | Sli. Adv. | Sli. Adv. | Sli. Adv. |

Value for Money – Distributional Impacts

6.5.11 Distributional Impacts consider the variance of transport intervention impacts across different social groups and focuses on a number of impacts including:

- User benefits;
- Noise;
- Air Quality;
- Accidents;
- Security;
- Severance;
- Accessibility; and
- Affordability.

6.5.12 However, given the absence of a suitable traffic model which adequately covers the full study area that would provide some basis on which draw a qualitative conclusion on the potential for any distributional impacts, an assessment has not been carried out.

Value for Money – Indicative Benefit Cost Ratio

6.5.13 The Indicative Benefit Cost Ratio category is concerned with the:

- Cost to the Private Sector;
- Indicative Net Present Value; and
- Indicative Economic BCR.

6.5.14 Table 6-6 summarises the assessment of these factors for each of the four packages.

Table 6-6 – Value for Money – Indicative Benefit Cost Ratio

| | Package 1 | Package 2 | Package 3 | Package 4 |
|--------------------------------------|----------------------|-----------------|-----------------|-----------------|
| Indicative Benefit Cost Ratio | | | | |
| Cost to Private Sector | Neutral | Neutral | Neutral | Neutral |
| Indicative NPV | Significant Positive | Positive | Positive | Positive |
| Indicative BCR | High category | Medium category | Medium category | Medium category |

6.6 Financial Case

Overview

- 6.6.1 The assessment of the Financial Case considers the estimated outturn cost for each package of measures. In addition, an initial assessment of funding is conducted, to establish whether any potential funding has already been identified or secured.
- 6.6.2 Table 6-7 summarises the assessment of the Financial Case for each of the four packages. A discussion of the results of this assessment is provided in the following paragraphs.

Table 6-7 – Financial Case

| | Package 1 | Package 2 | Package 3 | Package 4 |
|-------------------------------|--------------------------------------|----------------|----------------|----------------|
| Outturn Cost to implement | £300m to £400m | £200m to £300m | £100m to £200m | £100m to £200m |
| Operating & Maintenance Costs | Not Assessed | | | |
| Funding Allocation | No specific funding route identified | | | |

Outturn Scheme Costs

Operating and Maintenance Costs

- 6.6.3 At this stage, an assessment of the potential maintenance costs for each package of measures has not been undertaken. This will be conducted during Stage 3, during the development of business case assessments for the better performing options.

Funding Allocation

- 6.6.4 For the purposes of the study it has been assumed that in terms of funding availability, potential investment options would be fully funded by Government.

6.7 Delivery Case

6.7.1 Overview

6.7.2 There are three key elements associated with the assessment of the Delivery Case:

- Likely delivery agents;
- Stakeholder acceptability; and
- Public acceptability.

6.7.3 The assessment of ‘Likely delivery agents’ considers the complexity of scheme delivery and how this is related to the potential number of delivery agents. Furthermore, any potential ‘showstoppers’ that could prevent delivery of the scheme are identified.

6.7.4 The Stakeholder / Public acceptability section provides a qualitative assessment of the anticipated level of support or challenge from the respective groups in relation to each package of measures, again, looking to identify any potential ‘showstoppers’.

6.7.5 Table 6-8 summarises the assessment of the Delivery Case for each of the four packages.

Table 6-8 – Delivery Case

| | Package 1 | Package 2 | Package 3 | Package 4 |
|---------------------------------|-----------------|-----------------|-------------------|-------------------|
| Likely Delivery Agents | High complexity | High complexity | Medium complexity | Medium complexity |
| Stakeholder Acceptability | Neutral | Neutral | Neutral | Neutral |
| Public Acceptability / Interest | Neutral | Neutral | Neutral | Neutral |

6.8 Commercial Case

Overview

6.8.1 The Commercial Case is primarily concerned with the ‘Route to market’ and identifying the level of challenge faced to procure the intervention. This includes consideration of aspects including funding (and the likelihood of third party contributions), as well as procurement routes and the level of market interest.

6.8.2 Table 6-9 summarises the assessment of the Commercial Case for each of the four packages. A discussion of the results of this assessment is provided in the following paragraphs.

Table 6-9 – Commercial Case

| | Package 1 | Package 2 | Package 3 | Package 4 |
|-----------------|-----------------------------|-----------|-----------|-----------|
| Route to Market | Number of challenges faced. | | | |

Route to market

- 6.8.3 It was concluded that each of the four packages were at a very early stage of development and a number of key steps needed to be negotiated before potential procurement routes could be assessed. These key steps were anticipated to include:
- Preliminary / detailed scheme design;
 - Public and stakeholder consultation;
 - Planning approval;
 - Outline Business Case development; and
 - Funding approval.
- 6.8.4 Whilst outline designs for each of the packages have been produced as part of the option development stage, preliminary and subsequently detailed designs will need to be developed in the future.
- 6.8.5 It is envisaged that, given the extent of the trans-Pennine corridor, significant public and stakeholder consultation will need to take place regarding any preferred package(s) of options. As outlined, in previous sections, whilst there is expected to be considerable support for each of the packages as a result of the substantial benefits expected from each of the packages, several elements of the packages could be considered to be contentious.
- 6.8.6 Establishing a suitable funding route for any potential package of measures is another key challenge that will need to be overcome before a route to procurements can be established. At present, no specific funding route has been outlined for any of the packages.
- 6.8.7 Aligned with this issue, it will be important to further develop any business cases for any package(s). This will require a further detailed analysis of both the anticipated costs and benefits of the package.

6.9 Summary

- 6.9.1 The following paragraphs and Table 6-10 provide an overall summary of the impacts of each package of measures against the Option Assessment Framework provided within the 'Transport Appraisal Process' TAG Unit, in line with the Transport Business Case criteria.

Table 6-10 – Overall Summary Table

| Assessment Area | | Option | | | |
|-------------------------------------|--------------------------|--|----------------|----------------|----------------|
| | | Package1 | Package 2 | Package 3 | Package 4 |
| Strategic Case | | | | | |
| Policy Alignment | National | Lrg. Ben. | Mod. Ben. | Mod. Ben. | Mod. Ben. |
| | Regional | Mod. Ben. | Mod. Ben. | Mod. Ben. | Mod. Ben. |
| | Local | Lrg. Ben. | Mod. Ben. | Mod. Ben. | Mod. Ben. |
| Scheme Objectives Fit | Connectivity | Lrg. Ben. | Mod. Ben. | Mod. Ben. | Sli. Ben. |
| | Environmental | Mod. Adv. | Sli. Adv. | Sli. Adv. | Sli. Adv. |
| | Societal | Lrg. Ben. | Sli. Ben. | Neutral | Neutral |
| | Capacity | Lrg. Ben. | Mod. Ben. | Mod. Ben. | Mod. Ben. |
| | Resilience | Lrg. Ben. | Mod. Ben. | Mod. Ben. | Mod. Ben. |
| | Safety | Lrg. Ben. | Mod. Ben. | Mod. Ben. | Mod. Ben. |
| Value for Money | | | | | |
| Economy | Business Users | Lrg. Ben. | Mod. Ben. | Mod. Ben. | Sli. Ben. |
| | Reliability | Lrg. Ben. | Mod. Ben. | Mod. Ben. | Sli. Ben. |
| | Regeneration | Mod. Ben. | Sli. Ben. | Sli. Ben. | Sli. Ben. |
| | Wider Impacts | Mod. Ben. | Sli. Ben. | Sli. Ben. | Sli. Ben. |
| Environment | Noise | Mod. Ben. | Sli. Adv. | Sli. Adv. | Neutral |
| | Air Quality | Lrg. Ben. | Mod. Ben. | Sli. Ben. | Neutral |
| | Greenhouse Gases | Neutral | Neutral | Neutral | Neutral |
| | Landscape | Mod. Adv. | Sli. Adv. | Sli. Adv. | Sli. Adv. |
| | Townscape | Mod. Ben. | Sli. Ben. | Neutral | Neutral |
| | Historic Resources | Mod. Adv. | Sli. Adv. | Sli. Adv. | Sli. Adv. |
| | Biodiversity | Lrg. Adv. | Sli. Adv. | Sli. Adv. | Sli. Adv. |
| | Water Environment | Mod. Adv. | Sli. Adv. | Sli. Adv. | Sli. Adv. |
| Society | Non-Business Users | Lrg. Ben. | Mod. Ben. | Mod. Ben. | Sli. Ben. |
| | Physical Activity | Mod. Ben. | Sli. Ben. | Neutral | Neutral |
| | Journey Quality | Lrg. Ben. | Mod. Ben. | Mod. Ben. | Mod. Ben. |
| | Accidents | Lrg. Ben. | Mod. Ben. | Mod. Ben. | Mod. Ben. |
| | Security | Sli. Ben. | Sli. Ben. | Sli. Ben. | Sli. Ben. |
| | Access to Services | Sli. Ben. | Neutral | Neutral | Neutral |
| | Affordability | Mod. Ben. | Sli. Ben. | Sli. Ben. | Sli. Ben. |
| | Severance | Mod. Ben. | Sli. Ben. | Neutral | Neutral |
| Option Values | Neutral | Neutral | Neutral | Neutral | |
| Public Accounts | Cost to Transport Budget | £250m to £350m | £150m to £250m | £100m to £200m | £100m to £200m |
| | Indirect Tax Revenues | Sli. Adv. | Sli. Adv. | Sli. Adv. | Sli. Adv. |
| Indicative BCR | Cost to Private Sector | Neutral | Neutral | Neutral | Neutral |
| | Indicative BCR | High | Medium | Medium | Medium |
| Financial Case | | | | | |
| Outturn Cost (P50) | | £300m to £400m | £200m to £300m | £100m to £200m | £100m to £200m |
| Funding Allocation | | No specific funding route identified | | | |
| Delivery Case | | | | | |
| Likely Delivery Agents (complexity) | | High | High | Medium | Medium |
| Stakeholder/Public Acceptability | | Not consulted on specific packages as yet. | | | |
| Commercial Case | | | | | |
| Route to Market | | Number of challenges faced. | | | |

Strategic Fit

- 6.9.2 From the Table 6-10 it is clear that, whilst all the packages align with national, regional and local policy, Package 1 is felt to have a stronger alignment.
- 6.9.3 In terms of the specific scheme objectives, established as part of the Stage 1 report, all of the packages are anticipated to have a negative impact on the environmental objective. Whilst this is deemed to be slight for Packages 2, 3 and 4, it is considered to be moderate for Package 1. Across the other scheme objectives, Package 1 clearly scores higher than the other packages, with large beneficial impacts anticipated for connectivity, societal, capacity, resilience and safety objectives.

Value for Money - Economy

- 6.9.4 In relation to the economy impacts, Package 1 scores best with large beneficial impacts for business users and reliability and moderate beneficial impacts for regeneration and wider impacts. Packages 2 and 3 appear to be the next best options, whilst Package 4 scores a slight beneficial impact for each of the economy factors.

Value for Money - Environmental

- 6.9.5 In terms of the environmental impacts, all of the packages are deemed to have an adverse impact on landscape, historic resources, biodiversity and water environment. However, whilst these adverse impacts are expected to be slight for Packages 2, 3 and 4, they are anticipated to be large and moderate (respectively) for Package 1. Packages 1 and 2 are expected to have a beneficial impact on townscape, whereas the impact of Packages 3 and 4 is considered to be neutral. In terms of noise, Package 1 is expected to have a moderate beneficial impact whereas the impact of Packages 2 and 3 is anticipated to be adverse and that of Package 4, neutral. All four packages have been deemed to have a neutral impact on greenhouses. Whilst Package 4 is not expected to impact on air quality, the remaining packages are expected to have a beneficial impact, particularly Package 1.

Value for Money - Society

- 6.9.6 In terms of Society impacts, Table 6-10 shows that Package 1 clearly scores better than the other packages, with large beneficial impacts predicted for non-business users, journey quality and accidents and moderate beneficial impacts expected for physical activity, affordability and severance. Slight beneficial impacts are also expected for security and access to services. The next best option appears to be Package 2, followed by Package 3 and then Package 4.

Value for Money – Public Accounts

- 6.9.7 Table 6-10 presents the PVC estimates for the four packages, demonstrating that Package 1 has the highest cost range (£250m to £350m), followed by Package 2 (£150m to £250m) and then Packages 3 and 4 which both have cost ranges of £100m to £200m.
- 6.9.8 In terms of indirect tax revenues, a slight adverse impact is anticipated for each package.

Value for Money – Indicative BCR

- 6.9.9 At this stage, no private sector contributions have been identified for any of the packages, hence a neutral impact is assumed.
- 6.9.10 In terms of the indicative Net Present Value (NPV) and Benefit Cost Ratio (BCR), a monetised assessment of the schemes impacts has not been produced. As such, it is not possible to produce a NPV or BCR. However, a high level assessment of the potential benefits of each package vs. the likely package cost category has been considered and an indicative/likely NPV and BCR category has been produced. The table indicates that Package 1 is anticipated to deliver a High (2 to 4) category BCR and significant positive NPV, whilst the BCR for packages 2, 3 and 4 may only fall into the medium (1.5 to 2) category with positive NPVs.

Financial Case

- 6.9.11 Outturn costs have been estimated for all four packages and are presented in Table 6-10, demonstrating that Package 1 has the highest outturn cost ranges (£300m to £400m), followed by Package 2 (£200m to £300m) and then Packages 3 and 4 with respective cost ranges of £100m and £200m.
- 6.9.12 In terms of funding, all four packages have been scored as slight adverse, given the uncertainty over funding for the packages.

Delivery Case

- 6.9.13 Packages 1 and 2 are anticipated to have a high degree of complexity associated with their delivery and a large number of delivery agents are expected to be involved. The complexity of Packages 3 and 4 is not anticipated to be as great.
- 6.9.14 In terms of stakeholder acceptability and public acceptability / interest, a neutral impact has been concluded for all four packages, given that no consultation has taken place regarding the specific packages of measures. It is difficult to predict the likely support or objection any one package would receive.

Commercial Case

- 6.9.15 All four packages are deemed to be at an early stage of development, with a number of key steps needing to be negotiated before potential procurement routes could be assessed, including:
- Preliminary / detailed scheme design;
 - Public and stakeholder consultation;
 - Planning approval;
 - Outline Business Case development; and
 - Funding approval.

7 Conclusions– Identification of Better Performing Options

7.1 Introduction

- 7.1.1 The Highways Agency has conducted a study of connectivity between Manchester and Sheffield across the trans-Pennine routes. This report is the output from Stage 2 of this study and provides a short list of options that will be considered in more detail in Stage 3.
- 7.1.2 Stage 2 of the study has involved a process to generate and sift a range of proposals likely to achieve the objectives as refined following the completion of Stage 1. The process has also included discussions with a number of public sector stakeholder organisations to ascertain views on the option selection and sifting process.
- 7.1.3 The main output from this stage of the study has been a short list of the best performing schemes in the form of packages to be investigated further in Stage 3.
- 7.1.4 A summary of the packages is outlined below:

7.2 Package 1

7.2.1 Key impacts

- Greatest impact on alleviating congestion and reducing journey times, at the western end of the corridor;
- Potential to have large adverse impact on the environment;
- Likeliest to have the greatest impact in terms of encouraging economic growth;
- Increases potential for initiating smarter choices interventions by local authorities;
- Likely to have strong public acceptance;
- Significant benefit – societal impact;
- Large beneficial impact - network capacity;
- Likely to have largest beneficial impact on safety (bypass);
- A57(T) – A57 link improves reliability of route;
- Could potentially deliver wider economic benefits;
- Moderate beneficial impact on severance (could lead to encouragement of walking and cycling); and
- Large beneficial impact – reliability.

7.2.2 Risks

- Funding route yet to be identified; and
- High complexity, in terms of delivery.

7.3 Package 2

7.3.1 Key impacts

- Moderate benefit – societal impact;

- Moderate beneficial impact – network capacity;
- Moderate adverse environmental impact;
- Improved safety;
- A57(T) – A57 link improves reliability of route;
- Could potentially deliver wider economic benefits;
- Slight beneficial impact on severance; and
- Moderate beneficial impact – reliability.

7.3.2 Risks

- Funding route yet to be identified; and
- Complexity in terms of delivery.

7.4 Package 3

7.4.1 Key impacts

- Moderate benefit – societal impact;
- Moderate beneficial impact – network capacity;
- Moderate adverse environmental impact;
- Improved safety;
- A57(T) – A57 link improves reliability of route;
- Could potentially deliver wider economic benefits;
- Neutral impact on severance;
- Moderate beneficial impact – reliability; and
- Moderate complexity in terms of delivery.

7.4.2 Risks

- Funding route yet to be identified; and
- Some complexity in terms of delivery.

7.5 Package 4

7.5.1 Key impacts

- Moderate benefit – societal impact;
- Moderate beneficial impact – network capacity;
- Moderate adverse environmental impact;
- Improved safety;
- Moderate adverse environmental impact;
- Improved safety;
- A57(T) – A57 link improves reliability of route;
- Could potentially deliver wider economic benefits;
- Neutral impact on severance;
- Slight beneficial impact – reliability;
- Moderate complexity in terms of delivery;
- Improves connectivity to adjacent employment areas; and
- Compliments planned improvements to Westwood roundabout junction.

7.5.2 Risks

- Funding route yet to be identified;
- A57 (T) to A57 Link may not stand up on its own without being combined with a primary option in the west; and
- Whilst improvements to the A61 will improve journey time the user benefits likely to be low as improvements to the western end of the route (where congestion is greatest) are minimal in this option.

7.6 Best Performing Option / Package

7.6.1 The best performing options to be taken forward for consideration in Stage 3 include:

- Bypass of Mottram, Hollingworth and Tintwistle;
- Mottram Moor Link Road;
- A57 Mottram One Way; and
- A61 Dualling.

7.6.2 3 of the 4 options included a package of secondary / complementary measures to be made up of:

- A57(T) to A57 Link;
- Safety measures;
- Climbing Lanes (including Salter's Brook Realignment);
- Technology package; and
- Maintenance strategy.

7.6.3 Given its geographical remoteness from the other elements of the central package, the A61 dualling would also be assessed in stage 3 on a standalone basis as well as being assessed as an element within the central package.

7.6.4 For the three options at the western end the assessment in stage 3 would be centred on the complementary options as these will provide a whole route / central package comprising the measures outlined above with the variant scheme at the western end of the route.

- 7.6.5 Whilst the assessment of options has focused on schemes that can be delivered in the short to medium term, it is clear that there are a number of options that would merit further consideration as longer term solutions that have the potential to deliver a step change in the level of connectivity between Sheffield and Manchester.
- 7.6.6 The study considers that further consideration of solutions involving high performance road tunnels for the trans-Pennine routes should be undertaken, as they have the potential to provide a major step-change in levels of connectivity. Further work however would be necessary given the potentials scale, complexity, costs and delivery timescales of such investment options.
- 7.6.7 It is therefore recommended that both the A628 Peak District Tunnel and M67 to M1 Trans-Pennine tunnel are investigated further as potential long term solutions to trans-Pennine connectivity, given that they scored particularly well against the key problems and objectives during the sifting process, only being ruled out on deliverability and / or feasibility criteria within the context of the timescale of this study.
- 7.6.8 This report will now form the basis of Stage 3 which will undertake further analysis and business case assessment for the best performing options and packages.

8 Glossary

Air Quality Management Area: An area identified by a local authority where Defra's national air quality objectives are unlikely to be achieved.

Ancient Woodland: Woodland that has existed continuously since 1600 or before in England, Wales and Northern Ireland (or 1750 in Scotland).

BCR: Benefit-Cost Ratio. A measure of a schemes value for money. Calculated by dividing the Present Value Benefits (PVB) by the Present Value Costs (PVC).

CPO: Compulsory Purchase Order.

D2AP: *Dual 2-lane All Purpose Carriageway* Standard.

D2N2 city region: The Local Enterprise Partnership for Derby, Derbyshire, Nottingham and Nottinghamshire.

DfT: Department for Transport.

EAST: Early Assessment and Sifting Tool. A DfT decision support tool that has been developed to quickly summarise and present evidence on options in a clear and consistent format.

Flood Zone 3: Land having a 1 in 100 or greater annual probability of river flooding;
or
Land having a 1 in 200 or greater annual probability of sea flooding.

Glossop Spur: A proposal for a new link from the A57(T) to the A57 (part of the Mottram to Tintwistle Bypass Scheme).

HA: Highways Agency.

HS2: High-Speed 2 a planned high-speed railway between London Euston, the English Midlands, North West England, Yorkshire, and potentially North East England and the Central Belt of Scotland.

HS3: High-Speed 3: a proposed high-speed rail link between Manchester and Leeds.

Important Area for Noise: Places that are exposed to the highest levels of noise, according to Defra noise mapping.

INRIX: company awarded the Highways Agency's National Traffic Information Service (NTIS) contract.

Link Capacity: The maximum sustainable flow of traffic passing in 1 hour, under favourable road and traffic conditions.

LNMS Local Network Management Schemes: Highways Agency improvement schemes that cost no more than £10 million.

Local Enterprise Partnerships: Voluntary partnerships between local authorities and businesses to help determine local economic priorities and lead economic growth and job creation within the local area.

Northern Hub: A programme of targeted upgrades to the railway in the North of England. Scheduled to complete in 2019, it will allow up to 700 more trains to run each day and provide space for 44 million more passengers a year.

NPV: Net Present Value. Calculated by subtracting the Present Value Costs (PVC) from the Present Value Benefits (PVB).

NTIS: National Traffic Information Service.

PVB: Present Value of Benefits. The stream of benefits over the appraisal period that are converted to 2010 prices and discounted to 2010 to give a present value.

PVC: Present Value of Costs. The costs of a scheme over the construction period converted to 2010 prices and discounted to 2010 to give a present value.

SEMMMS: South East Manchester Multi-Modal Strategy (the A6 to Manchester Airport relief road), which will deliver enhanced access to the Airport City Local Enterprise Zone.

Scheduled monuments: A 'nationally important' archaeological site or historic building, given protection against unauthorised change.

Site of Special Scientific Interest: A conservation designation denoting a protected area in the United Kingdom.

South Pennines Route Strategy: A Highways Agency Route-based strategy designed to identify investment needs on the strategic road network.

Special Area for Conservation: An area which has been given special protection under the European Union's Habitats Directive.

Special Landscape Area: A non-statutory conservation designation used by local government to categorise sensitive landscapes which are, either legally or as a matter of policy, protected from development or other man-made influences.

Special Protection Area: An area of land, water or sea which has been identified as being of international importance for the breeding, feeding, wintering or the migration of rare and vulnerable species of birds found within the European Union.

S2: Single 7.3m Carriageway Standard.

TD27: Design Manual for Roads and Bridges, Volume 6, Section 1 – Cross Sections and Headroom's.

VAS: Vehicle Activated Signing - an electronic sign activated by the presence and/or speed of a vehicle, used to warn of hazards or enforce speeds.

VMS: Variable Message Sign - an electronic traffic sign used to give drivers information about traffic congestion, accidents, incidents, roadwork's, or speed limits on a specific link.

WebTAG or TAG: The Department for Transport's web-based multimodal guidance on appraising transport projects and proposals, commonly referred to as Transport Appraisal Guidance.