

SILVERTOWN TUNNEL

Volume 7

7.7 Traffic Impacts Mitigation Strategy

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Revision **01**

Planning Act 2008

Infrastructure Planning (Applications: Prescribed
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Silvertown Tunnel

Traffic Impacts Mitigation Strategy

7.7

Planning Act 2008

Infrastructure Planning

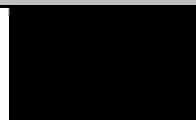

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Silvertown Tunnel

Traffic Impacts Mitigation Strategy (TIMS) [v1](#)

Document Reference: 7.7

Contents

Contents	5
List of Abbreviations	7
Glossary of Terms	8
1. INTRODUCTION	10
1.2 The Traffic Impacts Mitigation Strategy in context	11
1.3 Structure of the Traffic Impacts Mitigation Strategy	13
2. NEED FOR AND TYPES OF MITIGATION	15
2.1 Introduction.....	15
2.2 Determining the need for mitigation.....	15
2.3 Determining the type of mitigation and implementation of mitigation.....	19
3. INDICATIVE MITIGATION MEASURES	23
3.1 Introduction.....	23
3.2 Indicative measures.....	23

List of Figures

Figure 1-1 Relationship between the documents and governance..... 12

Figure 2-1 Process to determine the need for and type of mitigation 16

Figure 2-2 Process for testing suitability of mitigation measures..... 21

List of Tables

Table 3-1 Indication mitigation measures and delivery mechanisms 24

List of Abbreviations

DCO	Development Consent Order
GLA	Greater London Authority
HGV	Heavy Goods Vehicle
RAG	Red-Amber-Green
SCOOT	Split Cycle Offset Optimisation Technique
STIG	Silvertown Tunnel Implementation Group
TfL	Transport for London
TIMS	Traffic Impacts Mitigation Strategy
TLRN	Transport for London Road Network

Glossary of Terms

<p>Assessed Case</p>	<p>Scenario adopted for assessment of likely effects of the proposed scheme, in the context of central forecasts of transport conditions and with user charges set so as to balance the Scheme’s traffic, environmental, socio-economic and financial objectives.</p>
<p>Blackwall Tunnel</p>	<p>An existing road tunnel underneath the River Thames in east London, linking the London Borough of Tower Hamlets with the Royal Borough of Greenwich, comprising two bores each with two lanes of traffic.</p>
<p>Development Consent Order</p>	<p>This is a statutory order which provides consent for the project and means that a range of other consents, such as planning permission and listed building consent, will not be required. A DCO can also include provisions authorising the compulsory acquisition of land or of interests in or rights over land which is the subject of an application.</p> <p>http://infrastructure.planninginspectorate.gov.uk/help/glossary-of-terms/</p>
<p>Mitigation</p>	<p>Measures including any process, activity, or design to avoid, reduce, remedy or compensate for negative environmental impact or effects of a development.</p>
<p>The Scheme</p>	<p>The construction of a new bored tunnel with cut and cover sections at either end under the River Thames (the Silvertown Tunnel) between the Greenwich peninsula and Silvertown, as well as necessary alterations to the connecting road network and the introduction of user charging at both Silvertown and Blackwall tunnels.</p>

Transport for London (TfL)	<p>A London government body responsible for most aspects of the transport system in Greater London. Its role is to implement transport strategy and to manage transport services across London.</p> <p>These services include: buses, the Underground network, Docklands Light Railway, Overground and Trams. TfL also runs Santander Cycles, London River Services, Victoria Coach Station and the Emirates Air Line.</p> <p>As well as controlling a 580km network of main roads and the city's 6,000 traffic lights, TfL regulates London's private hire vehicles and the Congestion Charge scheme.</p>
The Tunnel, Silvertown Tunnel	<p>Proposed new twin-bore road tunnels under the River Thames from the A1020 in Silvertown to the A102 on Greenwich Peninsula, East London.</p>
User Charging	<p>The charge to be paid by users of the Silvertown Tunnel and Blackwall Tunnel that is to be imposed in order to manage traffic demand and help pay for the Scheme.</p>

1. INTRODUCTION

- 1.1.1 This Traffic Impacts Mitigation Strategy (TIMS) sets out the process for mitigating any significant adverse localised traffic or traffic-related impacts attributable to the Scheme in operation, should these be identified during the monitoring period of three years (with the potential for this to be extended to five years) after Scheme opening as requiring mitigation. A detailed description of the monitoring period and the timescales associated with this is set out in the Monitoring Strategy (Document Reference 7.6).
- 1.1.2 In the context of this document, the localised impacts of traffic refer to a wide range of impacts which are a direct result of traffic changes resulting from the Scheme in operation. This not only includes direct impacts such as congestion or delay but also wider traffic related impacts such as road safety, severance, noise and emissions.
- 1.1.3 As the local and wider road network will change between now and the Scheme opening year, TfL acknowledges that the need for, and the most appropriate type of, mitigations at junctions and elsewhere on the network, may emerge closer to (or after) the time of Scheme opening. Although committed changes to the road (and transport) networks have been taken account of in the Assessed Case, other (as yet uncommitted) changes to the road network are likely to be undertaken in the period between the publication of this strategy and the Scheme opening. These changes will come about as a result of as yet uncommitted land use developments and local highway schemes. An example of such a change is Cycle Superhighway 4 which is proposed to run along the A206 corridor and is in development by TfL, together with the relevant boroughs and other stakeholders.
- 1.1.4 Therefore, rather than specifying such localised mitigation measures in the DCO application, TfL is committing to monitoring the actual impacts of the Scheme and to the implementation of appropriate mitigation measures which can be delivered under TfL's existing powers where these are shown to be necessary. By assessing the predicted traffic impacts at Scheme opening nearer the time, and monitoring actual impacts thereafter TfL will more accurately be able to identify the scale and location of any adverse impacts and implement effective mitigation where required. It is this approach which is set out in the TIMS (and the Monitoring Strategy (Document Reference 7.6)).

1.1.5 Under this TIMS, the findings of the annual monitoring, carried out in accordance with the Monitoring Strategy (Document Reference 7.6), will be used to identify whether the Scheme in operation is giving rise to adverse traffic and traffic-related impacts on the local road network, such as delays at junctions or deteriorations in journey times that are sufficiently significant to warrant mitigation. The TIMS sets out the processes by which the need for, and type of localised mitigation measures will be determined.

1.2 The Traffic Impacts Mitigation Strategy in context

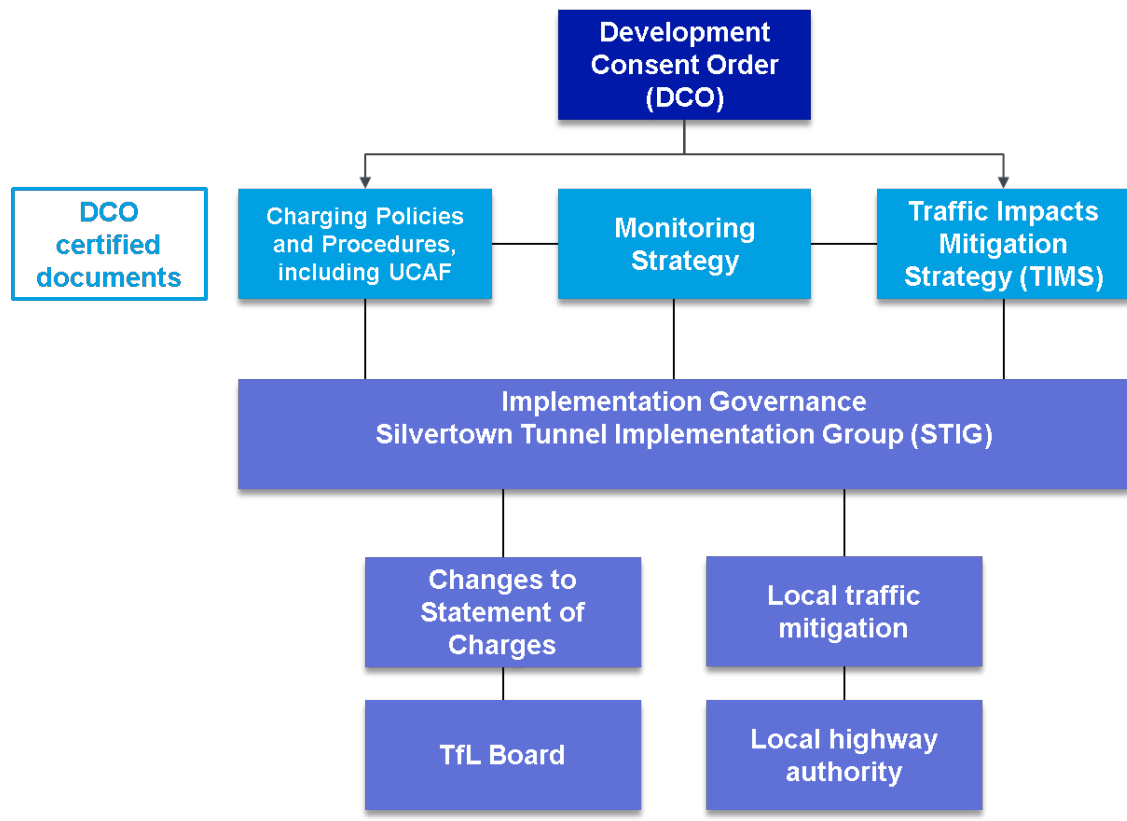
1.2.1 Figure 1-1 sets out the functional relationship between the TIMS, the Monitoring Strategy (Document Reference 7.6) and the [Charging Policy Charging Policies and Procedures](#) (Document Reference 7.11). The DCO contains a requirement for TfL to implement and comply with these three documents.

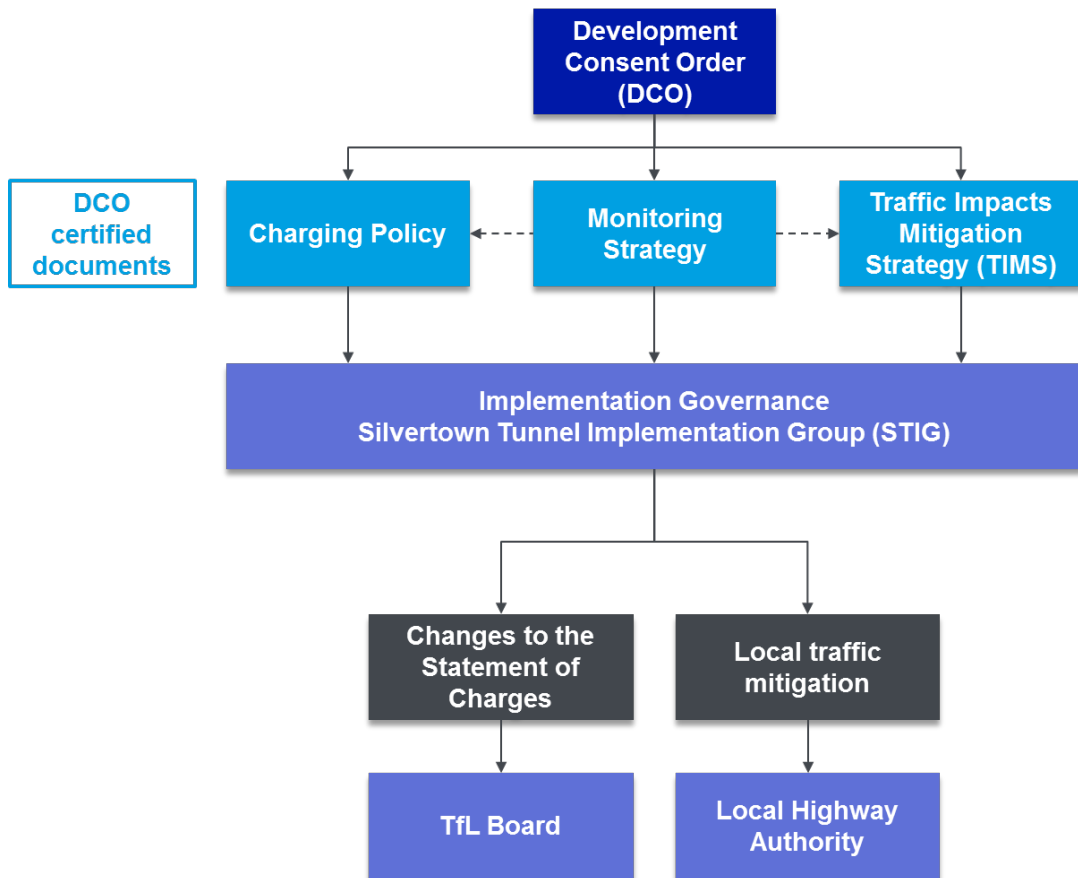
1.2.2 The main functions of the three documents are as follows:

- **TIMS** – sets out the process for determining and implementing appropriate mitigation for any localised traffic and traffic-related impacts which arise as a result of the Scheme.
- **Monitoring Strategy (Document Reference 7.6)** – sets out the scope of monitoring that TfL proposes to undertake in respect of traffic, air quality and carbon, noise and socio-economic impacts of the operation of the Scheme.
- **[Charging Policies and Procedures](#) (Document Reference 7.11)** – sets out the principles according to which TfL must set and vary the user charges and the procedures, [including the application of the User Charging Assessment Framework](#), that apply when doing so.

1.2.3 A governance process has been established for the implementation of each of these elements. While localised traffic mitigation is to some extent separate from charging, a relationship exists between them and monitoring outcomes may be used to feed into considerations around both localised traffic mitigation and user charging. The governance process therefore provides for one group to which these issues are brought for discussion – the Silvertown Tunnel Implementation Group (STIG). The DCO provides for the establishment of STIG and the role and responsibilities of STIG in relation to the TIMS are described in section 2.

Figure 1-1 Functional relationship between the Charging Policies and Procedures (Document Reference 7.11), Monitoring Strategy (Document Reference 7.6) and TIMS





1.3 Structure of the Traffic Impacts Mitigation Strategy

1.3.1 Chapter Two – sets out the process for determining the need for and type of mitigation measures, if any, required as a result of the operation of the Scheme, and their subsequent implementation.

1.3.2 Chapter Three – describes the indicative measures that may be implemented to mitigate any adverse traffic and associated impacts.

1.3.2.1.3.3 Appendix A – sets out the initial mitigation triggers.

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2. NEED FOR AND TYPES OF MITIGATION

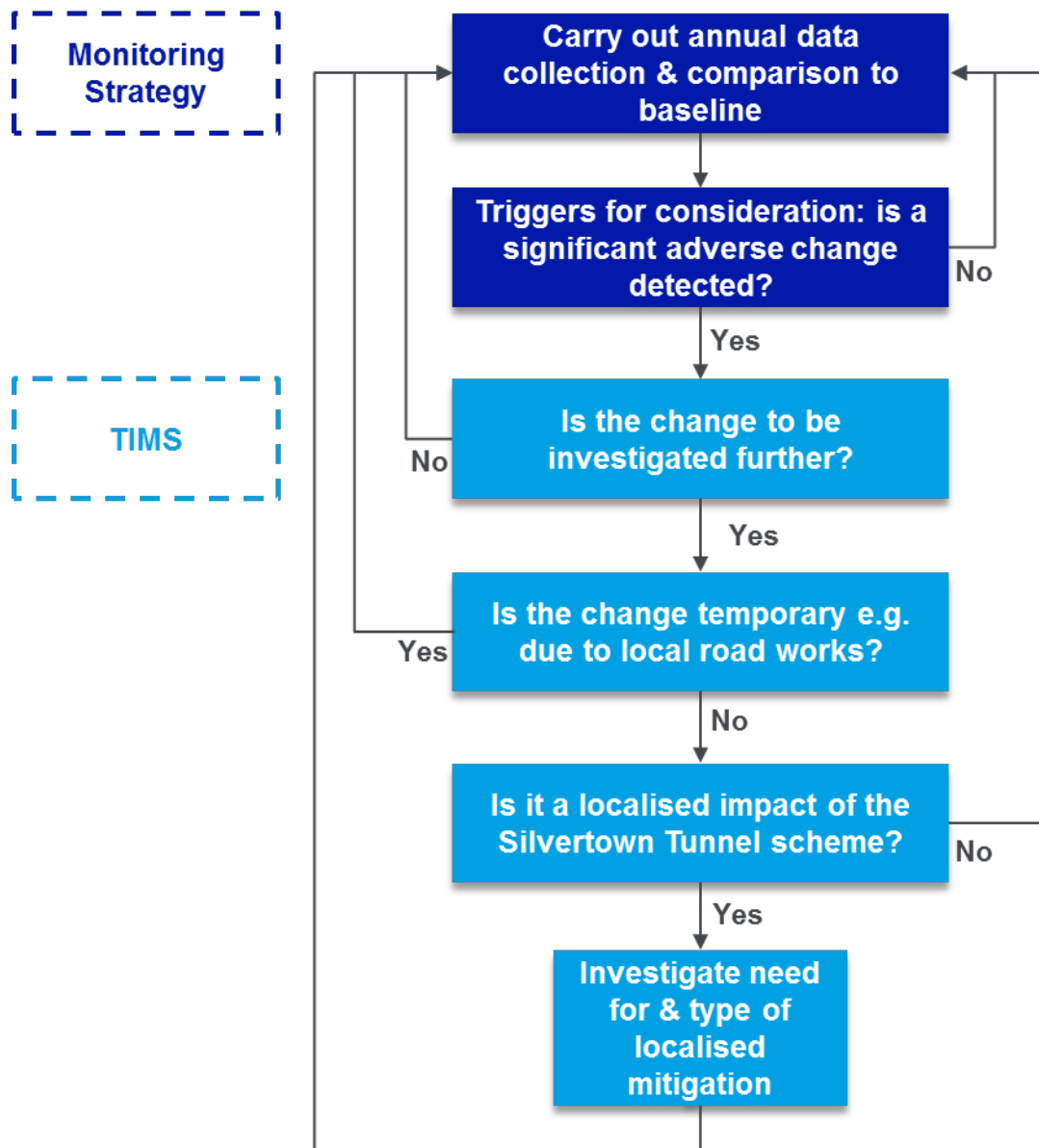
2.1 Introduction

- 2.1.1 The TIMS provides a procedural protocol for the consideration by TfL of the need for the implementation of traffic and traffic-related mitigation measures arising from the Scheme in operation and the form that any such mitigation measures should take. In implementing this strategy TfL shall have regard to the outputs of the Monitoring Strategy (Document Reference 7.6).
- 2.1.2 The STIG shall be consulted by TfL prior to action being taking to implement the TIMS and TfL shall have regard to any response received from the group before any mitigation measures to be taken are determined and implemented. STIG is made up of representatives from local boroughs, other key stakeholders and TfL.
- 2.1.3 The STIG's role includes reviewing the annual monitoring reports produced under the Monitoring Strategy (Document Reference 7.6) and making recommendations as to the need for and form of mitigation, if any, required arising under operation of the TIMS.

2.2 Determining the need for mitigation

- 2.2.1 The process to determine the need for the introduction of localised mitigation measures to recommend to TfL for support and then for implementation by the relevant highway authority is summarised in Figure 2-1. Each element is described in greater detail below.

Figure 2-1 Process to determine the need for and mitigation



2.2.2 **Annual data collection and baseline comparison** – TfL will publish annual monitoring reports in accordance with the Monitoring Strategy (Document Reference 7.6) and for presenting these to STIG for review and consideration. In the period of three years prior to Scheme opening TfL will collect relevant traffic data relating to the Silvertown Tunnel on an annual basis. This data will set the comparison baseline constituting the ‘without scheme’ network.

2.2.3 Triggers for consideration – STIG will review the annual monitoring reports produced by TfL to identify whether a significant level of change in traffic conditions compared to the baseline has been demonstrated. To assist STIG in this process, a set of triggers will be included for certain traffic-related metrics. The triggers will provide further insight on the traffic-related Scheme effects and are intended as a helpful addition to the monitoring reports.

2.2.4 It is planned that a traffic light rating system based on a red-amber-green (RAG) summary of the annual monitoring report locations will be adopted to identify the ‘trigger points’ to be considered further by STIG.

- Metrics and locations marked ‘red’ must be considered by STIG.
- Metrics and locations marked ‘amber’ may be considered by STIG if the group deems this necessary.
- Metrics and locations marked ‘green’ do not have to be considered by STIG.

2.2.5 A detailed set of triggers has been developed based on several metrics included in the initial traffic monitoring plan set out in the Monitoring Strategy (Appendix A); it is not proposed that triggers will be set for all traffic-related metrics. The triggers represent appropriate thresholds at which the different traffic-related metrics to be monitored would trigger an ‘amber’ or a ‘red’ flag for reporting in the annual monitoring reports and hence consideration by STIG. If the thresholds are not exceeded and no significant changes are identified, the metric and location would be marked as ‘green’.

2.2.6 The proposed triggers can be found in Appendix A of this note and apply to the post-opening monitoring period. Pre-opening the planned refreshed assessment of Scheme impacts will be used to identify any Scheme effects that require mitigation. It is not deemed appropriate to set triggers for the non-traffic-related metrics that will be monitored (for instance those related to noise and emissions) for the following reasons:

- The indirect impacts of any changes in traffic conditions brought about by the Scheme will directly relate to a traffic impact, which will be covered by the triggers and moderated by the user charges (e.g. a change in emissions on part of the network as a result of the Scheme would be a direct result of a change in traffic conditions);
- For a scheme of this nature changes in non-traffic-related metrics are more likely to be a result of a range of causal factors than is the case

with traffic-related metrics, making it more difficult to isolate and attribute individual causes.

- Additionally, non-traffic-related monitoring is generally subject to higher degrees of variability as a result of external factors. For example, the results of air quality emissions monitoring are influenced by prevailing weather conditions and this can have a significant bearing on the results.

2.2.7 Wherever monitoring of traffic-related metrics demonstrate that the proposed triggers have been activated, the relevant non-traffic-related metrics related to that activation will then be reviewed and reported on within the annual monitoring reports. In addition to the reporting of any related indirect changes to STIG, an assessment of the significance of these changes related to the Scheme itself (accounting for uncertainties in identifying individual causes, as described above) will be provided using judgement where necessary to assist STIG in considering the need for and type of any mitigation that might be required.

2.2.8 It is proposed that the initial set of triggers will be reviewed and if necessary updated in consultation with STIG to ensure they remain appropriate in light of future changes to road network performance and conditions.

2.2.42.2.9 Further investigation of issue – In making a decision on any further investigation of any adverse effects detected, whether or not a trigger has been activated, TfL must have regard to STIG's recommendations.

2.2.52.2.10 **Temporary nature of change** – In determining whether any change in traffic conditions from the baseline is to be investigated further, TfL shall first decide whether the change is temporary, for example caused by local construction or road works. If this is the case, long-term mitigation will not be required and the temporary impacts would be managed by traffic management measures. Monitoring the effects of the Scheme at the relevant location would continue on an annual basis as provided for in the Monitoring Strategy (Document Reference 7.6).

2.2.62.2.11 **Scheme effect** – If it is identified that the traffic or related adverse impact is of a more permanent nature, it will need to be established whether the change is the result of the Scheme. This will be achieved by

comparison of observed patterns e.g. of overall travel trends and traffic levels to control group data collected specifically for this purpose. This includes specifically selected control sites and overall London-wide and sub-regional data in order to understand the Scheme's effects.¹ If the change or impact cannot be attributed to the Scheme in operation, mitigation does not need to be considered under this strategy.

2.2.72.2.12 **Need for localised mitigation** – If STIG were reasonably to conclude that adverse impacts were solely or largely attributable to the Scheme, and where mitigation by other committed developments and committed interventions by TfL, the boroughs or required of developers were not sufficient in mitigating the impact, TfL will consider the need for mitigation measures.

2.3 Determining the type of mitigation and implementation of mitigation

2.3.1 Where it is determined that localised traffic mitigation measures are required, TfL will make a preliminary decision as to the form of mitigation and the programme for its implementation. Its preliminary decision will be presented to the STIG for consideration and recommendation.

2.3.2 Any mitigation measures proposed by TfL must meet the tests set out in Figure 2-2. STIG may make recommendations throughout this process which TfL must have regard to when making its final decision as the type of mitigation to be implemented by the relevant highway authority.

2.3.3 Where it is reasonably concluded that:

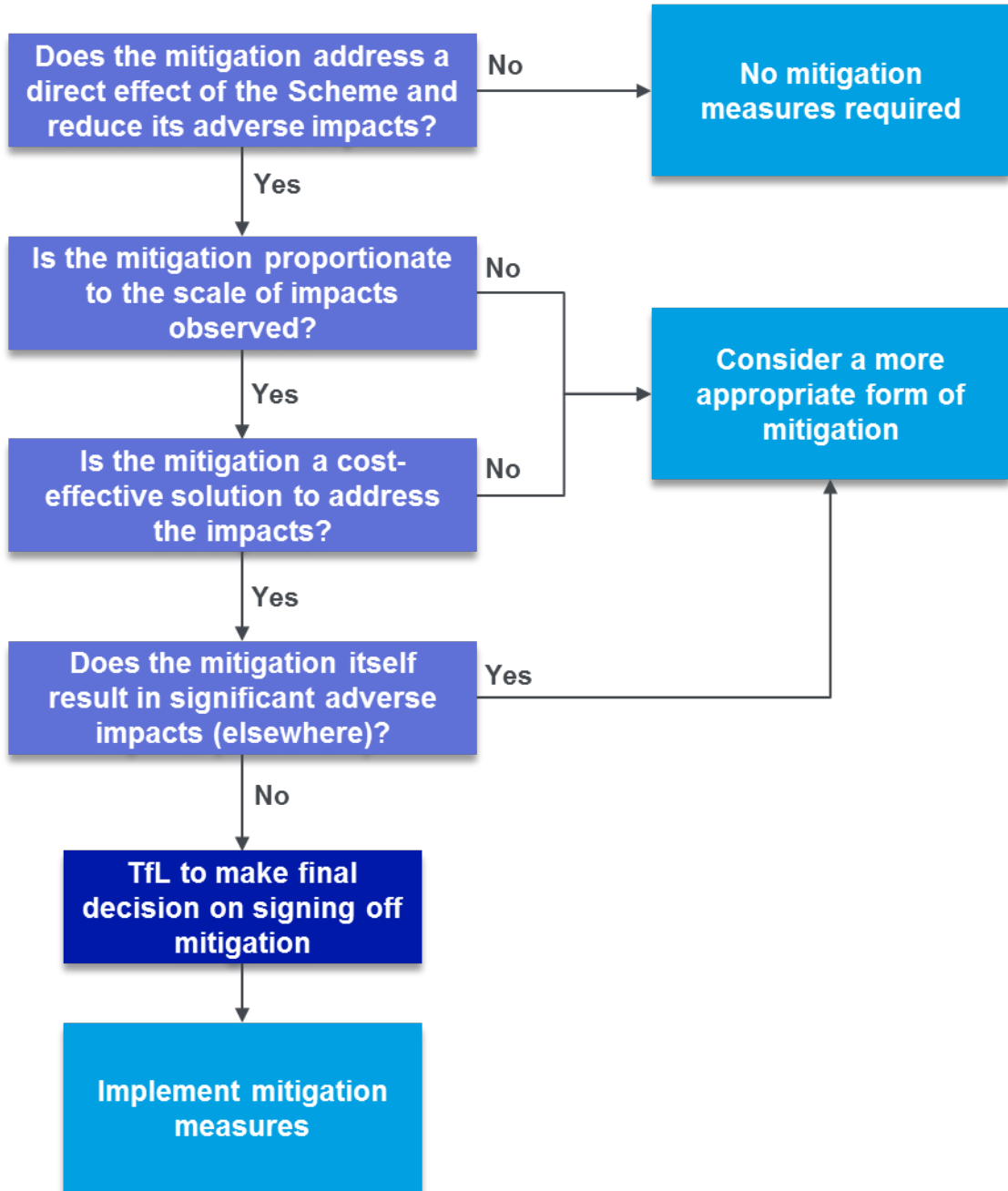
- any adverse impacts are solely or largely attributable to the operation of the Scheme;
- the tests set out in Figure 2-2 are met; and
- mitigation by other committed developments and committed interventions by TfL or the local highway authority are not sufficient in mitigating those adverse impacts.

¹ Further information on this process is set out in the Monitoring Strategy (Document Reference 7.6)

TfL will implement appropriate, reasonable and necessary mitigation measures in discussion with STIG. The final sign off on funding will be the responsibility of TfL.

- 2.3.4 Where mitigation measures will be located on roads for which the local authority is the highway authority (rather than the Transport for London Road Network (TLRN)), the relevant borough, in its role as the local highway authority, must approve the implementation of the proposed mitigation. If the mitigation is not approved by the relevant borough where required, the borough may choose to implement alternative mitigation or supplementary measures at its own cost, following the usual process of scheme planning, design, consultation and implementation.

Figure 2-2 Process for testing suitability of mitigation measures



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3. INDICATIVE MITIGATION MEASURES

3.1 Introduction

- 3.1.1 This chapter sets out a range of indicative mitigation measures which are considered appropriate in the light of TfL's network operational experience. It provides an indication of the type and scale of measures that could be implemented to mitigate any adverse traffic impacts that are identified as being caused by the Scheme. It demonstrates that there are a range of measures available that could be implemented within reasonable timescales by TfL and/or the local highway authority under their existing powers to address a variety of traffic and associated impacts.

3.2 Indicative measures

- 3.2.1 Table 3-1 sets out a range of potential mitigation measures, the effect that each measure is likely to have and the mechanism for delivering that mitigation measure. Changes to the Silvertown and Blackwall Tunnel user charge are not included as a mitigation measure here, as these are dealt with by the Charging Policy (Document Reference 7.11).

Table 3-1 Indicative mitigation measures and delivery mechanisms

Mitigation	Effect	Delivery
<p>Change in existing signal timings to manage localised congestion, air quality and/or noise impacts.</p>	<p>By re-distributing the length of total green time received by each arm, more green time can be given to the arm experiencing an increase in flow and/or delay in order to smooth the operation of the junction. Where operational, SCOOT will respond automatically to fluctuations in traffic flow through the use of on-street detectors embedded in the road.</p> <p>Changes in signal timings can also serve to reduce severance and improve crossing opportunities for pedestrians and cyclists.</p>	<p>In relation to all roads in London, functions in respect of traffic signals under sections 65, 73, 74 and 75 of the Road Traffic Regulation Act 1984 are vested in TfL. See section 275 Greater London Authority Act 1999.</p>

Mitigation	Effect	Delivery
<p>Introduction of new signals to manage localised congestion, air quality and/or noise impacts.</p>	<p>The introduction of signals at priority junctions, or additional signals at part-signalised junctions can aid in smoothing traffic flow and thereby reduce delay where it is problematic.</p> <p>The introduction of new signals can also serve to reduce severance and improve crossing opportunities for pedestrians and cyclists.</p>	<p>In relation to all roads in London, functions in respect of traffic signals under sections 65, 73, 74 and 75 of the Road Traffic Regulation Act 1984 are vested in TfL. See section 275 Greater London Authority Act 1999.</p>

Mitigation	Effect	Delivery
<p>Minor junction or geometry changes to manage localised congestion, air quality and/or noise impacts.</p>	<p>Minor changes to junctions or links (e.g. small scale widening, changes to turning movements, flare lengths, crossing locations) can add capacity to a link or junction where constraints and hence delay are being experienced.</p> <p>Such changes can also serve to improve road safety at those locations and to reduce severance for pedestrians and cyclists.</p>	<p>Within TfL's or the boroughs' remit where changes are implemented within the existing highway boundary.</p> <p>TfL has power to carry out works within or adjacent to a GLA road for the improvement or maintenance of the highway. The relevant local authority has the same power in relation to any roads for which it is the highway authority.</p>
<p>Traffic management measures to manage localised congestion, air quality and/or noise impacts.</p>	<p>To control and restrict traffic by direction, time of day and/or vehicle class/type to mitigate localised environmental impacts.</p>	<p>TfL's existing powers under the Road Traffic Regulation Act 1984.</p>
<p>Priority measures for different user groups e.g. bus lanes to manage localised congestion, air quality and/or noise impacts.</p>	<p>To improve journey times for particular user groups to ensure they are not adversely affected.</p>	<p>TfL's existing powers under the Road Traffic Regulation Act 1984.</p>

Mitigation	Effect	Delivery
<p>Adjust speed limits to manage localised congestion, air quality and/or noise impacts.</p>	<p>A reduction in speed limit can smooth traffic flows and reduce congestion. A change to speed limits may also influence journey times and consequently traffic flows, potentially leading to localised environmental improvements.</p> <p>Adjusting speed limits can also serve to improve road safety.</p>	<p>TfL's existing powers under the Road Traffic Regulation Act 1984.</p>
<p>Pedestrian (and cyclist) crossings to reduce severance and/or improve road safety.</p>	<p>Where an increase in flow creates severance problems, the introduction of different types of pedestrian crossings can improve crossing opportunities for pedestrians (and cyclists) and improve road safety.</p>	<p>TfL has power to carry out works within or adjacent to a GLA road for the improvement or maintenance of the highway. The relevant local authority has the same power in relation to any roads for which it is the highway authority.</p>

Mitigation	Effect	Delivery
<p>HGV bans to manage localised congestion, air quality and/or noise impacts.</p>	<p>Banning HGVs from using certain roads can help to manage any adverse displacement of HGV traffic and concentrate HGV traffic on strategic routes, able to accommodate these movements.</p>	<p>TfL's existing powers under the Road Traffic Regulation Act 1984.</p>
<p>Noise barriers to manage localised noise impacts.</p>	<p>Noise barriers can be effective in reducing the impact of traffic noise on receptors.</p>	<p>TfL has the power to carry out works within or adjacent to a GLA road for the improvement or maintenance of the highway. The relevant local authority has the same power in relation to any roads for which it is the highway authority.</p>
<p>Low noise surfacing to manage localised noise impacts.</p>	<p>Low noise surfacing can be effective in reducing the impact of traffic noise on receptors.</p>	<p>TfL has the power to carry out works within or adjacent to a GLA road for the improvement or maintenance of the highway. The relevant local authority has the same power in relation to any roads for which it is the highway authority.</p>

3.2.2 Detailed location-specific examples of traffic mitigation measures for the Assessed Case scenario are reported in Appendix C of the Transport Assessment (Document Reference 6.5).

Appendix A MITIGATION TRIGGERS

A.1 Introduction

A.1.1 Mitigation triggers are planned to be included in the annual monitoring reports to contribute to the process by which requirements for interventions to address Scheme-specific impacts on the road network are identified and delivered. These triggers will cover some of the traffic-related metrics that will be reported to STIG. A detailed set of initial triggers has been developed based on several of the metrics included within the initial traffic monitoring plan set out in the Monitoring Strategy (Table A-1 in Appendix A), including traffic flows; vehicle composition; journey time reliability; Woolwich Ferry queuing and usage; bus reliability; road safety; and junction performance.

A.1.2 These triggers apply to the post-opening monitoring period only. Pre-opening the planned refreshed assessment of Scheme impacts will be used to identify any Scheme effects that require mitigation.

A.1.3 The triggers will feed into the RAG summary of the annual monitoring report data, and will be supplemented by information on indirect impacts (for instance noise and emissions) where appropriate. The triggers represent appropriate thresholds at which any changes in various traffic-related metrics being monitored would trigger an 'amber' or a 'red' flag. A 'red' flag must be considered by STIG for potential mitigation, and an 'amber' flag may be considered by STIG if the group deem this necessary.

A.1.4 The derivation and nature of the triggers are explained in the following paragraphs.

A.2 Locations

A.2.1 The triggers will cover the 'Area of Influence' identified in the Monitoring Strategy which represents the geographical area where changes (in terms of traffic flow and delay) are anticipated. Specifically, the triggers will cover changes in traffic-related metrics at the following locations:

- The Blackwall and Silvertown tunnels;
- Other river crossings;

- Strategic corridors²; and
- Local roads³.

A.2.2 Overall it is expected that the monitoring undertaken in the Area of Influence would cover all of the most marked impacts of the Scheme. Should additional monitoring be undertaken in the wider buffer zone, for instance at the request of STIG, it is possible that additional triggers could be set for locations outside the Area of Influence if there is a demonstrable need for doing so.

A.3 Establishing a baseline

A.3.1 As set out in the Monitoring Strategy the baseline monitoring will begin three years prior to scheme opening. For the purpose of assessing the impacts of the scheme post-opening, it is planned that the baseline for assessing post-opening impacts will be weighted more towards the final year prior to scheme opening to ensure it reflects the latest information on the operation of the network.

A.3.2 Growth in population and employment in the East and South-East Sub Region (ESR) is expected to exceed that of London overall, and as set out in the Transport Assessment there is forecast to be an increase of 5-7% in peak hour private vehicle trips originating in the ESR between 2012 and the 2021 Reference Case⁴. This will in combination amount to approximately a 1% per annum increase in traffic flows and this is also factored into the trigger thresholds described below.

A.3.3 The general trend of the pre-opening monitoring period could be considered and used to make further refinements to the thresholds if it indicated faster than expected growth.

² Strategic corridors include the strategic radial and orbital corridors on the Transport for London Road Network (TLRN, which is divided in the Mayor's Transport Strategy into MTS corridors) and the Strategic Road Network (SRN, which have been specifically designated as such in the Traffic Management Designation Order 2005). These are key links that carry the highest volumes of traffic, and represent around 10% of London's roads in total.

³ For the purpose of the triggers local roads include the Borough Principal Road Network (BPRN), busy minor roads and busy bus routes. They represent the vast majority of roads in London.

⁴ Table 5-3 and Table 5-5 of the Transport Assessment.

A.4 Temporal considerations

A.4.1 It is planned that the triggers will be based primarily on data for the weekday AM and PM peak periods. In the case of the AM peak period this will be defined as 6am to 10am (rather than 7am to 10am) as the Blackwall Tunnel generally experiences traffic building up earlier than other parts of the network, whilst the PM peak will be defined as 4pm to 7pm. Consideration of peak periods rather than peak hours will ensure that the worst case impacts are captured as well as any peak contraction that may occur (as is expected as a result of the Scheme).

A.4.2 In some cases additional triggers will be set based on all day (24 hour) data, thereby ensuring that changes occurring outside the peak periods are also covered. The use of all day data will also be used for triggers relating to road safety, so that any changes in this metric caused by the Scheme would be picked up irrespective of time of day.

A.4.3 In order to account for seasonal variations it is planned that, for the purpose of the triggers, the monitoring data will be aggregated and compared quarterly to the same quarter in the baseline. This will help to minimise the likelihood of thresholds being triggered by general variability experienced across the network and not attributable to the Scheme, and fits with reporting cycles for the annual monitoring reports that will be produced for STIG.

A.5 Metrics

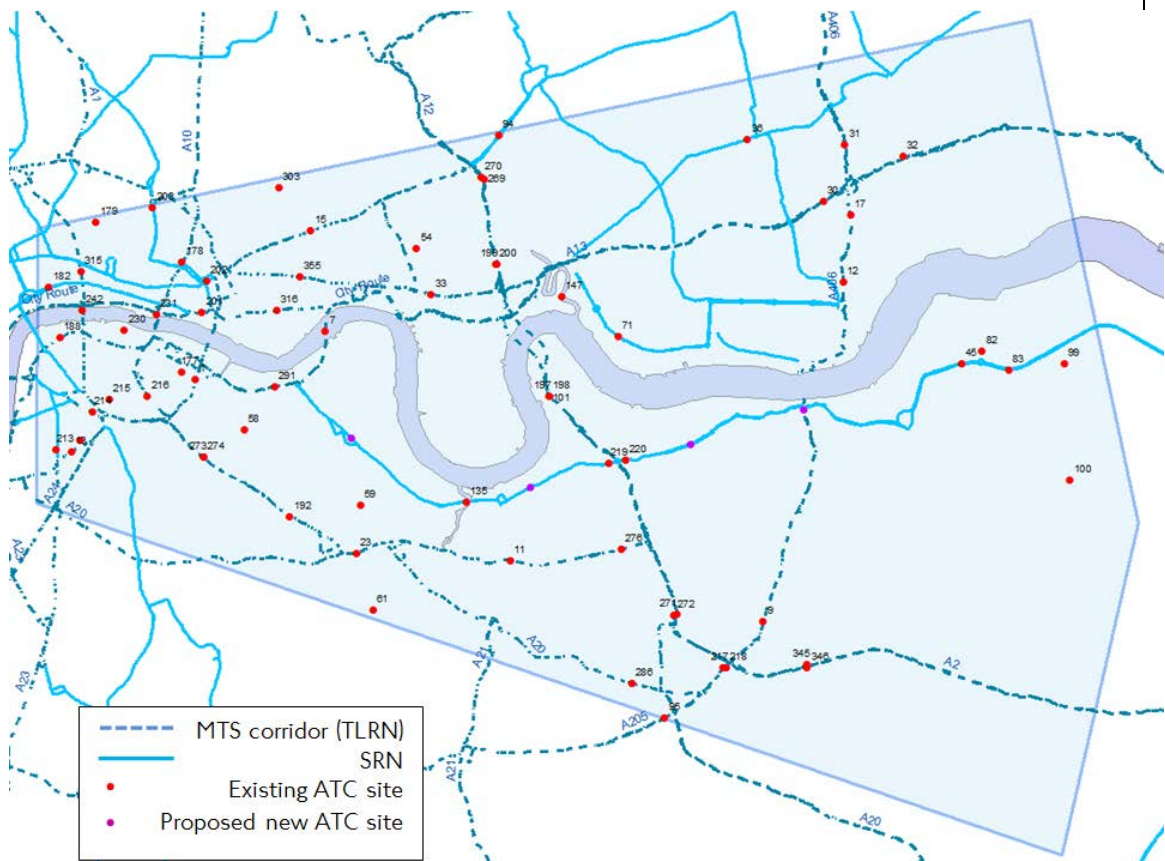
A.5.1 It is planned that triggers will be set on the following metrics:

A.5.2 **Traffic flows** – The primary source of data for measuring average traffic flow is Automated Traffic Counts (ATCs), of which there are currently approximately 350 located at various sites across London⁵. Several new ATCs are proposed in connection with the proposed Scheme to ensure good coverage within the Area of Influence. The initial triggers take into account conditions on the network (for instance the volume to capacity ratio (VCR) of a given link), the number of ATCs from which the data is derived and whether the flows are increasing or decreasing. It is proposed that triggers based on traffic flows will form the principal mitigation triggers for the

⁵ ATCs are located on strategic corridors and local roads.

Scheme and these will be set for all of the locations listed above with the exception of the Woolwich Ferry (see paragraph A.4.5 below).

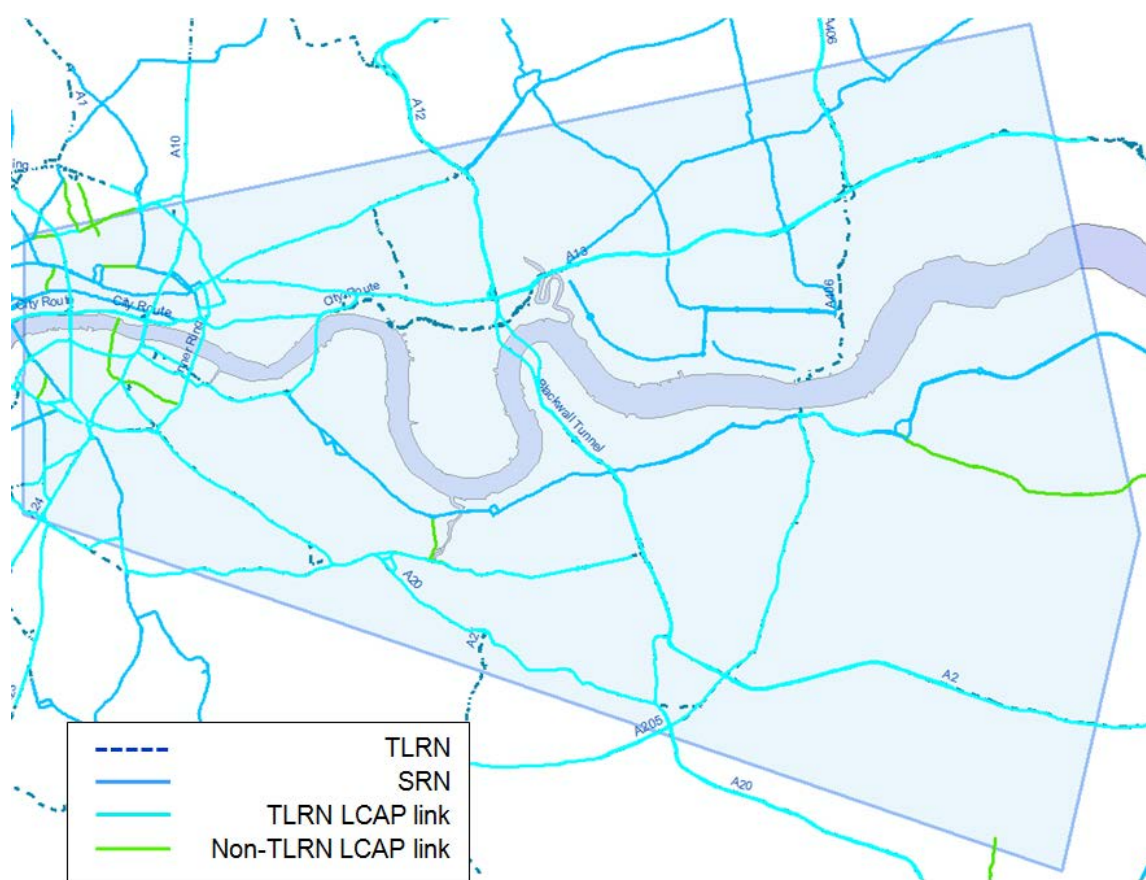
Figure A - 1: ATC sites in the Area of Influence



A.5.3 Vehicle composition – Vehicle composition can be determined from data derived from Automatic Number Plate Recognition (ANPR) cameras combined with records from the Driver & Vehicle Licensing Authority (DVLA). Given the greater traffic and environmental impacts that HGVs typically have relative to other traffic it is proposed that the initial triggers are based on HGVs as a proportion of all traffic, and these will be set for all of the locations listed above.

A.5.4 Journey time reliability – TfL continuously monitors journey time reliability on the Transport for London Road Network (TLRN) and a number of strategic corridors in London, using data from the London Congestion Analysis Project (LCAP). The Scheme is expected to have a notably positive impact on journey time reliability for trips made via the Blackwall Tunnel, and it is proposed that associated triggers are set for the Blackwall and Silvertown tunnels, other river crossings (excluding the Woolwich Ferry) and strategic corridors.

Figure A - 2: Map of core LCAP links in the Area of Influence



A.5.5 Queues and usage – Journey time and journey time reliability are not considered to be useful triggers for the Woolwich Ferry since these metrics are unlikely to be significantly impacted by the performance of the road network (at best this could provide a proxy measure for queues at the ferry, since it can be assumed that queuing will be the main variable component of the journey time). Instead, it is proposed that triggers are set based on usage data recorded by the ferry operator and observed queue lengths, frequencies and duration based on annual video surveys. Whilst indicative triggers have been proposed based on these aspects, these will need to be reviewed if new vessels are introduced within the next few years as planned which could have an impact on capacity.

A.5.6 Bus reliability – Bus reliability can be measured using excess wait time⁶ data derived from TfL’s iBus monitoring system. In the immediate period following opening of the Scheme it is likely that the reliability of new or extended cross-river routes will fluctuate as traffic patterns adapt and demand stabilises, hence triggers cannot be set for new routes prior to Scheme opening, however indicative triggers can be set based on the performance of non-cross-river routes in the vicinity of the Scheme now. These triggers will need to be reviewed by STIG once details of the routes to be monitored are known.

A.5.7 Road safety – It is planned that the number of Killed and Seriously Injured (KSI) road casualties for the Blackwall and Silvertown Tunnels be included as triggers for mitigation. It is recognised that increases in traffic flows at other locations due to the Scheme may affect road safety but, in this case, directly monitoring changes in traffic flows provides a better metric to use as a trigger for mitigation. The initial trigger is based on the number of incidents involving KSIs, rather than the number of KSIs themselves.

A.5.8 Junction performance – There is potentially scope for additional triggers to be set based on the performance of certain specific junctions, for example if the monitoring reveals a Scheme-related effect in the vicinity of a junction that is not included within an LCAP link. As junction performance varies significantly, it is expected that individual triggers would need to be set for each junction considered. It is therefore proposed that the inclusion of any triggers based on specific junctions would be agreed in consultation with STIG based on the refreshed assessment of Scheme impacts undertaken closer to Scheme opening.

A.6 Other considerations

A.6.1 Aside from any Scheme-related effects, a number of the above metrics will be affected by general variation, in particular the metrics on traffic flows and journey time reliability. It is important that this is taken into account in setting the trigger thresholds.

⁶ Excess wait time is a key indicator of bus reliability, which is a measure of how much time passengers had to wait above the time they would be expected to wait if every service ran to schedule.

A.6.2 Given the relatively high level of general variability observed at any given ATC across the network⁷, it is planned that both aggregated and individual traffic flow trigger thresholds will be set depending on the location and siting of ATCs. When data is aggregated over a number of ATCs (such as on a strategic corridor), the contribution from variability would be reduced as the number of sites increased. Consequently the threshold for a grouping of ATCs will be lower than the threshold for an individual ATC.

A.7 Initial mitigation triggers

A.7.1 The initial mitigation triggers are set out in Table A - 1. The triggers apply to the first year after Scheme opening and include an allowance for forecast growth to 2022. Updated triggers with additional growth would then be applied to subsequent years. Future changes in road network performance and conditions mean that the triggers may need to be adjusted in future to ensure they remain fit for purpose and do not result in an unacceptable level of false-positive alerts. It is consequently proposed that the initial set of triggers will be reviewed and if necessary updated in consultation with STIG to ensure they remain appropriate.

A.7.2 The triggers relating to the bus network and the Woolwich Ferry are indicative and would be reviewed closer to the time of Scheme opening, once details of the bus routes to be monitored are known and any changes to the capacity of the Woolwich Ferry have been confirmed. The triggers relating to junction performance would need to be agreed in consultation once details of the specific junctions to be included are known.

A.7.3 In all cases the final triggers to be included in the post-opening monitoring reports would be confirmed and agreed in consultation with STIG prior to Scheme opening, once the refreshed assessment of Scheme-related effects is complete.

⁷ By way of illustration, based on data collected between Q3 2013 and Q3 2016 for a total of 211 ATCs, for a randomly selected ATC there was at least a 15% flow change just due to general fluctuations 9% of the time for which data was collected and at least a 10% flow change 16% of the time.

Table A - 1: Initial mitigation triggers

Metric	Condition/s	Time period/s	Location																	
			Blackwall and Silvertown tunnels (combined)		Other river crossings (excluding Woolwich Ferry)		Woolwich Ferry		Strategic corridors		Local roads									
Traffic flow	Flow change with VCR:	Peaks & 24 hour	Aggregated				Individual				Decrease	Increase	Decrease	Increase	Decrease	Increase				
			Decrease	Increase	Decrease	Increase	Decrease	Increase	Decrease	Increase							Decrease	Increase	Decrease	Increase
			9-11%	11-14%	10-15%	10-13%	16-21%	16-19%									8-11%	8-11%	8-13%	11-13%
			>11%	>14%	>15%	>13%	>21%	>19%									>11%	>11%	>13%	>13%
			11-14%	9-11%	15-20%	8-10%	21-26%	14-16%									11-13%	6-8%	13-18%	8-11%
80-90%	>14%	>11%	>20%	>10%	>26%	>16%			>13%	>8%	>18%	>11%								
>90%	>16%	>9%		>8%		>14%			>6%			>8%								
Vehicle composition	Fraction of HGVs	Peaks & 24 hour	Decrease	Increase	Decrease	Increase	Decrease	Increase	Decrease	Increase	Decrease	Increase	Decrease	Increase						
			10-15%	15-20%	15-20%	10-15%	15-20%	8-10%	15-20%	20-25%	20-25%	10-15%								
Journey time reliability	JTR % points relative to target	Peaks	-4.5%		-4.5%				-4.5%											
			-6.5%		-6.5%				-6.5%											
Queues and usage	Usage	Peaks	Decrease	Increase	Decrease	Increase	Decrease	Increase	Decrease	Increase	Decrease	Increase								
							20-25%	10-15%												
							>25%	>15%												
Bus reliability	Excess wait time (high frequency services)	Peaks	0-0.2 min						0-0.2 min		0-0.2 min									
			>0.2 min						>0.2 min		>0.2 min									
Road safety	KSI / fatal - number of incidents	24 hour	KSI	Fatal																
			1-2	>0																
Junction performance	Degree of saturation	Peaks									Tbc	Tbc	Tbc	Tbc						
												Tbc	Tbc	Tbc	Tbc					

Note: These triggers apply to the first year after Scheme opening, and include an allowance for forecast growth to 2022 and general variability across the network. Updated triggers would apply for subsequent years.