M5 Junction 10 Improvements Scheme

Need for Scheme Technical Note

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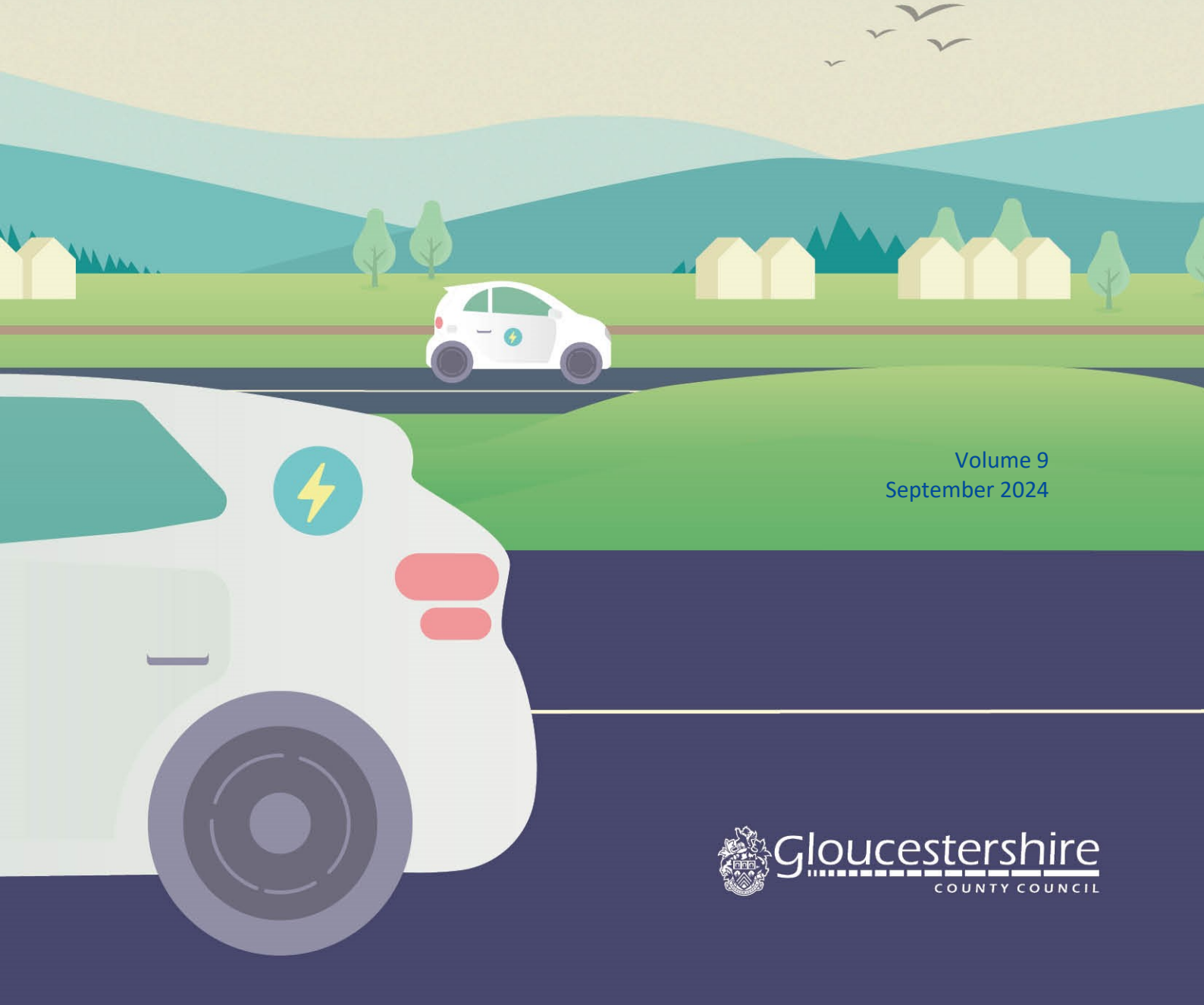
Rules 8 (k)

Planning Act 2008 Infrastructure Planning (Examination Procedure) Rules 2010



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The Infrastructure Planning (Examination Procedure) Rules 2010

M5 Junction 10 Improvements Scheme

Development Consent Order 202[x]

Need for Scheme Technical Note

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Technical Note

Project:	M5 Junction 10 Improvements Scheme
Subject:	Need for Scheme

1. Introduction

1.1. Public Benefits of the Scheme

1.1.1. The public benefit of the Scheme is embedded in the Scheme objectives which respond to the planning and environmental context and need for the Scheme:

- Support economic growth and facilitate growth in jobs and housing by providing improved transport network connections in west and north-west Cheltenham.
- Enhance the transport network in the west and north-west of the Cheltenham area with the resilience to meet current and future needs.
- Improve the connectivity between the SRN and the local transport network in west and north-west Cheltenham.
- Deliver a package of measures which is in keeping with the local environment, establishes biodiversity net gain and meets climate change requirements.
- Provide safe access to services for the local community, including for users of sustainable transport modes within and to west and north-west Cheltenham.

1.1.2. As is outlined in Table 2-1 of the Introduction to the Application (APP-001), in meeting these objectives the Scheme delivers overall public benefit which are outlined in more detail below.

Objective 1:

1.1.3. The Scheme will increase highway capacity around M5 Junction 10 and on the A4019, required to unlock the planned development on the strategic allocations A4 and A7 located east of M5 Junction 10 in the Joint Core Strategy (JCS) (2017). By directly unlocking, the Scheme will contribute towards economic growth through unlocking the development of approximately 7,203 dwellings and 85 hectares of employment land through the provision of a highway network that has the capacity to accommodate the increased traffic the allocated sites will generate, addressing road congestion and ensuring the future resilience of both the national and local networks.

Objective 2:

1.1.4. As has been established by both the JCS Transport Evidence Base (REP3-049) and the Scheme Transport Assessment (REP3-033) Cheltenham currently experiences significant congestion at peak times. The Scheme will enable additional capacity on the road network and at its junctions, whilst acting as a catalyst for economic growth and relieving traffic congestion and delay at Junction 9, 10 and 11 of the M5 and on the existing local road network, to support increased capacity and connectivity. The proposed West Cheltenham Link Road will also support the increased capacity, providing the A7 Strategic Allocation and areas to the south of Cheltenham with connectivity to Junction 10 and the M5. A need established through the DS5 to DS7 modelling scenarios of the JCS Transport Evidence Base.

Objective 3:

1.1.5. The M5 Junction 10 element of the Scheme will become part of the Strategic Road Network (SRN), with M5 Junction 10 being a key junction and connection for the wider region. This would support higher capacities and greater connectivity to the M5 and local

road network enhancements to the existing national road network as a result of the Scheme including:

- New and improved junction and slip roads (improvements to Junction 10 of the M5)
- Improvements to trunk roads, in particular, dualling of single carriageway strategic trunk roads and additional lanes on existing dual carriageways (improvements to the A4019)
- Measures to enhance the capacity of the motorway network (all three components of the Scheme).

Objective 4:

1.1.6. The Scheme will support the delivery of environmental goals through the provision of biodiversity enhancements and meeting 10% BNG on site, whilst encouraging the utilisation of alternative means of transport and helping to achieve the goal of creating a more integrated and sustainable transport network, whilst reducing GHG emissions. Moreover, the Scheme will improve transport resilience by replacing old degrading assets that were designed with less resilience to climate change than the assets that will replace them.

1.1.7. The all-movements junction on the M5 will improve road users' ability to join the wider SRN by providing opportunities for both north and south entrance and exits to the M5, allowing more efficient connectivity to Cheltenham and to the wider SRN. New dedicated crossing points for pedestrians and cyclists, as well as realigned PRoW, will also be provided as part of the Scheme. This includes continuous provision for pedestrian and cyclist movement along the A4019 and facilities to link over the M5. The Scheme will also contribute towards Improved links to the north and south of M5 Junction 10, allowing for the increased movement of goods and reliability of journey times, improving connectivity on the SRN and the local road network.

Objective 5:

1.1.8. The Scheme provides safe access to services for the local community and for users of sustainable transport modes within and to West and North West Cheltenham. The Scheme has been designed in accordance with all current standards and guidance, helping to improve road safety in the area. The Scheme will reduce road casualties and improve safety for users of sustainable modes of transport including walkers and cyclists during its operation through the provision of dedicated NMU facilities (footways, crossings, Public Rights of Way) and upgraded signalling and crossing points. The Scheme will enhance connectivity offered by recreational routes for NMUs and will include new, altered and improved PRoW improving conditions and accessibility for NMUs, promoting a modal shift to active travel and public transport alongside providing a safer SRN and local road network.

2. Planning Policy Framework

2.1. National Policy Statement for National Networks (2014)

2.1.1. When considering the planning policy framework for the Scheme the National Policy Statement for National Networks 2014 (NPS NN) is the basis for the Scheme's examination by the Examining Authority and any decisions by the Secretary of State and establishes the strategic need for the development of the national networks.

2.1.2. As set out in Table 3-1 of the Applicant's Planning Statement (REP1-028) the Scheme conforms to the Government's vision and strategic objectives for the national networks as follows:

Government vision and strategic objectives	Scheme Conformity
The Government will deliver national networks that meet the country's long-term needs; supporting a prosperous and competitive economy and improving overall quality of life, as part of a wider transport system.	The Scheme will help to increase highway capacity around M5 Junction 10 and on the A4019 which is crucial to unlock and support the planned development on site allocations West of Cheltenham, North West Cheltenham and safeguarded land east of M5 Junction 10 and will therefore support the economy and improve quality of life.
Networks with the capacity and connectivity and resilience to support national and local economic activity and facilitate growth and create jobs.	The Scheme would be part of the national network, with M5 Junction 10 being a key junction and connection for the wider region and would support higher capacities and greater connectivity to the M5 and local road networks west of Cheltenham.
Networks which support and improve journey quality, reliability and safety.	The Scheme overall is likely to improve average journey times. Across the majority of routes, journey time improvements, and a reduction in the length of queues on the Southbound off-slip are anticipated. The Scheme is also expected to improve road safety in the area.
Networks which support the delivery of environmental goals and the move to a low-carbon economy.	The Scheme will support the delivery of environmental goals. The Scheme design includes provision for NMU and public transport access and therefore supports the move to a low carbon economy.
Networks which join up our communities and link effectively to each other.	The all-movements junction on the M5 will help to join the wider network by providing opportunities for north and south entrance and exits to the M5 allowing more efficient connection of Cheltenham to the wider SRN. New dedicated crossing points for pedestrians and cyclists, as well as realigned PRoW, will also be provided as part of the Scheme. This will include continuous provision for pedestrian and cyclist movement along the A4019 and facilities to link over the M5.

2.1.3. This is further underpinned through the Scheme's compliance with the broader policy objectives of the NPS NN (2014). As outlined below:

2.1.4. Paragraphs 2.2 and 2.6 of the NPS NN (2014) state that:

> *2.2 There is a critical need to improve the national networks to address road congestion and crowding on the railways to provide safe, expeditious and resilient networks that better support social and economic activity; and to provide a transport network that is capable of stimulating and supporting economic growth. Improvements may also be required to address the impact of the national networks on quality of life and environmental factors.*
>
> *2.6 There is also a need for development on the national networks to support national and local economic growth and regeneration, particularly in the most disadvantaged areas. Improved and new transport links can facilitate economic growth by bringing businesses closer to their workers, their markets and each other. This can help rebalance the economy.*

2.1.5. As has already been established in section 3.7 of the Transport Assessment there is existing congestion experienced on the local road network surrounding Cheltenham that will be further exacerbated through the increased traffic levels associated with the development sites allocated through the JCS. In order to unlock the housing and employment growth identified within the JCS, whilst addressing issues of congestion associated with their development, there is a need for major scheme intervention and development on both the national and local road networks.

2.1.6. Paragraphs 2.9 and 2.16 of the NPS NN (2014) also state that:

> *2.9 Broader environment, safety and accessibility goals will also generate requirements for development. In particular, development will be needed to address safety problems, enhance the environment or enhance accessibility for non-motorised users. In their current state, without development, the national networks will act as a constraint to sustainable economic growth, quality of life and wider environmental objectives.*
>
> *2.16 Traffic congestion constrains the economy and impacts negatively on quality of life by:*
>
> - *constraining existing economic activity as well as economic growth, by increasing costs to businesses, damaging their competitiveness and making it harder for them to access export markets. Businesses regularly consider access to good roads and other transport connections as key criteria in making decisions about where to locate.*
> - *leading to a marked deterioration in the experience of road users. For some, particularly those with time-pressured journeys, congestion can cause frustration and stress, as well as inconvenience, reducing quality of life.*
> - *constraining job opportunities as workers have more difficulty accessing labour markets.*
> - *causing more environmental problems, with more emissions per vehicle and greater problems of blight and intrusion for people nearby. This is especially true where traffic is routed through small communities or sensitive environmental areas.*

2.1.7. As highlighted above the identified housing and employment growth outlined in the JCS would result in increased traffic level, placing increased pressure on a strategic and local road network that already experiences issues with congestion and safety that constrains the ability for identified economic growth to be met. To facilitate the required development the associated traffic related impacts would also require a major Scheme intervention.

Moreover, the new housing and employment developments would also bring with it the requirement for greater accessibility for non-motorised users.

2.1.8. In light of the Government's vision and strategic objectives set out in NPS NN (2014) paragraphs 2.10 and 2.22 conclude that:

> *2.10 …at a strategic level there is a compelling need for development of the national networks – both as individual networks and as an integrated system. The Examining Authority and the Secretary of State should therefore start their assessment of applications for infrastructure covered by this NPS on that basis.*
>
> *2.22 Without improving the road network, including its performance, it will be difficult to support further economic development, employment and housing and this will impede economic growth and reduce people's quality of life. The Government has therefore concluded that at a strategic level there is a compelling need for development of the national road network.*

2.1.9. In order to address the need identified, the Government's wider policy, as outlined in NPS NN (2014), paragraph 2.23 is to bring forward improvements and enhancements to the existing SRN to address the needs set out above.

> *2.23 Enhancements to the existing national road network will include:*
>
> - *junction improvements, new slip roads and upgraded technology to address congestion and improve performance and resilience at junctions, which are a major source of congestion;*
> - *implementing "smart motorways" (also known as "managed motorways") to increase capacity and improve performance;*
> - *improvements to trunk roads, in particular dualling of single carriageway strategic trunk roads and additional lanes on existing dual carriageways to increase capacity and to improve performance and resilience.*

2.1.10. When considering the wider policy on the development of the SRN paragraph 2.24 of the NPS NN (2014) states that:

> *2.24 The Government's policy on development of the Strategic Road Network is not that of predicting traffic growth and then providing for that growth regardless. Individual schemes will be brought forward to tackle specific issues, including those of safety, rather than to meet unconstrained traffic growth (i.e. 'predict and provide').*

2.1.11. Paragraph 2.27 also acknowledges that:

> *2.27 In some cases, to meet the need set out in section 2.1 to 2.11, it will not be sufficient to simply expand capacity on the existing network. In those circumstances new road alignments and corresponding links, including alignments which cross a river or estuary, may be needed to support increased capacity and connectivity.*

2.1.12. In deciding on an application for development consent under the Planning Act 2008 the NPS NN (2014) sets out general policies against which applications relating to national networks infrastructure are to be decided. Paragraph 4.2 states that:

> *4.2 Subject to the detailed policies and protections in this NPS, and the legal constraints set out in the Planning Act, there is a presumption in favour of granting development consent for national networks NSIPs that fall within the need for infrastructure established in this NPS. The statutory framework for deciding NSIP*

applications where there is a relevant designated NPS is set out in Section 104 of the Planning Act.

2.1.13. Paragraph 4.3 also states that in considering development proposals and weighing up its adverse impacts against its benefits:

4.3 …the Examining Authority and the Secretary of State should take account of:

- *its potential benefits, including the facilitation of economic development, including job creation, housing and environmental improvement, and any long-term or wider benefits;*
- *its potential adverse impacts, including any longer-term and cumulative adverse impacts, as well as any measures to avoid, reduce or compensate for any adverse impacts.*

2.1.14. When determining the need for planning obligations associated with a proposed development paragraph 4.10 outlines that:

4.10 Planning obligations should only be sought where they are necessary to make the development acceptable in planning terms, directly related to the proposed development and fairly and reasonably related in scale and kind to the development.

2.1.15. In considering the applications for linear infrastructure paragraphs 4.12 and 4.13 of the NPS NN (2014) state that:

4.12 … decision-makers will need to bear in mind the specific conditions under which such developments must be designed.

4.13 This NPS does not identify locations at which development of the road and rail networks should be brought forward. However, the road and rail networks provide access for people, business and goods between places and so the location of development will usually be determined by economic activity and population and the location of existing transport networks.

2.2. National Planning Policy Framework

2.2.1. Paragraphs 1.17 to 1.19 of the NPS NN (2014) outline that the National Planning Policy Framework (NPPF), latest version published December 2023, provides a framework upon which local authorities can construct local plans to bring forward developments, and that the NPPF is also an important and relevant consideration in decisions on nationally significant infrastructure projects, to the extent relevant to an individual project.

2.2.2. Of particular relevance to the consideration of this Scheme is NPPF paragraph 115 which states that:

115 Development should only be prevented or refused on highways grounds if there would be an unacceptable impact on highway safety, or the residual cumulative impacts on the road network would be severe.

2.2.3. When considering the need for the Scheme it should be noted that this is predicated on the conclusions of the JCS Transport Strategy Evidence Base. These conclusions establish that without the Scheme the residual cumulative effects on the road network, as a result of the development of the Strategic Allocation sites, would be severe and cause for refusal on highway grounds. On that basis, in the absence of a Major Scheme Intervention the growth identified within the JCS would not be able to be met.

3. Need for the Scheme

3.1. Housing Need

3.1.1. In determining the root cause of the need for the Scheme in more detail the Gloucester, Cheltenham and Tewkesbury Joint Core Strategy 2011 – 2-31 (2017) (JCS), and in particular Policy SP1, establishes that during the plan period:

> SP1 *… provision will be made to meet the need for approximately 35,175 new homes and a minimum of 192 hectares of B-class employment land to support approximately 39,500 new jobs*

3.1.2. More specifically Policy SA1 of the JCS formally designates seven Strategic Allocations, focusing on the need to deliver comprehensive development in each area. Moreover, Policy SA1 also establishes the need to maximise the efficient and effective delivery of infrastructure stating that:

> SA1.7 *Infrastructure should be planned and provided comprehensively across the site taking into account the needs of the whole Strategic Allocation. Developers must engage with the relevant infrastructure regulators and providers to ensure the implementation of the Infrastructure Delivery Plan and the provision of any other necessary infrastructure in accordance with Policies INF6 and INF7.*
>
> SA1.8 *The transport strategy to support the delivery of Strategic Allocations should align with and where appropriate contribute to the wider transport strategy contained within the Local Transport Plan, including priority transport corridors and junctions. The development of Strategic Allocations must encourage the use of walking, cycling and the use of public transport and ensure that transport demands arising from the development can be effectively mitigated in accordance with Policy INF1.*

3.1.3. SA1.7 seeks to ensure the implementation of the Infrastructure Delivery Plan for Gloucestershire and the provision of any other necessary infrastructure in accordance with Policies INF6 and INF7 of the JCS. SA1.8 links to the local transport plan and states that the transport strategy to support the delivery of Strategic Allocations should align with and where appropriate contribute to the wider transport strategy contained within the Gloucestershire Local Transport Plan (2021).

3.2. Mitigating Impacts on the Road Network

3.2.1. Whilst the Scheme seeks to unlock the Strategic Allocations established by the JCS it should be noted that the housing and employment growth does not represent a need for the Scheme in itself. However, as has been established in the JCS Transport Strategy Evidence Base (See Section 6 of REP3-049), the Traffic Forecasting Report (TFR) submitted as part of the HIF Outline Business Case (see Section 6 of Appendix C of REP1-046)and confirmed by the Joint Council's GC3M Assessment (see Section 5 of REP3-065), in order to meet the identified housing and employment need a major scheme intervention is required to address the associated impacts on both the strategic and local road networks.

3.2.2. When considering the outcomes of the JCS Transport Strategy Evidence Base and how this established the need for the Scheme it is important to understand the chronology of modelling and design iterations that led to the final mitigation package. This is outlined within the JCS Transport Evidence Base but is restated here for ease of reading and is summarised as follows:

Scenarios DS1 to DS3a

- Strategy DS1 primarily focused on the promotion of sustainable transport measures, as featured in the Gloucestershire LTP
- Strategy DS2 included the mitigation measures identified in DS1 but added in physical highway junction improvements.
- Strategy DS3 included the mitigation measures included in DS1 and DS2, in addition to a number of traffic management schemes on local roads and the introduction of a new access junction on the A40 to serve the proposed site in Longford. The traffic management measures were designed to limit the speed on local roads, thus moving longer distance traffic onto the Strategic Road Network (SRN) and other major roads, which are better able to accommodate the extra strategic traffic.
- Strategy DS3a removed some of the traffic management measures in DS3 to achieve a better balance between traffic using the local network and that using the SRN.

3.2.3. At this stage it should be noted that strategies (DS1 to DS3a) were tested sequentially. Relative to the 'Do Minimum' (DM) strategy, the DS1 strategy was not found to be successful due to the limited impacts of the behavioural change programme and further, major infrastructure interventions were considered necessary to mitigate the development impacts.

3.2.4. Similarly, Strategy DS2 reported minimal improvement to the transport network. However, in resolving a number of junction issues, the impact was over-compensated by encouraging too much traffic onto the local roads, which would be unacceptable. To address this, the impact of the Strategic Allocations was considered in isolation; this identified a number of local roads that were made less attractive through traffic management measure and subsequently tested in DS3. The conclusions at D3 were as follows:

- The network improvements implemented up to DS3a resulted in a significant reduction in average queued time compared to the DM, and a moderate drop compared to DS3. These improvements caused the over capacity queued time to decrease by 34% compared to the DM during both the AM and PM peak periods; and
- DS3a led to an improvement in the average network speed of around 2% during both peaks compared to the DM

3.2.5. Despite these improvements there continued to be a number of junctions located in the vicinity of the strategic allocations which reported capacity issues during either one or both periods of peak travel and concluded that additional mitigation schemes would need to be identified for the following junctions:

- Junction of Cheltenham Road East and Pirton Lane, near Strategic Allocation Site A2 and A3
- A40 Longford Roundabout
- A46 Shurdington
- M5 Junction10 Southbound Off-slip
- A46 Aston Cross Junction, Tewkesbury

Scenario DS4

3.2.6. In response to the Inspector's Interim Report DS4 included a number of significant modifications to the land-use scenario tested in DS3a including the addition of five potential strategic sites (Fiddington, Mitton, Winneycroft Farm, Innsworth and West of Cheltenham) and the removal of one site (North Churchdown). This resulted in an

increase of 3,970 dwellings and 45.8 ha of employment; the latter is focussed on a site to the West of Cheltenham.

3.2.7. The impact of DS4 was the significant deterioration in the performance of the highway network in terms of much longer queues, higher average travel times, and reduced average travel speeds. The junctions operating over capacity in DS4 included:

- M5 Junction 9
- M5 Junction 11
- M5 Junction 10
- A40 Arle Court roundabout
- A40 Benhall roundabout
- A46 Ashchurch
- A46 Shurdington
- St. Barnabas roundabout
- A417 Air Balloon roundabout

3.2.8. DS5a included a number of modifications to the land-use scenario tested in DS4 including the removal of two strategic sites (Fiddington and Leckhampton) and changes in the development quantum's for North West Cheltenham, West Cheltenham, Twigworth and Mitton. This resulted in a decrease of 2,261 dwellings and 12.9 ha of employment. Despite the network improvements between DS4 and DS5a there are significant issues in the scale of delay when compared to the DS3a scenario. The junctions operating over capacity in DS5a included:

- M5 Junction 9
- M5 Junction 10
- M5 Junction 11
- A38 Longford
- A40 Arle Court roundabout
- A40 Benhall roundabout
- A46 Ashchurch
- A46 Shurdington
- St. Barnabas roundabout
- A417 Air Balloon roundabout

Scenario DS5

3.2.9. The network delays experienced in DS5a remained unacceptable in terms of excessive vehicle delay and a revised mitigation package was required. This scenario within the transport evidence base is referred to 'Do Something 5' (DS5). The revised mitigation package represented a radical departure from DS3a and focused on road building (including major link roads, namely the West Cheltenham Link Road) and the upgrade of high frequency Public Transport bus corridors. It also included a number of schemes which are not JCS dependant, but due to changes in their scheme status they were included as it was assumed that the impact of the schemes would be significant on the transport network. They included:

- M5 J10 – Full Movements
- A417 Missing Link

3.2.10. DS5 had a significant impact on reducing the number of junction arms experiencing prolonged delay. These tend to be more local and are not strategically important. The junctions operating over capacity in DS5 included:

- A40 Longford Roundabout
- St Barnabas Roundabout
- M5 Junction 11 Southbound
- A435 / Hayfield Way / Finlay Way
- A38 Barnwood Rd / Armscroft Park Rd

3.2.11. The Do Something 5 scenario mitigated much of the impacts of the JCS strategic allocations and complied with the JCS Transport Strategy Objectives. However, neither Gloucestershire County Council nor National Highways as Highway Authorities could agree the JCS Transport Strategy until this scenario had been re-assessed using the 2013 CSV SATURN model.

Scenario DS6

3.2.12. As part of the proposed JCS Main Modifications, the Do Something 6 scenario was the first of the JCS model runs to use the updated 2013 CSV SATURN base year model. It also tested the revised land use scenario in line with the proposals included in the JCS Proposed Main Modifications document.

3.2.13. The mitigation package differed from previous scenarios and included over 30 interventions. Critical to the scenario were the access arrangements into the West Cheltenham Strategic Site. Within this scenario these were provided via Junction 10 of the M5 and a new distributor road linking into the site from the motorway. The motorway junction improvement comprised a minimum upgrade to allow full movements, with additional capacity provided on the slip roads. (This was based on an earlier scheme proposal tested in the Do Something 5 scenario developed previously by the Highways Agency – now National Highways).

3.2.14. The results of this modelling exercise recorded excessive queuing on the M5 Southbound and Northbound off-slips in the AM peak hour at Junction 10, with major queuing on the A4019 Tewkesbury Road at the new junction with the West of Cheltenham distributor road. During the PM peak hour, there was significant queuing on the distributor road due to traffic exiting the site being delayed at the northern signalised junction with the A4019 Tewkesbury Road, adjacent the M5 J10.

3.2.15. The conclusion reached was that in this scenario, the proposed network mitigation for access to the West of Cheltenham via M5 J10 and a new distributor road linking into the site was insufficient in terms of reducing traffic impact on both the Strategic road network and local road network to a reasonable level. The results however indicated that further work on an improved layout arrangement could potentially allow sufficient distribution of traffic across the network as, apart from the impact on the all-movements arrangements at M5 J10, there are no significant impacts elsewhere along key corridor routes across the modelled network.

Scenario DS6a

3.2.16. To robustly assess the access arrangements into the West Cheltenham Strategic Allocation an alternative Do Something 6a scenario was tested. This included the same mitigation measures included in Do Something 6 with the exception of alternative access arrangements to the West of Cheltenham site. This provided a direct comparison between the scenarios.

3.2.17. Within Do Something 6a access to the West of Cheltenham site was via a new link road off the A40 Golden Valley bypass, east of M5 Junction 11. This was necessary as a preliminary review of the site indicated that due to physical restrictions in terms of location

of existing nearby development, together with necessary grade separation and turning radii land take requirements, it would prove difficult to upgrade the existing M5 Junction 11 arrangement in order to allow direct access from the M5 into the site.

3.2.18. The outputs from this model test showed that impacts on the M5 were even more significant than those recorded in Do Something 6, with queuing on the M5 mainline and off-slip roads, as well as on the A40 Golden Valley Bypass eastbound on-slip, east of M5. There were a greater number of junctions on the rest of the highway network experiencing delays.

3.2.19. Analysis of the impacts on the M5 indicated the measurable deterioration at the motorway junctions compared to the Do Something 6 scenario, 'Do Minimum' and 'Do Something' scenarios. Based on the model outcomes and understanding of design constraints for the two access strategies, there was justification for discounting the primary access from the south (M5 Junction 11) in favour of the north (M5 Junction 10).

3.2.20. As a result, the updated scenario reverted back to providing access to the site from M5 Junction 10, based on further improved mitigation and refinement of the proposed junction design and layout as part of DS7.

4. JCS Transport Mitigation Strategy

4.1. Scenario DS7

4.1.1. The transport mitigation strategy outlined within the 'Do Something 7' (DS7) scenario was the preferred package of transport improvements. The schemes included within the scenario supported delivery of the JCS Transport Strategy Objectives, was consistent with the Six Point Plan and would help achieve the Transport Outcomes identified.

4.1.2. The schemes identified within the mitigation strategy were informed by the technical modelling outputs provided by the 2013 CSV SATURN highway base year model in line with the process identified in Para 1.3. To understand the impacts of the 'Do Something' 6 and 7 scenarios, modelling outputs from the 'Do nothing' scenario and 'Do minimum' scenarios were created and used as benchmarks against which to measure the impacts of the 'Do Something' scenarios.

4.1.3. It is important to note that this assessment had been undertaken based on the delivery of the full JCS plan. At that stage no assessment had been made regarding delivery phasing or the prioritisation of mitigation schemes.

4.1.4. The JCS plan period is to 2031. Regardless of the scale of growth identified in the plan, the transport network would be considerably busier than it is today as a result of planned growth outside the JCS area alongside existing committed growth already taking place within the JCS area. The JCS Transport Strategy is not required to resolve all of these issues, but only those attributed to the scale of growth outlined in the JCS plan.

4.1.5. The JCS transport strategy is therefore only required to mitigate those impacts on the highway network occurring between the 'Do Nothing' and 'Do Minimum' scenarios.

4.1.6. The assumptions used to create the 'Do Nothing' scenario included all JCS strategic allocation growth where planning permission had been granted at the time of the modelling assessment; and committed / delivered transport schemes since 2013.

4.1.7. To assess the impact of the transport strategy, 11 strategic travel corridors were identified within the JCS area. Within those corridors, highway junctions considered to be critical to their function were identified. The operation of these junctions were used to assess journey time reliability as a proxy of how well the corridor is functioning. The 11 corridors are illustrated in Appendix L of the JCS Transport Strategy Evidence Base. They were identified on the basis of their importance to support national and local economic growth, and informed by the Link and Place Spectrum outlined within Gloucestershire's Local Transport Plan (2015-2031).

4.1.8. As the CSV SATURN model is a strategic highways model, only those junctions identified where a 'significant' increase in delay or any safety issues occur for the M5 would be mitigated were taken forward as part of the strategy. The definition of 'significant' in the JCS strategic context is for any junction with a Ratio of Flow to Capacity (RFC) greater than 100% where a 10% increase is recorded between the 'Do Nothing' and 'Do Minimum' scenario for any part of the junction. Junctions were assumed to be operating within capacity if the RFC is less than 100%.

4.1.9. The corridors of particular relevance to the Scheme are Corridors 1 and 6. The impacts of DS7 on each of the strategic corridors can be summarised as follows:

Corridor 1

4.1.10. Corridor 1 included the M5 mainline, from Junction 13 (Stroud), to Junction 9 (Tewkesbury). This forms part of the Strategic Road Network and is managed by National

Highways. It is essential to maintain highway operation and safety by avoiding any queuing traffic on the motorway mainline caused by congestion at the motorway junctions impacting vehicles on the off-slips. The preferred mitigation package for this corridor (intended to account for the capacity issues identified in Figure 34 and other trip reassignment resulting from the JCS growth strategy and other network changes which impact travel demand within the corridor) included:

- M5 J11a to M5 J9 - Upgrade motorway to a smart motorway increasing capacity during peak times and controlling vehicle flows
- M5 J12 -Upgrade to junction to include 2 lane wide off and on slips
- M5 J11a - Optimise junction operation with improved signing and lining and area wide reassignment
- M5 J11 - Signalise Southbound off-slip. Northbound off slip extra lane
- M5 J10 - 'All Movements' junction improvements including complementary measures to M5 mainline. This includes a high capacity upgrade of M5 J10 junction including three lane motorway off slips and a three circulatory lane grade separated roundabout with A4019, and a new signal controlled junction immediately west of the M5 to accommodate the associated West of Cheltenham development access road (see corridor 6 for more information). This will be a high capacity signal controlled junction, with a separate left turn slip road from M5J10 northbound off- slip onto Cyber Park link road (southbound). There would also be new signals on the A4019 westbound entry to the new grade separated motorway junction
- M5 J9 - Extended junction to accommodate new off-line route for the A46 (see corridor 2 for more information)

4.1.11. The outcome of the Do Something 7 changes were that the M5 mainline and motorway off slips now operating within capacity. This is despite an increase in motorway traffic as a result of improvements to M5 Junction 10 and conversion to a full-movements junction.

Corridor 6

4.1.12. Corridor 6 starts within Cheltenham Town Centre and continues to the A38 Coombe Hill junction to the west of M5 Junction 10. The largest of the JCS Strategic housing allocations at North West Cheltenham would have direct access onto this corridor. It also forms parts part of the strategic public transport corridor served by the 41/42 linking Tewkesbury with Cheltenham. The route forms part of the local highway network and is managed by Gloucestershire County Council.

4.1.13. A significant change to this corridor is required to provide access to the West of Cheltenham Strategic Allocation. The Do Something 6a scenario considered access to the south of the site via M5 Junction 11 and the A40 resulting in significant delays including issues with the M5 mainline. Converting junction 10 to an 'All movements' junction and providing access from the A4019 to the West of Cheltenham via a new distributor link road significantly reduced the impact of the site on the local network.

4.1.14. The preferred mitigation package for this corridor (intended to account for the capacity issues and other trip reassignment resulting from the JCS growth strategy and other network changes which impact travel demand within the corridor) included:

- M5 J10 - 'All Movements' junction improvements (see corridor 1)
- New 50 mph dual carriageway two-lane link road, providing free-flow access from A4019 / M5 J10 to West of Cheltenham site only
- West of M5 J10 - Major/Minor Priority Junction on new 50 mph dual carriageway two- lane link road, with Minor junction arm for West of Cheltenham residential site access only

- West of M5 J10 - Change to highway priorities west of M5 J10, with a new Major/Minor Priority Junction, with A4019 (West) as Minor junction arm
- Withybridge Lane - Close access onto A4019
- A4019 / A4013 Kingsditch (Centrum Park) Roundabout – replacing existing roundabout with traffic signals
- New A4019 traffic signals site access junction, west of B4634 Old Gloucester Rd
- Revised A4019 traffic signals site access junction at B4634 Old Gloucester Rd / Gallagher Retail Park
- A4019 Tewkesbury Road corridor - Upgrade signals to SCOOT operation to optimise signal timings with bus priority along A4019 corridor junctions including
- B4634 Old Gloucester Rd/A4019 Junction (referred to as the 'Gallagher Junction' in the DCO Application)
- Hayden Road/A4019/Manor Road Junction
- A4019 / Elm Street Junction
- B4633 Gloucester Rd / A4019 /Townsend Street

4.1.15. The outcome of changes to M5 Junction 10 resulted in increased travel demand within the corridor. On the majority of the junctions in this corridor journey time delays have been minimised, however, it was identified that further efficiencies could be achieved through additional iterations of the layout designs for the following junctions: B4634 Old Gloucester Rd/A4019 Junction and Hayden Road. It should be noted that the B4634 Old Gloucester Road/A4019 Junction makes up part of the M5 J10 Improvements Scheme.

4.1.16. With regard to the suitability of the final DS7 mitigation package it was also noted in paragraph 224 the JCS Inspectors Final Report that:

> *224 Highways England are content that, from a strategic road network perspective, the JCS is sound and residual issues are not fundamental. Gloucestershire County Council, the local highways authority, is satisfied that the proposed planned growth in the JCS area can be safely accommodated on the local highway network without a cumulative severe impact, and that residual issues are not fundamental to the safe and efficient operation of the local transport network. Both indicate that residual issues are capable of resolution and can be dealt with through further detailed assessment and mitigation as sites come forward. I give considerable weight to the opinions of these bodies.*

4.2. DS7 Mitigation Package

4.2.1. When considering the key Corridors relevant to the Scheme, Corridors 1 and 6, the associated package of works for each corridor can be summarised as follows (elements of the M5 Junction 10 Improvements Scheme are shown in **bold**):

4.2.2. Corridor 1 – M5 – M5 Junction 13 to county boundary

- M5 J11a to M5 J9 - Upgrade motorway to a smart motorway increasing capacity during peak times and controlling vehicle flows
- M5 J12 -Upgrade to junction to include 2 lane wide off and on slips
- M5 J11a - Optimise junction operation with improved signing and lining and area wide reassignment
- M5 J11 - Signalise Southbound off-slip. Northbound off slip extra lane
- **M5 J10 - 'All Movements' junction improvements including complementary measures to M5 mainline. This includes a high capacity upgrade of M5 J10 junction including three lane motorway off slips and a three circulatory lane grade separated roundabout with A4019, and a new signal controlled junction immediately west of the M5 to accommodate the associated West of Cheltenham development access road (see corridor 6 for more information). This will be a high capacity signal controlled junction, with a separate left turn slip road from M5J10 northbound off-**

slip onto Cyber Park link road (southbound). There would also be new signals on the A4019 westbound entry to the new grade separated motorway junction

- M5 J9 - Extended junction to accommodate new off-line route for the A46 (see corridor 2 for more information)

4.2.3. Corridor 6 – A4019 – Coombe Hill to A435 Portland Street, Cheltenham

- **M5 J10 - 'All Movements' junction improvements (see corridor 1)**
- **New 50 mph dual carriageway two-lane link road, providing free-flow access from A4019 / M5 J10 to West of Cheltenham site only**
- West of M5 J10 - Major/Minor Priority Junction on new 50 mph dual carriageway two-lane link road, with Minor junction arm for West of Cheltenham residential site access only
- West of M5 J10 - Change to highway priorities west of M5 J10, with a new Major/Minor Priority Junction, with A4019 (West) as Minor junction arm
- **Withybridge Lane - Close access onto A4019**
- A4019 / A4013 Kingsditch (Centrum Park) Roundabout – replacing existing roundabout with traffic signals
- **New A4019 traffic signals site access junction, west of B4634 Old Gloucester Rd**
- **Revised A4019 traffic signals site access junction at B4634 Old Gloucester Rd / Gallagher Retail Park**
- A4019 Tewkesbury Road corridor - Upgrade signals to SCOOT operation to optimise signal timings with bus priority along A4019 corridor junctions including
- **B4634 Old Gloucester Rd/A4019 Junction**
- Hayden Road/A4019/Manor Road Junction
- A4019 / Elm Street Junction
- B4633 Gloucester Rd / A4019 /Townsend Street

4.2.4. A full breakdown of the DS7 package for all corridors can be found in Appendix K of the JCS Transport Strategy Evidence Base (REP3-049).

5. Further Policy Justification

5.1.1. As was established through its examination growth proposals identified in the adopted JCS will significantly increase the area's population and range of employment opportunities offered, with even more growth expected through the development of the Strategic and Local Plan. This will result in more trips within the area and will require careful management to reduce congestion and limit environmental impacts. The JCS aims to locate jobs near to the economically active population thus minimising out-commuting and reducing carbon emissions from car use and instead promoting sustainable transport by improving opportunities for public transport, walking and cycling by making routes more convenient, safe and attractive.

5.1.2. To manage the impacts of growth, the JCS is supported by a comprehensive Transport Strategy that details a recommended mitigation package to enable the delivery of the proposed development. The schemes detailed in the Transport Strategy are echoed in this Local Transport Plan.

5.1.3. The Gloucestershire Local Transport Plan, at paragraph 4.2.31 (Central Severn Vale Strategic Vision to 2031), states that the Central Severn Vale Strategic Vision will require improvements to M5 Junction 10 and 11 to maintain the safe operation of the highway and that these improvements will also support the delivery of the North West Cheltenham,

(Policy A4 of the JCS) and West Cheltenham (Policy A7 of the JCS) strategic allocations, addressing traffic congestion issues on the A40 and A4019 corridors and facilitating both the housing and employment need that the Scheme seeks to unlock.

5.1.4. The JCS Authorities Infrastructure Delivery Plan (IDP) (2017 Addendum to the IDP), at Table 3.1, also identifies the M5 Junction 10, West Cheltenham Link Road and A4019 access and improvement works set out in the mitigation package established by the JCS DS7 scenario.

5.1.5. At a national level the Government's Road Investment Strategy 2 lists the M5 Junction 10 Improvement Scheme as a planned enhancement scheme it expects to be built, acknowledging the separate funding stream brought by HIF and its associated governance.

6. Further Design Iteration

6.1.1. When considering the wider improvements proposed to the A4019 corridor Chapter 3 – Assessment of Alternatives (APP-062) of the submitted Environmental Statement outlines that the need for improvements to the A4019 were first identified in the August 2016 Transport Assessment as part of the Elms Park (North West Cheltenham) application for planning permission, which included plans to improve the A4019 over the approximate extents from the West Cheltenham Fire Station to its junction with the B4634.

6.1.2. Further to this development application, the Applicant commissioned Amey Consulting to develop a Concept Option for extending the proposed improvements of the A4019 to the west to link to the proposed M5 Junction 10 and the Link Road improvements. These proposed improvements included the widening and upgrade of the existing A4019 to dual carriageway standard with improvements to existing junctions. The Concept Option was included and assessed in the Homes England Bid for funding in March 2019.

6.1.3. Following submission of the Homes England Bid a review was undertaken to consider the Concept Option included with the submission and to identify potential new options.

6.1.4. As part of this exercise, options for wide single carriageways and part dualling of the A4019 were considered, as well as route corridors.

- Wide single carriageways and part dualling - WebTAG TAG Unit A5.4 – Marginal External Costs includes guidance on average capacities for urban roads by road type and geographical area. Table A2 of this includes Cheltenham in Area 7 – Urban large (>100,000) and using this area in Table A6 for an 'A Road' gives a suggested average capacity (passenger car units (PCU) per lane km per hour) of 1100. However, following an assessment using forecast traffic flows obtained from the Saturn model for the Scheme, it was found that all the individual links along the A4019 within the study area had a forecast flow exceeding 1100 PCU in either the eastbound, westbound or both carriageways. This assessment therefore ruled out wide single carriageways and part dualling as options for the A4019.
- Alternative route corridors – no alternative route corridors in place of the A4019 were identified due to severity of impacts on land, existing property and the planned development (the North West Cheltenham Development Area, and the land safeguarded for development to the north-west of Cheltenham).
- As a result of the Concept Option review and the associated forecast traffic flows, when taking into account the potential for alternate route corridors, it was concluded that the proposed dualling of the A4019 was the most viable option to be taken forward. In addition to the transport reasons outlined above section 3.4 of Chapter 3 (APP-062) also sets out other design considerations that demonstrate the need for the proposed A4019 improvements.

7. HIF Outline Business Case

7.1.1. Further to the adoption of the JCS and the associated findings of its Transport Strategy Evidence Base GCC made an application to Homes England, in March 2019, for Housing Infrastructure Fund (HIF) funding to fund the M5 Junction 10 Improvement Scheme works. As has been outlined in the Scheme Funding Statement (APP-036) as part of the funding application an investment case was made for the delivery of infrastructure improvements required to support the delivery of the identified dependent housing. This was supported by a Traffic Forecasting Report (TFR) as part of the HIF Outline Business Case (See Appendix C of REP1-046), with a design year of 2041, The select link analysis undertaken as part of the TFR established that the developments having a substantive impact on the most severely affected links were North West Cheltenham, West Cheltenham and the associated safeguarded sites.

7.1.2. Subsequently the HIF programme awarded funding to local authorities on a competitive basis for new infrastructure to unlock new homes in the areas of greatest housing demand, as referenced in the funding response received from Homes England and submitted into Examination (AS-057). Having been granted funding for the Scheme it is the Applicant's position that Homes England are also of a corroborating view that there is a justifiable need for the Scheme, as well as a need to consider growth beyond the existing JCS plan term.

8. Joint Councils' GC3M Assessment

8.1.1. The need for the Scheme identified by the JCS Transport Strategy Evidence Base and the DCO application has been reaffirmed by the Joint Council's GC3M Assessment that establishes the traffic impact of development associated with the West of Cheltenham and North West Cheltenham Strategic development sites on the surrounding road network, in the absence of the proposed M5 Junction 10 Improvements Scheme.

8.1.2. In its conclusions the assessment outlines the following:

- At 2041 (just prior to the Scheme design year of 2042) there are parts of the local road network with capacity issues at several junctions in the absence of further development.
- Despite the inclusion of proposed mitigation measures relating to individual developer planning applications, even with the deadweight level of development, there remains residual capacity issues at several junctions.
- In the deadweight scenarios, the capacity issues at the already congested junctions increase but for the most part, other key junctions are relatively unaffected (exceptions include the Coronation Square junction, High Street approach to the Gloucester Road/A4019/ junction). This suggests that the 'deadweight' position is potentially achievable in the absence of the M5 Junction 10 Improvements Scheme – but there may be some isolated junction improvements (above the identified Elms Park mitigation) required to ensure emerging capacity issues seen in the reference case are not exacerbated by new development.
- With 50% of development delivered, again problems are exacerbated where congestion issues were already observed in the reference case. Some of the biggest impacts are seen along the A40 corridor (particularly the Arle Court junction and M5 Junction 11) but other locations such as the Withybridge Lane junctions are also shown to be far above their available capacity. This increases the need for further mitigation (above that identified for the Elms Park site) in order to resolve the issues identified.
- With 100% development, there are widespread congestion issues across almost all of the junctions analysed (both with and without the Elms Park mitigation). This provides a clear indication that this level of development cannot be accommodated in the absence of major scheme intervention.

8.1.3. When considering the outcomes of the GC3M assessment it confirms the severity of cumulative impact that would be felt by the local road network in the absence of the M5 Junction 10 Improvements Scheme. Whilst a proportion of deadweight development could be achieved on an individual development site basis the strategic need identified by the JCS cannot be met without the intervention of a Scheme that addresses the cumulative impacts of the Strategic Allocations.

9. Conclusion

9.1.1. The Applicant has summarised in this technical note the case for the need for the scheme both on the strategic network and the local road network. The Applicant considers that the JCS Evidence Base, through an iterative design process, has demonstrated the need for the Scheme presented at examination to resolve traffic issues in the road network which would occur from planned development during the JCS period. The Applicant further considers that this need has been underscored through the HIF application and most recently the need for the Scheme has been demonstrated by the GC3M report. The Applicant considers that alternatives to a traffic solution, as well as alternative road schemes, were appropriately considered as part of the design iteration in the JCS in order to develop an appropriate solution to the one faced in this network. The solution before the examination is the only scheme demonstrated to be appropriate. The Applicant separately has assessed the proposed solution as part of its environmental statement, to assess for whether alternatives to the proposal could result in a lesser impact, the findings of this assessment of alternatives can be found in Chapter 3 of the Environment Statement. There is no alternative before the examination which the Applicant would consider to be capable of meeting the objectives of the Scheme.

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