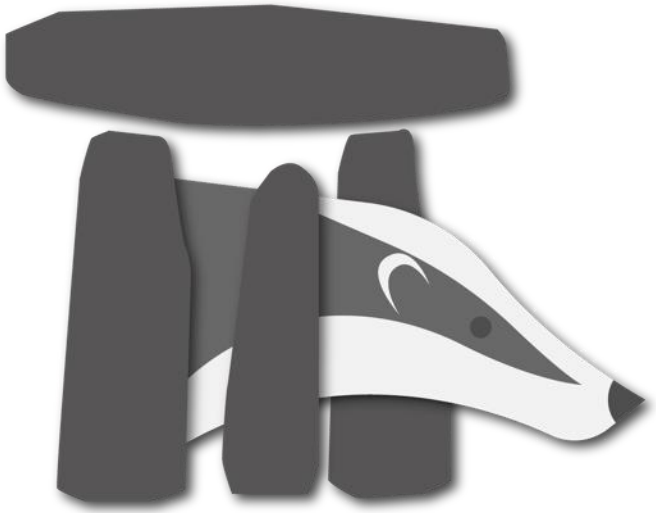


highways england

Logistics and Traffic Management | QS-13B | Delivery Methodology | Traffic Management Strategy

2. Your traffic management strategy shall provide the following information as a minimum:
    2.1. your methodology for developing the Scheme-wide construction-stage traffic management arrangements, including:
        2.1.1 an explanation of how works will be planned to minimise adverse impacts on journey times;
        2.1.2 a description of how the impacts of construction on traffic and journey times will be fully assessed during the detailed design stage, including the modelling methodology;
        2.1.3 the consultation process that will be undertaken during the detailed design to develop and agree the full traffic management arrangements;
    2.2. the strategy for construction phase traffic monitoring, including for HGV construction traffic;
    2.3. NMU diversion routes for the Scheme;

3. Your traffic management strategy shall provide indicative traffic management arrangements, including diagrams, for the following Scheme areas:
    3.1. Countess Roundabout, inclusive of the A345 and the A303 approaches to Countess Roundabout, and including:
        3.1.1 the traffic management arrangements for the key construction phases of the Scheme, including the interfaces between works areas and the highway network;
        3.1.2 an assessment and explanation of the traffic and journey time impacts, for both the east-west (A303) corridor and the north-south (A345) corridor, including queue lengths and journey time delays, during the key construction phases;
    3.2. the existing and new Longbarrow Junctions, inclusive of the A360 and the A303 approaches to Longbarrow Junction, and including:
        3.2.1 the traffic management arrangements for the key construction phases of the Scheme and western approach, including the interfaces between works areas and the highway network;
        3.2.2 an assessment and explanation of the traffic and journey time impacts for both the east-west (A303) corridor and the north-south (A360) corridor, including queue lengths and journey time delays, during key construction phases.

2 Our Traffic Management Strategy

Introduction

BADGER have developed the Construction Methodology, including temporary traffic management (TTM) arrangements, in full compliance with the tender Design, Reference Design, Contract Specification, Volume 2 Part 2 (Design and Technical Requirements Section 7.9, Section 10) Contract Drawings, Outline Environmental Plan (Chapter 3, Annex A.3), Volume 3 (Specification Appendices) and all General Requirements.

Objectives

The Traffic Management Strategy proposal has been designed to meet the following objectives:

- Safe and reliable journeys for everyone
- Safeguarding and enhancing biodiversity for future generations - through our construction methodology and lifecycle approach
- Spend and employ locally through self-delivery, a blend of international/local experience for a positive economic legacy.
- Keeping promises by understanding, managing, and meeting stakeholder expectations.

BADGER will achieve the objectives by:

- Rigorous planning to deliver Right First Time and On Time
- Combining meticulous implementation, and our local experience to plan and deliver safe, effective traffic management and maintain smooth traffic flow
- Putting people first, being honest and engaging effectively to identify local concerns and requirements.

Key Concepts

We designed our construction solutions and TTM proposals simultaneously, integrating our network knowledge and ensuring our proposals meet the needs of the local and trunk road network and all stakeholders. Our proposals address:

- The potential impact on local communities and road network
- The acute vertical alignment differences and constrained horizontal alignment of the Project Road.

Our design enables the efficient construction of the works while maintaining a minimum of one free-flowing lane of traffic in each direction and maintaining the slip road lengths on the approach lanes to Countess Roundabout, in full compliance with all Project requirements. We will use the phased introduction of a reduced speed limit controlled by average speed cameras and monitored by CCTV to provide rapid response to any incident and to ensure safe, predictable traffic flows.

We have selected individuals to join our Integrated Traffic Management Team (ITMT) based on their experience of projects of similar scale and scope, their technical expertise and knowledge of the local road network. The ITMT has been led by our TM Manager, who, following award, will lead the ITMT during Detailed Design and Construction, ensuring that the meticulous planning and innovative approach of the initial stage are embedded in the project delivery. Our ITMT have developed draft TM plans of each TM phase, including a detailed TTM design brief, which records key information e.g., required TTRO, other alternatives considered, and potential stakeholder issues. Our robust draft TTM proposals offer best-value, fully compliant and best practice solutions to the specific challenges offered by the Project. All the TM drawings will be submitted in a separate document.

2.1 Methodology for developing the Scheme-wide construction-stage traffic management arrangements

During the detailed design and construction our ITMT will be led by our TM Manager, supported by our TM Planners and senior TSCO. Immediately following award, our TM Manager will engage closely and collaboratively with Highways England, road authorities, Wiltshire Council, police forces, operators, Historic England and other relevant stakeholders and seek to arrange Traffic Management Liaison Group (TMLG).

Our Project Manager, supported by our TM Manager, will closely engage with the TMLG to deepen our understanding of stakeholder

needs and to review our detailed initial stage TTM plans (*SWLOGISTIC – DR – MW – 0004 and 0005 in* QS13C). Our TM Manager will develop our Traffic Management Plan (TMP) in accordance with DCO Requirement 9 **(MW-TRA2)** and will prepare the Construction Workforce Travel Plan **(MW-TRA3)**, the Site Access plan (SAP) **(MW-TRA4)** and the Site Travel Plan (STP) **(MW-TRA5)**. Our TM Manager will be responsible for seeking approval of the Authority.

BADGER is committed to delivering all of our TTM in a manner which maximises safety and minimises delay and disruption. We fully recognise that the Project Road is a key strategic route, with features which make it vulnerable to disruption including:

- High-speed single carriageway with high traffic volumes and frequency of incidents
- Poor forward visibility and limited overtaking capacity leading to driver frustration and unsafe manoeuvring
- Various junctions with the local road network, with delays on A303 likely to impact local roads, communities and businesses.

Following stakeholder engagement and during detailed design we will refine our proposals to mitigate delay and disruptions risks. Our TTM arrangements will mitigate and reduce these risks through our rigorous TTM design, meticulous implementation, and use of technology. We will implement and manage our TTM arrangement to reduce the impact on local and wider communities and prevent traffic diverting on to alternative routes and thereby spreading disruption. We will use methods that include our TRUST system and construction HGV vehicle management system (see below). Specific proposals which would be reviewed include:

- Monitoring and managing traffic flow during the construction period using our TRUST system, including providing live updates to Highways England Operations, Wiltshire County, Wiltshire Police, and other authorised stakeholders.
- Emergency access through the works shall be maintained when safe to do so. TTM escorting. We will support this with additional, innovative protection offered by the Intellicone system.

During detailed design and construction our TM Manager and TM Planner will prepare detailed TM plans for submission to the Client no later than 12 weeks prior to the first access date. In parallel our TSCO will request authorisation of for the required Temporary Traffic Regulation Orders (TTRO) and all other relevant approvals and will be responsible for submitting and agreeing these request seeking approvals. BADGER will adhere to the Customer View principles during design, construction and maintenance. Implementation and monitoring will be through the TMLG. We have indicated the relevant principles by **CVXX** in this document.

2.1.1 How works will be planned to minimise adverse impacts on journey times.

BADGER's temporary traffic design is based on the following:

- Construction of offline sections and/or temporary diversions first, enabling traffic to be transferred onto them. By moving traffic to one side of the works, together with our approach to haul roads **(***SWLOGISTIC – DR – MW – 0001,-0002 and -0003* **QS13C),** we will minimise our interface, simplifying the phasing.
- The works will be constructed using clear, well defined TTM phases, with a minimum of sub-phases. This will enhance clarity for road users, supporting reliable journey times.
- Maintaining a minimum of one free-flowing lane in each direction on A303, maintaining traffic flow and guaranteeing the lane requirements at Countess Roundabout in accordance with **Appendix 1/17 2 (ii).** 40mph temporary speed limit at temporary diversions, supported by average speed cameras, in the diversion and influence areas and complete duration of the works, avoiding road user confusion. Roadside information for this reduction will be accordingly displayed **(CV05)**. The speed reduction will improve safety and the speed cameras provide a well proven method of improving driver behaviour. This will reduce potential collisions and enhance journey time reliability.
- We will keep the existing speed limit on the A303 in non-diverted areas (e.g., between Longbarrow and Countess roundabouts) as much as feasible **(CV05)**.
- Use of desirable carriage widths of 3.25m on diverted routes where possible, above the standard minimum required **(CV04)**

- Integrated CCTV, Variable Message Signs and TASCAR (average speed monitoring) system will be used to monitor traffic, provide live data to road users, and communicate with Highways England Operations, Client and authorised stakeholders. This will provide accurate and dependable journey time information to road users which will promote stable flow.
- We will avoid rat running by agreeing a series of measures with Wiltshire County Council and other relevant Authorities based on a mix of preventive ones (such as introduction of one-way street and/or close traffic only to neighbours) and deterrents (such as speed humps, road narrowing), after analysing the traffic impacts together in the TMLG **(V2P2- 7.9.6.).** Stonehenge road will be closed from the start of the Construction phase as a preventive measure following the Environmental Statement.
- We ensure all construction HGV and works/ delivery traffic, follows the designated site access routes agreed with HE and relevant local highways authorities **(MW-G15)** towards the compounds and access site roads.This will be achieved using our telematics based works vehicle management system. This will verifiably ensure construction traffic does not utilise routes intended for local traffic **(V2P2-7.9.11).**
- Operative haul routes will be within the works area at all times, with the exception of the excavated material from the East Portal cutting which requires circa 80,000m3 is taken by road to the West landscape fills/embankments. Impact of this additional traffic (meaning approx.7 vehicles/hour in 2.5 months) has been checked on the model and is estimated negligible. Plant crossings will not be used on the A303. Works traffic will operate “left-in / left out” protocols which will minimise impact on other road users.
- Extensive use will be made of temporary works to overcome pinch-points or temporary level differences and safely maintain traffic flow. These include:
  - Diverting traffic from the existing A303 to temporary roads and new slip roads.
  - Temporary bridges between new and existing carriageways.
  - Widening areas in the existing slip roads and inside Roundabout, avoiding constrains in the specifications of the documentation.

The works will be planned to minimise impacts on journey times by retaining as much capacity as reasonably possible through:

- Detailed traffic modelling of each construction stage and TTM phase. This has already been used to predict the effect of different TTM alternative solutions at the Countess Roundabout and Longbarrow Junction (refer to 3.1.2. and 3.2.2.)
- Proposed TTM solutions have been selected only after ensuring that the required capacity is available for existing and future road users. This provides a clear understanding of likely traffic flows at every phase of construction.
- Early opening of parts of the scheme to provide increased capacity as soon as possible: 1. early opening of eastern and western slip roads at the Countess roundabout immediately following their construction, and 2. sequential early partial opening of the flyover following completion of the relevant construction stage **(CV02)** (3.1.1 + the Programme in US-21.) **(TQ2B1.1, led by our Construction Manager)**
- Traffic signals at the Countess roundabout have been optimised to operate effectively during each TTM phase. This ensures sufficient capacity for each arm of the junction and balances flow across all approaches.
- Removal of temporary 40mph limit within the works when not required and it is safe to do so, e.g., while a 40mph average speed limit would be necessary in immediate vicinity of the works, it appears redundant on the extended length of A303 between the Countess and Longbarrow Junction **(CV05)**. This has been validated by our modelling and will further reduce the impact of our TTM measures.
- Shorten traffic management as soon as possible, shrinking work zones in line with the work taking place on site. **(CV03)**
- Keep to a minimum the time when there is a need for merging traffic from different roads into the same section, i.e. We will keep the A360 temporary bridge operative until it is possible to divert the traffic through the tunnels just after that temporary bridge is removed**):** according to the Tendered Programme**,** approximately 24 months after section one at Longbarrow is complete (Longbarrow Construction Phase (7-11)

2.1.2 How the impacts of construction on traffic and journey times will be fully assessed during the detailed design stage

BADGER will evaluate the impact of the construction on traffic and journey time by the monitoring and communication tools that will help us manage strategic traffic in real-time, delivering consistent journey time and accurate information. An initial survey will be conducted as a baseline for future assessments. In case there are any significant differences in terms of flow, the Aimsun model will be updated and the traffic management scenarios reassessed during the detailed design stage, as a sensitivity assessment, when needed.

Our traffic monitoring team will use real-time data from our temporary CCTV (in accordance with **Appendix 1/25**) and ANPR systems to monitor queue length and determine average journey times through the works. Details of multiple engagement and communication methods will be agreed through the TMP and the Stakeholder Engagement and Communications Plan **(CV15)**.

Our traffic safety and management proposals will be controlled and coordinated through the TMP. The plan will identify all the temporary traffic management measures associated with each construction operation and be cross-referenced to the duration of each phase of the Programme.

A 2026 reference case and 2026 construction year Aimsun microsimulation model has been developed to assess the impact of the TM strategies at the Countess and Longbarrow roundabouts, as well as the A303 between the two junctions and all approach roads.

As the detail design develops, at least the same traffic scenarios as the ones prepared during the tender will be run to incorporate the initial survey data and confirm the previous conclusions reached. A validation exercise will be carried out to compare actual flows (during construction) and the flows provided be HE, which have subsequently been modelled

The Aimsun model would also allow an assessment of the impacts prior to significant design work being undertaken. For example, should the geometry of a particular section of the traffic management strategy change, it is possible to model this within the model in order to ensure that this does not have an impact on overall journey times and the level of queueing and delay.

The model will be also used to test any possible layout changes and/or changes in the construction methodology or phasing, as necessary. After analysis of the actual traffic data and queues, the models will be run as part of the assessment for the TMLG when the journey time thresholds are exceeded: we will extend the model to assess TM measures when required at other locations within the vicinity of the Scheme, such as the western tie-in at the west of the A303 (not included at present); the model is capable of assessing the impacts at other locations within the current extent of the model, subject to the appropriate level of validation.

2.1.3 Consultation process that will be undertaken during the detailed design to develop and agree the full traffic management arrangements

Our consultation process will be led by our Project Manager and supported by our TM Manager and TM planner. The early preparation of clearly defined and well document TTM plans and TM Design Brief (TTMDB) during the initial stage will allow us to engage closely and collaboratively with the *Client* and key stakeholders immediately following award.

Our Project Manager, supported by our TM Manager and TM Planner will seek to jointly arrange TMLG meetings, with the relevant key stakeholders. We propose that TMLG meetings are held at least monthly, during the Detailed Design phase and continue throughout the Construction stage, with additional meetings before major layout changes and/or critical operations.

Our TM Manager and TM Planner will engage closely and collaboratively with the parties in the TMLG to:

- Review monthly the effectiveness and performance, and optimise our TTM plans considering all available options, to best meet stakeholder requirements and integrate our processes with the requirements, HE Operations, emergency services, and key stakeholders **(CV01)**. This will inform future plans and drive

continuous improvement and minimise disruption to the wider network
- Coordinate and agree on the TMP and road space bookings before implementation
- Ensure all parties have adequate advance notice of change **(CV09)**
- Coordinate Construction Period maintenance and operation services
- Agree on incident response protocols with emergency services.

During the Detailed Design stage, our TM Manager will be responsible for the development of the TMP, the construction Workforce Travel Plan, the Site Access Plan and the Site Travel Plan. He will also compile a complete set of fully detailed TTM drawings for each TTM phase which will form part of the TMP, including those in relation to the Works for the Local Authority **(V2P10)**. He will prepare and submit these documents for approval to the following Authorities **(V3 App 1/17-1, MW-TRA2)**:
- Highways England
- Wiltshire County Council, and adjoining local authorities
- Emergency services
- Public transport operators
- The organisers of any major or significant local events, and owners of significant local visitor attractions (including the National Trust and English Heritage Trust)
- Other relevant organisations regarding traffic management and control measures to be implemented to accommodate abnormal traffic.

The regime for monitoring the impact of Providing the Works, part of the TMP, will be developed in coordination with the TMLG, as per **V2P2-7.9.8**. We will determine the specific monitoring locations (at least thirty) specifically consulting with Wiltshire Council for local road monitoring **(V2P2 7.9.9).** Proposed locations will incorporate those in **V2P2 – 7.9.10** and in **V2P10 2.7.** for local roads.

Our detailed TM arrangements are coordinated with the construction programme to ensure the proposals are presented in good time for acceptance by the TMLG. We will capture all planned TTROs and strategic road space requirements in our TMP and present details for discussion at the TMLG.

For each viable option identified, we will prepare a draft TTMDB and draft Traffic Management drawings. The TTMDB will consider likely stakeholder requirements, identify the extent and timing of all carriageway restrictions, will include traffic management installation and removal methodologies, and all required TTRO and approvals. This strategy allows us to explicitly consider stakeholder requirements during TTM development and creates a record of our stakeholder assumptions. It assists early engagement with stakeholders following award and creates a more dynamic TTM management.

2.2 Strategy for construction phase traffic management and monitoring, including for abnormal loads, costruction traffic and deliveries

Our management strategy for the construction phase will be based on the implementation of TRUST system, TASCAR and ITCR for the monitoring of TTM measures, traffic flows, and public services **(MW-TRA11)**, and the use of multiple public communication channels **(CV15)**

Traffic management and monitoring

We will utilise our integral **Tactical Road User Surveillance Technology (TRUST)** system in order to manage and monitor the traffic management system, our works vehicles including deliveries, traffic flow and recovery of vehicles.

The TRUST system provides a comprehensive set of tools to ensure safe and reliable journeys through the works with rigorous data capture and storage and a robust verifiable monitoring of all works vehicles and will enable us to:
- Continuously and automatically monitor traffic flow to achieve our initial stage designs and commitments to minimise disruption.
- Manage the route and timing of all **construction traffic** including **deliveries**, using advanced telematics, to track and enforce HGV and abnormal loads **(V2P2 7.9.11)** and to ensure there is no disruption to local communities through agreed designated routes. The system will provide an automatic alert to our ITCR should any site vehicle deviate from the designated

routes in our plan. We will agree a specific route for every supplier to make sure we fulfil requirement **MW-TRA2.f).** Deliveries of construction material/ equipment will take place during 'non- peak' time hours**.** For occasional deliveries, we will look to operate "stop and escort" points **(TQ2B3.1),** led by our Construction Manager**.** Refer to **QS13A for abnormal loads** in more detail.

- Immediately make available live automated journey time information to Highways England and to Wiltshire County for their network management and to enable the use of their permanent VMS network.
- Allow our Control Room to utilise our temporary VMS to provide live information to road users (using agreed messages triggered in line with agreed protocols)
- Continuously monitor the roadworks using CCTV and dispatch our recovery vehicles and TM site teams as required without delay (and within the thresholds of **V3 App 1/20 1.1**), plus alerting emergency services as necessary, via the ICTR. At the same time, traffic flow will be managed and monitored thus reducing incidents and minimising delay.
- Incorporate average speed cameras to maintain traffic speeds at the agreed limits

We will provide CCTV coverage on the Project Road, extended to the first 'free recovery' signs. In addition to monitoring flow, the cameras will enable us to rapidly mobilise recovery vehicles in the event of a traffic incident **(MW-TRA6 c)** even in low light conditions**)** We will install **TASCAR** on the Project Road to enable enforcement of the mandatory speed limit to improve safety for the road-user by reducing the risk of incidents and improve traffic flow.

We will establish an **Integrated Traffic Control Room (ITCR)**. The ITCR will operate 24/7 to monitor and coordinate our traffic management operations. The ITCR will be operated by our traffic monitoring team (TMT), who will be in permanent contact with our on-duty TSCO and TM operatives. The TMT will use a linked network of CCTV, ANPR cameras, and VMS that will enable us to continuously monitor traffic flow and automatically monitor queue lengths.

Immediate response: our ANPR system will automatically provide an alert if queueing occurs or queue lengths change, then inform all required organisations. The TRUST system will immediately detect any stationary vehicle. In addition, the flow monitoring system will immediately detect, and raise an alert for the ITCR staff if there is a variation in traffic flow. Our ITCR operators can intervene straight away, with planned and agreed intervention levels and actions. VMS messages will be immediately amended to respond to queuing.

The effectiveness of the TRUST system will be measured, including journey time impact and will be reported to the Project Manager and reviewed at the TMLG monthly meetings.

BADGER will deploy visible signalling and barriers **(CV07 & CV08)** and will respect the lighting requirements for the WHS. TM Operatives will undertake regular inspection checks and maintenance of temporary lines and road markings **(CV06)**. They will also safely implement TM arrangements and support our traffic emergency response team and emergency services as required. The Intellicone System will be used to protect the workforce from public vehicles making unauthorised incursions into the works area. The system will sound an alarm when it detects a vehicle entering the site at this point, both at the point of entry and at each works site within lane closure, which allows the work force to move to a place a safety since they are aware an unauthorised vehicle has entered the site

Communication Channels

TRUST system will send automatic alerts to BADGER Communications Team and to HE Customer Contact Centre with information being updated through an agreed protocol. We will also agree the installation and maintenance of a link with the existing CCTV system with the Regional Operations Centre (ROC) (App 1/25 1 (iii)).

We will use **Variable Message Signs (VMS)** to provide road users with scheme-relevant information, including:

- Accurate journey-time and estimated queue lengths **(CV12)**
- Planned works and road closures

The VMS will be continuously updated by the ITCR staff to accurately inform the public of traffic conditions. We will position the VMSs at strategic locations approaching key junctions, including Longbarrow and Countess Junctions, so that users can make informed route choices. Portable VMS will be strategically positioned where queues may be likely to form to provide actual journey time information and avoid driver stress **(CV11)**.

BADGER will feed accurate and timely data, via HE where appropriate, into a range of communication media to assist with journey planning **(CV15)**. This will include:

- Existing media (local and national radio channels)
- Long distance advance signage to direct traffic away from the A303 to alternative routes of the M5/ M4.
- Regular feeds into the Road Hauliers (RHA) and Freight Transport Association (FTA) Apps to provide traffic updates and alternative routes for freight.

We will use additional channels to keep road users and those of affected and local communities **(CV14)** informed, including:

- Newsletters and letter-drops, notices at community facilities
- Roadshows/mobile displays
- Visitor Centre Information Boards
- Information Boards at indicated locations **(V2P3 App1/20) (CV10)** together with information on temporary signs at the roadside **(CV13)**
- Log and track fault page **(TQ2B2.1)** led by our Community Relations Manager

All communications will be positive and proactive **(CV16)** using the appropriate tone of messaging.

We will receive road user feedback via road user surveys **(SSPM 2.1)**, Social Media and Iboxcomms **(TQ2B2.1)** (following **V2P7 1.3.1.**) **(CV18)**

All above mentioned tools will help us to manage traffic in real time. They will also assist with vehicle breakdown recovery, maintaining clear blue light routes the agreed measures to discourage ‘rat-running’ onto local roads **will be implemented and monitored**. The data collected will enable benchmarking for continual improvement.

2.3 NMU diversion routes for the Scheme;

The interface between the works and the existing NMU will be managed and coordinated through the TMP. The plan will identify all the temporary measures associated with each construction operation and be cross-referenced to the duration of each phase of the Programme. Our strategy will always consider the needs and safety of pedestrians and NMUs. We will open the new permanent routes as soon as it is safe to do so. All diversions of public rights of way will be agreed with the relevant Local Authority Rights of Way Officer and designed in accordance with **V2P2 Table 8.1** Suitable advanced warning notices and route signage will ensure that users know what is happening and where to go. The proposed main NMU interface with the haul roads and diversion routes throughout the Traffic phasing are depicted on drawings in **QS13C**. We will outline the existing and proposed temporary arrangements at all the key crossing points. All NMU route diversions will:

- Have a hard surface
- Have adequate drainage to prevent flooding or ponding
- Be provided with dropped kerbs at all crossings, suitable for pedestrians with prams and disabled using a wheelchair
- Be kept clean and free from all materials, construction plant and stationary vehicles
- Be held to a minimum length
- Where possible will be segregated from traffic using barriers
- Be lit where the existing route is lit
- Where crossed by active site entries during working hours will be controlled by a banksman (refer to plant crossings in *HE551506 – BDG – GEN – SWLOGISTIC – DR – MW – 0004 and 005 in QS13C*– anticipated only in Green Bridge 2 and WST04 byway).
- Be signage-provided on hoarding to indicate re-routing (**MW-G28 e)**)

NMU management at **Countess** junction during the construction phasing, shown on drawing *HE551506 – BDG – GEN – SWLOGISTIC – DR – MW – 0005* includes the utilisation of existing traffic lights to allow pedestrian crossings through safety areas, the construction of

temporary pedestrian path inside the existing roundabout (covered during the construction of the adjacent abutment) and to South East of the roundabout for an at-grade crossing, and the demolition of the existing subway. The crossing system of the NMU route at Countess will be adjusted as the works progresses through different construction phases (**QS9B** and **QS13B)**. We will manage this by retaining and enhancing the existing traffic signalling equipment.

When crossing with construction traffic, we will prioritise the byway traffic by using temporary signalling along the haul road, provided with banksman and gates with safety boom barriers (closed during non-working periods) and CCTV cameras that will control the gates during those non-working periods.

- **WSTO6B:** we will protect the NMU path in its current location and divert while we construct t Green Bridge 2. The NMU will be diverted on to Green Bridge 2 as soon as it can be safely opened.
- **WSTO4:** A temporary crossing will be installed on the route with our internal haul road (gaining access from our compound to the River Till viaduct construction site). The byway will be always kept open as per requirements, even when we build the viaduct, adopting a temporary diversion. After the completion of section 1, the byway will be segregated by new-jersey and security barrier from a new haul road that we will use to achieve the southern part of the scheme undercrossing the first west span of the viaduct (QS-13C).

Our TM operatives will carry out daily inspections of each route and undertake any maintenance required to ensure NMUs are always safe and operational.

3.Traffic management strategy. Indicative traffic management arrangements, including diagrams

The TM strategy will be focused on the need for a separation of the Construction works and the internal site works traffic from the existing highway and local network. Details for the temporary arrangements (including temporary access/egress points) are described in **drawings** *SWLOGISTIC – DR – MW – 0004 and 0005* in **QS13C** The four key locations that drives the traffic management of the Project and that will be further investigated and checked are as follows:

- The Tie-in connection between the existing A303 West Section roads with the new one, the Winterbourne Stoke Bypass (Western tie-in).
- The Longbarrow Junction arrangement with the connection between A303 and A360, considering two main scenarios:
  - Completion and opening of Section 1
  - Completion and opening of the entire road scheme.
- The Countess Roundabout with the East and West approaches over the existing roundabout and the connection with the A345.

Objective

BADGER will manage the traffic diversion strategy during the Construction Phase to minimise any disruption to the road users and the time journey delay. Traffic modelling software will be implemented to review the best solutions. Different independent and combined scenarios have been modelled to support the traffic diversion arrangement to allow the construction of the wide scheme road (refer to 3.1.2 and 3.2.2.in this document). Early opening of the relevant areas of the works will occur as these are completed and safe for use.

3.1 Countess Roundabout, inclusive of the A345 and the A303 approaches to Countess Roundabout

The traffic signals' staging and timings at the Countess Roundabout will be continuously monitored and reviewed throughout all stages of construction. We will retain and enhance the existing signalling equipment. This will include the restaging of the junction at different stages of construction in order to manage traffic flow impacts **(TQ2B1.1,** led and managed by our Construction Manager)

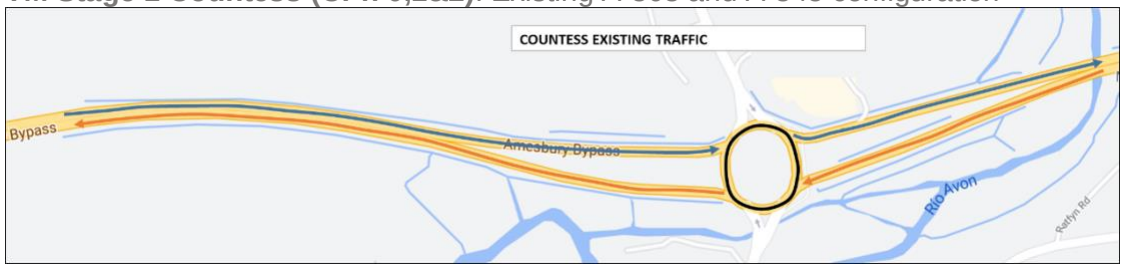
BADGER will consider 7 different TM stages for the full development of the Countess Roundabout (RB):

1. Existing A303 and A345 configuration (**TM01**CPh00), ground improvement (CPh01) and construction of temporary slip roads.(CPh02)

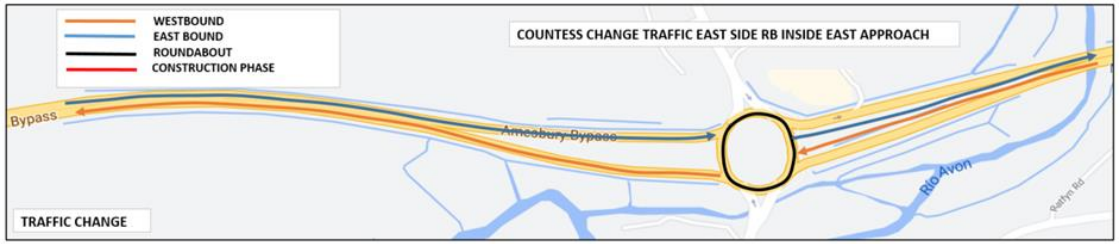
2. Diversion of the existing traffic within the centre island through temporary slip roads (**TM02**-CPh03) and construction of the new slip roadson the east side of the RB. (Interference: Need turn in/out to connect highway net with works area) (CPh04)
3. Diversion of the traffic trough the new Eastern slip roads (**TM03**-CPh05). After the construction of the temporary west, the westbound slip road (CPh06) with temporary site access/egress at the west of the roundabout, we will divert the west bound traffic onto it
4. (**TM04**-CPh 07) construct thereafter the new westbound slip road with access/egress through the existing closed west WB (CPh07).
5. West access area of the RB: diversion of both bounds into the existing west carriageway (by temporary widening) to enable the construction of the new north area and the fly over. (**TM05**-CPh08) In addition, we will provide a third lane inside the westside of the RB that will allow the right-turning traffic to be separated signallised.and the A303 traffic, either WB or EB, to be run in the same signal stage **(TQ2B1.1)**. This will be included in a temporary traffic signal control plan (TSCP) (Interference: Interface between network traffic and the site will be done through the closed west eastbound slip road at the West access area of the roundabout. The Access/Egress inside the roundabout will be through the north of the roundabout itself, and for the east appoach of the roundabout, turn in/out will be used at the slip roads, until structures and ramps are constructed (CPh09 & CPh 9.1). The works traffic will be then driven through the constructed flyover and the closed West Eastbound slip road (CPh10)).
6. Completion of the section 2 with the flyover open one lane per bound and tie in with the existing A-303 (**TM06**-CPh 11). (Interference: Turn in/out in the east bound will be needed in the West part of the roundabout to link the works area and highway network. The access to the east portal will be done through the temporary internal haul road once built) (CPh 12).
7. New A-303 complete full operative with 2 lanes per bound. (**TM07**-CPh13).

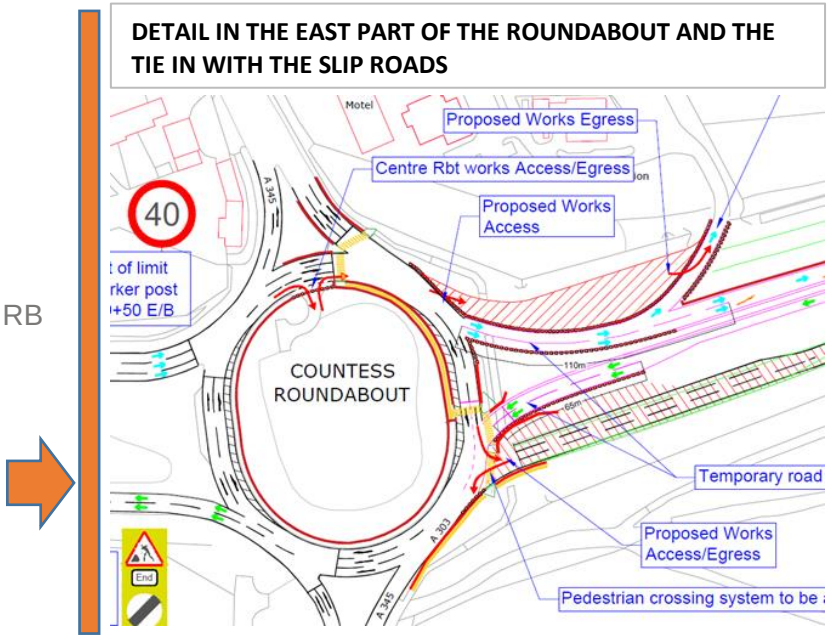
3.1.1 Interfaces between works areas and the highway network

TM Stage 1 Countess (CPh 0,1&2): Existing A-303 and A-345 configuration

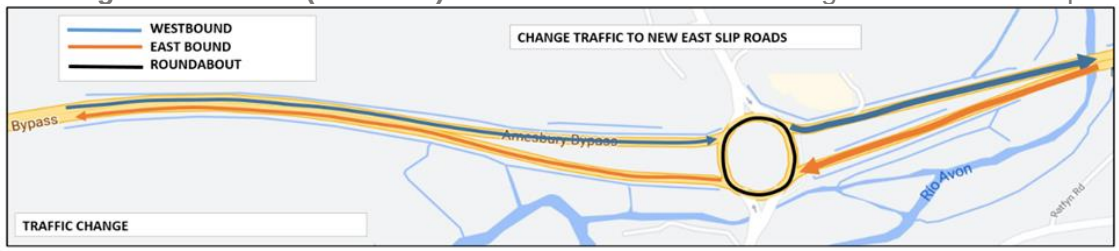


TM Stage 2 Countess (CPh 3 &4): Prepare Construction new slip roads in East side of the RB



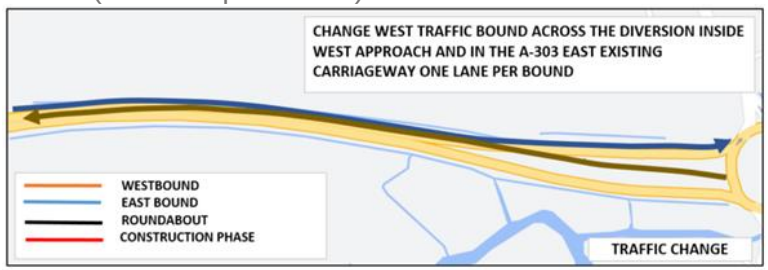


TM Stage 3 Countess (CPh 5&6): Diversion of the traffic through the new East slip roads

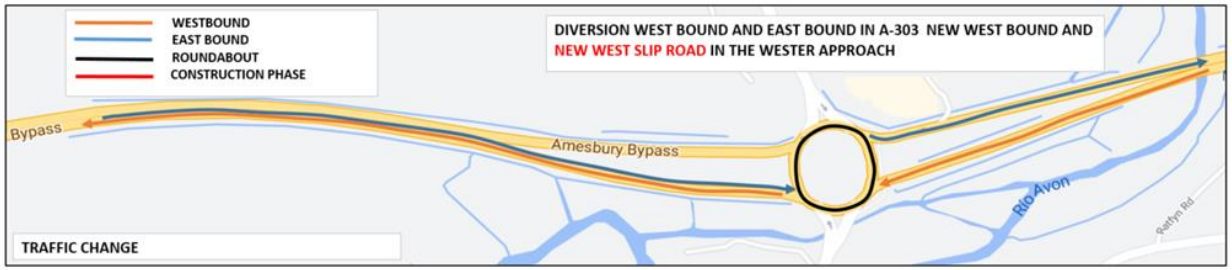


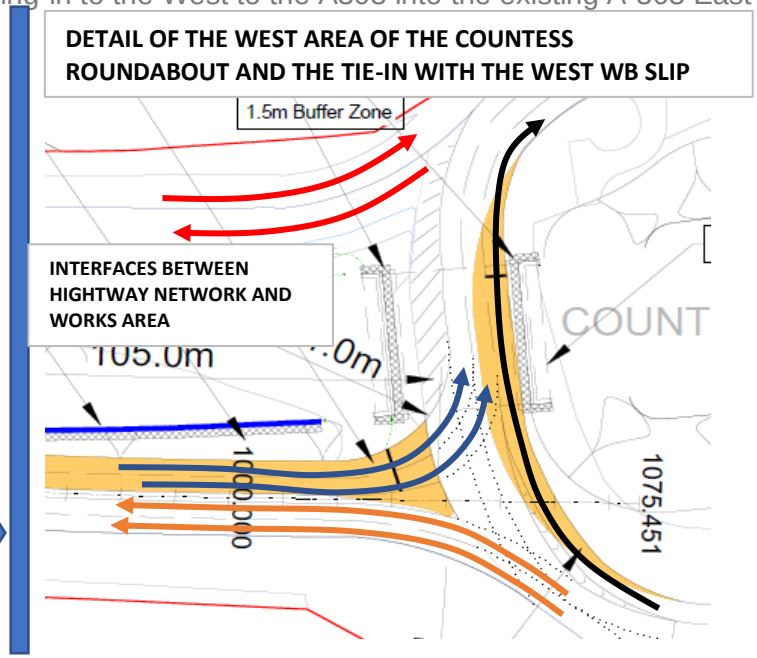
Note that TM stages TM01,TM02, TM03 and TM04 to the East and TM05 to the West of Countess roundabout can be undertaken in parallel should the programme requires it.

TM Stage 4 Countess (CPh 7): Diversion of the West Slip Road inside West approach area and tieing-in to the West to the A303 into the existing A-303 East bound (one lane per bound)

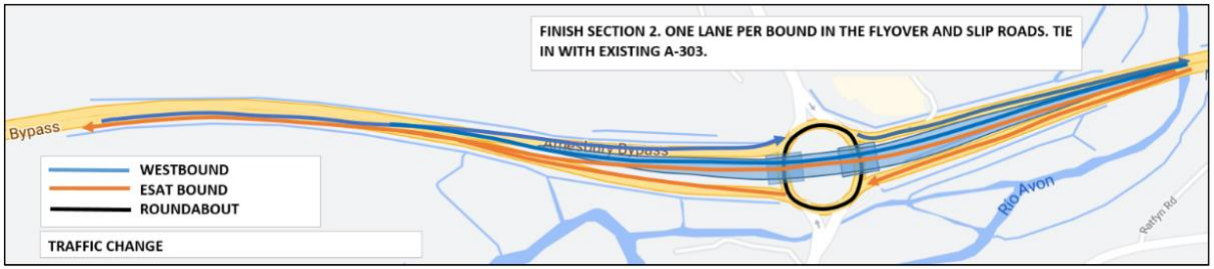


TM Stage 5 Countess (CPh 8, 9 &10): Diversion West and East Bounds in new West Slip Road (2 lanes/bound) and new A-303 West carriageway (one line/bound).

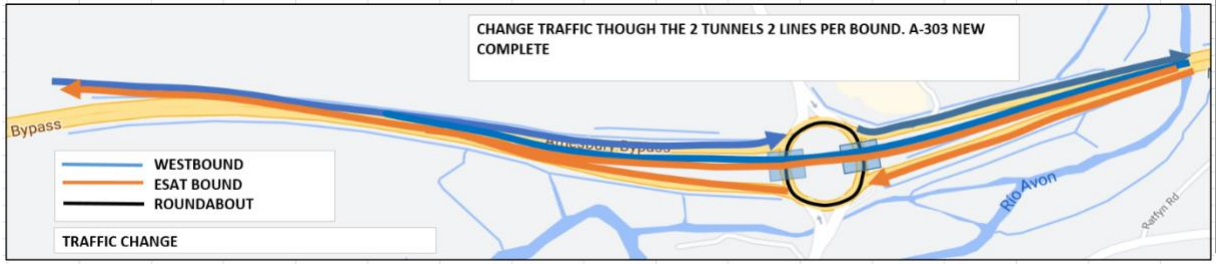




TM Stage 6 Countess (CPh11&12): Finish Section 2. Flyover open one lane per bound, tieing-in to the A303 existing WB carriageway.The four slip roads are operative.



TM Stage 7 Countess (CPh13): New A-303 complete full operative with 2 lanes per bound

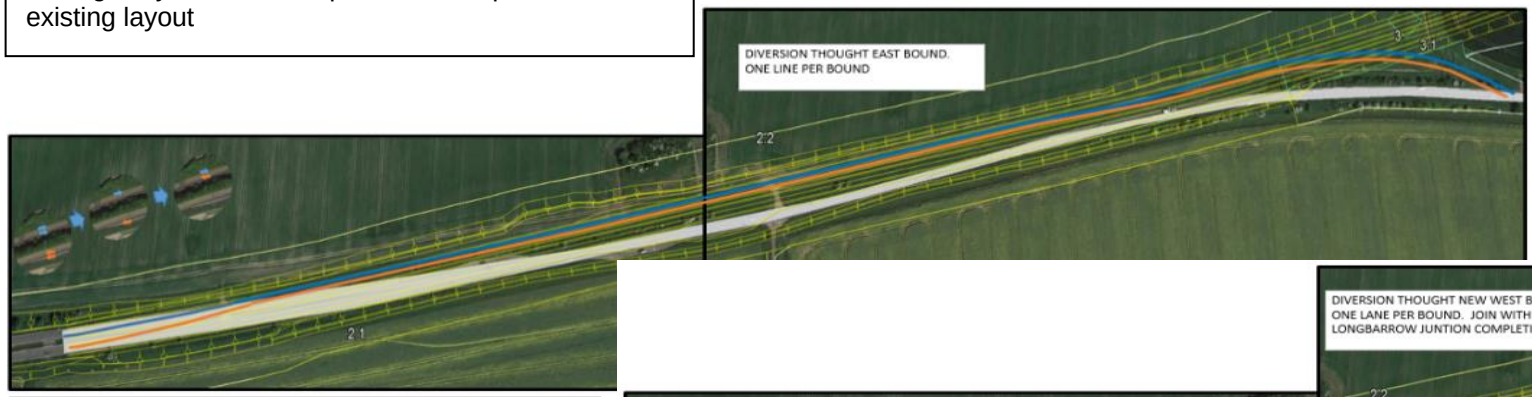


Detailed traffic management drawings can be found in *HE551506 – BDG – GEN – SWLOGISTIC – DR – MW – 0005* QS13C and will be part of the TMP.Details for typical access and egress points from the existing highway network for the construction sites including the acess egress to eastern portal are shown on QS13C - Traffic arrangement drawings

Western tie-in phasing

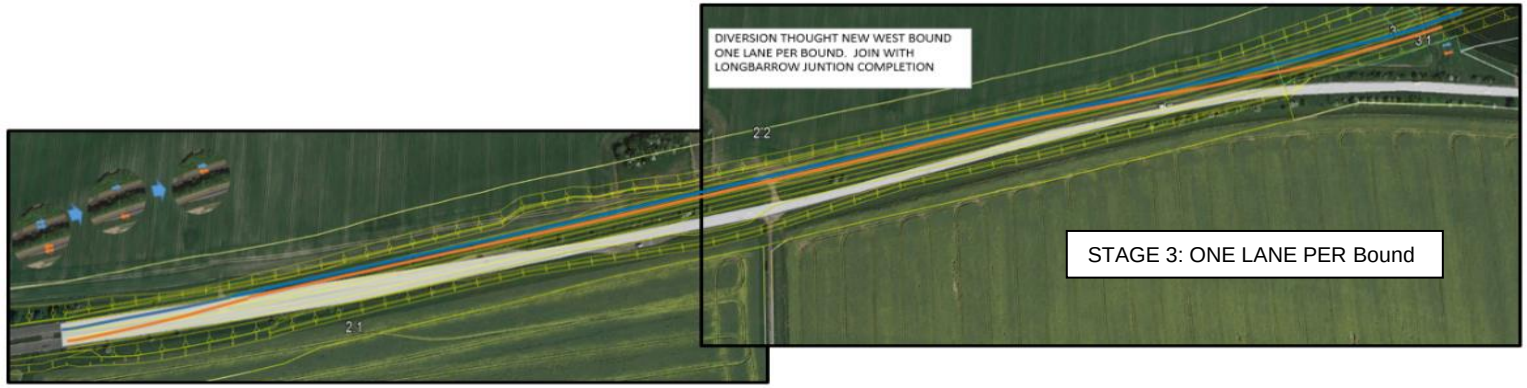
The western tie-in with the existig A-303 is summarised in four stages, shown on the adjacent sketches. BADGER will make sure that the Western Tie in will be compliant with the DAMS requirements

Western tie-in TM Stage 1: Existing A-303 (white line). Transition from 2 lanes in each of the 2 existing carriageways to one lane per bound as per the existing layout



Western tie-in TM Stage 2: Diversion through the new East carriageway (one lane per bound- blue EB; orange WB) up to Winterbourne bypass, where the traffic is diverted through the existing A303. During Longbarrow TM02 and TM03, traffic has to continue running through the existing A303

Western tie-in TM Stage 3: Diversion through the new West carriageway up to Longbarrow junction, where the traffic is diverted through the roundabouts (traffic continue in contra-flow). This stage corresponds with Longbarrow TM04 and TM05. (refer to section 3.2.1.)



Western tie-in TM Stage 4: Final stage. Two lanes per bound, both West and East carriageways with two lanes open to traffic. This stage corresponds with the final situation, when two lanes are open to traffic through the tunnel.

3.1.2 An assessment and explanation of the traffic and journey time impacts, for both east-west and north-south corridors, including queue lengths & journey time delays, during key construction phases

A 2026 reference case and 2026 construction year Aimsun microsimulation model has been developed to assess the impact of the TM strategies at the Countess and Longbarrow roundabouts, as well as the A303 between the two junctions and all approach roads. It would be possible to extend the model to cover an extended section of the A303 to assess the impact of the TM measures during the detailed design stage. The model will be extended as necessary and will incorporate additional junctions or areas such as the Western tie-in not included at present, when modelling assessments are required at those locations. Where prior matrix data is not available from HE's model, this will be estimated using the current matrix. The extent of the areas to be included in the model would be agreed with HE prior to the detailed design stage so that the model is updated to be suitable for these additional assessments.

Methodology/Inputs

The methodology for developing the model is as follows:

- 2017 base year matrices for the AM, PM and busy day periods - extracted directly from HE's VISSIM model - have been input into the model on the basis of the VISSIM model zone structure. User classes include light, medium and heavy.
- 2017 base CTC surveys provided by HE have been used to calibrate traffic flows across the model area and ANPR travel time data has been used to validate journey times across all periods assessed.
- The matrices taken from the VISSIM model performed well in Aimsun and it was therefore not necessary to make any adjustments.
- The 2017 base year model has been fully calibrated and validated to meet TAG criteria.
- 2026 reference case matrices taken directly from VISSIM have been input into the validated base year model and the microsimulation model has been ran to ensure the matrices correspond with traffic flow Figures 7-5, 7-6 and 7-7 as provided by HE.

The 2026 reference case modelling results represent a "baseline" for which the traffic management scenarios are to be assessed against.

Traffic Management Assessments
Four traffic management scenarios have been assessed in the validated model, using the 2026 construction year matrices input directly from the VISSIM model, as advised by HE. It should be noted these flow matrices are different to the 2026 reference case matrices as they account for strategic reassignment from the VISSIM model. As such, the total demand modelled is lower than the reference case model, particularly in the busy day period. **(TQ2B1.1,** led by our Traffic Management Lead)

The scenarios modelled are as follows:

- Scenario 1: Countess TM03 & TM04 (4.1 as QS13C) + Longbarrow TM02.
- Scenario 2: Countess TM03 & TM05 + Longbarrow TM02
- Scenario 3A: Countess TM06 + Longbarrow TM04
- Scenario 3B: Countess TM06 + Longbarrow TM05

Traffic & journey time impacts for both EW (A303) and NS (A345) corridors

A.1. Journey time Analysis (JTA): Countess Roundabout
Analysis has been undertaken for the following four routes:

Route 01-A:	Route 01-B:	Route 02-A:	Route 02-B
A303 EB	A303 WB	A345 SB	A345 NB

Individual 15-minute time sliced journey time statistics have been outputted from the model and aggregated to derive an average peak hour journey time for the four routes above. The journey time routes defined cover all approaches and the circulatory of the roundabout, extending to approx. 1km in either direction. A time-weighted average is also presented. This has been calculated based on the estimated number of months allocated to each stage of construction. A summary of the anticipated duration of each scenario extracted from the construction programme is set out below:

- **Scenario 1**: 4 months
- **Scenario 2**: 20 months.
- **Scenario 3A**: 28 months.
- **Scenario 3B**: 3 months.

The measurement points have been defined so that the average journey times are not skewed by areas of the network that are not affected by the TM measures (refer to QS13 SWLOGISTIC – DR – MW – 0005). Analysis of the model has been undertaken to ensure that this captures the extent of queuing and delay caused by the traffic management measures. Detailed journey time statistics are provided in Table 1, with the worst-case impacts highlighted in orange for reference.

Table 1: Journey Time Analysis Countess Roundabout

Route Reference	07:30 – 08:30 | AM Peak Hour (minutes:seconds)					
	2026 Reference Case	Impact				
		Scenario 1	Scenario 2	Scenario 3A	Scenario 3B	Average (Time-Weighted)
ROUTE 01-A_A303 EB	01:29	01:09	01:43	00:19	00:19	**00:53**
ROUTE 01-B_A303 WB	01:35	00:50	00:53	00:11	00:12	**00:29**
ROUTE 02-A_A345 SB	03:23	-00:46	02:02	-01:02	-01:02	**-00:06**
ROUTE 02-B_A345 NB	02:31	-00:38	00:01	-00:34	-00:34	**-00:21**
Route reference	17:00 – 18:00 | PM Peak Hour (minutes:seconds)					
ROUTE 01-A_A303 EB	01:34	00:44	01:09	00:14	00:14	**00:36**
ROUTE 01-B_A303 WB	01:37	00:41	01:03	00:09	00:09	**00:31**
ROUTE 02-A_A345 SB	02:30	-00:02	00:16	-00:24	-00:24	**-00:08**
ROUTE 02-B_A345 NB	02:26	-00:17	00:33	-00:28	-00:28	**-00:05**
Route reference	17:00 – 18:00 | Busy Day Peak Hour (minutes:seconds)					
ROUTE 01-A_A303 EB	01:37	00:43	01:28	00:11	00:11	**00:41**
ROUTE 01-B_A303 WB	01:58	02:24	03:40	-00:09	-00:09	**01:25**
ROUTE 02-A_A345 SB	02:27	00:17	01:43	00:09	00:14	**00:44**
ROUTE 02-B_A345 NB	02:27	-00:21	-00:07	-00:02	-00:01	**-00:05**

The JTA undertaken at the Countess roundabout shows that:

- Scenario 2 is predicted to give rise to the greatest journey time impacts, followed by the results of Scenario 1. This is because all A303 and A345 traffic would be required to travel through the roundabout with the TM strategy in place. Scenario 2 is predicted to perform worse than Scenario 1 as a result of the introduction of an additional stage in the traffic signal control plan. This is required to safely and efficiently accommodate right turning vehicles from the A303 (East) as a result of the realignment of the western entry / exit at the southwestern corner of the roundabout.
- Scenario 3A and Scenario 3B perform broadly consistent across all time periods assessed. This is because from Scenario 3A onwards, the Countess roundabout will operate with the flyover partially open to traffic. This results in some benefits for A345 traffic as less traffic will travel through the at-grade section of the roundabout and minimal impacts for A303 traffic as a result of the retention of the 40mph average speed limit and reduced one-lane capacity.

Taking into account the time-weighted average, the results suggest that average journey time impacts across all routes and time periods assessed are predicted to be no greater than 01:25.

A.2. Queue Length Analysis: Countess Roundabout

To understand the impact of the TM scenarios at the Countess RB, detailed junction statistics have been extracted from the Aimsun model for each modelled scenario. Table 2 present detailed queue length analysis and delay statistics compared to the 2026 reference case scenario, with the worst-case impacts highlighted in orange for ease of reference.

Table 2: Queue Length Analysis | Countess Roundabout

Arm Reference	Statistic	07:30 – 08:30 | AM Peak Hour				
		2026 Reference Case	Impact			
			Scenario 1	Scenario 2	Scenario 3A	Scenario 3B
Arm A: A345 North	D (s)	55.1	-22.8	22.3	-32.5	-32.3
	MnQ (m)	23.8	-14.8	15.0	-19.1	-19.0
	MxQ (m)	90.1	-52.9	51.0	-62.7	-62.2
Arm B: A303 East	D (s)	15.0	27.7	22.6	27.1	28.8
	MnQ (m)	4.3	8.6	5.2	-0.5	-0.3
	MxQ (m)	29.6	27.3	21.4	-10.1	-9.5
Arm C: A345 South	D (s)	30.6	-13.1	-2.6	-20.3	-20.6
	MnQ (m)	17.3	-6.8	6.8	-11.5	-11.5
	MxQ (m)	88.3	-27.7	43.0	-41.8	-42.1
Arm D: A303 West	D (s)	20.7	15.8	65.1	24.5	25.1
	MnQ (m)	8.2	11.4	35.1	-4.5	-4.3
	MxQ (m)	38.8	36.7	126.4	-20.1	-19.0
Arm Reference	Statistic	17:00 – 18:00 | PM Peak Hour				
Arm A: A345 North	D (s)	31.7	1.3	13.4	-14.9	-14.9
	MnQ (m)	11.0	-0.1	5.3	-7.4	-7.3
	MxQ (m)	50.3	-10.2	6.2	-26.0	-25.2
Arm B: A303 East	D (s)	18.8	25.0	41.9	29.5	29.4
	MnQ (m)	8.3	7.9	24.4	-1.2	-1.2

	MxQ (m)	44.4	23.4	57.8	-12.5	-13.8
Arm C: A345 South	D (s)	25.0	1.1	55.1	-16.9	-16.9
	MnQ (m)	14.6	5.5	85.7	-9.4	-9.2
	MxQ (m)	98.6	-1.3	177.8	-51.9	-51.8
Arm D: A303 West	D (s)	24.8	5.3	45.2	26.1	25.6
	MnQ (m)	10.2	0.9	10.2	-5.0	-4.9
	MxQ (m)	53.0	9.6	31.1	-29.5	-28.5
Arm Reference	Statistic	17:00 – 18:00 | Busy Day Peak Hour				
Arm A: A345 North	D (s)	55.1	-22.8	22.3	-32.5	-32.3
	MnQ (m)	23.8	-14.8	15.0	-19.1	-19.0
	MxQ (m)	90.1	-52.9	51.0	-62.7	-62.2
Arm B: A303 East	D (s)	15.0	27.7	22.6	27.1	28.8
	MnQ (m)	4.3	8.6	5.2	-0.5	-0.3
	MxQ (m)	29.6	27.3	21.4	-10.1	-9.5
Arm C: A345 South	D (s)	30.6	-13.1	-2.6	-20.3	-20.6
	MnQ (m)	17.3	-6.8	6.8	-11.5	-11.5
	MxQ (m)	88.3	-27.7	43.0	-41.8	-42.1
Arm D: A303 West	D (s)	20.7	15.8	65.1	24.5	25.1
	MnQ (m)	8.2	11.4	35.1	-4.5	-4.3
	MxQ (m)	38.8	36.7	126.4	-20.1	-19.0

The results show that the worst-case impact in terms of queueing and delay is predicted to occur on:

	AM Peak Hour	PM Peak Hour	Busy day peak hour
Arm/ Scenario	Arm D/ Scenario 2	Arm C/ Scenario 2	Arm B/Scenario 2
Predicted increase in delay	65.1s/vehicle	55.1s/vehicle	180.1s/vehicle

The modelling demonstrates that this increase in delay would result in an increase in mean and maximum queue lengths of:

- AM peak hour: 35.1m and 126.4m, respectively.
- PM peak hour: 85.7m and 177.8m, respectively.
- Busy day peak hour: 202.2m and 347.9m, respectively.

Across all other scenarios modelled, the forecast increase in delay is predicted to be no more than:

- AM peak hour: 28.8s/vehicle.
- PM peak hour: 45.2s/ vehicle.
- Busy day peak hour: 182.8s/vehicle

A.3. Analysis: Queue Lengths, Delay and Journey Time Impacts

Arm A | A345 North: **Scenario 2:** the additional stage in the TSCP means greater impacts in queueing and delay on this Arm A, required to accommodate a separate signalised right turn movement from the A303 (East) at this construction stage. This is consistent with the JTA undertaken, which forecasts an increase in journey times travelling on the A345 SB through the Countess roundabout, particularly in the AM and Busy Day peak periods. **Scenarios 3A and 3B:** additional green time can be allocated to the Arm A as a result of the partial opening of the fly-over (therefore less traffic through the circulatory). In these scenarios, consistent decreases in journey times are predicted travelling on the A345 SB during the AM and PM peak periods and non-material increases (up to approx. 14s) are predicted during the busy day peak

Arm B | A303 East: **Scenario 1 and 2**: Reasonably consistent results as the capacity remains broadly consistent with the inclusion of the separately signalised right turn movement and additional circulatory lane in Scenario 2. This is also shown in the JTA, which shows broadly consistent impacts for journeys travelling on the A303 WB through the Countess roundabout (impacts are a lot greater during the busy day peak). This is due to a significant increase (seasonal variation) in right turning vehicles from the A303 to the A345. However, the separately signalised movement assists in offsetting some of the impacts of the TM arrangement, reducing the impact on journeys. **Scenario 3A and 3B**: Much lower impacts are predicted as a result of a reduction in flow on the WB off-slip following the partial opening of the fly-over. However, compared to the reference case, an increase in queueing and delay is still predicted, affecting a very small proportion of vehicles. This occurs because the green time has been reallocated to the A345 which becomes the predominant traffic flow movement. This is supported by the JTA which shows a significant decrease in journey times travelling WB on the A303 through the Countess roundabout (using the fly-over) compared to the Scenario 1 and 2.

Arm C | A345 South: **Scenario 1 and 2**: In the majority of cases, reasonably insignificant changes in the level of queueing and delay are reported on Arm C (Scenario 2 slightly worse). This increase is largely consequence of the additional stage in the TSCP, required to accommodate the separately signalised right turn movement from the A303 (East) at this construction stage. To ensure A303 flows are adequately accommodated, a lesser amount of green time is allocated to the A345 (South) in this scenario which, in turn, results in an increase in the level of queueing and delay compared to the 2026 reference case scenario. This is consistent with the JTA results which suggests that the impact on journey times travelling NB on the A345 would be greater in Scenario 2 compared to Scenario 1, albeit marginal. **Scenario 3A and 3B** additional green time can be allocated to the Arm C as a result of the partial opening of the fly-over (less traffic through

the circulatory). In these scenarios, consistent decreases in journey times are predicted travelling A345 NB across all assessment periods

Arm D | A303 West: **Scenario 1 and 2:** The differences in the level of queueing and delay on the Arm D occur for two reasons. Firstly, as set out above, the additional stage required in the TSCP Scenario 2 results in traffic being held a red signal for a slightly longer period of time. Secondly, vehicles travelling EB onto the circulatory of the roundabout are required to make a slower turn as a result of the TM arrangement and geometry. These two factors combined result in differences between Scenario 1 and 2. This is also shown in the results of the JTA, which shows that the impacts on journey times travelling on the A303 EB are consistently higher in Scenario 2 compared to Scenario 1. **Scenario 3A and 3B**: similar to the Arm B of the junction, much lower impacts are predicted as a result of a reduction in flow following the opening of the fly-over. However, compared to the reference case, an increase in terms of queueing and delay is still predicted, affecting a very small proportion of vehicles. This occurs because the green time has been reallocated to the A345 which becomes the predominant traffic flow movement. This is supported by the JTA which shows a significant decrease in journey times travelling EB on the A303 through the Countess roundabout (using the fly-over) compared to the Scenario 1 and 2.

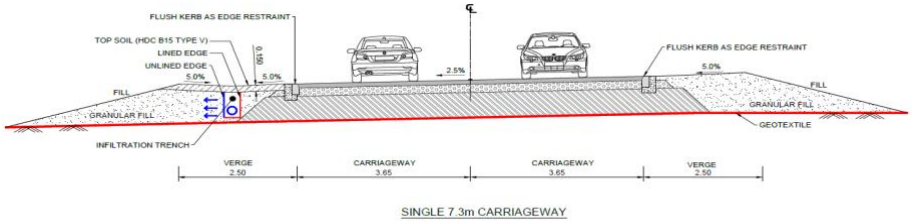
3.2.1 Traffic management arrangements for the key construction phases of the Scheme and western approach, including the interfaces between works areas and the highway network

BADGER will consider 6 different TM stages for the full development of the Longbarrow junction. Detailed traffic management drawings can be found in *HE551506 –BDG – GEN – SWLOGISTIC – DR – MW – 0004 in QS13C* and will be part of the TMP

TM Stage 1 (See Right: Sketch TM Longbarrow Stage 1)

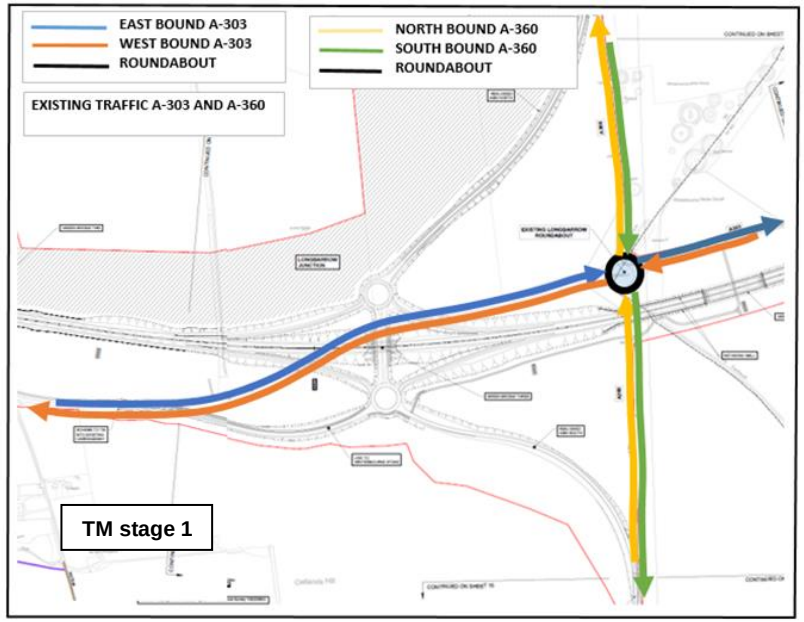
Existing traffic: The new A-303 crosses at the same level with the existing A-303 and the A-360 (CPh0), therefore in order to manage the internal east and west flow, two temporary bridges will be installed during the second construction stage, one for each highway (CPh02).The temporary diversion will have the following cross section dimensions, with flush kerbs and filter drain without hard strip.

TM Stage 2: The traffic will be temporarily diverted from the A303 and the

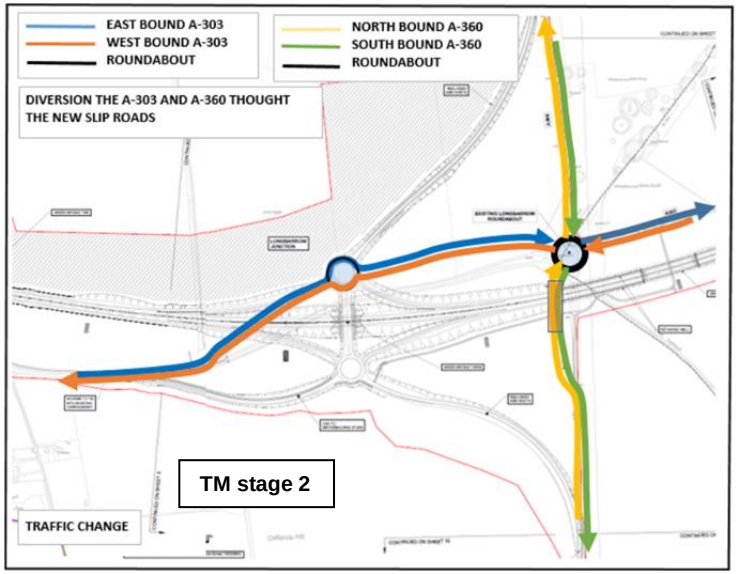


SINGLE 7.3m CARRIAGEWAY

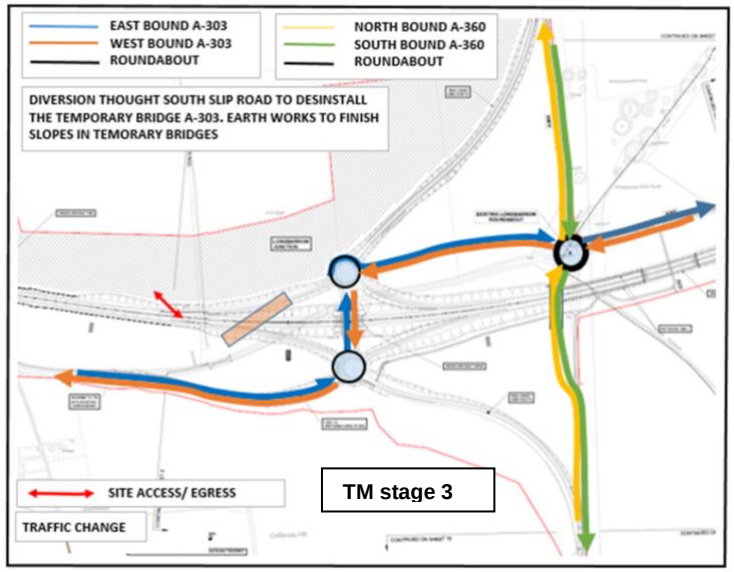
A360 over the temporary bridges, avoiding future level differences between the existing and new alignments (CPh04). (Interferences: the access/egress to the works area will be via the A360 through the main



compound until the North Roundabout is constructed and directly from the North roundabout thereafter – **refer to** SWLOGISTIC – DR – MW – 0004 in **QS13C**). This will allow us to undertake CPh 05 to 07)



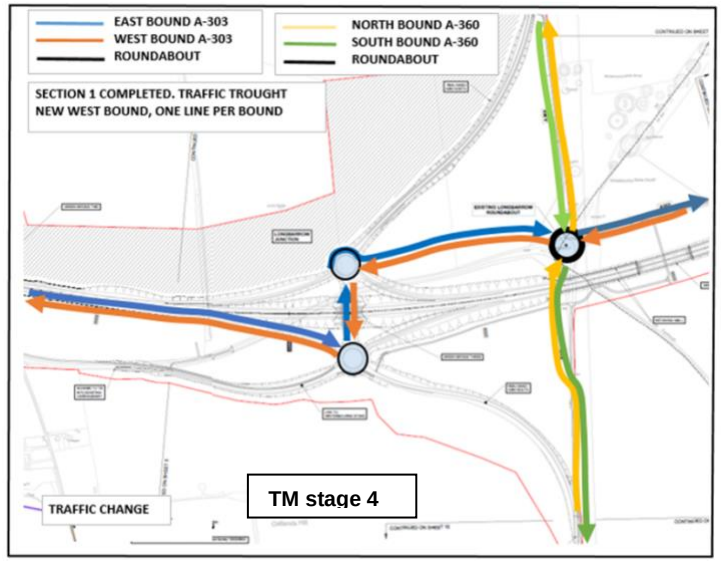
Sketch Longbarrow TM Stage 2



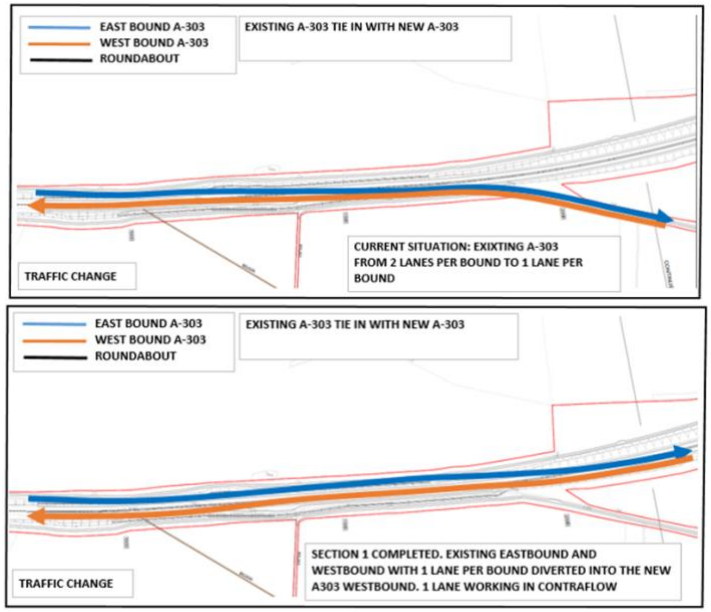
Sketch Longbarrow TM Stage 3

TM Stage 3: in order to disassemble the temporary bridges, A303 traffic will be moved onto the Southwest access to the South roundabout and the new junction bridge, leaving the A360 traffic as on TM stage 2 to avoid mixing both A303 and A360 traffic. This will allow us to undertake CPh 08 to 09

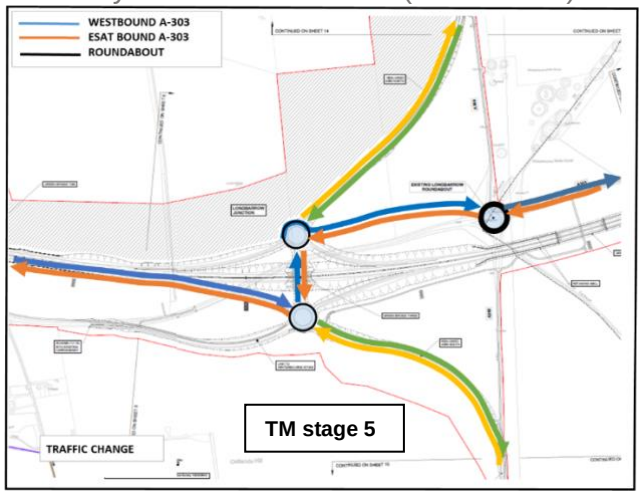
TM Stage 4: A303 traffic: Upon completion of Section 1 and West tie –in carriageways (refer Western tie-in stage 3), we will divert both directions of the traffic flow onto the already new built A-303 WB carriageway, one lane per bound in contraflow and through the WB slip road, using the roundabouts configuration thereafter for the purpose. A360 traffic remains through the existing roundabout and temporary bridge, as per the previos TM stage, avoiding the mix of traffics as much time as possible , minimising the impacts on the network at V3 App1/17-2 (f) times.Only the new WB carriageay will be open to traffic, enabling us to finish the construction of the junction (CPh11) (Interferences: The works area are connected through the north roundabout to the compound and from the compound through internal haul roads. No interference between the highway grid and the works areas)



Sketch TM Longbarrow Stage 4

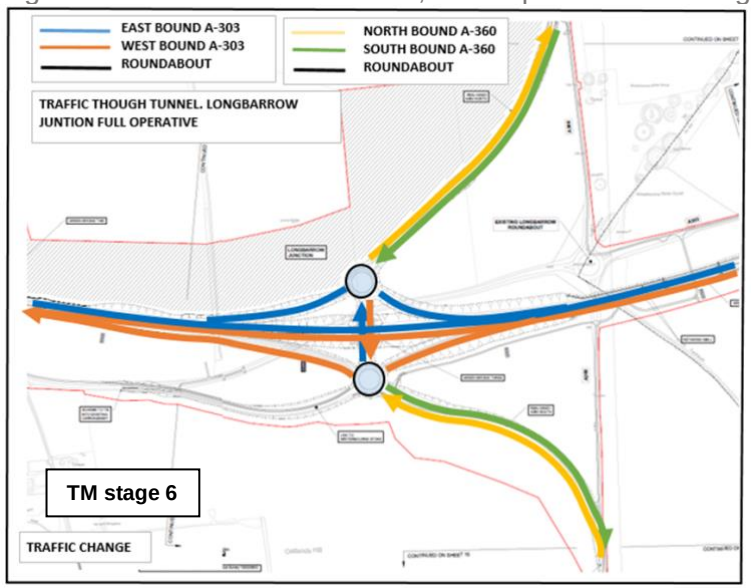


TM Stage 5: The A303 traffic remains as in the previos TM Stage 4. In order to remove the A360 temporary bridge (CPh 12), the A360 traffic is diverted into its final layout. Only in this occasion A360 and A303 traffic will share a road section between the roundabouts, and this has been analysed in our TM model (scenario 3B)

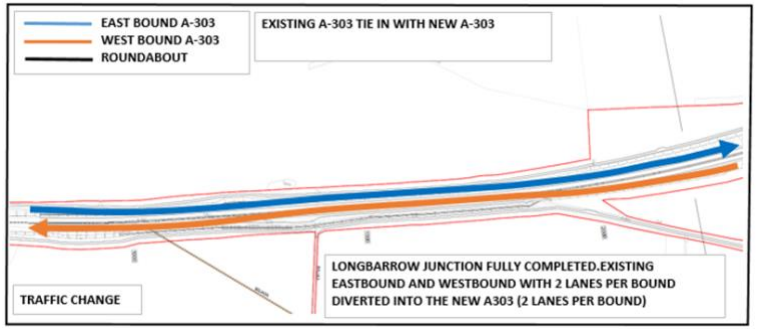


Sketch TM Longbarrow Stage 5

TM Stage 6: West Tie in and Longborrow full operative. The new A-303 is now open with 2 lanes per bound and the A360 is operated through the new Lonbarrow Juntion, as the previous TM Stage 5.



Sketch TM Longbarrow Stage 6



3.2.2 An assessment and explanation of the traffic and journey time impacts for both the east-west (A303) corridor and the north-south (A360) corridor, including queue lengths and journey time delays, during key construction phases

Methodology/inputs

B.1. Journey time Analysis (JTA): Longbarrow

Analysis has been undertaken for the following four routes:

Route 01-A:	Route 01-B:	Route 02-A:	Route 02-B
A303 EB	A303 WB	A360 SB	A360 NB

A similar approach to the sliced journey time statistics have been output from the model and measurement points as in Countess has been followed (refer to QS13C *SWLOGISTIC – DR – MW – 0004).* A time-weighted average is also presented. Detailed journey time statistics are provided in Table 3, with the worst-case impacts in orange for reference

Table 3: Journey Time Analysis | AM Peak Hour (07:30 – 08:30) | Longbarrow Roundabout

Route Reference	07:30 – 08:30 | AM Peak Hour (minutes:seconds)					
	2026 Reference Case	Impact				
		Scenario 1	Scenario 2	Scenario 3A	Scenario 3B	Average (Time-Weighted)
ROUTE 01-C_A303 EB	03:42	-00:20	-00:25	01:30	01:02	**00:39**
ROUTE 01-D_A303 WB	05:57	00:25	00:27	00:03	-00:03	**00:13**
ROUTE 03-A_A360 SB	03:27	00:50	00:50	02:41	03:36	**01:56**
ROUTE 03-B_A360 NB	02:46	00:59	00:59	01:01	-00:15	**00:56**
Route reference	17:00 – 18:00 | PM Peak Hour (minutes:seconds)					
ROUTE 01-C_A303 EB	03:50	-00:48	-00:48	00:57	00:42	**00:10**
ROUTE 01-D_A303 WB	04:33	00:40	00:56	00:43	00:37	**00:47**
ROUTE 03-A_A360 SB	02:58	01:09	01:08	01:03	01:02	**01:05**
ROUTE 03-B_A360 NB	02:57	00:51	00:51	00:52	-00:23	**00:47**
Route reference	17:00 – 18:00 | Busy Day Peak Hour (minutes:seconds)					
ROUTE 01-C_A303 EB	18:28	01:42	01:03	01:42	00:37	**01:24**
ROUTE 01-D_A303 WB	08:12	-00:14	-00:16	01:26	03:21	**00:48**
ROUTE 03-A_A360 SB	09:11	03:49	01:17	-00:07	01:08	**00:44**
ROUTE 03-B_A360 NB	03:20	00:50	00:43	00:47	01:40	**00:48**

The JTA undertaken at the Countess roundabout shows that:

- Broadly consistent results are reported for Scenario 1 and Scenario 2, except during the busy day peak. This is because the traffic management layout at Longbarrow is the same during both scenarios and the only change would be at the Countess roundabout. The results of the busy day peak vary due to the highly congested nature of this assessment period.
- Overall, Scenario 3A and Scenario 3B is predicted to give rise to the greatest journey time impacts, with only marginal differences in terms of the results. This is because the new dumbbell roundabout / grade separated junction is only partially open, with all A303 bound traffic required to use the southern dumbbell for access.

Taking into account the time-weighted average, the average journey time impacts through the Longbarrow roundabout across all stages of construction are predicted to be no greater than 01:56.

B.2. Queue Length Analysis: Longbarrow Roundabout

To understand the impact of the traffic management scenarios at the Longbarrow roundabout, detailed junction statistics have been extracted from the Aimsun model for each modelled scenario. Table 4 presents detailed queue length analysis and delay statistics compared to the 2026 reference case scenario, with the worst-case impacts highlighted in orange for reference.

Table 4: Queue Length Analysis | AM Peak Hour (07:30 – 08:30) | Longbarrow Roundabout

Arm Reference	Statistic	07:30 – 08:30 | AM Peak Hour)				
		2026 Reference Case	Impact			
			Scenario 1	Scenario 2	Scenario 3A	Scenario 3B
Arm A: A360 North	D (s)	51.8	-23.6	-22.8	43.0	73.2
	MnQ (m)	33.6	-29.2	-28.4	30.4	65.2
	MxQ (m)	91.0	-60.4	-57.6	144.6	170.2
Arm B: A303 East	D (s)	19.7	-1.3	-0.9	-13.4	14.4
	MnQ (m)	10.9	-1.0	-1.0	-7.8	16.1
	MxQ (m)	56.9	-8.6	-9.1	-29.3	75.0
Arm C: A360 South	D (s)	14.4	23.3	23.1	34.8	24.8
	MnQ (m)	1.6	-0.3	-0.3	-1.1	0.7
	MxQ (m)	25.2	-3.7	-2.0	-8.1	14.4
Arm D: A303 West	D (s)	46.2	-15.9	-14.1	-20.8	8.7
	MnQ (m)	39.1	-28.0	-26.8	-30.9	-36.3
	MxQ (m)	169.3	-111.1	-104.9	-119.5	-115.1
Arm Reference	Statistic	17:00 – 18:00 | PM Peak Hour				
Arm A: A360 North	D (s)	13.2	10.4	10.1	24.5	31.9
	MnQ (m)	1.9	-0.2	-0.3	1.6	7.0
	MxQ (m)	13.9	0.3	-0.1	23.4	53.3
Arm B: A303 East	D (s)	12.0	0.1	0.7	-8.6	25.3
	MnQ (m)	7.4	0.0	0.1	-5.5	27.1
	MxQ (m)	50.9	-2.0	-4.2	-26.5	97.8
Arm C: A360 South	D (s)	24.5	16.0	15.7	28.0	25.5
	MnQ (m)	6.9	-4.4	-4.4	-5.4	4.2
	MxQ (m)	48.0	-19.0	-19.0	-21.6	23.7
Arm D: A303 West	D (s)	48.6	-23.7	-25.4	-29.3	5.6
	MnQ (m)	35.7	-30.1	-30.8	-32.4	-33.8

	MxQ (m)	141.5	-110.1	-112.1	-115.9	-99.0
Arm Reference	Statistic	17:00 – 18:00 | Busy Day Peak Hour				
Arm A: A360 North	D (s)	107.3	40.7	6.9	25.8	32.6
	MnQ (m)	125.4	23.0	-11.9	14.9	30.8
	MxQ (m)	358.7	-3.9	-50.2	40.0	-7.2
Arm B: A303 East	D (s)	15.4	4.2	4.2	-7.9	67.1
	MnQ (m)	7.4	1.2	0.8	-3.4	78.6
	MxQ (m)	28.9	10.8	8.5	-3.6	182.1
Arm C: A360 South	D (s)	33.4	15.0	12.8	28.5	42.9
	MnQ (m)	13.2	-6.7	-8.1	-7.9	23.7
	MxQ (m)	60.2	-17.8	-21.7	-22.7	54.8
Arm D: A303 West	D (s)	77.1	3.2	1.6	-12.1	-10.5
	MnQ (m)	96.1	-43.7	-38.5	-47.9	-72.8
	MxQ (m)	292.5	-113.1	-117.2	-149.5	-156.5

The results show that the worst-case impact in terms of queueing and delay is predicted to occur on:

	AM Peak Hour	PM Peak Hour	Busy day peak Hour
Arm/ Scenario	Arm A/ Scenario 3B	Arm D / Scenario 3B	Arm C/Scenario 3B
Predicted increase in delay	73.2s/vehicle	31.9s/vehicle	42.9s/vehicle

The modelling demonstrates that this increase in delay would result in an increase in mean and maximum queue lengths of:

- AM peak hour: 7.5m and 53.3m, respectively.
- PM peak hour: 65.2m and 170.2m, respectively.
- Busy day peak hour: 78.6m and 182.1m, respectively.

Across all other scenarios modelled, the forecast increase in delay is predicted to be less than:

- AM peak hour: 43s/vehicle.
- PM peak hour: 28s/ vehicle.
- Busy day peak hour: 42.9s/vehicle

B.3. Analysis: Queue Lengths, Delay and Journey Time Impacts

As shown in the results, there are differences across each scenario compared to the 2026 reference case. A summary of the key differences is set out as follows:

Arm A | A360 North: **Scenario 1 and 2**: reasonably small variations in the level of queueing and delay are predicted in the AM and PM peaks. However, these impacts are exacerbated in the busy day peak due to the congested nature of the Longbarrow roundabout. This is consistent with the JTA which suggests reasonably low journey time impacts for trips travelling SB on the A360 during the AM and PM peaks (no more than 01:09) and greater impacts during the busy day peak. As the roundabout currently operates with significant amounts of delay during the busy day peak (common congestion on the circulatory), any change in the uniform pattern of traffic flow can significantly affect the operation of the roundabout (evident in the varying results). **Scenario 3A and 3B**: The predicted increase, broadly consistent across all scenarios, performs slightly worse overall in Scenario 3B, when all traffic travelling through the two grade-separated dumbbells interacts (following the removal of the temporary bridge on the A360 (South)). However, it is noted that this scenario would be operational for a reasonably short period of time. This is supported by the JTA, which shows consistently greater impacts for journeys travelling SB on the A360 in Scenario 3B compared to 3A.
Arm B | A303 East: **Scenario 1 and 2**: reasonably small variations in the level of queueing and delay is predicted. This is because the layout and capacity of the roundabout remains as per the existing at this stage. As such, any change in those is likely to occur more as a result of the daily variation in flow which would, of course, be expected without the traffic management strategies in place. This is demonstrated in the JTA results, which suggests that journeys travelling WB through the Longbarrow roundabout would increase by up to only 56s across all assessment periods. **Scenario 3A and 3B:** Slight reductions are predicted in Scenario 3A and occur largely as a result of the change in flow patterns associated with the partial opening of the grade-separate dumbbells at Longbarrow. However, the modelling shows that more significant increases in Scenario 3B compared to 3A, particularly in the PM and busy day peaks. This is consistent with the JTA, which shows much greater impacts for journeys travelling WB through the Longbarrow roundabout and newly constructed dumbbells in Scenario 3B compared to 3A. This occurs for two reasons:

- The statistics are collected from the eastern arm of the newly constructed northern dumbbell, rather than the eastern arm of the existing Longbarrow roundabout.
- The WB approach capacity to the newly constructed northern dumbbell (using contra-flow on the slip road) is only one lane, compared to a flared three-lane approach at the existing Longbarrow roundabout.

Arm C | A360 South: Scenario 1 and 2: broadly consistent results with reasonably modest changes in the level of queueing and delay, showing that, whilst the delay (in s/vehicle) would increase, in most cases the level of mean queuing would differ by less than 10m (< 2 vehicles). This is consistent with the JTA, which suggests that trips travelling NB on the A360 would be subject to reasonably low journey time impacts across all assessment periods (< 1 minute). **Scenario 3A and 3B**: slightly worse impacts in terms of delay is predicted in Scenario 3A, however, the level of mean queueing would differ by less than 10m (as Scenario 1&2). This is because the approach capacity on the A360 NB is as per existing from Scenario 1 to Scenario 3A, resulting in immaterial changes. The worst-case impacts are predicted in Scenario 3B as a result of the diversion of A360 NB traffic through the newly constructed grade-separated dumbbells (only significant during the busy day peak). Most of the forecast increase in delay and queuing occurs due to the reduction in approach capacity (from two lanes to one) combined with volume of traffic travelling through the southern dumbbell to access the newly constructed Winterbourne Stoke bypass. This is also shown in the results of the JTA, whereby journey time impacts travelling NB on the A360 would increase by more than 1 minute during the busy day peak in Scenario 3.

Arm D | A303 West: **Scenario 1 and 2**: reasonably small variations in the level of queueing and delay is predicted - mean queue lengths are expected to vary by up to only 44m (7 fewer vehicles), which is usually expected within daily variation and considered not significant. This is supported by the results of the JTA, showing impacts of less than 2 minutes on journeys travelling EB on the A303 through the Longbarrow roundabout. **Scenario 3A and 3B**: similar differences are also reported in Scenario 3A - mean queues predicted to vary by up to only 48m (8 vehicles), as the approach capacity of the eastern arm of Longbarrow junction is retained across the first three scenarios. The queue length analysis demonstrates that reductions in the level of queueing and delay could occur on the Arm D in Scenario 3B, because:

- The queue and delay statistics are collected from the newly constructed EB off-slip at the southern dumbbell (operating in contra-flow) - where EB traffic merges with the A360, whereas the JTA covers a section of the network through the newly constructed Longbarrow junction.
- Much of the queueing and delay on the western arm of the junction occurs as a result of upstream congestion travelling EB on the A303 past Stonehenge which subsequently blocks through the Longbarrow roundabout. With Scenario 3B in operation, A303 and A360 traffic merges differently and with less conflict (i.e., the movements are separated between two roundabouts), resulting in an overall reduction in the level of queueing and delay.

Whilst isolated reductions could occur on this arm, journey times through the newly constructed Longbarrow junction are still predicted to increase compared to the reference case (expected to be up to only approx. 1min).

Journey Time Impacts: A338 and A36

As well as the shorter distance journey time routes, analysis has also been carried out in relation to the journey time impacts between the A338 and the A36. The current model does not extend as far as the A36 but includes the junction with the A338: The JTA set out in Table 5 encompasses the junction with the A338 and up to a point approx. 500m to the West of the B3083 (reference case) and/ or the newly constructed Winterbourne Stoke bypass, extending as far as the point set out above.

Table 5: Journey Time Analysis | A338 and A36

Route Reference	2026 Reference Case	Scenario 1 (min:s)	Scenario 2 (min:s)	Scenario 3A (min:s)	Scenario 3B (min:s)	Average Impact (Time-Weighted) (min:s)	Impact compared to TQ-2B Baseline (min:s)
	AM | 08:00 – 09:00						
A303 EB	15:18	01:12	02:56	00:31	00:04	01:25	-03:35
A303 WB	16:12	02:21	02:02	-02:03	-00:40	-00:10	–05:10
	PM | 17:00 – 18:00						
A303 EB	12:37	00:24	02:06	00:02	-00:07	00:48	-04:12
A303 WB	15:07	01:36	03:00	-01:38	-00:07	00:22	-04:38
	Busy Day | 17:00 – 18:00						
A303 EB	35:31	03:30	04:59	01:15	00:16	02:43	-02:17
A303 WB	26:00	00:34	02:32	-03:17	00:22	-00:41	-05:41

In summary, it is concluded that the average journey time impacts on the A303 between the A338 and A36 are significantly lower than the baseline requirement set out by HE and in all cases are less than 5min. **(TQ2B1.1)**