national highways

Lower Thames Crossing

9.134 Wider Network Impacts Position Paper

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1 Executive summary

1.1.1 This document provides further submissions from the Applicant on the policy tests on assessing transport impacts, the provision of mitigation and the decision basis for highways schemes as set out in the National Policy Statement for National Networks (NPSNN) (Department for Transport (DfT), 2014).

1.1.2 It sets out how the policy tests on safety and severance have been applied to the A122 Lower Thames Crossing (the Project).

1.1.3 It sets out the consideration of compliance with the policy tests on safety and severance with specific regard to key corridors that have been identified as being of particular concern with regard to the impacts of traffic changes on the wider highways network through the Examination, including:

a. Blue Bell Hill corridor

b. A13 corridor

c. A2/M2 corridor

d. Asda roundabout

1.1.4 The document provides a description of how the Monitoring and Mitigation Strategy (Transport for London, 2017) secured by the Silvertown Tunnel DCO functions, and considers the similarities to the proposed approach within the Project application.

1.1.5 It provides a 'without prejudice' Requirement, that would secure similar functionality to the Silvertown Tunnel DCO Requirement relating to post-opening monitoring and mitigation of highways impacts.

1.2 Action Point Signposting

1.2.1 This submission addresses Action Points 3, 5 and 6 arising from ISH10 [**EV-082**].

1.2.2 ISH 10 Action Point 3 [**EV-082**] states:

NPS Policy and RIS relationship

"To provide clarity in policy terms as to why LTC is not dealing with expected, possible or foreseeable issues on the local highway network, such as Blue Bell Hill. Additionally, provide clarity on what would be dealt with by the Road Investment Strategy process (RIS), by other DfT funds and by local funds, and the justification for this approach."

1.2.3 Chapter 2 sets out the policy framework set out by the NPSNN, the alignment of that policy with the framework set out within the draft Development Consent Order [**REP5-024**] and the national road investment strategy and justifies this approach.

1.2.4 Section 4.3 sets out the relationship between the A122 Lower Thames Crossing and both national and local road investment funding.

1.2.5 ISH 10 Action Point 5 [**EV-082**] states:

Silvertown Tunnel approach

On a without prejudice basis, a provision to be drafted for possible inclusion in the dDCO to provide a process or methodology to manage future issues identified during LTC operation as a consequence of monitoring, drawing on the Silvertown DCO model.

1.2.6 Section 4.2 provides the requested Requirement, on a without prejudice basis.

1.2.7 ISH 10 Action Point 6 [**EV-082**] states:

Silvertown Tunnel approach: drafting /ambiguity removal

Provide an explanation of the use of the wording "Unacceptable impact", its definition or the triggers where this wording is appropriate as opposed to a situation which could be considered as a 'severe inconvenience'. What could be specified to make a trigger point to enable further work investigation and how is this secured?

1.2.8 Chapter 2 provides a consideration of the nature of unacceptable impacts, as set out in the NPSNN (DfT, 2014). Section 4.1 provides a consideration of the Silvertown Tunnel approach. The Applicant notes that neither the made Silvertown Tunnel Development Consent Order, nor the secured Monitoring and Mitigation Strategy (secured at Appendix B), includes the wording "unacceptable impact".

1.2.9 It should be noted that the following action points are not addressed in this document:

a. ISH10 Action Point 1 – is addressed by submission of an update to the Localised Traffic Modelling Report **[Document Reference 9.15]**

b. ISH10 Action Point 4 – is addressed by submission of the Applicant's submissions on construction impacts and management at Asda roundabout **[Document Reference 9.158]**

2 Introduction

2.1 Background

2.1.1 The Applicant agreed to submit this document at Deadline 6 within the Deadline 5 submission Wider Network Impacts Update [**REP5-085**]. It also follows up on the oral presentation given at ISH 10, and the Wider Network Impacts Update. It provides further submissions from the Applicant on the appropriate approach to mitigating traffic impacts in the context of policy.

2.1.2 Following Issue Specific Hearing 4 (ISH4) and Issue Specific Hearing 7 (ISH7), the Examining Authority issued a number of Action Points [**EV-042f** and [**EV-046e**] with regard to the impacts on the Local Road Network (LRN), and specifically at the Orsett Cock junction and the A229 Blue Bell Hill.

2.1.3 In particular, ISH 4 Action Point 3 [**EV-042f**] states:

Local Road Network Impact Mitigation: Security

Consider how the DCO/Wider Network Impacts Management and Monitoring Plan [APP-545] could be amended to secure mitigation at locations where monitoring shows that LTC traffic has caused ***unacceptable impacts*** *on the local road network that were not predicted in the Transport Assessment i.e., the Orsett Cock roundabout. (emphasis added)*

Consider how the DCO/Wider Network Impacts Management and Monitoring Plan could be amended to secure mitigation at the A229 Bluebell Hill where a ***significant adverse impact*** *is forecasted in the Transport Assessment. (emphasis added)*

Consider how the DCO/Wider Network Impacts Management and Monitoring Plan could be amended to secure mitigation at the A229 Bluebell Hill where a ***significant adverse impact*** *is forecasted in the Transport Assessment. (emphasis added)*

2.1.4 Submissions to the Examination from interested parties, for example from Thurrock Council at Deadline 4 [**REP4-352**] (from page 49 onwards) have asserted that the Applicant must mitigate the traffic impacts of the Project. However, Thurrock Council, nor any other party, has engaged with the analysis presented by the Applicant which identifies the impacts and the relevant tests, providing definition of impacts which must be mitigated.

2.1.5 These matters have been covered in other documents and submissions and it is not intended to repeat those submissions here. For reference, however, relevant submissions from the Applicant can be found in the following Examination documents and are respectfully commended to the Examining Authority:

a. The Planning Statement [**APP-495**] sets out from paragraph 6.5.310 how the application accords with the policies of the NPSNN (DfT, 2014) which relate to 'Impacts on transport networks'; while compliance with individual policy paragraphs is presented in the Planning Statement Appendix A National Policy Statement for National Networks Accordance Table [**APP-496**] from page 198;

b. The Transport Assessment [**REP4-150**] at Chapter 7 identifies and grades the transport-related impacts of the Project, while Appendix F [**APP-535**] assesses those impacts against policy and demonstrates policy compliance;

c. The Economic Appraisal Package [**APP-524** to **APP-527**] takes full account of the transport related benefits and disbenefits, providing a net assessment of the impacts of the Project;

d. In the Post-event submission for ISH4 [**REP4-180**] the Applicant records its submission at ISH4, reviewing relevant policy issues and showing how the Application meets the terms of the relevant policy tests. The most relevant passages are from 4.1.3; 4.1.5 and in Appendix B;

e. Similarly, the Post-event submission for ISH7 [**REP4-183**] records the Applicant's presentation at ISH7, particularly from paragraph 1.3.46.

2.1.6 Without repeating that background, this submission seeks to assist the discussion of what impacts may be considered 'unacceptable' and how that might translate into a requirement for mitigation, or otherwise affect the decision to be taken on the application.

2.2 The policy framework

2.2.1 It is important to recognise the particular nature of this DCO application – it is a new road, adding critically important highway capacity at a nationally important part of the network and redistributing traffic as a result. It has been designed and selected to bring, and does achieve, substantial benefit to the strategic road network (SRN) and the Local Road Network (LRN) and it differs fundamentally from a site development like (for example) Sizewell C, which creates new traffic impacts at a point in the road network.

2.2.2 This is a distinction recognised in policy – it is why there is an NPSNN (DfT, 2014) with its own particular policy tests while other developments either have their own National Policy Statement (NPS) or are dealt with through the Town and Country Planning Act 1990 (TCPA) process against the different tests in the National Planning Policy Framework (NPPF) (Department of Levelling Up, Housing and Communities, 2023); and The strategic road network and the delivery of sustainable development (DfT, 2022a). Those documents are not designed for this type of development and their policies should not be applied as if they did (although the nature of the tests they set out does provide useful learnings).

2.2.3 The distinction can be seen within the NPSNN itself. It deals with three categories of Nationally Significant Infrastructure Projects (NSIPs) – nationally significant road projects (and rail projects) and strategic rail freight interchange (SRFI) projects – and it is careful to distinguish its text and policy requirements for each; particularly for SRFIs, which are not linear network connections but more like 'ordinary' development projects with particular local impacts. When it comes to mitigation, the polices are deliberately quite different.

2.2.4 There may be at least two reasons for this:

a. Additions to the national network to add capacity and relieve strategic congestion by redistributing existing traffic are likely to have very different characteristics and effects from "development"; and

b. Network developments are part of a funded process of investment. As paragraph 1.21 of the NPS explains:

"Sitting alongside the NPS are the investment programmes for the road and rail networks – the Rail Investment Strategy (HLOS) and the Road Investment Strategy (RIS). These, together with the business plans prepared by the relevant delivery bodies, provide detailed articulation of the Government's funding strategy for the road and rail networks and investment priorities over forthcoming periods."

2.2.5 Strategic road network DCOs, therefore, are not isolated projects brought forward by the private sector where there is a gap in the market. They are part of a deliberate, incremental, funded programme to enhance the network. As such, they are not likely to be complete in themselves; each step contributes to the enhancement of the network but there will be more to do to consolidate and build on each project through the next planned phases of investment. There is a process in place for that. This is explained, for example, in the Circular 01/2022 Strategic road network and the delivery of sustainable development (DfT, 2022a) which includes the following specific update from the superseded DfT Circular 02/2013:

"3. The company will deliver on the commitments set out in each RIS and work with the Government and key stakeholders to investigate future investment needs on the SRN. This is facilitated through the preparation of route strategies by the company, which must take account of relevant strategies and priorities concerning local road and other transport networks as set out in the licence."

2.2.6 This is also why the NPSNN (DfT, 2014) itself states unequivocally at paragraph 2.24 that "*The Government's policy on development of the Strategic Road Network is not that of predicting traffic growth and then providing for that growth regardless. Individual schemes will be brought forward to tackle specific issues, including those of safety, rather than to meet unconstrained traffic growth*".

2.2.7 This is highly material when considering calls from local authorities and others to add further investment to this project to solve issues on the road network.

2.2.8 This Examination should not only assume that the Government's Road Investment Strategy process will work; it is apparent that it is working in practice.

2.2.9 Government is plainly aware that there may be a need for further investment as a consequence of and complementary to the Project. In this context, the Road Investment Strategy 2: 2020 - 2025 (RIS2) (DfT, 2020) is explicit:

"We will explore …further changes to the extent of the network that could be implemented for the start of RP3. For example, ***we recognise that the plans for the Lower Thames Crossing will have an impact on the road networks***

of Kent and Essex and we will consider what that means for the shape of the SRN in those areas.*"* (page 37)

"This project will also have a national impact, allowing freight traffic to the Continent to bypass Dartford, and have an uncongested route to Dover. ***We expect to investigate linked improvements on the A2 into Kent as part of the pipeline of work for the next RIS****."* (page 101)

2.2.10 Similarly, RIS2, for example, directly references the case for the Tilbury Link Road (on page 100).

2.2.11 That process (of planning further investment) is already underway. In May 2023, for example, the Government published a consultation document on its Route Strategy for Kent Corridors to the M25 (National Highways, 2023) as one of many regional strategy consultations to inform the next round of investment in RIS3. The draft document makes 24 references to the Lower Thames Crossing and its consequences in order to help identify strategies for further investment.

2.3 The approach to decision making

2.3.1 In terms of the overall approach to decision making, it is important to recognise that the NPSNN (DfT, 2014) provides a presumption in favour of new network infrastructure projects (paragraphs 2.10 and 4.2), for which it says there is a compelling need; and that paragraphs 4.3 and 4.4 provide that decisions are to be based on a balanced consideration of benefits and impacts:

"4.3 In considering any proposed development, and in particular, when weighing its adverse impacts against its benefits, the Examining Authority and the Secretary of State should take into account:

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

4.4 In this context, environmental, safety, social and economic benefits and adverse impacts, should be considered at national, regional and local levels. These may be identified in this NPS, or elsewhere."

2.3.2 This is consistent with Section 104 (7) of the Planning Act 2008 and with the approach directed at paragraph 5.212 of the NPS which instructs that, when it comes to impacts on transport networks, "*the scheme must be decided in accordance with the NPS except to the extent that one or more of sub-sections 104(4) to 104(8) of the Planning Act 2008 applies.*"

2.3.3 This is notably different to the equivalent direction given to the decision maker in relation to SRFIs in the next paragraphs 5.213–5.214 which are explicit that applicants should mitigate impacts identified in the Transport Analysis Guidance (TAG)(DfT, 2022b) compliant Transport Assessment [**REP4-148** to **REP4-152**]. For the reasons explained above, that distinction in approach is deliberate.

2.3.4 The Applicant has carefully considered these requirements in preparation of the project assessments:

a. In Chapter 7 of the Transport Assessment [**REP4-150**] the transport related forecast impacts of the Project are identified and graded, while Appendix F [**APP-535**] assesses those impacts against policy and demonstrates policy compliance;

b. In the Economic Appraisal Package [**APP-524** to **APP-527**] the transport related benefits and disbenefits (adverse impacts) of the Project are fully taken into account; and show the overall economic benefit of the Project and, for instance that the A122 Lower Thames Crossing would create overall journey time benefits across the affected network.

2.4 The approach to mitigation

2.4.1 It is in this context that the approach to mitigation should be considered. It has been asserted by a number of Interested Parties that unacceptable impacts must be mitigated but no party has attempted a definition of "unacceptable" for these purposes.

2.4.2 In essence, if "unacceptable" is to be used in the context of decision making on the Application, it is important to understand its context within the NPSNN (DfT, 2014). The word "unacceptable" is used in the NPSNN but notably not in relation to traffic impacts.

2.4.3 The starting point for analysis is the approach which the NPSNN requires generally in respect of requirements or obligations. The NPSNN makes clear that requirements should only be imposed where they meet several tests, including that they are "necessary" (paragraph 4.9), while "*Planning obligations should only be sought where they are* ***necessary to make the development acceptable in planning terms****, directly related to the proposed development and fairly and reasonably related in scale and kind to the development*." (paragraph 4.10) (emphasis added).

2.4.4 It is at least apparent from the balance required to be struck by the NPSNN that an application can have adverse effects that are not mitigated and nevertheless be acceptable if those effects are outweighed by benefits, in the context of a presumption in favour of granting consent. The policy requires those adverse effects to be assessed and taken into account (as the Applicant explicitly has in this case). It does not require them to be mitigated. The same principle can be seen in Section 104 (7) of the Planning Act 2008.

2.4.5 The NPSNN (DfT, 2014) contains five references to impacts which may make development 'unacceptable' unless they are mitigated. These relate to different environmental topics such as pollution or land stability but not to traffic impacts.

2.4.6 The Applicant has explained at Issue Specific Hearings 4, 7 and 10 that the NPSNN does not require mitigation simply to address an increase in delay or congestion. No party has been able to show that to be wrong.

2.4.7 Thurrock Council's submission at Deadline 4 [**REP4-352**] (at page 50) relies on paragraphs 3.2 and 5.202 from the NPSNN. However, neither support the Council's assertion that adverse traffic effects must be mitigated:

"3.2 The Government recognises that for development of the national road and rail networks to be sustainable these should be designed to minimise social and environmental impacts and improve quality of life."

"5.202 Development of national networks can have a variety of impacts on the surrounding transport infrastructure including connecting transport networks. Impacts may include economic, social and environmental effects. The consideration and mitigation of transport impacts is an essential part of Government's wider policy objectives for sustainable development."

2.4.8 The first is not a test for traffic mitigation – and its emphasis is on different types of impacts. The second is general in its terms and, of course, introductory to the actual text in the NPSNN that deals with how to address impacts on the transport network. Clearly, it would be more informative to look at that text.

2.4.9 This is the approach taken by the Applicant, in the Planning Statement [**APP-495**] and in the Transport Assessment [**REP4-148** to **REP4-152**] and not repeated here. As set out earlier, paragraph 2.24 of the NPSNN (DfT, 2014) is clear that "*The Government's policy on development of the Strategic Road Network is not that of predicting traffic growth and then providing for that growth regardless. Individual schemes will be brought forward to tackle specific issues, including those of safety, rather than to meet unconstrained traffic growth (i.e. 'predict and provide')*."

2.4.10 Congestion or increased delay, therefore, is not the test to be applied when considering the need for mitigation. This is distinct from the role congestion may play as a driver of the need for investment in the road network. In the NPSNN (paragraphs 2.15 to 2.20) congestion is considered specifically as a driver of need, both due to economic impacts and environmental impacts. The application addresses the chronic and strategically important congestion which impacts the operation of the national road network at a critical location (the Dartford Crossing – which is idenitifed as being subject to severe congestion in Annex A to the NPSNN) and the congestion effects (benefits and impacts) need to be taken not account in decision making, but there is no obligation or expectation in the NPSNN or elsewhere that all congestion effects must be mitigated or that free-flowing traffic conditions are an objective.

2.4.11 Even in tests for developments under the TCPA regime the bar is set deliberately high when it comes to congestion effects. The NPPF (Department of Levelling Up, Housing and Communities, 2023) at paragraph 111 provides that "*Development should only be prevented or refused on highways grounds if there would be an unacceptable impact on highway safety, or the residual cumulative impacts on the road network would be severe*."

2.4.12 While the NPPF does not have "effect" in relation to the Project for the purposes of section 104 of the Planning Act 2008, this test is representative of the fact that congestion is not an impact which must be mitigated in all circumstances. The Applicant considers it important that even development under the TCPA which is caught by this paragraph of the NPPF, is not refused on the basis of congestion impacts unless the impact "on the road network" arising from the residual impacts from that development would be severe. In this context the Applicant notes Appeal decision 3185493 (Planning Inspectorate, 2018) which confirmed that "*That approach was that the term 'severe' sets a high bar for intervention via the planning system in traffic effects arising from development;*

mere congestion and inconvenience are insufficient in themselves but rather it is a question of the consequence of such congestion." This has been endorsed in other decisions (Appeal decision 3157862).

2.4.13 The DfT Circular, Strategic road network and the delivery of sustainable development (DfT, 2022a) provides a similar test at paragraph 51 *"Where a transport assessment indicates that a development would have an unacceptable safety impact or the residual cumulative impacts on the SRN would be severe, the developer must identify when, in relation to the occupation of the development, transport improvements become necessary."*

2.4.14 The NPSNN (DfT, 2014), however, presumably deliberately, does not set out an equivalent test. If those tests were to be applied in this case, however, the cumulative effect of the Project on the SRN is overwhelmingly positive.

2.4.15 At ISH 10, reliance was placed by some parties on NPSNN paragraph 5.211, which requires consideration to be given to impacts on local transport networks. The Applicant agrees such issues are clearly material, which is why their effects are fully assessed and taken into account in the application. The paragraph, however, does not require them to be mitigated.

2.4.16 Equally, parties relied on NPSNN paragraph 5.202, which explains that the consideration and mitigation of transport impacts is an essential part of Government's wider policy objectives for sustainable development. However, that paragraph is introductory to the specific guidance on which impacts are to be mitigated. It does not say all impacts must be mitigated, and no party seriously suggests that it does. It follows, therefore, that it is important to read on to the policy provided under the heading of 'Mitigation'.

2.4.17 The first part of paragraph 5.202 is helpful, however, in identifying an emphasis on economic, environmental and social effects.

2.4.18 For nationally significant road projects and their impact on the transport network, the specific test on mitigation for road and rail developments simply provides:

"5.215 Mitigation measures for schemes should be proportionate and reasonable, focussed on promoting sustainable development.

5.216 Where development would worsen accessibility such impacts should be mitigated so far as reasonably possible. There is a very strong expectation that impacts on accessibility for non-motorised users should be mitigated."

2.4.19 Several parties have relied upon the emphasis on accessibility in paragraph 5.216. However, the NPSNN is clear what it means by "accessibility" (see paragraph 2.9 and the section under paragraph 3.19). Accessibility explicitly means accessibility for non-motorised users and for people with mobility impairments.

2.4.20 The emphasis, therefore, is not on mitigation of any localised congestion that might arise from the Project, unless congestion renders conditions unsafe or environmentally unacceptable.

2.4.21 The absence of a definitive policy on the extent to which localised congestion could be "unacceptable" is likely to be deliberate and it is common across all planning and transport policy. In reality, the scale of road use is such that the

country literally cannot afford to plan for free-flow traffic conditions; and neither would it want to predict and provide for unconstrained demand. The extent to which investment in the road network achieves free-flow conditions is a matter for Government, and Government investment decisions, balancing a wide range of geographic and modal alternative priorities.

2.4.22 Where localised congestion may arise (and where it does not trigger a need for mitigation on grounds of safety, environment, etc.), its adverse effects fall to be taken into account in the decision.

2.4.23 The NPSNN (DfT, 2014) is very clear on its priorities for mitigation, and they are safety, severance & accessibility, and environment (see paragraphs 2.9 and 4.4 collectively). More specifically, the NPS' priorities for mitigation are:

a. Safety: (paragraphs 2.24, 3.9 and 4.60-66)

b. Severance and accessibility: (paragraphs 3.19-3.22, 5.205 and 5.216, the terms of which are explicit: see above: "*Where development would worsen accessibility such impacts should be mitigated so far as reasonably possible. There is a very strong expectation that impacts on accessibility for non-motorised users should be mitigated.*")

c. Environment: (paragraph 5.206 as well as multiple environmental topic specific requirements in Section 5).

2.4.24 These matters have been fully addressed in the application. Subsequent sections of this submission demonstrate how that is the case at locations on the network of most concern to some IPs.

2.5 Implications for ports

2.5.1 The relationship of the Project to ports does not change this analysis.

2.5.2 The National Policy Statement for Ports (DfT, 2012) is very clear on the national importance of ports. Likewise, the Applicant understands that importance and the rationale for the Project, of course, is at least in part due to the benefit it can bring to UK ports by:

a. relieving existing congestion on the Dartford Crossing and approach roads, which constrains cross-river travel for ports located south of the River Thames;

b. providing new capacity across the River Thames improving links between ports located south of the Thames and the rest of the country;

c. relieving M25 junction 30 and the A13 between the M25 and the connection with the A122 Lower Thames Crossing, where existing congestion impacts on the access from the ports on the north shore of the Thames onto the SRN; and

d. by providing new connections on the SRN reducing journey times from the ports on the north shore of the Thames to the rest of the country.

2.5.3 When promoting port development, the National Policy Statement for Ports (DfT, 2012) states that: "*the applicant's assessment should be conducted in a way that takes into account all of the Government's objectives for transport, including the need: - to promote economic growth through improving networks and links for passengers and freight, as well as ensuring an efficient and competitive transport sector both nationally and internationally*". The Government's transport objectives are set out in a number of places, not least within the NPSNN (DfT, 2014) and given effect through decisions made by Government, for example, in the investment priorities it determines through the preparation of the Roads Investment Strategy, prepared in accordance with the Infrastructure Act 2015. In other words, it can be assumed that government policy is consistently applied and that the scale of the A122 Lower Thames Crossing is endorsed through route and scheme selection, and that the operation of the Road Investment Strategy to take a phased approach to transport improvements arising across the region around the A122 Lower Thames Crossing is consistent with Government's understanding of its own ports policy.

2.5.4 Journey times between both the Port of Tilbury and London Gateway port and locations across the south-east have been provided in Appendix B [**REP4-154**] and Appendix C of the Transport Assessment [**REP4-156**]. These tables demonstrate that there is a significant net reduction in journey times between the Ports and regional destinations. Further information is also provided in the 9.135 Applicant's Response to the Joint Statement on Policy Compliance of the LTC Scheme with the Ports Policy made on the dDCO at D3 [**Document Reference 9.135**].

2.5.5 It is worth noting that the NPSNN was designated after the National Policy Statement for Ports (DfT, 2012), and that its policies for road network NSIPs therefore take account of the Government's ports and other policies. There is no additional or special policy to apply.

2.6 The purpose of the Wider Network Impacts Management and Monitoring Plan in this context

2.6.1 Other submissions address the Applicant's approach to monitoring wider impacts of the Project, specifically the Wider Network Impacts Management and Monitoring Plan [**APP-545**]. In the context of the appropriate approach to mitigation, however, the approach which is described there is directly relevant to the question of whether further mitigation is "necessary" or whether the Application is acceptable in planning terms as presented.

2.6.2 In this context, it must be directly relevant that:

a. The Project is a "complex infrastructure project" which is intended to be transformational. It will deliberately have effects that will resonate across the SRN and LRN.

b. The Project takes a careful approach to identifying and mitigating effects related to safety, severance, accessibility and the environment.

c. The Project is brought forward as part of the Government approved Road Investment Strategy process, which takes a phased, five-yearly approach to regional and national priorities. The fact that the Project is the largest such project to have been planned and supported in that way is a measure of its importance and its inclusion in RIS2 is a statement of government policy and a commitment that it should come forward as planned.

d. That process is well understood by the Examination but it is explained in the circular, Strategic road network and the delivery of sustainable development (DfT, 2022a) which emphasises the strategic role and responsibility of National Highways in this context since its role was established in the Infrastructure Act 2015.

e. The extent of the Project has been approved by the Secretary of State through a careful process of scheme selection.

f. Government is aware that there may be a need for further investment as a consequence of, and complementary to the Project.

g. The process of planning further investment is already underway.

2.6.3 In other words, the Government is aware of the principle that further investment will be necessary in the regional road network to supplement and consolidate the investment in the Lower Thames Crossing. It has a process in place for that purpose.

2.6.4 In the context of investment onto the SRN, Government is also aware of the concerns of local authorities and others that more should be done. The Route Strategy process is highly consultative and the Examination is aware of many schemes that have progressed through that process (see, for example, the schemes listed at Section 3.3 of the Wider Network Impacts Management and Monitoring Plan [**APP-545**]). In addition, a number of other areas of existing congestion on the highways network, for which authorities have been arguing mitigation should be provided by the A122 Lower Thames Crossing, have been identified in the Route Strategies Initial Overview Reports prepared to inform the next phase of the Road investment Strategy. As such, these locations are part of the consideration by the Secretary of State and any future investment will be determined in accordance with the relevant process (see Section 4.3 for further information). Similarly, investment onto the LRN is also a matter for Government to address, and DfT puts in place frameworks through which that funding can be allocated, such as the Major Road Network (MRN) & Large Local Majors (LLM) Schemes.

2.6.5 Affordability and priority are for government policy to decide, with the benefit of a process deliberately established for that purpose. It should not be prejudged by this Examination but the necessary future decisions would be helpfully informed by the Wider Network Impacts Management and Monitoring Plan [**APP-545**] outcomes and reporting.

2.6.6 Smaller-scale impacts will also be identified, and for these cases there are more appropriate and more immediate interventions than inclusion into a Route

Strategy. The funding framework provided by DfT also supports smaller-scale investment through a number of additional routes, including:

a. Operational funding to National Highways

b. Designated Funds, provided through the Road Investment Strategy and administered by National Highways, such as the Safety and Congestion fund

c. Highways maintenance funding allocations, provided to local highways authorities by DfT.

2.6.7 The Wider Network Impacts Management and Monitoring Plan [**APP-545**] would provide an evidence base to support decisions to deliver interventions identified as a result of the monitoring. This includes the LRN (see from paragraph 3.3.10, Plate 5.1 and paragraph 6.2). The delivery mechanism, including the funding, for any interventions would be dependent on the nature of the intervention.

3 Consideration of individual impacts

3.1 How the assessments take account of the forecast impacts

3.1.1 There will always be a level of uncertainty in relation to a traffic forecast, and consequently the forecast impacts of changes in traffic flows on the highways network. As well as localised uncertainties, such as the nature and location of developments, there are national uncertainties relating to growth, and government policies relating to transport. This uncertainty is recognised by the framework that has been set out in legislation, policy and guidance for the delivery of planning approval for projects.

3.1.2 Key areas of consideration include accounting for uncertainty in the traffic flows, and accounting for uncertainty in the assessment of the environmental impacts. Guidance is provided on how to account for uncertainty in the traffic flows through the TAG (DfT, 2022b), which is also clear that the core scenario provides the sensible basis for decision making. Policy, in the form of the NPSNN (DfT, 2014), directs this guidance to be used in consideration of the uncertainty in traffic flows, with a number of key references.

3.1.3 Paragraphs 4.6 and 4.7 provide direction on the use of this guidance in terms of the development of a transport model. Paragraph 4.6 provides direction on the need for a transport model, and elements of uncertainty that need to be considered, stating "*Applications for road and rail projects should usually be supported by a local transport model to provide sufficiently accurate detail of the impacts of a project. The modelling will usually include national level factors around the key drivers of transport demand such as economic growth, demographic change, travel costs and labour market participation, as well as local factors. The Examining Authority and the Secretary of State do not need to be concerned with the national methodology and national assumptions around the key drivers of transport demand.* […]*".* Paragraph 4.7 then enshrines the TAG as the framework for this modelling and consideration of uncertainty, stating "*The Department's WebTAG guidance is updated regularly. This is to allow the evidence used to inform decision-making to be up-to-date".*

3.1.4 Importantly, paragraph 4.6 then goes on to state "*We do encourage an assessment of the benefits and costs of schemes under high and low growth scenarios, in addition to the core case. The modelling should be proportionate to the scale of the scheme and include appropriate sensitivity analysis to consider the impact of uncertainty on project impacts"*. This text clearly indicates the purpose of consideration of the high and low growth scenarios, being specifically to allow for consideration of the benefits and costs of schemes.

3.1.5 Paragraph 4.61 then goes on to direct the application of this guidance in terms of safety: "*The applicant should undertake an objective assessment of the impact of the proposed development on safety including the impact of any mitigation measures. This should use the methodology outlined in the guidance from DfT (WebTAG) and from the Highways Agency.*"

3.1.6 In environmental legislation, uncertainty is also considered. The requirements in The Infrastructure Planning (Environmental Impact Assessment) Regulations

2017 stipulate at article 14 (2)(b) what an environmental statement should provide:

14.— (2) An environmental statement is a statement which includes at least—

(b) a description of the likely significant effects of the proposed development on the environment;

(c) a description of any features of the proposed development, or measures envisaged in order to avoid, prevent or reduce and, if possible, offset likely significant adverse effects on the environment;

(f) any additional information specified in Schedule 4 relevant to the specific characteristics of the particular development or type of development and to the environmental features likely to be significantly affected.

3.1.7 The purposeful use of the word *'likely'* in the characterisation is intended to account for uncertainty, and for the purposes of transport schemes links to the consideration of uncertainty in the preparation of the transport model. Importantly, the guidance on the purpose of the alternative scenarios (high and low growth) within the NPSNN (DfT, 2014), is constrained to the purpose of understanding the benefits and costs of schemes. The '*likely'* environmental effects are therefore those associated with the core scenario.

3.1.8 It is in the nature of any scheme which contains elements of uncertainty, as characterised above, that there will be "known impacts", being those impacts that are forecast and recognised in the assessments, and those that are unknown, as they are outside the framework of the assessment. By providing guidance on the management of uncertainty, the NPSNN sets out how these should be considered in the planning balance:

3.1.9 Uncertainty that is identified and for which guidance is provided, and therefore included in the assessment of impacts, includes:

a. Uncertainty accounted for in the core scenario: these uncertainties should be accounted for in consideration of the highways impacts and associated environmental effects constitute "likely effects" for the purpose of the Environmental Statement

b. Uncertainty accounted for in the high and low growth scenarios: these uncertainties should be accounted for in consideration of the benefits and costs of the Project only

3.1.10 Policy and guidance do not require unknown impacts beyond these definitions of uncertainty to be addressed. There is no requirement to consider uncertainty that is not accounted for through the national methodology, or which would arise through a divergence of outcomes from those forecast by the national methodology.

3.1.11 Within the assessments undertaken to support the planning decision for the A122 Lower Thames Crossing, uncertainty has been considered in accordance with TAG (DfT, 2022b), and hence in accordance with the NPSNN (DfT, 2014).

3.1.12 The Project's transport model has been prepared, following TAG, as reported in the Combined Modelling and Appraisal Report [**APP-518**] and associated

appendices. Importantly, the Project's transport model sets out a core scenario, and then provides both high and low growth scenarios. These models have then been used to conduct an economic appraisal, as reported in Appendix D of the Combined Modelling and Appraisal Report [**APP-525**], and a transport assessment as reported in the Transport Assessment [**REP4-148**, **REP4-150** and **REP4-152**]. The transport model has then been used to inform the environmental impact assessment, as reported in the Environmental Statement.

3.1.13 In terms of the known uncertainty:

a. The core scenario forms the basis of the identified transport impacts, as reported in the Transport Assessment, and the identified likely environmental effects, as reported in the Environmental Statement. Specifically:

i. Disbenefits arising as a result of forecast changes in traffic flows across the highway network leading to adverse impacts at specific junctions have been considered in the economic appraisal. The reported Transport Economic Efficiency analyses within Appendix D of the Combined Modelling and Appraisal Report [**APP-525**] account for the disbenefits that arise from these impacts by providing a net assessment of both the benefits and disbenefits. The net positive transport economic efficiency benefit demonstrated through this assessment evidences that the cumulative impacts are beneficial. Table A.34 of this document sets out that as well as the cumulative impacts being beneficial on a Project-wide basis, they are also beneficial on a sectoral basis, considering each of the geographical sectors analysed.

ii. The Transport Assessment reports on both localised impacts and benefits (in Plates 7.25 to 7.36 of the main document) and impacts on the network through reporting journey time changes which consider both benefits and disbenefits, in 2030 and 2045, included as Appendix B [**REP4-154**] and Appendix C [**REP4-156**] respectively. All impacts and journey times are considered in the above referenced Transport Economic Efficiency analyses, however the Transport Assessment provides key information to illustrate these impacts. Impacts and benefits in high and low growth scenarios are also set out, in Appendix D of the same report [**APP-533**].

iii. The environmental impact assessment considers the known uncertainty as the consequential changes in traffic inform the development of the core scenario, which by forming the basis of any assessments of the consequences of changing traffic flows, defines the likely effects, notably with regard to air quality and noise impacts.

iv. The safety assessment accounts for impacts on the network by accounting for the changes that congestion and relief on the highway network would have on traffic routing along specific roads, and then

determining consequential changes in the number of collisions. Information on this analysis is set out in Chapter 9 of the Transport Assessment [**REP4-152**], and Section 8.6 of the Economic Appraisal Report (Appendix D of the Combined Modelling and Appraisal Report [**APP-525**]) demonstrating compliance with paragraph 4.61 of the NPSNN (DfT, 2014).

b. The high and low growth scenarios have been used to develop benefit cost ratios, which are reported in Table 11.4 of Appendix D of the Combined Modelling and Appraisal Report [**APP-525**], showing compliance with the requirements within paragraph 4.6 of the NPSNN on the purpose of these alternative scenarios.

3.1.14 In terms of unknown uncertainty, consideration of this in either the transport assessments or the environmental impact assessment is not necessary under legislation, nor is it required by the NPSNN, and so should not form a consideration in the planning balance. The very nature of such unknown uncertainties is such that it would not be appropriate for a single project to have to consider management, and they are therefore, reasonably, addressed at a national level through government funding to state institutions that address any consequences, in accordance with the need and national spending priorities. The Project commitment to monitoring in order to help inform those future processes is a model approach, which goes beyond the requirements of the NPSNN and which recognises concerns about uncertainty.

3.2 Consideration of the Project position on unacceptable impacts

3.2.1 The Applicant has set out its view on compliance with policy regarding the impacts on traffic flows on the wider networks within Appendix F of the Transport Assessment [**APP-535**]. For clarity, and in relation to the topic areas identified as containing tests of 'unacceptable' impact within the NPS, compliance with the requirements is explained below.

Safety

3.2.2 The test requires that a project achieves two things, and then sets out the means by which this should be achieved. The two outcomes are that a project should minimise the risk of road casualties arising from the scheme, and that a project should contribute to an overall improvement in the safety of the SRN (NPSNN paragraph 4.66 (DfT, 2014)). These outcomes must be demonstrated through undertaking three core processes:

a. Firstly, a project should undertake an objective assessment of the impact of the proposed development on safety, using the methodology outlined in guidance from the DfT (NPSNN paragraph 4.61). Section 9 of the Transport Assessment [**REP4-152**] sets out the safety assessment, which concluded that the Project would result in a net reduction in the accident cost per km driven over the 60 year appraisal period.

b. Secondly, a project should undertake a road safety audit during the development of the proposals, take account of the findings, and continue to undertake further road safety audits as the design progresses at the next stage (NPSNN paragraph 4.62 and 4.63). That section also provides information on the road safety audit process (undertaken following the guidance in Design Manual for Roads and Bridges GG 119 - Road safety audit (Highways England, 2020)) that was undertaken during preliminary design (stage 1), as well as confirming the further stages that will be completed during the ongoing scheme development (Stage 2 – detailed design, Stage 3 – completion of construction and Stage 4 – 12 months post-opening). The road safety audit process is reported in Section 9.2 of the Transport Assessment [**REP4-152**]. It should be noted that a road safety audit is only conducted on the proposed new or improved highways, and not on the wider road network, in accordance with the requirements of GG 119 paragraph 2.1: "*Where there are physical changes to the highway impacting on road user behaviour or resulting in a change to the outcome of a collision on the trunk road and motorway network*".

c. Thirdly, a project should put in place rigorous processes for monitoring and evaluating safety (NPSNN paragraph 4.65). National Highways undertakes a Post Opening Project Evaluation (POPE) exercise on all major improvement projects, which requires evaluation of safety after the opening of a project, and would be conducted for the A122 Lower Thames Crossing. Details of this process are provided in the POPE Methodology Manual (National Highways, 2022). The stage 4 Road safety audit would also undertaken 12 months after the opening of the Project, which would inform any amendments required to the highways constructed under the Order.

Environment

3.2.3 Environment – the effects of changing traffic flows on the environment are considered in the Environmental Statement and are not duplicated here. Compliance with each element of the policy is summarised in the National Policy Statement for National Networks Accordance Table at Appendix A of the Planning Statement [**APP-496**], and addressed in detail in the relevant sections of the Environmental Statement.

Severance and accessibility

3.2.4 The test, at paragraph 5.216 of the NPSNN (DfT, 2014) states "*Where development would worsen accessibility such impacts should be mitigated so far as reasonably possible. There is a very strong expectation that impacts on accessibility for non-motorised users should be mitigated.*"

3.2.5 A severance assessment has been completed and is reported in Section 7.2 of the Health and Equalities Impact Assessment [**REP3-118**]. This assessment has considered the potential separation of residents from community facilities and the services they use within their community as a result of substantial changes in transport infrastructure or by changes in traffic flows arising from the

Project. The assessment identified locations where mitigation should be provided, including Elaine Avenue (Strood), Brennan Drive (Tilbury) and Valley Drive (Gravesend). These locations were initially identified as secured in the proposed S106 Heads of Terms [**APP-505**], and as discussions proceed with the relevant authorities, updates have been provided in the Consents and Agreements Position Statement [**Document Reference 3.3**].

3.3 Consideration of specific locations

3.3.1 A number of locations have been identified by Interested Parties as having specific impacts through the Examination. Together these locations can be considered as a series of corridors, including:

a. Blue Bell Hill corridor

b. A13 corridor

c. A2/M2 corridor

d. A1089 (Asda roundabout)

3.3.2 Appendix A provides a series of figures showing the volume over capacity at these locations, as forecast by the Project's transport model, for each modelled time period (AM peak, inter-peak and PM peak), for 2030 and 2045, for two scenarios - both without and with the A122 Lower Thames Crossing. The plates provide the same information as supplied in the Transport Assessment [**REP4-148**], within Plates 7.19 to 7.24, as well as within Plates 5.10 to 5.15 of the Traffic Forecasts Non-Technical Summary [**APP-528**], however the larger scale of the plates facilitates a view of these impacts on a corridor basis.

3.3.3 Table 3.1 sets out for each junction identified, how these are considered within the application materials with reference to the findings within the Transport Assessment [**REP4-148**], including Appendix B [**REP4-154**] and Appendix C [**REP4-156**], as well as Appendix D of the Combined Modelling and Appraisal Report [**APP-526**]. The table also identifies where work is in hand to examine these locations through the current Road Investment Strategy, or in the preparation works that inform the next Road Investment Strategy, or through other mechanisms.

Table 3.1 Consideration of disbenefits arising from areas of Wider Network Impacts identified by Interested Parties

Location		Disbenefits considered within Transport Assessment and Combined Modelling and Aprpaisal Report	Route Strategy consideration
Bluebell Hill Corridor	M20 junction 6 (junction with the A229 at Blue Bell Hill)	• Identified as having Major Adverse Impacts in 2030 in the Transport Assessment • All transport disbenefits accounted for in the Transport Economic Efficiency analyses • Journeys along the M20 considered in the journey time changes assessment	Route Strategy Initial Overview Report: Kent Corridors to M25 Route - M20 and M2 (LRN and MRN interaction with SRN) identified as area location F
	M2 junction 3 (junction with the A229 at Blue Bell Hill)	• Identified as having Major Adverse Impacts in 2030 in the Transport Assessment • All transport disbenefits accounted for in the Transport Economic Efficiency analyses • Journeys along the M2 considered in the journey time changes assessment	Route Strategy Initial Overview Report: Kent Corridors to M25 Route - M20 and M2 (LRN and MRN interaction with SRN) identified as area location F
A13 Corridor	Orsett Cock junction	• Identified as having Moderate Adverse Impacts in 2030 in the Transport Assessment • All transport disbenefits accounted for in the Transport Economic Efficiency analyses • Journeys along the A13 considered in the journey time changes assessment • Journeys to and from London Gateway considered in the journey time assessment	Road Investment Strategy 2: Consideration of trunking: A13/A1014 from the end of the trunked A13 through to the London Gateway Port
	Manorway junction	• Identified as having Major Adverse Impacts in 2030 in the Transport Assessment • All transport disbenefits accounted for in the Transport Economic Efficiency analyses • Journeys along the A13 considered in the journey time changes assessment	Road Investment Strategy 2: Consideration of trunking: A13/A1014 from the end of the trunked A13 through to the London Gateway Port

Location		Disbenefits considered within Transport Assessment and Combined Modelling and Aprpaisal Report	Route Strategy consideration
		• Journeys to and from London Gateway considered in the journey time assessment	
	Five Bells Interchange	• Identified as having Major Adverse Impacts in 2030 in the Transport Assessment • All transport disbenefits accounted for in the Transport Economic Efficiency analyses • Journeys along the A13 considered in the journey time changes assessment	In May 2023 DfT consulted on "*Shaping the future of England's strategic roads*" (DfT, 2023) including the potential to trunk A13 & A130 – Stanford-le-Hope to Southend-on-Sea
	Pitsea Interchange	• Identified as having Major Adverse Impacts in 2030 in the Transport Assessment • All transport disbenefits accounted for in the Transport Economic Efficiency analyses • Journeys along the A13 considered in the journey time changes assessment	In May 2023 DfT consulted on "*Shaping the future of England's strategic roads*" including the potential to trunk A13 & A130 – Stanford-le-Hope to Southend-on-Sea
A2 / M2 Corridor	M25 junction 2 (junction with the A2)	• Identified as having Moderate Adverse Impacts in 2030 in the Transport Assessment • All transport disbenefits accounted for in the Transport Economic Efficiency analyses • Journey times along the M25, and between the M25 and the A2 considered in the journey time changes assessment	Route Strategy Initial Overview Report: London Orbital and M23 - M25 / A282 Dartford (Badgers Mount to Upminster) A2 (Bexley), A20 (Swanley) and A13 (Aveley) identified as area location A
	A2 Pepper Hill (junction with Springhead road)	• Identified as having Major Adverse Impacts in 2030 in the Transport Assessment • All transport disbenefits accounted for in the Transport Economic Efficiency analyses • Journeys along the A2 considered in the journey time changes assessment	Corridor was reviewed as part of the work informing Route Strategy Initial Overview Report: Kent Corridors to M25 Route - M20 and M2 (LRN and MRN interaction with SRN), Not identified as a specific area for further consideration.

Location		Disbenefits considered within Transport Assessment and Combined Modelling and Aprpaisal Report	Route Strategy consideration
	A2 junction with A227 (Wrotham Road)	• Identified as having Minor Adverse Impacts in 2030 in the Transport Assessment • All transport disbenefits accounted for in the Transport Economic Efficiency analyses • Journeys along the A2 considered in the journey time changes assessment	Corridor was reviewed as part of the work informing Route Strategy Initial Overview Report: Kent Corridors to M25 Route - M20 and M2 (LRN and MRN interaction with SRN), Not identified as a specific area for further consideration.
	A2 Gravesend East junction (including Valley Drive)	• Valley Drive Identified as having Minor Adverse Impacts in 2030 in the Transport Assessment • All transport disbenefits accounted for in the Transport Economic Efficiency analyses	Route Strategy Initial Overview Report: Kent Corridors to M25 Route - M20 and M2 (LRN and MRN interaction with SRN) identified as area location F
	M2 junction 1 (including connections onto A289)	• Identified as having Moderate Adverse Impacts in 2030 in the Transport Assessment • All transport disbenefits accounted for in the Transport Economic Efficiency analyses • Journeys along the M2 and A2 considered in the journey time changes assessment	Route Strategy Initial Overview Report: Kent Corridors to M25 Route - M20 and M2 (LRN and MRN interaction with SRN) identified as area location F
	M2 junction 2 (with the A228)	• Identified as having Moderate Adverse Impacts in 2030 in the Transport Assessment • All transport disbenefits accounted for in the Transport Economic Efficiency analyses • Journeys along the M2 considered in the journey time changes assessment	Route Strategy Initial Overview Report: Kent Corridors to M25 Route - M20 and M2 (LRN and MRN interaction with SRN) identified as area location F
A1089	Asda roundabout	• Not identified as having adverse impacts in 2030 in the Transport Assessment • All transport disbenefits accounted for in the Transport Economic Efficiency analyses • Journeys to and from Port of Tilbury considered in the journey time assessment.	Route Strategy Initial Overview Report: Kent Corridors to M25 Route - A1089 and A13 to M25 identified as Area of interest B

3.3.4 Each of these corridors has been considered carefully in accordance with the tests set out within the NPSNN (DfT, 2014), and consideration against the tests relating to safety and severance is provided below. As previously stated, compliance with the tests against unacceptability as regards environmental considerations are set out separately in the Environmental Statement.

Blue Bell Hill corridor

3.3.5 Blue Bell Hill provides an important connection between the M2 and the M20, and is forecast to see increases in traffic flows, mostly in the morning as traffic travels from the M20 to the M2 to join the A122 Lower Thames Crossing. There would therefore be increased traffic flows leaving the M20 to travel along A229, exacerbating the existing impacts on Blue Bell Hill Interchange. This traffic travels north and joins the M2, which will have increased traffic flows due to other drivers taking advantage of the A122 Lower Thames Crossing, and this leads to an impact for drivers trying to join the M2. Existing issues in this area have already been identified:

a. Conditions relating to the M20 and M2 and the connections with the LRN are set out in the Route Strategy Initial Overview Report - Kent Corridors to M25 (National Highways, 2023)

b. Conditions on the A229 and junctions are considered in the Blue Bell Hill road scheme being promoted by Kent County Council.

3.3.6 These impacts arise directly as a consequence of traffic benefiting from the Project, and provide a clear example of how the impacts need to be considered in light of the net benefits the Project provides.

Severance

3.3.7 With regard to severance, the A229 is also a major dual carriageway and already has grade separated walking and cycling crossing facilities unimpeded by changing traffic flows. In terms of the connecting roads, there will again be increases and decreases in flows. There are two notable areas for consideration:

a. At the interchange with the M2, there is already a network of segregated shared provision for cyclists and walkers, with controlled crossings.

b. At the interchange with the M20, there is a network of tracks for walkers and cyclists across the area, with provision of some subways and bridges to cross major links such as the off-slip from the M20. This segregated network provides for connectivity across the links impacted by the opening of the A122 Lower Thames Crossing.

Safety

3.3.8 The safety assessment undertaken in accordance with NPSNN paragraph 4.61 (DfT, 2014) and reported in Section 9 of the Transport Assessment [**REP4-152**] includes the M2, the M20 and the A229 within the assessment. This assessment provides the necessary compliance with paragraph 4.61 of the NPSNN.

3.3.9 Paragraphs 4.62 and 4.63 of the NPSNN, requiring a road safety audit, do not apply to Blue Bell Hill as the Applicant does not propose to make any physical changes to the highways network at this location as part of the Project.

3.3.10 The A229 is a dual carriageway which has been designed to accommodate high flows of traffic both on the carriageway and at the interchanges, though it is noted that there are currently a high number of incidents on this section of highway. This forms a key part of the objectives for the A229 Blue Bell Hill improvement scheme proposed by Kent County Council to "*improve road safety and address known accident hotspots*".

3.3.11 The M2 and the M20, as motorways, are also designed to accommodate high traffic flows, and have additional safety provision such as technology providing the ability to reduce speed limits and Variable Message Signs (VMS) to inform drivers of queues.

A13 Corridor

3.3.12 The A13 forms an important transport corridor, with a series of junctions including the Orsett Cock junction, Manorway junction, Five Bells interchange and Pitsea interchange. Following the opening of the A122 Lower Thames Crossing there is forecast to be an increase in traffic along the A13 to the east of the junction with the new road, as people seek to use it to access the Lower Thames Crossing, as well as to benefit from the relief provided on the A13 west of the Project and at M25 junction 30. As a result of the increased traffic flow, there would be impacts on a number of the on-slips and off-slips along this corridor, as identified in the Transport Assessment [**REP4-148** to **REP4-152**]. These impacts arise directly as a consequence of traffic benefiting from the Project, and provide a clear example of how the impacts need to be considered in light of the benefits the project Provides.

3.3.13 The Road Investment Strategy 2: 2020 – 2025 (DfT, 2020) identifies the potential for the A13 from the existing SRN as far as Manorway junction to be trunked, stating "*Consideration of trunking: A13/A1014 from the end of the trunked A13 through to the* […] *London Gateway Port*", while in May 2023 the DfT consulted on "Shaping the future of England's strategic roads" including the potential to trunk A13 & A130 – Stanford-le-Hope to Southend-on-Sea, which would include Five Bells Interchange and Pitsea Interchange.

Severance

3.3.14 The A13 is itself a major dual carriageway, and while not prohibited to walkers and cyclists it is not appropriate for their use. A number of crossing exist for walkers and cyclists, both associated with highways and specifically for use by non-motorised users. In terms of the connecting roads, some would experience increases in flows, and others reductions. However, the majority of the impacts relating to traffic flows arise on the slips joining and/or leaving the A13, which are also not used by walkers or cyclists.

3.3.15 One location does not conform to this pattern, the Orsett Cock junction, where a forecast increase in traffic flows would arise around the roundabout. Currently there is a mix of controlled and uncontrolled crossings for walkers and cyclists across the roundabout. As has been noted, the Applicant has identified that at detailed design consideration would be given to further signalisation of the

circulatory, which would allow for more controlled crossings. The Applicant has proposed a Requirement for a scheme to be prepared for the Orsett Cock junction prior to construction, and that scheme would require consideration of walkers and cyclists (proposed in the Wider Network Impacts Update [**REP5-085**] and has been inserted into the draft DCO **[Document Reference 3.1(8)]** at Deadline 6.

3.3.16 In addition, the proposed design enhances the provision for walkers and cyclists provided at Rectory Road, which would provide a better and more direct route for people seeking to travel between the communities of Orsett and either Grays or Chadwell St Mary. As such, there is not considered to be an issue with severance on the A13 corridor.

Safety

3.3.17 The safety assessment undertaken in accordance with NPSNN paragraph 4.61 (DfT, 2014) and reported in Chapter 9 of the Transport Assessment [**REP4-152**] includes the A13. This assessment provides the necessary compliance with paragraph 4.61 of the NPSNN.

3.3.18 Paragraphs 4.62 and 4.63 of the NPSNN, requiring a road safety audit, do not apply to Manorway, Five Bells Interchange and Pitsea Interchange as the Applicant does not propose to make any physical changes to the highway network at these locations.

3.3.19 The Orsett Cock junction comprises a series of slip roads and the circulatory itself. Although the preliminary design does not include any physical changes to the design of the roundabout itself, a road safety audit was conducted as a component of the full Project audit process during the development of the preliminary design. A road safety audit has been prepared for the slip roads that are proposed to be modified by the Project, including the A1013, and the A13 west-facing on and off-slips, as well as on the A13 mainline where it is modified to accommodate the changed connections. As with all elements where further design work is to be undertaken, Stage 2, 3 and 4 road safety audits will be prepared at the appropriate stages and if necessary the works designed and amended accordingly.

3.3.20 The A13 is a dual carriageway which has been designed to accommodate high flows of traffic both on the carriageway and at the interchanges. Roads of this nature are designed not to become inherently unsafe in the event of congestion and queues, including when network incidents occur, and so have appropriate sightlines for traffic that take account of the speed of the traffic and the need for drivers to respond to different traffic conditions.

A2 / M2 corridor

3.3.21 There is forecast to be an increase in flows on the A2/M2 corridor to the east of the junction with the A122 Lower Thames Crossing, as drivers choose to use the new provision. This increase in flows on the M2 would impact on users trying to join from connecting roads. To the west of this junction there is forecast to be a reduction in traffic flows on the A2, leading to impacts on roads approaching the A2 as people join the road network to take advantage of improved journey times.

3.3.22 The corridor was reviewed during preparation of two Route Strategy Initial Overview Reports, and areas of interest were identified as follows:

a. Route Strategy Initial Overview Report: Kent Corridors to M25 Route (National Highways, 2023) - identified the section from Gravesend East to M2 Junction 2 as area location F, as well as the continuation of the M2 as far as junction 5

b. Route Strategy Initial Overview Report: London Orbital and M23 (National Highways, 2023) - M20 and M2 (LRN and MRN interaction with SRN) identified the section from Gravesend East to M2 Junction 2 as area location F, as well as the continuation of the M2 as far as junction 5

Severance

3.3.23 The M2 and the associated slip roads are prohibited to walkers and cyclists, and while the A2 is not prohibited to walkers and cyclists it is not appropriate for their use. Considering the importance of this corridor, there is considerable provision for segregated walkers and cyclists along the length of the corridor and crossing the existing A2.

3.3.24 The severance assessment did identify that there was an increase in traffic along Wrotham Road (the A227) as reported in Table 7.10 of the Health and Equalities Impact Assessment [**APP-539**]. However, appropriate pedestrian refuges were identified at various points through Meopham.

3.3.25 An increase in traffic along Valley Drive, connecting onto the Gravesend East junction, was also identified, and while a number of crossing points were identified, including refuge points, a crossing points with dropped kerbs / tactile paving in the southern section of the road meant that an existing accessibility issue would be exacerbated by the Project, and in accordance with paragraph 5.216 of the NPSNN (DfT, 2014) there is a strong expectation that this should be mitigated. As indicated in the Consents and Agreements Position Statement **[Document Reference 3.3]**. The Applicant has prepared a feasibility assessment identifying opportunities to reduce severance at this location, and engaged with Gravesham Borough Council and Kent County Council on the next steps confirming that the obligation for Valley Drive will sit within the section 106 agreement with Kent County Council as the Highway Authority, and the Applicant has made a proposal for a financial contribution.

Safety

3.3.26 The safety assessment undertaken in accordance with NPSNN paragraph 4.61 and reported in Chapter 9 of the Transport Assessment [**REP4-152**] includes the A2, the M2, the A227, the A228, the A289, Springhead Road and Valley Drive within the assessment.

3.3.27 As with the A13, there are elements of the A2 / M2 corridor that are included within the preliminary design, including the Gravesend East junction, the A2 between the Gravesend East junction and M2 junction 1, and elements of M2 junction 1 itself. All of these elements have been assessed in the road safety audit undertaken in accordance with paragraphs 4.62 and 4.63 of the NPSNN.

No road safety audit is required on other sections of the highway network, as no physical changes are proposed by the Applicant as part of the Project.

Asda roundabout

3.3.28 Following the opening of the A122 Lower Thames Crossing, there would be a forecast increase in traffic flowing through the Asda roundabout, most notably joining from the A126 Dock Road. This traffic arises as people choose to make journeys using the A1089 and A13, taking advantage of the relief provided by the A122 Lower Thames Crossing. By 2045 the Asda roundabout is forecast to experience congestion in the Do Minimum scenario, and this traffic benefitting from the A122 Lower Thames Crossing will lead to an exacerbation those impacts. Again, this demonstrates that the impacts need to be considered in a comprehensive and balanced sense, as they arise through people taking advantage of the benefits arising from the project.

3.3.29 The Route Strategy Initial Overview Report: Kent Corridors to M25 Route (National Highways, 2023) - identified the highway from Port of Tilbury to the M25 Junction 30, including the A1089 and the stretch of the A13, as area location B; also identifying that the Tilbury Link Road, first identified as a pipeline scheme in Road Investment Strategy 2: 2020-2025 (DfT, 2020), is important to connectivity in this area.

Severance

3.3.30 With regard to severance, the Asda roundabout sits within a network of footpaths that connect the nearby communities with workplaces and also the Asda supermarket. There are uncontrolled crossings along affected links, including in proximity to the Asda roundabout, over the A126 Dock Road and St Andrew's Road (A1089 south of the roundabout). However, the community is better served by a separate route that is located further south, which passes underneath St Andrew's Road.

Safety

3.3.31 The safety assessment undertaken in accordance with NPSNN paragraph 4.61 (DfT, 2014) and reported in Chapter 9 of the Transport Assessment [**REP4-152**] includes the A1089 and the Asda roundabout within the assessment.

3.3.32 No road safety audit is required at this location to demonstrate compliance with paragraphs 4.62 and 4.63 of the NPSNN, as no physical changes are proposed by the Applicant as part of the Project.

3.3.33 This stretch of road has been designed to accommodate high traffic flows, and as set out previously, the increased flows through this junction are not considered to provide an unacceptable impact on safety.

4 Consideration of the Silvertown Tunnel approach

4.1 Benefits or otherwise of the "Silvertown Alternative approach"

Introduction

4.1.1 The Applicant's Wider Network Impacts Monitoring and Management Plan [**APP-545**] proposes that the output from monitoring the effects of the Project should feed into existing processes and funding streams for investment into the SRN and LRN.

4.1.2 Interested parties have expressed concern that this route is too remote and does not guarantee the implementation of any necessary mitigation. Those parties have proposed an alternative monitoring and mitigation approach, citing the process adopted in the Silvertown Tunnel DCO as preferable.

Principles of the Silvertown approach

4.1.3 It is obviously important to understand the characteristics of the 'Silvertown approach'. The basic structure is set out below and then discussed in more detail.

4.1.4 The Silvertown Tunnel DCO puts in place a framework for pre-opening mitigation and post-opening monitoring and mitigation, and considers a series of aspects including highways impacts, air quality and noise impacts, and socio-economic impacts. The Applicant considers that the nature of the proposed A122 Lower Thames Crossing proposals substantially differ from the Silvertown Tunnel proposals as follows:

a. The pre-opening aspects of the Silvertown Tunnel DCO Monitoring and Mitigation Strategy (Transport for London, 2017) are not applicable, as the Applicant has set out clearly the impacts within the wider application materials, and where appropriate has included mitigation within the Project.

b. The air quality and noise monitoring aspects of the Silvertown Tunnel DCO Monitoring and Mitigation Strategy are not applicable. The Applicant has provided a response to the Examining Authority's questions:

   i. Air Quality - ExQ1_5.1.11 (Monitoring – Operational Phase) within Responses to the Examining Authority's ExQ1 Appendix C – 5. Air Quality [**REP4-190**]

   ii. Noise - ExQ1_9.5.2 within Appendix E of the response, 9. Noise & Vibration [**REP4-192**] and ExQ2_9.1.4 in Applicant's Response to ExQ2 [**Document Reference 9.152**] alongside this submission.

4.1.5 The approach set out in the Silvertown Tunnel DCO works as follows in relation to post opening monitoring and mitigation of highways impacts:

a. Requirement 7 provides that the Applicant must:

i. adhere to a Monitoring and Mitigation Strategy (MMS) (included as Appendix B).

ii. post opening of the tunnel: undertake monitoring and provide the results to Silvertown Tunnel Implementation Group (STIG), identify in consultation with STIG 'thresholds' of changes in traffic conditions which require the need for mitigation to be investigated; develop in consultation with STIG any measures which are necessary to mitigate adverse highways impacts caused by the project and implement or secure the implementation of the necessary mitigation measures.

4.1.6 STIG comprises representatives of relevant local and highway authorities (equivalent to the group established through Table 2.1 of the Wider Network Impacts Monitoring and Management Plan [**APP-545**]. STIG is established through Article 66 of the Silvertown DCO.

4.1.7 In principle, the provisions at Silvertown are not dissimilar to those for the Project. Parties appear to believe that the Silvertown approach somehow secures a particular scale of mitigation and/or that the local authorities will be able to determine that mitigation through their role in STIG.

4.1.8 However, that is not the case and, in particular:

a. while requirement 7 describes mitigation in the context of a "*material worsening in traffic conditions*", it does not define "*material"*. In fact, Requirement 7 (10) requires the Applicant to "*identify in consultation with the members of STIG appropriate thresholds for changes on the highway network which require TfL to investigate whether mitigation measures are necessary*."

b. The Requirement obliges the parties to "*carry out the provisions of the requirement in accordance with the MMS*". The MMS makes clear that:

i. It is for TfL to conclude "*that any adverse changes in traffic metrics are a consequence of the Scheme in operation*" and only then will TfL "*consider the appropriate form of mitigation in consultation* [with] *the highway authority on whose roads the measures may be required.*" (paragraph 4.2.3)

ii. Triggers are identified in Appendix E of the MMS but the document is clear that their purpose is to provide an alert where traffic conditions exceed levels anticipated, so that there may be something to investigate – the triggers are not thresholds of acceptability (Annex E E1.1)

iii. "*If TfL determines that mitigation is not required following a trigger activation it will provide the members of STIG with a clear justification for this.*" (Annex E E1.2)

4.1.9 The Applicant has set out above how the known impacts of the Project, as determined through the forecasts have been identified, assessed and where appropriate mitigated in accordance with the requirements of the NPSNN (DfT, 2014). As described in Section 3.1, there are unknown factors that may arise, through developments that are currently insufficiently defined to meet the requirements for consideration, through changes in Government policy, and through other factors that could, in combination with the changes to the traffic flows arising from the A122 Lower Thames Crossing, lead to the need for further interventions on the highways network. These uncertain aspects were acknowledged by the Secretary of State in the decision made regarding the Silvertown Tunnel, with the following statement in paragraph 18 of the Decision Letter (DfT, 2018) *"The Secretary of State also agrees with the Panel that there are inevitable significant uncertainties in traffic forecasting and modelling* […] *and that to address this, adequately resourced and independent monitoring needs to be put in place. This is to ensure that mitigation measures can be implemented expeditiously, and on the basis of robust information, should the need arise to effect changes in the user regime or other complementary measures"*.

4.1.10 Importantly, this statement indicates the purpose of the post-opening Silvertown Tunnel DCO MMS, being to provide a framework for the management of unknown uncertainties, and providing for monitoring that could inform the development of any mitigation measures, rather than directly requiring mitigation to be secured based on any specific threshold.

4.1.11 This much is not surprising. No regional or strategic highway authority is likely to put itself in a position where the extent of mitigation is determined by the requests and expectations of local highway authorities. There is no absolute test specified in policy which determines when a link or junction must be improved – it is not an objective formula, it is a matter of judgement and negotiation, inevitably taking account of the extent of available funds. Equally, any Secretary of State is unlikely to give up control of public spending or allow its agencies to do so. The Circular, Strategic road network and the delivery of sustainable development (DfT, 2022a) is explicit in paragraph 2 that the Secretary of State sets the budget for National Highways. All road investment decisions require a judgement, taking account of competing priorities.

4.1.12 It is also notable that the Secretary of State made a modification to the Requirement when the order was made, (paragraph 102 of the Decision Letter) which "*allows the Secretary of State to delegate the functions with respect to pre-opening traffic measures to the Mayor of London, with the Mayor's consent, as the Secretary of State considers that the monitoring and mitigation strategy may fit better with the Mayor's responsibilities"*. This also reflects the specific position of Transport for London as sitting within the devolved power of the Mayor of London, with the funding decisions in the authority area, both with regard to TfL and with the local highway authorities within the GLA, sitting under the Greater London Authority.

Comparison with Wider Network Impacts Management and Monitoring Plan

4.1.13 The Silvertown process is not what parties appear to believe it to be. It does not define a scale of future mitigation, nor give control over future mitigation to local interests. Like the Wider Networks approach, it commits to working with highway authorities and to transparently monitoring future conditions, so that knowledge of those conditions can inform future network investment decisions made by the relevant authority. The post-opening approach to consideration of highways impacts is intended to deal with uncertainty, rather than to address known impacts of the project.

4.1.14 It is a process suited to the circumstances of that project and to the operation of powers within London.

4.1.15 Consequently, the process into which the Wider Network Impacts Management and Monitoring Plan [**APP-545**] feeds the results of its monitoring in this case is most obviously appropriate in this case. That process is tried and tested. It is already established and operating for the purpose of informing future investment decisions. It is highly consultative and does not need to be recreated for the purposes of this application.

4.1.16 That process has multiple advantages over any other, particularly the ability to balance priorities in a transparent, consultative and methodological way; and its inherent characteristic of recognising that any judgement on priorities must be fair and must be undertaken in the knowledge of constraints or otherwise on public funds.

4.1.17 But it also has one other clear benefit compared with any scheme which focuses only on the impacts of a single project. Even in the very near future, any impacts of the A122 Lower Thames Crossing will only be one factor among wider changes arising from multiple planning decisions and shifts in economic forces or public behaviour. Focusing a strategy on mitigating the isolated impacts of one project is very likely to be inefficient and sometimes wrong. Far better must be the strategy that leads to decisions in the Road Investment Strategy, which takes account of all factors in determining which road investments should be made.

4.2 Proposed Requirement

4.2.1 The following Requirement is proposed on a without prejudice basis. The Applicant maintains that the DCO as currently drafted, when taken in combination with the licence obligations under which National Highways operates (Highways England: licence, DfT, 2015) and the wider government framework including the Infrastructure Act 2015, provides a sufficient and robust framework to manage any impacts that might arise on the wider highways network, whether known and forecasted, or unknown.

4.2.2 Nevertheless, should the Examining Authority or the Secretary of State consider that additional security to the delivery of this process should be incorporated into a made DCO, then the following wording would be considered appropriate by the Applicant:

Network Management Group

17.—(1) The undertaker must establish and fund the reasonable secretarial and administrative costs of a consultative body to be known as the Lower Thames Network Management Group (in this Order referred to as "NMG") and the first meeting of the NMG must be held not less than one year prior to the opening of the tunnel area, and thereafter at least once each calendar year on a date to be determined by the undertaker (who must undertake reasonable endeavours to identify a date which ensures attendance of the authorities and bodies under subparagraph (2)).

(2) The NMG will comprise the authorities and bodies identified in Table 2.1 of the wider network impacts management and monitoring plan.

(3) The undertaker will, at each meeting held in a year in which monitoring under paragraph 14 is produced, consult the NMG on a proposed network management plan which must provide—

(a) the undertaker's commentary on the outputs of the monitoring produced pursuant to paragraph 14;

(b) a description of the traffic conditions on the road network arising directly as a result of the operation of the authorised development which would require intervention;

(c) interventions or measures which the undertaker proposes to address any traffic conditions identified in accordance with subparagraph (b);

(d) steps which the undertaker is proposing to take in connection with—

(i) implementing the interventions identified under sub-paragraph (c) where such measures can be implemented using the permitted development rights vested in the undertaker;

(ii) where sub-paragraph (i) does not apply, incorporating any of the interventions identified under sub-paragraph (c) in the initial report or route strategies; and

(iii) cooperating with the relevant highway authority with introducing the measure or seeking funding for that intervention or measure; and

(e) a written account of how any representations made in relation to a meeting held under paragraph (6) has been considered by the undertaker.

(4) Following consultation with the NMG under paragraph (3) on the proposed network management plan, the undertaker must submit the network management plan to the Secretary of State for approval who may make amendments to the network management plan, following consultation with the undertaker, where it considers further interventions or measures are required.

(5) The undertaker must implement the network management plan approved under paragraph (4).

(6) The undertaker will, at each meeting held under paragraph (1), consult the NMG on the operational traffic impacts directly arising from the operation of the authorised development, and where available, on the

implementation of the network management plan approved under paragraph (5).

(7) In this paragraph
"the 2015 Act" means the Infrastructure Act 2015;
"initial report" means the initial report for the strategic road network pursuant to paragraph 6.6 of the undertaker's licence under the 2015 Act; and
"route strategies" means the route strategies prepared in respect of the road network work pursuant to paragraph 5.13 of the undertaker's licence under the 2015 Act.

4.2.3 The Applicant emphasises that such a requirement is not necessary because of its position on the application of policy in the NPSNN set out above. The Applicant therefore considers that such a requirement would fail to meet the test for requirements in paragraph 4.9 of the NPSNN; and the Applicant would go further and say that such a requirement would undermine the established framework for funding decisions and conflict with Government policy, including the Road Investment Strategy which explicitly states that Government will consider further interventions which may further address the wider network impacts arising from the Project.

4.3 Application of the proposed Requirement

4.3.1 For the national road investment framework to function as intended, it needs to support delivery of interventions that vary in size and complexity, from localised signal timing changes through to substantial schemes that are subject to a full investment decision.

4.3.2 Future interventions on the highways network are funded through multiple mechanisms, and the appropriate route of funding would be determined, with or without the inclusion of the without prejudice requirement, through consideration of the specific nature of the intervention proposed. To demonstrate how funding would apply, a series of different intervention scenarios have been prepared as set out in Table 4.1 identifying potential funding sources that could be utilised.

4.3.3 Table 4.1 also identified how, should the without prejudice Requirement be included, it would align with the various funding scenarios.

Table 4.1 Implementation scenarios for the proposed Requirement

Road type	Nature of intervention	Application of Requirement	Likely sources of funding
SRN	Changes to signal timing	Requirement (3)(d)(i) – Direction provided to National Highways Operations to review signals	C
	Minor modifications (white lining / signage / signalisation)	Requirement (3)(d)(i) – Subject to Secretary of State approval, implementation by National Highways Operations	C
	Limited physical works within highways boundary (e.g. merge modifications)	Requirement (3)(d)(i) – Subject to Secretary of State approval, direction provided to National Highways Operations to proceed with development of Business Case	C, G
	Major works within highways boundary	Subject to Secretary of State approval: • Either Requirement (3)(d)(i) – direction provided to National Highways Operations to proceed with development of Business Case • Otherwise Requirement (3)(d)(ii) – incorporation into the route strategy or initial report by National Highways Strategic Planning team	A, C, D, E, G
	Major works outside highways boundary	Requirement (3)(d)(ii) – Subject to Secretary of State approval, incorporation into the route strategy or initial report by National Highways Strategic Planning team	A, G
LRN	Changes to signal timing	Requirement (3)(d)(iii) – Advice provided to Local Highways Authority team to review signals	F
	Minor modifications (white lining / signage / signalisation)	Requirement (3)(d)(iii) – Co-operation with Local Highways Authority team in seeking funding	F, G
	At grade severance issues (e.g. pedestrian crossing)	Requirement (3)(d)(iii) – Co-operation with Local Highways Authority team in seeking funding	E, F, G
	Grade separated severance issues	Requirement (3)(d)(iii) – Co-operation with Local Highways Authority team in seeking funding	E, F, G

Road type	Nature of intervention	Application of Requirement	Likely sources of funding
	Major works within highways boundary	Requirement (3)(d)(iii) – Co-operation with Local Highways Authority team in seeking funding	B, E, F, G
	Major works outside highways boundary	Requirement (3)(d)(iii) – Co-operation with Local Highways Authority team in seeking funding	B

Potential funding stream key:	
A – DfT - Road Investment Strategy B – DfT – Large Local Majors / Major Road Network or successor scheme C – National Highways Operation & Maintenance Budget D – National Highways Operations Capital Renewals Budget	E – National Highways Designated Funds (Safety and congestion fund, or successor scheme) F – Local Highway Authority - Local highways maintenance funding G – Developer contributions

5 Conclusion

5.1.1 The A122 Lower Thames Crossing would lead to changes in traffic movements across the region, with consequential beneficial and adverse impacts on the highways network. This much is recognised directly in RIS2, which commits the Government to continue to investigate and to invest in affected corridors as part of its phased, incremental approach to investment.

5.1.2 A number of Interested Parties suggest that more should be done as part of this project and have listed multiple additional road investment schemes to which they argue commitment must be made. In the Applicant's view, to do so would grossly exceed the requirements of the NPSNN (DfT, 2014) and would undermine and prejudice mechanisms which Parliament has put in place for these purposes.

5.1.3 The Project's transport model (the Lower Thames Area Model) has assessed the impacts of the Project and addressed uncertainty in accordance with the requirements of the NPSNN. Forecast disbenefits are accounted for in the assessments and account for uncertainty in accordance with the NPSNN requirements. Having accounted for these disbenefits, the proposals demonstrate an important overall benefit to the highways network. In enhancing national and regional connectivity, the Project would be transformative. Weighed on its merits, as required by the NPSNN, consent should be granted.

5.1.4 Where the NPSNN (DfT, 2014) provides definition of unacceptable impacts, these have been considered in the assessments and where appropriate, mitigation has been provided. As a result, the Project does not result in any unacceptable impacts.

5.1.5 While the Project does result in localised increases in congestion, the NPSNN does not require mitigation for these localised increases, rather it requires that the disbenefits arising from these be taken into account in the consideration of the benefits and costs of the proposals. Similarly, the many localised improvements that arise across the highways network are taken account of in this consideration, alongside the significant regional benefits.

5.1.6 Notwithstanding that the Applicant has accounted for uncertainty in the assessments, and accounted for the resultant disbenefits, the Applicant recognises that there remains further uncertainty that is not accounted for. The Applicant contends that the planning framework, including both legislation and policy, is intentional in how it considers this uncertainty should be addressed, and government has put in place a series of funding mechanisms across the national highway framework that allow for responses to these uncertainties to be managed at the appropriate level. This includes delivery through the functions of both the local highways authority (or the devolved Greater London Authority), and National Highways, as the Strategic Highways Company. The Application commits to a comprehensive and transparent monitoring process to assist the application of those mechanisms.

5.1.7 The Applicant considers that these provisions more than address the requirements of policy and that the operation of established mechanisms for future investment and management decisions in the SRN and LRN are fit for purpose. Nevertheless, if more is considered necessary, the Applicant has

proposed a Requirement, on a without prejudice basis, that could be incorporated into the A122 Lower Thames Crossing DCO, following a recommendation by the Examining Authority and/or decision by the Secretary of State.

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Glossary

Term	Abbreviation	Explanation
A122		The new A122 trunk road to be constructed as part of the Lower Thames Crossing project, including links, as defined in Part 2, Schedule 5 (Classification of Roads) in the draft DCO (Application Document 3.1)
A122 Lower Thames Crossing	**Project**	A proposed new crossing of the Thames Estuary linking the county of Kent with the county of Essex, at or east of the existing Dartford Crossing.
A122 Lower Thames Crossing/M25 junction		New junction with north-facing slip roads on the M25 between M25 junctions 29 and 30, near North Ockendon.
A13/A1089/A122 Lower Thames Crossing junction		Alteration of the existing junction between the A13 and the A1089, and construction of a new junction between the A122 Lower Thames Crossing and the A13 and A1089, comprising the following link roads: • Improved A13 westbound to A122 Lower Thames Crossing southbound • Improved A13 westbound to A122 Lower Thames Crossing northbound • Improved A13 westbound to A1089 southbound • A122 Lower Thames Crossing southbound to improved A13 eastbound and Orsett Cock roundabout • A122 Lower Thames Crossing northbound to improved A13 eastbound and Orsett Cock roundabout • Orsett Cock roundabout to the improved A13 westbound • Improved A13 eastbound to Orsett Cock roundabout • Improved A1089 northbound to A122 Lower Thames Crossing northbound • Improved A1089 northbound to A122 Lower Thames Crossing southbound
A2		A major road in south-east England, connecting London with the English Channel port of Dover in Kent.
Application Document		In the context of the Project, a document submitted to the Planning Inspectorate as part of the application for development consent.
Construction		Activity on and/or offsite required to implement the Project. The construction phase is considered to commence with the first activity on site (e.g. creation of site access), and ends with demobilisation.
Design Manual for Roads and Bridges	**DMRB**	A comprehensive manual containing requirements, advice and other published documents relating to works on motorway and all-purpose trunk roads for which one of the Overseeing Organisations (National Highways, Transport Scotland, the Welsh Government or the Department for Regional Development (Northern Ireland)) is highway authority. For the A122 Lower Thames Crossing the Overseeing Organisation is National Highways.
Development Consent Order	**DCO**	Means of obtaining permission for developments categorised as Nationally Significant Infrastructure Projects (NSIP) under the Planning Act 2008.

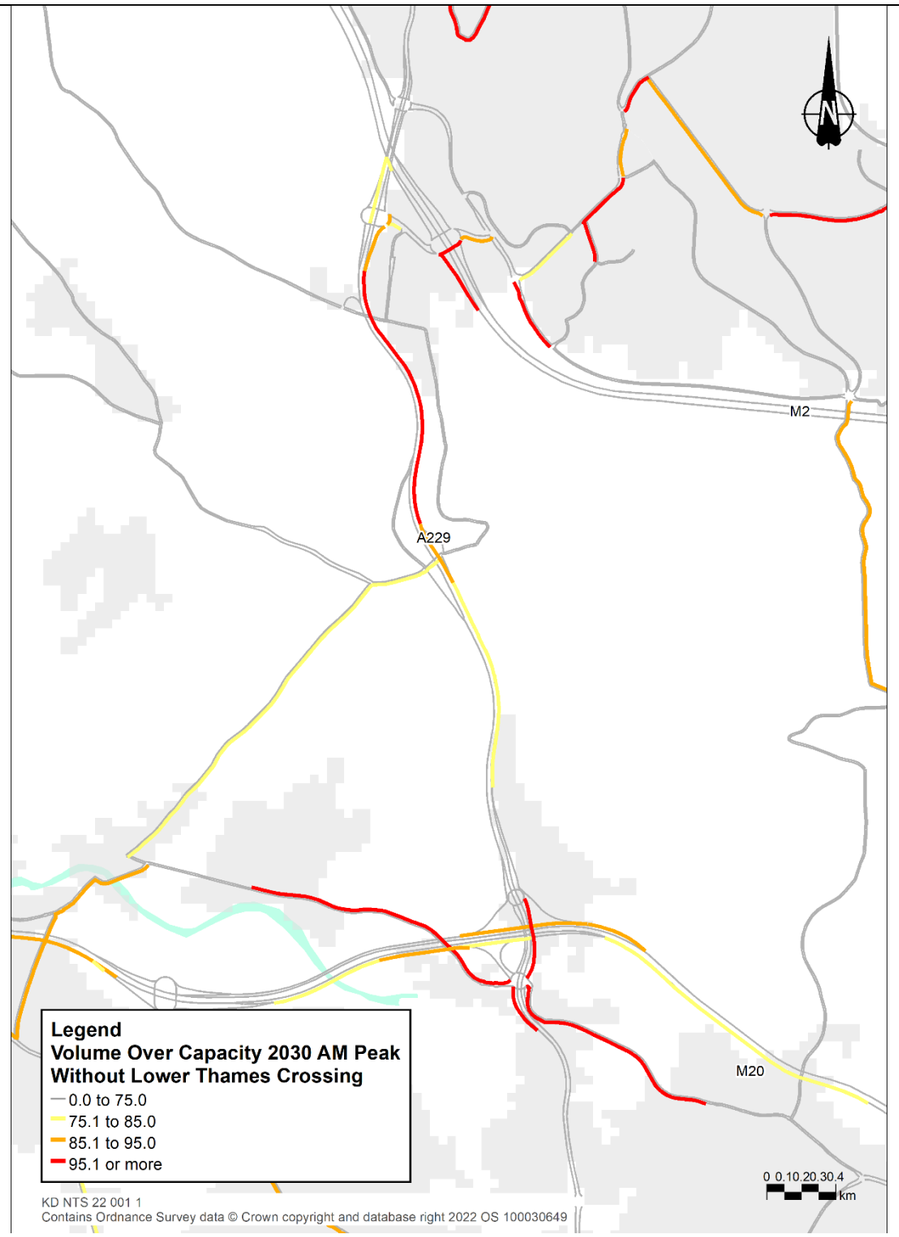
Term	Abbreviation	Explanation
Development Consent Order application	**DCO application**	The Project Application Documents, collectively known as the 'DCO application'.
Environmental Statement	**ES**	A document produced to support an application for development consent that is subject to Environmental Impact Assessment (EIA), which sets out the likely impacts on the environment arising from the proposed development.
Highways England		Former name of National Highways.
M2 junction 1		The M2 will be widened from three lanes to four in both directions through M2 junction 1.
M2/A2/Lower Thames Crossing junction		New junction proposed as part of the Project to the east of Gravesend between the A2 and the new A122 Lower Thames Crossing with connections to the M2.
M25 junction 29		Improvement works to M25 junction 29 and to the M25 north of junction 29. The M25 through junction 29 will be widened from three lanes to four in both directions with hard shoulders.
National Highways		A UK government-owned company with responsibility for managing the motorways and major roads in England. Formerly known as Highways England.
National Planning Policy Framework	**NPPF**	A framework published in March 2012 by the UK's Department of Communities and Local Government, consolidating previously issued documents called Planning Policy Statements (PPS) and Planning Practice Guidance Notes (PPG) for use in England. The NPPF was updated in February 2019 and again in July 2021 by the Ministry of Housing, Communities and Local Government.
National Policy Statement	**NPS**	Set out UK government policy on different types of national infrastructure development, including energy, transport, water and waste. There are 12 NPS, providing the framework within which Examining Authorities make their recommendations to the Secretary of State.
National Policy Statement for National Networks	**NPSNN**	Sets out the need for, and Government's policies to deliver, development of Nationally Significant Infrastructure Projects (NSIPs) on the national road and rail networks in England. It provides planning guidance for promoters of NSIPs on the road and rail networks, and the basis for the examination by the Examining Authority and decisions by the Secretary of State.
Nationally Significant Infrastructure Project	**NSIP**	Major infrastructure developments in England and Wales, such as proposals for power plants, large renewable energy projects, new airports and airport extensions, major road projects etc that require a development consent under the Planning Act 2008.
North Portal		The North Portal (northern tunnel entrance) would be located to the west of East Tilbury. Emergency access and vehicle turn-around facilities would be provided at the tunnel portal. The tunnel portal structures would accommodate service buildings for control operations, mechanical and electrical equipment, drainage and maintenance operations.
Operation		Describes the operational phase of a completed development and is considered to commence at the end of the construction phase, after demobilisation.

Term	Abbreviation	Explanation
Order Limits		The outermost extent of the Project, indicated on the Plans by a red line. This is the Limit of Land to be Acquired or Used (LLAU) by the Project. This is the area in which the DCO would apply.
Planning Act 2008		The primary legislation that establishes the legal framework for applying for, examining and determining Development Consent Order applications for Nationally Significant Infrastructure Projects.
Project road		The new A122 trunk road, the improved A2 trunk road, and the improved M25 and M2 special roads, as defined in Parts 1 and 2, Schedule 5 (Classification of Roads) in the draft DCO (Application Document 3.1).
Project route		The horizontal and vertical alignment taken by the Project road.
South Portal		The South Portal of the Project (southern tunnel entrance) would be located to the south-east of the village of Chalk. Emergency access and vehicle turn-around facilities would be provided at the tunnel portal. The tunnel portal structures would accommodate service buildings for control operations, mechanical and electrical equipment, drainage and maintenance operations.
The tunnel		Proposed 4.25km (2.5 miles) road tunnel beneath the River Thames, comprising two bores, one for northbound traffic and one for southbound traffic. Cross-passages connecting each bore would be provided for emergency incident response and tunnel user evacuation. Tunnel portal structures would accommodate service buildings for control operations, mechanical and electrical equipment, drainage and maintenance operations. Emergency access and vehicle turn-around facilities would also be provided at the tunnel portals.

Appendix A Volume Over Capacity figures

A.1 Blue Bell Hill corridor

Figure A-1 – Volume over Capacity Plots for Blue Bell Hill corridor (2030, AM peak)



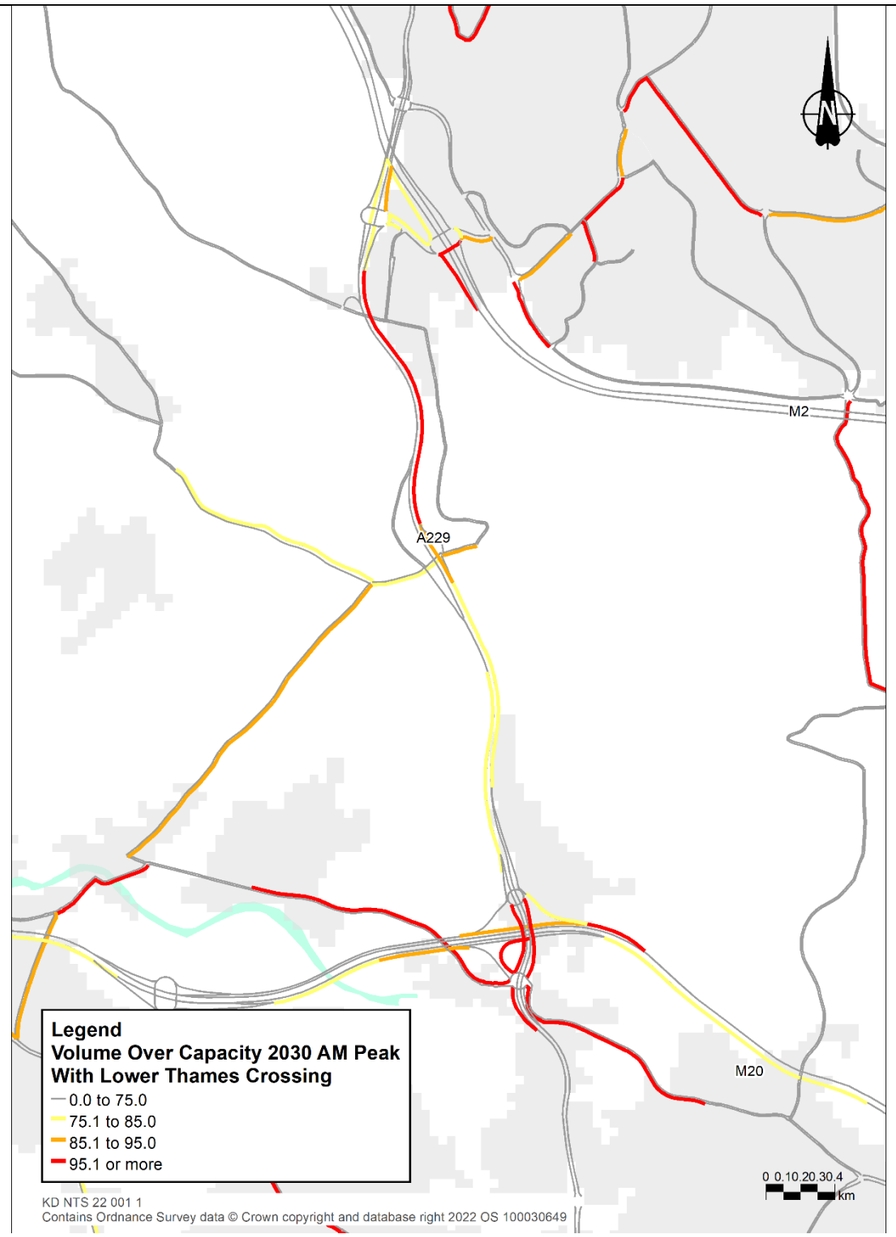
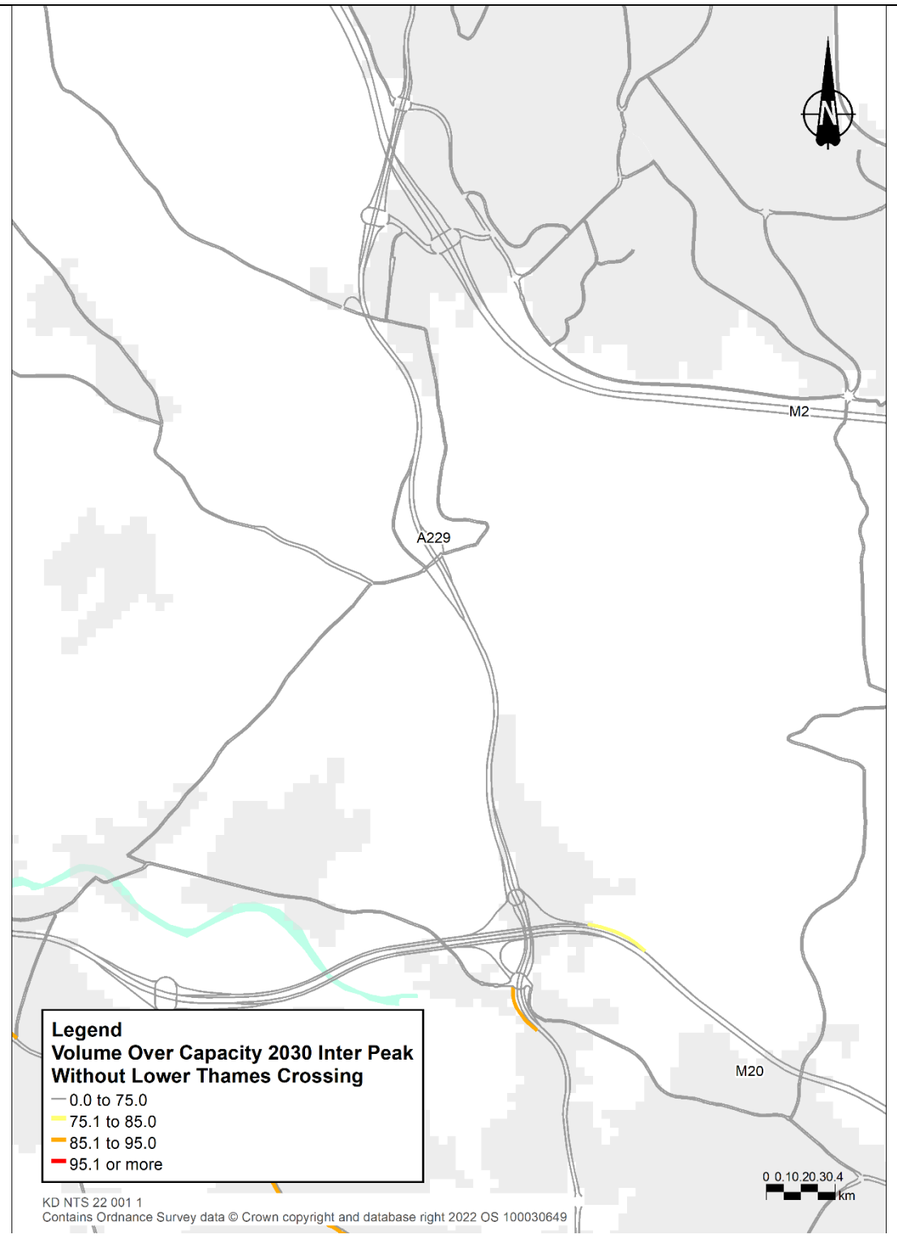


Figure A-2 – Volume over Capacity Plots for Blue Bell Hill corridor (2030, Inter-peak)



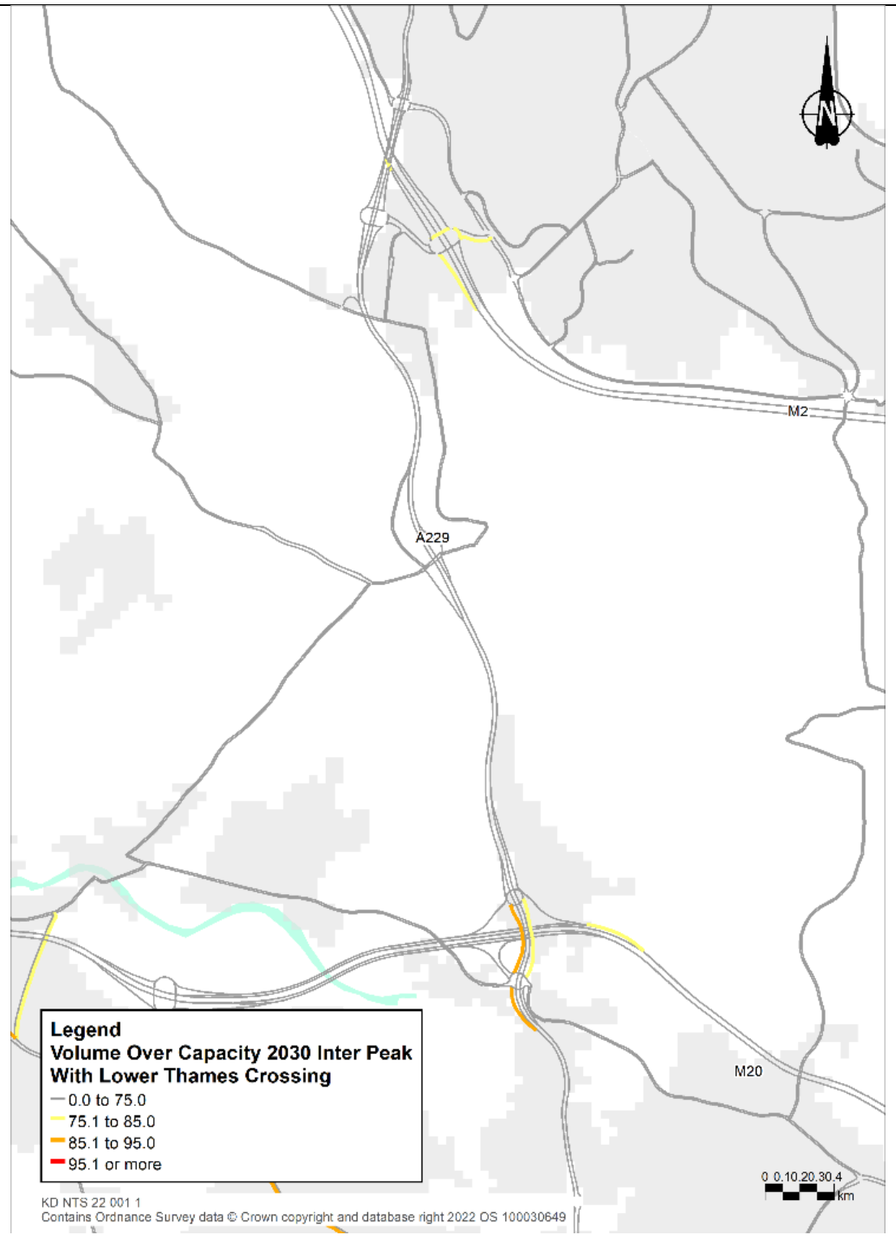
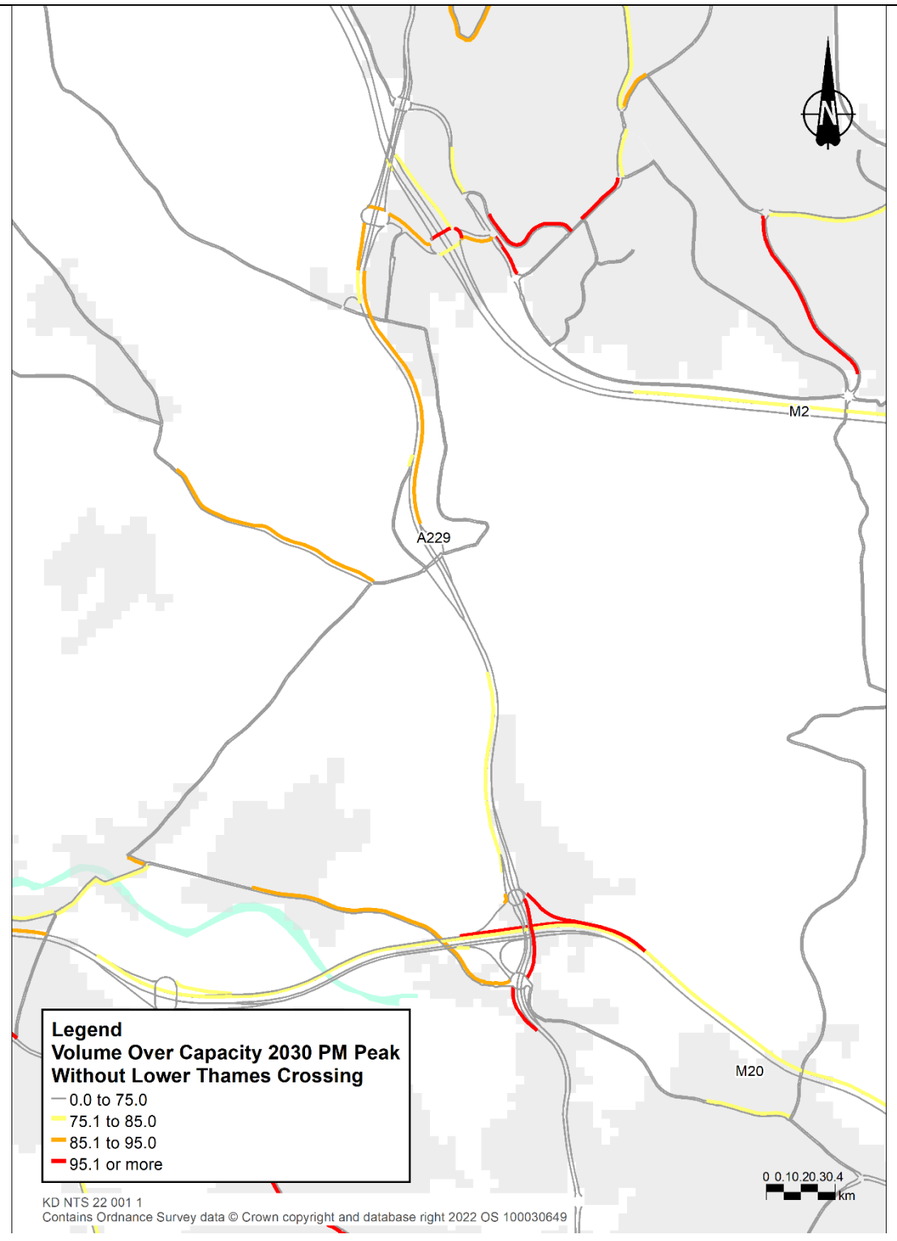


Figure A-3 – Volume over Capacity Plots for Blue Bell Hill corridor (2030, PM peak)



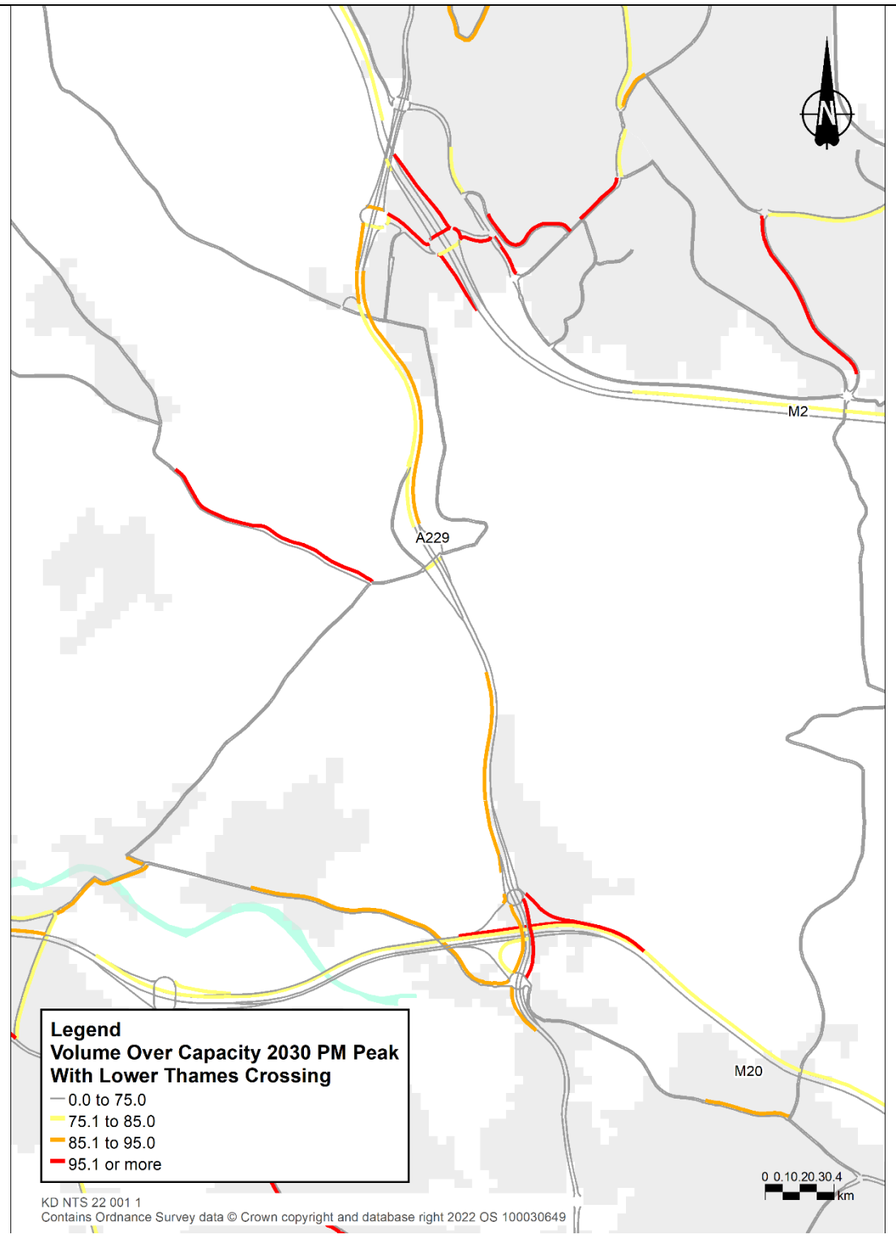
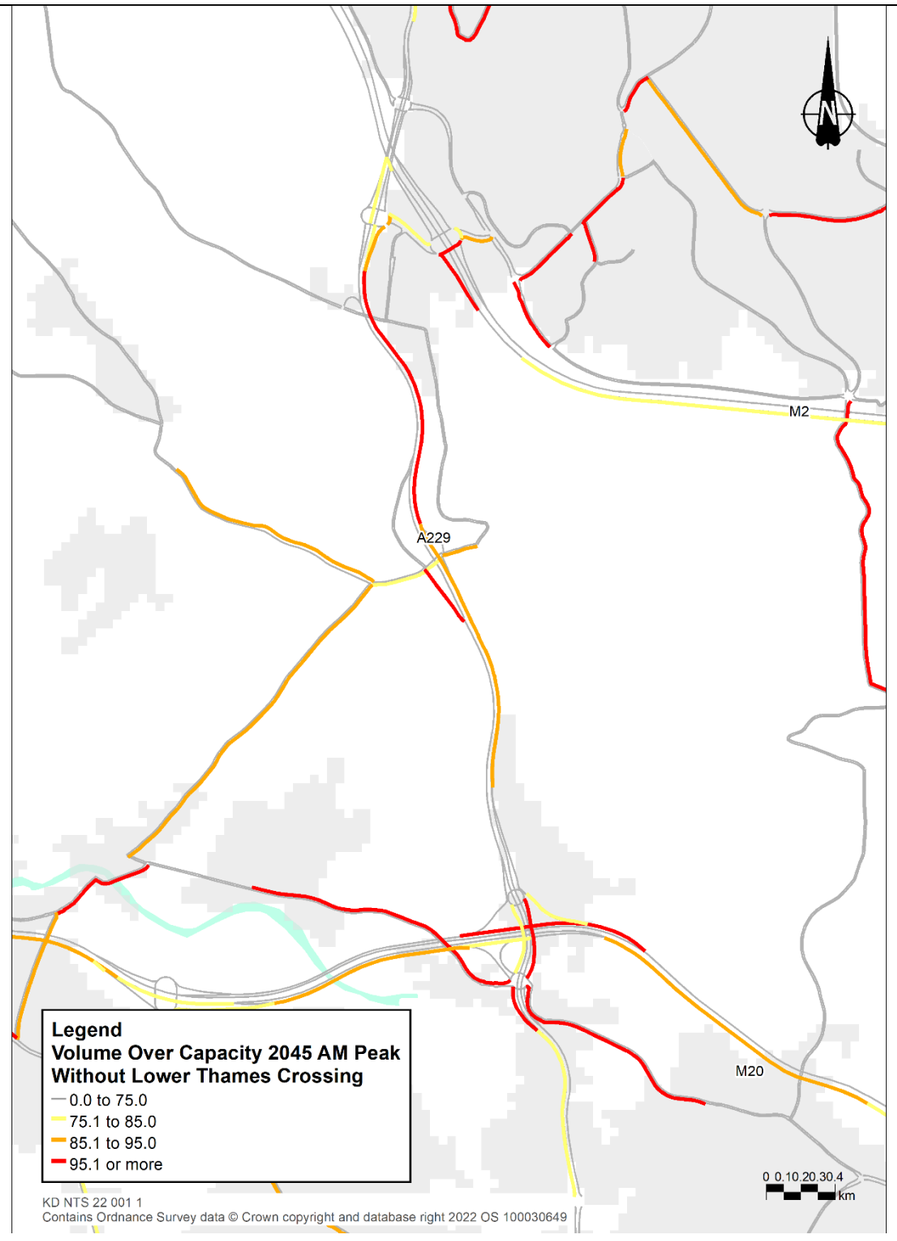


Figure A-4 – Volume over Capacity Plots for Blue Bell Hill corridor (2045, AM peak)



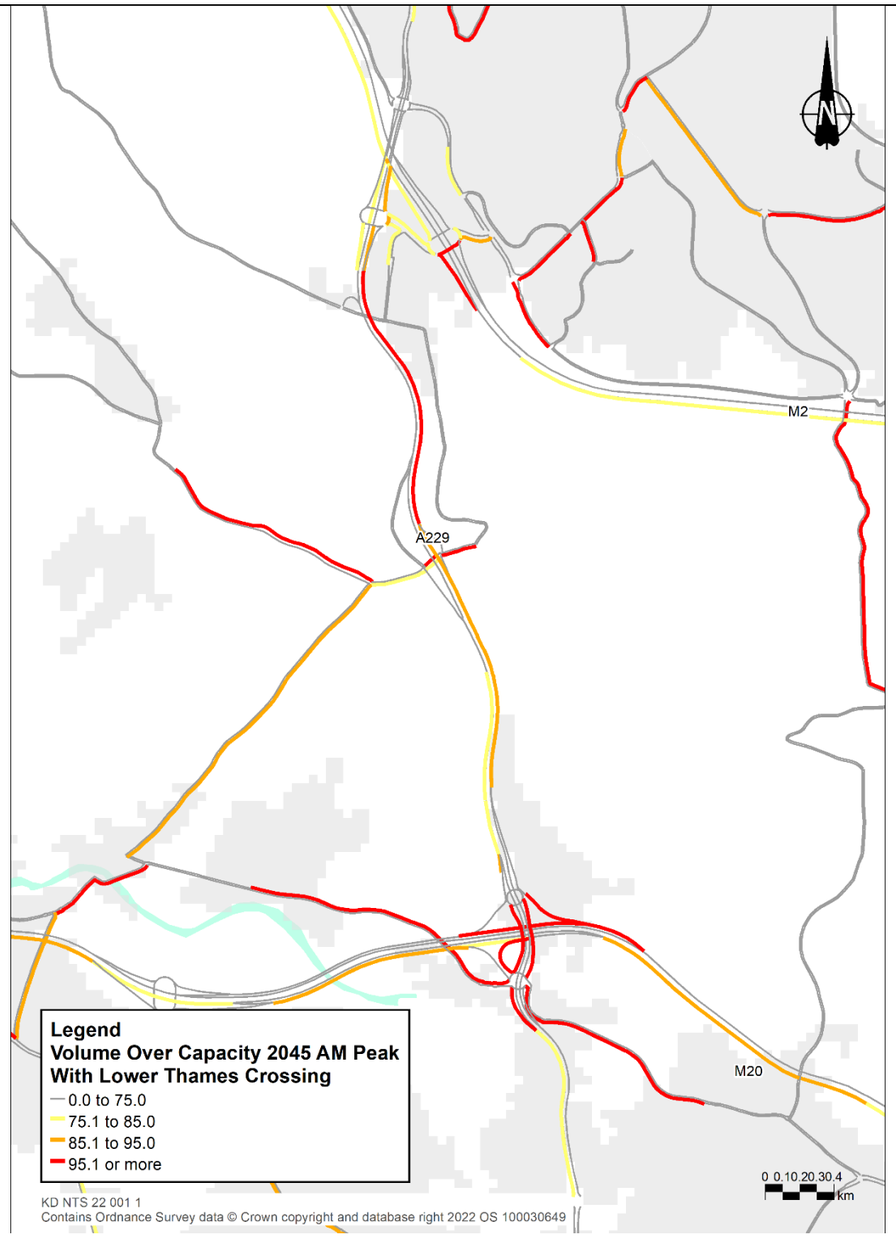
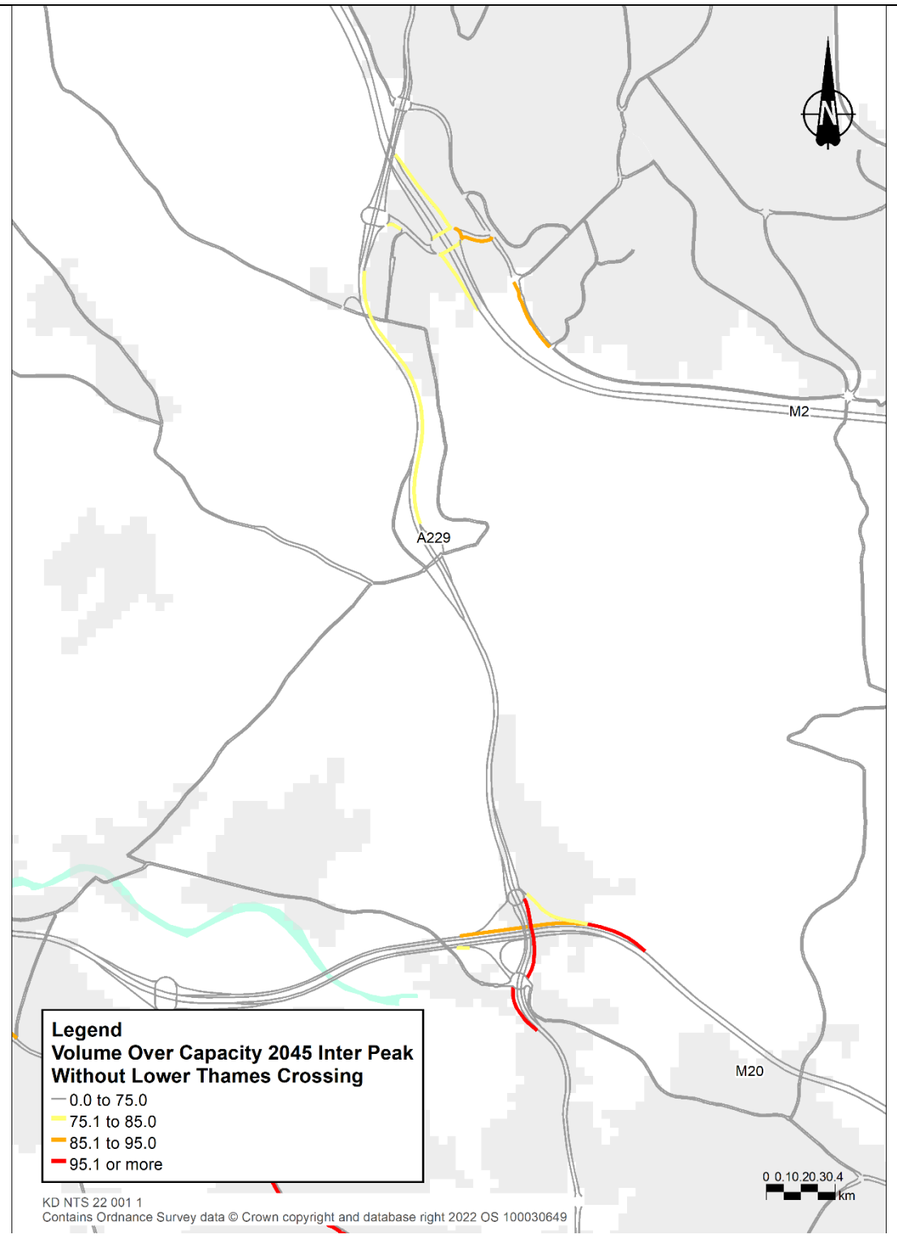


Figure A-5 – Volume over Capacity Plots for Blue Bell Hill corridor (2045, Inter-peak)



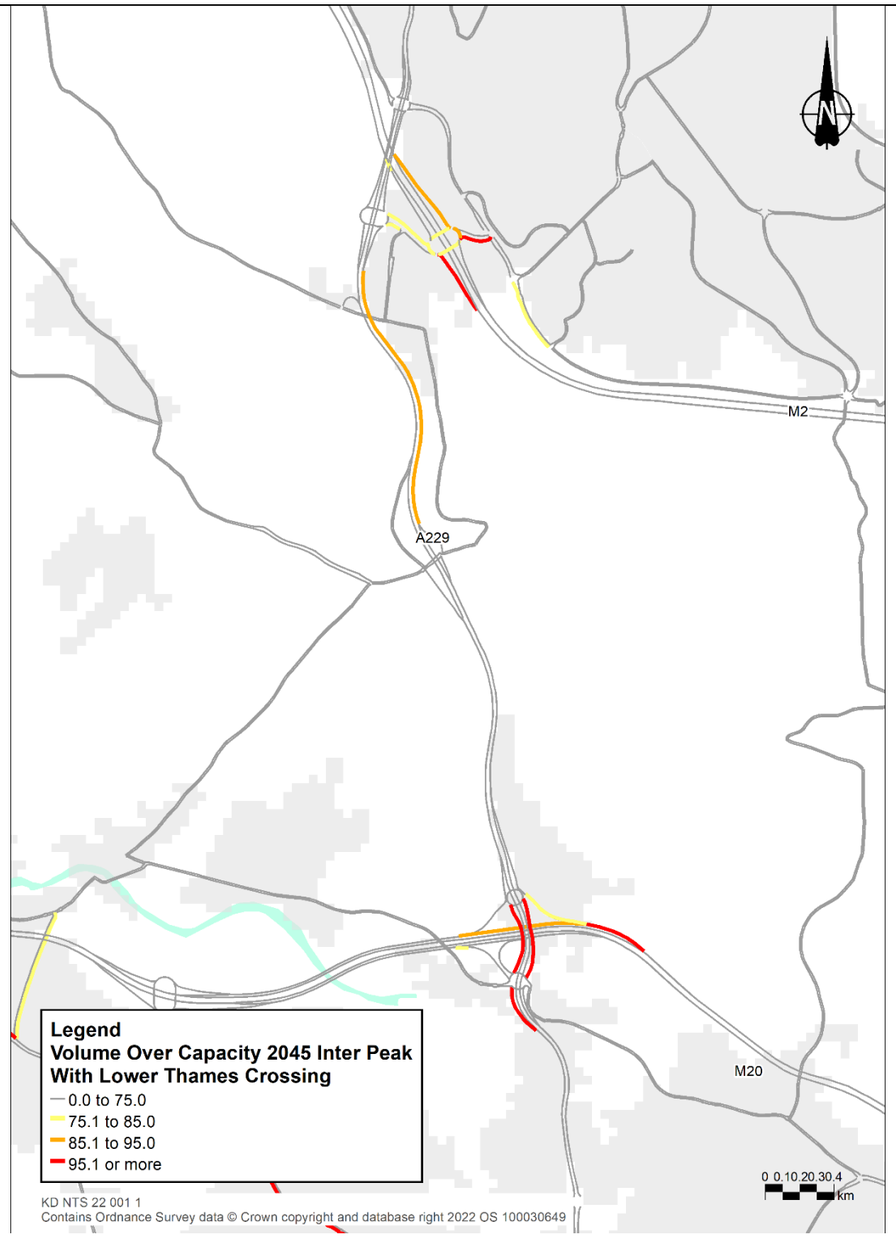
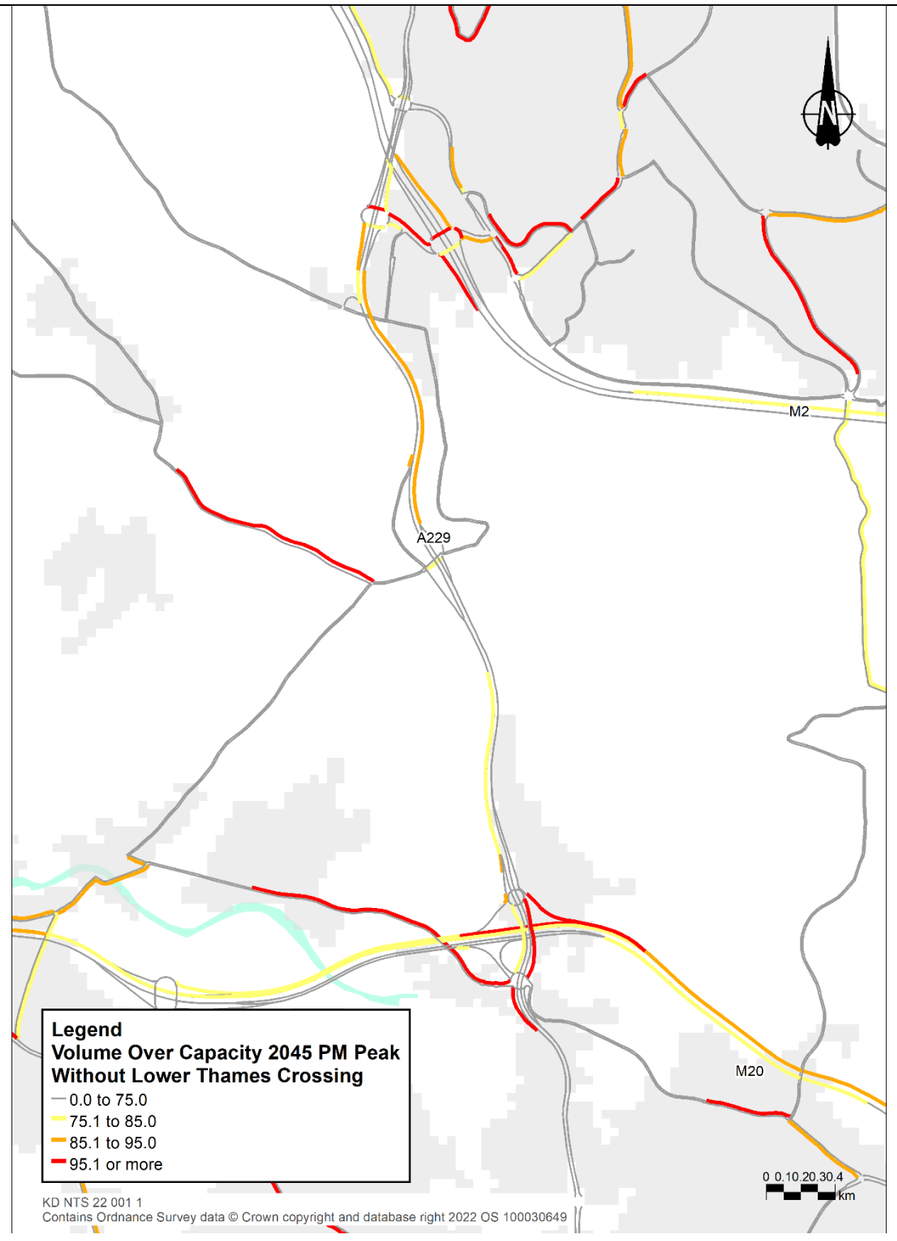
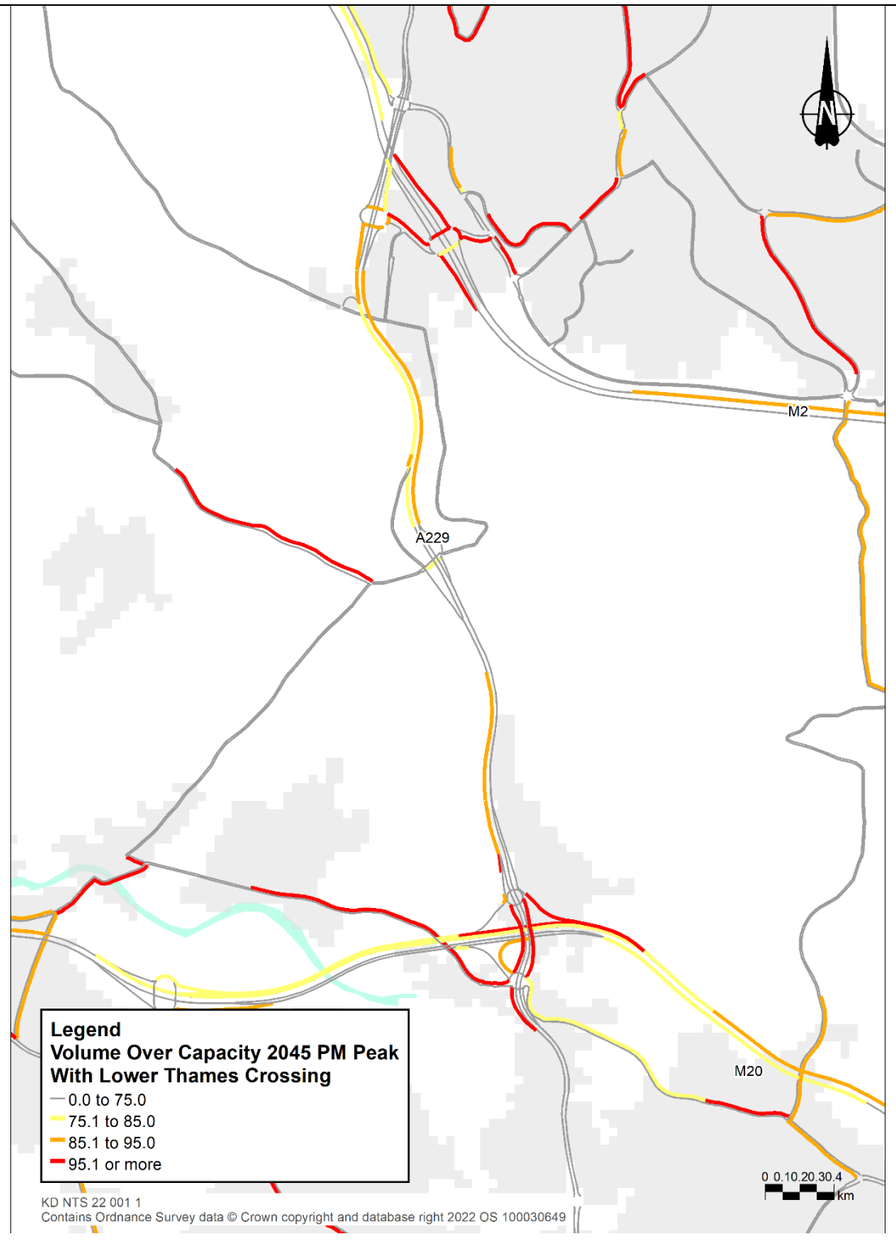


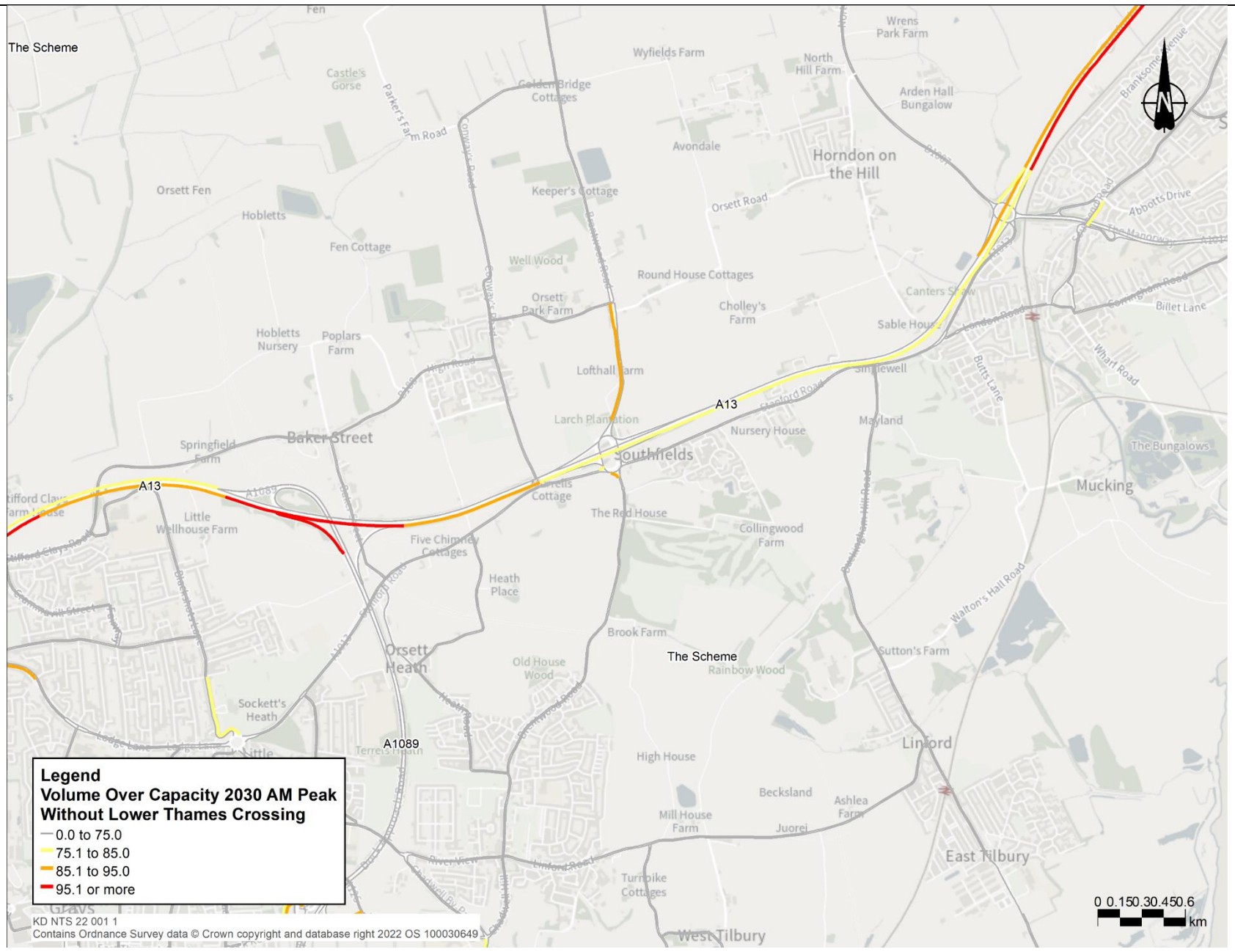
Figure A-6 – Volume over Capacity Plots for Blue Bell Hill corridor (2045, PM peak)





A.2 A13 corridor

Figure A-7 – Volume over Capacity Plots for A13 corridor (West) (2030, AM peak)



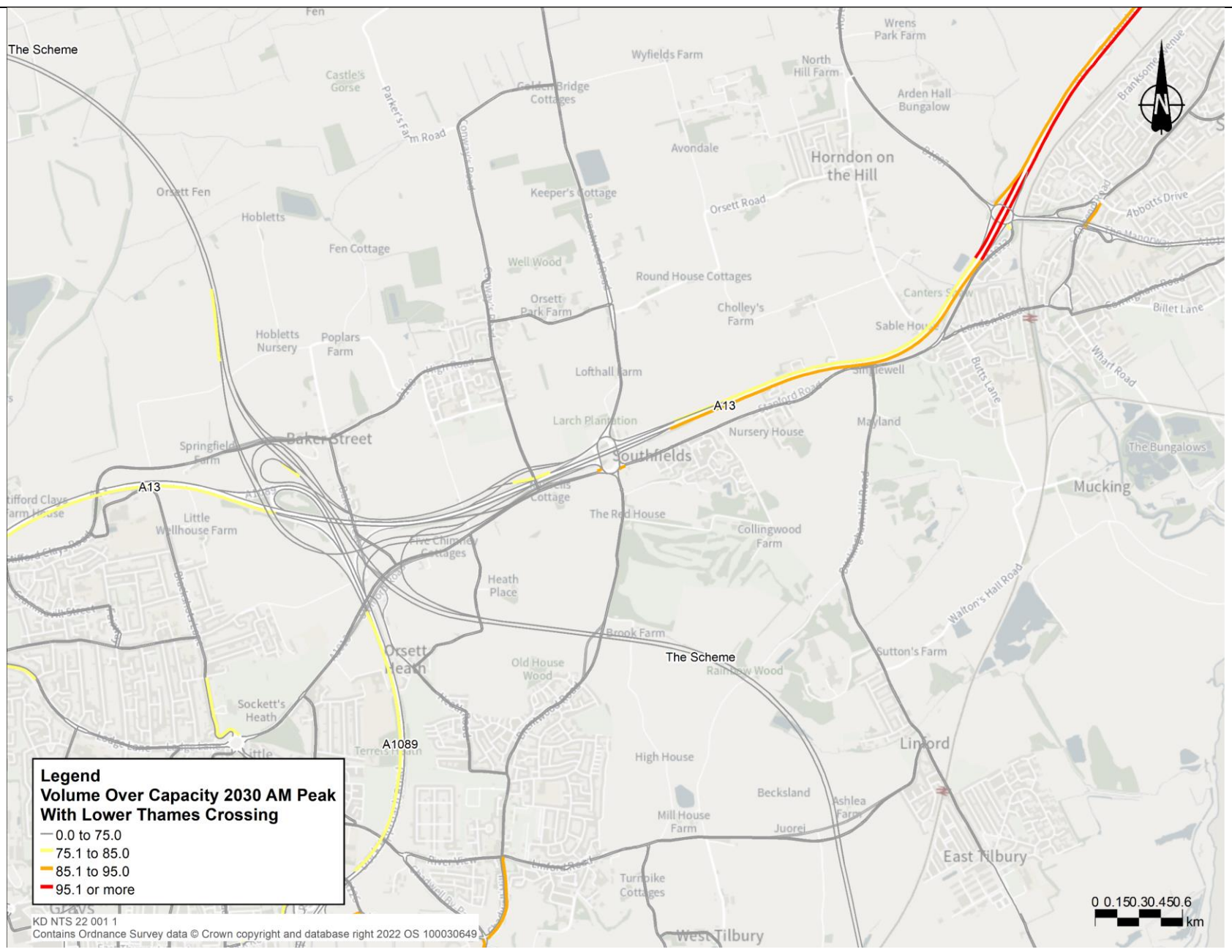
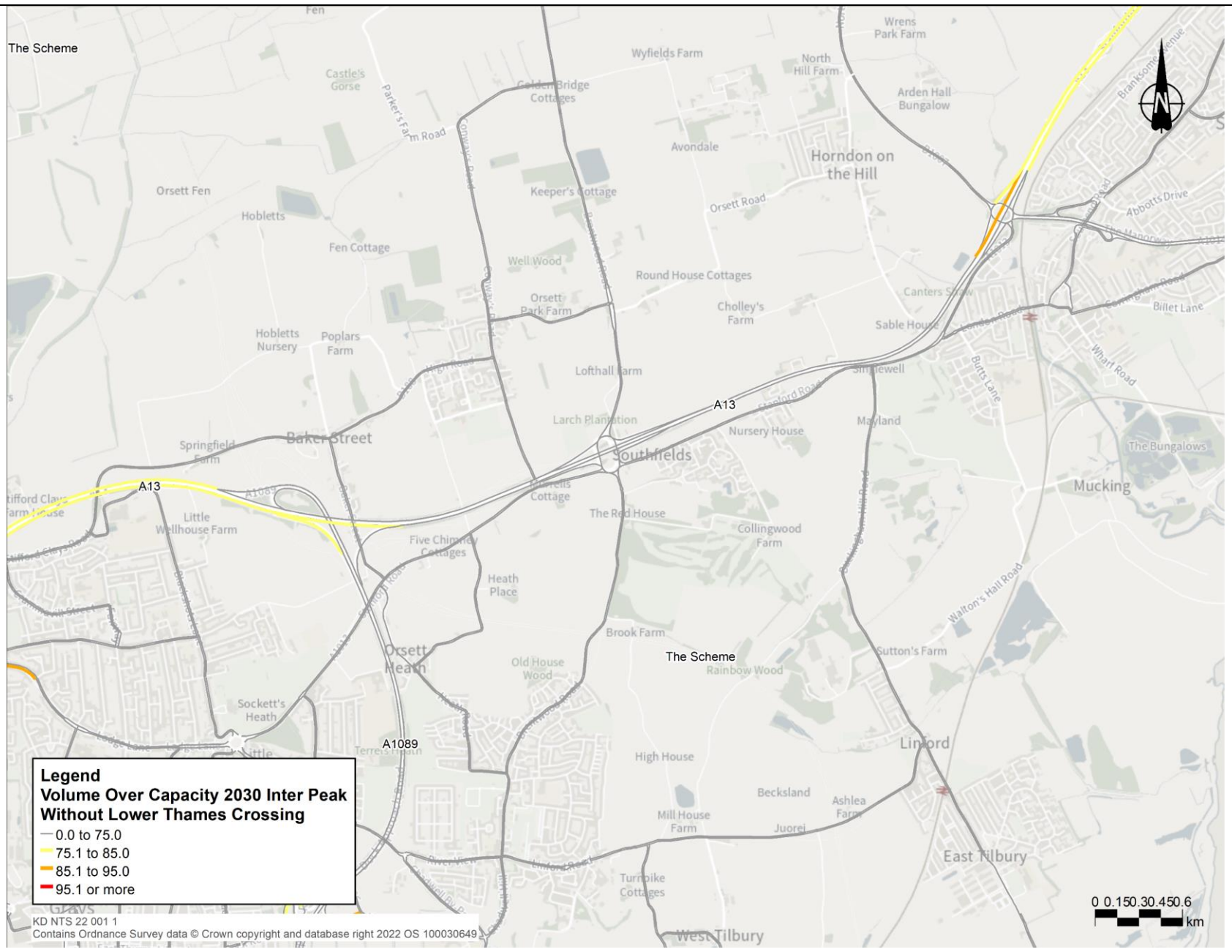


Figure A-8 – Volume over Capacity Plots for A13 corridor (West) (2030, Inter-peak)



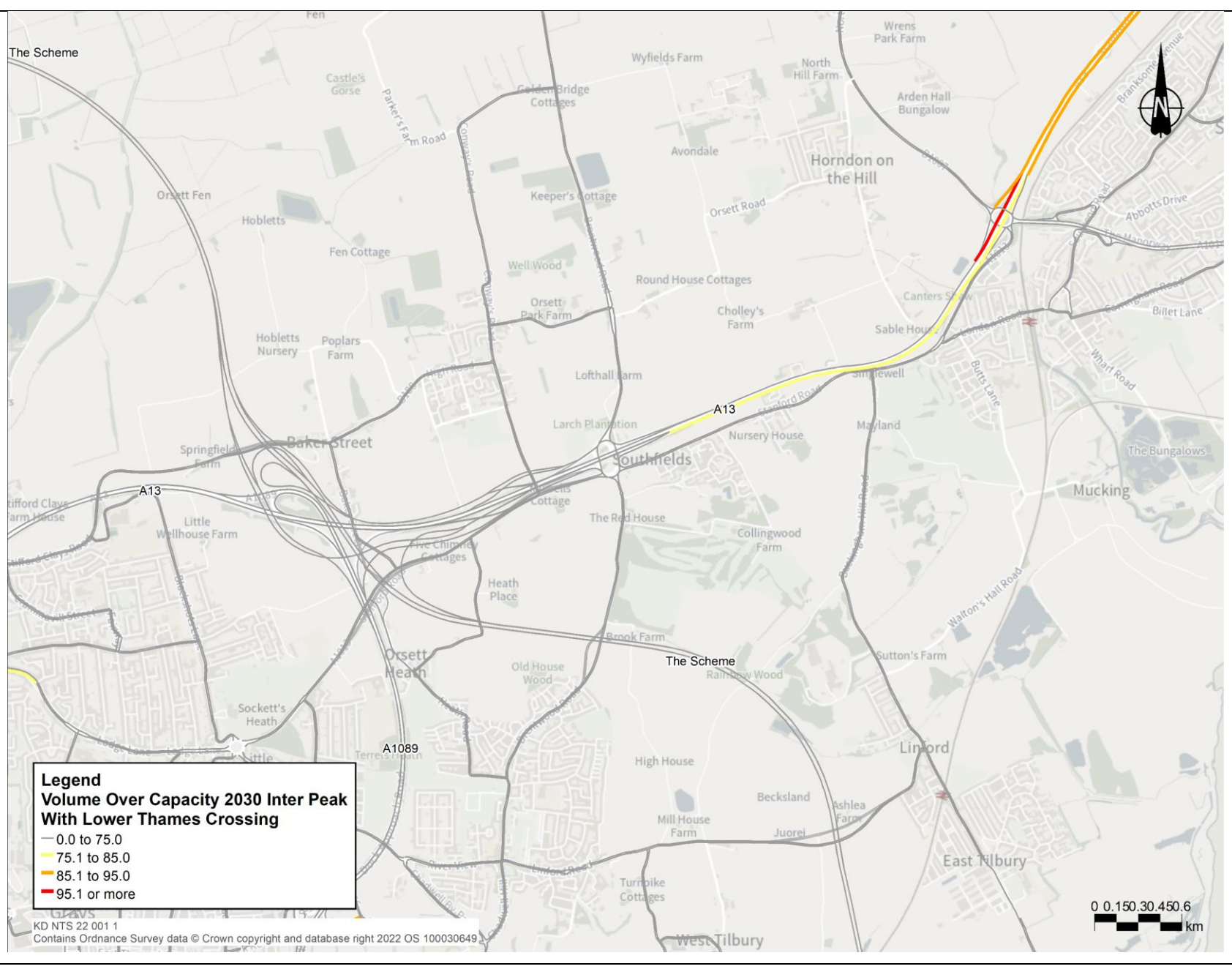
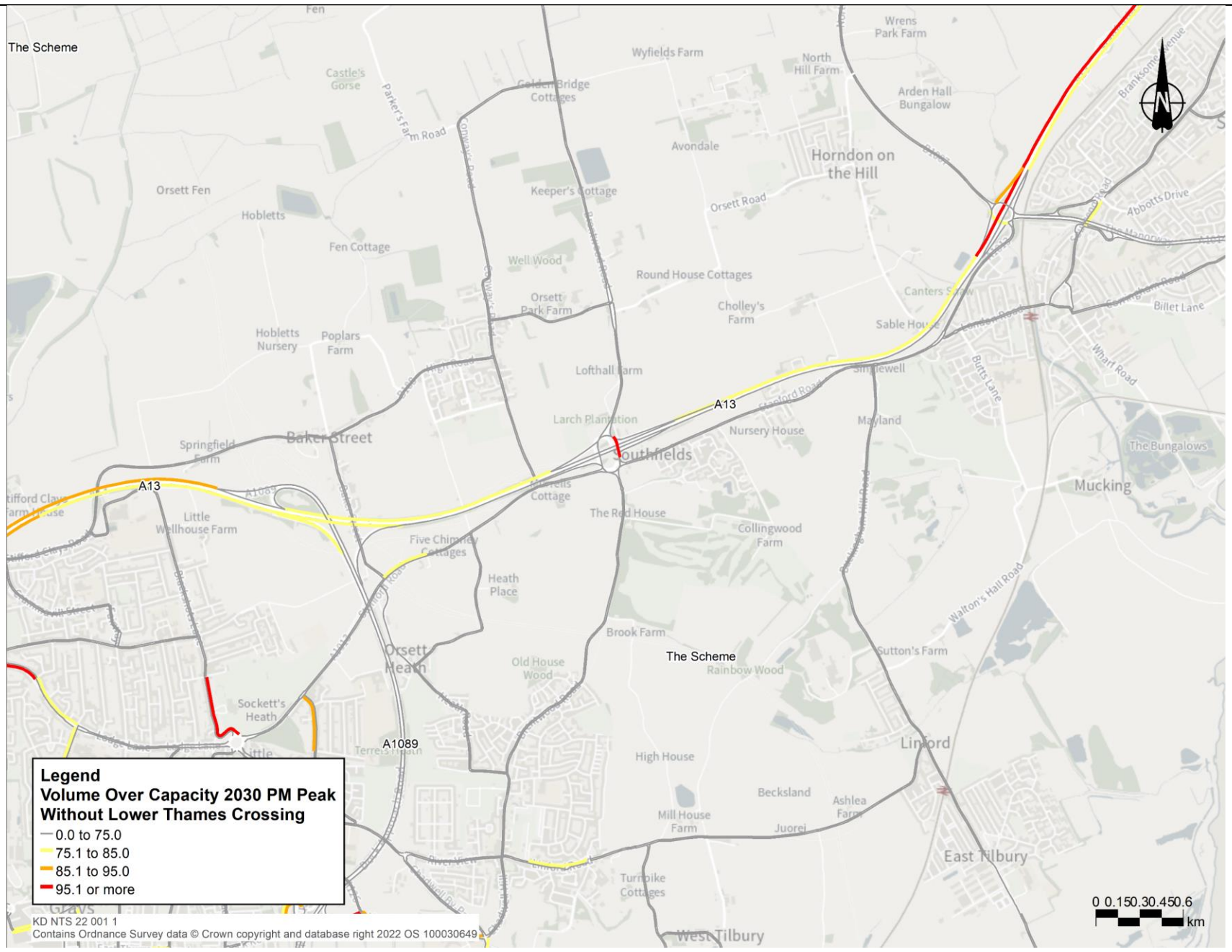


Figure A-9 – Volume over Capacity Plots for A13 corridor (West) (2030, PM peak)



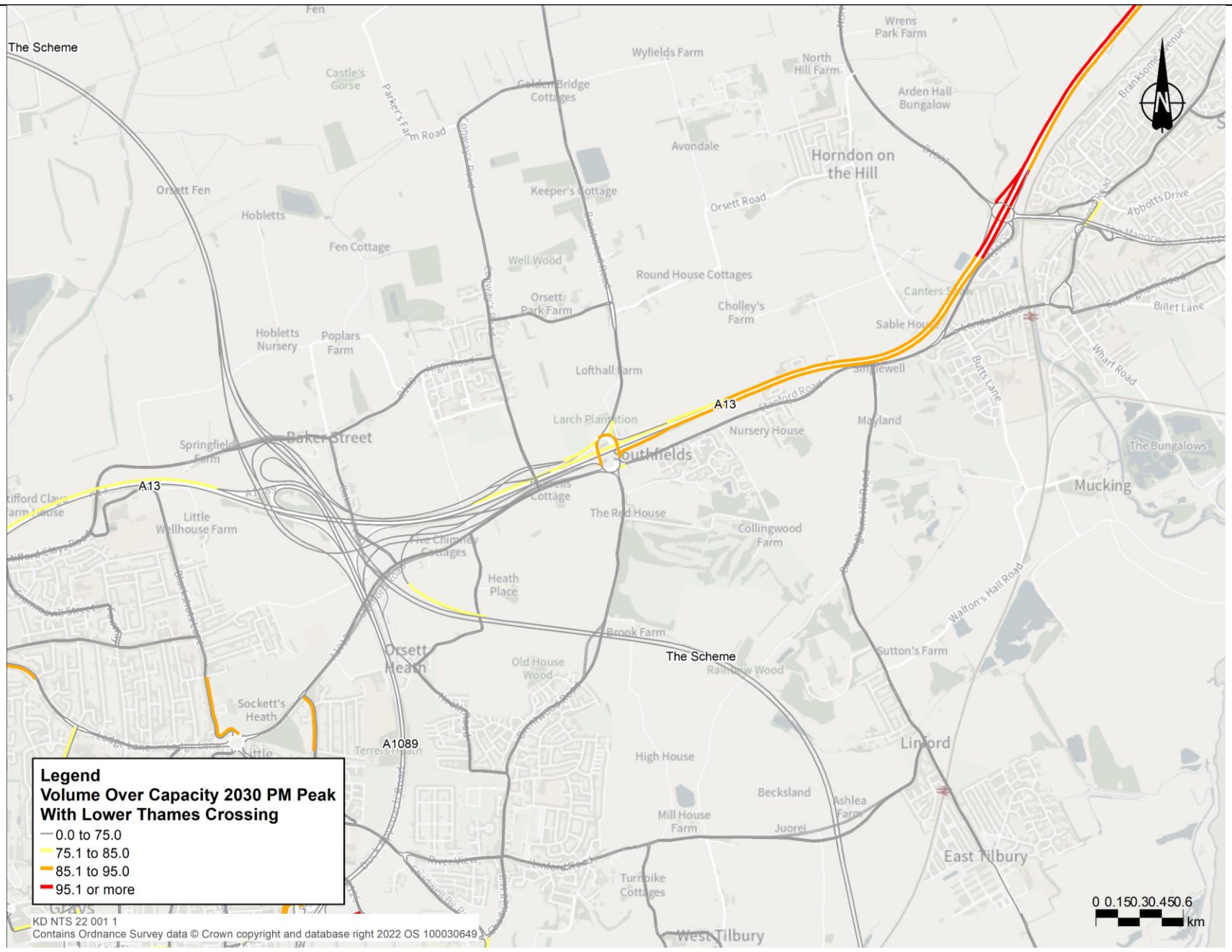
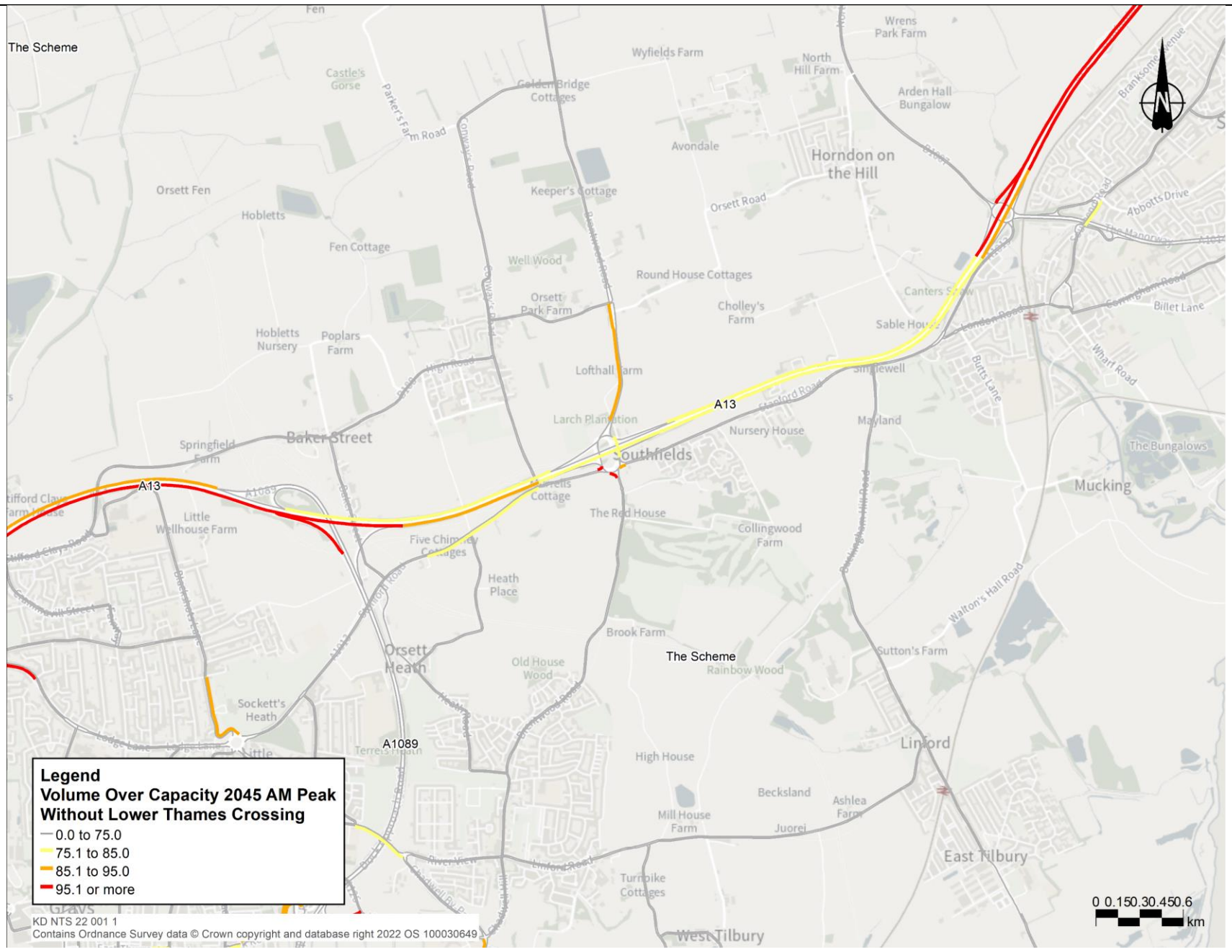


Figure A-10 – Volume over Capacity Plots for A13 corridor (West) (2045, AM peak)



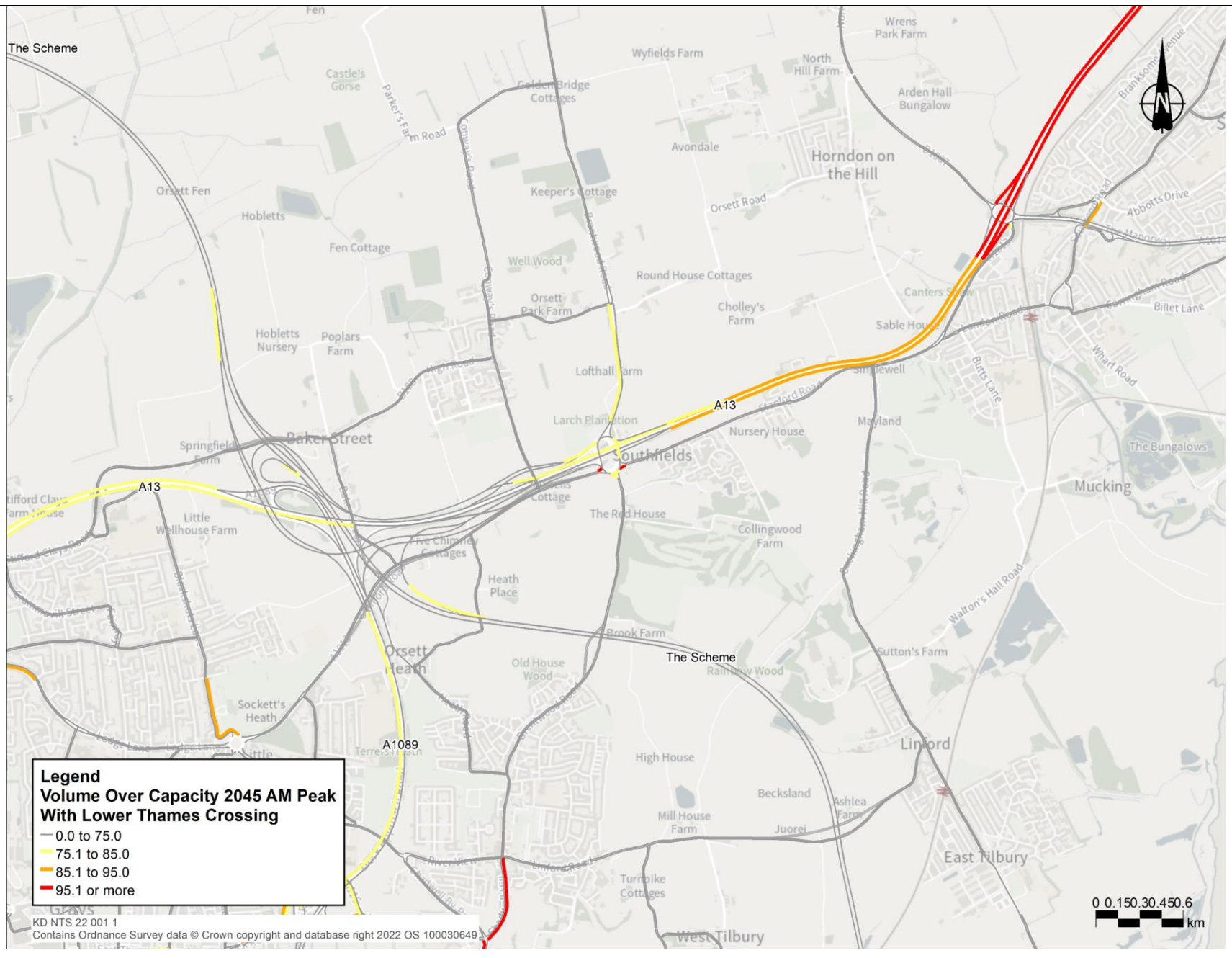
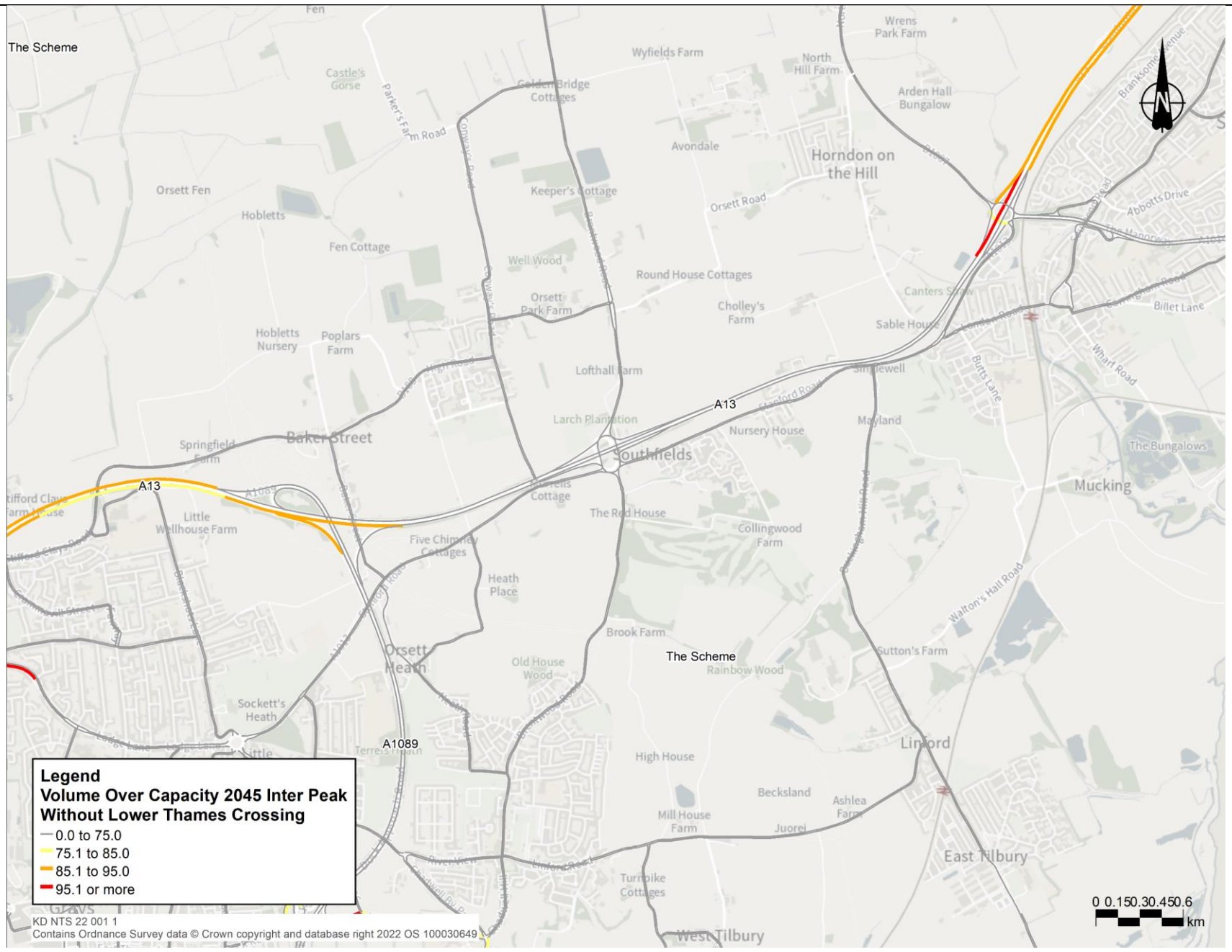


Figure A-11 – Volume over Capacity Plots for A13 corridor (West) (2045, Inter-peak)



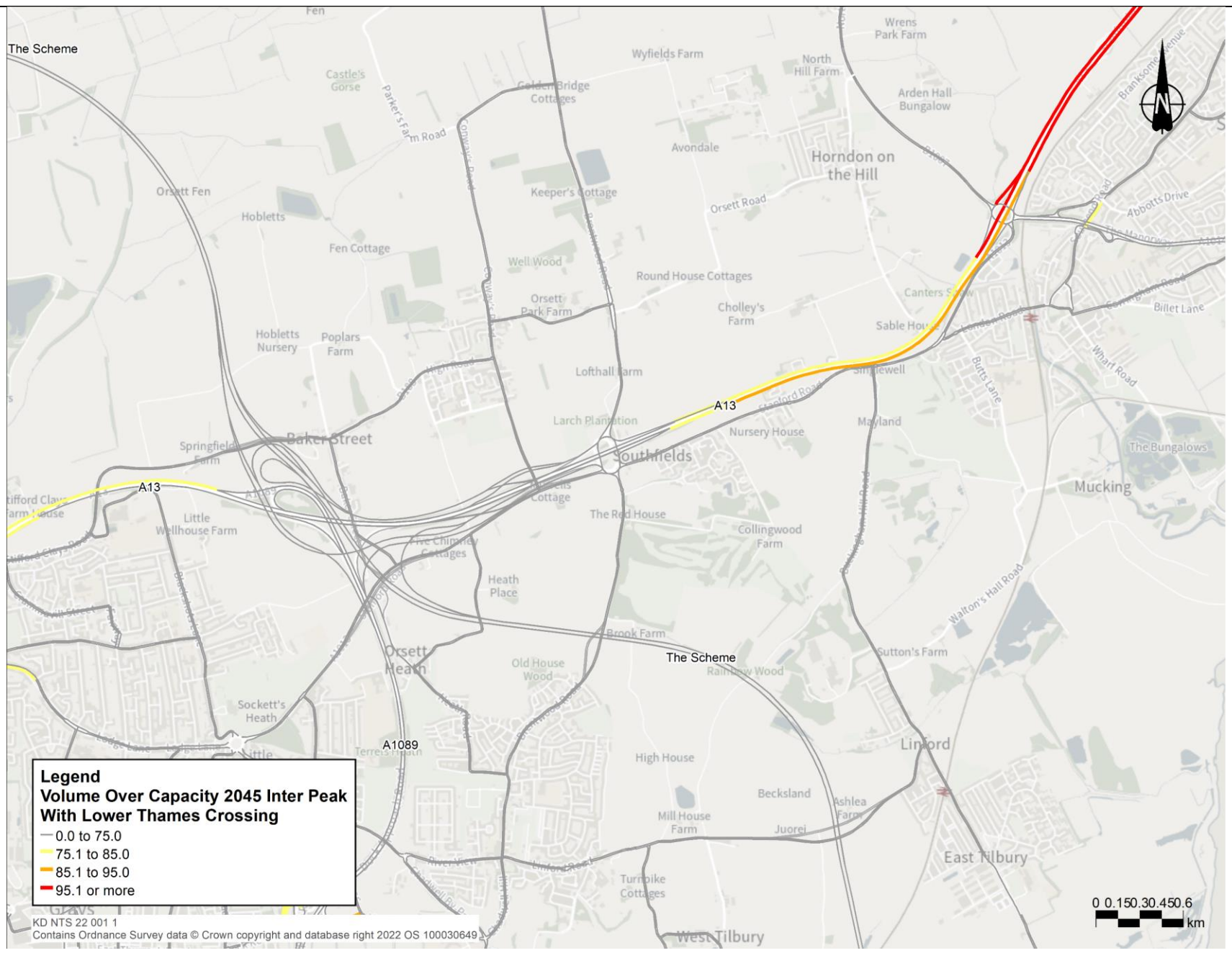
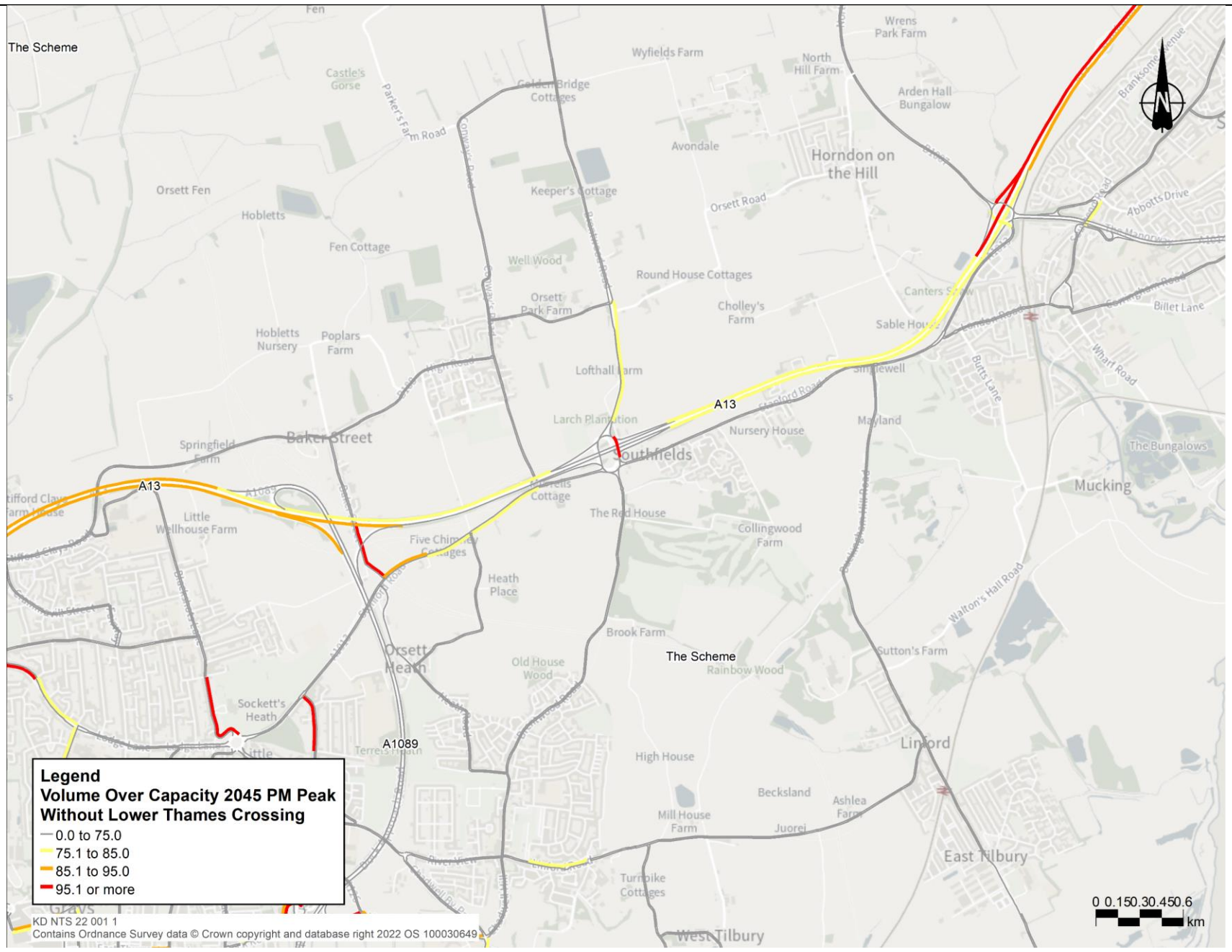


Figure A-12 – Volume over Capacity Plots for A13 corridor (West) (2045, PM peak)



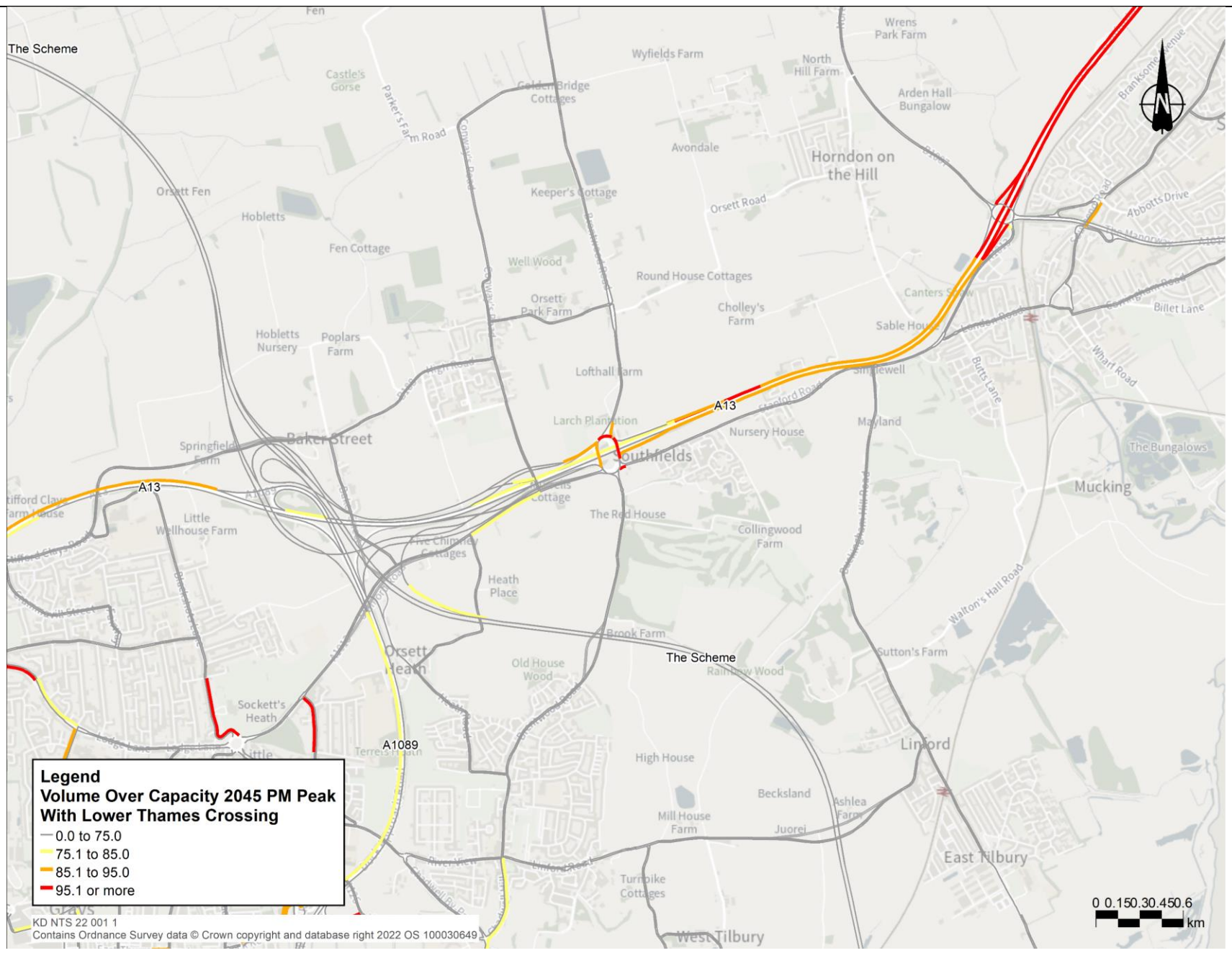
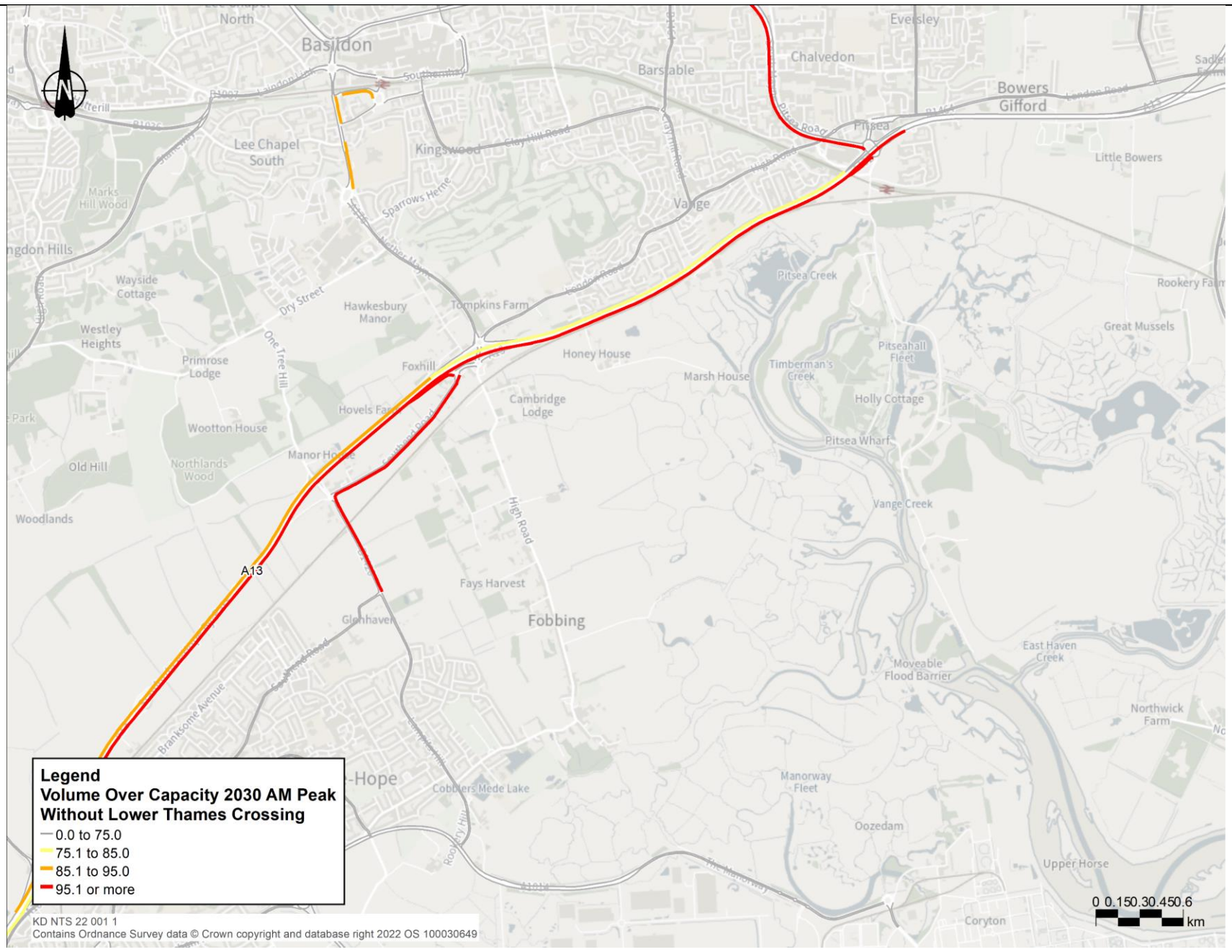


Figure A-13 – Volume over Capacity Plots for A13 corridor (East) (2030, AM peak)



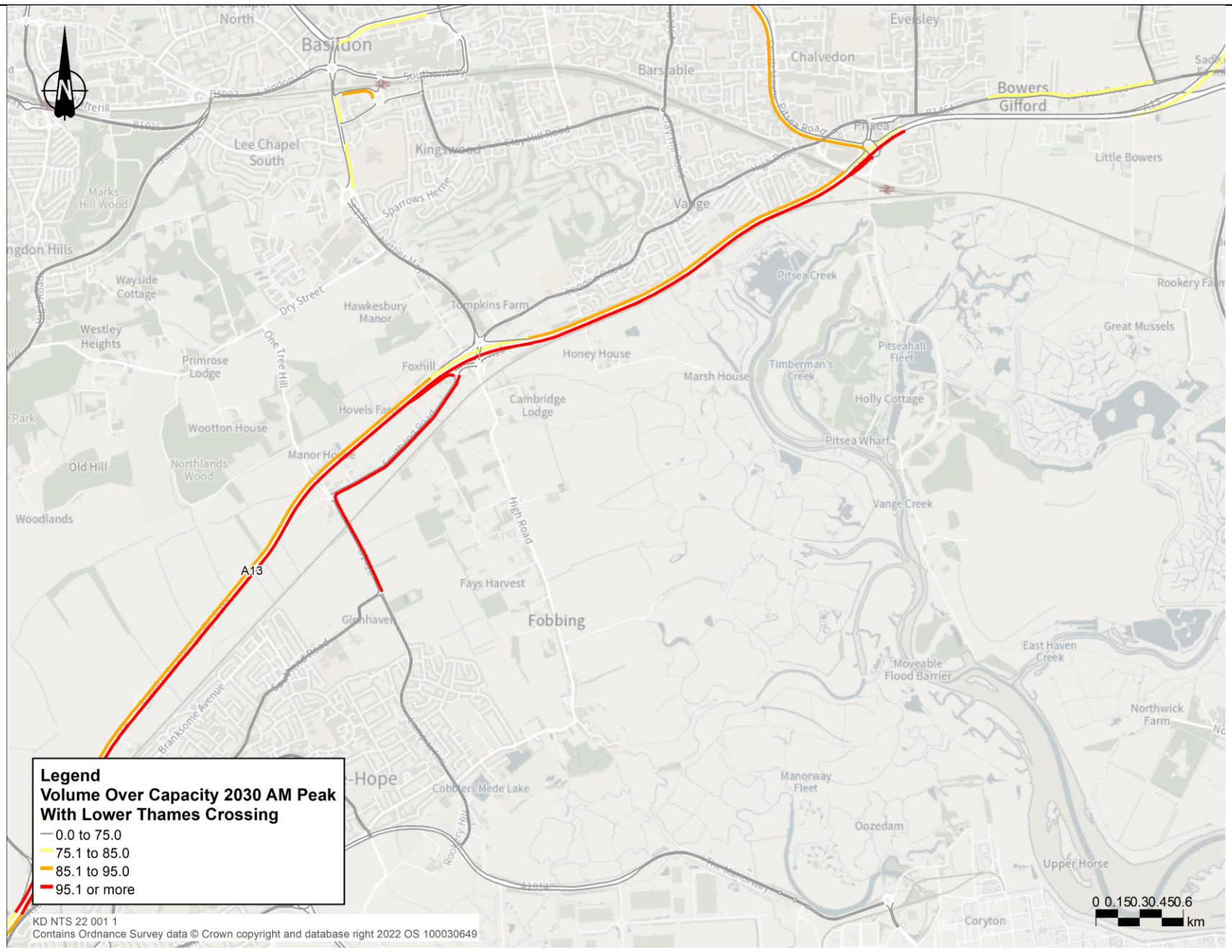


Figure A-14 – Volume over Capacity Plots for A13 corridor (East) (2030, Inter-peak)

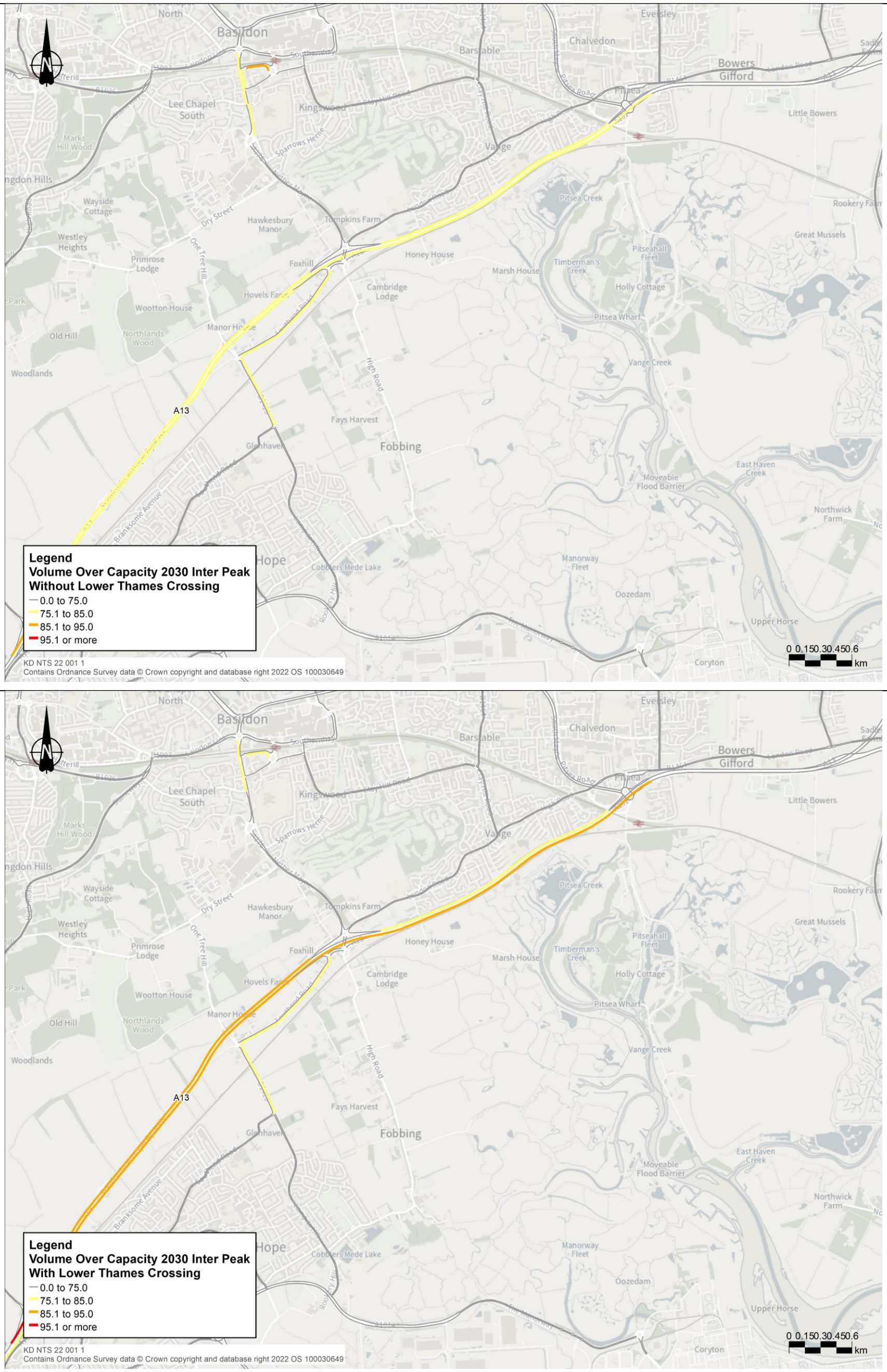
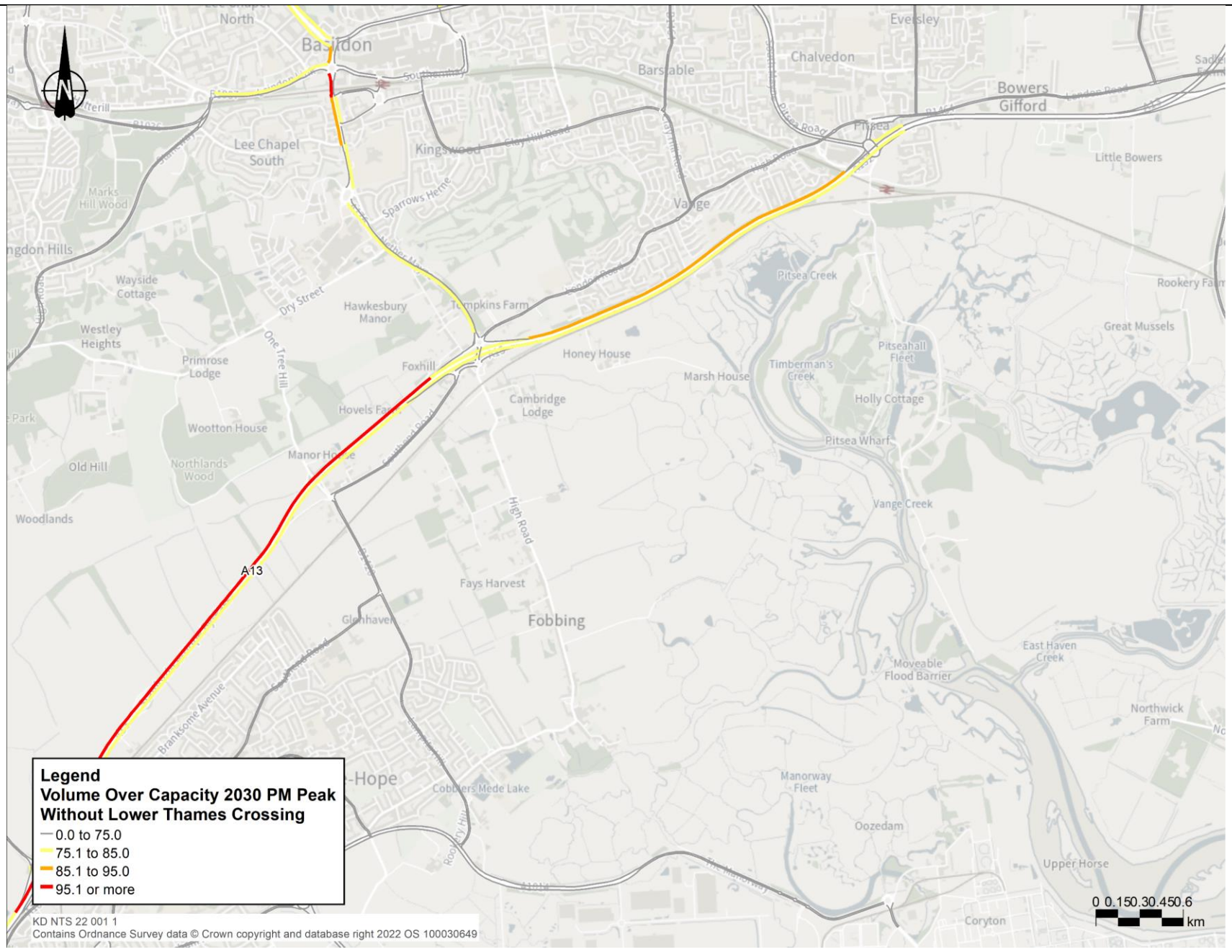


Figure A-15 – Volume over Capacity Plots for A13 corridor (East) (2030, PM peak)



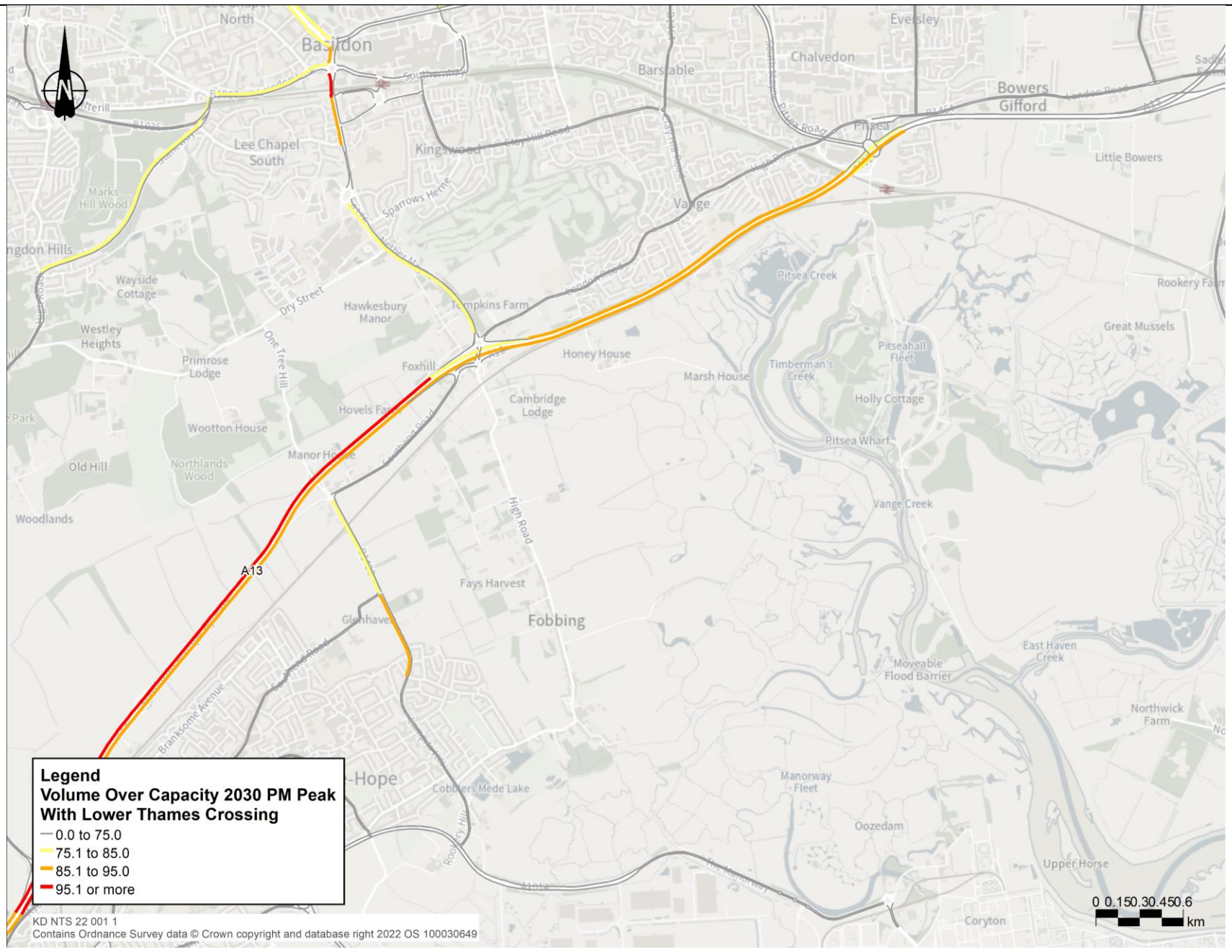
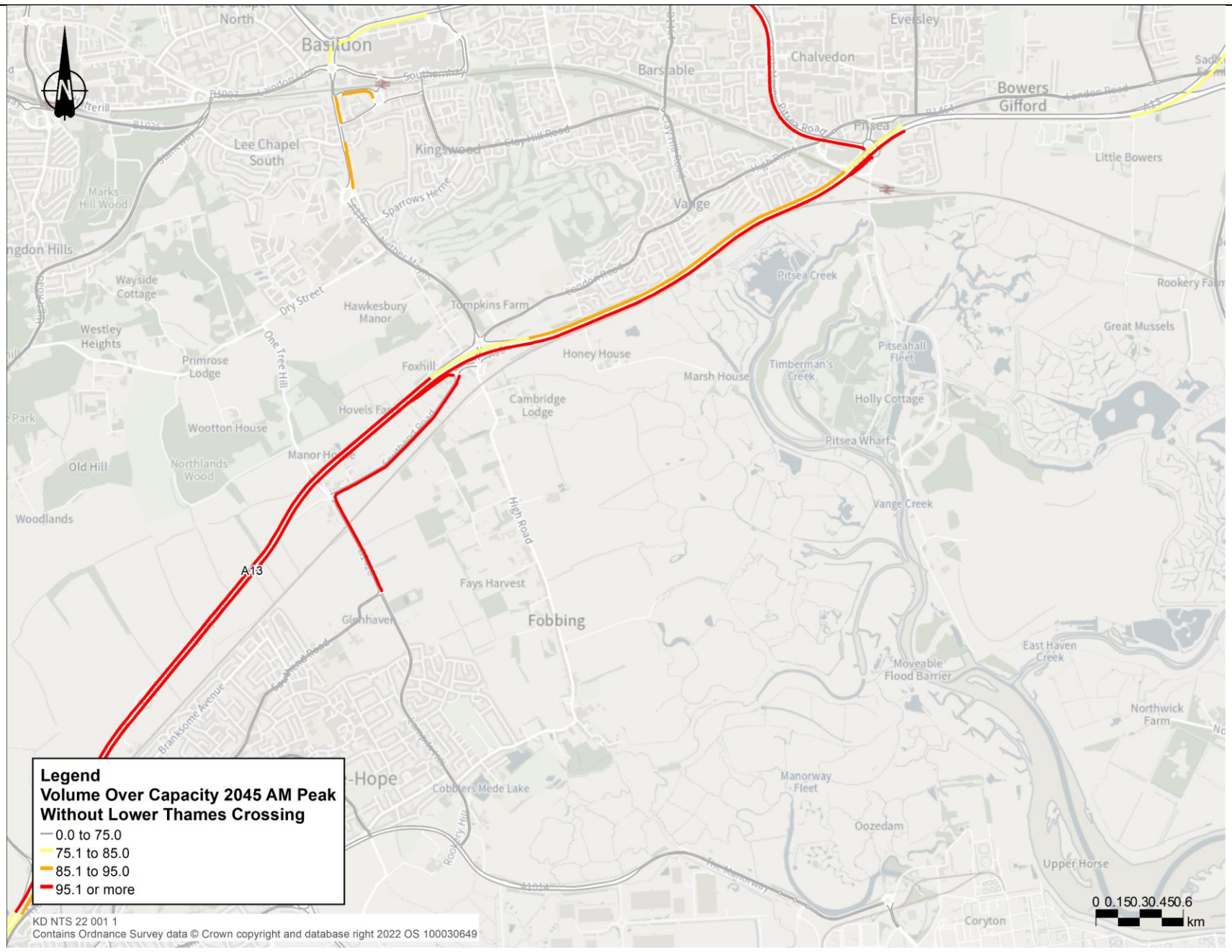


Figure A-16 – Volume over Capacity Plots for A13 corridor (East) (2045, AM peak)



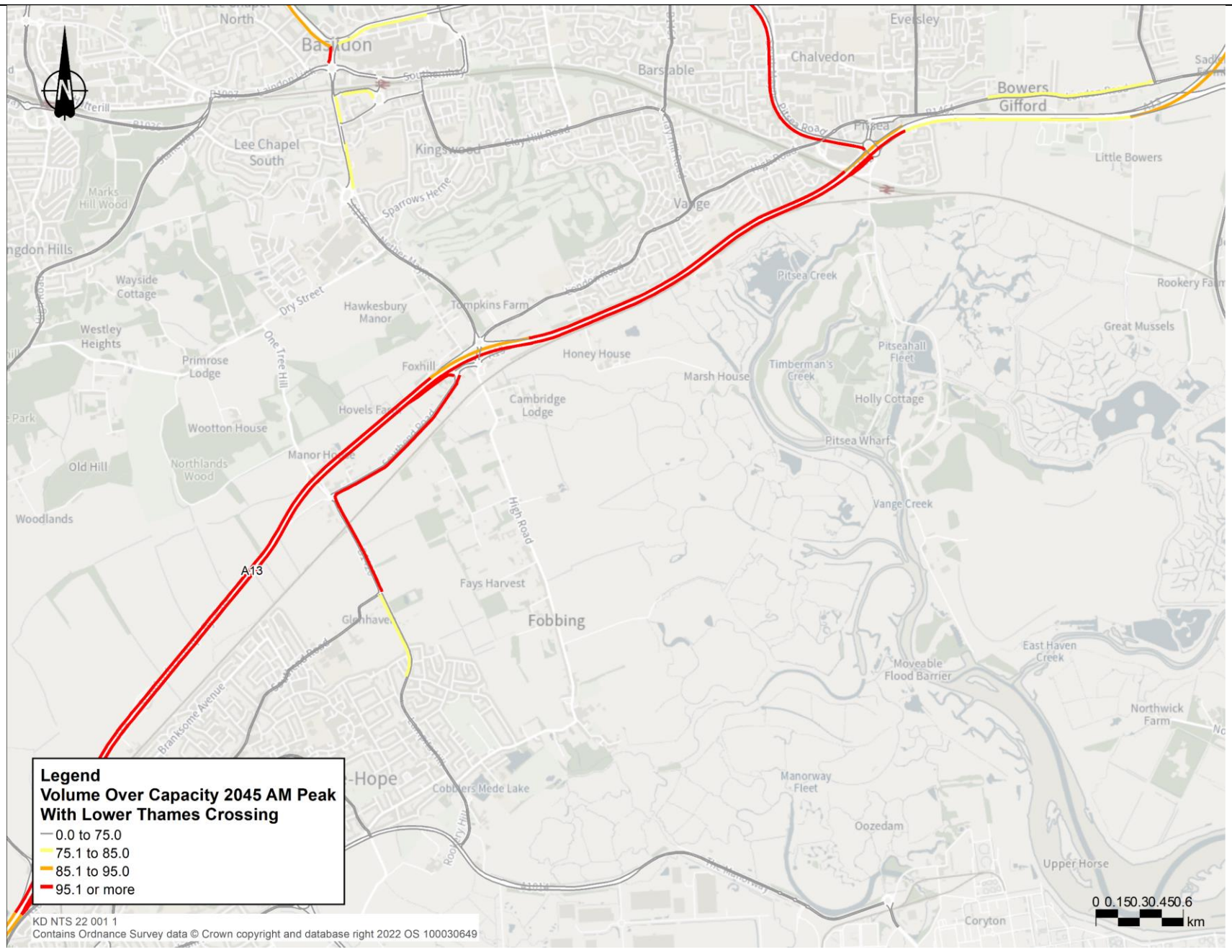
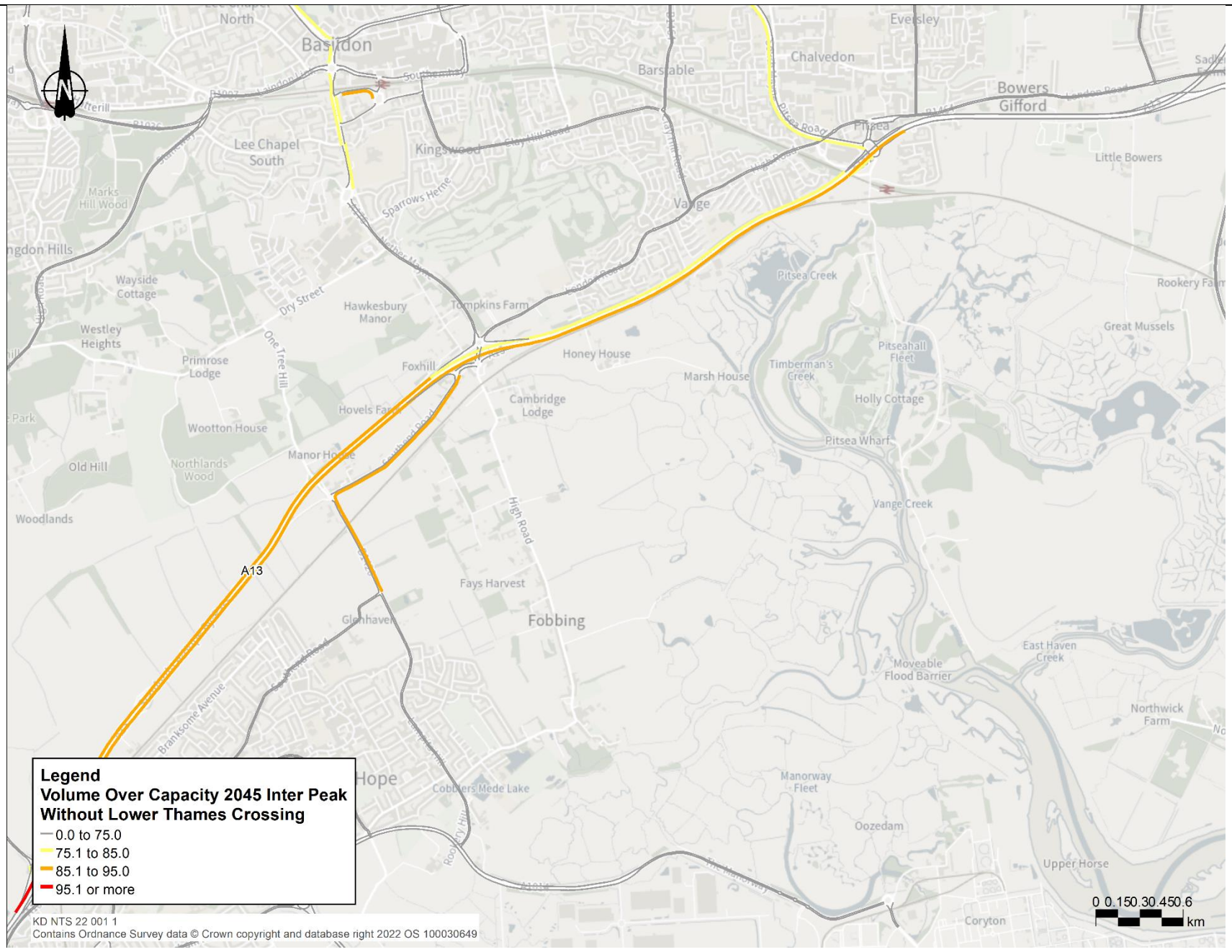


Figure A-17 – Volume over Capacity Plots for A13 corridor (East) (2045, Inter-peak)



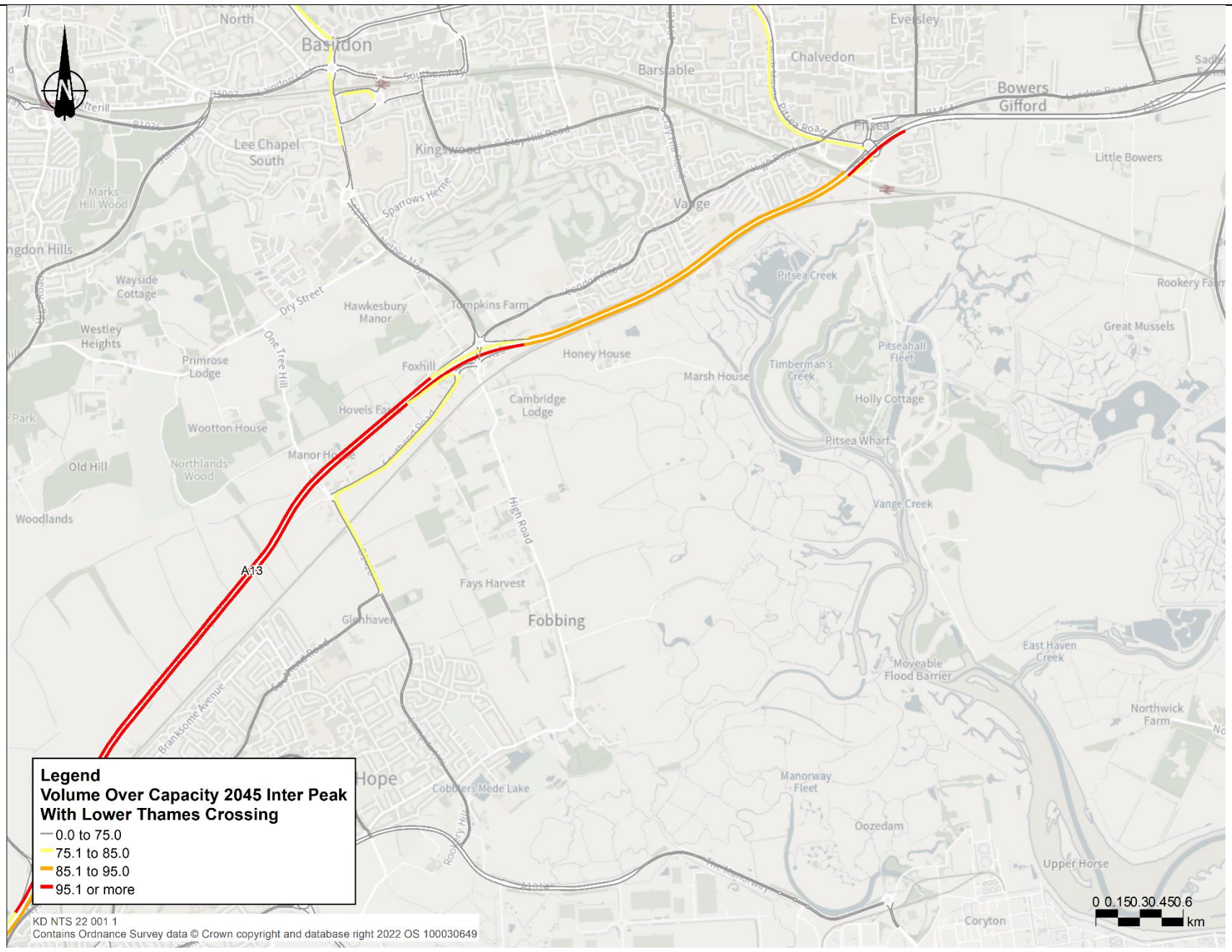
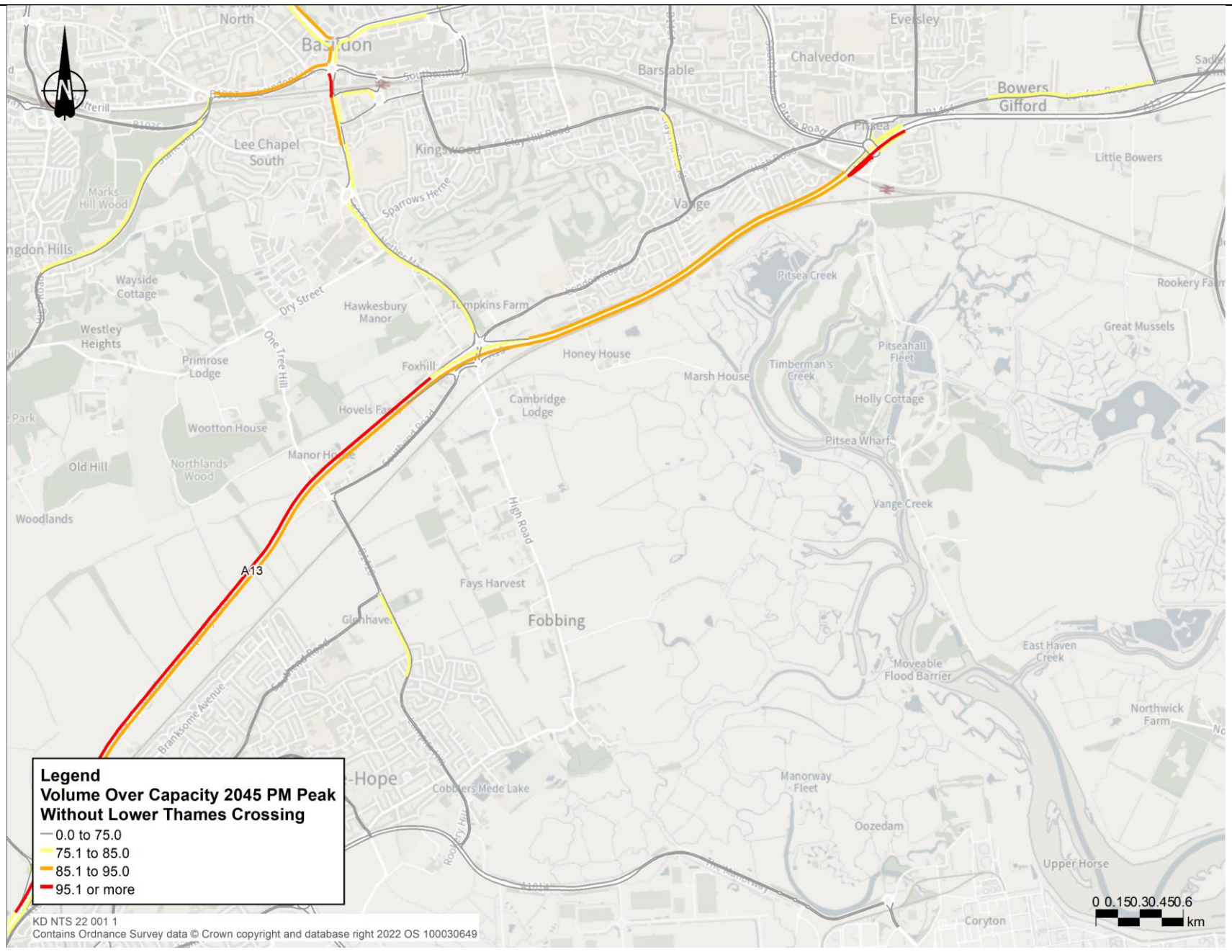
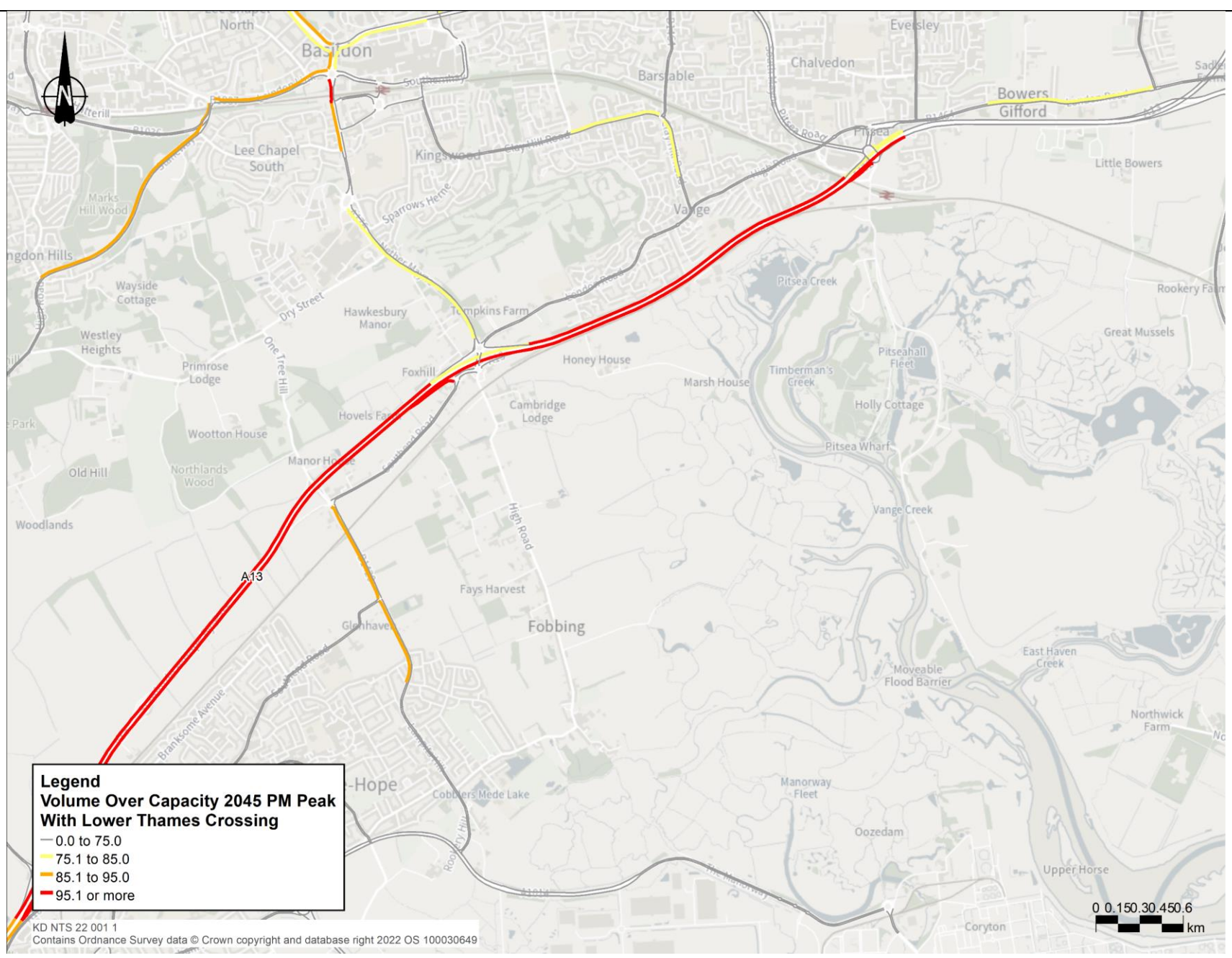


Figure A-18 – Volume over Capacity Plots for A13 corridor (East) (2045, PM peak)





A.3 A2/M2 Corridor

Figure A-19 – Volume over Capacity Plots for A2/M2 corridor (West) (2030, AM peak)

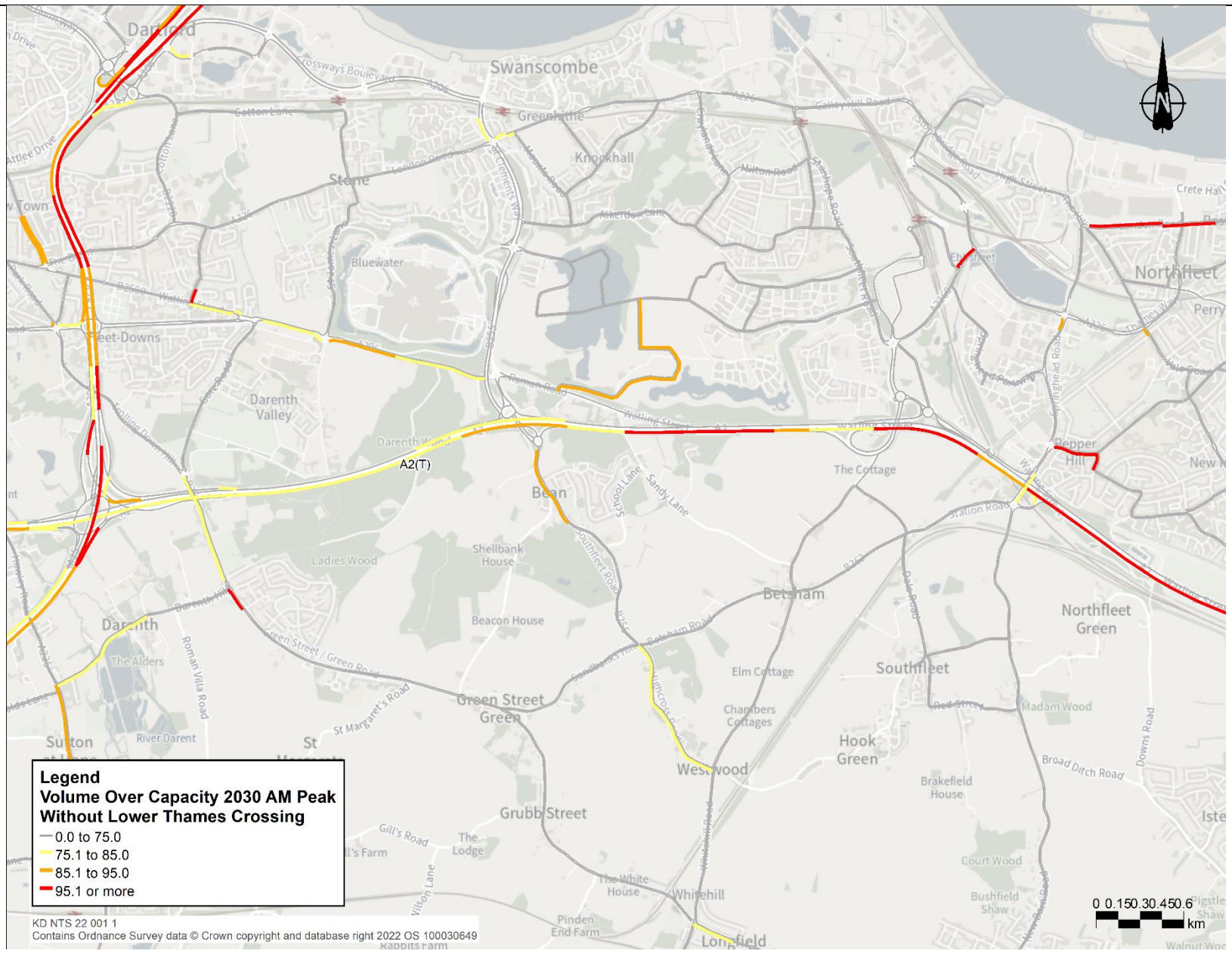
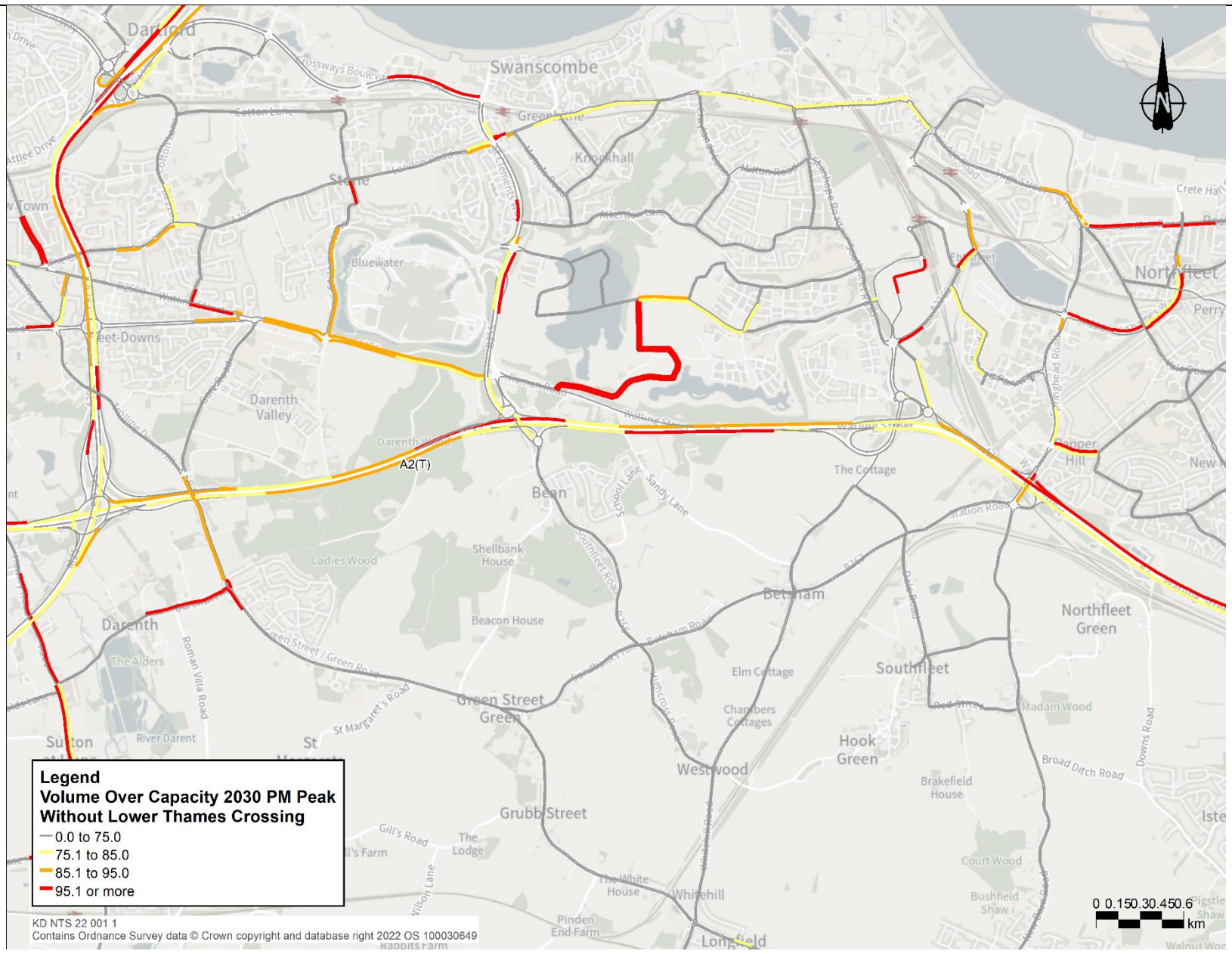


Figure A-20 – Volume over Capacity Plots for A2/M2 corridor (West) (2030, Inter-peak)

Figure A-21 – Volume over Capacity Plots for A2/M2 corridor (West) (2030, PM peak)



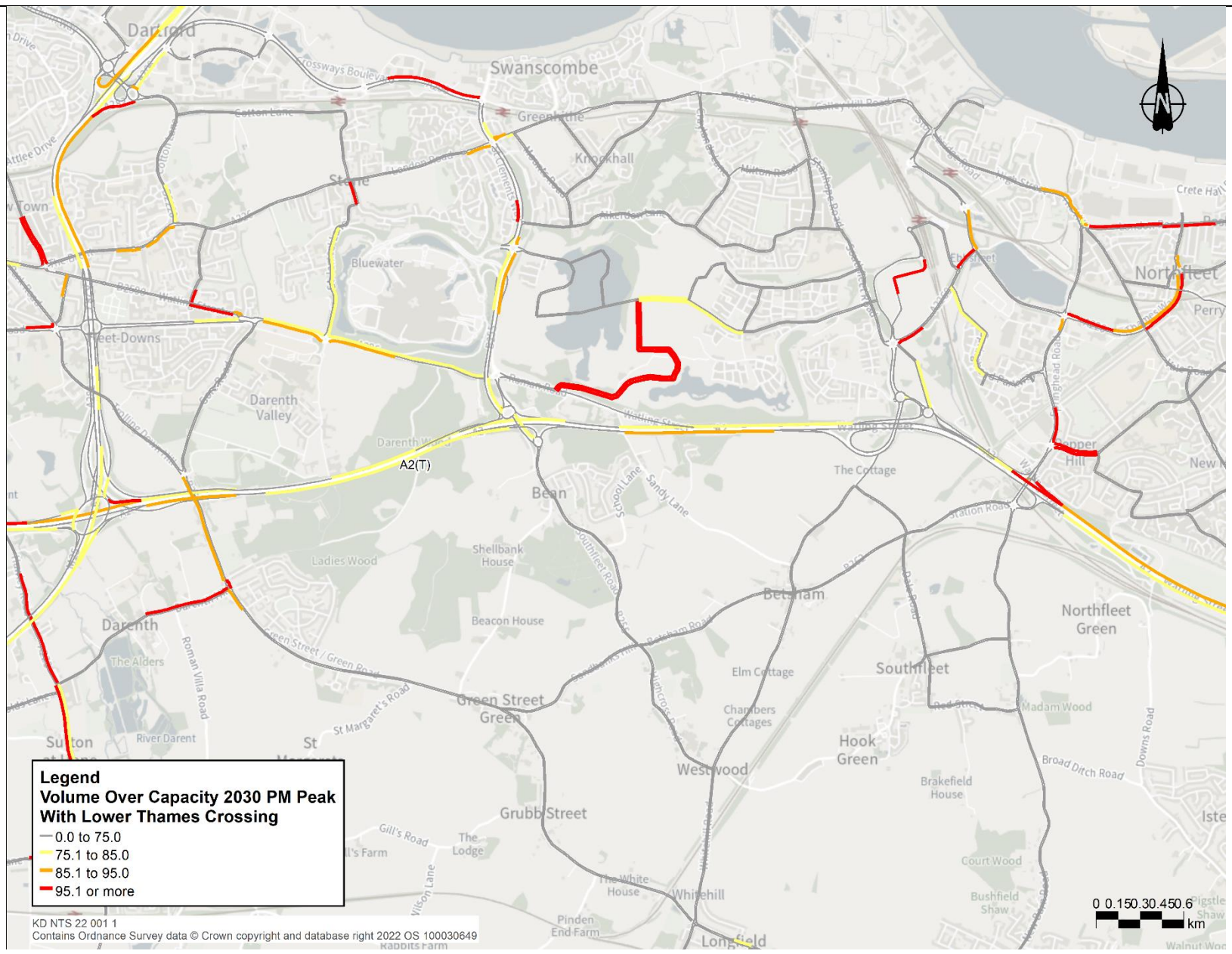


Figure A-22 – Volume over Capacity Plots for A2/M2 corridor (West) (2045, AM peak)

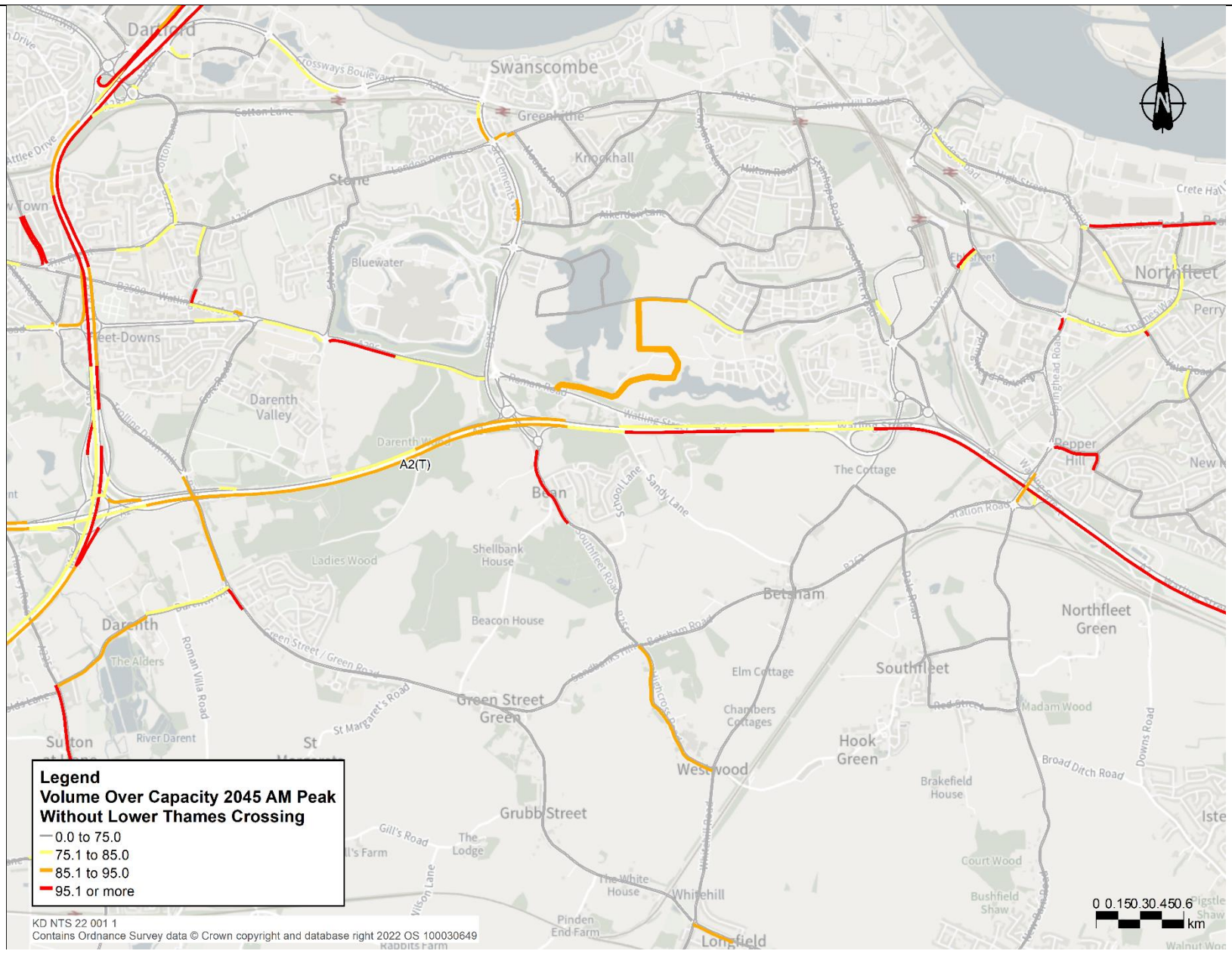
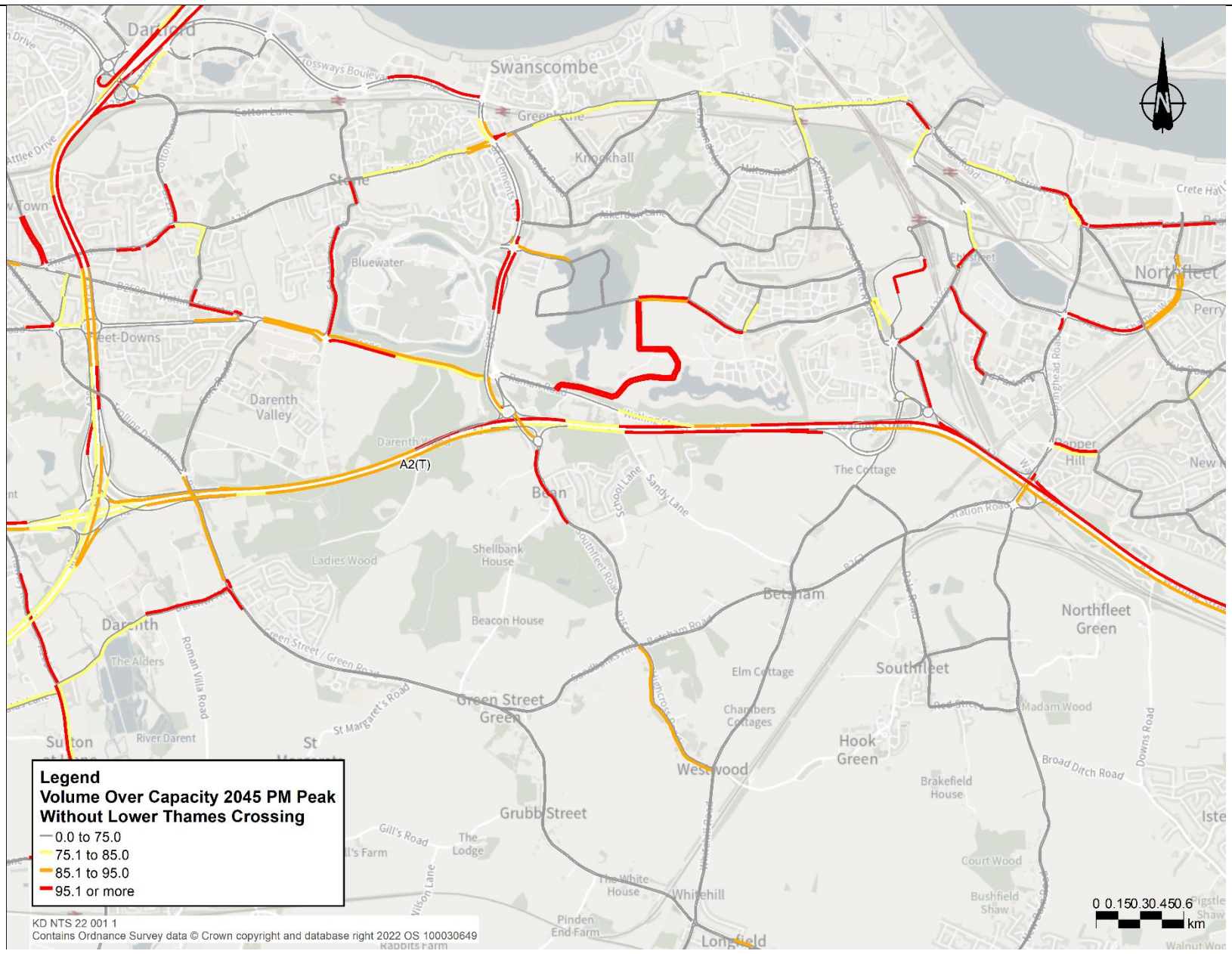


Figure A-23 – Volume over Capacity Plots for A2/M2 corridor (West) (2045, Inter-peak)

Figure A-24 – Volume over Capacity Plots for A2/M2 corridor (West) (2045, PM peak)



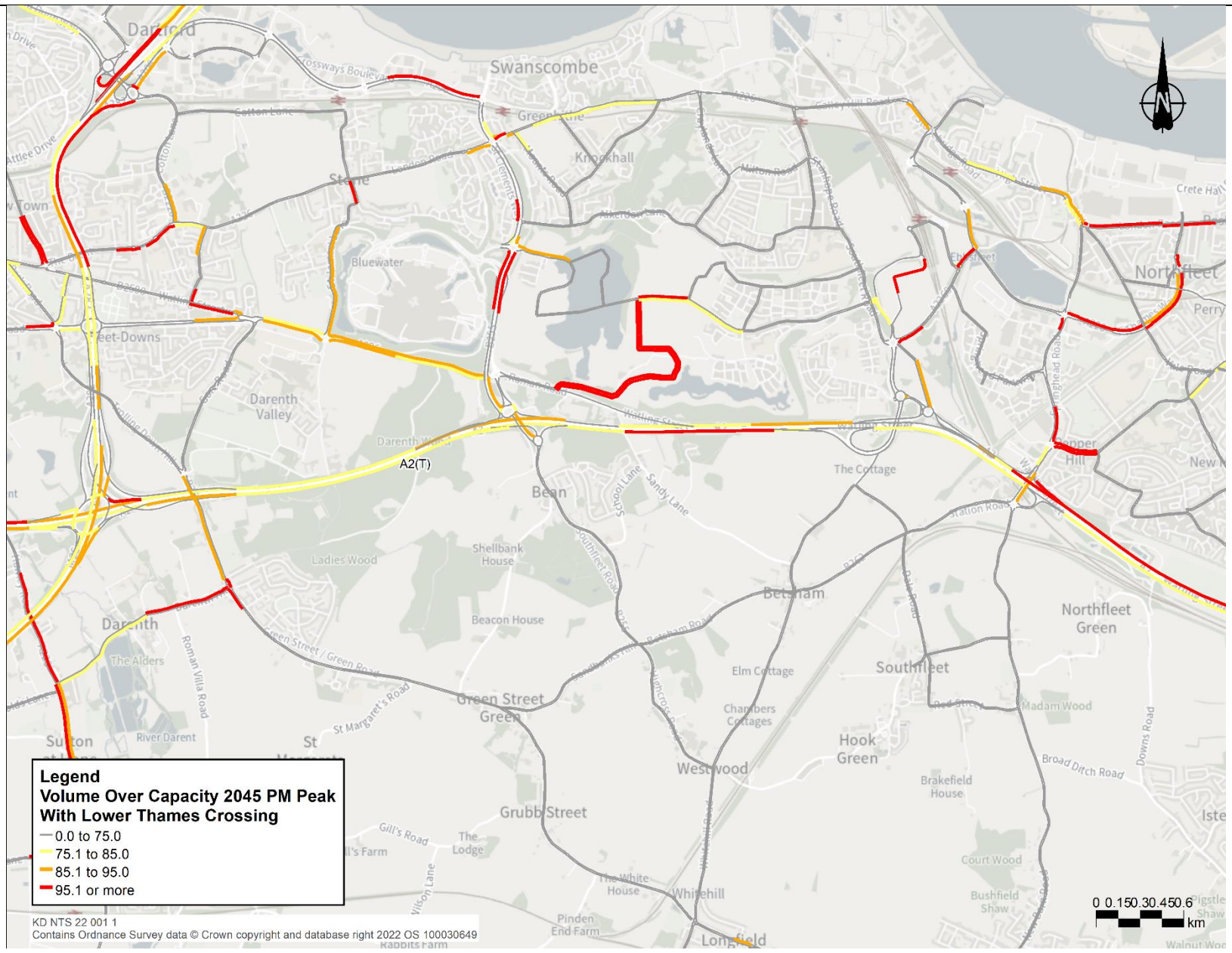
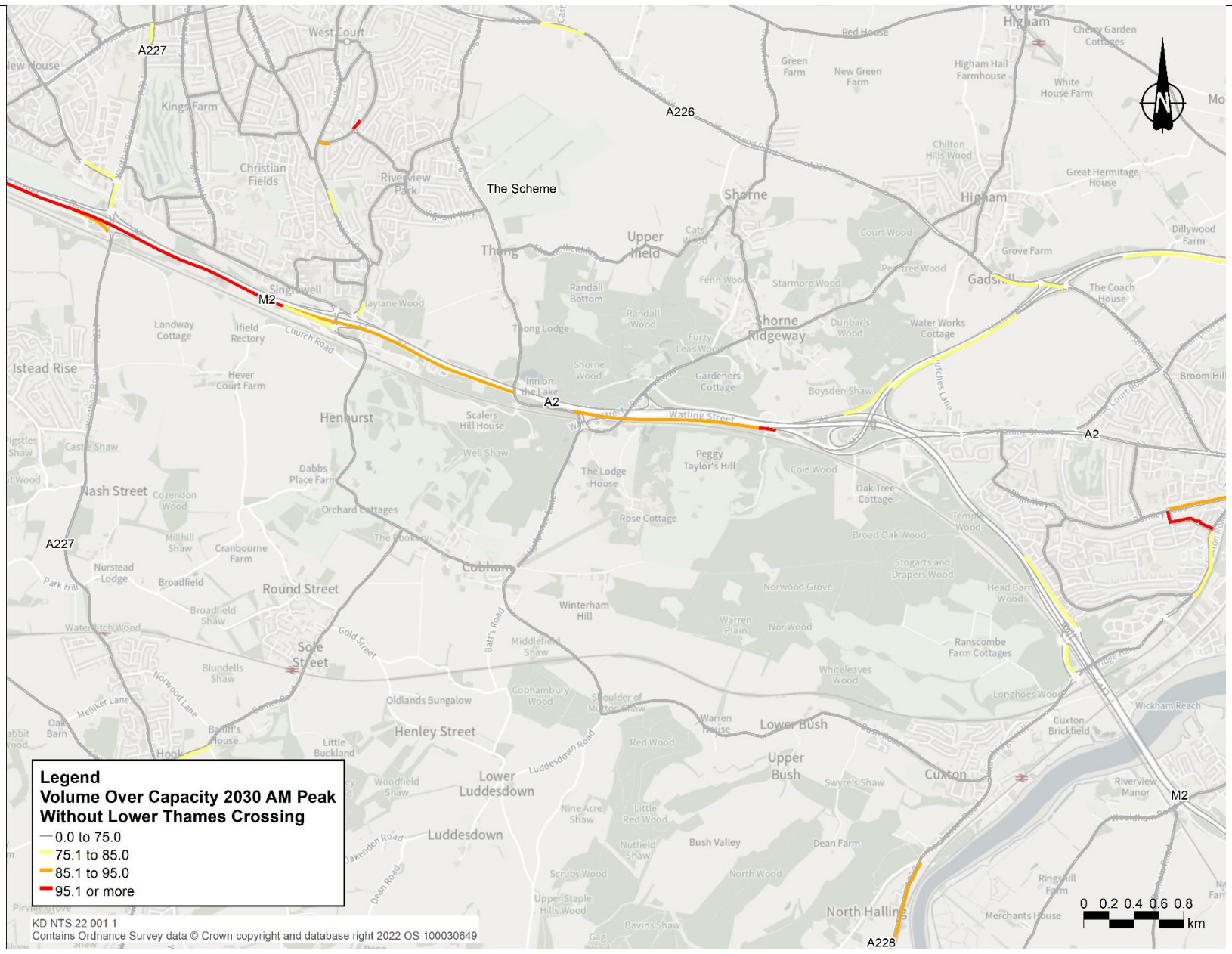


Figure A-25 – Volume over Capacity Plots for A2/M2 corridor (East) (2030, AM peak)



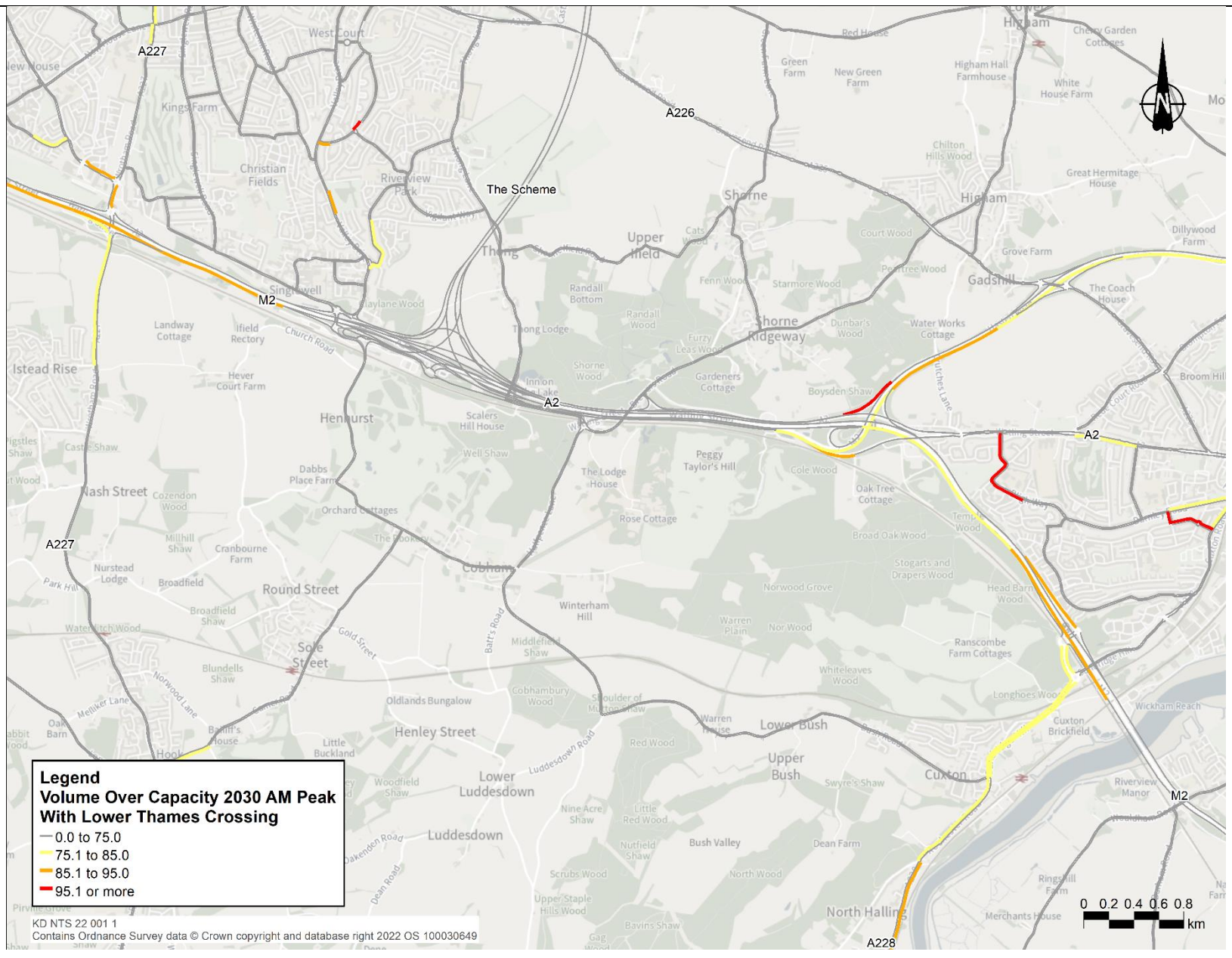


Figure A-26 – Volume over Capacity Plots for A2/M2 corridor (East) (2030, Inter-peak)

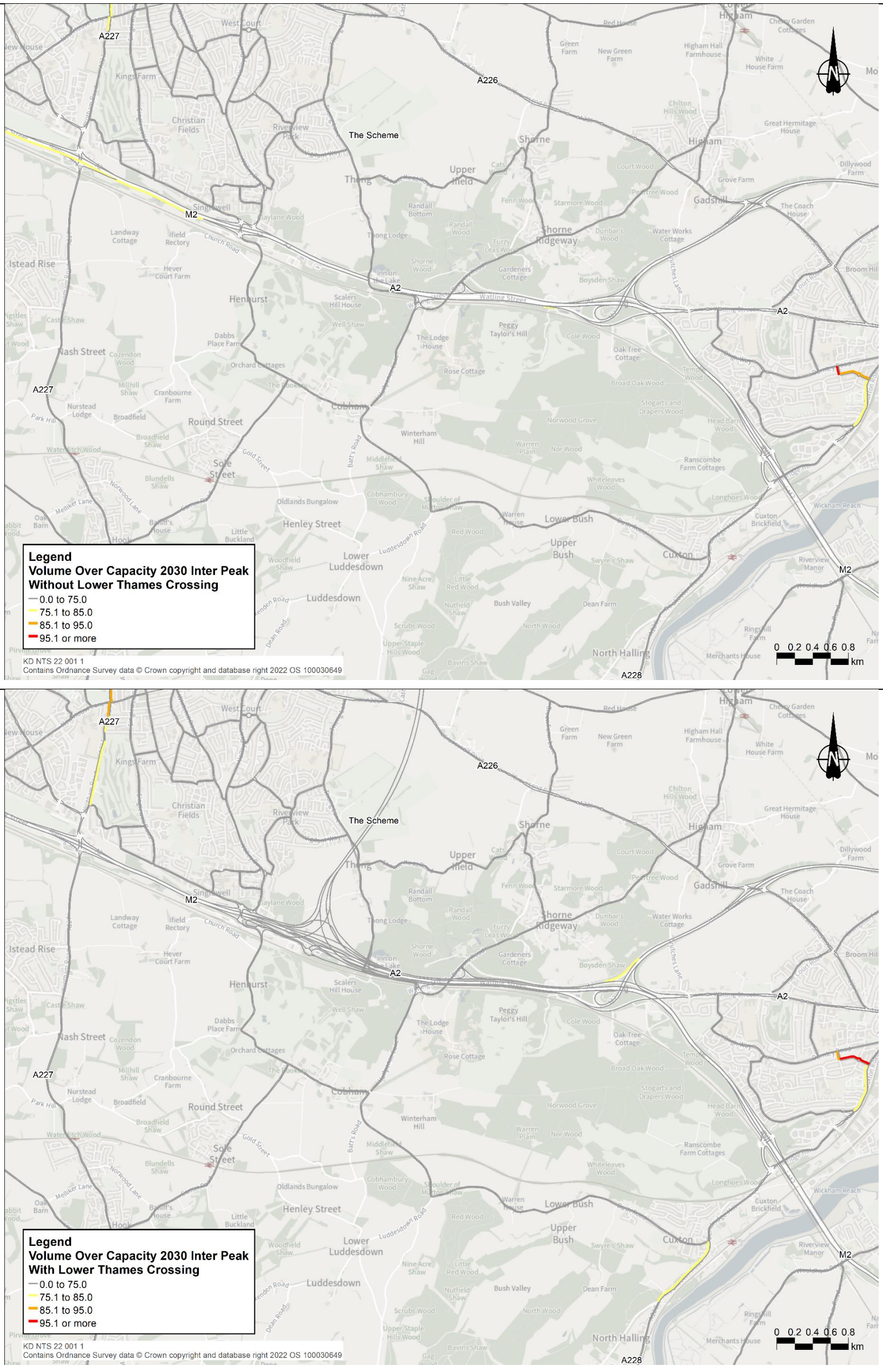


Figure A-27 – Volume over Capacity Plots for A2/M2 corridor (East) (2030, PM peak)

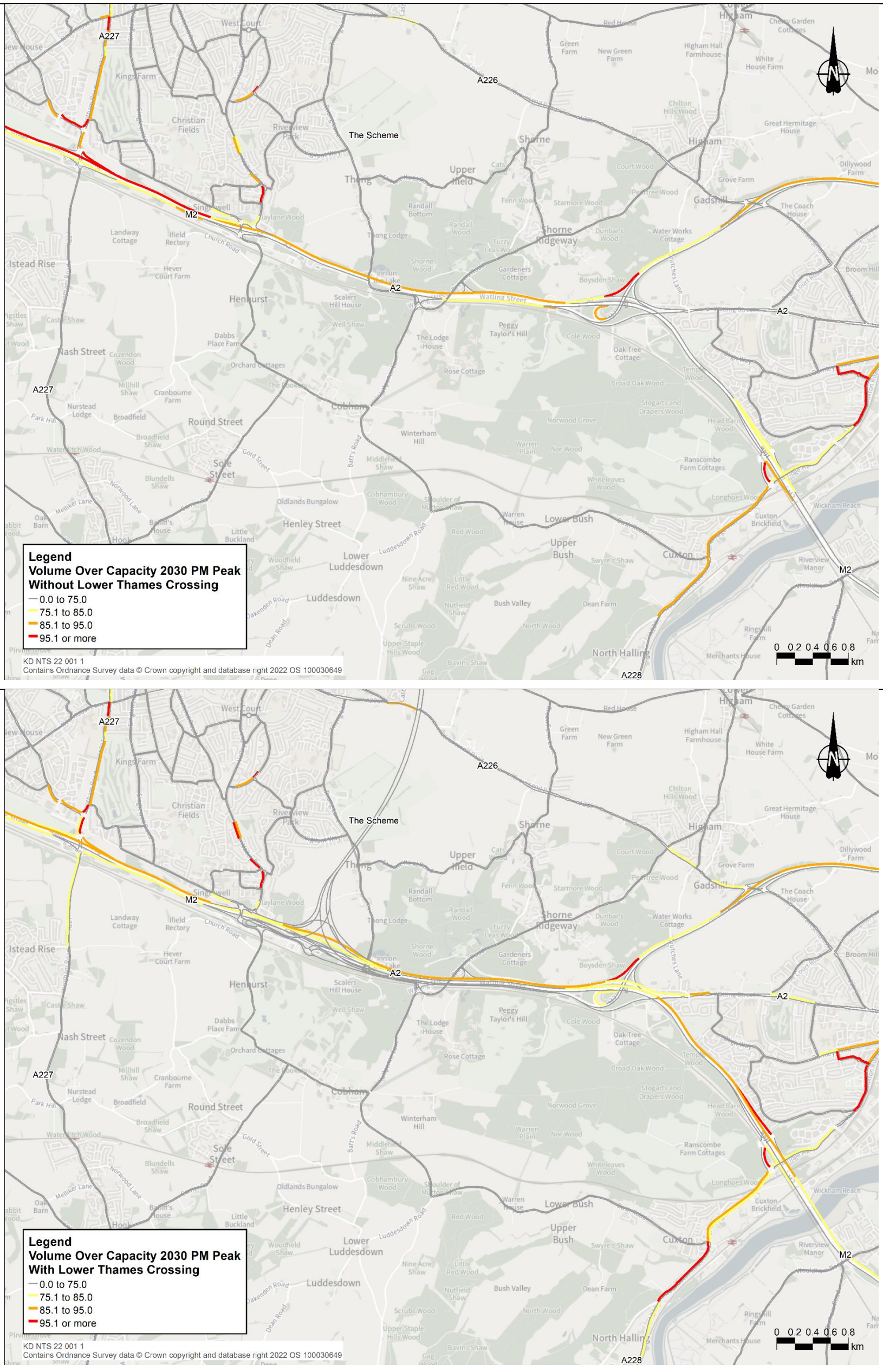
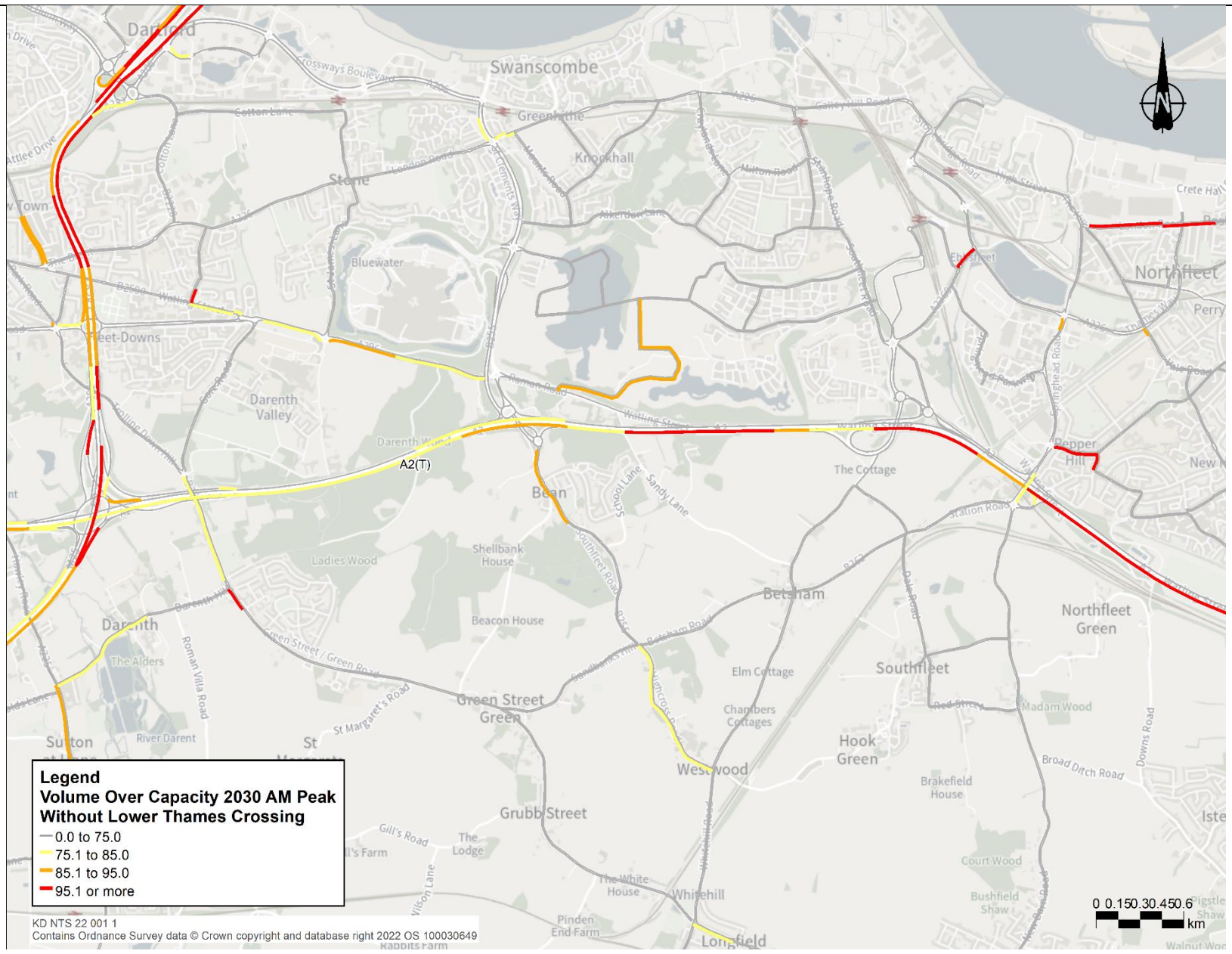


Figure A-28 – Volume over Capacity Plots for A2/M2 corridor (East) (2045, AM peak)



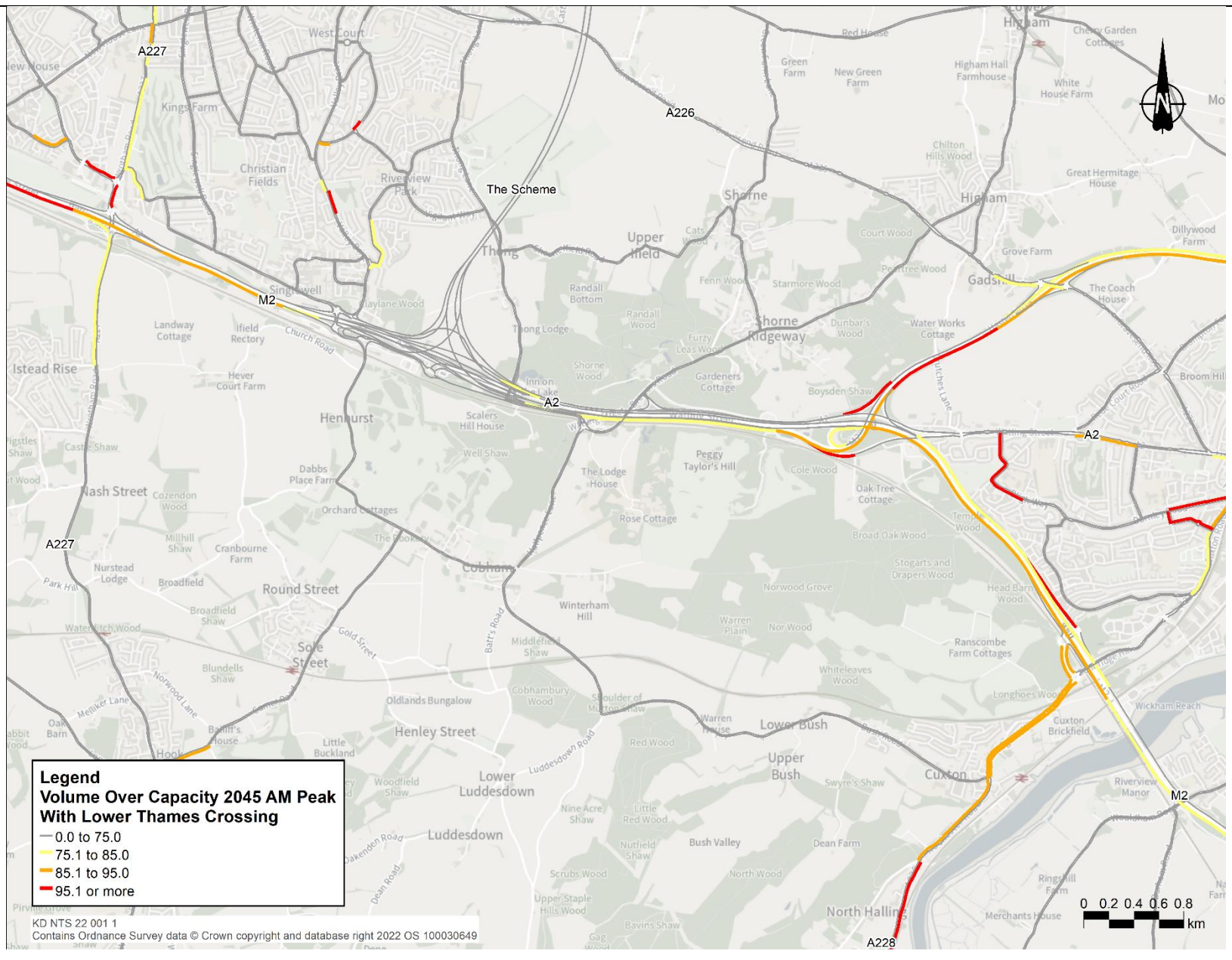
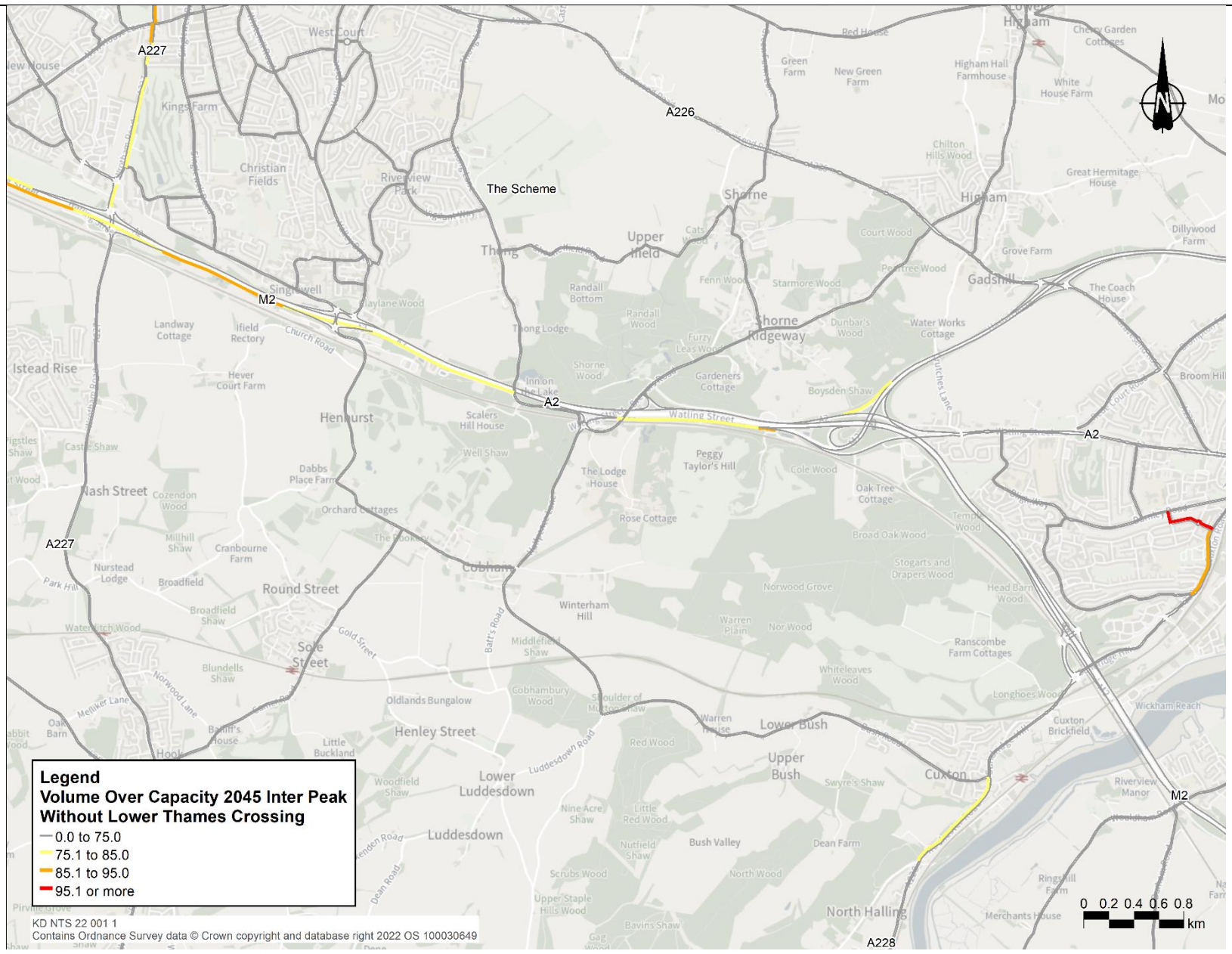


Figure A-29 – Volume over Capacity Plots for A2/M2 corridor (East) (2045, Inter-peak)



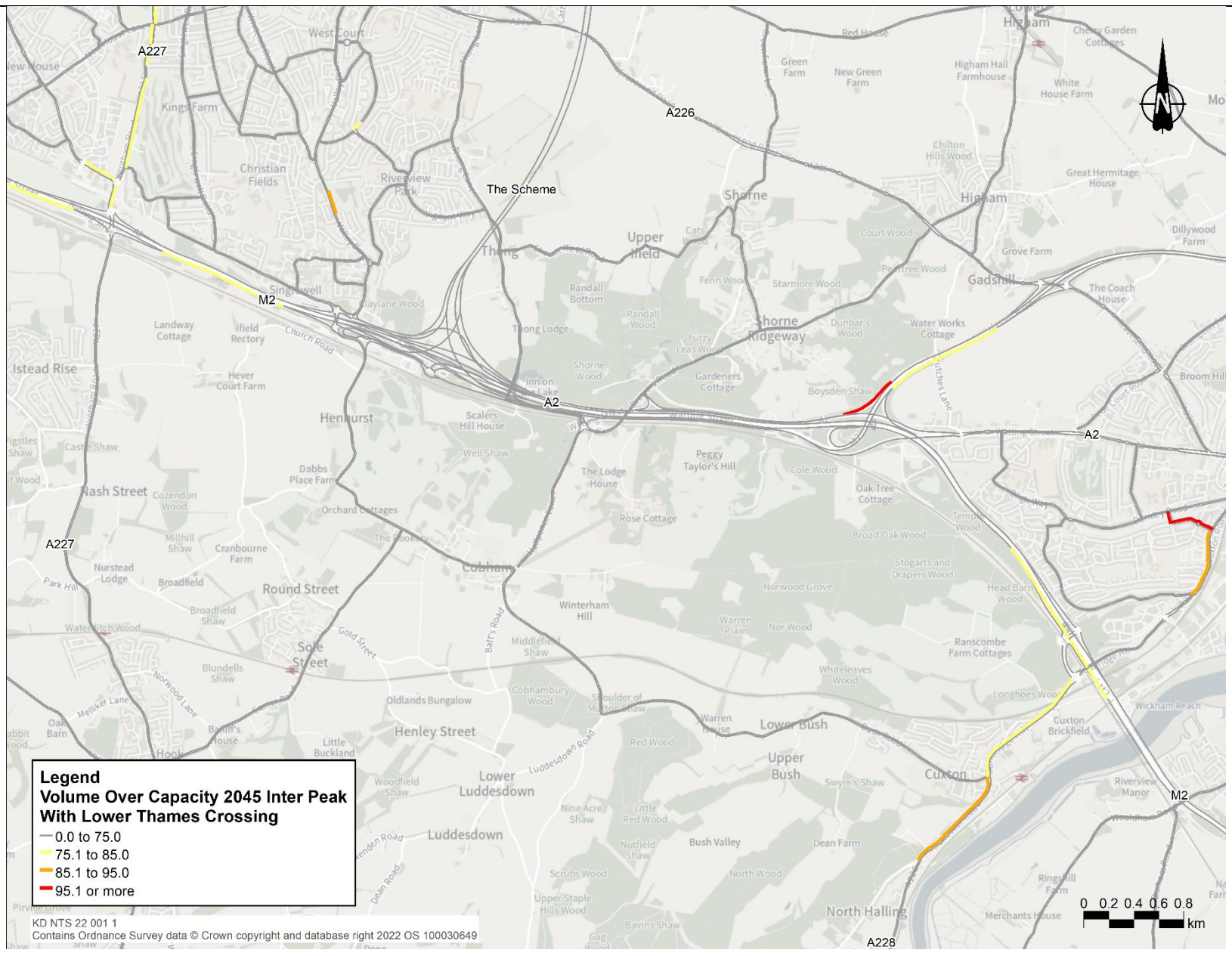
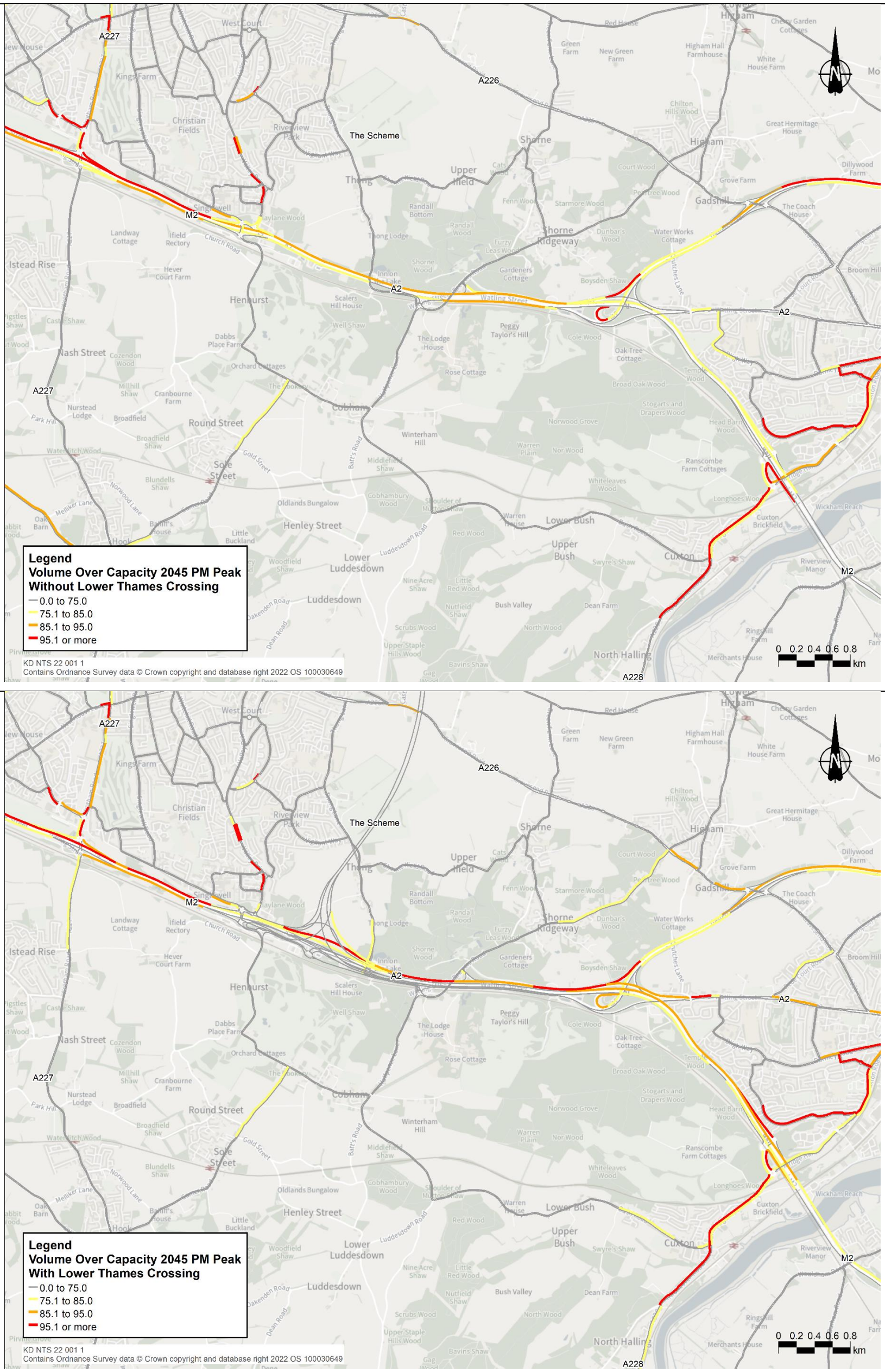


Figure A-30 – Volume over Capacity Plots for A2/M2 corridor (East) (2045, PM peak)



A.4 Asda roundabout

Figure A-31 – Volume over Capacity Plots for Asda roundabout (2030, AM peak)

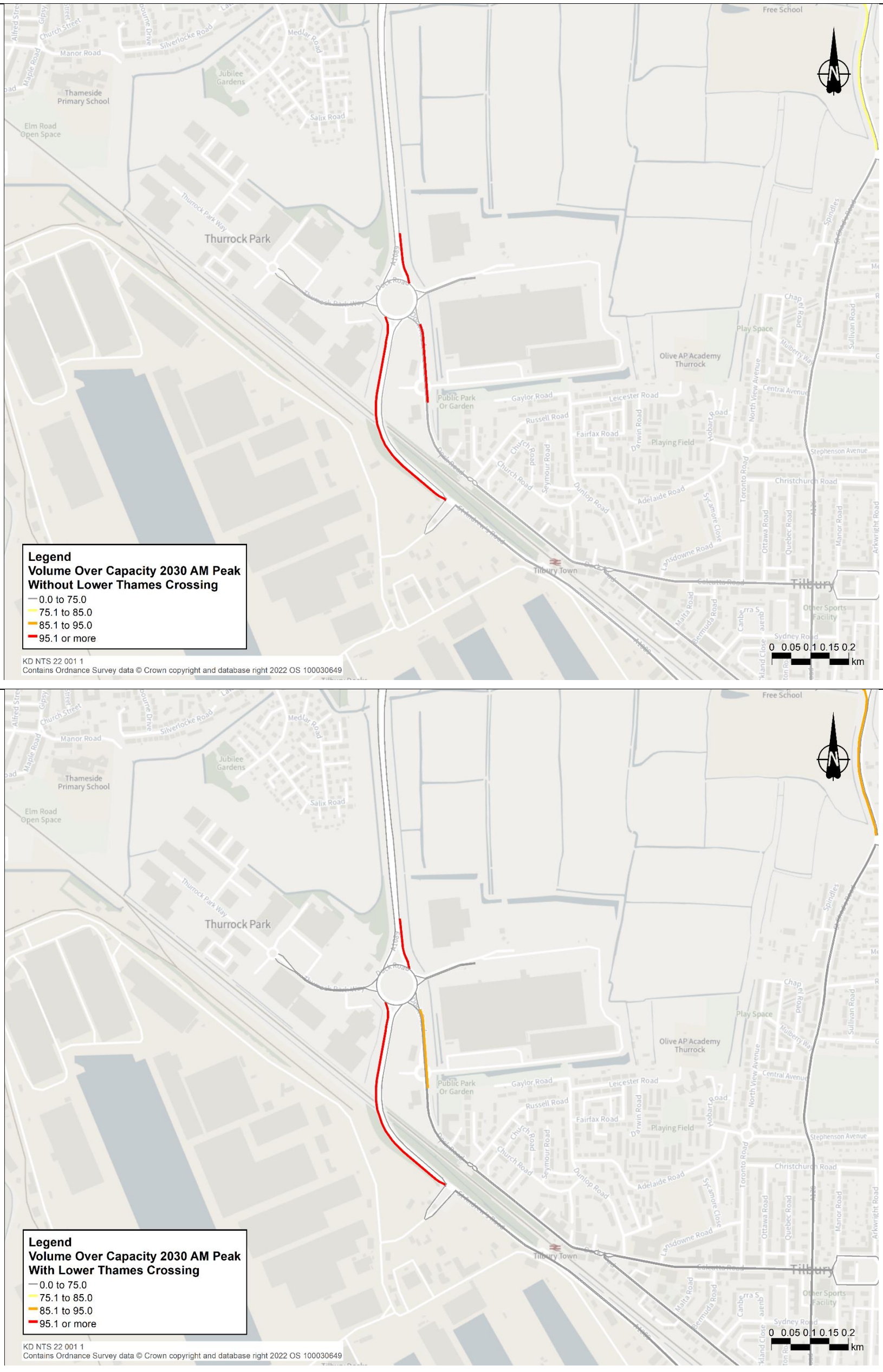


Figure A-32 – Volume over Capacity Plots for Asda roundabout (2030, Inter-peak)

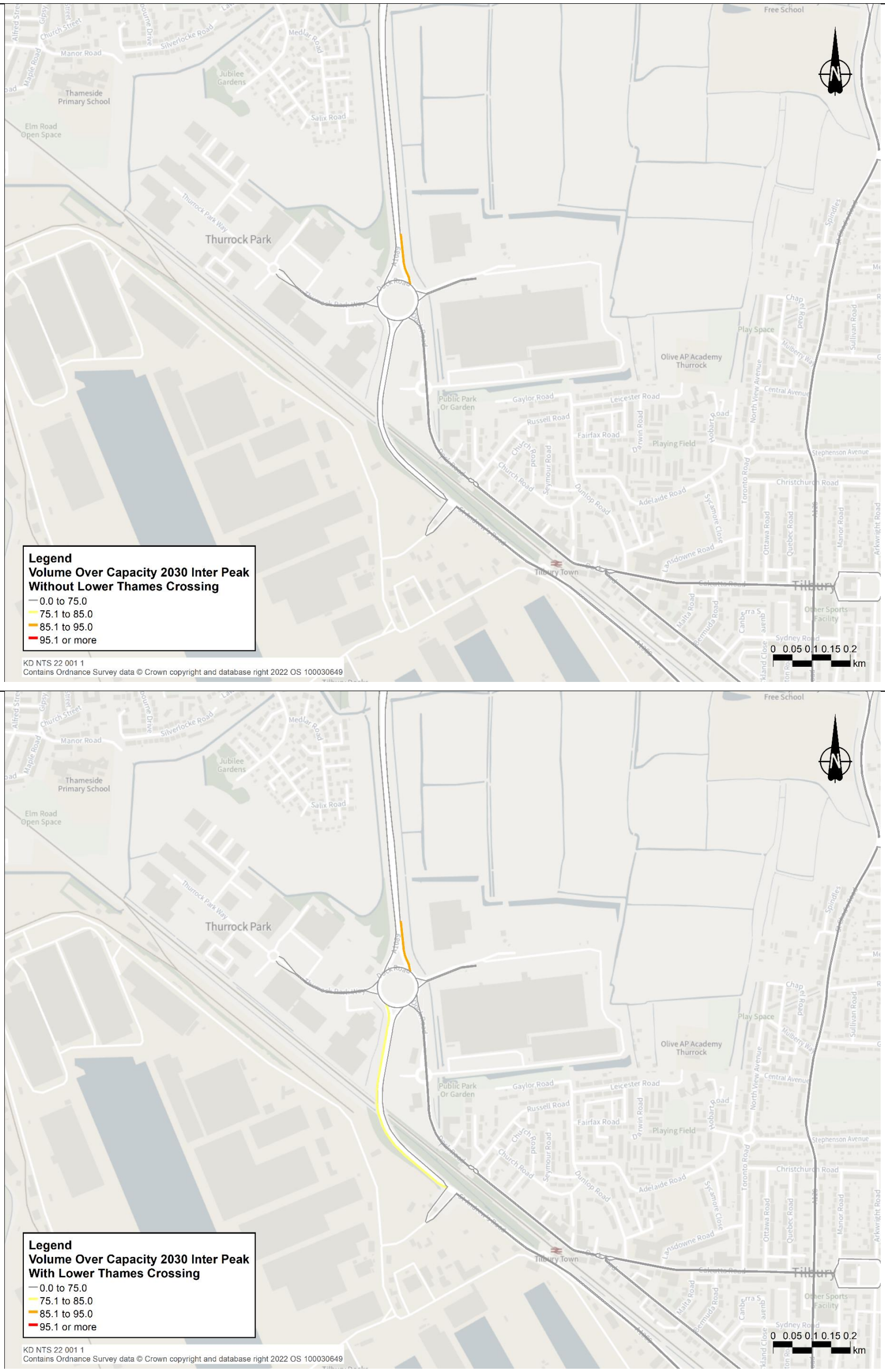
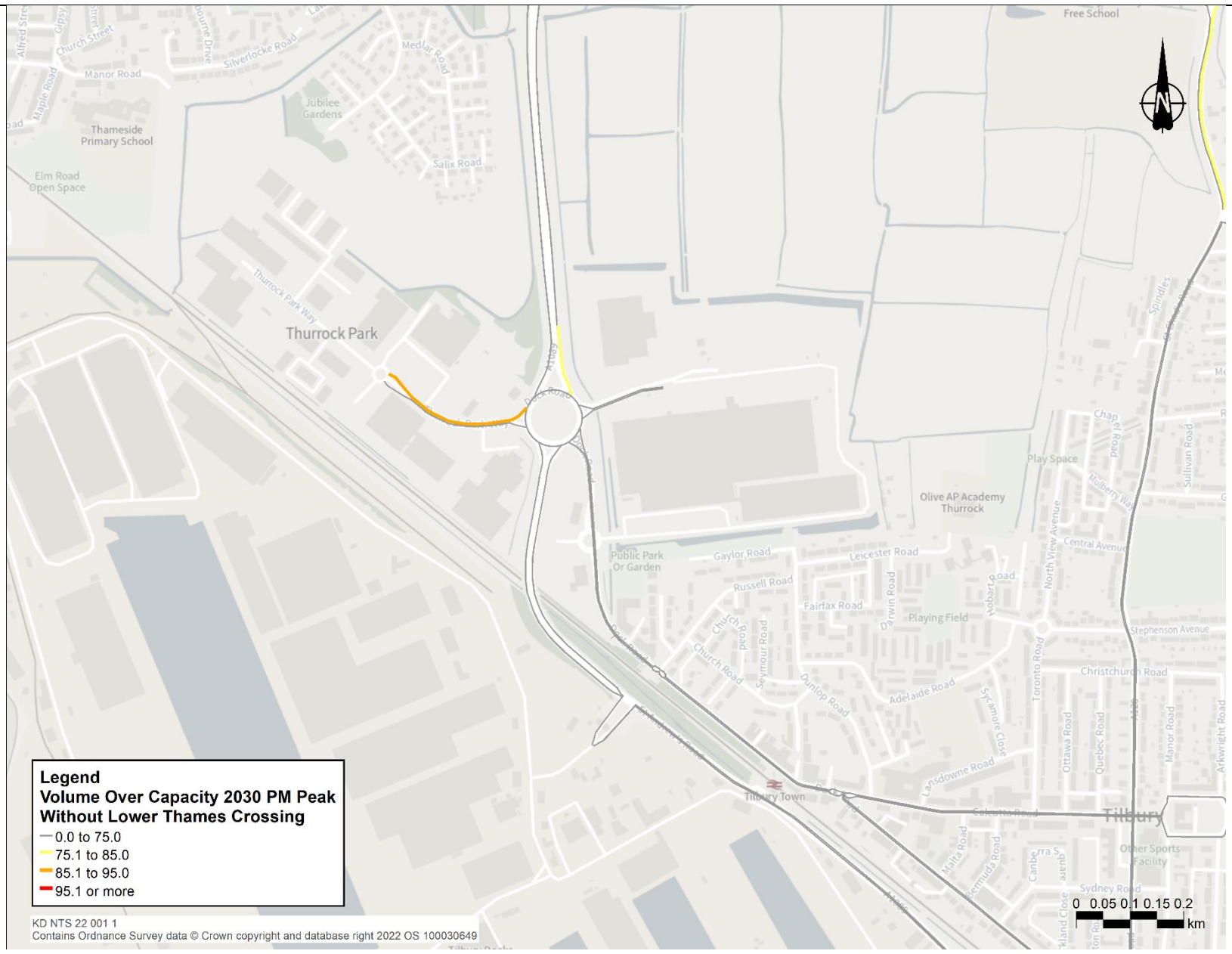


Figure A-33 – Volume over Capacity Plots for Asda roundabout (2030, PM peak)



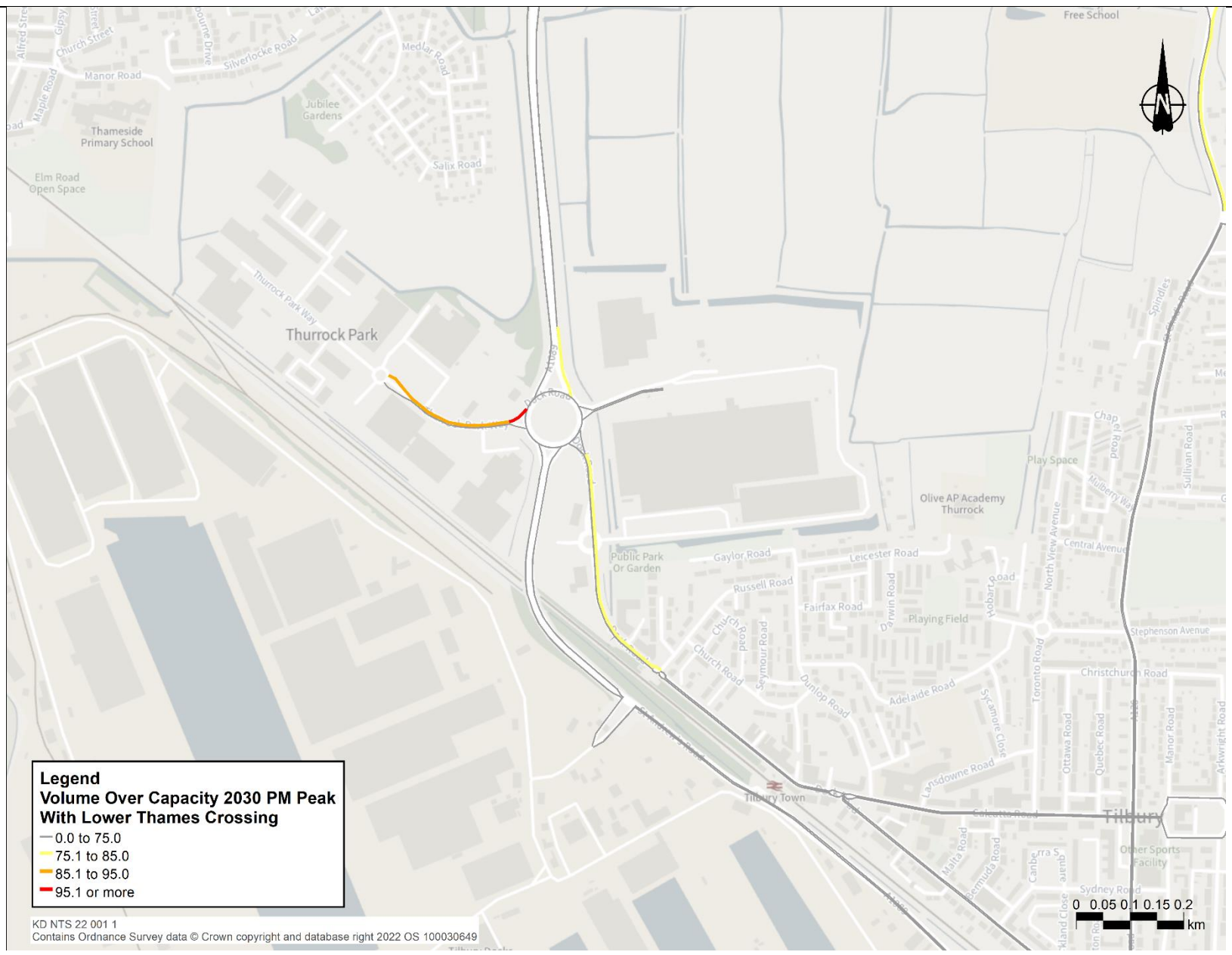
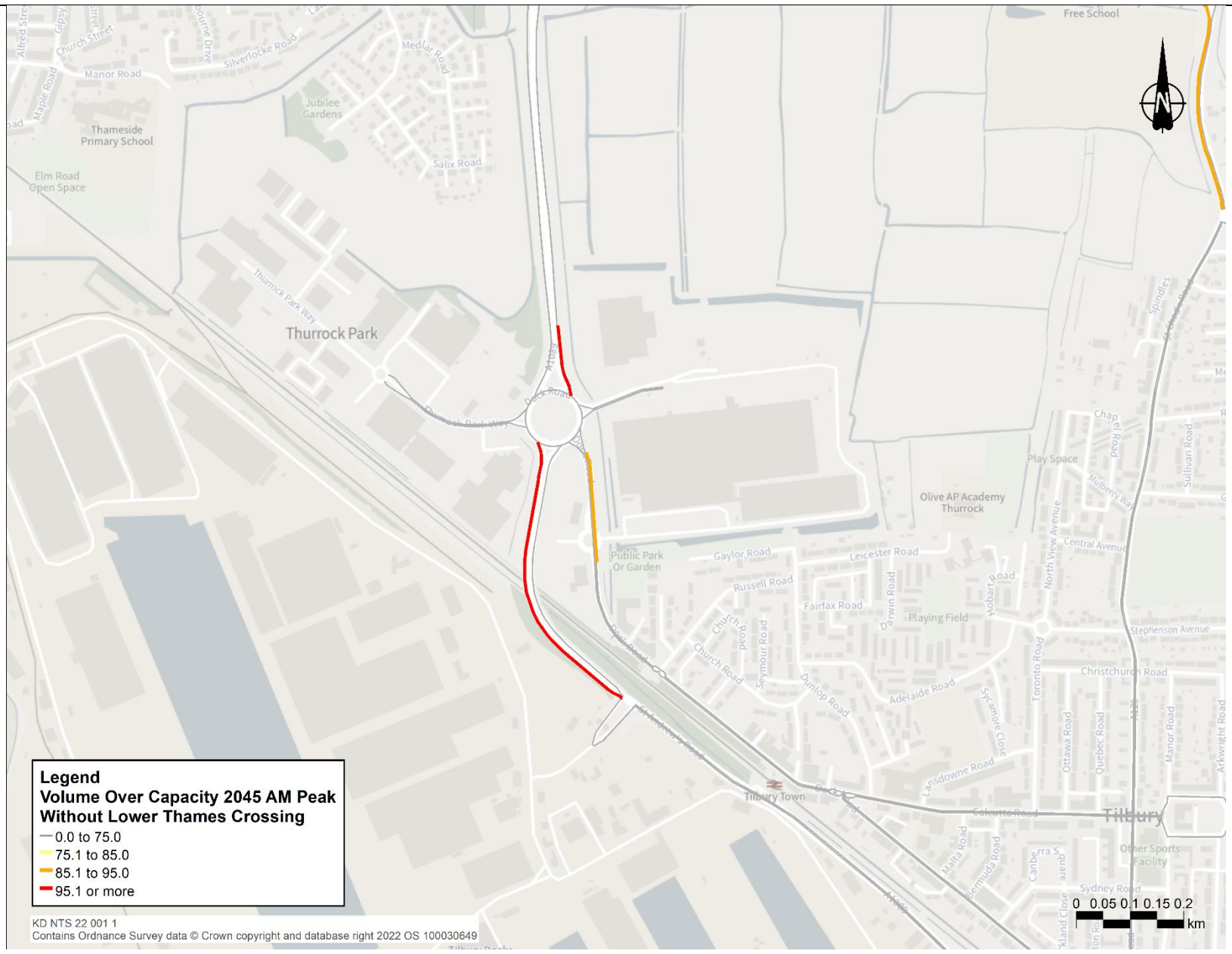


Figure A-34 – Volume over Capacity Plots for Asda roundabout (2045, AM peak)



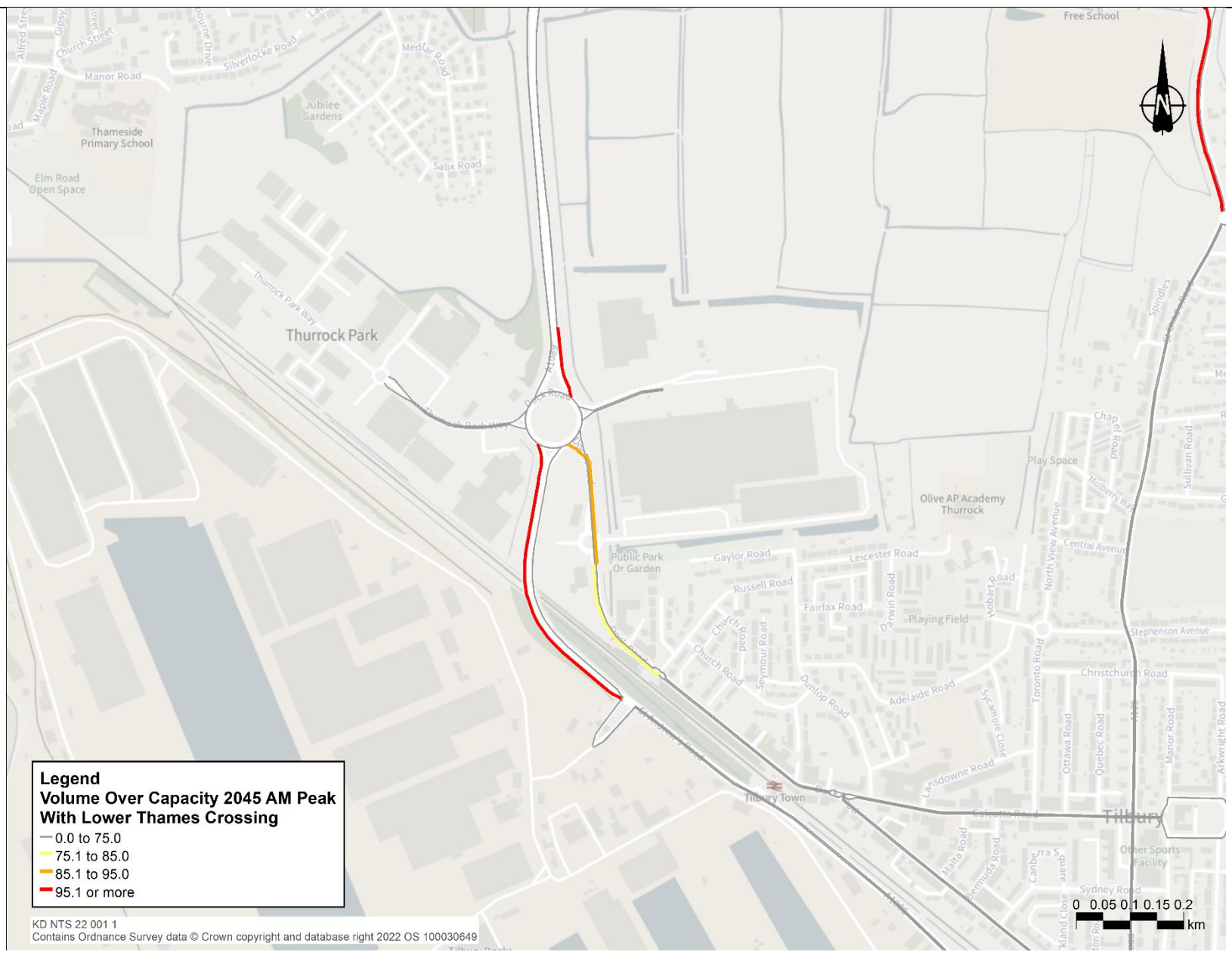


Figure A-35 – Volume over Capacity Plots for Asda Roundabout (2045, Inter-peak)

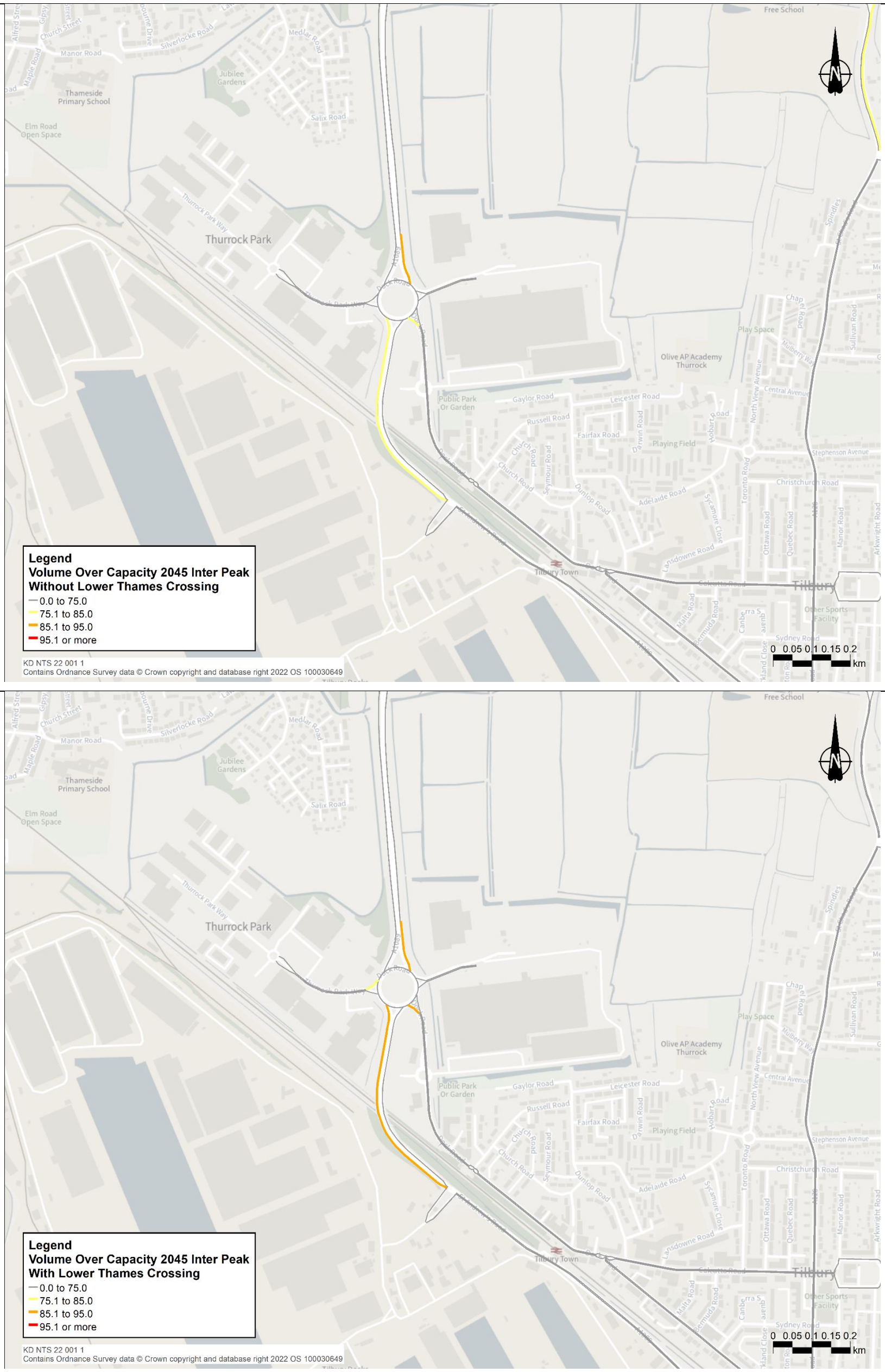
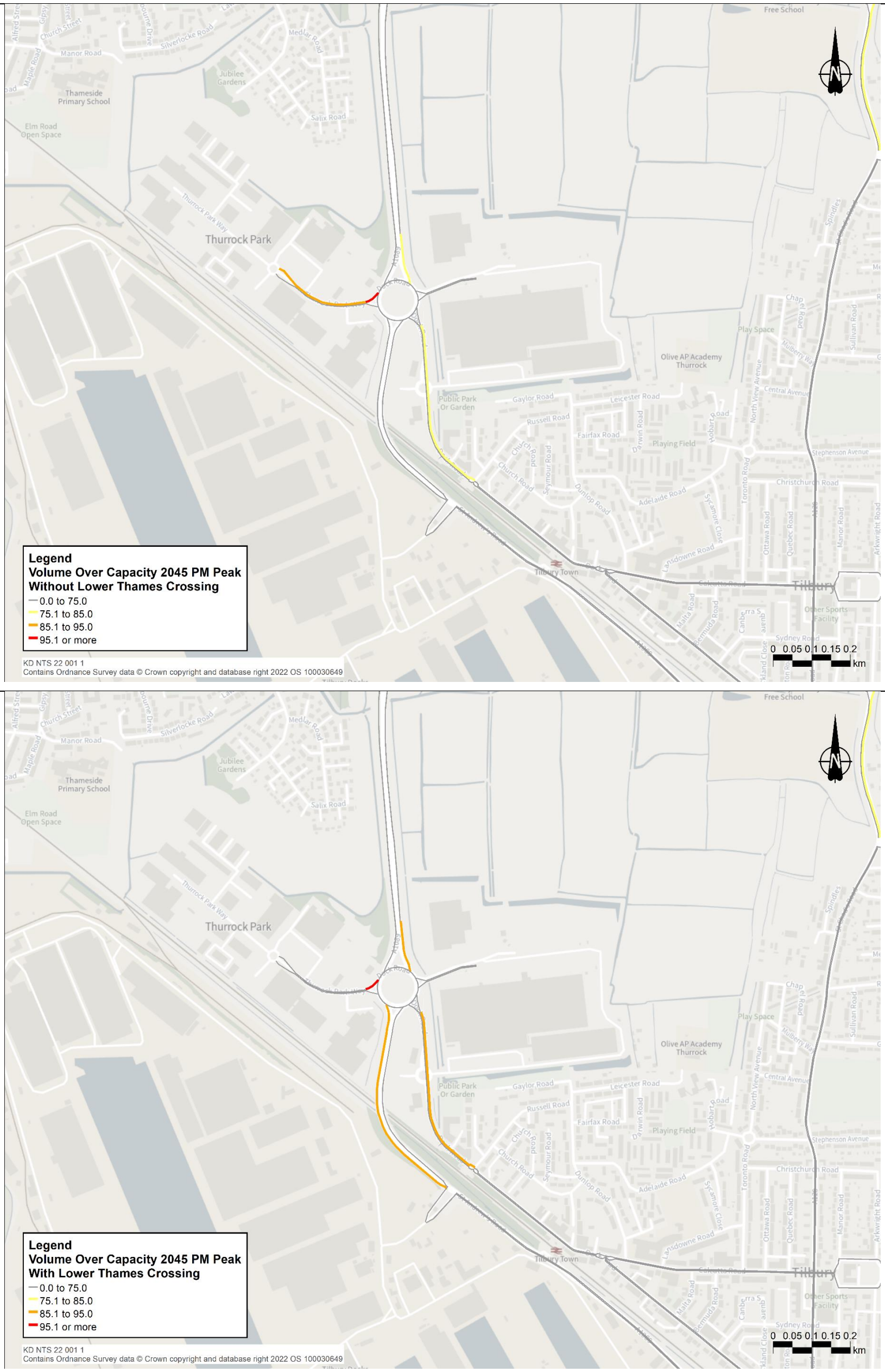


Figure A-36 – Volume over Capacity Plots for Asda roundabout (2045, PM peak)



Appendix B Silvertown Monitoring and Mitigation Strategy

SILVERTOWN TUNNEL

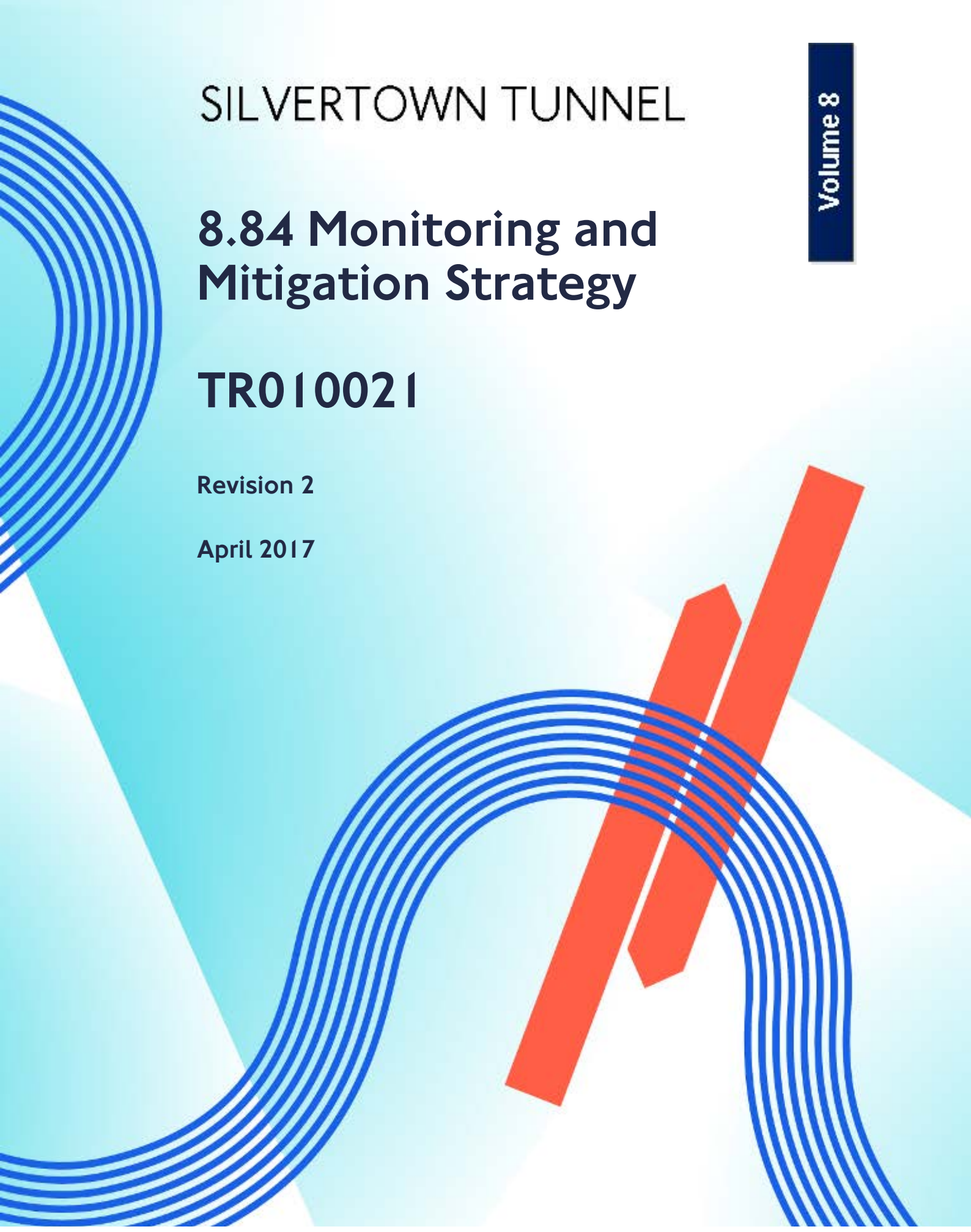
Volume 8

8.84 Monitoring and Mitigation Strategy

TR010021

Revision 2

April 2017



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TRANSPORT FOR LONDON

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Silvertown Tunnel

Monitoring and Mitigation Strategy

Planning Act 2008

Infrastructure Planning

The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009

Document Reference: *8.84*

Author: *Transport for London*

Rev.	Date	Approved By	Signature	Description
0	06/03/2017	David Rowe (TfL Lead Sponsor)	[redacted]	For Deadline 4 Submission
1	05/04/2017	David Rowe (TfL Lead Sponsor)	[redacted]	For Deadline 6 submission
2	10/04/2017	David Rowe (TfL Lead Sponsor)	[redacted]	For Deadline 7 submission

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1. INTRODUCTION

1.1 Purpose of this document

1.1.1 The purpose of the Monitoring and Mitigation Strategy (M&MS) is to set out the approach to:

- monitoring the traffic, air quality (including carbon), noise and socio-economic impacts of the Silvertown Tunnel scheme (the Scheme) in operation; and
- determining and implementing appropriate mitigation for any localised traffic and traffic-related impacts which arise as a result of the Scheme, both prior to and after Scheme opening.

1.1.2 The Strategy provides a detailed explanation of how TfL will comply with Requirement 7 (monitoring and mitigation) of the Silvertown Tunnel Development Consent Order (DCO).

1.1.3 The approach set out in this Strategy has been developed with regard to feedback received from the local boroughs throughout the DCO examination.

1.2 Relationship between the Monitoring and Mitigation Strategy, Charging Policies and Procedures and Bus Strategy

1.2.1 The M&MS interacts with the Charging Policies and Procedures document and the Bus Strategy.

1.2.2 Schedule 2 of the DCO provides that TfL must comply with the M&MS in respect of monitoring the impacts of the Scheme and bringing forward any mitigation to address adverse Scheme impacts that are identified. Article 52 of the DCO requires TfL to exercise the user charging power in accordance with the Charging Policies and Procedures and Schedule 2 of the DCO requires bus services through the tunnel to be planned and provided in accordance with the Bus Strategy.

1.2.3 A failure by TfL to comply with the commitments in these documents would amount to a breach of the terms of the DCO.

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

- **Charging Policies and Procedures** – sets out the principles according to which TfL must set and vary the user charges and the procedures that apply when doing so.

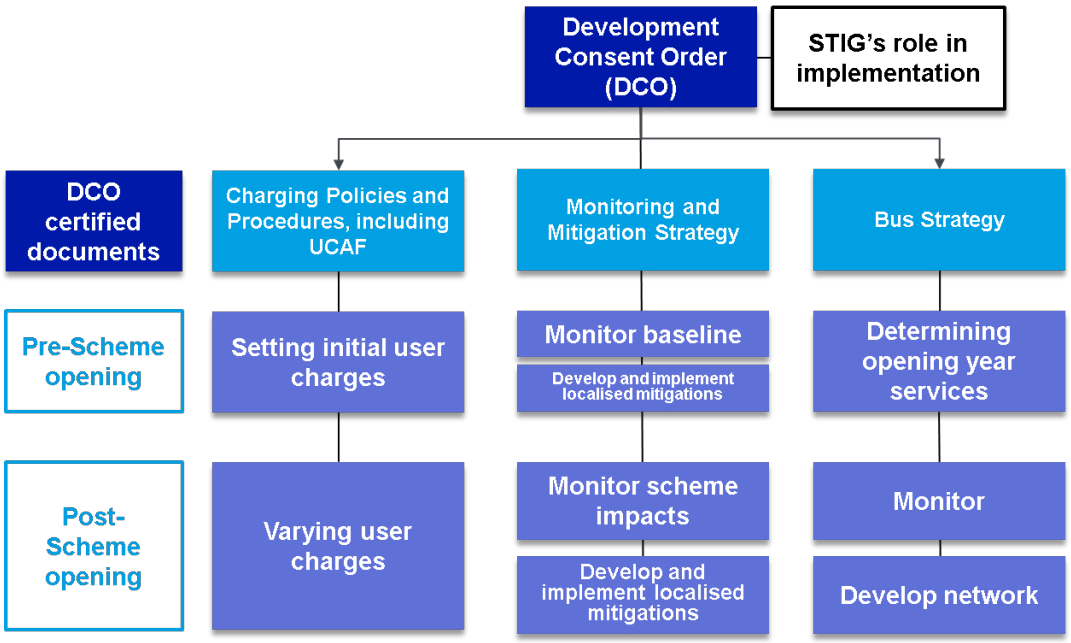
- **Monitoring and Mitigation Strategy** – sets out the scope of monitoring of Scheme impacts that TfL will undertake and the processes for determining and implementing appropriate mitigation for any localised traffic and traffic-related impacts.
- **Bus Strategy** – sets out the commitments which TfL will fulfil in developing bus services prior to Scheme opening and in reviewing and modifying services.

1.2.5 Compliance with the obligations in each of these documents is secured by requirements in Schedule 2 of the DCO and, in the case of the Charging Policies and Procedures document, by Article 52 of the DCO.

1.2.6 The DCO provides a role for members of the Silvertown Tunnel Implementation Group (STIG) in relation to the operation of each of these documents. The role and responsibilities of STIG is explained in each of these documents.

1.2.7 The functions of the three documents and the role of STIG are summarised in Figure 1-1 below.

Figure 1-1: The relationship between the Charging Policies and Procedures, Monitoring and Mitigation Strategy and the Bus Strategy



1.2.8 The M&MS applies from not later than three years prior to the Scheme opening for public use and for three years following the Scheme opening for public use, with the potential for the M&MS to be extended by a further two years[1]. The Bus Strategy and the Charging Policies and Procedures apply for the life of the Scheme.

1.3 Structure of this document

1.3.1 This document is structured as follows:

- Chapter 2 explains the purpose of the refreshed assessment of Scheme impacts and the process for identifying and implementing localised traffic mitigations in advance of Scheme opening.
- Chapter 3 describes the monitoring programme, including the geographical area that will be covered and the timeframes for monitoring baseline conditions and Scheme impacts.
- Chapter 4 explains the processes for reviewing the monitoring data and identifying and implementing any mitigation measures identified as being necessary after the Scheme is operational.
- Chapter 5 provides an overview of the types of mitigation measures which could be implemented, both pre- and post-opening of the Scheme.

[1] With the possible exception of air quality monitoring, which may continue for a longer period as set out in paragraph 3.7.5.

2. PRE-OPENING MITIGATION

2.1 Overview of the refreshed assessment

2.1.1 Prior to the Silvertown Tunnel opening for public use, TfL must refresh its assessment of Scheme impacts, in order to:

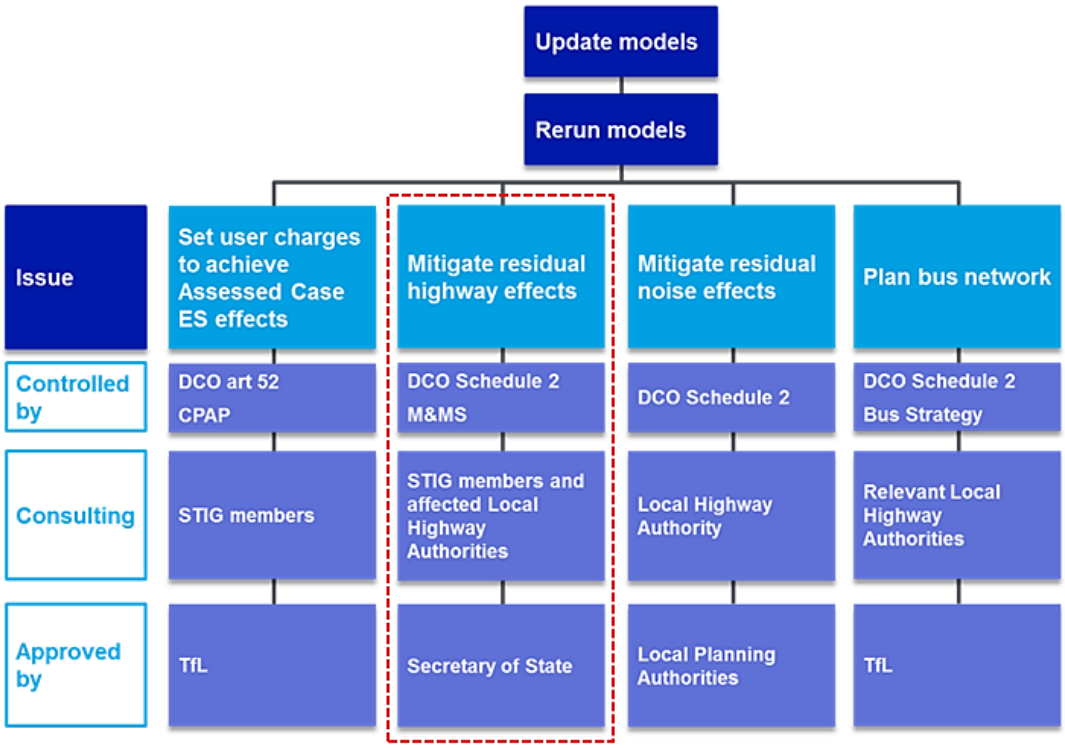
- Set the opening user charges;
- Define the requirement for and form of localised mitigation for residual effects; and
- Specify the bus network through the Silvertown Tunnel that will operate on opening.

2.1.2 For this process TfL will update the relevant transport and environmental models, rerun those models, and develop its proposals for each element in conformity with the commitments, policies and procedures set out in the relevant certified documents and any DCO requirements. The assessment will incorporate a wider range of analyses that the modelling alone.

2.1.3 Because there are interactions between each of these elements, TfL must ensure that they are developed and considered in light of one another.

2.1.4 Figure 2-1 below summarises the elements of the process and the governance arrangements applying to each.

Figure 2-1: Elements comprising the refreshed assessment (pre-scheme opening)



2.1.5 This approach ensures that opening user charges, mitigation measures and the opening bus network are based on the most up to date information that is available before the Scheme opens.

2.1.6 This will result in a better outcome than specifying these aspects of the Scheme now, for the following reasons:

- The Scheme is still a number of years from implementation, with an expected opening date of 2023;
- Significant growth is expected across east and south-east London over the next few years, which could materially change background conditions (there is an inherent degree of uncertainty regarding the pace of this growth). As set out in Chapter 5 of the Transport Assessment [APP-086], across the Silvertown Tunnel host boroughs (Greenwich, Newham and Tower Hamlets) the forecast growth rate in population and employment in the period to 2021 is more than double the London average;
- Linked to this growth, the road network in this part of London is especially dynamic and will change and evolve between now and Scheme opening (with several schemes in the vicinity of the tunnels

being actively considered although not presently committed; for example, Cycle Superhighway 4 and the Bow Vision scheme).

2.1.7 The refreshed assessment will not 'replace' the assessment which was used to identify the likely significant effects of the Scheme in the Environmental Statement. Rather, it will enable TfL to have the benefit of the most up-to-date data when setting the initial user charges and identifying and implementing any mitigation measures that are necessary before the Scheme opens.

2.1.8 This Monitoring and Mitigation Strategy concerns the mitigation of residual traffic-related local effects identified as part of the refreshed assessment process that will be undertaken prior to Scheme opening (the process outlined in red in Figure 2-1). If, through the refreshed assessment, the need for localised traffic-related mitigation measures is identified, TfL will develop these measures in consultation with STIG and submit them to the Secretary of State for Transport for approval. TfL must then implement the approved measures before the Silvertown Tunnel opens for public use, or provide funding for the relevant local highway authority to implement them.

2.1.9 Any measures required to mitigate residual noise impacts will be submitted for the approval of the local planning authority in accordance with requirement 12 of the DCO.

2.1.10 The data from the refreshed assessment will be used by TfL when setting the initial user charges. As these charges will have a direct bearing on the extent and scope of any mitigation measures required, it is important that any mitigation for residual effects is set in the context of these charges.

2.1.11 It should be noted that this M&MS relates to the Scheme in operation. The monitoring and mitigation of construction impacts is governed by the Code of Construction Practice.

2.2 Scope of the refreshed assessment

2.2.1 The refreshed assessment will incorporate the following elements:

- Collection of up-to-date traffic count data and the latest available origin and destination data, as part of the monitoring programme.
- Updating of the strategic transport modelling with new travel data and any new committed relevant transport schemes or major developments that will be implemented prior to scheme opening (i.e. schemes that are not currently included within the Assessed Case but

which are committed at the time of the refreshed assessment). Updating of environmental modelling in parallel with transport modelling.

- Development of an updated Reference Case for the scheme opening year.
- Testing of user charge scenarios in the context of updated Reference and Assessed Cases.
- Assessment of likely traffic, air quality, noise, and socio-economic impacts of scenarios at strategic level and identification of charges which meet the requirement of Policy 8 in the Charging Policies and Procedures document.
- Assessment of the demand for bus services, to inform the planning of the bus network in line with the Bus Strategy and ensure the appropriate level of service is provided at the time the Scheme opens for public use.
- Identification of likely location and magnitude of any localised impacts including the development of local traffic models as required, to enable more detailed consideration of Scheme impacts on the highway network.
- Iterative use of the strategic and local models to identify and optimise any localised mitigation that may be required as a result of the refreshed assessment. The process for identifying the need for mitigation is set out in the following section.

2.2.2 TfL will engage with STIG members on the approach to completing the refreshed assessment, including aspects that are of particular interest to host boroughs such as the collection of origin and destination data and users' values of time (including stated preference surveys).

2.2.3 The refreshed assessment will be undertaken using the most appropriate industry standard modelling tools available within TfL's suite of strategic and local models at the time. This will allow TfL to take advantage of any innovations or model enhancements made over the next few years. The latest air quality and noise modelling software will also be used.

2.3 Identifying the need for and form of localised mitigation

2.3.1 The Scheme is expected to have a significant positive overall impact on the transport network, as set out in the Transport Assessment [APP-086]. TfL's assessment is that, in a limited number of cases, the Scheme could lead to moderate localised deteriorations in road network performance on some parts of the road network, principally as a result of previously queued cross-river traffic being released at peak times due to the increased capacity provided by the tunnel.

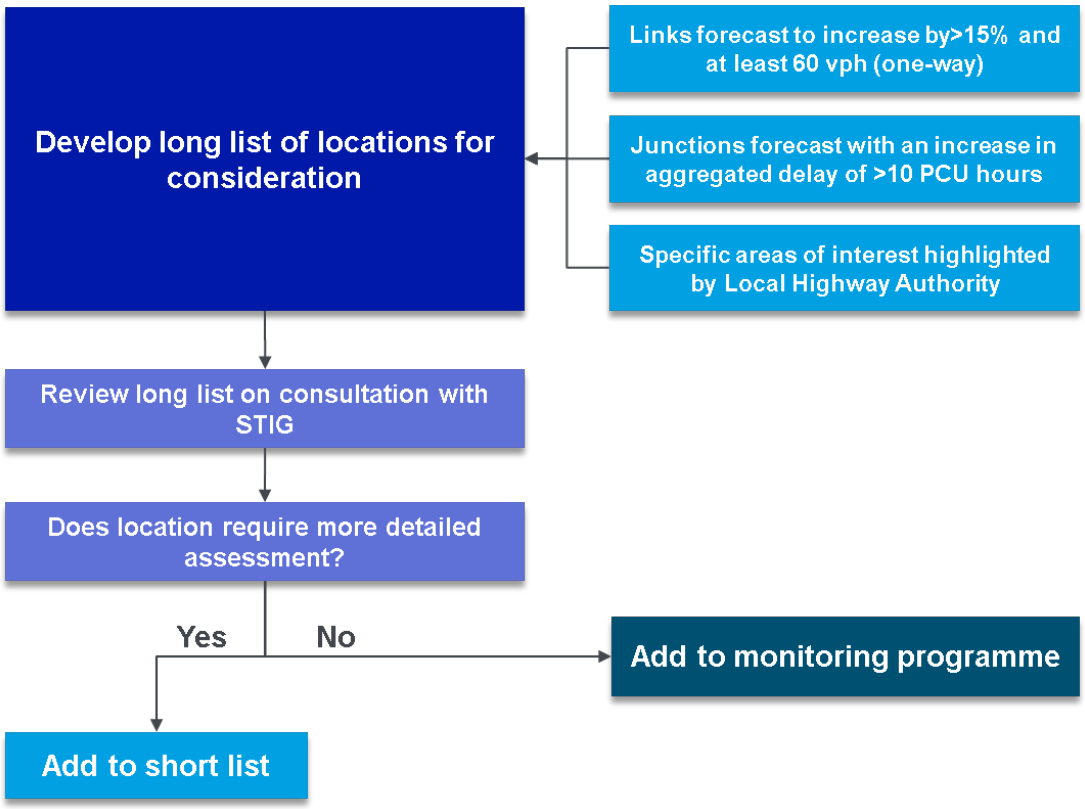
2.3.2 TfL will adopt a methodical approach to identifying the need for mitigation and developing measures through its refreshed assessment, building on the process described in Appendix C of the Transport Assessment [APP-087].

2.3.3 TfL will first establish a 'long list' of locations for consideration of the localised impacts of the Scheme and the need for mitigation, including:

- all links where one-way traffic flows are forecast to increase by more than 15% and by at least 60 vehicles per hour; or
- all junctions that are forecast to experience an increase in aggregated delay of greater than 10 passenger car unit (PCU) hours; or
- areas where local highway authorities have flagged a potential concern that are included in the initial traffic monitoring plan and/or within the 'area of influence' or wider 'buffer zone' identified in Figure 3-1.

2.3.4 Once the long list has been populated this will be reviewed in consultation with the members of STIG and TfL will make a decision on which locations will be included within a 'short list' to be assessed further using local modelling. As part of this process a detailed review of the outputs from the strategic transport modelling will be undertaken for each location. Any long-listed locations not subject to further assessment and not already being monitored will be added to the monitoring programme. Figure 2-2 shows the approach that will be followed in determining which locations will be subject to local modelling.

Figure 2-2: Establishing focus locations for local modelling



Further assessment and development of localised mitigation

2.3.5 For locations on the short list, further assessment of Scheme impacts will be undertaken using local modelling. A range of local and micro-simulation modelling packages will be used, depending on the location and type of junction in question.

2.3.6 The purpose of the local modelling is two-fold; firstly, to enable a more detailed consideration of Scheme impacts and provide further insights into the need for localised mitigation measures, and secondly to test the effectiveness of any measures that are identified to address adverse impacts.

2.3.7 In developing any localised mitigation measures, TfL will iterate the outputs from the local and strategic modelling to ensure that the measures identified are fully optimised.

2.3.8 In assessing the need for localised mitigation for locations in the short list, TfL will take into account views from the affected local highway authority (or authorities should the location affect more than one borough). Input will also be sought from TfL Area and Corridor Managers, for instance to determine

whether the location is subject to other proposals that could have a bearing on the need for or form of mitigation required.

2.3.9 On the basis of this assessment, TfL will make a decision on whether a localised mitigation measure is necessary in order to address an adverse impact caused by the Scheme. Key considerations will be the nature and scale of the impact, as well as the potential for the impact to be effectively mitigated.

2.3.10 If TfL determines that localised traffic mitigation is required at a given location, TfL will make a preliminary assessment as to the form of mitigation and the programme for its implementation. This preliminary assessment will be presented to the relevant local authorities for consideration and review. TfL and the local authorities may wish to engage with other potentially affected parties as part of this process (for instance user groups, local landowners etc.). TfL will then undertake detailed design of the mitigation measure and produce a detailed cost estimate, having regard to feedback received from the local highway authority.

2.3.11 In determining the form of pre-opening mitigation, TfL and the affected local highway authority/ies will give consideration to both the benefits and any potential adverse impacts that a mitigation measure could have including at locations elsewhere. Such considerations may have a bearing on the form of mitigation adopted.

2.3.12 In instances where physical changes to the streetscape are required, TfL will ensure the measures developed are sympathetic to the existing streetscape and take account of relevant guidance (including for instance TfL's *Streetscape Guidance* and the *London Cycling Design Standards*).

Secretary of State approval

2.3.13 TfL will work closely with affected local authorities to identify and develop the package of localised traffic mitigation to be implemented pre-opening. Once the proposed package of localised traffic-related mitigation measures has been finalised, TfL will submit details of the package to the Secretary of State for Transport for approval.

2.3.14 The details must include the following information:

- A description of each mitigation measure, accompanied by a plan (where appropriate) and a reasoned justification for why the measure is deemed necessary;

- A description of the process undertaken to develop the package of measures, including locations investigated by TfL but not taken forward for mitigation;
- The local authorities' responses to consultation on the proposed mitigation measures and programme for implementation;
- Costs estimates for the proposed measures; and
- The proposed programme for implementation of the measures.

2.3.15 If the Secretary of State intends to approve mitigation measures with material modifications, the Secretary of State must consult the relevant highway authority on the proposed modifications and take into account responses to the consultation by the authority.

2.4 Funding and delivery of pre-opening mitigation

2.4.1 The cost of implementation all pre-opening mitigation measures approved by the Secretary of State will be met by TfL as part of the overall implementation of the Silvertown Tunnel scheme.

2.4.2 TfL will expedite the delivery of pre-opening mitigation measures (for instance through allocating designated resources for design and implementation, and ring-fencing funding), so as to ensure that all pre-opening mitigation measures will be implemented by TfL before opening of the Scheme (or sufficient opportunity provided to the local highway authority/ies to implement measures on the local road network), with the exception of the circumstances explained in paragraphs 2.4.4 and 2.4.5. Any necessary consultation will be completed in line with normal procedures prior to implementation.

Measures on the TLRN

2.4.3 Where mitigation measures can be implemented under TfL's statutory powers (e.g. measures on roads for which TfL is the highway authority (the Transport for London Road Network (TLRN) or changes to signal timings) TfL will be responsible for implementing the mitigation.

2.4.4 In limited circumstances where it may not be feasible or appropriate to complete implementation prior to Scheme opening, TfL will consult with the relevant borough on the programme for its implementation and include a justification for this programme in the submission to the Secretary of State (where applicable). Examples of where mitigation identified through the

refreshed assessment could be implemented post-opening include where a separate major scheme was being delivered on a part of the network on which a localised mitigation was required; in such cases, provided the proposed programme for implementation is approved by the Secretary of State, the mitigation may be implemented as part of the major scheme but funded by TfL as a Silvertown Tunnel measure.

Measures on borough roads

2.4.5 Where TfL is not able to implement an approved measure under its statutory powers, (e.g. junction modifications on roads for which TfL is not the highway authority), TfL may seek agreement with the relevant highway authority under section 8 of the Highways Act 1980 for TfL to implement those measures to an agreed timescale. Alternatively, the highway authority may be responsible for implementation of the mitigation, with the necessary funding provided by TfL and secured via a bilateral agreement. In these circumstances, TfL will apply the same timescale for identifying and agreeing the works but the timing for the implementation of these works will be a matter for the relevant highway authority.

2.4.6 A highway authority may choose to implement an alternative mitigation to the measure approved by the Secretary of State following the usual process of scheme planning, design, consultation and implementation. The alternative mitigation must provide a broadly comparable level of value in addressing the Scheme impact. TfL will contribute towards the cost of the mitigation up to the estimated cost of the original measure approved by the Secretary of State, or less if the alternative mitigation is of lower cost. If the highway authority wishes to take the opportunity to implement supplementary measures at its own cost (for instance to tie the mitigation in with wider streetscape improvements) it will be able to do so.

2.5 Indicative timeline

2.5.1 The refreshed assessment will be undertaken sufficiently in advance of Scheme opening to ensure there is time to complete the process described above and implement any necessary mitigation. An indicative timeline for completion of the refreshed assessment and implementation of resulting mitigation is set out in Table 2-1. In practice some of the activities set out in the table may commence earlier than listed, if this is necessary to ensure the activity is completed on time.

2.5.2 Collection of the data required to inform the refreshed assessment represents the first step in the process. Monitoring of baseline conditions

pre-opening will commence no later than three years prior to the expected date of Scheme opening, and any data that is required to inform the refreshed assessment (for example traffic counts) will be collected as part of this process. The finalised scope of the monitoring programme will be presented to STIG members for review approximately six months before the commencement of traffic-related monitoring (i.e. around three and a half years prior to Scheme opening).

Table 1-1: Indicative time for refreshed assessment and implementing pre-opening mitigation

Years prior to scheme opening	Indicative date (based on current programme)	Activity
3.5	Q1 2020	Agree monitoring programme
3	Q3 2020	Commence monitoring
2.75	Q4 2020	Update strategic modelling to include latest available data
2.5	Q1 2021	Test and refine user charges, including assessment of traffic, air quality, noise and socio-economic impacts
2.25	Q2 2021	Develop local modelling and identify localised mitigation measures required
2	Q3 2021	Consult STIG on proposed mitigation measures
1.75	Q4 2021	Submit package of mitigation to Secretary of State for approval

1.5	Q1 2022	Implement localised mitigation measures
1.5	Q1 2022	TfL Board to approve initial user charges by reference to the Charging Policies and Procedures

2.5.3 The timeline above allows around 18 months for delivery of mitigation measures identified through the refreshed assessment. This is considered to be a sufficient timescale for implementation of localised mitigation prior to Scheme opening, taking account of the considerations set out in section 2.4.

3. MONITORING PROGRAMME

3.1 Overview

3.1.1 This chapter explains the monitoring programme (including timeframes for carrying out monitoring) and how its results will be disseminated. The following chapter then explains how the findings of the monitoring will be used to identify any post-opening mitigation measures required.

3.1.2 As well as being used to identify any post-opening mitigation requirements, monitoring of the impacts of the Scheme in operation will also be used to inform decisions around setting and varying the user charges, and this process is set out in the Charging Policies and Procedures document. Where variations to the user charge are considered within the period of monitoring, data collected through the monitoring programme will input to the User Charging Assessment Framework (UCAF).

3.1.3 The monitoring of construction impacts is governed by the Code of Construction Practice.

3.2 Topics covered

3.2.1 The monitoring programme will comprise the following topic areas:

- Traffic monitoring
- Air quality and carbon monitoring
- Noise monitoring
- Socio-economic monitoring.

3.2.2 The monitoring programme focuses on the four topics listed above as these have potential to be affected by the operation of the Scheme including changes to the user charges. Each of these topics is discussed in further detail in this chapter, and detailed monitoring plans for the first year of monitoring can be found in Appendices A to D.

3.2.3 Information on a range of different metrics will be collected for each of the topic areas. These metrics will be collected using various data collection methods, potentially including new data collection methods emerging as a result of recent technological innovations (for example using mobile phone data to estimate transport demand).

3.2.4 As a general rule TfL will make use of existing sources of data collection where possible. These will be supplemented with the installation of new monitoring equipment and with bespoke data collection exercises to fill any gaps.

3.2.5 The data collected through the monitoring programme will be reported in monitoring reports which will be provided to members of STIG.

3.3 Principles underlying the monitoring programme

3.3.1 The traffic, environmental and socio-economic monitoring will comply with the following principles.

- Monitoring shall describe and characterise the main effects of the Scheme in operation, through comparison with the baseline collected prior to opening.
- Monitoring shall enable unexpected or unanticipated effects to be identified.
- Monitoring shall seek to understand, as well as to measure, by employing a range of quantitative and qualitative research techniques in a complementary manner to enable a comprehensive understanding of the Scheme's wider potential effects, including travel behaviour.
- Monitoring shall provide Best Value, employing techniques that are appropriate and proportionate to the expected scale, extent and importance of the expected changes.

3.3.2 The monitoring programme will be of sufficient scope to provide a sound understanding of the impact of the Scheme in operation. Nonetheless, TfL recognises the value of monitoring undertaken by others and hence in addition to the data collected through the monitoring programme, TfL will take into account monitoring data collected by local authorities and other bodies where it is relevant and appropriate to do so.

3.4 Timing and duration of monitoring

3.4.1 The monitoring programme will commence no later than three years prior to the expected date of Scheme opening and continue for three years post opening[2]. The duration of the post-opening monitoring will be reviewed and TfL will consult the members of STIG on whether it is appropriate to extend this period by up to an additional two years. The monitoring programme is time limited because the most significant effects are expected to materialise within around a year of the Scheme opening and it will become increasingly difficult to distinguish the effects of the Scheme from other projects over time.

3.4.2 Following the three to five year monitoring post-opening, the collection of monitoring data will revert to TfL's general network performance monitoring programme.

3.4.3 The data collected prior to the opening of the Scheme will form the baseline against which a comparison will be made following the Scheme's implementation.

3.4.4 As this baseline period will coincide with the Scheme's construction, data from locations affected by construction traffic will be compared with previous years' data and regional trends, and in light of data from the Contractor appointed to build the Scheme regarding construction traffic behaviour, to ensure that a fair and representative baseline is used.

3.5 Geographical scope of the monitoring

3.5.1 The geographical area encompassed by the monitoring programme will vary for each topic, but in all cases will cover an area of sufficient spatial scope to fully capture the expected material impacts of the Scheme in operation. For example, the noise impacts resulting from the Scheme are expected to be limited to a localised area in the vicinity of the Scheme itself whilst the traffic impacts may occur over a much wider area.

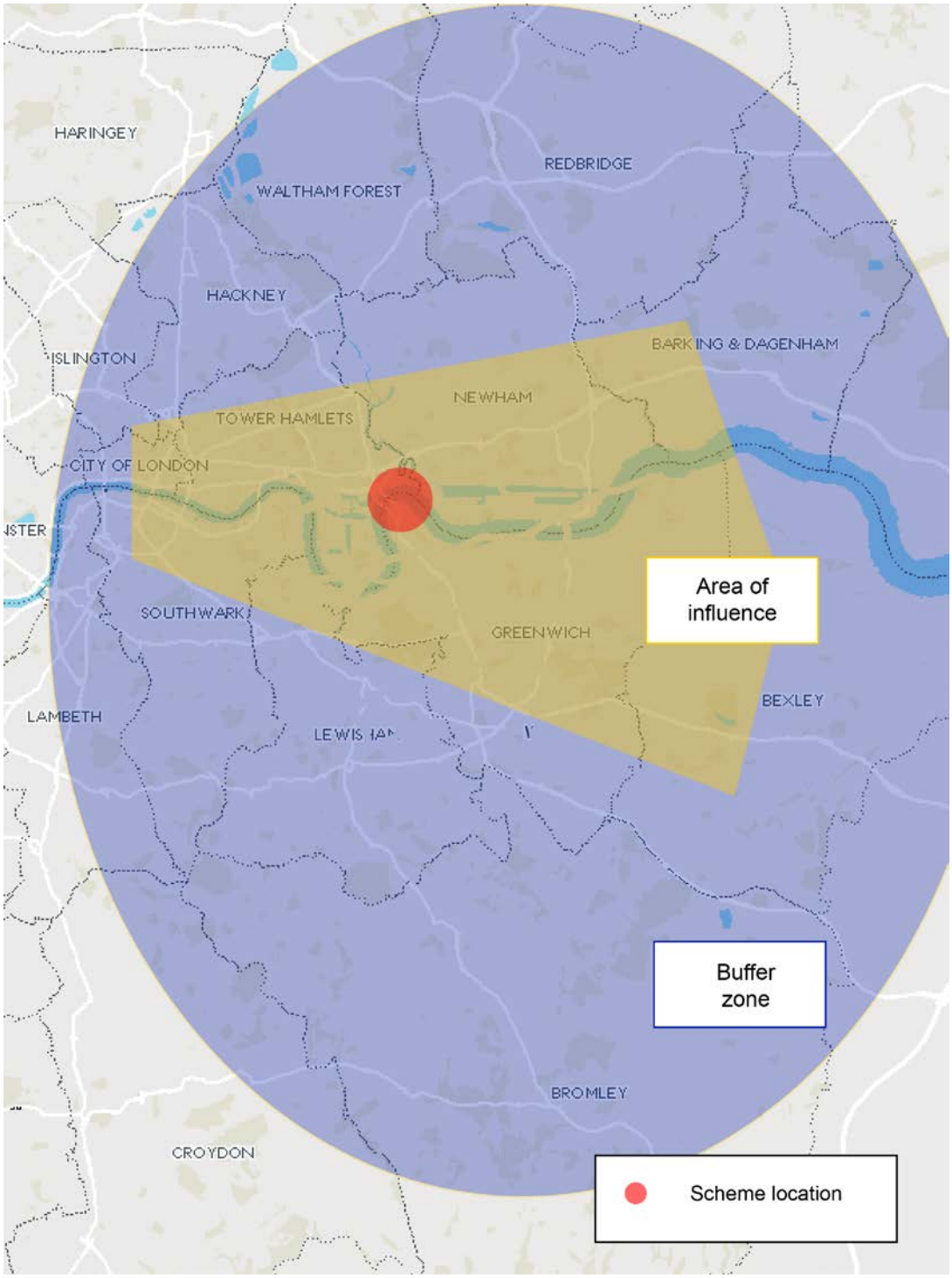
3.5.2 The monitoring area can be seen in Figure 3-1. The 'area of influence' is the area where changes are most marked, and represents the area in which the monitoring is focused; this covers the majority of the three host boroughs (Greenwich, Newham and Tower Hamlets), the three nearest adjacent crossings (Woolwich Ferry, Rotherhithe Tunnel and Tower Bridge) and parts

[2] With the possible exception of air quality monitoring, which may continue for a longer period as set out in paragraph 3.7.5.

of other boroughs in the vicinity of the Scheme where Scheme impacts are reasonably foreseeable. Additional traffic monitoring locations are included in the wider 'buffer zone', which covers a large part of east and south-east London.

3.5.3 The geographical scope of the monitoring will be reviewed at the time when TfL is undertaking its refreshed assessment of Scheme impacts. Should this refreshed assessment identify potential Scheme impacts at locations not identified in current modelling, the scope of the monitoring programme will be extended to ensure these locations are included in the monitoring programme. If justified by the refreshed assessment, the monitoring of Scheme impacts could be undertaken over a much wider area through TfL's wider monitoring programmes.

Figure 3-1: Monitoring area



3.5.4 Once the Scheme is operational, should a member of STIG identify potential impacts that they consider may be a result of the Scheme at a location not being monitored under the Scheme's monitoring programme at that time (for instance using TfL's publically available wider data set), this can be brought

to TfL's attention for further consideration and possible inclusion in the monitoring programme going forward.

3.6 Traffic monitoring

3.6.1 There are a range of traffic metrics that can provide information on the traffic impacts of the Scheme. Whilst the type of information to be collected is defined, the method by which this data is collected is not prescribed by this monitoring programme and a range of monitoring techniques could potentially be employed. This is because traffic data collection is an area of rapid development and new data collection methods are emerging as a result of continued technological innovation.

3.6.2 The key metric considered is traffic flows. Monitoring traffic flows and changes in flows at river crossings, their approaches and diversionary routes is fundamental to the monitoring programme for the Scheme. It provides the means by which any localised delays and or network performance issues which are noted following its implementation may be identified. It also provides context for the monitoring of environmental and socio-economic impacts.

3.6.3 A range of other traffic-related metrics will also be monitored including journey times and journey time reliability, junction performance, traffic composition, bus performance and road safety. The monitoring programme will take account of the relevant impacts of the Scheme on all highway users including motorists, bus passengers, pedestrians and cyclists.

3.6.4 The proposed locations for data collection, data collection methods and the geographical scope of the traffic monitoring are set out in Appendix A. The scope of the monitoring has been informed by the expected impacts of the Scheme as set out in the Transport Assessment [APP-086]. In addition to the locations listed in Appendix A, data will be collected at control sites to enable differentiation of the impacts of the Scheme from those attributable to other unconnected changes on the network. The control sites used for comparison will be presented to STIG members and specified within the monitoring reports. Where a control sites is within a borough that is a member of STIG, details of the control site will be sent to the relevant local authority for comment.

3.6.5 To aid the process of identifying any unexpected impacts of the Scheme on the highway network once operational, a range of traffic-related triggers have been set. These triggers will be based on the monitoring data collected and

reported within the monitoring reports. Further information on the triggers can be found in section 4.2 and Appendix E of this document.

3.7 Air quality and carbon monitoring

3.7.1 Three years prior to Scheme opening TfL will install a network of diffusion tubes and, where appropriate, automatic air quality monitors to collect air quality data for a continuous period of at least twelve months to establish an up-to-date baseline. This will provide a picture of the actual concentrations at a point closer to the Scheme opening. In addition, the results of monitoring undertaken by relevant local authorities and Defra will be utilised by TfL to provide additional baseline information.

3.7.2 The air quality monitoring will be undertaken for the measurement of NO_2 only. The rationale behind this decision is that the current baseline monitoring for other pollutants (PM_{10} and $PM_{2.5}$) show that they are achieving compliance with the Air Quality Strategy (AQS) Objectives/EU Limit Values. The assessment also indicates that the Scheme has a negligible impact on particulates. It must also be noted that the Greater London Urban Area is compliant in relation to the EU Limit Value for PM_{10}.

3.7.3 The geographical scope of the air quality monitoring is detailed in Appendix B. This has been informed by the likely air quality impacts of the Scheme as reported in the Environmental Statement and Updated Air Quality and Health Assessment.

3.7.4 NO2 monitors will be sited in areas:

a) where the Scheme is forecast to bring about a change in air quality in excess of 0.4 µg/m3 where annual mean concentrations are above the national air quality objective value;

b) where the Scheme could lead to traffic diverting to alternative routes which were not foreseen in the original assessment; and

c) to ensure the monitoring locations are representative of relevant exposure at sensitive receptors.

3.7.5 Once the Scheme is operational the air quality monitoring must continue for three years, or until the monitoring shows there is no exceedance of the annual national air quality objective for NO_2 monitored at locations where the Scheme results in a worsening of air quality, whichever is the longer.

3.7.6 The air quality monitoring data will be reported in the annual monitoring report which must be reviewed as soon as reasonably practicable by a firm of air quality experts appointed by TfL in consultation with STIG members. The expert review must determine whether or not there has been a material worsening of air quality as a result of the Scheme (as detailed in section 4.4 of this document).

Monitoring the carbon impacts[3]

3.7.7 Carbon Dioxide (CO_2) emissions will also be calculated as part of the monitoring programme. As carbon dioxide is a greenhouse gas, it has an impact on a global scale, rather than producing any measurable adverse localised impacts. As such the Scheme's impact on CO_2, must be assessed at a total emissions level.

3.7.8 In order to accurately calculate the carbon impact of the Scheme, the calculation will be based on the observed traffic flows obtained through the traffic monitoring, and will use established relationships to estimate the CO_2 impact of traffic change. The carbon impact will be calculated by reference to the traffic using the Blackwall and Silvertown tunnels.

3.8 Noise monitoring

3.8.1 The noise impacts of the Scheme are a function of the volume of traffic flows, which may change over time. Monitoring traffic flows therefore provides a means by which any localised traffic noise issues which may arise from the Scheme in operation can be identified. Prior to the commencement of any construction activity associated with the Scheme TfL will install a network of noise monitors to collect data for a continuous period of at least twelve months to establish an up-to-date baseline. This will provide a better picture of the background noise environment closer to the Scheme opening.

3.8.2 The approach to data collection and the geographical scope of the noise monitoring is detailed in Appendix C. The monitoring of noise will be limited

[3] CO2 is not usually considered within air quality assessments as it is a greenhouse gas and does not directly affect human health, although it does need to be controlled to mitigate the health and environmental impacts of climate change. The EU Ambient Air Quality Directive (2008/50/EC) lists which pollutants are considered as air quality pollutants (Benzene, 1,3 Butadiene, Carbon monoxide, Lead, NO2, PM10 / 2.5, Sulphur Dioxide), and excludes CO2. This has been transposed in to English law.

to the area around the Silvertown Tunnel portals; monitoring is not proposed, nor considered necessary, outside of this immediate area having regard to the noise modelling undertaken and reported in the Environmental Statement. Secure locations will be used for noise monitoring to ensure the equipment is not at risk to theft or damage.

3.8.3 Noise monitoring will be undertaken using a number of permanently installed type 1 "Live L_{Aeq}" remote access data logging sound level meters recording noise within the vicinity of the Tunnel on a 24 hours a day, seven days a week basis during the monitoring period.

3.8.4 In assessing noise levels, and subject to agreement with the data owners, where available TfL will have regard to any long term noise monitoring undertaken by the local authorities or other statutory bodies within the local area of influence, or in the vicinity of the tunnel portals where appropriate and representative.

3.8.5 Once operational, the noise monitoring will continue for a minimum of three years. Before the end of that period, TfL will consult STIG members on whether it is appropriate to extent this period by up to an additional two years.

3.8.6 The noise monitoring data collected post-opening will be presented within the annual monitoring reports.

3.9 Socio-economic monitoring

3.9.1 In the three year period prior to Scheme opening TfL will collect and collate socio-economic data on an annual basis. This will include analysing secondary data related to business activity and employment, as well as collecting primary data on cross-river movement by residents and businesses[4]. This will provide the baseline for comparison with data collected post-opening also collected on an annual basis.

3.9.2 The approach to data collection and the geographical scope of the socio-economic monitoring is detailed in Appendix D. The geographical scope of the monitoring needs to be sufficiently large to fully capture the discrete

[4] This will include data from the London Travel Demand Survey (LTDS), a continuous household survey of the London area that captures information on households, people, trips and vehicles. This will allow usage of crossings and the types of travel making use of the crossings to be assessed.

socio-economic impacts of the Scheme, and will include the local authorities where impacts are expected to be most significant as identified in the Regeneration and Development Impact Assessment (part of the Business Case [APP-102].

3.10 Reporting of monitoring data

3.10.1 TfL will produce annual monitoring reports of the impacts of the Scheme and will present these to members of STIG for review. The reports will enable the impacts arising as a direct effect of the operation of the Scheme to be identified.

3.10.2 The annual monitoring reports will include the following contents:

- Summary of any mitigation measures implemented since the previous monitoring report
- Summary of any wider changes in background patterns or trends, for example environmental changes brought about by the impacts of new developments or meteorological influence
- Traffic monitoring outputs
- Traffic-related triggers
- Air quality monitoring and predicted carbon emissions outputs
- Noise monitoring outputs
- Socio-economic monitoring outputs
- Reasoned recommendations where appropriate for any changes to the monitoring programme for the coming year

3.10.3 For the first year after the Silvertown Tunnel opens for public use, TfL will produce and submit to STIG interim monitoring reports on a quarterly basis to help ensure that any impacts can be identified promptly. These reports will be less detailed than the annual monitoring reports but will include data collected to date and a high level analysis of the results.

3.10.4 Certain types of data to be collected as part of the monitoring programme are available on a ‘live’ basis, and it is likely that these will become increasingly available over time. Whilst all data will be reported in the monitoring reports, wherever possible TfL will aim to make the monitoring

data available to members of STIG via online data platforms (for example the TfL Data Store).

3.11 Review of monitoring data

3.11.1 The annual monitoring reports will be produced by TfL and sent to STIG members within two months of data collection. STIG will be responsible for:

- Reviewing the findings presented in the monitoring reports
- Considering the need for and type of any mitigation measures that might be required to address Scheme impacts, in line with the process set out in Chapter 4 of this document
- Reviewing the monitoring programme and make recommendations to TfL for changes where appropriate

3.11.2 Proposals for changes to the monitoring programme can be made by any member of STIG in the interest of enabling future impacts to be fully captured. Aspects on which STIG members may request changes include the monitoring locations, metrics considered and data collection methods. In updating the monitoring programme, TfL shall have regard to any recommendations made by STIG.

3.11.3 STIG will also be able to request changes to the contents of the monitoring reports including the addition of new topics and removal of existing topics if considered appropriate. TfL will remain responsible for the final content and structure of the monitoring reports.

4. POST-OPENING MITIGATION

4.1 Overview

4.1.1 This chapter explains the process for identifying and implementing after the Silvertown Tunnel has opened for public use any measures required to mitigate any adverse Scheme impacts which were not foreseen and mitigated at the pre-opening stage.

4.1.2 The need for any mitigation following the Scheme's opening will be identified through review of the monitoring reports containing the data collected through the monitoring programme. Different processes will apply to different Scheme impacts, as follows:

- The traffic data (including the triggers) will be reviewed by STIG. If TfL concludes (having regard to the views of STIG members) that traffic conditions have materially worsened as a result of the Scheme, or a trigger has been activated, TfL will investigate to determine whether localised mitigation is required to address these impacts. This could include measures to address any noise-related impacts caused by changes to traffic conditions.

- The socio-economic data will be reviewed by members of STIG. If TfL consider, having regard to the views of STIG members, that the Scheme has had a material adverse socio-economic impact, TfL will consider whether localised mitigation is required to address these impacts.

- The air quality data will be reviewed by a firm of experts appointed by TfL in consultation with the members of STIG. If in the view of the experts there has been a material worsening in air quality as a result of the Scheme, TfL must develop a scheme of mitigation and submit this to the Mayor of London for approval (see section 4.4 below).

4.1.3 The process for reviewing each element of the monitoring data is described in further detail below, split into traffic impacts, socio-economic impacts, air quality impacts and noise impacts. The approach to developing and implementing mitigation for all impacts identified as a result of the Scheme in operation is then set out.

4.2 Traffic impacts

4.2.1 TfL will produce monitoring reports of the impacts of the Scheme in operation and present these to members of STIG for review and consideration. In considering the impacts of the Scheme, TfL and the members of STIG will be able to draw on all information and data that is set out within the monitoring reports, including the mitigation triggers. Particular focus will be given to whether there has been a change in traffic flows. In response to the monitoring reports, STIG members may request that TfL considers the need for mitigation at any locations within their borough where they consider the Scheme may be having an adverse impact.

4.2.2 By reviewing the observed monitoring data collected once the Scheme has opened, and comparing this against the observed baseline data collected prior to opening, it will be possible to identify the traffic-related impacts arising as a direct effect of the Scheme in operation. It should be noted that changes observed between the pre- and post-opening monitoring data will not necessarily be a result of the Scheme.

Key considerations

4.2.3 Where having reviewed the monitoring data and taking into account the views of the members of STIG TfL concludes that any adverse changes in traffic metrics are a consequence of the Scheme in operation, TfL will consider the appropriate form of mitigation in consultation the highway authority on whose roads the measures may be required.

4.2.4 It is important that any changes to the metrics caused by non-Scheme factors, such as changing background trends or other developments, are taken into account when considering the need for mitigation. This will be done by comparing the traffic monitoring data to control sites and overall London-wide and sub-regional data, as well as assessing the impacts that other developments (including changes to land uses and changes to the highway network) may be having on the various metrics.

4.2.5 The duration of the change also needs to be taken into account. If the change identified is temporary or short-term in nature, for example the change is only observed for a matter of weeks immediately following Scheme opening, long-term mitigation may not be required as the change is likely to be a result of initial fluctuations in traffic flows as users adapt to the Scheme. Many such fluctuations would be expected to settle down over time.

Traffic-related triggers

4.2.6 The triggers will provide a means of assisting with the determination of whether any traffic-related changes that may have occurred as a result of the Scheme require mitigation. The triggers consider whether a level of change observed after the Scheme has opened differs from what was anticipated, and are designed to provide an alert if these levels are breached. If a trigger is activated, TfL must consider if mitigation is required.

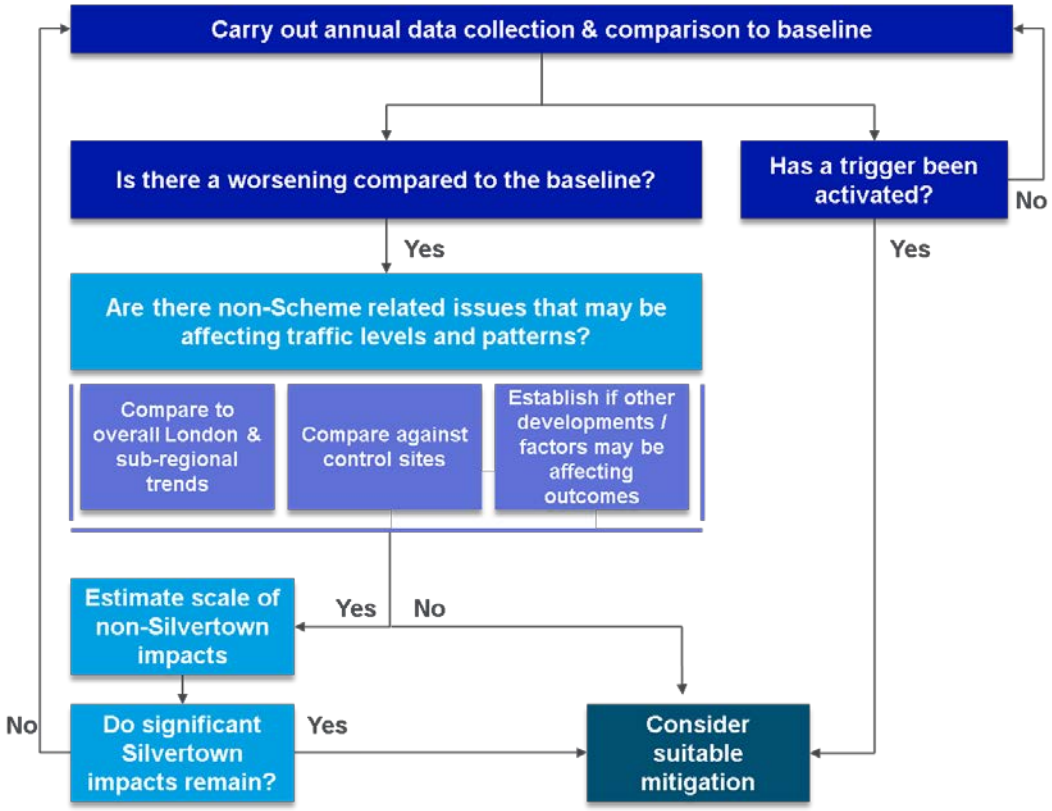
4.2.7 The triggers are intended to indicate whether observed Scheme impacts (based on data collected through the monitoring programme) are materially different from those forecast in the Assessed Case and set out in the DCO application, over a prolonged period of time. By basing the triggers on the expected change caused by the Scheme, the triggers will remain applicable if background conditions across the network (for instance growth in the number of highway trips across the network) were different from those currently forecast.

4.2.8 A detailed set of triggers has been developed based on discussions with stakeholders and these can be found in Appendix E. The triggers will be reviewed in light of the refreshed assessment prior to Scheme opening and if necessary updated in agreement with STIG members to ensure they remain fit for purpose in light of future changes to road network performance and conditions.

TfL investigation of the need for mitigation

4.2.9 The process for establishing the traffic-related Scheme effects, based on both the review of the monitoring data and the traffic-related triggers, is summarised in Figure 4-2.

Figure 4-1: Establishing the traffic-related Scheme effects post-opening



4.2.10 Following a request from any member of STIG in response to the monitoring reports, or if a trigger is activated, TfL will consider whether mitigation is necessary. Key considerations will be the nature and scale of the impact, as well as the potential for the impact to be effectively mitigated.

4.2.11 As part of this appraisal TfL will consider any committed interventions, and input from TfL Area and Corridor Managers will be sought to determine whether the location is subject to other proposals that could have a bearing on the need for or form of mitigation required. TfL's appraisal of all requests for mitigation to be considered will be shared with the other STIG members for consideration.

4.2.12 In the event of a trigger being activated, TfL will investigate the nature of the impact and its cause. If TfL determines that mitigation is not required it will provide the members of STIG with a clear justification for this.

4.3 Socio-economic impacts

4.3.1 It is acknowledged that it will be difficult to isolate the precise impact of the Scheme on most changes in the socio-economic characteristics of east London. For example, changes in business performance and the labour

market will be driven primarily by the strength of the UK and London economy, as wide range of other factors, with the Scheme playing a relatively minor role.

4.3.2 For this reason, TfL will monitor the socio-economic characteristics of cross-river travellers, as well as wider socio-economic trends, in order to understand the Scheme's contribution.

4.3.3 Where TfL determine that a socio-economic impact is directly attributable to the Scheme, TfL will consider the best way to mitigate the impact. This may include the provision of new or enhanced bus routes, funding local-led business or labour market support, support to help businesses adjust to the user charge or changes to the charging regime for particular groups.

4.4 Air quality impacts

4.4.1 It is acknowledged that differentiating between effects on air quality as a direct result of the operation of the Scheme and effects arising from other, unrelated activities is likely to be a complex process which will require expert input. TfL will therefore appoint an independent air quality expert to review the air quality monitoring data set in the annual monitoring reports. TfL will consult with STIG members regarding the expert to be appointed.

4.4.2 Just relying on air quality monitoring data will not differentiate between effects resulting from the Scheme and those arising from other, unrelated activities. In coming to a view on the air quality impacts of the Scheme, consideration will therefore need to be given to other data sources including London wide local authority monitoring data, traffic flows, composition or speeds as well as outputs from strategic and local traffic modelling and/or air quality modelling. The Scheme is unlikely to have a material impact on air quality without also having an impact on traffic beyond what was predicted in the refreshed assessment.

4.4.3 If the annual review carried out by the appointed firm of experts concludes that the authorised development has materially worsened air quality beyond the impacts predicted within the Environmental Statement at locations where there are exceedances of national air quality objectives, TfL must consult the relevant air quality authorities on a preliminary scheme of mitigation including a programme for its implementation within three months of the review. Following that consultation, TfL must prepare a detailed scheme of mitigation and submitted this to the Mayor of London for approval. Before considering whether to approve the scheme of mitigation, the Mayor must

consult the relevant air quality authorities and take into consideration any responses received.

4.4.4 TfL then must implement or secure the implementation of the scheme of mitigation in accordance with the programme approved by the Mayor of London.

4.4.5 A ‘material worsening’ of air quality will be deemed to have arisen if, after the annual monitoring review, the Scheme is shown to have resulted in a ‘significant impact’ following the approach set out in Interim Advice Note (IAN)174/13.

4.5 Noise impacts

4.5.1 In respect of noise, a 25% change in traffic flow is required to bring about a noticeable 1dB change in noise in line with the DMRB thresholds. A traffic-related trigger would be activated if traffic flows at the Blackwall and Silvertown Tunnels changed to a much smaller degree than this (±3% from forecast level of change). Accordingly, consideration of localised mitigation measures would be triggered by changes in traffic flow numbers considerably below the levels which could give rise to noticeable noise impacts.

4.5.2 Notwithstanding this, to ensure noise impacts are properly understood, TfL will appoint an independent noise expert to carry out an annual review the noise monitoring data presented within the annual monitoring reports. TfL will consult STIG members regarding the expert to be appointed.

4.5.3 It is acknowledged that differentiating between effects on noise from the Scheme in operation and those arising from other, unrelated activities is likely to be complex. Just relying on noise monitoring data will not differentiate between noise effects resulting from the Scheme and other unrelated activities. Therefore, in conjunction with the noise monitoring data presented within the annual monitoring report, the flows, composition (including the percentage of heavy vehicles) and speed of the traffic through the tunnels will be considered by the independent noise specialist.

4.5.4 To fully appreciate the effects of changes in any, or all of these parameters on the road traffic noise levels through the tunnels, the traffic monitoring data will be used by the noise expert to calculate a “Basic Noise Level” in accordance with the guidance of the Calculation of Road Traffic Noise (DfT, 1988). This will allow noise resulting from changes in each of the total flow,

percentage of heavy vehicles and speed to be appropriately accounted for and reported.

4.5.5 If the annual review carried out by the independent noise expert concludes that the difference in calculated Basic Noise Level values between the predicted flows and measured flows through the Blackwall and Silvertown Tunnel is greater than 1dB (and that the difference is attributable to the Scheme), TfL will consider the need for localised noise mitigation measures in consultation with the relevant local authorities.

4.6 Development of post-opening mitigation

4.6.1 Where it is identified that mitigation is required to address an adverse Scheme impact post-opening, TfL will determine the form of mitigation to be implemented in consultation with the relevant highway authority. Mitigation could take a number of forms, and it may be that a package of different measures is deemed necessary to address the identified impacts. Further detail on the range of mitigation measures which could be implemented can be found in Chapter 4 and Appendix F.

4.6.2 Should a change to the user charges be identified as a form of mitigation, the process set out in Charging Policies and Procedures for varying the user charges will apply. This includes the use of the User Charging Assessment Framework (UCAF) and a consultation with STIG members.

4.6.3 In the event of a change to the bus network being identified as form of mitigation, for instance to address a socio-economic impact, the process set out in the Bus Strategy will apply.

4.6.4 Where localised mitigations are identified on the highway network to address localised effects, for example an adverse traffic-related impact at a particular junction, a similar process for identifying pre-opening localised mitigations will be followed (as set out in Chapter 2). TfL will first complete a preliminary assessment as to the form of localised mitigation and the programme for its implementation. This preliminary assessment will then be presented to the relevant local authority for consideration and review within three months of the need for mitigation being identified.

4.6.5 TfL and the local authority may wish to engage with other potentially affected parties as part of their review (for instance user groups, local landowners etc.). TfL will then undertake detailed design of the mitigation where necessary, having regard to feedback received from the local highway authority.

4.6.6 In determining the form of post-opening mitigation, TfL and the affected local authority will need to give consideration to both the benefits and any potential adverse impacts that a mitigation measure could have including at locations elsewhere. Such considerations may have a bearing on the form of mitigation adopted.

4.6.7 In instances where physical changes to the streetscape are required, TfL will ensure the measures developed are sympathetic to the existing streetscape and take account of relevant guidance (including for instance TfL's *Streetscape Guidance* and the *London Cycling Design Standards*).

4.7 Funding and delivery of post-opening localised mitigation

4.7.1 TfL will meet the cost of implementing all post-opening mitigation measures identified as being necessary in relation to impacts attributable to the Scheme.

4.7.2 TfL will expedite the delivery of post-opening localised mitigation measures (for instance through allocating designated resources for design and implementation, and ring-fencing funding). The intention will be to implement the mitigation measure as soon as reasonably practicable. Any necessary consultation will be completed in line with normal procedures prior to implementation.

Measures on the TLRN

4.7.3 Where mitigation measures can be implemented under TfL's statutory powers (e.g. measures on roads for which TfL is the highway authority (the Transport for London Road Network (TLRN)), or changes to single timings), TfL will be responsible for implementing the mitigation.

Measures on borough roads

4.7.4 Where TfL is not able to implement a mitigation measure under its statutory powers, (e.g. junction modifications on roads for which TfL is not the highway authority), TfL may seek agreement with the relevant highway authority under section 8 of the Highways Act 1980 for TfL to implement those measures. Alternatively, the highway authority may be responsible for implementation of the mitigation, with the necessary funding provided by TfL and secured via a bilateral agreement. In these circumstances, TfL will apply the same timescale for identifying and agreeing the works but the timing for the implementation of these works will be a matter for the relevant highway authority.

4.7.5 A highway authority may choose to implement an alternative mitigation to the measure proposed by TfL following the usual process of scheme planning, design, consultation and implementation. The alternative mitigation must provide a broadly comparable level of value in addressing the Scheme impact. TfL will contribute towards the cost of the mitigation up to the estimated cost of the measure proposed by TfL, or less if the alternative mitigation is of lower cost. If the highway authority wishes to take the opportunity to implement supplementary measures at its own cost (for instance to tie the mitigation in with wider streetscape improvements) it will be able to do so.

5. INDICATIVE MITIGATION MEASURES

5.1 Introduction

5.1.1 Indicative mitigation measures to address the impacts of the Scheme have been identified and are set out at Appendix F. The mitigation measures are capable of addressing a range of impacts that may be identified as being caused by the Scheme including air quality, noise and socio-economic impacts.

5.1.2 The list of indicative measures demonstrates that there are a range of measures available that could be implemented within reasonable timescales by TfL and/or the local highway authorities under their existing powers to address a variety of traffic and associated impacts.

5.2 Indicative measures

5.2.1 A range of potential measures will be explored when developing any mitigation, in order to ensure that the measures are tailored to the cause, locality and extent of any potential impacts. Appendix F sets out a range of potential mitigation measures, the effect that each measure is likely to have and where appropriate the statutory powers for delivering that mitigation measure. It should be noted that this list is not exhaustive and other measures could also potentially be considered.

Changes to the user charge

5.2.2 In addition to physical measures, changes to the Silvertown and Blackwall Tunnel user charges could also be used as a mitigation measure in certain circumstances. The approach to setting the initial user charges and making subsequent variations is set out in the Charging Policies and Procedures.

5.2.3 Variations to the user charges could potentially take a number of forms, meaning that this is a highly flexible form of mitigation. It could include for example:

- adding or removing discounts and exemptions, or changing the criteria for these;
- changing the hours at which the charges apply or the types of vehicles to which they apply; and
- changing the charge levels.

5.2.4 For air quality and noise impacts, once physical mitigation measures (for example noise barriers) have been implemented prior to Scheme opening, the most likely mitigation measure post-opening would be to vary the user charge.

Mitigation at adjacent crossings

5.2.5 If a significant adverse impact was identified on an adjacent river crossing as a result of the Scheme, either on completion of the refreshed assessment (pre-opening) or observed through the monitoring data (post-opening), TfL would in the first instance consider a range of potential traffic management measures to mitigate the impact on the crossing (including the potential for adjustments to the user charges at the Blackwall and Silvertown tunnels to address the issue).

5.2.6 The implementation of a user charge at adjacent crossings would subsequently be considered as a potential mitigation if such management measures were deemed to be insufficient for mitigating the impact or otherwise not appropriate. The legal powers necessary to implement any user charge, as well the potential need for any amendments to existing legislation, would be duly considered as part of this process.

Support for sustainable transport measures

5.2.7 In the unlikely event that mitigation measures implemented to address an adverse Scheme impact have not proved sufficient to directly and fully mitigate it, residual impacts may remain. In these circumstances, if in the opinion of TfL and the affected local authority these residual impacts are sufficient to justify offsetting by strategic or local measures to encourage the take up of sustainable and active travel, TfL would consider implementing or making available support to the affected local authority to implement these measures as appropriate.

5.2.8 Such measures could range from enhancements to pedestrian and cyclist infrastructure on the local highway network, to the provision of additional cycle parking, travel planning for residents, schools and businesses and other ‘soft’ measures. These offsetting measures would be proportionate to the scale of the residual impacts remaining and could be delivered by the relevant local authority subject to agreement with TfL.

List of Abbreviations

ANPR	Automatic Number Plate Recognition
AQS	Air Quality Strategy
ATC	Automatic Traffic Counts
CO_2	Carbon Dioxide
Defra	Department for Environment, Food and Rural Affairs
DCO	Development Consent Order
DMRB	Design Manual for Roads and Bridges
DVLA	Driver and Vehicle Licensing Agency
ES	Environmental Statement
EU	European Union
LCAP	London Congestion Analysis Project
MSOA	Middle Level Super Output Area
NML	Noise Monitoring Location
NO_2	Nitrogen Dioxide

PM_{10}	Particulate Matter (typically less than or equal to 10micron)
SCOOT	Split Cycle Offset Optimisation Technique
STIG	Silvertown Tunnel Implementation Group
TfL	Transport for London
TLRN	Transport for London Road Network

Glossary of Terms

AM peak	The morning peak hours when traffic is busiest. In the context of the Silvertown Tunnel scheme this applies to the hours between 6:00 and 10:00 in the northbound direction.
Assessed Case	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.
Blackwall Tunnel	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.
Carbon	'Carbon' is used as short hand to refer to the basket of six greenhouse gases (GHGs) recognised by the Kyoto Protocol. GHGs are converted to carbon dioxide equivalents (CO_2e) based on their global warming potential per unit as compared to one unit of CO_2.
Development Consent Order	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. http://infrastructure.planninginspectorate.gov.uk/help/glossary-of-terms/
Excess Wait Time	The time waited in excess of the average scheduled wait time e.g. when waiting for a bus service.
Host Boroughs	The Royal Borough of Greenwich, and the London Boroughs of Newham and Tower Hamlets where the existing Blackwall Tunnel and proposed Silvertown Tunnel are situated.

Inter peak	The time period between the AM peak and the PM peak when traffic levels are lower. In the context of the Silvertown Tunnel scheme this refers to the hours between 10:00 and 16:00.
Mitigation	Measures including any process, activity, or design to avoid, reduce, remedy or compensate for negative environmental impact or effects of a development.
PM Peak	The evening peak hours when traffic is busiest. In the context of the Silvertown Tunnel scheme this applies to the hours between 16:00 and 19:00 in the southbound direction.
Rotherhithe Tunnel	An existing road tunnel underneath the River Thames in east London, linking the London Borough of Tower Hamlets with the London Borough of Southwark, comprising a single bore with two lanes of traffic. Pedestrian and cycle access is permitted.
The Scheme	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.
Transport for London (TfL)	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. 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. 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.

The Tunnel, Silvertown Tunnel	Proposed new twin-bore road tunnels under the River Thames from the A1020 in Silvertown to the A102 on Greenwich Peninsula, East London.
Tunnel Portal	A structure created which defines the end of a section of tunnel.
User Charging	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.
Woolwich Ferry	The Woolwich Ferry links Woolwich (Royal Borough of Greenwich) and North Woolwich (London Borough of Newham). It also links two ends of the inner London orbital road routes; the North Circular and South Circular. It runs every 5-10 minutes throughout the day, from Monday to Friday and every 15 minutes on Saturdays and Sundays. It carries pedestrians, cyclists, cars, vans and lorries. The ferry is operated by Briggs Marine and Environmental on behalf of TfL.

Appendix A Traffic Monitoring Plan

A.1 Traffic monitoring plan

Table A-1 Initial traffic monitoring plan

Outcome	Metric	Location	Duration
River crossings			
Blackwall Tunnel & Silvertown Tunnel crossing performance	Hourly traffic crossing flow (including vehicle type & assessment of volume to capacity ratio)	Blackwall Tunnel & Silvertown Tunnel northbound & southbound	Continuous, subject to data collection methods
	Peak hour traffic crossing delay	Blackwall Tunnel & Silvertown Tunnel northbound & southbound approaches	AM peak, inter peak & PM peak data to allow establishment of trends over time
Performance of adjacent crossings: Woolwich Ferry	Hourly traffic crossing flow (including vehicle type)	Woolwich Ferry northbound & southbound	Continuous, subject to data collection methods

Outcome	Metric	Location	Duration
	Queue lengths	Woolwich Ferry northbound & southbound approaches	AM peak, inter peak & PM peak data to allow establishment of trends over time
Performance of adjacent crossings: Rotherhithe Tunnel	Hourly traffic crossing flow (including vehicle type & assessment of volume to capacity ratio)	Rotherhithe Tunnel northbound & southbound	Continuous, subject to data collection methods
	Peak hour traffic crossing delay	Rotherhithe Tunnel northbound & southbound approaches	AM peak, inter peak & PM peak data to allow establishment of trends over time
Performance of adjacent crossings: Tower Bridge	Hourly traffic crossing flow (including vehicle type & assessment of volume to capacity ratio)	Tower Bridge northbound & southbound	Continuous, subject to data collection methods
	Peak hour traffic crossing delay	Tower Bridge northbound & southbound approaches	AM peak, inter peak & PM peak data to allow establishment of trends over time

Outcome	Metric	Location	Duration
Key corridors (see Figure A-1 for a map highlighting these locations)			
Performance of key corridors: A2 (incl. A102)	Vehicle journey times	GLA boundary to Blackwall/Silvertown Tunnel diverge northbound & southbound	Continuous, subject to data collection methods
	Vehicle journey time reliability	GLA boundary to Blackwall/Silvertown Tunnel diverge northbound & southbound	Continuous, subject to data collection methods
	Hourly traffic flow (including vehicle type & assessment of volume to capacity ratio)	GLA boundary to Blackwall/Silvertown Tunnel diverge northbound & southbound	Continuous, subject to data collection methods
Performance of key corridors: A12	Vehicle journey times	Redbridge Roundabout to Blackwall Tunnel portal northbound & southbound	Continuous, subject to data collection methods
	Vehicle journey time reliability	Redbridge Roundabout to Blackwall Tunnel portal northbound & southbound	Continuous, subject to data collection methods

Outcome	Metric	Location	Duration
	Hourly traffic flow (including vehicle type & assessment of volume to capacity ratio)	Redbridge Roundabout to Blackwall Tunnel portal northbound & southbound	Continuous, subject to data collection methods
Performance of key corridors: A13	Vehicle journey times	Aldgate to Renwick Road eastbound & westbound	Continuous, subject to data collection methods
	Vehicle journey time reliability	Aldgate to Renwick Road eastbound & westbound	Continuous, subject to data collection methods
	Hourly traffic flow (including vehicle type & assessment of volume to capacity ratio)	Aldgate to Renwick Road eastbound & westbound	Continuous, subject to data collection methods
Other strategic & local links (see Figure A-1 for a map highlighting these locations)			
Performance of other strategic & local links: Albert Road (east)	Traffic flow (including assessment of volume to capacity ratio)	Pier Road to Woolwich Manor Way northbound & southbound	Hourly data for a typical weekday & weekend day
Performance of other strategic & local links: Albert Road (west)	Traffic flow (including assessment of volume to capacity ratio)	Connaught Bridge to Pier Road/Albert Road junction eastbound & westbound	Hourly data for a typical weekday & weekend day

Outcome	Metric	Location	Duration
Performance of other strategic & local links: A1261 Aspen Way	Traffic flow (including assessment of volume to capacity ratio)	A13 East India Dock Road to Leamouth Circus eastbound & westbound	Hourly data for a typical weekday & weekend day
Performance of other strategic & local links: Cassland Road	Traffic flow (including assessment of volume to capacity ratio)	A102/Cassland Road/Wick Road junction to Cassland Road/B113 junction eastbound & westbound	Hourly data for a typical weekday & weekend day
Performance of other strategic & local links: Charlton Way	Traffic flow (including assessment of volume to capacity ratio)	Shooters Hill Road to Vanburgh Park eastbound & westbound	Hourly data for a typical weekday & weekend day
Performance of other strategic & local links: Connaught Bridge	Traffic flow (including assessment of volume to capacity ratio)	N Woolwich Road to Victoria Dock Road northbound & southbound	Hourly data for a typical weekday & weekend day
Performance of other strategic & local links: A200 Creek Road	Traffic flow (including assessment of volume to capacity ratio)	A2209 Deptford Church Street to Greenwich Town Centre eastbound & westbound	Hourly data for a typical weekday & weekend day
Performance of other strategic & local links: A20 Eltham Road	Traffic flow (including assessment of volume to capacity ratio)	Kidbrooke Park Road to Burnt Ash Road eastbound & westbound	Hourly data for a typical weekday & weekend day

Outcome	Metric	Location	Duration
Performance of other strategic & local links: Homerton High Street	Traffic flow (including assessment of volume to capacity ratio)	Kenworthy Road to Ponsford Street eastbound & westbound	Hourly data for a typical weekday & weekend day
Performance of other strategic & local links: Jamaica Road	Traffic flow (including assessment of volume to capacity ratio)	Lower Road to Tower Bridge eastbound & westbound	Hourly data for a typical weekday & weekend day
Performance of other strategic & local links: Kenworthy Road	Traffic flow (including assessment of volume to capacity ratio)	A102/B112 junction to A102/Cassland Road/Wick Road junction northbound & southbound	Hourly data for a typical weekday & weekend day
Performance of other strategic & local links: Limehouse Link	Traffic flow (including assessment of volume to capacity ratio)	Eastbound & westbound	Hourly data for a typical weekday & weekend day
Performance of other strategic & local links: Lower Lea Crossing	Traffic flow (including assessment of volume to capacity ratio)	Leamouth Circus to Tidal Basin Roundabout eastbound & westbound	Hourly data for a typical weekday & weekend day
Performance of other strategic & local links: A200 Lower Road / Evelyn Street	Traffic flow (including assessment of volume to capacity ratio)	Rotherhithe Tunnel Roundabout to A2209 Deptford Church Street northbound & southbound	Hourly data for a typical weekday & weekend day

Outcome	Metric	Location	Duration
Performance of other strategic & local links: Maze Hill	Traffic flow (including assessment of volume to capacity ratio)	Trafalgar Road to Vanburgh Terrance northbound & southbound	Hourly data for a typical weekday & weekend day
Performance of other strategic & local links: A11 Mile End Road / Bow Road	Traffic flow (including assessment of volume to capacity ratio)	A13 to Bow Roundabout eastbound & westbound	Hourly data for a typical weekday & weekend day
Performance of other strategic & local links: A2 New Cross Road / Blackheath Hill	Traffic flow (including assessment of volume to capacity ratio)	A2/A207 junction to Old Kent Road eastbound & westbound	Hourly data for a typical weekday & weekend day
Performance of other strategic & local links: A1020 Nth Woolwich Road	Traffic flow (including assessment of volume to capacity ratio)	Tidal Basin Roundabout to Connaught Bridge northbound & southbound	Hourly data for a typical weekday & weekend day
Performance of other strategic & local links: A2 Old Kent Road	Traffic flow (including assessment of volume to capacity ratio)	New Cross Road to Tower Bridge Road eastbound & westbound	Hourly data for a typical weekday & weekend day
Performance of other strategic & local links: Royal Albert Way	Traffic flow (including assessment of volume to capacity ratio)	Gallions Reach Roundabout to Connaught Bridge / A1020 / A112 junction eastbound &	Hourly data for a typical weekday & weekend day

Outcome	Metric	Location	Duration
		westbound	
Performance of other strategic & local links: Royal Docks Road	Traffic flow (including assessment of volume to capacity ratio)	A13/A406 Interchange to Beckton Roundabout northbound & southbound	Hourly data for a typical weekday & weekend day
Performance of other strategic & local links: A1011 Silvertown Way	Traffic flow (including assessment of volume to capacity ratio)	Tidal Basin Roundabout to Canning Town Roundabout northbound & southbound	Hourly data for a typical weekday & weekend day
Performance of other strategic & local links: A205 South Circular	Traffic flow (including assessment of volume to capacity ratio)	Woolwich Ferry Roundabout to A20 Sidcup Road northbound & southbound	Hourly data for a typical weekday & weekend day
Performance of other strategic & local links: Stockwell Street/Crooms Hill/General Wolfe Road	Traffic flow (including assessment of volume to capacity ratio)	A206 to A2 northbound & southbound	Hourly data for a typical weekday & weekend day
Performance of other strategic & local links:	Traffic flow (including assessment of volume to	A100 Tower Bridge to Limehouse Link eastbound	Hourly data for a typical weekday & weekend day

Outcome	Metric	Location	Duration
A1203 The Highway	capacity ratio)	& westbound	
Performance of other strategic & local links: Tower Bridge Road	Traffic flow (including assessment of volume to capacity ratio)	Tower Bridge to Old Kent Road northbound & southbound	Hourly data for a typical weekday & weekend day
Performance of other strategic & local links: A206 Trafalgar Road / Romney Road	Traffic flow (including assessment of volume to capacity ratio)	Greenwich Town Centre to A102	Hourly data for a typical weekday & weekend day
Performance of other strategic & local links: B207 Trundley's Road / Sanford Street	Traffic flow (including assessment of volume to capacity ratio)	Bestwood Street to New Cross Road northbound & southbound	Hourly data for a typical weekday & weekend day
Performance of other strategic & local links: Tunnel Avenue	Traffic flow (including assessment of volume to capacity ratio)	Blackwall Tunnel Southern Approach to Blackwall Lane northbound & southbound	Hourly data for a typical weekday & weekend day

Outcome	Metric	Location	Duration
Performance of other strategic & local links: Victoria Park Road	Traffic flow (including assessment of volume to capacity ratio)	Victoria Park Rd/Wick Road junction to Harrowgate Road/Victoria Park Road junction eastbound & westbound	Hourly data for a typical weekday & weekend day
Performance of other strategic & local links: Wick Road	Traffic flow (including assessment of volume to capacity ratio)	A12 junction to Well Street/B113 junction eastbound & westbound	Hourly data for a typical weekday & weekend day
Performance of other strategic & local links: Woolwich Manor Way	Traffic flow (including assessment of volume to capacity ratio)	A13 Newham Way to Gallions Roundabout northbound & southbound	Hourly data for a typical weekday & weekend day
Performance of other strategic & local links: A206 Woolwich Road	Traffic flow (including assessment of volume to capacity ratio)	A102 to Woolwich Ferry Roundabout northbound & southbound	Hourly data for a typical weekday & weekend day
Junctions (see Figure A-1 for a map highlighting these locations)			
Performance of junctions: A100 Tower Bridge Road / Grange Rd / Bermondsey St	Junction delay, degree of saturation, journey time	-	AM peak and PM peak for a typical weekday

Outcome	Metric	Location	Duration
Performance of junctions: A100 Tower Bridge Road / A1203 E Smithfield / A1210 Mansell St	Junction delay, degree of saturation, journey time	-	AM peak and PM peak for a typical weekday
Performance of junctions: A1011 Silvertown Way / Tidal Basin Road	Junction delay, degree of saturation, journey time	-	AM peak and PM peak for a typical weekday
Performance of junctions: A102 Kenworthy Road B112 Marsh Hill	Junction delay, degree of saturation, journey time	-	AM peak and PM peak for a typical weekday
Performance of junctions: A102 / A206 Woolwich Road	Junction delay, degree of saturation, journey time	-	AM peak and PM peak for a typical weekday
Performance of junctions: A1020 Lower Lea Crossing / Tidal Basin Roundabout	Junction delay, degree of saturation, journey time	-	AM peak and PM peak for a typical weekday

Outcome	Metric	Location	Duration
Performance of junctions: A1020 Royal Albert Way / A1020 Royal Docks Road / Sir Steve Redgrave Bridge / Gallions Roundabout	Junction delay, degree of saturation, journey time	-	AM peak and PM peak for a typical weekday
Performance of junctions: A1020 North Woolwich Road / Connaught Bridge	Junction delay, degree of saturation, journey time	-	AM peak and PM peak for a typical weekday
Performance of junctions: A112 Connaught Road / Connaught Bridge	Junction delay, degree of saturation, journey time	-	AM peak and PM peak for a typical weekday
Performance of junctions: A112 Connaught Road / A1020 Royal Albert Way / Connaught Bridge	Junction delay, degree of saturation, journey time	-	AM peak and PM peak for a typical weekday
Performance of junctions: A112 Prince Regent Lane / Victoria Dock Road	Junction delay, degree of saturation, journey time	-	AM peak and PM peak for a typical weekday

Outcome	Metric	Location	Duration
Performance of junctions: A112 Prince Regent Lane / A124 Barking Road / A112 Greengate Street	Junction delay, degree of saturation, journey time	-	AM peak and PM peak for a typical weekday
Performance of junctions: A12 Blackwall Tunnel Northern Approach / Devas Street	Junction delay, degree of saturation, journey time	-	AM peak and PM peak for a typical weekday
Performance of junctions: A12 Blackwall Tunnel Northern Approach / A13 East India Dock Road	Junction delay, degree of saturation, journey time	-	AM peak and PM peak for a typical weekday
Performance of junctions: A12 / A11 Bow Roundabout	Junction delay, degree of saturation, journey time	-	AM peak and PM peak for a typical weekday
Performance of junctions: A1206 Preston's Road Roundabout / Cotton Street	Junction delay, degree of saturation, journey time	-	AM peak and PM peak for a typical weekday
Performance of junctions: A1261 Aspen Way / Upper	Junction delay, degree of saturation, journey time	-	AM peak and PM peak for a typical weekday

Outcome	Metric	Location	Duration
Bank Street			
Performance of junctions: A1261 Aspen Way / A1261 W India Dock Rd / A1203 Limehouse Link	Junction delay, degree of saturation, journey time	-	AM peak and PM peak for a typical weekday
Performance of junctions: A13 Alfreds Way / Renwick Road	Junction delay, degree of saturation, journey time	-	AM peak and PM peak for a typical weekday
Performance of junctions: A13 Eastbound diverge at A1020 junction	Junction delay, degree of saturation, journey time	-	AM peak and PM peak for a typical weekday
Performance of junctions: A13 / A117 High Street South / A117 Woolwich Manor Way	Junction delay, degree of saturation, journey time	-	AM peak and PM peak for a typical weekday
Performance of junctions: A13 / A112 Prince Regent Lane	Junction delay, degree of saturation, journey time	-	AM peak and PM peak for a typical weekday

Outcome	Metric	Location	Duration
Performance of junctions: A13 / Canning Town Gyratory	Junction delay, degree of saturation, journey time	-	AM peak and PM peak for a typical weekday
Performance of junctions: A13 Newham Way / A406 North Circular Road	Junction delay, degree of saturation, journey time	-	AM peak and PM peak for a typical weekday
Performance of junctions: A2 Blackheath Hill / Greenwich South Street / Lewisham Road	Junction delay, degree of saturation, journey time	-	AM peak and PM peak for a typical weekday
Performance of junctions: A2 Blackheath Hill / Hyde Vale	Junction delay, degree of saturation, journey time	-	AM peak and PM peak for a typical weekday
Performance of junctions: A2 Deptford Bridge / Greenwich High Road	Junction delay, degree of saturation, journey time	-	AM peak and PM peak for a typical weekday
Performance of junctions: A2 Deptford Bridge / Deptford Church Street	Junction delay, degree of saturation, journey time	-	AM peak and PM peak for a typical weekday

Outcome	Metric	Location	Duration
Performance of junctions: A2 / A2213 / Kidbrooke Interchange	Junction delay, degree of saturation, journey time	-	AM peak and PM peak for a typical weekday
Performance of junctions: A2 Shooters Hill Road / Charlton Way	Junction delay, degree of saturation, journey time	-	AM peak and PM peak for a typical weekday
Performance of junctions: A2 Shooters Hill Road / Prince Charles Road	Junction delay, degree of saturation, journey time	-	AM peak and PM peak for a typical weekday
Performance of junctions: A2 / A102 / A207 / Sun in the Sands Roundabout	Junction delay, degree of saturation, journey time	-	AM peak and PM peak for a typical weekday
Performance of junctions: A2 / A205 Westhorne Avenue	Junction delay, degree of saturation, journey time	-	AM peak and PM peak for a typical weekday
Performance of junctions: A2 New Cross Road / Pagnell Street	Junction delay, degree of saturation, journey time	-	AM peak and PM peak for a typical weekday

Outcome	Metric	Location	Duration
Performance of junctions: A20 Lee High Road / A2212 Burnt Ash Road	Junction delay, degree of saturation, journey time	-	AM peak and PM peak for a typical weekday
Performance of junctions: A20 Lewisham Way / Dixon Rd	Junction delay, degree of saturation, journey time	-	AM peak and PM peak for a typical weekday
Performance of junctions: A20 Sidcup Rd / B263 Green Lane / Southwood Road	Junction delay, degree of saturation, journey time	-	AM peak and PM peak for a typical weekday
Performance of junctions: A200 Creek Road / Deptford Church Street	Junction delay, degree of saturation, journey time	-	AM peak and PM peak for a typical weekday
Performance of junctions: A200 Evelyn Street / Deptford High Street	Junction delay, degree of saturation, journey time	-	AM peak and PM peak for a typical weekday
Performance of junctions: A200 Evelyn Street / Oxestalls Road	Junction delay, degree of saturation, journey time	-	AM peak and PM peak for a typical weekday

Outcome	Metric	Location	Duration
Performance of junctions: A200 Lower Road / Surrey Quays Road	Junction delay, degree of saturation, journey time	-	AM peak and PM peak for a typical weekday
Performance of junctions: A200 Lower Road / Bush Road	Junction delay, degree of saturation, journey time	-	AM peak and PM peak for a typical weekday
Performance of junctions: A200 Lower Road / A200 Jamaica Road / Rotherhithe Tunnel	Junction delay, degree of saturation, journey time	-	AM peak and PM peak for a typical weekday
Performance of junctions: A205 / A206 / Woolwich Ferry Roundabout	Junction delay, degree of saturation, journey time	-	AM peak and PM peak for a typical weekday
Performance of junctions: A205 South Circular Road / A207 Shooters Hill Road	Junction delay, degree of saturation, journey time	-	AM peak and PM peak for a typical weekday
Performance of junctions: A205 South Circular Road / / A208 Well Hall Road / Rochester Way	Junction delay, degree of saturation, journey time	-	AM peak and PM peak for a typical weekday

Outcome	Metric	Location	Duration
Performance of junctions: A205 South Circular Road / A21 Rushey Green	Junction delay, degree of saturation, journey time	-	AM peak and PM peak for a typical weekday
Performance of junctions: A205 South Circular Road / / A210 Eltham Road / A210 Eltham Hill	Junction delay, degree of saturation, journey time	-	AM peak and PM peak for a typical weekday
Performance of junctions: A205 South Circular Road / A2212 Burnt Ash Hill	Junction delay, degree of saturation, journey time	-	AM peak and PM peak for a typical weekday
Performance of junctions: A206 / Blackwall Lane / Vanbrugh Hill	Junction delay, degree of saturation, journey time	-	AM peak and PM peak for a typical weekday
Performance of junctions: A206 / A200 / Greenwich Town Centre	Junction delay, degree of saturation, journey time	-	AM peak and PM peak for a typical weekday
Performance of junctions: A206 Plumstead Road / Burrage Road	Junction delay, degree of saturation, journey time	-	AM peak and PM peak for a typical weekday

Outcome	Metric	Location	Duration
Performance of junctions: A206 Romney Road / Park Row	Junction delay, degree of saturation, journey time	-	AM peak and PM peak for a typical weekday
Performance of junctions: A206 Woolwich Road / Anchor & Hope Lane	Junction delay, degree of saturation, journey time	-	AM peak and PM peak for a typical weekday
Performance of junctions: A206 Trafalgar Road / Maze Hill	Junction delay, degree of saturation, journey time	-	AM peak and PM peak for a typical weekday
Performance of junctions: A21 Bromley Road / Bellingham Road / Randlesdown Road	Junction delay, degree of saturation, journey time	-	AM peak and PM peak for a typical weekday
Performance of junctions: A210 Eltham High Street / A208 Well Hall Road	Junction delay, degree of saturation, journey time	-	AM peak and PM peak for a typical weekday
Performance of junctions: B210 Charlton Way / Maze Hill / Prince Charles Road	Junction delay, degree of saturation, journey time	-	AM peak and PM peak for a typical weekday

Outcome	Metric	Location	Duration
Performance of junctions: B212 Lee Road / B220 Lee Terrace	Junction delay, degree of saturation, journey time	-	AM peak and PM peak for a typical weekday
Performance of junctions: Bugsby's Way / Anchor and Hope Lane	Junction delay, degree of saturation, journey time	-	AM peak and PM peak for a typical weekday
Buses and other public transport			
Performance of cross-river bus routes via Blackwall Tunnel & Silvertown Tunnel	Bus journey time, speed	Relevant sections of cross-river bus routes on key approaches to Blackwall & Silvertown Tunnels	Continuous, subject to data collection methods
	Excess wait time	Entire route of all cross river bus routes using Blackwall & Silvertown Tunnels	Continuous, subject to data collection methods
Performance of bus routes on the network adjacent to the crossings	Bus journey time, speed	Relevant sections of bus routes on key approaches to Blackwall & Silvertown Tunnels	Continuous, subject to data collection methods

Outcome	Metric	Location	Duration
	Excess wait time	Entire route of relevant bus routes using approaches to Blackwall & Silvertown Tunnels	Continuous, subject to data collection methods
Bus patronage levels	Bus patronage data	Entire route of all cross river bus routes using Blackwall & Silvertown Tunnels	Continuous, subject to data collection methods
Cycle Shuttle service	Patronage data	Entire route (note: route is to be confirmed)	Continuous, subject to data collection methods
Rail patronage levels	Rail patronage data	Jubilee line between Canning Town and North Greenwich Docklands Light Railway between Island Gardens and Cutty Sark Docklands Light Railway between King George V and Woolwich Arsenal	Continuous, subject to data collection methods

Outcome	Metric	Location	Duration
Road safety			
Changes in patterns of road accidents, especially those involving vulnerable road users	Accident data	Key corridors, other strategic & local links & junctions set out earlier in this table	Full annual records
Pedestrian & cyclist indicators			
Impact of Scheme related changes in traffic flow on severance and the ability of pedestrians and cyclists to use/cross the roads	Traffic flow data Pedestrian & cyclist indicators such as crossing wait times etc.	Albert Road/Connaught Road between Hartmann Road and Pier Road	Traffic flow: 24-hour data for a typical week and weekend Pedestrian & cyclist indicators: AM peak and PM peak for a typical weekday
		Bugsby's Way between John Harrison Way and Peartree Way	
		Connaught Bridge between Connaught Roundabout and Connaught Road	
		Lower Lea Crossing between Leamouth Circus and Tidal Basin Roundabout	

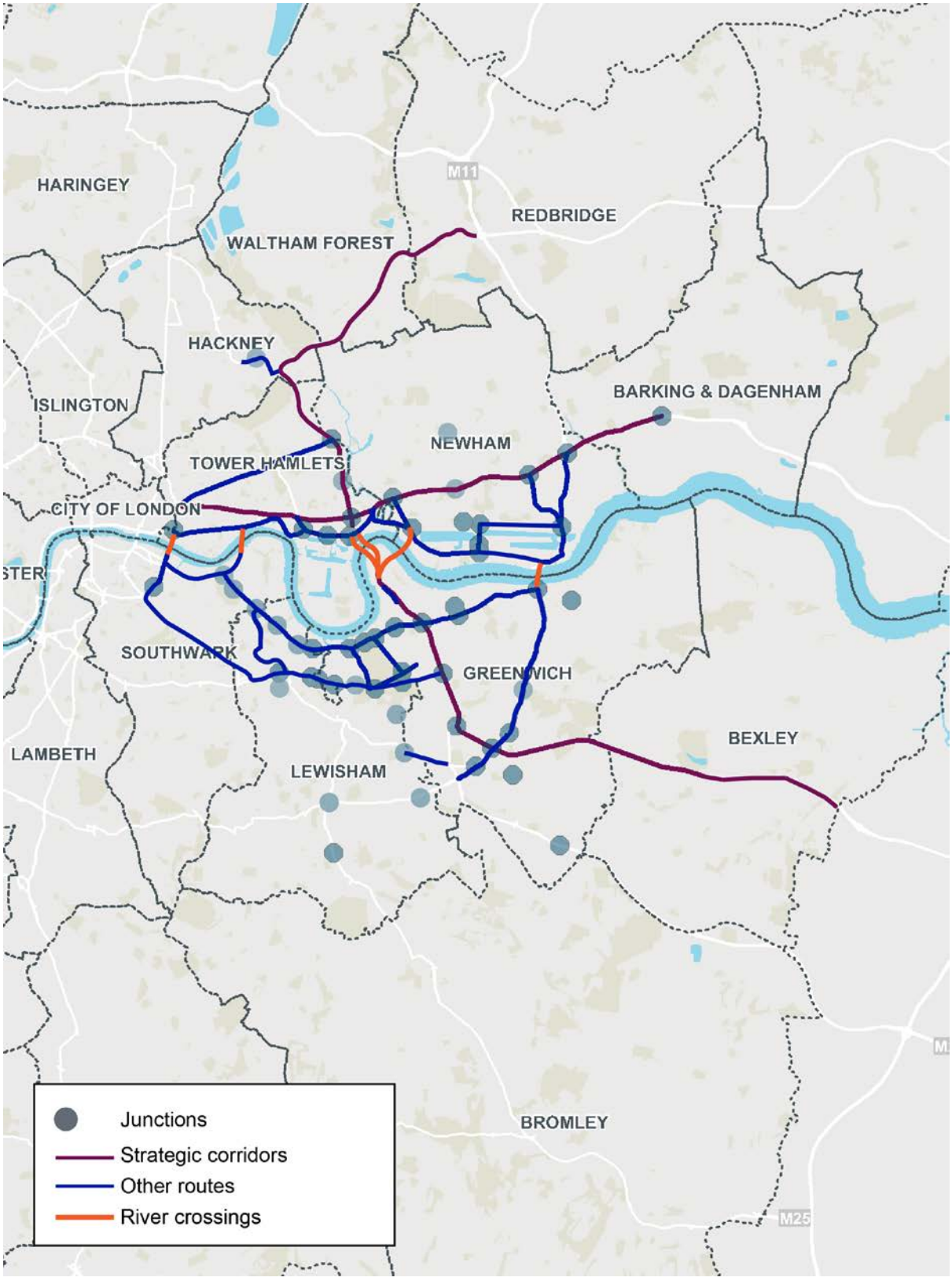
Outcome	Metric	Location	Duration
		Millennium Way between Edmund Halley Way and John Harrison Way	
		A206 Nelson Road/Trafalgar Road between Greenwich High Road and Blackwall Lane	
		North Woolwich Road between Silvertown Way and North Woolwich Roundabout	
		Prince of Wales Road between A2 Shooters Hill and South Row	
		Prince Regent Lane between A13 and Victoria Dock Road	
		Silvertown Way between A13 and North Woolwich Road	

Outcome	Metric	Location	Duration
		Victoria Dock Road between Caxton Street North and Connaught Roundabout	
		West Parkside/Pilot Busway between Edmund Halley Way and John Harrison Way	
		A206 Woolwich Road between Blackwall Lane and Anchor and Hope Lane	
Use of local roads by cyclists and pedestrians	Pedestrian & cyclist numbers	Boord Street footbridge	24-hour data for a typical weekday and weekend
		Lower Lea Crossing	
Use of Emirates Air Line as pedestrian & cyclist crossing	Pedestrian & cyclist numbers	Emirates Air Line	24-hour data for a typical week and weekend

Outcome	Metric	Location	Duration
Impact of mitigation measures on pedestrians & cyclists	Pedestrian & cyclist numbers, wait times etc.	Locations where mitigations are being implemented as a result of this strategy	24-hour data for a typical weekday and weekend
Travel behaviour			
Changes in travel behaviour of Blackwall Tunnel & Silvertown Tunnel users and the local population	Survey data including stated and revealed preference for users of different modes and vehicle types	No fixed geographic location	Every two years during a neutral month
Control sites			

Outcome	Metric	Location	Duration
Changes in travel patterns and trends independent of the Scheme	Vehicle journey times Vehicle journey time reliability Traffic flow (including assessment of volume to capacity ratio) Junction delay Degree of saturation Bus speed Accident data	Making use of TfL's existing and ongoing data collection programme	Making use of TfL's existing and ongoing data collection programme
Additional traffic data to update the strategic traffic model			
To update the strategic traffic model in advance of Scheme opening	Traffic flows, vehicle journey time routes, origin & destination pairs	As required to update the model	As required to update the model

Figure A-1 Traffic monitoring locations



Appendix B Air quality monitoring plan

Figure B-1 Air quality monitoring locations

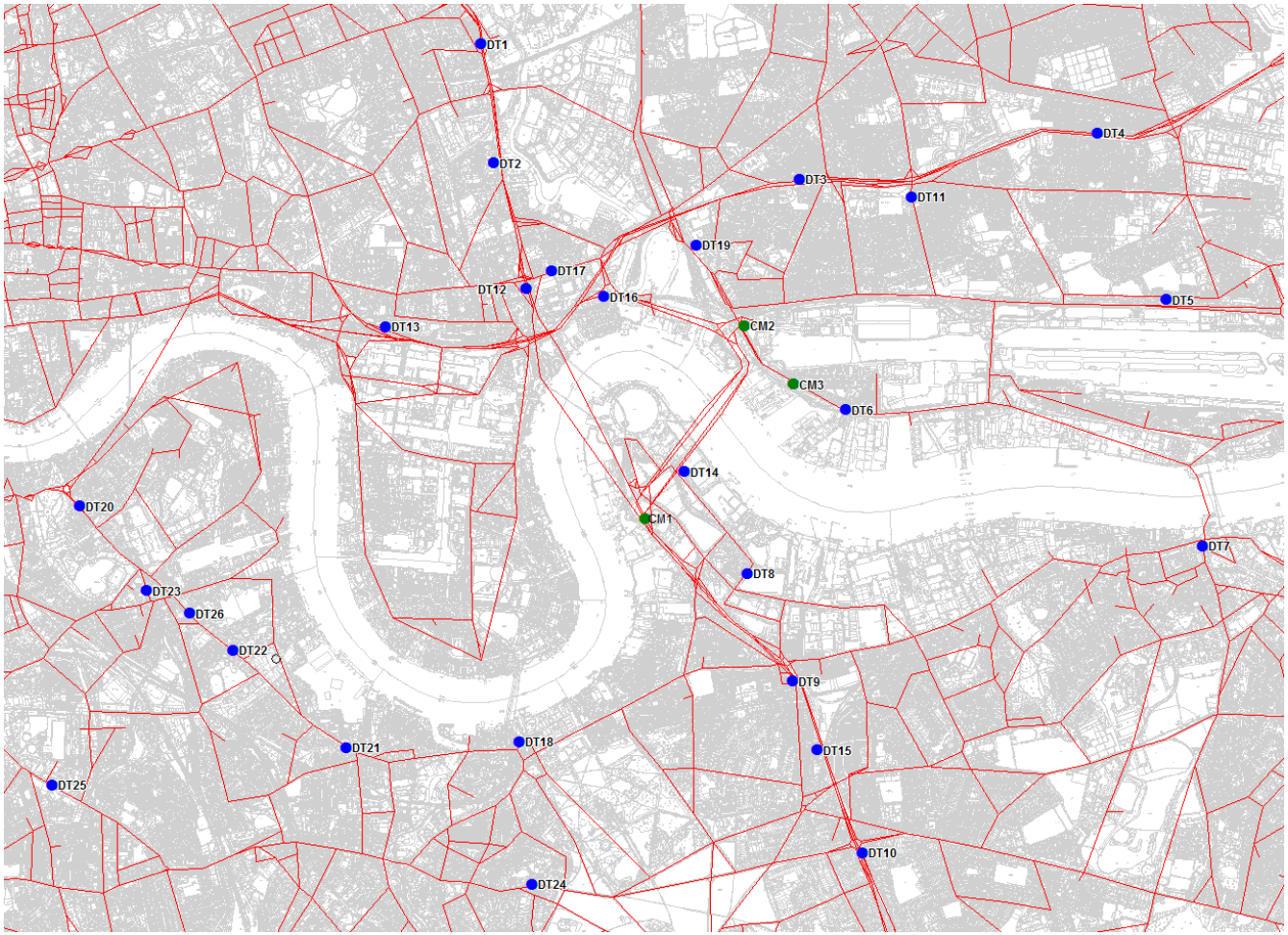


Table B-1 Initial air quality monitoring plan

B.1.1 The exact location of the air quality monitoring sites will be agreed with the relevant local authority at the time of installation.

Location	X co-ordinate	Y co-ordinate	Diffusion Tube (DT) or Continuous Automatic Monitoring (CM)
Silvertown Tunnel Southern Portal, Greenwich Peninsula	539168	179338	CM1
Hoola Development, Royal Victoria	539908	180728	CM2
Dalemain Mews, West Silvertown	540257	180314	CM3
Washington Close, Bromley-By-Bow	538034	182752	DT1
Tevoit Street, Bromley-By-Bow	538127	181888	DT2
Douglas Road	540302	181769	DT3
Newham Way, Beckton	542427	182102	DT4
Campion Close, Cyprus	542911	180913	DT5
North Woolwich Road, West Silvertown	540633	180133	DT6
John Wilson Street, Woolwich	543174	179161	DT7

Location	X co-ordinate	Y co-ordinate	Diffusion Tube (DT) or Continuous Automatic Monitoring (CM)
Southern Way, Millennium Village	539926	178964	DT8
Westcombe Hill, Westcombe	540254	178196	DT9
Sun-in-the-Sands, Greenwich	540756	176970	DT10
Prince Regent Lane, Custom House	541098	181646	DT11
Robin Hood Lane, Poplar	538356	180991	DT12
Ming Street, Poplar	537347	180722	DT13
East Parkside, Greenwich Peninsula	539482	179687	DT14
Siebert Road, Westcombe	540423	177707	DT15
Switch House, East India	538908	180936	DT16
East India Dock Road, Poplar	538545	181129	DT17
College Approach, Greenwich	538306	177768	DT18
Silvertown Way, Canning Town	539566	181301	DT19

Location	X co-ordinate	Y co-ordinate	Diffusion Tube (DT) or Continuous Automatic Monitoring (CM)
Lower Road, Canada Water	535179	179438	DT20
Evelyn Street, Deptford	537066	177726	DT21
Evelyn Street, Deptford Park	536258	178418	DT22
Rotherhithe Old Road, Rotherhithe	535648	178839	DT23
Blackheath Hill, Blackheath	538394	176750	DT24
Old Kent Road, Peckham	534977	177458	DT25
Lower Road, Rotherhithe	535942	178694	DT26

Appendix C Noise monitoring plan

Figure C-1 Noise monitoring locations

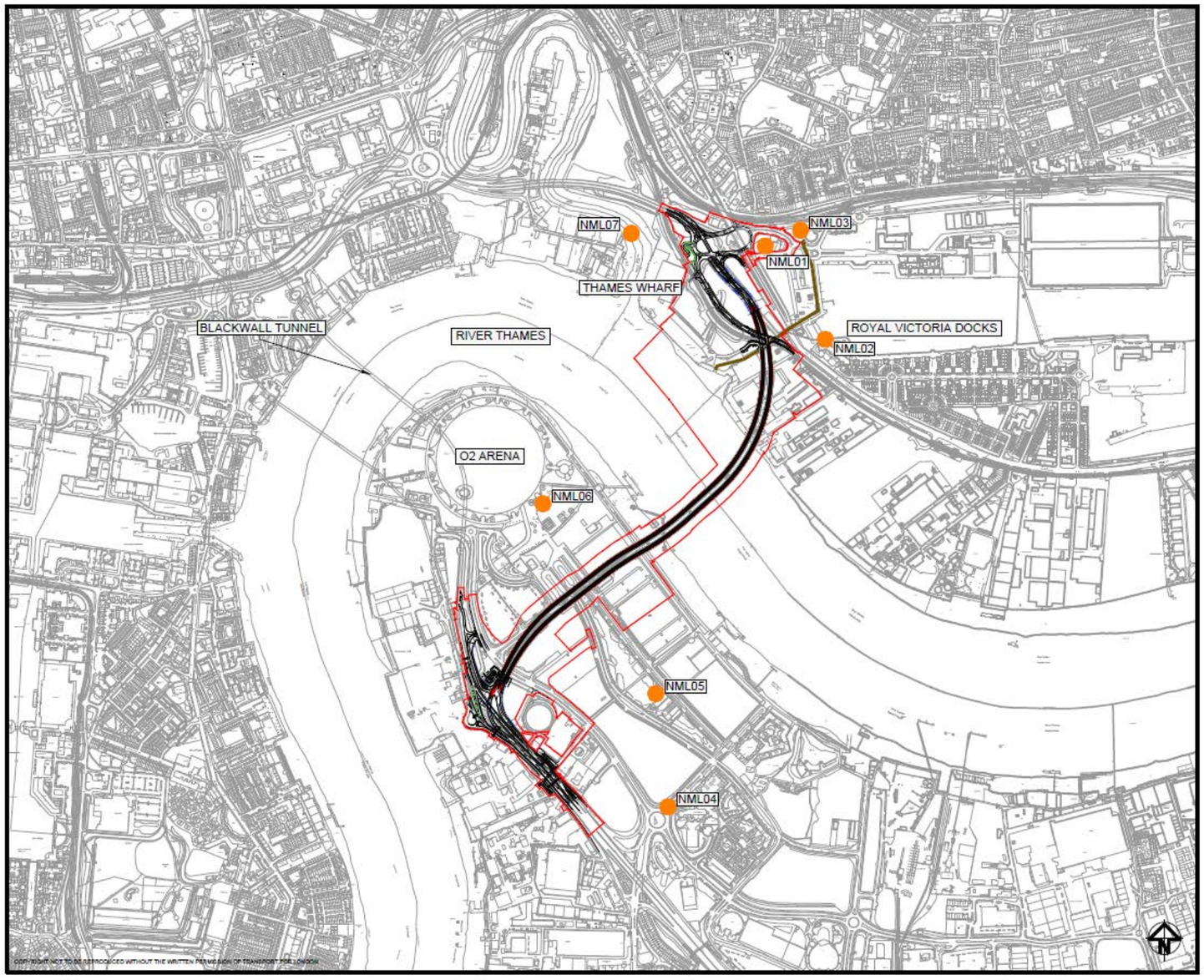


Table C-1 Initial noise monitoring plan

C.1.1 The exact location of the noise monitoring sites will be agreed with the relevant local authority at the time of installation.

Monitoring Location	Location Description	Approximate National Grid Reference	Monitoring Regime
NML01	Residential properties within the southern extent/façade of the Hoola mixed use/ residential development	TQ 39909 80728	Continuous monitoring using Calibrated Type 1 Data logging Sound Level Meter quantifying at minimum L_{Aeq}, L_{A10} and L_{Amax} parameters in hourly periods
NML02	Residential properties in the vicinity of the existing Western Beach Apartment block	TQ 40093 80452	Continuous monitoring using Calibrated Type 1 Data logging Sound Level Meter quantifying at minimum L_{Aeq}, L_{A10} and L_{Amax} parameters in hourly periods
NML03	Residential properties within the southern extent/façade of the Pump Tower residential development	TQ 40014 80774	Continuous monitoring using Calibrated Type 1 Data logging Sound Level Meter quantifying at minimum L_{Aeq}, L_{A10} and L_{Amax} parameters in hourly periods
NML04	The Millennium School educational facility	TQ 39667 79082	Continuous monitoring using Calibrated Type 1 Data logging Sound Level Meter quantifying at minimum L_{Aeq}, L_{A10} and L_{Amax} parameters in hourly periods
NML05	Residential properties	TQ 39614	Continuous monitoring

Monitoring Location	Location Description	Approximate National Grid Reference	Monitoring Regime
	in the vicinity of the Pilot Public House	79381	using Calibrated Type 1 Data logging Sound Level Meter quantifying at minimum L_{Aeq}, L_{A10} and L_{Amax} parameters in hourly periods
NML06	The Ravensbourne College educational facility	TQ 39275 79961	Continuous monitoring using Calibrated Type 1 Data logging Sound Level Meter quantifying at minimum L_{Aeq}, L_{A10} and L_{Amax} parameters in hourly periods
NML07	The Faraday School educational facility	TQ 39521 80744	Continuous monitoring using Calibrated Type 1 Data logging Sound Level Meter quantifying at minimum L_{Aeq}, L_{A10} and L_{Amax} parameters in hourly periods

Appendix D Socio-economic monitoring plan

D.1 Residents

D.1.1 TfL will commit to undertaking a residents survey and behavioural survey to monitor the impact of the Scheme on London's socio-economic groups. At least 1,000 people will be surveyed across east and south-east London on an annual basis, stratified by location, age, gender and income to ensure it is representative of the area's population.

D.1.2 Table D - 1 sets out an indicative range of metrics that will be collected from the survey to help inform whether mitigation is required for specific socio-economic groups. This list is not intended to be exhaustive and will be finalised in consultation with STIG members. All of the following will be analysed by income band (to identify the impacts on lower income groups), location (to identify the impacts on specific regeneration areas) and socio-economic classification including age, gender, disability and ethnicity.

Table D - 1 Initial socio-economic monitoring plan - residents

Outcome	Metric	Location	Duration
The number of residents that cross the River to reach their place of work - highway	Residents Survey	Borough and LSOA level	Continuous over an annual period
The number of residents that cross the River to reach their place of work – public transport	Residents Survey	Borough and LSOA level	Continuous over an annual period
The number of residents that cross the River to reach retail and social infrastructure - highway	Residents Survey	Borough and LSOA level	Continuous over an annual period
The number of residents that cross the River to reach retail and social infrastructure - public transport	Residents Survey	Borough and LSOA level	Continuous over an annual period
The number of residents that cross the River for social purposes -	Residents Survey	Borough and LSOA level	Continuous over an

highway			annual period
The number of residents that cross the River for social purposes - public transport	Residents Survey	Borough and LSOA level	Continuous over an annual period
The frequency of cross-river trips by residents, by journey purpose - highway	Residents Survey	Borough and LSOA level	Continuous over an annual period
The frequency of cross-river trips by residents, by journey purpose - public transport	Residents Survey	Borough and LSOA level	Continuous over an annual period
The time of day of cross-river trips by residents, by journey purpose - highway	Residents Survey	Borough and LSOA level	Continuous over an annual period
The time of day of cross-river trips by residents, by journey purpose – public transport	Residents Survey	Borough and LSOA level	Continuous over an annual period
The number of residents that reassigned their journey to other crossings over the past year and the reason for this switch, by journey purpose	Behavioural Survey	Borough and LSOA level	Continuous over an annual period
The number of residents that redistributed to an alternative destination over the past year and the reasons for this, by journey purpose	Behavioural Survey	Borough and LSOA level	Continuous over an annual period
The number of residents that switched mode over the past year and the reasons for this, by journey purpose	Behavioural Survey	Borough and LSOA level	Continuous over an annual period
The number of residents that	Behavioural	Borough and	Continuous

retimed their trips over the past year and the reasons for this, by journey purpose	Survey	LSOA level	over an annual period

D.1.3 In addition to the metrics set out above, the surveys will also allow further exploration of the reasons why changes in travel behaviour may have taken place for particular socio-economic groups. This will include:

- Whether the cost of the Scheme has had any impact on particular socio-economic group's ability to cross the river, to access employment opportunities or for social reasons, and the behavioural responses to this.
- Whether the reduction in congestion, or improvement in journey time reliability, has had any impact on a particular socio-economic group's ability to cross the river.
- Whether the impact of the bus services has had any impact on a particular socio-economic group's ability to cross the river.

D.1.4 In addition to the residents and behavioural surveys, TfL will continue to collect and analyse a significant amount of data on the travel patterns of east and south-east London residents as part of its annual London Travel Demand Survey (LTDS). This will be used to understand how cross-river travel behaviour may have changed within the context of changing travel behaviour within the wider area. TfL will also use socio-economic monitoring data from local authorities where available.

D.2 Businesses

D.2.1 TfL will commit to undertaking a business survey to monitor the impact of the Scheme on London's businesses. At least 500 businesses will be surveyed across east and south-east London on an annual basis, stratified by location, size and sector to ensure it is representative of the area's business mix.

D.2.2 Table D - 2 sets out an indicative range of metrics that will be collected from the survey to help inform whether mitigation is required for specific types of businesses. This list is not intended to be exhaustive and will be finalised in consultation with STIG members. All of the following will be analysed by business size, sector and location.

Table D - 2 Initial socio-economic plan – businesses

Outcome	Metric	Location	Duration
The number of cross-river trips made to visit potential customers	Business Survey	Borough and LSOA level	Continuous over an annual period
The number of potential customers that visit the business from the other side of the River	Business Survey	Borough and LSOA level	Continuous over an annual period
The number of employees that travel to the business from the other side of the River	Business Survey	Borough and LSOA level	Continuous over an annual period
The frequency of cross-river trips by businesses, by journey purpose - highway	Business Survey	Borough and LSOA level	Continuous over an annual period
The frequency of cross-river trips by businesses, by journey purpose – public transport	Business Survey	Borough and LSOA level	Continuous over an annual period
The time of day of cross-river trips by businesses, by journey purpose - highway	Business Survey	Borough and LSOA level	Continuous over an annual period
The time of day of cross-river trips by businesses, by journey purpose – public transport	Business Survey	Borough and LSOA level	Continuous over an annual period
The number of businesses that reassigned their journeys to other crossings and the reason for this switch, by journey purpose.	Business Survey	Borough and LSOA level	Continuous over an annual period
The number of businesses that redistributed to an alternative destination and the reasons for	Business Survey	Borough and LSOA level	Continuous over an annual

this, by journey purpose			period
The number of businesses that switched mode and the reasons for this, by journey purpose	Business Survey	Borough and LSOA level	Continuous over an annual period
The number of businesses that retimed their trips and the reasons for this, by journey purpose	Business Survey	Borough and LSOA level	Continuous over an annual period
The number of time critical deliveries missed as a result of crossing the River	Business Survey	Borough and LSOA level	Continuous over an annual period
The degree to which staff are late for work/miss meetings as a result of crossing the River	Business Survey	Borough and LSOA level	Continuous over an annual period
The number of times unpredictable events when crossing the river have impeded business operations	Business Survey	Borough and LSOA level	Continuous over an annual period
The number of businesses taking part in the Business Transition Scheme and views on this	Business Survey	Borough and LSOA level	Continuous over an annual period

D.2.3 In addition to the metrics set out above, the survey will also allow further exploration of the reasons why changes in travel behaviour may have taken place for particular business types. This will include:

- Whether the Scheme has enabled the business to grow or invest and the reasons for this
- Whether the business has taken on more staff, or lost staff, as a result of the Scheme and the reasons for this
- The impact of any changes in reassignment, redistribution or mode shift on the operation and profitability of the business

- The impact of any changes in congestion and journey time reliability on the operation and profitability of the business

D.2.4 Other secondary data

D.2.5 In addition to the primary data that TfL will collect through surveys, TfL will also monitor wider socio-economic characteristics to identify the impact of the Scheme within its wider context.

D.2.6 Table A - 3 sets out the additional range of secondary data that will be monitored. Again, this list is not intended to be exhaustive and will be finalised in consultation with STIG members.

Table A - 3 Secondary socio-economic data

Outcome	Source	Location	Duration
Unemployment rate, split by age and gender	JSA Claimant Count	Borough and LSOA level	For each month over an annual period
Indices of Multiple Deprivation	DCLG	Borough and LSOA level	Every four years
The number of business operating, by size and sector	Business Register and Employment Survey	Borough and LSOA level	Annually
The number of employees, by size and sector	Business Register and Employment Survey	Borough and LSOA level	Annually
Rental levels for commercial and industrial floorspace	Commercial agents/Costar database	Borough and LSOA level	Annually
The number of pupils who attend schools outside of their home Borough	Boroughs	Borough	Annually

Appendix E Mitigation Triggers

E.1 Overview of Trigger Process

E.1.1 Mitigation triggers are proposed as a means of assisting the identification of any unexpected traffic-related impacts of the scheme on the highway network following opening of the scheme (likely impacts identified ahead of opening are subject to their own mitigation procedure). Triggers refer to levels of change post scheme opening which exceed the level of change anticipated, and are designed to provide an alert if these levels are breached.

E.1.2 Trigger levels are ranked using a RAG (Red, Amber, Green) system. Green represents the expected change (based on the difference between modelled scheme and modelled reference case, with forecasting range / variability and measurement error taken into account as necessary); amber is the first level of warning and would warrant an investigation into mitigation if deemed necessary by STIG; and red always warrants an investigation into whether mitigation is needed. If TfL determines that mitigation is not required following a trigger activation it will provide the members of STIG with a clear justification for this.

E.1.3 The triggers will cover the 'area of influence' identified in Figure 3-1 which represents the geographical area where anticipated changes (in terms of traffic conditions) are most marked. Specifically, the triggers will cover changes in traffic-related metrics at the following locations:

- The Blackwall and Silvertown tunnels;
- Other river crossings;
- Strategic corridors[5]; and
- Local roads.

[5] Strategic corridors include the strategic radial and orbital corridors outlined in the Mayor's Transport Strategy (MTS corridors), the Transport for London Road Network (TLRN) and Strategic Road Network (SRN). These are key links that carry the highest volumes of traffic and the majority of TfL bus routes.

E.1.4 Monitoring undertaken in the area of influence will 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.

E.1.5 Triggers will be reviewed prior to scheme opening and if necessary updated in consultation with STIG to ensure they remain fit for purpose. It should be stressed that STIG can have regard to any information set out in the monitoring reports in forming a view on the impacts of the scheme; a trigger doesn't have to be breached for STIG to explore a potential scheme effect, in the same way that activation of a trigger does not necessarily mean that mitigation is required. Similarly, the triggers do not in any way restrict STIG's ability to apply professional judgement when considering the monitoring reports. Indeed, it is expected that the collective experience of STIG would be put to good use in interpreting the monitoring reports and the triggers.

E.2 Proposed Metrics

E.2.1 Triggers will be set for the following traffic-related metrics:

a. Traffic Flows - This metric considers changes in traffic flows as a result of the Scheme. It is proposed that triggers based on traffic flows will form the principal mitigation triggers for the Scheme. 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 London. Traffic flows are considered the primary metric for assessing unanticipated scheme impacts.

b. Vehicle Composition (HGVs) - Triggers for HGV usage are given as increases to the current observed proportion of HGVs (that is the flow of HGVs as a proportion of all traffic) in each geographic area. There is expected to be no background growth in the proportion of HGVs using the assessed roads. 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).

c. Journey Time Reliability - The current methodology for assessing JTR involves scaling journey lengths, on the corridors of interest, to a "30 minute standard journey" and then counting the percentage of trips which take more than 5 minutes longer than the expected time. The primary source of data for assessing the impact of the scheme on

journey time reliability is ANPR data, captured continuously as part of the London Congestion Analysis Project (LCAP).

d. Queues extending beyond a certain point - The primary source of data for assessing the scheme impact at Woolwich will be usage data. In addition, surveys of vehicle queuing will be undertaken to provide an indication of impacts on the adjacent road network. The ferry approaches present a unique situation, with the total queue length having a high degree of variation and thus not likely to be a true indicator of actual road operation. The methodology proposed has therefore been developed to capture and compare the amount of time per day that the queued ferry traffic extends to a point on the highway network that impacts on through (non-ferry) traffic. This methodology can be consistently replicated each year to enable like-for-like comparison.

e. Bus Reliability (EWT) - Bus reliability can be measured using excess wait time[6] data derived from TfL's iBus monitoring system. Note that TfL are currently investigating the use of bus journey time reliability as a metric for monitoring buses. If this becomes the standard metric for bus evaluation, then it may be appropriate to adopt this metric for the trigger. The routes and start/end points would be agreed nearer to the time of Scheme opening once the bus network to be in place on opening of the Scheme has been agreed.

f. Road Safety - The key metric for road safety is the number of KSIs. Further it is suggested that rather than the number of KSIs directly, the number of incidents which result in a KSI are used to asses the impact of the scheme at Blackwall/Silvertown.

g. 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

[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.

would need to be set for each junction considered nearer to the time of Scheme opening based on outputs from the refreshed assessment.

E.3 Overview of Data Constraints

E.3.1 Trigger levels will be set based on expected changes due to the scheme derived from outputs of the modelled scheme. The intention is that the triggers will tell us whether observed scheme impacts are materially different from those forecast in the Assessed Case, over a prolonged period of time. The intention is not that a freak or unusual event causes a trigger, but that a trigger is activated if there is a sustained deviation from expected scheme outcomes.

E.3.2 By appropriately reflecting the expected change caused by the scheme, the triggers thresholds would remain applicable if background conditions across the network (i.e. the Reference Case) were different from those currently forecast. Setting the trigger thresholds based on absolute values is not considered appropriate because changes in background conditions, which are not a result of the scheme, could render the triggers irrelevant. A trigger based on an absolute traffic flow of x at a certain location, for instance, may not be breached even if the scheme was having an unforeseen effect if background growth across the network was lower than forecast. Similarly, if background growth was higher than forecast, the trigger could be breached purely by traffic growth regardless of the scheme's effect.

E.3.3 Were background conditions observed to be notably different in practice to those forecast, this would be identified as part of the pre-scheme monitoring and the refreshed assessment of scheme impacts undertaken prior to opening. TfL would then take appropriate steps so that the scheme is not likely to give rise to materially new or materially different environmental effect to those assessed in the Environmental Statement, for example through adjustments to user charging and the implementation of localised mitigation. The post-opening triggers in effect provide an additional level of surety that unanticipated scheme effects can be identified and addressed post scheme opening.

E.3.4 Due to the need for sustained change to be distinguished from expected variation in flows (over a given time period) the trigger thresholds cannot be based on variance from the forecast scheme impacts alone. This is particularly the case for triggers based on traffic flows, but could also apply to a lesser degree for triggers based on other metrics (for example journey time reliability).

E.3.5 Currently there is high variability in daily traffic flow across the network – in a given week, for example, flows may vary by ±20% so a trigger which simply looks for a 5% difference in expected flow will trigger frequently but may not actually pick up a sustained trend in the change in traffic flow. Although considering data on a quarterly basis will help to reduce the level of variability, significant variability remains. Similarly and as explained above, the method for a trigger to be activated needs to take into account growth, as otherwise background growth may cause a trigger to activate rather than an unexpected scheme effect.

E.4 Overview of Data Analysis

E.4.1 The means of accounting for variability and growth will be agreed at a later date. There are two potential methods for doing this. The first involves building in allowance for variability and growth based on observed data collected through the monitoring programme (in order to determine exactly what these allowances should be, consideration of the acceptable number of false positives is required). The second involves isolating the scheme impacts from background growth and variability using regression to look at the expected difference in the level of flow pre- and post- Scheme opening. The host boroughs have expressed a preference for adopting this approach.

E.4.2 Where other metrics follow a similar pattern of variability an adaptation of the chosen method will be used to set the appropriate trigger thresholds. Where no variation is expected trigger levels will be set without reference to day to day variation.

E.4.3 In slightly more detail, the considerations which have to be taken into account over the monitoring period, are as follows:

- Background growth
- Measurement error
- Initial fluctuations in flow
- Temporal fluctuations

E.4.4 For background growth, the first method outlined about above involves including a fixed percentage in the trigger level to account for this. The second method using regression explicitly takes this into account.

E.4.5 For measurement error, this reflects the fact that the methods used to count traffic are not 100% accurate. Including a small allowance for measurement

error in the metrics that are based on traffic counts (incorporated within the forecasting range/variability allowance) is one method of addressing this.

E.4.6 For initial fluctuations in flow, it is likely that it will take time for the drivers to become used to the Scheme being in place and, as such, there may be significant variation in usage patterns in the initial period. It is possible that these will be above and beyond what might be expect due solely to day to day variation in daily traffic flow, and this should be given due consideration for any trigger activations within the first year after Scheme opening.

E.4.7 For the temporal fluctuations, 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.

E.4.8 It is planned that the triggers will be based primarily on all day (24 hour) weekday flows. However, it is recognised that the Scheme could have different impacts across different periods of the day and accordingly triggers will also be set for peak periods for the traffic flow, vehicle composition and journey time reliability metrics.

E.4.9 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).

E.5 Initial mitigation triggers

E.5.1 The initial mitigation triggers are set out in Table A-4.

E.5.2 It is planned that the triggers will be reviewed by TfL in consultation with STIG members in the light of the refreshed assessment undertaken prior to scheme opening, at a point when the opening year bus network has been confirmed. It will then be possible to specify the bus routes to be covered by the triggers and any triggers relating to junction performance, as well as agree the approach for dealing with variability and growth.

E.5.3 As part of this review, it may be appropriate to amend the trigger metrics or thresholds for other reasons (for instance because of a change in the way data is collected or reported, or a notable change in background conditions). In such instances TfL will set out a rationale for any amendments it considers necessary and share this with STIG members for approval.

E.5.4 Similarly, it is planned that the triggers will be reviewed post-opening of the Scheme as part of the first annual monitoring report to ensure they are fit for purpose and performing their intended function. Where potential changes are identified, TfL will set out a rationale for any amendments it considers necessary and share this with STIG members for approval.

Table A - 4: Initial mitigation triggers

Metric	Location	Blackwall / Silvertow	Blackwall Tunnel	Silvertown Tunnel	Rotherhithe Tunnel	Tower Bridge	Woolwich Ferry	MTS corridors	Local roads	Notes
Traffic flows	Red alert	+4%	82%	32%	+8%	+7%	+5%	+7%	+7%	Change from baseline. Forecast change is based on change between Ref and Assessed Case. The individual triggers for Blackwall and Silvertown are based on the proportion of traffic flow at each crossing relative to the combined traffic flow.
	Amber alert	0%	78%	28%	+4%	+3%	+1%	+3%	+3%	
	Forecast range/variability	-1%	77%	27%	+3%	+2%	0%	+2%	+2%	
	Forecast change in flow	-3%	75%	25%	+1%	0%	-2%	0%	0%	
	Forecast range/variability	-5%	73%	23%	-1%	-2%	-4%	-2%	-2%	
	Amber alert	-6%	72%	22%	-2%	-3%	-5%	-3%	-3%	
	Red alert	-10%	68%	18%	-6%	-7%	-9%	-7%	-7%	
			Based on proportion of flow relative to combined flow							
Vehicle composition (HGVs)	Red alert	0%				+7%	+7%	+7%	+7%	Change from baseline. Forecast change is based on change between Ref and Assessed Case.
	Amber alert	-4%				+3%	+3%	+3%	+3%	
	Forecast range/variability	-5%				+4%	+4%	+2%	+2%	
	Forecast change in HGVs	-7%				2%	2%	0%	0%	
	Forecast range/variability	-9%				0%	0%	-2%	-2%	
	Amber alert	-10%				-1%	-1%	-3%	-3%	
	Red alert	-14%				-5%	-5%	-7%	-7%	
Journey time reliability	Forecast JTR	TLRN mean	TLRN mean	TLRN mean	TLRN mean	TLRN mean		TLRN mean		Change from TLRN average, on the basis that currently JTR at Blackwall Tunnel is significantly worse than average.
	Amber alert	-3%	-3%	-3%	-3%	-3%		-3%		
	Red alert	-6%	-6%	-6%	-6%	-6%		-6%		
Queues extending beyond a certain point	Amber alert - north side						16%			% of time queues extend beyond a predefined point on the highway network, based on current conditions. North side point = entry to waiting area, south side point = Woolwich Church Street.
	Red alert - north side						20%			
	Amber alert - south side						9%			
	Red alert - south side						13%			
Bus reliability (EWT)	Forecast EWT	EWT mean	EWT mean	EWT mean				EWT mean	EWT mean	Change from London-wide average, on the basis that currently bus reliability at Blackwall Tunnel is significantly worse than average.
	Amber alert	-2%	-2%	-2%				-2%	-2%	
	Red alert	-5%	-5%	-5%				-5%	-5%	
Road safety	Amber alert - SI	1-2	1-2	1-2						Absolute numbers of KSIs.
	Red alert - SI	>2	>2	>2						
	Amber alert - Fatal	>0	>0	>0						
	Red alert - Fatal	>1	>1	>1						
Junction performance	Forecast DoS							Tbc	Tbc	Change from baseline. Forecast change will be determined based on baseline conditions.
	Amber alert							Tbc	Tbc	
	Red alert							Tbc	Tbc	

Appendix F Potential mitigation measures

Potential mitigation measures, delivery mechanisms and impacts covered

Mitigation	Effect	Delivery	To address these impacts:			
			Traffic	AQ	Noise	Other
Variation of the user charge	Varying the user charge can be used as a tool to manage traffic demand on the network. An effective charge ensures efficient flow of traffic and reduced adverse environmental impacts.	TfL would administer this through the Charging Policy and Procedures document (CPAP)	✓	✓	✓	
Changes to charging regime for particular groups	The user charge can be varied for specific vehicle types or users.	TfL would administer this through the Charging Policy and Procedures document (CPAP)	✓	✓	✓	✓
Discount on user charge for low income users	Reduce the cost of the user charge and therefore increase the net-benefits for low income users	TfL would administer this through the Charging Policy and Procedures document (CPAP)				✓
Introduction or alteration of emissions based charging	To encourage the cleanest vehicles and/or discourage the dirtiest vehicles	TfL would administer this through the Charging Policy and Procedures document (CPAP)		✓		

Mitigation	Effect	Delivery	To address these impacts:			
			Traffic	AQ	Noise	Other
Introduction of a user charge at adjacent crossings	A user charge could be introduced at adjacent river crossings. This would provide a mechanism for managing demand at other river crossings.	TfL would administer this through its existing powers under section 295 of, and Schedule 23 to, the Greater London Authority Act 1999. In the case of the Woolwich Ferry it would be necessary to repeal or amend the Metropolitan Board of Works Act 1885.	✓	✓	✓	

Mitigation	Effect	Delivery	To address these impacts:			
			Traffic	AQ	Noise	Other
Improvements to Woolwich Ferry vehicle waiting areas, including potential reconfiguration	Improvements to the waiting areas could lead to more efficient utilisation of available space and reduce the likelihood of traffic queuing to use the service impacting on the local highway network	Within TfL's or the boroughs' remit where changes are implemented within the existing highway boundary. TfL has power to carry out works within or adjacent to a GLA road for the improvement or maintenance of the highway. The relevant borough has the same power in relation to any roads for which it is the highway authority.	✓			
New or enhanced bus routes	Adjusted/implemented routes can re-route bus traffic in a more efficient manner, and relieve noise and AQ problem spots	This would be delivered as per the approach set out in the Bus Strategy	✓	✓	✓	✓
Concessions on cross-river public transport	Discounts or exemptions on particular public transport routes could be applied to encourage mode shift and mitigate against potential socio-economic impacts of the user charge	TfL would administer this through the Charging Policy and Procedures document (CPAP) and the Bus Strategy				✓

Mitigation	Effect	Delivery	To address these impacts:			
			Traffic	AQ	Noise	Other
Use of low emission buses	Using low emission buses only to cross the river can help mitigate harmful AQ effects. This can be useful if traffic is in congested conditions.	This would be delivered as per the approach set out in the Bus Strategy		✓	✓	
Technology to encourage take up of low emission vehicles	To encourage the cleanest vehicles and/or discourage the dirtiest vehicles	Dependent on technology utilised		✓		
Change in existing signal timings to manage localised congestion, air quality and/or noise impacts.	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. Changes in signal timings can also serve to reduce severance and improve crossing opportunities for pedestrians and cyclists.	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.	✓	✓	✓	

Mitigation	Effect	Delivery	To address these impacts:			
			Traffic	AQ	Noise	Other
Introduction of new signals to manage localised congestion, air quality and/or noise impacts.	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. The introduction of new signals can also serve to reduce severance and improve crossing opportunities for pedestrians and cyclists.	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.	✓	✓	✓	
Minor junction or geometry changes to manage localised congestion, air quality and/or noise impacts.	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. Such changes can also serve to improve road safety at those locations and to reduce severance for pedestrians and cyclists.	Within TfL's or the boroughs' remit where changes are implemented within the existing highway boundary. TfL has power to carry out works within or adjacent to a GLA road for the improvement or maintenance of the highway. The relevant borough has the same power in relation to any roads for which it is the highway authority.	✓	✓	✓	

Mitigation	Effect	Delivery	To address these impacts:			
			Traffic	AQ	Noise	Other
Traffic management measures to manage localised congestion, air quality and/or noise impacts.	To control and restrict traffic by direction, time of day and/or vehicle class/type to mitigate localised environmental impacts.	TfL's or the boroughs' existing powers under the Road Traffic Regulation Act 1984.	✓	✓	✓	
Priority measures for different user groups e.g. bus lanes to manage localised congestion, air quality and/or noise impacts.	To improve journey times for particular user groups to ensure they are not adversely affected.	TfL's or the boroughs' existing powers under the Road Traffic Regulation Act 1984.	✓	✓	✓	
Adjust speed limits to manage localised congestion, air quality and/or noise impacts.	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. Adjusting speed limits can also serve to improve road safety.	TfL's or the boroughs' existing powers under the Road Traffic Regulation Act 1984.	✓	✓	✓	

Mitigation	Effect	Delivery	To address these impacts:			
			Traffic	AQ	Noise	Other
Pedestrian (and cyclist) crossings to reduce severance and/or improve road safety.	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.	TfL has power to carry out works within or adjacent to a GLA road for the improvement or maintenance of the highway. The relevant borough has the same power in relation to any roads for which it is the highway authority.				✓
HGV bans to manage localised congestion, air quality and/or noise impacts.	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.	TfL's or the boroughs' existing powers under the Road Traffic Regulation Act 1984.	✓	✓	✓	
Noise barriers to manage localised noise impacts.	Noise barriers can be effective in reducing the impact of traffic noise on receptors.	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 borough has the same power in relation to any roads for which it is the highway authority.			✓	

Mitigation	Effect	Delivery	To address these impacts:			
			Traffic	AQ	Noise	Other
Low noise surfacing to manage localised noise impacts.	Low noise surfacing can be effective in reducing the impact of traffic noise on receptors.	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 borough has the same power in relation to any roads for which it is the highway authority.			✓	
Business Transition Scheme	Help businesses to plan their movements in the most cost-efficient way and to act as a potential brokerage service for new opportunities	TfL would fund the Scheme, elements of which would be administered by boroughs				✓
Funding local-led business/labour market support	Concessions can be given for local residents, workers, and businesses for crossing the river.					✓
Freight and servicing management in local centres	Local coordination of freight and servicing trips can help to reduce the number of these trips on the local network.		✓	✓		✓

Mitigation	Effect	Delivery	To address these impacts:			
			Traffic	AQ	Noise	Other
Engagement with schools	Work with schools to raise awareness about air pollution and the measures that can be taken to reduce emissions e.g. Supporting schools to implement travel plans.			✓		✓
Public realm improvements, including improvements to facilities for pedestrians and cyclists	Public realm improvements to improve conditions for road users including pedestrians and cyclists.	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 borough has the same power in relation to any roads for which it is the highway authority.		✓	✓	✓
Designate Air Quality focus / management areas	Liaison with communities can help identify areas to be safeguarded and maintained as cleaner air spaces.			✓		✓

Mitigation	Effect	Delivery	To address these impacts:			
			Traffic	AQ	Noise	Other
Controlled parking zones and parking management	Better control of on-street parking, which can help to improve network performance and conditions for pedestrians and cyclists	TfL's or the boroughs' existing powers under the Road Traffic Regulation Act 1984.	✓			✓
Improvements to signage and wayfinding	Improved signage could help to improve network performance and aid wayfinding by road users	TfL's or the boroughs' existing powers under the Road Traffic Regulation Act 1984.	✓			
Measures to encourage mode shift from private vehicles to public transport, walking and cycling, for example improvements to pedestrian and cyclist facilities, travel planning and associated measures	Increased take up of sustainable and active travel in local areas impacted by the Scheme, potentially to offset residual impacts not addressed by other measures	Delivered by boroughs or TfL under existing powers	✓	✓	✓	✓

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