national highways

Lower Thames Crossing

9.15 Localised Traffic Modelling Appendix C – Orsett Cock Forecasting report (Clean version)

Infrastructure Planning (Examination Procedure) Rules 2010

Volume 9

DATE: November 2023
DEADLINE: 6A

Planning Inspectorate Scheme Ref: TR010032
Examination Document Ref: TR010032/EXAM/9.15

VERSION: 3.0

Revision history

Version	Date	Submitted
1.0	18 July 2023	Deadline 1
2.0	31 October 2023	Deadline 6
3.0	14 November 2023	Deadline 6A

Lower Thames Crossing

9.15 Localised Traffic Modelling
Appendix C – Orsett Cock Forecasting report
(Clean version)

List of contents

Page number

List of plates

Page number

List of tables

Page number

1 Introduction

1.1 Purpose of document

1.1.1 The purpose of this document is to present the findings from the traffic operation appraisal undertaken of the network in vicinity of the Orsett Cock junction including the A13/A1089 and the A1013 Stanford Road/Rectory Road junction.

1.1.2 A version and run ID log is contained within Annex A. This sets out changes made to the model. This version of the forecasting report presents the forecasts based on version 3 of the model (Run ID 3.6).

1.1.3 Annex B provides the results of two sensitivity tests undertaken at the Orsett Cock junction based on the version 3 VISSIM forecast model Core Scenario (run ID 3.6).

1.2 Modelling software

1.2.1 Road traffic micro-simulation models represent individual vehicles travelling within the road network, providing realistic driver behaviour such as lane changing and overtaking. The micro-simulation software selected for the Lower Thames Crossing is VISSIM. The model has been developed in VISSIM version 2020 (SP13).

1.3 The Project

1.3.1 The A122 Lower Thames Crossing (the Project) would provide a connection between the A2 and M2 in Kent, south-east of Gravesend, crossing under the River Thames through a tunnel, before joining the M25 south of junction 29. The Project route is presented in Plate 1.1.

1.3.2 The A122 would be approximately 23km long, 4.25km of which would be in tunnel. On the south side of the River Thames, the Project route would link the tunnel to the A2 and M2. On the north side, it would link to the A13, M25 junction 29 and the M25 south of junction 29. The tunnel entrances would be located to the east of the village of Chalk on the south of the River Thames and to the west of East Tilbury on the north side.

1.3.3 Junctions are proposed at the following locations:

a. New junction with the A2 to the south-east of Gravesend

b. Modified junction with the A13/A1089 in Thurrock

c. New junction with the M25 between junctions 29 and 30

1.3.4 To align with NPSNN policy and to help the Project meet the Scheme Objectives, it is proposed that road user charges would be levied in line with the Dartford Crossing. Vehicles would be charged for using the new tunnel.

1.3.5 The Project route would be three lanes in both directions, except for:

a. link roads

b. stretches of the carriageway through junctions

c. the southbound carriageway from the M25 to the junction with the A13/A1089, which would be two lanes

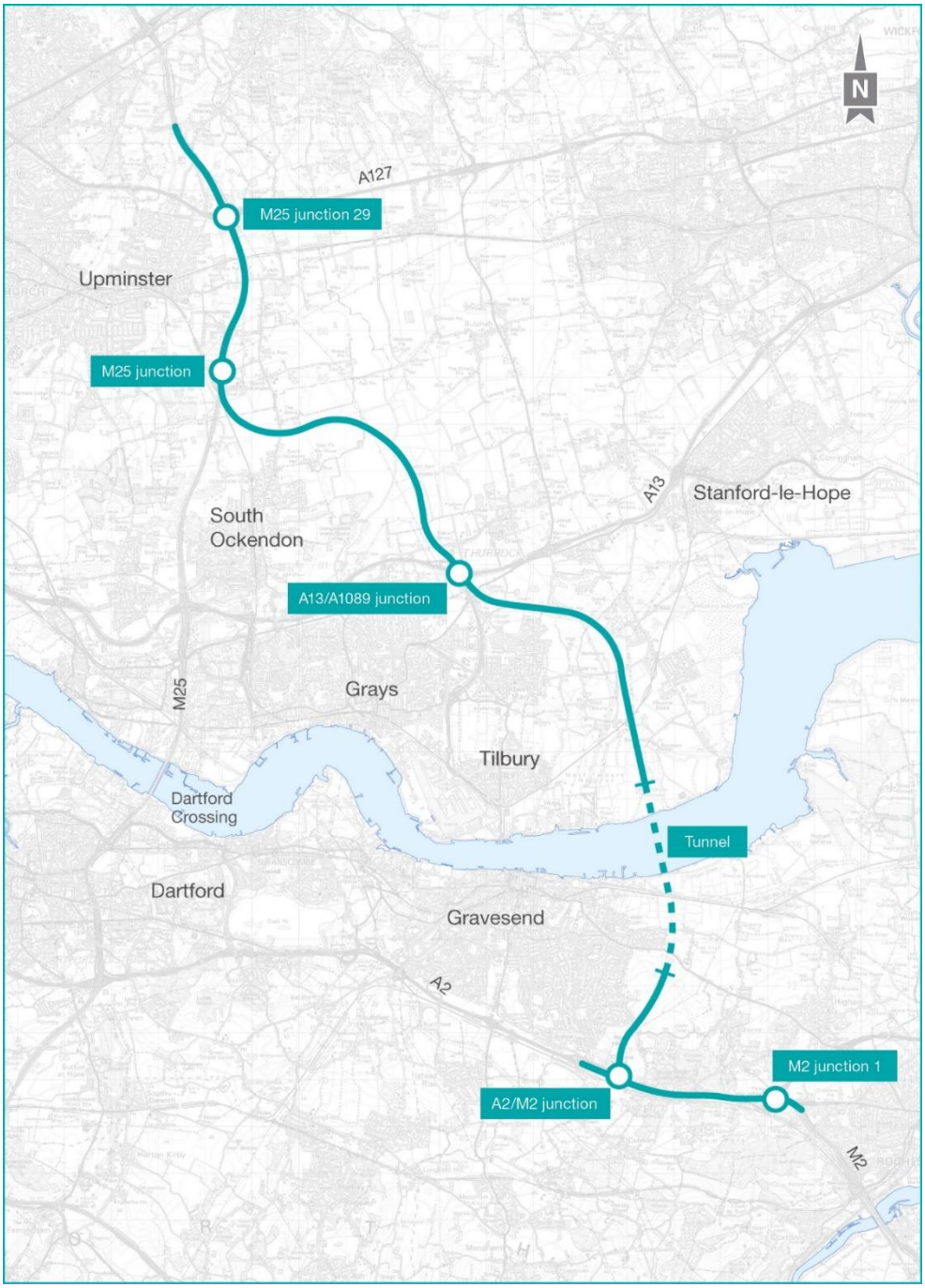
1.3.6 In common with most A-roads, the A122 would operate with no hard shoulder but would feature a 1m hard strip on either side of the carriageway. It would also feature technology including stopped vehicle and incident detection, lane control, variable speed limits and electronic signage and signalling. The A122 design outside of the tunnel would include emergency areas. The tunnel would include a range of enhanced systems and response measures instead of emergency areas.

1.3.7 The A122 would be classified as an ‘all-purpose trunk road’ with green signs. For safety reasons, walkers, cyclists, horse-riders and slow-moving vehicles would be prohibited from using it.

1.3.8 The Project would include adjustment to a number of local roads. There would also be changes to a number of public rights of way, used by walkers, cyclists and horse riders. Construction of the Project would also require the installation and diversion of a number of utilities, including gas mains, overhead electricity powerlines and underground electricity cables, as well as water supplies and telecommunications assets and associated infrastructure.

1.3.9 The Project has been developed to avoid or minimise significant effects on the environment. Some of the measures adopted include landscaping, noise mitigation, green bridges, floodplain compensation, new areas of ecological habitat and two new parks.

Plate 1.1 Lower Thames Crossing route



2 Modelling scope

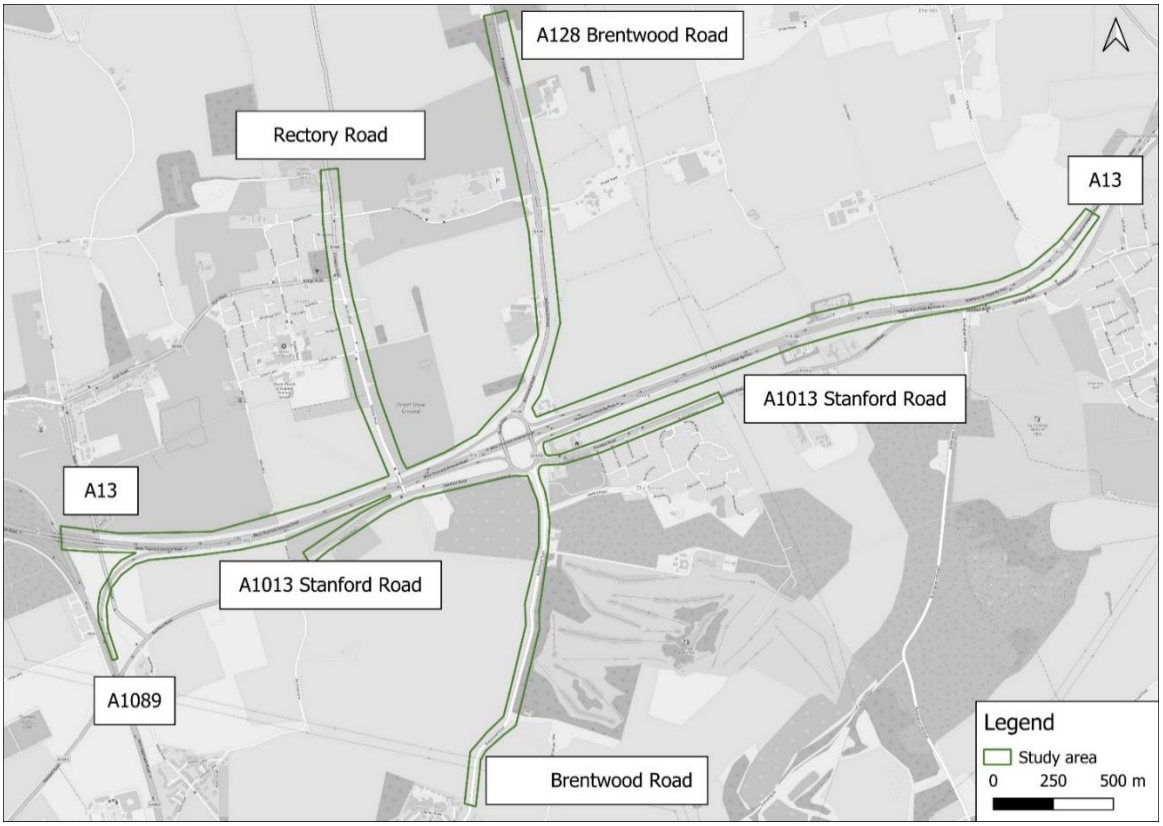
2.1.1 The traffic operation study area, modelling years and time periods were defined based on discussion and agreement with Thurrock Council and their consultants during a workshop on 14 December 2021. Further information is set out in Localised Traffic Modelling Appendix B – Orsett Cock LMVR [**REP1-188**], which describes the development of the 2016 base year VISSIM model.

2.1.2 The study area is located to the north-east of Grays and Plate 2.1 shows the extent of the study area covered by the VISSIM model. The section of the A13 in this area and the Orsett Cock junction recently had construction works completed as part of the A13 Widening Scheme between the Orsett Cock and the Manorway junctions, undertaken by Thurrock Council.

2.1.3 The Orsett Cock junction in 2016 was an unsignalised, grade-separated roundabout with two circulatory lanes. The A13 had three lanes in each direction west of the junction and two lanes east of the junction. The area of interest also extends to the westbound diverge from the A13 onto the A1089 in order to capture the anticipated changes proposed around the A13/ A1089 interchange in the Project.

2.1.4 The model also includes the A1013 Stanford Road/ Rectory Road unsignalised T-junction, located just to the west of the Orsett Cock junction.

Plate 2.1 Traffic operations study area



2.1.5 The VISSIM base year model was developed to reflect the road network and traffic condition in 2016, before the construction work commenced. Accordingly, a Local Model Validation Report (LMVR) was issued in June 2022 explaining how the base year model was developed and validated for two time periods, namely:

a. AM Peak Period (07:00 - 09:00) to capture the peak hour for the A13 and strategic road network (07:00–08:00) and the peak hour of the junction and local roads (08:00–09:00); and

b. PM Peak Period (17:00 - 18:00).

2.1.6 Following this, Do Minimum (DM) models representing forecast years 2030 and 2045 without the Project and 2030 and 2045 Do Something (DS) models with the Project were developed.

2.1.7 This report explains how the DM and DS models were developed and compares results from the 2030 and 2045 DS models with the results of the 2030 and 2045 DM models to aid understanding of how network operating conditions are forecast to change from the DM without the Project, to the DS with the Project.

3 2030 and 2045 model development and forecasting

3.1 Introduction

3.1.1 This section describes the development of the 2030 and 2045 DM and DS VISSIM models in terms of:

a. Network development

b. Forecast traffic demand

c. Traffic signal optimisation

d. Model calibration

e. Initial visual observation

f. Interim improvements in the DS scenario

3.1.2 A version and run ID log is contained within Annex A. This sets out changes made to the model. This version of the forecasting report presents the forecasts based on version 3 of the model (Run ID 3.6).

3.2 Network development – Do Minimum

3.2.1 The 2030 and 2045 DM scenarios have the same network. The DM network was developed from the 2016 base year network by incorporating the A13 widening scheme between the Orsett Cock and Manorway junctions. This scheme was recently completed by Thurrock Council.

3.2.2 The principal network changes between the 2016 base year and the DM were:

a. Introduction of an extra lane in both directions on the A13 east of the Orsett Cock junction.

b. Reconfiguration of the merges and diverges at the Orsett Cock junction with the A13 in both directions.

c. Reconfiguration of the westbound on-slip to the A13 West with the slip road reduced to one lane.

d. Reconfiguration of the A128 North approach with an extra flare lane.

e. Reconfiguration of the A13 West approach (eastbound off-slip) with an extra flare lane.

f. Introduction of an extra lane in the circulatory.

g. Introduction of controlled pedestrian crossings and traffic signals on the A13 West and A13 East approaches.

3.2.3 Additionally, in the VISSIM model, the links for A128 Brentwood Road (north), Brentwood Road (south), A13 (east), and Rectory Road have been extended to capture the entire length of the possible queues.

3.3 Network development – Do Something

3.3.1 The DS network was developed from the DM network by incorporating the highway design as per the DCO application within the traffic operations study area for Orsett Cock. The principal network changes between the DM and DS models were:

a. Introduction of new Project links around the A13/ A1089 interchange.

b. Reconfiguration of A13/ A1089 interchange.

c. Reconfiguration of slip roads on the A13 west of the Orsett Cock junction.

d. Realignment of A1013 (West) Stanford Road.

e. Introduction of traffic signals on the A128 North and Brentwood Road (South) approaches at Orsett Cock.

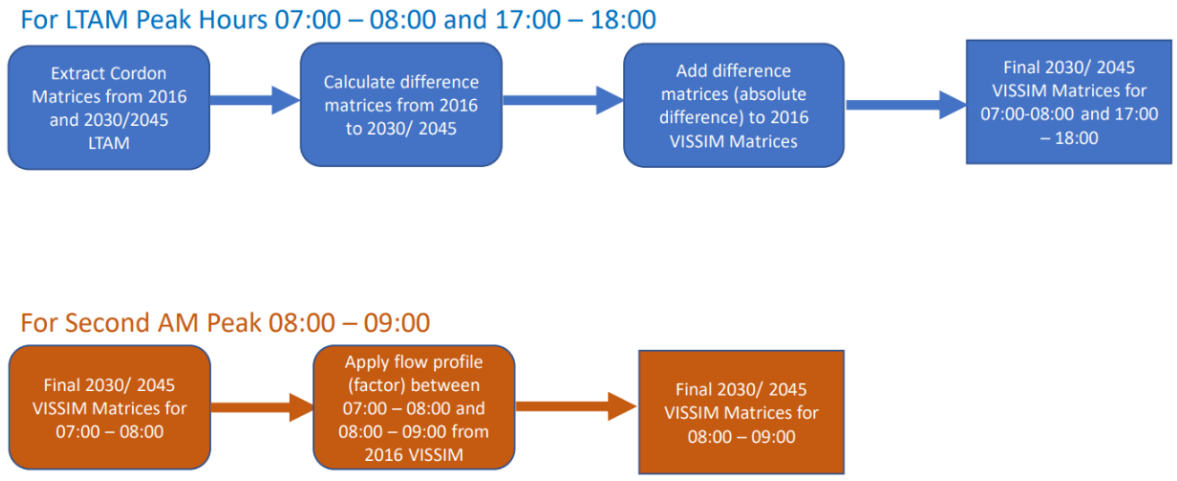
f. Reconfiguration of the A1013/ Rectory Road junction.

3.3.2 The network coding for both DM and DS networks were undertaken using highway design drawings. For the DM network drawings of the A13 widening scheme were provided by Thurrock Council, and for the DS network the design of the Project used drawings submitted in the DCO application.

3.4 Forecast traffic demand

3.4.1 The forecast traffic demand matrices for each vehicle type in VISSIM were calculated as shown in Plate 3.1 and described in detail in subsequent sections.

Plate 3.1 Forecast Traffic Demand Calculation for VISSIM



3.4.2 The 2030 and 2045 DM forecast traffic demand in VISSIM was determined by examining the differences in forecast traffic flows (for model zones) predicted by the 2016 base year and 2030/2045 DM Lower Thames Area Model (LTAM) – the Project's transport model (CM49) models for the available hours of 07:00 – 08:00 in the AM peak and 17:00 – 18:00 in the PM peak.

3.4.3 The absolute differences in flows between these models were identified and then applied to the 2016 base year VISSIM model to develop the 2030/2045 DM matrices. This was undertaken on the basis of origin-destination matrices so applying a matrix of 'flow differences' to the 2016 Base Year matrix to create the 2030 and 2045 DM matrix.

3.4.4 Where applying absolute differences resulted in negative values, the percentage difference was used instead of the absolute difference. This was the case for the origin – destination pairs for which the LTAM forecast indicated negative growth. If the 2016 base year flows in VISSIM were lower than the LTAM base flows, applying this negative flow difference would lead in some instances to a negative number, therefore it was preferred to use percentage difference instead where this occurred.

3.4.5 For the second hour in the AM (08:00 – 09:00), which is not available from the LTAM, the existing flow base year profile in VISSIM (derived from count data) was used to factor the 2030 and 2045 matrices from the 07:00 – 08:00 hour to the 08:00 – 09:00 hour.

3.4.6 The 2030 and 2045 hourly matrices were split into 15-minute intervals using the flow profiles from the base year VISSIM model. In summary, the comparison of the 2016 Base and 2030 DM traffic demands in Table 3.1 indicates that the overall traffic demand is forecast to increase by 30%-32% in the AM peak hours and 27% in the PM peak hour, whereas for 2045 DM traffic demand is forecast to increase by 41%-43% in the AM peak hours and 36% in the PM peak hour.

Table 3.1 Traffic volumes (vehicles) in study area by scenario

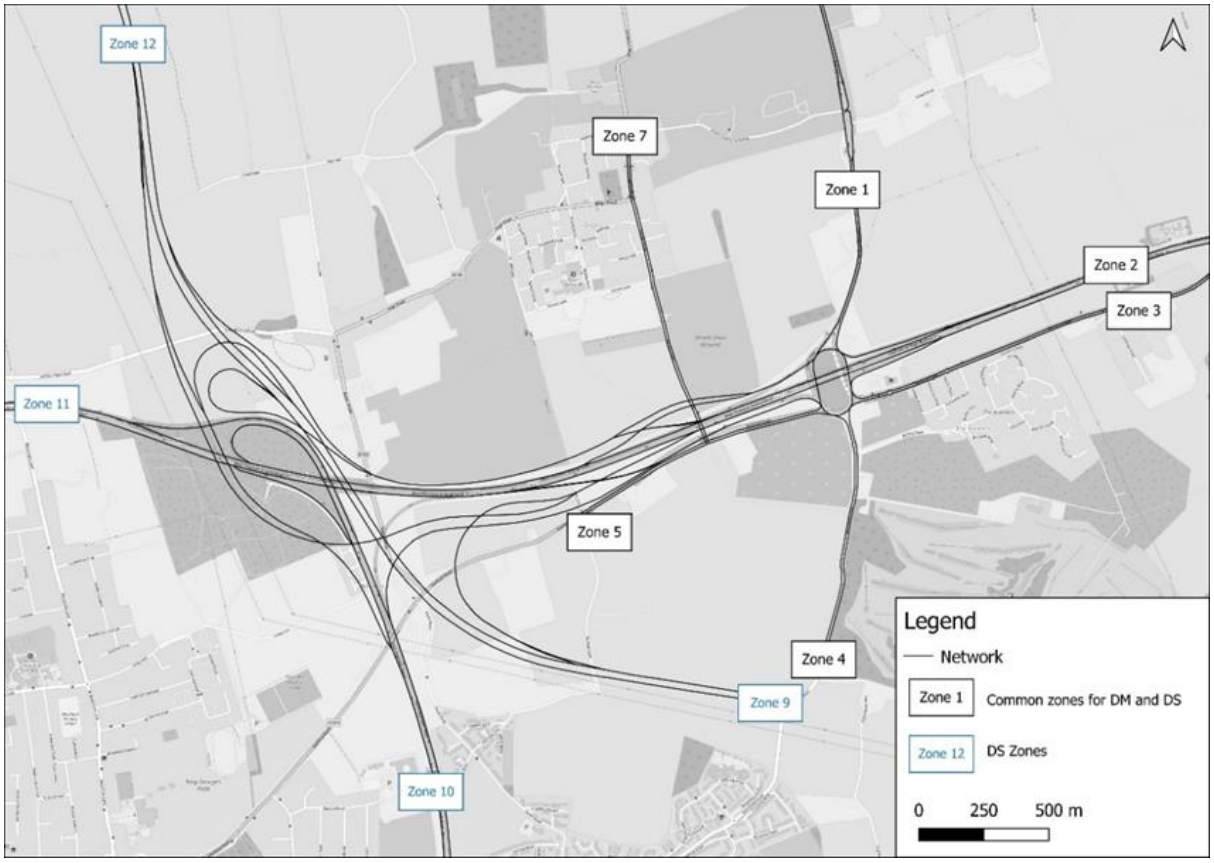
Peak	Vehicle Type	2016 Base	2030 DM	2030 DS		2045 DM	2045 DS	
				Project mainline flows*	Total *		Project mainline flows*	Total**
AM (07:00 – 08:00)	Car	6,698	8,876	1,818	14,731	9,602	2,091	16,148
	LGV	1,693	2,028	599	3,172	2,270	733	3,635
	HGV	739	1,010	630	2,357	1,035	628	2,374
	Total	**9,130**	**11,914**	**3,046**	**20,261**	**12,906**	**3,453**	**22,156**
AM (08:00 – 09:00)	Car	6,790	9,057	1,818	14,919	9,817	2,091	16,317
	LGV	1,247	1,485	599	2,631	1,675	733	3,021
	HGV	822	1,112	630	2,470	1,141	628	2,487
	Total	**8,859**	**11,653**	**3,046**	**20,020**	**12,633**	**3,453**	**21,825**
PM (17:00 – 18:00)	Car	8,172	10,201	1,787	17,410	10,915	1,978	18,911
	LGV	1,300	1,635	417	2,571	1,850	479	2,949
	HGV	386	654	541	1,719	659	517	1,714
	Total	**9,858**	**12,490**	**2,745**	**21,700**	**13,424**	**2,974**	**23,574**

*Note: * Project mainline flows are those that travel through the A13/A1089/A122 junction.*
*** Total DS traffic volumes include Project mainline flows.*

3.4.7 The 2030 and 2045 DS forecast traffic demand matrices in VISSIM were determined using the same method as the 2030 and 2045 DM, that is by examining the differences in forecast traffic flows from the LTAM for the 2016 base year and 2030/2045 DS (CS72).

3.4.8 There are new zones associated with the new traffic from the Project in the DS models. The new zones are shown in Plate 3.2. The traffic demand and the distributions for these zones were taken directly from the LTAM cordon matrices and added to the VISSIM matrices.

Plate 3.2 Do-Something model VISSIM zones



3.4.9 Similar to the 2030 and 2045 DM matrices, for the second hour in the AM (08:00 – 09:00) which is not available from the LTAM, flow matrices were derived using the existing base year flow profile between 07:00 – 08:00 and 08:00 – 09:00.

3.4.10 The DS hourly matrices were also split into 15-minute intervals using the existing flow profiles from the VISSIM base year model. In summary, the comparison of the 2030 DM and DS and 2045 DM and DS traffic demands in Table 3.1 indicates that the overall traffic demand in the study area increases by approximately 73% between the DM and DS scenarios in the AM and PM peak hours.

3.4.11 It should be noted that the DM versus DS is not a direct comparison for traffic demands at the Orsett Cock junction as the DS total volume includes the mainline traffic travelling north-south on the Project. For clarity the mainline traffic volumes on the Project have been shown separately in Table 3.1.

3.5 Public transport

3.5.1 Bus services and location of bus stops in the DM and DS models were assumed to remain consistent with those in the base year model.

3.6 Traffic signals optimisation

3.6.1 The operation of traffic signals in the 2030 and 2045 DM and DS network were initially optimised using LinSIG models and then further fine-tuned in VISSIM to reflect the small changes in demand and arrival pattern of vehicles in the 15-minute intervals.

3.6.2 A cycle time of 60 seconds was used in the DM and DS models.

3.7 DM and DS VISSIM model calibration

3.7.1 The network coding method and model parameters used in the DM and DS models were largely consistent with those calibrated in the base year model. However, due to changes of the network layout at the Orsett Cock junction, some parameters were adjusted in the DM and DS models to provide more realistic driving behaviours to reflect the new layout. These adjustments and the justifications for the changes are summarised below:

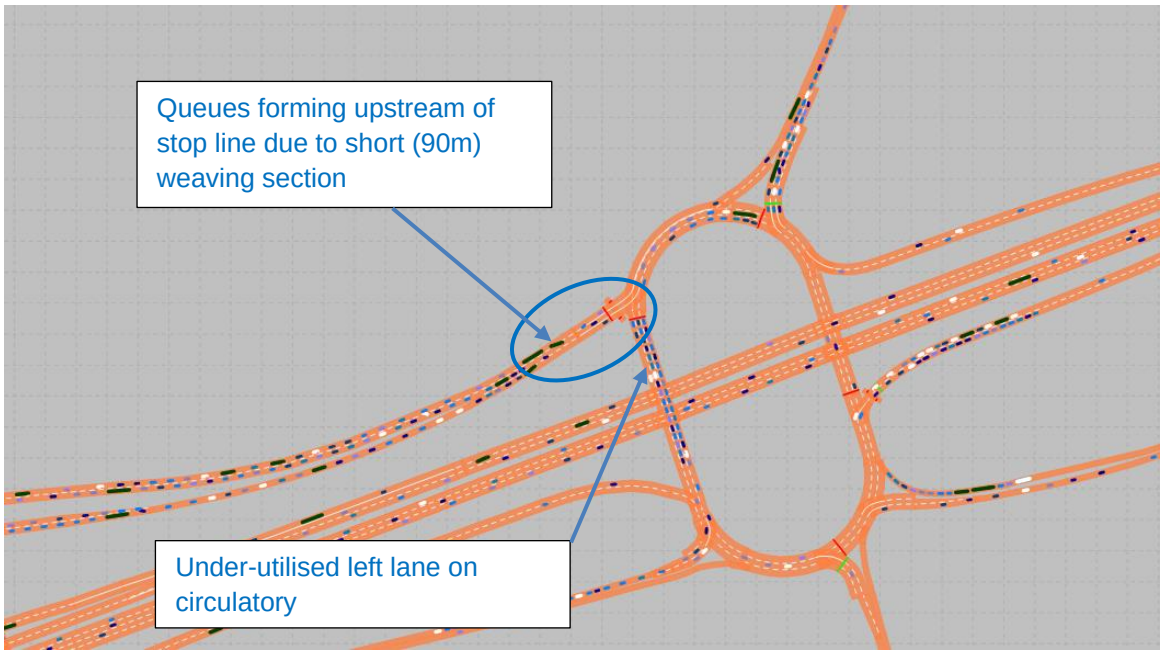
a. The speed distributions of the desired speed and reduced speed areas on the circulatory were reduced by 10% to reflect the new circulatory carriageway lane configuration in the DM and DS models, compared to the base model.

b. The circulatory has two lanes in the base model and most of the links use the standard “Urban (motorised)” link behaviour type, except for a short three-lane section just before the A1013 (W) exit which uses the “Urban (merge)” link type to allow smoother lane change behaviour, as there will be more lane changes and weaving in the three-lane section. Given the whole circulatory is widened to three lanes in the DM and DS models, all circulatory links in these models have been adjusted to use the “Urban (merge)” link type.

3.8 Initial visual observations

3.8.1 Visual observations during the simulation runs of the DS models indicated the traffic behaviour upstream of the traffic signals at the A13 west approach and its circulatory, were impacting the efficiency of these traffic signals. This is shown in Plate 3.3 and summarised below.

Plate 3.3 Traffic Behaviour at A13 West & Circulatory



Weaving on the A13 West approach

3.8.2 The section where traffic from the Project and the A13 would merge on the A13 west approach has a modelled length of 90m. The model results for the PM peak indicated that this merge length would need to be increased as a large number of vehicles from the Project need to be in the middle and right-hand lanes while much of the traffic from the A13 needs to use the middle and left-hand lanes for the A128 (N) exit. The short 90m merge length causes a bottleneck upstream of the stop line with queues predicted to extend to the A13 mainline. Extending the merge would provide more space for lane change and remove the bottleneck.

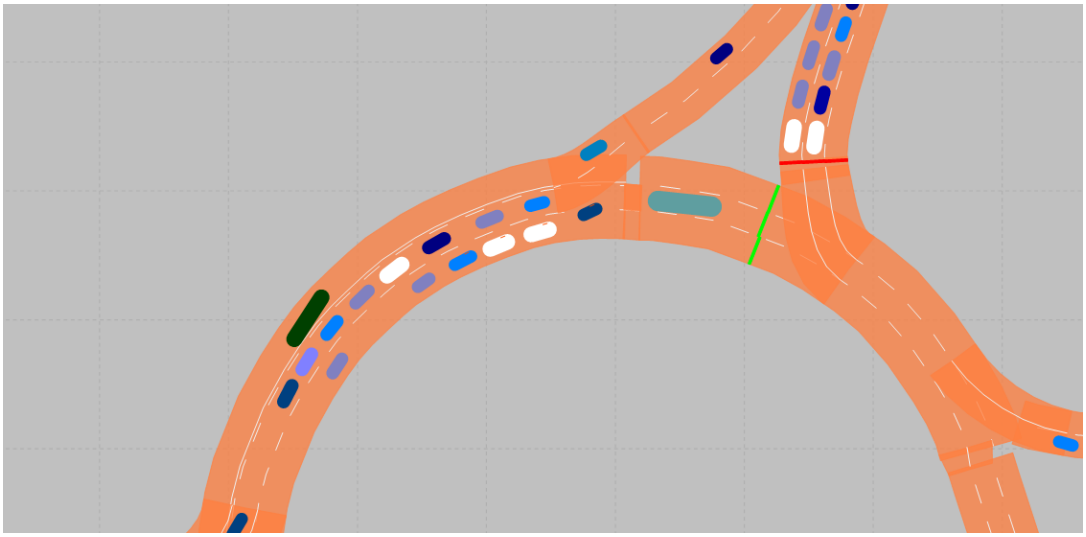
Under-utilised left lane on the western overbridge

3.8.3 The lane markings on the eastern overbridge are currently marked with the left lane dedicated for the A128 (N), middle lane for the A128 (N) & A13 (E) and right lane for the A13 (E) & A1013. The volume of traffic travelling from the circulatory to the A128 (N) is relatively low in comparison to other movements which resulted in the left lane being under-utilised.

Lane change at the northern circulatory

3.8.4 As shown in Plate 3.4, traffic travelling from the right-hand lane on the western overbridge needs to change to the middle lane for the A13 (E) exit. This causes delays upstream of the stop line.

Plate 3.4 Lane change in northern circulatory



3.9 Improvements for the DS Network

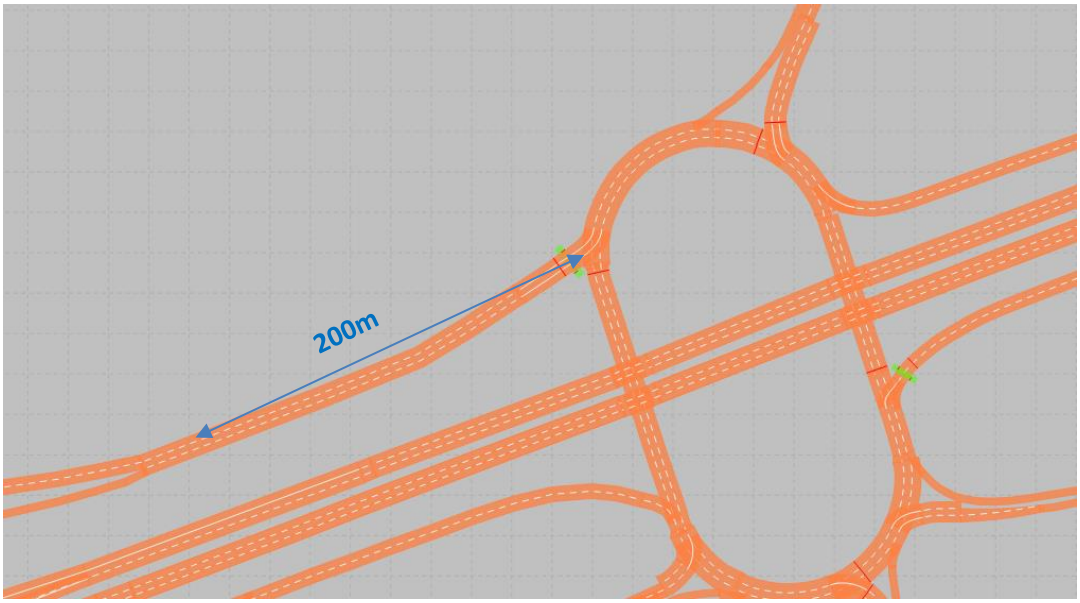
3.9.1 The changes described below have been implemented into the DS network in VISSIM as a provisional improvement. These are currently limited to changes on the slip roads connecting the Project to the A13 (W), and minor changes to the lane markings at the Orsett Cock junction.

3.9.2 The changes described below can be accommodated using the flexibility available within the draft DCO. Requirements for further improvements at the Orsett Cock junction would be determined following detailed design, stakeholder engagement and using the flexibility available within the draft DCO.

A13 West approach Improvement

3.9.3 The improved DS network increases the modelled length of the section where traffic from the Project and the A13 merges on the A13 west approach, from 90m to 200m as shown in Plate 3.5.

Plate 3.5 A13 West approach improvement



Modified lane markings at A128 (N) exit

3.9.4 The purpose of this modification is to achieve a more even spread in lane usage on the western overbridge and avoid traffic changing lanes in the northern circulatory for the A13 (E) exit. The modifications as shown in Plate 3.6 in red include the following changes:

a. A128 (N) exit reduced to one lane

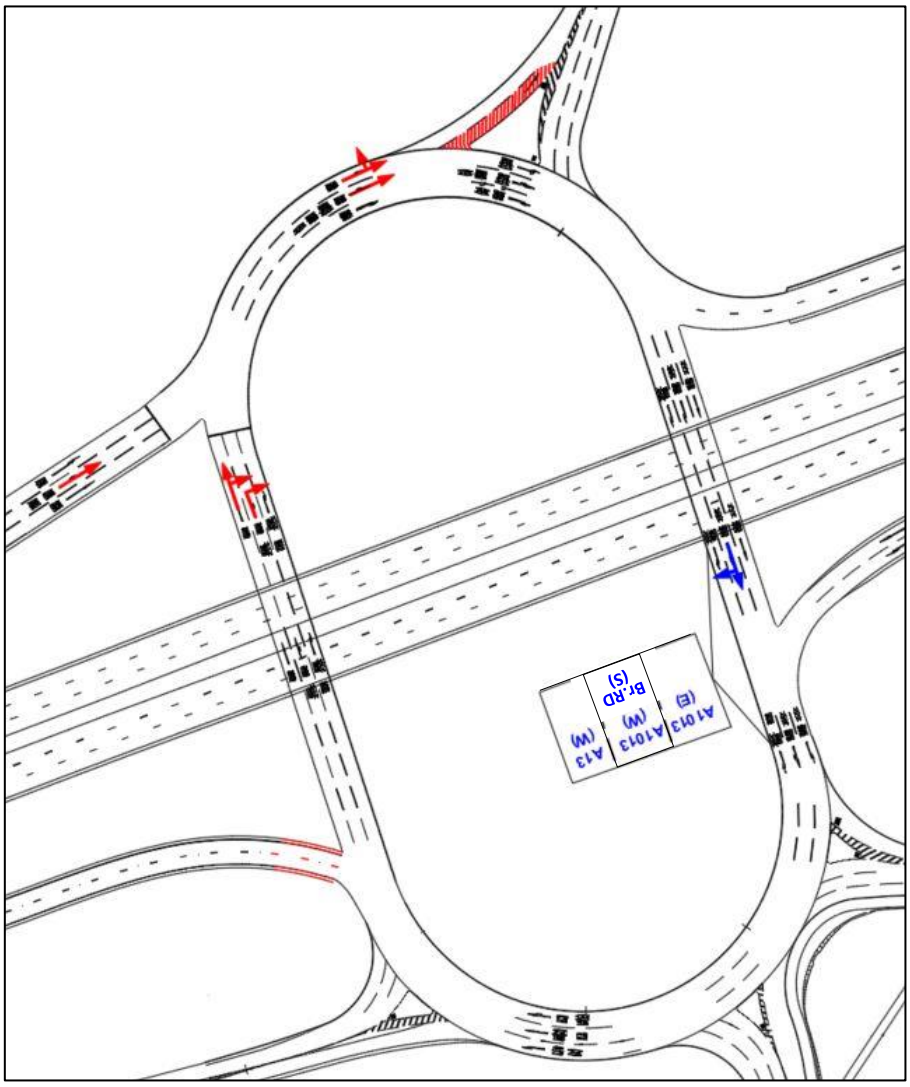
b. Allow traffic to use the left lane on the western overbridge for the A13 (E) exit

Modified lane markings at circulatory leading to Brentwood Road (South) exit

3.9.5 The purpose of this modification is to achieve a more even spread in lane usage and avoid traffic changing lanes in the eastern circulatory for the Brentwood Road (South) exit. The modifications as shown in Plate 3.6 in blue include the following changes:

a. Allow traffic to use the middle lane for the Brentwood Road (South) exit

Plate 3.6 Modified Lane Markings at Roundabout



Modified lane markings at A13 (W) exit

3.9.6 The westbound on-slip on the A13 West exit is one lane in the DM network. This has been modified to two lanes in the DS network so as to tie in with the Project's design which has two lanes on the slip road.

4 Traffic condition analysis

4.1 Introduction

4.1.1 This section compares the results of the 2030 and 2045 DM and DS VISSIM models in terms of the following traffic condition indicators:

a. Average delays per vehicle

b. Mean maximum queues and average queues

c. Predicted journey times

d. Relative delays on links

4.1.2 Both the AM and PM Do Something models used in this analysis include the improvements described in Section 3.9.

4.1.3 Consistent with the base year model validation, the results of the DM and DS models are the averages of the same 20 random seeds used in the base model.

4.2 Junctions traffic conditions

4.2.1 The predicted traffic conditions at the Orsett Cock and A1013/ Rectory Road junctions are shown in Table 4.1 to Table 4.3 for 2030 and Table 4.4 to Table 4.6 for 2045 and have been measured in terms of the total throughput flow in vehicles, average delay per vehicle and average queue length in metres for each hour within the AM and PM peak period.

4.2.2 The average delay per vehicle is calculated by taking the weighted average of the delay from all movements on each approach. It should be noted that for the Orsett Cock junction, the delays are measured for each vehicle completing the full movement from the entry to the exit, therefore including delays from the traffic signals on the circulatory.

4.2.3 Queues are presented in mean maximum queue lengths and average queue lengths. The mean maximum queues are calculated by taking the average of the maximum queue length in each five-minute interval. This is more reliable in comparison to taking the maximum queue length over a one-hour interval, where the maximum queue can sometimes be misleading as it may have occurred only for a very short time/ single time step during the simulation. Vehicles are defined to be in a queue when their headway and speed drops below 20 meters and 3.1mph respectively and exit the queue when their speed increases above 6.2mph.

2030 traffic conditions

4.2.4 Table 4.1 shows that the traffic conditions in the 2030 DM scenario on the A128 (N), A13 (E), A1013 (E) and A13 (W) approaches are predicted to be in free-flowing condition with short queues and delays during the 07:00 – 08:00 period.

Table 4.1 07:00 – 08:00 Traffic Conditions, 2030

		Flow [veh]			Avg. Delay per veh [s]			Mean Max. Queue [m] (Divide by 5.75m for queue in PCUs)			Average Queue [m] (Divide by 5.75m for queue in PCUs)		
Junction	**Approach**	**Base**	**DM**	**DS**	**2016 Base**	**2030 DM**	**2030 DS**	**2016 Base**	**2030 DM**	**2030 DS**	**2016 Base**	**2030 DM**	**2030 DS**
Orsett Cock	A128 Brentwood Rd (North)	632	713	639	15	44	80	37	31	67	5	4	27
	A13 (East)	676	940	805	26	30	52	37	61	56	6	15	17
	A1013 Stanford Rd (East)	655	663	651	49	27	61	114	38	88	48	8	40
	Brentwood Rd (South)	602	700	728	41	145	99	55	369	168	23	253	86
	A1013 Stanford Rd (West)	599	795	625	46	76	79	97	186	102	37	90	46
	A13 (West)	497	471	1,484	54	36	29	93	38	65	43	10	14
A1013 Stanford Road / Rectory Road	Rectory Rd	136	183	263	9	62	50	10	59	57	1	27	19
	Stanford Rd (East)	833	977	862	7	8	7	10	14	35	1	1	2
	Stanford Rd (West)	557	725	565	3	4	3	-	-	-	-	-	-

4.2.5 Delays on the Brentwood Road (S) and A1013 Stanford Road (West) approaches respectively, are forecast to increase in the 2030 DM scenario compared to 2016, with queues on the Brentwood Road (S) extending past the entrance of the Orsett Golf Club.

4.2.6 Delays at the Orsett Cock junction are forecast to remain similar or slightly increase on most of the approaches in the 2030 DS scenario compared to the 2030 DM scenario. However, the predicted queues on all approaches can be accommodated within the available safe storage space.

4.2.7 The greatest forecast increase in delay in the 2030 DS scenario would be on the A128 Brentwood Road (N). This approach is signalised in the DS scenario and has short green times in order to prioritise the circulatory to minimise queueing on the circulating carriageway due to the short storage space available.

4.2.8 Delays and queues are forecast to decrease on the Brentwood Road (South) approach in the 2030 DS scenario compared to the 2030 DM scenario.

4.2.9 The delay on the A1013 Stanford Road (W) approach is forecast to increase, but the respective queues are predicted to be shorter in the 2030 DS scenario compared to 2030 DM scenario. This is because vehicles on the approach wait longer to enter the roundabout in the 2030 DS scenario but there are less traffic joining the back of the queue as demand flow on the approach is lower in the 2030 DS scenario compared to 2030 DM.

4.2.10 At the A1013 Stanford Road/ Rectory Road junction, traffic conditions remain free-flowing in the 2030 DM scenario. There would be small increases in queues on Stanford Road (E) in the 2030 DS scenario. The increase in queues on Stanford Road (E) is due to the removal of the right turn pocket resulting in right turning vehicles blocking the ahead traffic.

Table 4.2 08:00 – 09:00 Traffic Conditions, 2030

		Flow [veh]			Avg. Delay per veh [s]			Mean Max. Queue [m] (Divide by 5.75m for queue in PCUs)			Average Queue [m] (Divide by 5.75m for queue in PCUs)		
Junction	**Approach**	**Base**	**DM**	**DS**	**2016 Base**	**2030 DM**	**2030 DS**	**2016 Base**	**2030 DM**	**2030 DS**	**2016 Base**	**2030 DM**	**2030 DS**
Orsett Cock	A128 Brentwood Rd (North)	695	801	725	25	49	81	51	39	75	17	6	30
	A13 (East)	788	897	770	40	30	54	47	59	58	19	13	19
	A1013 Stanford Rd (East)	637	618	648	96	25	73	153	34	94	108	6	41
	Brentwood Rd (South)	610	809	807	216	601	142	127	1,405	272	133	1,314	173
	A1013 Stanford Rd (West)	722	848	762	59	171	228	109	670	580	49	547	459
	A13 (West)	506	473	1,537	60	36	32	85	38	70	34	10	17
A1013 Stanford Road / Rectory Road	Rectory Rd	205	203	369	11	1,029	494	13	698	533	2	640	456
	Stanford Rd (East)	1,141	985	873	8	10	10	13	27	62	1	4	7
	Stanford Rd (West)	620	802	624	3	85	64	-	-	-	-	-	-

4.2.11 Table 4.2 shows that in the 2030 DM 08:00 – 09:00 period, the traffic conditions on the A128 (N), A13 (E), A1013 (E) and A13 (W) approaches are forecast to be similar to the 07:00 – 08:00 period and are predicted to be in free-flowing condition with delays of less than 50 seconds.

4.2.12 Both the Brentwood Road (S) and A1013 Stanford Road (W) approaches are forecast to be over saturated in the 2030 DM scenario with long queues. The queue on the Brentwood Road (S) approach is predicted to extend past the Orsett Golf Club and the queue on the A1013 (W) approach is predicted to extend past Rectory Road.

4.2.13 Similar to the 07:00 – 08:00 period, there are forecast to be increased delays on most approaches at the Orsett Cock junction in the 2030 DS scenario compared to the 2030 DM scenario. The predicted queues on most approaches can be accommodated within the available safe storage space, except for the A1013 Stanford Road (W) approach where the queue extend past Rectory Road.

4.2.14 Traffic delays would decrease most on the Brentwood Road (S) in the 2030 DS scenario compared to the DM scenario with delays decreasing by 459s and the mean maximum queue decreasing by 1,133m.

4.2.15 Traffic delays decrease on the Brentwood Road (S) approach as a result of the implementation of the traffic signals and lower demand flow in the DS scenario.

4.2.16 The A1013 Stanford Road (W) approach is forecast to remain over saturated in the 2030 DS scenario. Delays per vehicle are predicted to increase compared to the 2030 DM scenario, but the respective queues are shorter in the 2030 DS scenario compared to 2030 DM scenario due to lower demand in 2030 DS.

4.2.17 At the A1013 Stanford Road/ Rectory Road junction, delays and queueing are forecast to increase in both the 2030 DM and DS scenarios compared to the 2016 base year. Rectory Road is saturated with long queues in both scenarios, but delays and queues are smaller in 2030 DS comparing to 2030 DM due to less opposing traffic on Stanford Road.

Table 4.3 17:00 – 18:00 Traffic Conditions, 2030

		Flow [veh]			Avg. Delay per veh [s]			Mean Max. Queue [m] (Divide by 5.75m for queue in PCUs)			Average Queue [m] (Divide by 5.75m for queue in PCUs)		
Junction	**Approach**	**Base**	**DM**	**DS**	**2016 Base**	**2030 DM**	**2030 DS**	**2016 Base**	**2030 DM**	**2030 DS**	**2016 Base**	**2030 DM**	**2030 DS**
Orsett Cock	A128 Brentwood Rd (North)	854	940	824	54	109	74	88	270	68	40	164	25
	A13 (East)	442	888	553	69	74	330	87	112	217	51	65	189
	A1013 Stanford Rd (East)	501	588	520	24	51	112	34	56	112	5	20	59
	Brentwood Rd (South)	410	494	509	13	66	91	19	55	49	2	18	17
	A1013 Stanford Rd (West)	988	1,043	913	30	50	97	135	78	74	38	18	22
	A13 (West)	805	772	2,159	205	39	137	467	39	672	389	10	503
A1013 Stanford Road / Rectory Road	Rectory Rd	311	316	347	21	260	81	33	212	96	7	162	43
	Stanford Rd (East)	680	931	886	6	9	10	10	22	56	1	3	6
	Stanford Rd (West)	855	1,035	896	4	6	4	-	-	-	-	-	-

4.2.18 In the PM peak, traffic conditions on the A128 Brentwood Road (North) arm are forecast to be over saturated in the 2030 DM scenario with delays and queues increasing when compared to the 2016 base scenario.

4.2.19 In the 2030 DS scenario, the Orsett Cock junction is also predicted to be over-saturated in the PM peak with longer delays and queues on the A13 (E), A1013 (E) and A13 (W) approaches.

4.2.20 Traffic conditions on the A128 Brentwood Road (North) improve in 2030 DS due to the traffic signals.

4.2.21 At the A1013 Stanford Road/ Rectory Road junction, delays and queues on Rectory Road increase in both the 2030 DM and 2030 DS scenarios compared to the base year. Demand flows on Rectory Road are similar in the DM and DS scenarios but delays and queues are lower in the 2030 DS scenario compared to 2030 DM due to less opposing traffic on Stanford Road.

4.2.22 The queues on Stanford Road (E) also increase in the 2030 DS scenario due to the removal of the right turn pocket resulting in right turning vehicles blocking the ahead traffic.

2045 traffic conditions

4.2.23 At the Orsett Cock junction, Table 4.4 shows that the traffic conditions in the 2045 DM scenario on the A128 (N), A13 (E), A1013 (E) and A13 (W) approaches are predicted to be in free-flowing condition with short delays and queues during the 07:00 – 08:00 period.

Table 4.4 07:00 – 08:00 Traffic Conditions, 2045

		Flow [veh]			Avg. Delay per veh [s]			Mean Max. Queue [m] (Divide by 5.75m for queue in PCUs)			Average Queue [m] (Divide by 5.75m for queue in PCUs)		
Junction	**Approach**	**Base**	**DM**	**DS**	**2016 Base**	**2045 DM**	**2045 DS**	**2016 Base**	**2045 DM**	**2045 DS**	**2016 Base**	**2045 DM**	**2045 DS**
Orsett Cock	A128 Brentwood Rd (North)	632	817	630	15	52	145	37	39	205	5	6	131
	A13 (East)	676	981	732	26	33	53	37	64	52	6	15	15
	A1013 Stanford Rd (East)	655	805	608	49	47	148	114	83	258	48	32	188
	Brentwood Rd (South)	602	524	918	41	323	137	55	635	435	23	532	290
	A1013 Stanford Rd (West)	599	770	548	46	173	118	97	532	162	37	403	98
	A13 (West)	497	512	1,893	54	39	35	93	39	85	43	10	21
A1013 Stanford Road / Rectory Road	Rectory Rd	136	138	249	9	207	49	10	192	53	1	143	18
	Stanford Rd (East)	833	1,002	823	7	16	7	10	75	38	1	31	2
	Stanford Rd (West)	557	800	577	3	63	5	-	-	-	-	-	-

4.2.24 Delays on the Brentwood Road (S) and A1013 Stanford Road (West) approaches respectively, are forecast to increase in the 2045 DM scenario compared to 2016, with queues on Brentwood Road (S) extending past the entrance of the Orsett Golf Club and queues on A1013 Stanford Road (West) extend past Rectory Road.

4.2.25 Delays at the Orsett Cock junction are forecast to increase on the A128 (N), A13 (E) and A1013 (E) approaches in the 2045 DS scenario compared to the 2045 DM scenario.

4.2.26 Traffic conditions on the Brentwood Road (South) arm improve in 2045 DS due to the traffic signals.

4.2.27 The decrease in delays on the A1013 Stanford Road (West) approach in 2045 DS is due to the lower flow.

4.2.28 At the A1013 Stanford Road/ Rectory Road junction, traffic conditions improve in the 2045 DS scenario with shorter delays and queues on all three approaches.

Table 4.5 08:00 – 09:00 Traffic Condition, 2045

		Flow [veh]			Avg. Delay per veh [s]			Mean Max. Queue [m] (Divide by 5.75m for queue in PCUs)			Average Queue [m] (Divide by 5.75m for queue in PCUs)		
Junction	**Approach**	**Base**	**DM**	**DS**	**2016 Base**	**2045 DM**	**2045 DS**	**2016 Base**	**2045 DM**	**2045 DS**	**2016 Base**	**2045 DM**	**2045 DS**
Orsett Cock	A128 Brentwood Rd (North)	695	915	750	25	57	417	51	47	961	17	9	835
	A13 (East)	788	940	696	40	33	55	47	61	51	19	15	16
	A1013 Stanford Rd (East)	637	769	679	96	54	357	153	105	605	108	51	517
	Brentwood Rd (South)	610	576	886	216	1,154	445	127	1,443	1,364	133	1,409	1,296
	A1013 Stanford Rd (West)	722	812	637	59	191	298	109	786	707	49	683	606
	A13 (West)	506	517	1,982	60	40	38	85	39	95	34	10	26
A1013 Stanford Road / Rectory Road	Rectory Rd	205	150	336	11	2,040	386	13	1,261	405	2	1,226	331
	Stanford Rd (East)	1,141	1,044	857	8	15	10	13	78	65	1	29	7
	Stanford Rd (West)	620	881	612	3	121	128	-	-	-	-	-	-

4.2.29 Table 4.5 shows that in the 2045 DM 08:00 – 09:00 period, the traffic conditions on the A128 (N), A13 (E), A1013 (E) and A13 (W) approaches are forecast to be similar or slightly improved when compared to the 2016 base scenario.

4.2.30 Both Brentwood Road (S) and A1013 Stanford Road (W) approaches are forecast to be over saturated in the 2045 DM scenario with long queues without the Project. The queue on Brentwood Road (S) approach is predicted to extend past the Orsett Golf Club and the queue on the A1013 (W) approach is predicted to extend past Rectory Road.

4.2.31 The forecast shows increased delays on some approaches at the Orsett Cock junction in the 2045 DS scenario compared to the 2045 DM scenario with delays and queues increasing the most on the A128 (N) approach due to the large increase in flow from A13(W) that includes traffic from the Project.

4.2.32 Traffic delays would decrease on Brentwood Road (S) in the 2045 DS scenario compared to the DM scenario due to the traffic signals, but queues remain long due to the higher demand flow.

4.2.33 The A1013 Stanford Road (W) approach is forecast to remain over saturated in the 2045 DS scenario. Queues are predicted to be shorter in the 2045 DS scenario compared to 2045 DM scenario due to the lower demand flow in the 2045 DS scenario.

4.2.34 At the A1013 Stanford Road/ Rectory Road junction, Rectory Road is saturated in both the 2045 DM and 2045 DS scenarios but delays and queues are shorter in the 2045 DS at Rectory Road compared to the 2045 DM scenario due to the lower traffic flow on A1013 (W) and the Pegasus crossing, which creates more gaps in the opposing A1013 traffic.

Table 4.6 17:00 – 18:00 Traffic Condition, 2045

		Flow [veh]			Avg. Delay per veh [s]			Mean Max. Queue [m] (Divide by 5.75m for queue in PCUs)			Average Queue [m] (Divide by 5.75m for queue in PCUs)		
Junction	**Approach**	**Base**	**DM**	**DS**	**2016 Base**	**2045 DM**	**2045 DS**	**2016 Base**	**2045 DM**	**2045 DS**	**2016 Base**	**2045 DM**	**2045 DS**
Orsett Cock	A128 Brentwood Rd (North)	854	798	890	54	356	117	88	1,061	182	40	917	97
	A13 (East)	442	1,018	501	69	78	230	87	131	144	51	77	116
	A1013 Stanford Rd (East)	501	696	514	24	192	159	34	326	175	5	240	112
	Brentwood Rd (South)	410	571	647	13	107	171	19	117	191	2	58	119
	A1013 Stanford Rd (West)	988	1,040	887	30	63	127	135	83	131	38	18	53
	A13 (West)	805	765	2,163	205	47	318	467	39	2,257	389	10	2,125
A1013 Stanford Road / Rectory Road	Rectory Rd	311	269	366	21	445	121	33	347	134	7	289	76
	Stanford Rd (East)	680	1,044	914	6	12	10	10	44	65	1	9	8
	Stanford Rd (West)	855	1,127	976	4	7	6	-	-	-	-	-	-

4.2.35 In the PM peak, traffic conditions on the A128 Brentwood Road (North) arm are forecast to be over saturated in the 2045 DM scenario with increases in delays and queues when compared to the 2016 base scenario.

4.2.36 In the 2045 DS scenario, traffic conditions at the Orsett Cock junction are forecast to be worse than the 2045 DM with delays and queues increasing on most approaches except A1013 Stanford Rd (East) and A128 Brentwood Road (N) which improves with the Project due to the traffic signals. The largest increase in queue length is on the A13(W) approach due to the additional traffic from the Project. This queue is on the A122 to Orsett Cock junction link and the queue length reported in Table 4.6 would not extend back to the A13.

4.2.37 At the A1013 Stanford Road/ Rectory Road junction, Rectory Road is over-saturated in the 2045 DM scenario with longer delays and queues compared to the base year. Traffic conditions on Rectory Road are forecast to improve in the 2045 DS scenario with the Project compared to the 2045 DM.

4.3 Journey times

4.3.1 A comparison of journey times has been carried out on the same routes used for the base year model validation. These cover all movements between the origins and destinations as illustrated in Plate 4.1. In addition, journey times on routes associated with the Project and A1089 from the DS scenarios as shown in Plate 4.2 are included for information.

Plate 4.1 Journey Time Start and End Locations for Base and Do-Minimum

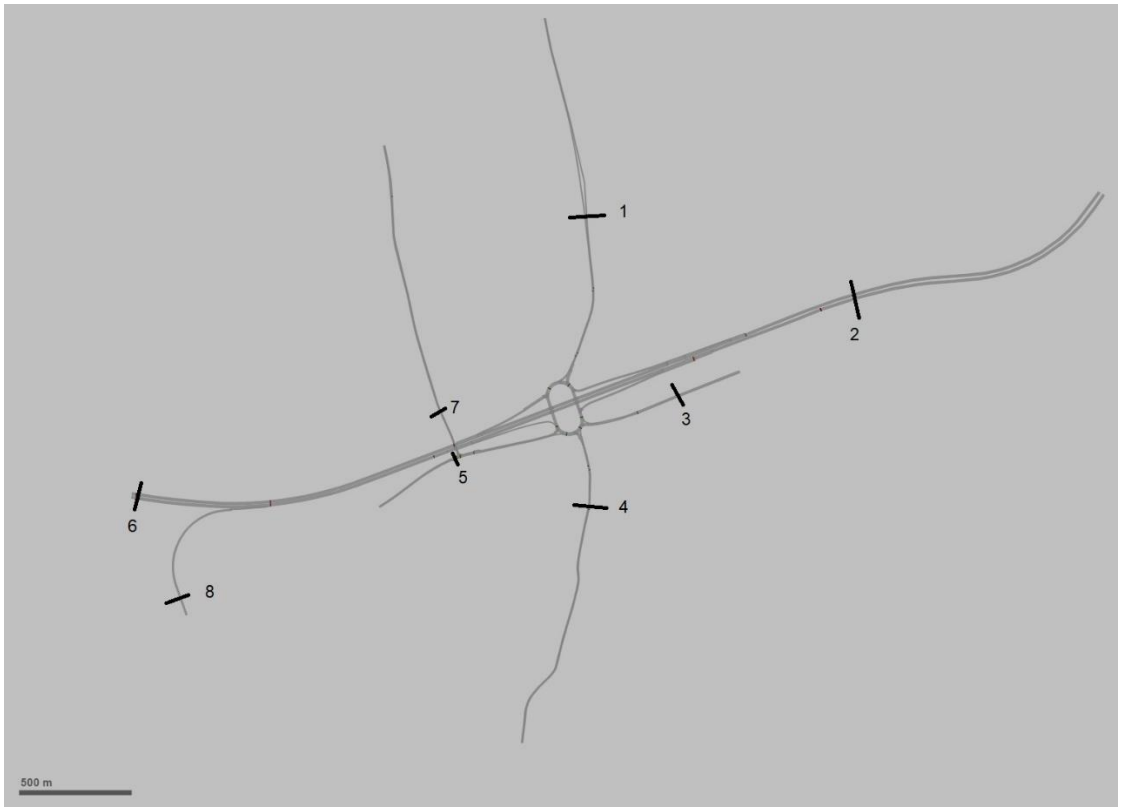


Plate 4.2 Journey Time Start and End Locations for Do-Something

4.3.2 Table 4.7 to Table 4.9 show a summary comparing the journey times for the 2016 Base Year, 2030 DM and 2030 DS for the AM and PM peak periods.

Table 4.7 2030 Journey Time Comparison, AM 07:00 – 08:00

Route	Name	2016 Base			2030 DM			2030 DS		
		Distance [m]	JT [s]	Speed [mph]	Distance [m]	JT [s]	Speed [mph]	Distance [m]	JT [s]	Speed [mph]
1-->2	A128 Brentwood Rd (North) to A13 EB mainline	2,085	109	42.7	2,122	131	36.4	2,122	171	27.8
1-->3	A128 Brentwood Rd (North) to A1013 Stanford Rd (East)	1,381	99	31.3	1,396	127	24.7	1,396	164	19.1
1-->4	A128 Brentwood Rd (North) to Brentwood Rd (South)	1,341	90	33.4	1,347	116	25.9	1,347	154	19.6
1-->5	A128 Brentwood Rd (North) to A1013 Stanford Rd (West)	1,555	107	32.5	1,533	134	25.6	1,535	175	19.6
1-->6	A128 Brentwood Rd (North) to A13 WB mainline	3,052	151	45.2	3,025	203	33.3	3,036	242	28.1
1-->7	A128 Brentwood Rd (North) to Rectory Rd	1,555	107	32.5	1,753	156	25.1	1,741	193	20.2
1-->8	A128 Brentwood Rd (North) to A13 WB off-slip to A1089	3,190	164	43.5	3,163	216	32.7	3,071	242	28.4
2-->1	A13 WB mainline to A128 Brentwood Rd (North)	2,344	146	36.1	2,359	162	32.7	2,359	186	28.3
2-->3	A13 WB mainline to A1013 Stanford Rd (East)	1,629	99	36.8	1,653	100	36.9	1,653	112	33.2
2-->4	A13 WB mainline to Brentwood Rd (South)	1,588	90	39.5	1,604	90	39.9	1,605	102	35.3
2-->5	A13 WB mainline to A1013 Stanford Rd (West)	1,803	107	37.7	1,790	108	37.1	1,793	123	32.5
2-->6	A13 WB mainline to A13 WB mainline	3,177	119	59.7	3,177	118	60.0	3,178	123	57.8
2-->7	A13 WB mainline to Rectory Rd	1,803	107	37.7	2,010	130	34.6	1,999	141	31.8
2-->8	A13 WB mainline to A13 WB off-slip to A1089	3,315	132	56.2	3,315	131	56.4	3,329	190	39.3

Route	Name	2016 Base			2030 DM			2030 DS		
		Distance [m]	JT [s]	Speed [mph]	Distance [m]	JT [s]	Speed [mph]	Distance [m]	JT [s]	Speed [mph]
2-->9	A13 WB mainline to Project (South)	-	-	-	-	-	-	4,404	184	53.6
2-->12	A13 WB mainline to Project (North)	-	-	-	-	-	-	5,329	218	54.6
3-->1	A1013 Stanford Rd (East) to A128 Brentwood Rd (North)	1,563	152	23.0	1,590	146	24.3	1,589	192	18.5
3-->2	A1013 Stanford Rd (East) to A13 EB mainline	2,177	161	30.4	2,215	163	30.4	2,216	223	22.2
3-->4	A1013 Stanford Rd (East) to Brentwood Rd (South)	808	97	18.7	835	75	25.0	835	108	17.3
3-->5	A1013 Stanford Rd (East) to A1013 Stanford Rd (West)	1,022	114	20.1	1,021	93	24.7	1,023	129	17.7
3-->6	A1013 Stanford Rd (East) to A13 WB mainline	2,518	158	35.7	2,513	161	34.8	2,523	196	28.8
3-->7	A1013 Stanford Rd (East) to Rectory Rd	1,022	114	20.1	1,240	115	24.2	1,229	147	18.7
3-->8	A1013 Stanford Rd (East) to A13 WB off-slip to A1089	2,656	171	34.8	2,651	174	34.0	2,559	196	29.2
4-->1	Brentwood Rd (South) to A128 Brentwood Rd (North)	1,397	129	24.0	1,431	223	14.4	1,430	192	16.6
4-->2	Brentwood Rd (South) to A13 EB mainline	2,011	137	32.5	2,056	240	19.2	2,057	223	20.6
4-->3	Brentwood Rd (South) to A1013 Stanford Rd (East)	1,307	126	22.9	1,330	236	12.6	1,330	216	13.8
4-->5	Brentwood Rd (South) to A1013 Stanford Rd (West)	856	90	20.9	862	169	11.4	864	130	14.9
4-->6	Brentwood Rd (South) to A13 WB mainline	2,352	134	38.8	2,354	238	22.1	2,364	196	27.0

Route	Name	2016 Base			2030 DM			2030 DS		
		Distance [m]	JT [s]	Speed [mph]	Distance [m]	JT [s]	Speed [mph]	Distance [m]	JT [s]	Speed [mph]
4-->7	Brentwood Rd (South) to Rectory Rd	856	92	20.9	1,081	191	12.6	1,070	147	16.3
4-->8	Brentwood Rd (South) to A13 WB off-slip to A1089	2,490	147	37.5	2,492	251	22.2	2,400	196	27.4
5-->1	A1013 Stanford Rd (West) to A128 Brentwood Rd (North)	1,453	137	23.8	1,465	168	19.6	1,466	164	20.0
5-->2	A1013 Stanford Rd (West) to A13 EB mainline	2,067	145	31.9	2,090	184	25.3	2,093	195	24.0
5-->3	A1013 Stanford Rd (West) to A1013 Stanford Rd (East)	1,363	135	22.7	1,364	180	16.9	1,367	187	16.3
5-->4	A1013 Stanford Rd (West) to Brentwood Rd (South)	1,322	126	23.6	1,315	170	17.3	1,318	177	16.6
5-->6	A1013 Stanford Rd (West) to A13 WB mainline	2,408	143	37.9	2,387	183	29.2	2,400	168	32.0
5-->7	A1013 Stanford Rd (West) to Rectory Rd	217	19	25.2	217	19	25.0	216	19	25.6
5-->8	A1013 Stanford Rd (West) to A13 WB off-slip to A1089	2,546	156	36.7	2,525	196	28.9	2,436	168	32.5
6-->1	A13 EB mainline to A128 Brentwood Rd (North)	2,768	172	35.1	2,770	154	40.2	2,775	153	40.7
6-->2	A13 EB mainline to A13 EB mainline	3,345	121	61.7	3,347	122	61.5	3,347	128	58.6
6-->3	A13 EB mainline to A1013 Stanford Rd (East)	2,678	170	34.4	2,669	167	35.8	2,676	176	34.1
6-->4	A13 EB mainline to Brentwood Rd (South)	2,637	161	35.7	2,621	157	37.4	2,627	166	35.4
6-->5	A13 EB mainline to A1013 Stanford Rd (West)	2,852	178	35.0	2,807	174	36.0	2,815	188	33.6
6-->7	A13 EB mainline to Rectory Rd	2,852	182	35.0	3,026	197	34.4	3,021	205	33.0

Route	Name	2016 Base			2030 DM			2030 DS		
		Distance [m]	JT [s]	Speed [mph]	Distance [m]	JT [s]	Speed [mph]	Distance [m]	JT [s]	Speed [mph]
6-->8	A13 EB mainline to A13 WB off-slip to A1089	4,486	235	41.9	4,437	256	38.7	4,351	254	38.3
7-->1	Rectory Rd to A128 Brentwood Rd (North)	1,453	136	23.8	1,675	223	16.8	1,704	216	17.7
7-->2	Rectory Rd to A13 EB mainline	2,067	145	31.9	2,301	240	21.4	2,330	246	21.2
7-->3	Rectory Rd to A1013 Stanford Rd (East)	1,363	134	22.7	1,575	236	14.9	1,604	239	15.0
7-->4	Rectory Rd to Brentwood Rd (South)	1,322	125	23.6	1,526	226	15.1	1,556	229	15.2
7-->5	Rectory Rd to A1013 Stanford Rd (West)	225	39	12.8	225	100	5.0	247	65	8.5
7-->6	Rectory Rd to A13 WB mainline	2,408	142	37.9	2,598	238	24.4	2,638	220	26.9
7-->8	Rectory Rd to A13 WB off-slip to A1089	2,546	155	36.7	2,736	251	24.4	2,674	219	27.3
9-->1	Project (South) to A128 Brentwood Rd (North)	-	-	-	-	-	-	5,842	288	45.4
9-->2	Project (South) to A13 EB mainline	-	-	-	-	-	-	6,430	274	52.5
9-->3	Project (South) to A1013 Stanford Rd (East)	-	-	-	-	-	-	5,746	311	41.3
9-->4	Project (South) to Brentwood Rd (South)	-	-	-	-	-	-	5,695	304	41.9
9-->5	Project (South) to A1013 Stanford Rd (West)	-	-	-	-	-	-	5,883	321	41.0
9-->6	Project (South) to A13 WB mainline	-	-	-	-	-	-	7,384	378	43.7
9-->7	Project (South) to Rectory Rd	-	-	-	-	-	-	6,120	345	39.7
9-->10	Project (South) to A1089	-	-	-	-	-	-	7,798	397	43.9
9-->12	Project (South) to Project (North)	-	-	-	-	-	-	3,524	131	60.3
10-->9	A1089 to Project (South)	-	-	-	-	-	-	4,496	241	41.7

Route	Name	2016 Base			2030 DM			2030 DS		
		Distance [m]	JT [s]	Speed [mph]	Distance [m]	JT [s]	Speed [mph]	Distance [m]	JT [s]	Speed [mph]
10-->11	A1089 to A13 (West)	-	-	-	-	-	-	1,451	62	52.6
10-->12	A1089 to Project (North)	-	-	-	-	-	-	2,730	112	54.7
11-->10	A13 (West) to A1089	-	-	-	-	-	-	1,780	72	55.1
12-->1	Project (North) to A128 Brentwood Rd (North)	-	-	-	-	-	-	4,468	236	42.4
12-->2	Project (North) to A13 EB mainline	-	-	-	-	-	-	5,056	216	52.3
12-->3	Project (North) to A1013 Stanford Rd (East)	-	-	-	-	-	-	4,372	254	38.5
12-->4	Project (North) to Brentwood Rd (South)	-	-	-	-	-	-	4,321	247	39.1
12-->5	Project (North) to A1013 Stanford Rd (West)	-	-	-	-	-	-	4,509	265	38.0
12-->6	Project (North) to A13 WB mainline	-	-	-	-	-	-	6,009	0	-
12-->7	Project (North) to Rectory Rd	-	-	-	-	-	-	4,746	287	37.0
12-->9	Project (North) to Project (South)	-	-	-	-	-	-	3,852	154	56.1
12-->10	Project (North) to A1089	-	-	-	-	-	-	6,424	344	41.7

*Note - * No trips recorded on this route*

4.3.3 The journey time comparison between the 2030 DM scenario and the 2016 Base Year for the 07:00 – 08:00 period shows the following:

a. Journey times in the DM are similar or slightly higher than the base year across the majority of the routes, except for those routes originating from the Brentwood Road (South), A1013 (W) and Rectory Road where journey times increase on average by 70s due to the delays on these approaches as described in the previous section.

4.3.4 The journey time comparison between the 2030 DS and 2030 DM scenarios for the 07:00 – 08:00 period shows the following:

a. Journey times in the DS scenario are forecast to be higher than the DM scenario across the majority of the routes, except for those routes originating from Brentwood Road (South) where journey times decrease in the DS scenario. The journey times in the DS scenarios from Rectory Road are very similar to the DM scenario, with small increases of less than 10 seconds and decreases of up to 35 seconds.

b. The journey time from the A13 (E) to the A1089 are forecast to increase more than the journey times from the A13 (E) to other destinations, as traffic travelling from the A13 (E) to the A1089 is required to travel through the Orsett Cock junction in the DS scenario.

c. Journey times in the DS scenario on the A13 mainline would be similar to the DM scenario in both directions.

Table 4.8 2030 Journey Time Comparison, AM 08:00 – 09:00

Route	Name	2016 Base			2030 DM			2030 DS		
		Distance [m]	JT [s]	Speed [mph]	Distance [m]	JT [s]	Speed [mph]	Distance [m]	JT [s]	Speed [mph]
1-->2	A128 Brentwood Rd (North) to A13 EB mainline	2,085	120	38.9	2,122	134	35.4	2,122	174	27.3
1-->3	A128 Brentwood Rd (North) to A1013 Stanford Rd (East)	1,381	109	28.2	1,396	131	23.9	1,396	164	19.0
1-->4	A128 Brentwood Rd (North) to Brentwood Rd (South)	1,341	99	30.2	1,347	120	25.2	1,347	155	19.5
1-->5	A128 Brentwood Rd (North) to A1013 Stanford Rd (West)	1,555	119	29.3	1,533	139	24.7	1,535	179	19.1
1-->6	A128 Brentwood Rd (North) to A13 WB mainline	3,052	161	42.4	3,025	199	34.0	3,036	243	28.0
1-->7	A128 Brentwood Rd (North) to Rectory Rd	1,555	119	29.3	1,753	164	23.9	1,741	197	19.8
1-->8	A128 Brentwood Rd (North) to A13 WB off-slip to A1089	3,190	174	40.9	3,163	212	33.3	3,071	243	28.3
2-->1	A13 WB mainline to A128 Brentwood Rd (North)	2,344	157	33.0	2,359	162	32.7	2,359	189	27.9
2-->3	A13 WB mainline to A1013 Stanford Rd (East)	1,629	112	31.9	1,653	101	36.8	1,653	115	32.1
2-->4	A13 WB mainline to Brentwood Rd (South)	1,588	102	34.1	1,604	89	40.1	1,605	106	34.0
2-->5	A13 WB mainline to A1013 Stanford Rd (West)	1,803	122	32.7	1,790	109	36.9	1,793	130	30.8
2-->6	A13 WB mainline to A13 WB mainline	3,177	118	60.1	3,177	118	60.4	3,178	123	57.8
2-->7	A13 WB mainline to Rectory Rd	1,803	123	32.7	2,010	134	33.5	1,999	148	30.2
2-->8	A13 WB mainline to A13 WB off-slip to A1089	3,315	131	56.4	3,315	131	56.8	3,329	194	38.4
2-->9	A13 WB mainline to Project (South)	-	-	-	-	-	-	4,404	185	53.4
2-->12	A13 WB mainline to Project (North)	-	-	-	-	-	-	5,329	218	54.6

Route	Name	2016 Base			2030 DM			2030 DS		
		Distance [m]	JT [s]	Speed [mph]	Distance [m]	JT [s]	Speed [mph]	Distance [m]	JT [s]	Speed [mph]
3-->1	A1013 Stanford Rd (East) to A128 Brentwood Rd (North)	1,563	199	17.7	1,590	144	24.7	1,589	200	17.8
3-->2	A1013 Stanford Rd (East) to A13 EB mainline	2,177	210	23.4	2,215	162	30.7	2,216	232	21.4
3-->4	A1013 Stanford Rd (East) to Brentwood Rd (South)	807	145	12.7	835	72	26.0	835	116	16.1
3-->5	A1013 Stanford Rd (East) to A1013 Stanford Rd (West)	1,022	164	14.1	1,021	91	25.1	1,023	141	16.3
3-->6	A1013 Stanford Rd (East) to A13 WB mainline	2,518	206	27.6	2,513	152	37.1	2,523	204	27.6
3-->7	A1013 Stanford Rd (East) to Rectory Rd	1,022	162	14.1	1,240	117	23.8	1,229	158	17.4
3-->8	A1013 Stanford Rd (East) to A13 WB off-slip to A1089	2,656	220	27.3	2,651	165	36.0	2,559	204	28.0
4-->1	Brentwood Rd (South) to A128 Brentwood Rd (North)	1,397	292	11.1	1,431	279	11.5	1,430	220	14.5
4-->2	Brentwood Rd (South) to A13 EB mainline	2,011	303	15.4	2,056	297	15.5	2,057	252	18.2
4-->3	Brentwood Rd (South) to A1013 Stanford Rd (East)	1,307	293	10.4	1,330	294	10.1	1,330	243	12.3
4-->5	Brentwood Rd (South) to A1013 Stanford Rd (West)	856	257	7.8	862	226	8.5	864	161	12.0
4-->6	Brentwood Rd (South) to A13 WB mainline	2,352	299	18.3	2,353	287	18.4	2,364	225	23.5
4-->7	Brentwood Rd (South) to Rectory Rd	856	245	7.8	1,081	252	9.6	1,070	179	13.4
4-->8	Brentwood Rd (South) to A13 WB off-slip to A1089	2,490	312	18.5	2,491	300	18.6	2,400	225	23.9

Route	Name	2016 Base			2030 DM			2030 DS		
		Distance [m]	JT [s]	Speed [mph]	Distance [m]	JT [s]	Speed [mph]	Distance [m]	JT [s]	Speed [mph]
5-->1	A1013 Stanford Rd (West) to A128 Brentwood Rd (North)	1,453	150	22.1	1,465	268	12.2	1,466	315	10.4
5-->2	A1013 Stanford Rd (West) to A13 EB mainline	2,067	161	29.2	2,090	286	16.4	2,093	347	13.5
5-->3	A1013 Stanford Rd (West) to A1013 Stanford Rd (East)	1,363	150	20.6	1,364	282	10.8	1,367	338	9.1
5-->4	A1013 Stanford Rd (West) to Brentwood Rd (South)	1,323	140	21.5	1,315	271	10.8	1,318	328	9.0
5-->6	A1013 Stanford Rd (West) to A13 WB mainline	2,408	157	34.9	2,387	276	19.4	2,400	320	16.8
5-->7	A1013 Stanford Rd (West) to Rectory Rd	217	19	14.1	217	19	25.8	216	19	25.5
5-->8	A1013 Stanford Rd (West) to A13 WB off-slip to A1089	2,546	170	34.0	2,525	289	19.6	2,436	320	17.0
6-->1	A13 EB mainline to A128 Brentwood Rd (North)	2,768	170	33.9	2,770	154	40.2	2,775	156	39.8
6-->2	A13 EB mainline to A13 EB mainline	3,345	122	61.5	3,347	122	61.5	3,347	128	58.5
6-->3	A13 EB mainline to A1013 Stanford Rd (East)	2,678	171	32.7	2,669	168	35.5	2,676	178	33.6
6-->4	A13 EB mainline to Brentwood Rd (South)	2,637	161	34.1	2,621	157	37.3	2,627	169	34.9
6-->5	A13 EB mainline to A1013 Stanford Rd (West)	2,852	180	33.1	2,807	176	35.6	2,815	193	32.6
6-->8	A13 EB mainline to A13 WB off-slip to A1089	4,486	236	40.5	4,437	250	39.7	4,351	257	37.9
6-->7	A13 EB mainline to Rectory Rd	2,852	193	33.1	3,026	202	33.5	3,021	211	32.1
7-->1	Rectory Rd to A128 Brentwood Rd (North)	1,453	147	22.1	1,675	823	4.6	1,704	600	6.4
7-->2	Rectory Rd to A13 EB mainline	2,067	158	29.2	2,301	841	6.1	2,330	632	8.3
7-->3	Rectory Rd to A1013 Stanford Rd (East)	1,363	148	20.6	1,574	837	4.2	1,604	622	5.8

Route	Name	2016 Base			2030 DM			2030 DS		
		Distance [m]	JT [s]	Speed [mph]	Distance [m]	JT [s]	Speed [mph]	Distance [m]	JT [s]	Speed [mph]
7-->4	Rectory Rd to Brentwood Rd (South)	1,323	138	21.5	1,526	826	4.1	1,556	613	5.7
7-->5	Rectory Rd to A1013 Stanford Rd (West)	225	43	11.8	225	564	0.9	247	295	1.9
7-->6	Rectory Rd to A13 WB mainline	2,408	154	34.9	2,598	831	7.0	2,638	604	9.8
7-->8	Rectory Rd to A13 WB off-slip to A1089	2,546	168	34.0	2,736	844	7.3	2,674	604	9.9
9-->1	Project (South) to A128 Brentwood Rd (North)	-	-	-	-	-	-	5,842	293	44.6
9-->2	Project (South) to A13 EB mainline	-	-	-	-	-	-	6,430	275	52.3
9-->3	Project (South) to A1013 Stanford Rd (East)	-	-	-	-	-	-	5,746	314	41.0
9-->4	Project (South) to Brentwood Rd (South)	-	-	-	-	-	-	5,695	306	41.7
9-->5	Project (South) to A1013 Stanford Rd (West)	-	-	-	-	-	-	5,883	327	40.3
9-->6	Project (South) to A13 WB mainline	-	-	-	-	-	-	7,384	379	43.6
9-->7	Project (South) to Rectory Rd	-	-	-	-	-	-	6,120	350	39.1
9-->10	Project (South) to A1089	-	-	-	-	-	-	7,798	400	43.6
9-->12	Project (South) to Project (North)	-	-	-	-	-	-	3,524	131	60.1
10-->9	A1089 to Project (South)	-	-	-	-	-	-	4,496	242	41.6
10-->11	A1089 to A13 (West)	-	-	-	-	-	-	1,451	62	52.8
10-->12	A1089 to Project (North)	-	-	-	-	-	-	2,730	112	54.8
11-->10	A13 (West) to A1089	-	-	-	-	-	-	1,780	72	54.9
12-->1	Project (North) to A128 Brentwood Rd (North)	-	-	-	-	-	-	4,468	239	41.9
12-->2	Project (North) to A13 EB mainline	-	-	-	-	-	-	5,056	217	52.0
12-->3	Project (North) to A1013 Stanford Rd (East)	-	-	-	-	-	-	4,372	256	38.3

Route	Name	2016 Base			2030 DM			2030 DS		
		Distance [m]	JT [s]	Speed [mph]	Distance [m]	JT [s]	Speed [mph]	Distance [m]	JT [s]	Speed [mph]
12-->4	Project (North) to Brentwood Rd (South)	-	-	-	-	-	-	4,321	248	38.9
12-->5	Project (North) to A1013 Stanford Rd (West)	-	-	-	-	-	-	4,509	271	37.3
12-->6	Project (North) to A13 WB mainline	-	-	-	-	-	-	6,009	0	-
12-->7	Project (North) to Rectory Rd	-	-	-	-	-	-	4,746	294	36.1
12-->9	Project (North) to Project (South)	-	-	-	-	-	-	3,852	155	55.6
12-->10	Project (North) to A1089	-	-	-	-	-	-	6,424	348	41.3

*Note - * No trips recorded on this route*

4.3.5 The journey time comparison between the 2030 DM scenario and the 2016 Base Year for the 08:00 – 09:00 period shows the following:

a. Journey times in the DM would be quicker than the base year on the majority of routes except those originating from A128 (N), A1013 (West) and Rectory Road due to the delays on the approach.

b. Journey times for those routes originating from the A1013 (E) on average decrease by 60s as the traffic signals at the A13 (E) approach assist with creating gaps in opposing traffic that contributes to the decrease in journey times.

4.3.6 The journey time comparison between the 2030 DS and 2030 DM scenarios for the 08:00 – 09:00 period shows the following:

a. Journey times in the DS scenario would be higher than the DM scenario across the majority of the routes, except for those routes originating from the Brentwood Road (South) and Rectory Road where journey times decrease in the DS scenario.

b. The journey times originating from Brentwood Road (South) decrease on average by one minute as the introduction of traffic signals controlling the traffic contributes to the reduction in journey times.

c. Journey time from the A13 (E) to the A1089 is forecast to increase more than the journey times from the A13 (E) to other destinations, as traffic travelling from the A13 (E) to the A1089 are required to travel through the Orsett Cock junction in the DS scenario.

d. Journey times in the DS scenario on the A13 mainline would be similar to the DM scenario in both directions.

Table 4.9 2030 Journey Time Comparison, PM 17:00 – 18:00

Route	Name	2016 Base			2030 DM			2030 DS		
		Distance [m]	JT [s]	Speed [mph]	Distance [m]	JT [s]	Speed [mph]	Distance [m]	JT [s]	Speed [mph]
1-->2	A128 Brentwood Rd (North) to A13 EB mainline	2,085	160	27.1	2,122	204	23.3	2,122	175	27.1
1-->3	A128 Brentwood Rd (North) to A1013 Stanford Rd (East)	1,381	140	21.6	1,396	208	15.0	1,396	158	19.7
1-->4	A128 Brentwood Rd (North) to Brentwood Rd (South)	1,341	127	23.1	1,347	197	15.3	1,347	147	20.5
1-->5	A128 Brentwood Rd (North) to A1013 Stanford Rd (West)	1,555	144	23.8	1,534	214	16.0	1,535	168	20.5
1-->6	A128 Brentwood Rd (North) to A13 WB mainline	3,052	187	36.1	3,025	265	25.6	3,036	225	30.2
1-->7	A128 Brentwood Rd (North) to Rectory Rd	1,555	146	23.8	1,753	240	16.4	1,741	185	21.1
1-->8	A128 Brentwood Rd (North) to A13 WB off-slip to A1089	3,190	200	35.2	3,163	278	25.5	3,071	231	29.7
2-->1	A13 WB mainline to A128 Brentwood Rd (North)	2,344	189	27.4	2,359	211	25.0	2,359	512	10.3
2-->3	A13 WB mainline to A1013 Stanford Rd (East)	1,628	149	24.1	1,652	152	24.3	1,653	407	9.1
2-->4	A13 WB mainline to Brentwood Rd (South)	1,588	137	25.7	1,604	140	25.6	1,605	396	9.1
2-->5	A13 WB mainline to A1013 Stanford Rd (West)	1,803	153	26.1	1,790	157	25.4	1,792	417	9.6
2-->6	A13 WB mainline to A13 WB mainline	3,177	113	62.8	3,177	115	62.0	3,178	119	59.9
2-->7	A13 WB mainline to Rectory Rd	1,803	155	26.1	2,009	183	24.6	1,999	434	10.3
2-->8	A13 WB mainline to A13 WB off-slip to A1089	3,315	126	58.7	3,315	128	58.1	3,329	480	15.5

Route	Name	2016 Base			2030 DM			2030 DS		
		Distance [m]	JT [s]	Speed [mph]	Distance [m]	JT [s]	Speed [mph]	Distance [m]	JT [s]	Speed [mph]
2-->9	A13 WB mainline to Project (South)	-	-	-	-	-	-	4,404	193	51.2
2-->12	A13 WB mainline to Project (North)	-	-	-	-	-	-	5,329	218	54.6
3-->1	A1013 Stanford Rd (East) to A128 Brentwood Rd (North)	1,563	125	28.0	1,590	169	21.0	1,589	271	13.1
3-->2	A1013 Stanford Rd (East) to A13 EB mainline	2,177	150	30.7	2,215	194	25.6	2,215	321	15.4
3-->4	A1013 Stanford Rd (East) to Brentwood Rd (South)	807	72	25.1	835	98	19.0	835	154	12.1
3-->5	A1013 Stanford Rd (East) to A1013 Stanford Rd (West)	1,022	88	25.9	1,021	116	19.7	1,023	175	13.1
3-->6	A1013 Stanford Rd (East) to A13 WB mainline	2,518	131	42.9	2,513	166	33.8	2,523	233	24.3
3-->7	A1013 Stanford Rd (East) to Rectory Rd	1,022	88	25.9	1,240	141	19.7	1,229	192	14.3
3-->8	A1013 Stanford Rd (East) to A13 WB off-slip to A1089	2,656	144	41.1	2,651	179	33.1	2,559	239	24.0
4-->1	Brentwood Rd (South) to A128 Brentwood Rd (North)	1,397	99	31.6	1,431	150	21.4	1,430	195	16.4
4-->2	Brentwood Rd (South) to A13 EB mainline	2,011	123	33.9	2,056	174	26.4	2,057	245	18.8
4-->3	Brentwood Rd (South) to A1013 Stanford Rd (East)	1,307	103	28.2	1,330	179	16.7	1,330	229	13.0
4-->5	Brentwood Rd (South) to A1013 Stanford Rd (West)	856	62	30.9	862	96	20.1	864	100	19.4
4-->6	Brentwood Rd (South) to A13 WB mainline	2,352	105	50.0	2,354	147	35.9	2,365	157	33.7

Route	Name	2016 Base			2030 DM			2030 DS		
		Distance [m]	JT [s]	Speed [mph]	Distance [m]	JT [s]	Speed [mph]	Distance [m]	JT [s]	Speed [mph]
4-->7	Brentwood Rd (South) to Rectory Rd	856	62	30.9	1,081	121	19.9	1,070	117	20.5
4-->8	Brentwood Rd (South) to A13 WB off-slip to A1089	2,490	118	47.0	2,491	160	34.9	2,400	163	32.9
5-->1	A1013 Stanford Rd (West) to A128 Brentwood Rd (North)	1,452	117	27.7	1,465	129	25.3	1,466	177	18.5
5-->2	A1013 Stanford Rd (West) to A13 EB mainline	2,066	142	30.5	2,090	154	30.3	2,093	227	20.6
5-->3	A1013 Stanford Rd (West) to A1013 Stanford Rd (East)	1,362	122	24.9	1,364	158	19.3	1,366	210	14.5
5-->4	A1013 Stanford Rd (West) to Brentwood Rd (South)	1,321	109	27.0	1,315	147	20.1	1,318	199	14.8
5-->6	A1013 Stanford Rd (West) to A13 WB mainline	2,407	123	43.4	2,387	127	42.2	2,400	139	38.7
5-->7	A1013 Stanford Rd (West) to Rectory Rd	217	19	25.8	217	19	25.5	216	19	25.1
5-->8	A1013 Stanford Rd (West) to A13 WB off-slip to A1089	2,545	137	41.5	2,525	140	40.5	2,436	145	37.6
6-->1	A13 EB mainline to A128 Brentwood Rd (North)	2,768	342	18.8	2,770	151	41.1	2,775	206	30.2
6-->2	A13 EB mainline to A13 EB mainline	3,345	265	28.7	3,347	124	60.3	3,347	167	44.8
6-->3	A13 EB mainline to A1013 Stanford Rd (East)	2,678	347	17.9	2,669	180	33.2	2,676	239	25.1
6-->4	A13 EB mainline to Brentwood Rd (South)	2,637	334	18.3	2,621	168	34.9	2,627	227	25.8
6-->5	A13 EB mainline to A1013 Stanford Rd (West)	2,852	350	18.9	2,807	185	33.9	2,815	248	25.3
6-->8	A13 EB mainline to A13 WB off-slip to A1089	4,486	407	25.4	4,437	249	39.8	4,351	312	31.2

Route	Name	2016 Base			2030 DM			2030 DS		
		Distance [m]	JT [s]	Speed [mph]	Distance [m]	JT [s]	Speed [mph]	Distance [m]	JT [s]	Speed [mph]
6-->7	A13 EB mainline to Rectory Rd	2,852	338	18.9	3,026	211	32.1	3,021	266	25.4
7-->1	Rectory Rd to A128 Brentwood Rd (North)	1,452	117	27.7	1,675	311	12.0	1,704	255	14.9
7-->2	Rectory Rd to A13 EB mainline	2,066	151	30.5	2,300	336	15.3	2,330	305	17.1
7-->3	Rectory Rd to A1013 Stanford Rd (East)	1,362	122	24.9	1,574	340	10.3	1,604	288	12.4
7-->4	Rectory Rd to Brentwood Rd (South)	1,321	109	27.0	1,526	329	10.4	1,555	277	12.6
7-->5	Rectory Rd to A1013 Stanford Rd (West)	225	47	10.7	225	225	2.2	247	96	5.8
7-->6	Rectory Rd to A13 WB mainline	2,407	124	43.4	2,598	309	18.8	2,638	217	27.2
7-->8	Rectory Rd to A13 WB off-slip to A1089	2,545	137	41.5	2,736	322	19.0	2,674	223	26.9
9-->1	Project (South) to A128 Brentwood Rd (North)	-	-	-	-	-	-	5,842	331	39.4
9-->2	Project (South) to A13 EB mainline	-	-	-	-	-	-	6,430	288	49.9
9-->3	Project (South) to A1013 Stanford Rd (East)	-	-	-	-	-	-	5,746	462	27.8
9-->4	Project (South) to Brentwood Rd (South)	-	-	-	-	-	-	5,695	448	28.4
9-->5	Project (South) to A1013 Stanford Rd (West)	-	-	-	-	-	-	5,883	471	28.0
9-->6	Project (South) to A13 WB mainline	-	-	-	-	-	-	7,384	513	32.2
9-->7	Project (South) to Rectory Rd	-	-	-	-	-	-	6,120	499	27.4
9-->10	Project (South) to A1089	-	-	-	-	-	-	7,798	533	32.7
9-->12	Project (South) to Project (North)	-	-	-	-	-	-	3,524	125	62.8

Route	Name	2016 Base			2030 DM			2030 DS		
		Distance [m]	JT [s]	Speed [mph]	Distance [m]	JT [s]	Speed [mph]	Distance [m]	JT [s]	Speed [mph]
10-->9	A1089 to Project (South)	-	-	-	-	-	-	4,496	247	40.7
10-->11	A1089 to A13 (West)	-	-	-	-	-	-	1,451	61	53.5
10-->12	A1089 to Project (North)	-	-	-	-	-	-	2,730	108	56.7
11-->10	A13 (West) to A1089	-	-	-	-	-	-	1,780	72	55.4
12-->1	Project (North) to A128 Brentwood Rd (North)	-	-	-	-	-	-	4,468	276	36.2
12-->2	Project (North) to A13 EB mainline	-	-	-	-	-	-	5,056	235	48.1
12-->3	Project (North) to A1013 Stanford Rd (East)	-	-	-	-	-	-	4,372	400	24.5
12-->4	Project (North) to Brentwood Rd (South)	-	-	-	-	-	-	4,321	386	25.1
12-->5	Project (North) to A1013 Stanford Rd (West)	-	-	-	-	-	-	4,509	413	24.5
12-->6	Project (North) to A13 WB mainline	-	-	-	-	-	-	6,009	0	-
12-->7	Project (North) to Rectory Rd	-	-	-	-	-	-	4,746	427	24.9
12-->9	Project (North) to Project (South)	-	-	-	-	-	-	3,852	169	50.9
12-->10	Project (North) to A1089	-	-	-	-	-	-	6,424	475	30.2

*Note - * No trips recorded on this route*

4.3.7 The journey time comparison between the 2030 DM scenario and 2016 base year for the 17:00 – 18:00 period shows the following:

a. Journey times in the DM scenario are forecast to be longer than the base year across the majority of the routes, except for those routes originating from the A13 (West).

b. Journey times for routes originating from the A13 (W) eastbound are forecast to reduce significantly by over 150 seconds on average due to widening of the A13 mainline in the DM scenario.

4.3.8 The journey time comparison between the 2030 DS and 2030 DM scenarios for the 17:00 – 18:00 period shows the following:

a. Journey times in the DS scenario would be higher than the DM scenario across the majority of routes except those originating from A128 (N) and Rectory Road.

b. Journey times from the A128 (N) decrease by 45s on average compared to the 2030 DM scenario.

c. Journey times of routes originating from the A13 (E) increase the most due to the delay on the approach to the junction. Journey times from the A13 (E) are forecast to increase by over 250s.

4.3.9 Table 4.10 show a summary comparing the journey times for the 2016 Base Year, 2045 DM and 2045 DS for the AM and PM peak periods.

Table 4.10 2045 Journey Time Comparison, AM 07:00 – 08:00

Route	Name	2016 Base			2045 DM			2045 DS		
		Distance [m]	JT [s]	Speed [mph]	Distance [m]	JT [s]	Speed [mph]	Distance [m]	JT [s]	Speed [mph]
1-->2	A128 Brentwood Rd (North) to A13 EB mainline	2,085	109	42.7	2,122	137	34.6	2,122	245	19.4
1-->3	A128 Brentwood Rd (North) to A1013 Stanford Rd (East)	1,381	99	31.3	1,396	130	24.0	1,396	239	13.1
1-->4	A128 Brentwood Rd (North) to Brentwood Rd (South)	1,341	90	33.4	1,347	120	25.1	1,347	229	13.1
1-->5	A128 Brentwood Rd (North) to A1013 Stanford Rd (West)	1,555	107	32.5	1,533	147	23.3	1,535	252	13.6
1-->6	A128 Brentwood Rd (North) to A13 WB mainline	3,052	151	45.2	3,025	257	26.3	3,036	318	21.4
1-->7	A128 Brentwood Rd (North) to Rectory Rd	1,555	107	32.5	1,753	174	22.6	1,741	269	14.5
1-->8	A128 Brentwood Rd (North) to A13 WB off-slip to A1089	3,190	164	43.5	3,163	270	26.2	3,072	318	21.6
2-->1	A13 WB mainline to A128 Brentwood Rd (North)	2,344	146	36.1	2,360	164	32.1	2,359	187	28.2
2-->3	A13 WB mainline to A1013 Stanford Rd (East)	1,629	99	36.8	1,653	101	36.7	1,653	112	33.1
2-->4	A13 WB mainline to Brentwood Rd (South)	1,588	90	39.5	1,604	91	39.6	1,605	102	35.2
2-->5	A13 WB mainline to A1013 Stanford Rd (West)	1,803	107	37.7	1,790	118	34.1	1,793	125	32.2
2-->6	A13 WB mainline to A13 WB mainline	3,177	119	59.7	3,177	121	58.7	3,178	123	57.7
2-->7	A13 WB mainline to Rectory Rd	1,803	107	37.7	2,010	144	31.2	1,999	142	31.6
2-->8	A13 WB mainline to A13 WB off-slip to A1089	3,315	132	56.2	3,315	134	55.3	3,329	191	39.0
2-->9	A13 WB mainline to Project (South)	-	-	-	-	-	-	4,404	189	52.2
2-->12	A13 WB mainline to Project (North)	-	-	-	-	-	-	5,329	221	53.9

Route	Name	2016 Base			2045 DM			2045 DS		
		Distance [m]	JT [s]	Speed [mph]	Distance [m]	JT [s]	Speed [mph]	Distance [m]	JT [s]	Speed [mph]
3-->1	A1013 Stanford Rd (East) to A128 Brentwood Rd (North)	1,563	152	23.0	1,590	164	21.7	1,589	274	13.0
3-->2	A1013 Stanford Rd (East) to A13 EB mainline	2,177	161	30.4	2,215	185	26.8	2,216	306	16.2
3-->4	A1013 Stanford Rd (East) to Brentwood Rd (South)	808	97	18.7	835	90	20.8	835	189	9.9
3-->5	A1013 Stanford Rd (East) to A1013 Stanford Rd (West)	1,022	114	20.1	1,021	117	19.5	1,023	212	10.8
3-->6	A1013 Stanford Rd (East) to A13 WB mainline	2,518	158	35.7	2,513	227	24.7	2,523	278	20.3
3-->7	A1013 Stanford Rd (East) to Rectory Rd	1,022	114	20.1	1,240	143	19.4	1,229	229	12.0
3-->8	A1013 Stanford Rd (East) to A13 WB off-slip to A1089	2,656	171	34.8	2,651	240	24.7	2,559	278	20.6
4-->1	Brentwood Rd (South) to A128 Brentwood Rd (North)	1,397	129	24.0	1,431	339	9.4	1,430	215	14.9
4-->2	Brentwood Rd (South) to A13 EB mainline	2,011	137	32.5	2,056	360	12.8	2,057	247	18.6
4-->3	Brentwood Rd (South) to A1013 Stanford Rd (East)	1,307	126	22.9	1,330	353	8.4	1,331	241	12.4
4-->5	Brentwood Rd (South) to A1013 Stanford Rd (West)	856	90	20.9	862	292	6.6	864	153	12.7
4-->6	Brentwood Rd (South) to A13 WB mainline	2,352	134	38.8	2,354	402	13.1	2,365	218	24.2
4-->7	Brentwood Rd (South) to Rectory Rd	856	92	20.9	1,081	319	7.6	1,070	170	14.1
4-->8	Brentwood Rd (South) to A13 WB off-slip to A1089	2,490	147	37.5	2,492	416	13.4	2,400	219	24.5

Route	Name	2016 Base			2045 DM			2045 DS		
		Distance [m]	JT [s]	Speed [mph]	Distance [m]	JT [s]	Speed [mph]	Distance [m]	JT [s]	Speed [mph]
5-->1	A1013 Stanford Rd (West) to A128 Brentwood Rd (North)	1,453	137	23.8	1,465	267	12.3	1,466	208	15.8
5-->2	A1013 Stanford Rd (West) to A13 EB mainline	2,067	145	31.9	2,090	288	16.2	2,093	240	19.5
5-->3	A1013 Stanford Rd (West) to A1013 Stanford Rd (East)	1,363	135	22.7	1,364	281	10.9	1,367	233	13.1
5-->4	A1013 Stanford Rd (West) to Brentwood Rd (South)	1,322	126	23.6	1,315	271	10.9	1,318	224	13.2
5-->6	A1013 Stanford Rd (West) to A13 WB mainline	2,408	143	37.9	2,387	330	16.2	2,400	211	25.4
5-->7	A1013 Stanford Rd (West) to Rectory Rd	217	19	25.2	217	19	25.5	216	19	25.6
5-->8	A1013 Stanford Rd (West) to A13 WB off-slip to A1089	2,546	156	36.7	2,525	343	16.5	2,436	212	25.7
6-->1	A13 EB mainline to A128 Brentwood Rd (North)	2,768	172	35.1	2,770	155	40.1	2,775	158	39.4
6-->2	A13 EB mainline to A13 EB mainline	3,345	121	61.7	3,347	124	60.4	3,347	137	54.6
6-->3	A13 EB mainline to A1013 Stanford Rd (East)	2,678	170	34.4	2,669	169	35.4	2,676	183	32.7
6-->4	A13 EB mainline to Brentwood Rd (South)	2,637	161	35.7	2,621	159	36.9	2,627	174	33.8
6-->5	A13 EB mainline to A1013 Stanford Rd (West)	2,852	178	35.0	2,807	186	33.8	2,815	196	32.1
6-->7	A13 EB mainline to Rectory Rd	2,852	182	35.0	3,026	212	31.9	3,021	213	31.7
6-->8	A13 EB mainline to A13 WB off-slip to A1089	4,486	235	41.9	4,437	309	32.1	4,351	263	37.1
7-->1	Rectory Rd to A128 Brentwood Rd (North)	1,453	136	23.8	1,675	471	8.0	1,704	257	14.8
7-->2	Rectory Rd to A13 EB mainline	2,067	145	31.9	2,300	492	10.5	2,330	289	18.0
7-->3	Rectory Rd to A1013 Stanford Rd (East)	1,363	134	22.7	1,574	485	7.3	1,604	283	12.7
7-->4	Rectory Rd to Brentwood Rd (South)	1,322	125	23.6	1,526	475	7.2	1,556	273	12.7

Route	Name	2016 Base			2045 DM			2045 DS		
		Distance [m]	JT [s]	Speed [mph]	Distance [m]	JT [s]	Speed [mph]	Distance [m]	JT [s]	Speed [mph]
7-->5	Rectory Rd to A1013 Stanford Rd (West)	225	39	12.8	225	210	2.4	247	63	8.8
7-->6	Rectory Rd to A13 WB mainline	2,408	142	37.9	2,598	534	10.9	2,638	261	22.6
7-->8	Rectory Rd to A13 WB off-slip to A1089	2,546	155	36.7	2,736	547	11.2	2,674	261	22.9
9-->1	Project (South) to A128 Brentwood Rd (North)	-	-	-	-	-	-	5,842	297	44.0
9-->2	Project (South) to A13 EB mainline	-	-	-	-	-	-	6,430	283	50.8
9-->3	Project (South) to A1013 Stanford Rd (East)	-	-	-	-	-	-	5,746	320	40.1
9-->4	Project (South) to Brentwood Rd (South)	-	-	-	-	-	-	5,695	314	40.5
9-->5	Project (South) to A1013 Stanford Rd (West)	-	-	-	-	-	-	5,883	335	39.3
9-->6	Project (South) to A13 WB mainline	-	-	-	-	-	-	7,384	387	42.7
9-->7	Project (South) to Rectory Rd	-	-	-	-	-	-	6,120	356	38.5
9-->10	Project (South) to A1089	-	-	-	-	-	-	7,798	408	42.8
9-->12	Project (South) to Project (North)	-	-	-	-	-	-	3,524	135	58.5
10-->9	A1089 to Project (South)	-	-	-	-	-	-	4,496	246	40.9
10-->11	A1089 to A13 (West)	-	-	-	-	-	-	1,451	62	52.1
10-->12	A1089 to Project (North)	-	-	-	-	-	-	2,730	114	53.6
11-->10	A13 (West) to A1089	-	-	-	-	-	-	1,780	72	55.1
12-->1	Project (North) to A128 Brentwood Rd (North)	-	-	-	-	-	-	4,468	242	41.4
12-->2	Project (North) to A13 EB mainline	-	-	-	-	-	-	5,056	223	50.6
12-->3	Project (North) to A1013 Stanford Rd (East)	-	-	-	-	-	-	4,372	262	37.4
12-->4	Project (North) to Brentwood Rd (South)	-	-	-	-	-	-	4,321	257	37.6

Route	Name	2016 Base			2045 DM			2045 DS		
		Distance [m]	JT [s]	Speed [mph]	Distance [m]	JT [s]	Speed [mph]	Distance [m]	JT [s]	Speed [mph]
12-->5	Project (North) to A1013 Stanford Rd (West)	-	-	-	-	-	-	4,509	277	36.5
12-->6	Project (North) to A13 WB mainline	-	-	-	-	-	-	6,009	0	-
12-->7	Project (North) to Rectory Rd	-	-	-	-	-	-	4,746	303	35.1
12-->9	Project (North) to Project (South)	-	-	-	-	-	-	3,852	162	53.3
12-->10	Project (North) to A1089	-	-	-	-	-	-	6,424	352	40.8

*Note - * No trips recorded on this route*

4.3.10 The journey time comparison between the 2045 DM scenario and the 2016 Base Year for the 07:00 – 08:00 period shows the following:

a. Journey times in the DM are higher than the base year across the majority of the routes.

4.3.11 The journey time comparison between the 2045 DS and 2045 DM scenarios for the 07:00 – 08:00 period shows the following:

a. Journey times in the DS scenario are forecast to be higher than the DM scenario across the majority of the routes, except for those routes originating from Brentwood Rd (S), the A1013 Stanford Rd (W) and Rectory Road where journey times decrease in the DS scenario.

b. The journey time from the A13 (E) to the A1089 are forecast to increase more than the journey times from the A13 (E) to other destinations, as traffic travelling from the A13 (E) to the A1089 is required to travel through the Orsett Cock junction in the DS scenario.

c. Journey times in the DS scenario on the A13 mainline would be similar to the DM scenario in both directions.

Table 4.11 2045 Journey Time Comparison, AM 08:00 – 09:00

Route	Name	2016 Base			2045 DM			2045 DS		
		Distance [m]	JT [s]	Speed [mph]	Distance [m]	JT [s]	Speed [mph]	Distance [m]	JT [s]	Speed [mph]
1-->2	A128 Brentwood Rd (North) to A13 EB mainline	2,085	120	38.9	2,122	140	33.9	2,122	449	10.6
1-->3	A128 Brentwood Rd (North) to A1013 Stanford Rd (East)	1,381	109	28.2	1,396	137	22.9	1,396	440	7.1
1-->4	A128 Brentwood Rd (North) to Brentwood Rd (South)	1,341	99	30.2	1,347	125	24.0	1,347	430	7.0
1-->5	A128 Brentwood Rd (North) to A1013 Stanford Rd (West)	1,555	119	29.3	1,533	152	22.6	1,535	455	7.6
1-->6	A128 Brentwood Rd (North) to A13 WB mainline	3,052	161	42.4	3,025	230	29.4	3,036	517	13.1
1-->7	A128 Brentwood Rd (North) to Rectory Rd	1,555	119	29.3	1,753	181	21.7	1,741	472	8.3
1-->8	A128 Brentwood Rd (North) to A13 WB off-slip to A1089	3,190	174	40.9	3,163	243	29.1	3,072	519	13.2
2-->1	A13 WB mainline to A128 Brentwood Rd (North)	2,344	157	33.0	2,360	163	32.3	2,359	186	28.4
2-->3	A13 WB mainline to A1013 Stanford Rd (East)	1,629	112	31.9	1,653	102	36.3	1,653	115	32.1
2-->4	A13 WB mainline to Brentwood Rd (South)	1,588	102	34.1	1,604	91	39.5	1,605	105	34.2
2-->5	A13 WB mainline to A1013 Stanford Rd (West)	1,803	122	32.7	1,790	117	34.2	1,793	130	30.9
2-->6	A13 WB mainline to A13 WB mainline	3,177	118	60.1	3,177	120	59.4	3,178	123	57.9
2-->8	A13 WB mainline to A13 WB off-slip to A1089	3,315	131	56.4	3,315	133	55.8	3,329	194	38.4
2-->9	A13 WB mainline to Project (South)	-	-	-	-	-	-	4,404	190	52.0

Route	Name	2016 Base			2045 DM			2045 DS		
		Distance [m]	JT [s]	Speed [mph]	Distance [m]	JT [s]	Speed [mph]	Distance [m]	JT [s]	Speed [mph]
2-->12	A13 WB mainline to Project (North)	-	-	-	-	-	-	5,329	222	53.8
3-->1	A1013 Stanford Rd (East) to A128 Brentwood Rd (North)	1,563	199	17.7	1,590	167	21.3	1,589	389	9.1
3-->2	A1013 Stanford Rd (East) to A13 EB mainline	2,177	210	23.4	2,215	188	26.4	2,216	423	11.7
3-->4	A1013 Stanford Rd (East) to Brentwood Rd (South)	807	145	12.7	835	94	19.8	835	308	6.1
3-->5	A1013 Stanford Rd (East) to A1013 Stanford Rd (West)	1,022	164	14.1	1,021	121	18.9	1,023	333	6.9
3-->6	A1013 Stanford Rd (East) to A13 WB mainline	2,518	206	27.6	2,513	199	28.3	2,523	395	14.3
3-->7	A1013 Stanford Rd (East) to Rectory Rd	1,022	162	14.1	1,240	150	18.5	1,229	350	7.8
3-->8	A1013 Stanford Rd (East) to A13 WB off-slip to A1089	2,656	220	27.3	2,651	212	28.0	2,559	397	14.4
4-->1	Brentwood Rd (South) to A128 Brentwood Rd (North)	1,397	292	11.1	1,431	406	7.9	1,430	249	12.8
4-->2	Brentwood Rd (South) to A13 EB mainline	2,011	303	15.4	2,056	426	10.8	2,057	284	16.2
4-->3	Brentwood Rd (South) to A1013 Stanford Rd (East)	1,307	293	10.4	1,330	423	7.0	1,331	275	10.8
4-->5	Brentwood Rd (South) to A1013 Stanford Rd (West)	856	257	7.8	862	359	5.4	864	193	10.0
4-->6	Brentwood Rd (South) to A13 WB mainline	2,352	299	18.3	2,353	437	12.0	2,365	256	20.7
4-->7	Brentwood Rd (South) to Rectory Rd	856	245	7.8	1,081	388	6.2	1,070	211	11.4
4-->8	Brentwood Rd (South) to A13 WB off-slip to A1089	2,490	312	18.5	2,491	451	12.4	2,400	258	20.8

Route	Name	2016 Base			2045 DM			2045 DS		
		Distance [m]	JT [s]	Speed [mph]	Distance [m]	JT [s]	Speed [mph]	Distance [m]	JT [s]	Speed [mph]
5-->1	A1013 Stanford Rd (West) to A128 Brentwood Rd (North)	1,453	150	22.1	1,464	289	11.3	1,466	392	8.4
5-->2	A1013 Stanford Rd (West) to A13 EB mainline	2,067	161	29.2	2,090	310	15.1	2,093	427	11.0
5-->3	A1013 Stanford Rd (West) to A1013 Stanford Rd (East)	1,363	150	20.6	1,364	306	10.0	1,367	418	7.3
5-->4	A1013 Stanford Rd (West) to Brentwood Rd (South)	1,323	140	21.5	1,315	295	10.0	1,318	408	7.2
5-->6	A1013 Stanford Rd (West) to A13 WB mainline	2,408	157	34.9	2,387	321	16.6	2,400	399	13.5
5-->7	A1013 Stanford Rd (West) to Rectory Rd	217	19	14.1	217	19	25.5	216	19	25.1
5-->8	A1013 Stanford Rd (West) to A13 WB off-slip to A1089	2,546	170	34.0	2,525	334	16.9	2,436	401	13.6
6-->1	A13 EB mainline to A128 Brentwood Rd (North)	2,768	170	33.9	2,770	155	39.9	2,775	160	38.7
6-->2	A13 EB mainline to A13 EB mainline	3,345	122	61.5	3,347	124	60.6	3,347	137	54.7
6-->3	A13 EB mainline to A1013 Stanford Rd (East)	2,678	171	32.7	2,669	173	34.6	2,676	186	32.2
6-->4	A13 EB mainline to Brentwood Rd (South)	2,637	161	34.1	2,621	162	36.3	2,627	176	33.4
6-->5	A13 EB mainline to A1013 Stanford Rd (West)	2,852	180	33.1	2,807	188	33.4	2,815	201	31.4
6-->7	A13 EB mainline to Rectory Rd	2,852	193	33.1	3,026	217	31.2	3,021	218	31.0
6-->8	A13 EB mainline to A13 WB off-slip to A1089	4,486	236	40.5	4,437	279	35.5	4,351	265	36.8
7-->1	Rectory Rd to A128 Brentwood Rd (North)	1,453	147	22.1	1,675	1130	3.3	1,704	683	5.6
7-->2	Rectory Rd to A13 EB mainline	2,067	158	29.2	2,300	1151	4.5	2,330	718	7.3
7-->3	Rectory Rd to A1013 Stanford Rd (East)	1,363	148	20.6	1,574	1147	3.1	1,604	709	5.1

Route	Name	2016 Base			2045 DM			2045 DS		
		Distance [m]	JT [s]	Speed [mph]	Distance [m]	JT [s]	Speed [mph]	Distance [m]	JT [s]	Speed [mph]
7-->4	Rectory Rd to Brentwood Rd (South)	1,323	138	21.5	1,526	1136	3.0	1,556	699	5.0
7-->5	Rectory Rd to A1013 Stanford Rd (West)	225	43	11.8	225	881	0.6	247	292	1.9
7-->6	Rectory Rd to A13 WB mainline	2,408	154	34.9	2,598	1162	5.0	2,638	690	8.6
7-->8	Rectory Rd to A13 WB off-slip to A1089	2,546	168	34.0	2,736	1175	5.2	2,674	692	8.6
9-->1	Project (South) to A128 Brentwood Rd (North)	-	-	-	-	-	-	5,842	301	43.5
9-->2	Project (South) to A13 EB mainline	-	-	-	-	-	-	6,430	286	50.3
9-->3	Project (South) to A1013 Stanford Rd (East)	-	-	-	-	-	-	5,746	325	39.6
9-->4	Project (South) to Brentwood Rd (South)	-	-	-	-	-	-	5,695	319	40.0
9-->5	Project (South) to A1013 Stanford Rd (West)	-	-	-	-	-	-	5,883	342	38.5
9-->6	Project (South) to A13 WB mainline	-	-	-	-	-	-	7,384	391	42.3
9-->7	Project (South) to Rectory Rd	-	-	-	-	-	-	6,120	360	38.1
9-->10	Project (South) to A1089	-	-	-	-	-	-	7,798	413	42.2
9-->12	Project (South) to Project (North)	-	-	-	-	-	-	3,524	135	58.3
10-->9	A1089 to Project (South)	-	-	-	-	-	-	4,496	246	40.9
10-->11	A1089 to A13 (West)	-	-	-	-	-	-	1,451	62	52.0
10-->12	A1089 to Project (North)	-	-	-	-	-	-	2,730	114	53.4
11-->10	A13 (West) to A1089	-	-	-	-	-	-	1,780	72	55.1
12-->1	Project (North) to A128 Brentwood Rd (North)	-	-	-	-	-	-	4,468	245	40.9
12-->2	Project (North) to A13 EB mainline	-	-	-	-	-	-	5,056	225	50.4
12-->3	Project (North) to A1013 Stanford Rd (East)	-	-	-	-	-	-	4,372	263	37.2

Route	Name	2016 Base			2045 DM			2045 DS		
		Distance [m]	JT [s]	Speed [mph]	Distance [m]	JT [s]	Speed [mph]	Distance [m]	JT [s]	Speed [mph]
12-->4	Project (North) to Brentwood Rd (South)	-	-	-	-	-	-	4,321	260	37.2
12-->5	Project (North) to A1013 Stanford Rd (West)	-	-	-	-	-	-	4,509	283	35.6
12-->6	Project (North) to A13 WB mainline	-	-	-	-	-	-	6,009	0	-
12-->7	Project (North) to Rectory Rd	-	-	-	-	-	-	4,746	308	34.4
12-->9	Project (North) to Project (South)	-	-	-	-	-	-	3,852	163	52.9
12-->10	Project (North) to A1089	-	-	-	-	-	-	6,424	356	40.3

*Note - * No trips recorded on this route*

4.3.12 The journey time comparison between the 2045 DM scenario and the 2016 Base Year for the 08:00 – 09:00 period shows the following:

a. Journey times in the DM would be higher than the base year on the majority of routes.

b. Journey times for those routes originating from the A1013 (E) on average decrease by 25s as the traffic signals at the A13 (E) approach assist with creating gaps in opposing traffic that contributes to the decrease in journey times.

4.3.13 The journey time comparison between the 2045 DS and 2045 DM scenarios for the 08:00 – 09:00 period shows the following:

a. Journey times in the DS scenario would be higher than the DM scenario across the majority of the routes, except for those routes originating from the Brentwood Road (South) and Rectory Road where journey times decrease in the DS scenario.

b. The journey times originating from Brentwood Road (South) decrease on average by 165s as the introduction of traffic signals controlling the traffic contributes to the reduction in journey times.

c. Journey time from the A13 (E) to the A1089 is forecast to increase, as traffic travelling from the A13 (E) to the A1089 are required to travel through the Orsett Cock junction in the DS scenario.

d. Journey time from the A128 (N) is forecast to increase on average by 297s in DS due to higher delays and congestions at the approach.

e. Journey times in the DS scenario on the A13 mainline would be similar to the DM scenario in both directions.

Table 4.12 2045 Journey Time Comparison, PM 17:00 – 18:00

Route	Name	2016 Base			2045 DM			2045 DS		
		Distance [m]	JT [s]	Speed [mph]	Distance [m]	JT [s]	Speed [mph]	Distance [m]	JT [s]	Speed [mph]
1-->2	A128 Brentwood Rd (North) to A13 EB mainline	2,085	160	27.1	2,122	392	12.1	2,122	214	22.2
1-->3	A128 Brentwood Rd (North) to A1013 Stanford Rd (East)	1,381	140	21.6	1,396	416	7.5	1,396	200	15.6
1-->4	A128 Brentwood Rd (North) to Brentwood Rd (South)	1,341	127	23.1	1,347	405	7.4	1,347	189	16.0
1-->5	A128 Brentwood Rd (North) to A1013 Stanford Rd (West)	1,555	144	23.8	1,534	425	8.1	1,535	211	16.3
1-->6	A128 Brentwood Rd (North) to A13 WB mainline	3,052	187	36.1	3,025	475	14.2	3,036	269	25.2
1-->7	A128 Brentwood Rd (North) to Rectory Rd	1,555	146	23.8	1,753	453	8.7	1,741	228	17.1
1-->8	A128 Brentwood Rd (North) to A13 WB off-slip to A1089	3,190	200	35.2	3,163	488	14.5	3,071	274	25.1
2-->1	A13 WB mainline to A128 Brentwood Rd (North)	2,344	189	27.4	2,359	215	24.5	2,359	424	12.5
2-->3	A13 WB mainline to A1013 Stanford Rd (East)	1,628	149	24.1	1,652	154	24.0	1,653	304	12.2
2-->4	A13 WB mainline to Brentwood Rd (South)	1,588	137	25.7	1,604	143	25.1	1,605	293	12.3
2-->5	A13 WB mainline to A1013 Stanford Rd (West)	1,803	153	26.1	1,790	163	24.6	1,792	315	12.7
2-->6	A13 WB mainline to A13 WB mainline	3,177	113	62.8	3,177	116	61.5	3,178	120	59.0
2-->7	A13 WB mainline to Rectory Rd	1,803	155	26.1	2,009	191	23.5	1,999	332	13.5
2-->8	A13 WB mainline to A13 WB off-slip to A1089	3,315	126	58.7	3,315	128	57.7	3,329	378	19.7
2-->9	A13 WB mainline to Project (South)	-	-	-	-	-	-	4,404	199	49.6
2-->12	A13 WB mainline to Project (North)	-	-	-	-	-	-	5,329	221	54.0

Route	Name	2016 Base			2045 DM			2045 DS		
		Distance [m]	JT [s]	Speed [mph]	Distance [m]	JT [s]	Speed [mph]	Distance [m]	JT [s]	Speed [mph]
3-->1	A1013 Stanford Rd (East) to A128 Brentwood Rd (North)	1,563	125	28.0	1,590	287	12.4	1,589	331	10.7
3-->2	A1013 Stanford Rd (East) to A13 EB mainline	2,177	150	30.7	2,215	315	15.7	2,215	378	13.1
3-->4	A1013 Stanford Rd (East) to Brentwood Rd (South)	807	72	25.1	835	214	8.7	835	200	9.3
3-->5	A1013 Stanford Rd (East) to A1013 Stanford Rd (West)	1,022	88	25.9	1,021	235	9.7	1,023	222	10.3
3-->6	A1013 Stanford Rd (East) to A13 WB mainline	2,518	131	42.9	2,513	284	19.8	2,523	281	20.1
3-->7	A1013 Stanford Rd (East) to Rectory Rd	1,022	88	25.9	1,240	262	10.6	1,229	239	11.5
3-->8	A1013 Stanford Rd (East) to A13 WB off-slip to A1089	2,656	144	41.1	2,651	297	19.9	2,559	285	20.1
4-->1	Brentwood Rd (South) to A128 Brentwood Rd (North)	1,397	99	31.6	1,431	185	17.3	1,430	282	11.3
4-->2	Brentwood Rd (South) to A13 EB mainline	2,011	123	33.9	2,056	213	21.6	2,057	329	14.0
4-->3	Brentwood Rd (South) to A1013 Stanford Rd (East)	1,307	103	28.2	1,330	237	12.6	1,331	315	9.4
4-->5	Brentwood Rd (South) to A1013 Stanford Rd (West)	856	62	30.9	862	132	14.6	864	174	11.1
4-->6	Brentwood Rd (South) to A13 WB mainline	2,352	105	50.0	2,354	182	28.9	2,365	233	22.7
4-->7	Brentwood Rd (South) to Rectory Rd	856	62	30.9	1,081	160	15.1	1,070	191	12.5
4-->8	Brentwood Rd (South) to A13 WB off-slip to A1089	2,490	118	47.0	2,492	195	28.5	2,400	237	22.7

Route	Name	2016 Base			2045 DM			2045 DS		
		Distance [m]	JT [s]	Speed [mph]	Distance [m]	JT [s]	Speed [mph]	Distance [m]	JT [s]	Speed [mph]
5-->1	A1013 Stanford Rd (West) to A128 Brentwood Rd (North)	1,452	117	27.7	1,465	132	24.8	1,466	207	15.9
5-->2	A1013 Stanford Rd (West) to A13 EB mainline	2,066	142	30.5	2,090	160	29.1	2,093	254	18.5
5-->3	A1013 Stanford Rd (West) to A1013 Stanford Rd (East)	1,362	122	24.9	1,364	184	16.5	1,366	239	12.8
5-->4	A1013 Stanford Rd (West) to Brentwood Rd (South)	1,321	109	27.0	1,315	173	17.0	1,318	228	12.9
5-->6	A1013 Stanford Rd (West) to A13 WB mainline	2,407	123	43.4	2,387	130	41.2	2,400	157	34.3
5-->7	A1013 Stanford Rd (West) to Rectory Rd	217	19	25.8	217	19	25.0	216	20	24.5
5-->8	A1013 Stanford Rd (West) to A13 WB off-slip to A1089	2,545	137	41.5	2,525	143	39.6	2,436	161	33.8
6-->1	A13 EB mainline to A128 Brentwood Rd (North)	2,768	342	18.8	2,770	152	40.8	2,775	417	14.9
6-->2	A13 EB mainline to A13 EB mainline	3,345	265	28.7	3,347	125	59.9	3,347	182	41.2
6-->3	A13 EB mainline to A1013 Stanford Rd (East)	2,678	347	17.9	2,669	204	29.3	2,676	450	13.3
6-->4	A13 EB mainline to Brentwood Rd (South)	2,637	334	18.3	2,621	193	30.4	2,627	439	13.4
6-->5	A13 EB mainline to A1013 Stanford Rd (West)	2,852	350	18.9	2,807	213	29.5	2,815	461	13.7
6-->7	A13 EB mainline to Rectory Rd	2,852	338	18.9	3,026	241	28.1	3,021	478	14.1
6-->8	A13 EB mainline to A13 WB off-slip to A1089	4,486	407	25.4	4,437	276	36.0	4,351	524	18.6
7-->1	Rectory Rd to A128 Brentwood Rd (North)	1,452	117	27.7	1,675	381	9.8	1,704	315	12.1
7-->2	Rectory Rd to A13 EB mainline	2,066	151	30.5	2,300	410	12.6	2,330	362	14.4
7-->3	Rectory Rd to A1013 Stanford Rd (East)	1,362	122	24.9	1,574	434	8.1	1,604	348	10.3
7-->4	Rectory Rd to Brentwood Rd (South)	1,321	109	27.0	1,526	422	8.1	1,555	337	10.3

Route	Name	2016 Base			2045 DM			2045 DS		
		Distance [m]	JT [s]	Speed [mph]	Distance [m]	JT [s]	Speed [mph]	Distance [m]	JT [s]	Speed [mph]
7-->5	Rectory Rd to A1013 Stanford Rd (West)	225	47	10.7	225	319	1.6	247	125	4.4
7-->6	Rectory Rd to A13 WB mainline	2,407	124	43.4	2,598	379	15.3	2,638	265	22.3
7-->8	Rectory Rd to A13 WB off-slip to A1089	2,545	137	41.5	2,736	392	15.6	2,674	269	22.2
9-->1	Project (South) to A128 Brentwood Rd (North)	-	-	-	-	-	-	5,842	762	17.2
9-->2	Project (South) to A13 EB mainline	-	-	-	-	-	-	6,430	590	24.4
9-->3	Project (South) to A1013 Stanford Rd (East)	-	-	-	-	-	-	5,746	926	13.9
9-->4	Project (South) to Brentwood Rd (South)	-	-	-	-	-	-	5,695	912	14.0
9-->5	Project (South) to A1013 Stanford Rd (West)	-	-	-	-	-	-	5,883	937	14.0
9-->6	Project (South) to A13 WB mainline	-	-	-	-	-	-	7,384	964	17.1
9-->7	Project (South) to Rectory Rd	-	-	-	-	-	-	6,120	541	25.3
9-->10	Project (South) to A1089	-	-	-	-	-	-	7,798	983	17.8
9-->12	Project (South) to Project (North)	-	-	-	-	-	-	3,524	158	49.8
10-->9	A1089 to Project (South)	-	-	-	-	-	-	4,496	253	39.8
10-->11	A1089 to A13 (West)	-	-	-	-	-	-	1,451	62	52.4
10-->12	A1089 to Project (North)	-	-	-	-	-	-	2,730	109	55.9
11-->10	A13 (West) to A1089	-	-	-	-	-	-	1,780	72	55.2
12-->1	Project (North) to A128 Brentwood Rd (North)	-	-	-	-	-	-	4,468	612	16.3
12-->2	Project (North) to A13 EB mainline	-	-	-	-	-	-	5,056	530	21.4
12-->3	Project (North) to A1013 Stanford Rd (East)	-	-	-	-	-	-	4,372	737	13.3
12-->4	Project (North) to Brentwood Rd (South)	-	-	-	-	-	-	4,321	728	13.3

Route	Name	2016 Base			2045 DM			2045 DS		
		Distance [m]	JT [s]	Speed [mph]	Distance [m]	JT [s]	Speed [mph]	Distance [m]	JT [s]	Speed [mph]
12-->5	Project (North) to A1013 Stanford Rd (West)	-	-	-	-	-	-	4,509	741	13.6
12-->6	Project (North) to A13 WB mainline	-	-	-	-	-	-	6,009	0	-
12-->7	Project (North) to Rectory Rd	-	-	-	-	-	-	4,746	750	14.2
12-->9	Project (North) to Project (South)	-	-	-	-	-	-	3,852	179	48.0
12-->10	Project (North) to A1089	-	-	-	-	-	-	6,424	802	17.9

*Note - * No trips recorded on this route*

4.3.14 The journey time comparison between the 2045 DM scenario and 2016 base year for the 17:00 – 18:00 period shows the following:

a. Journey times in the DM scenario are forecast to be higher than the base year across the majority of the routes, except for those routes originating from the A13 (West).

b. Journey times for routes originating from the A13 (W) eastbound are forecast to reduce significantly on average by 147 seconds due to widening of the A13 mainline in the DM scenario.

4.3.15 The journey time comparison between the 2045 DS and 2045 DM scenarios for the 17:00 – 18:00 period shows the following:

a. Journey times in the DS scenario would be higher than the DM scenario across most of the routes due to the increased number of vehicles using the Orsett Cock junction.

b. Journey times of routes originating from the A128 Brentwood (N) are predicted to decrease on average by 210 seconds in 2045 DS.

c. Journey times of routes originating from the A13 (W) and A13 (E), excluding the mainline, increase the most due to the delay on the approach to the junction. Journey times from the A13(W) and A13 (E) are forecast to increase by 185s on average.

4.4 Relative delays

4.4.1 The relative delay in VISSIM is the total segment delay divided by the total segment travel time on a link, with the link made up of 10m length segments.

4.4.2 The 2030 relative delay plots on all links in the network are shown in Plate 4.3 to Plate 4.8. They provide a visual representation of the delays at the junctions and along the mainline.

Plate 4.3 Relative Delay Plot (2030 DM 07:00 – 08:00)

Plate 4.4 Relative Delay Plot (2030 DS 07:00 – 08:00)

Plate 4.5 Relative Delay Plot (2030 DM 08:00 – 09:00)

Plate 4.6 Relative Delay Plot (2030 DS 08:00 – 09:00)

Plate 4.7 Relative Delay Plot (2030 DM 17:00 – 18:00)

Plate 4.8 Relative Delay Plot (2030 DS 17:00 – 18:00)

4.4.3 In addition to the delays at the Orsett Cock junction and the A1013 Stanford Road/ Rectory Road junction, which have been described in the previous sections, the plots also show that the traffic conditions of the A13 mainline are free-flowing in all peak periods.

4.4.4 The 2045 relative delay plots on all links in the network are shown in Plate 4.9 to Plate 4.14. They provide a visual representation of the delays at the junctions and along the mainline.

Plate 4.9 Relative Delay Plot (2045 DM 07:00 – 08:00)

Plate 4.10 Relative Delay Plot (2045 DS 07:00 – 08:00)

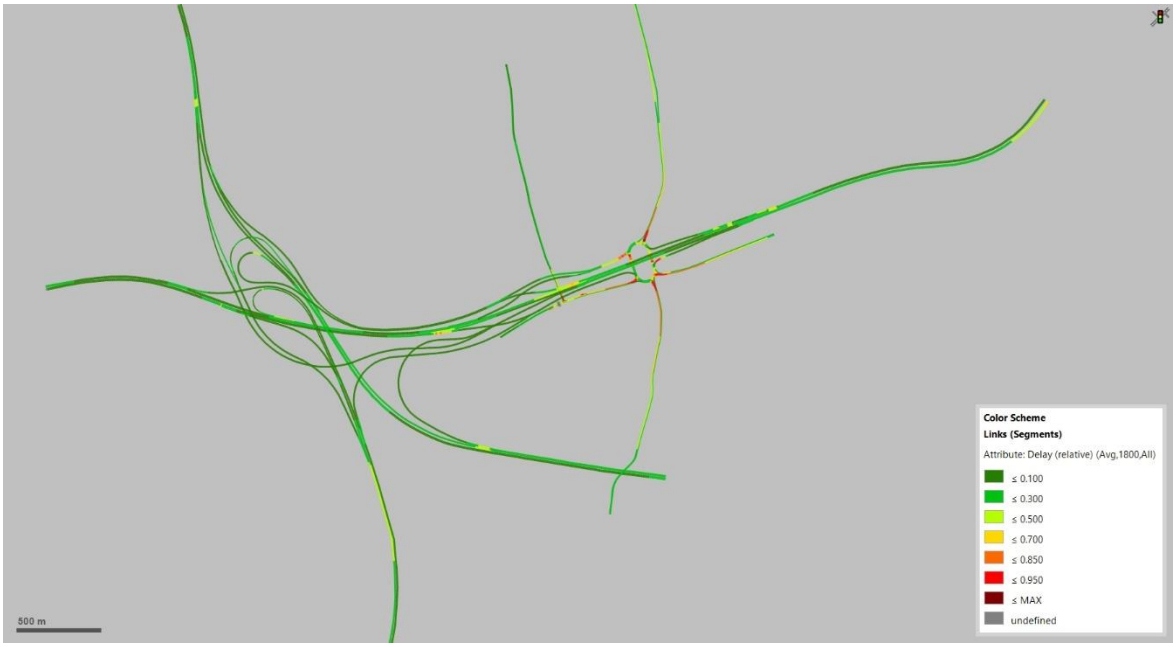


Plate 4.11 Relative Delay Plot (2045 DM 08:00 – 09:00)

Plate 4.12 Relative Delay Plot (2045 DS 08:00 – 09:00)

Plate 4.13 Relative Delay Plot (2045 DM 17:00 – 18:00)

Plate 4.14 Relative Delay Plot (2045 DS 17:00 – 18:00)

4.4.5 The plots show that the traffic conditions of the A13 mainline are free-flowing in all peak periods.

4.4.6 Brentwood Road (S) is forecast with long delays in the two AM peak hours in both DM and DS scenarios in 2045.

4.4.7 Plate 4.14 shows that the 2045 DS scenario has long delays on the A13 (W) approach extending to the Project.

4.5 Latent Demand

4.5.1 In addition to the junction and journey time results, network latent demand statistics are also provided for the model in Table 4.13. Latent demand is the number of vehicles not being able to deploy in the network within the evaluation period because of congestion. It is typically the total difference between the demand flow and the modelled flow on all the entry links.

Table 4.13 Latent demand [veh]

Scenario	AM 7-8	AM 8-9	PM 17-18
DM 2030	3	23	3
DS 2030	64	2	2
DM 2045	82	458	166
DS 2045	79	48	88

4.5.2 Table 4.13 shows that small numbers of vehicles were unable to deploy in the 2030 DM and DS scenarios for all peaks.

4.5.3 The level of latent demand is higher in 2045 due to increased congestion. The number of vehicles unable to deploy in the 2045 DM and DS scenarios is less than 1% of total demand for all peaks except in the 0800–0900 hour of the 2045 DM scenario where the level of latent demand is 3% of the total demand.

5 Conclusions

5.1.1 This report describes the development of the 2030 and 2045 Do Minimum (DM) and the 2030 and 2045 Do Something (DS) VISSIM models of the Orsett Cock study area that includes the Orsett Cock junction. It also compares the results between the two models.

5.1.2 The DS models contain minor modifications to improve conditions at the junction. Further improvements will be developed through detailed design and stakeholder engagement.

5.1.3 The analysis of the traffic conditions at the Orsett Cock junction shows that the Brentwood Road (South) approach is predicted to be over-saturated in DM scenarios (without the Project). The traffic conditions on this approach improve slightly in DS scenarios (with the Project).

5.1.4 Overall delays and queueing are forecast to increase at the junction with the implementation of the Project in 2030 and 2045, particularly in the PM peak period with an increase in delays and queues in the 2045 DS scenario on all of the approaches except the A1013 Stanford Rd (East) and A128 Brentwood Road (N) approaches.

5.1.5 Analysis of the traffic conditions at the A1013 Stanford Road/ Rectory Road junction shows that Rectory Road is over-saturated in the DM scenarios and the delays and queues are predicted to decrease in the DS scenarios.

References

Transport for London (September 2021). Traffic Modelling Guidelines Version 4.0.

https://content.tfl.gov.uk/traffic-modelling-guidelines.pdf

Transport for London (March 2017). Model Auditing Process (MAP) Version 3.5. Engineer Guide for Design Engineer (DE), Checking Engineer (CE) and Model Auditing Engineer (MAE). https://content.tfl.gov.uk/map-v3-5-engineer-guide.pdf

AECOM (September 2016). A13 Widening – A13 / A128 Orsett Cock Roundabout Assessment of Proposed Layout with Capacity Improvements.

Glossary

Term	Explanation
ANPR	Automatic Number Plate Recognition
ATC	Automatic Traffic Count
DCO	Development Consent Order - Means of obtaining permission for developments categorised as Nationally Significant Infrastructure Projects (NSIPs)
DfT	Department for Transport
DMRB	Design Manual for Roads and Bridges: A comprehensive manual which contains 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 the highway authority. For the Lower Thames Crossing, the Overseeing Organisation is National Highways.
Do Minimum	A future year scenario which includes changes to the road network and planned development that is forecast to go ahead, but not the Lower Thames Crossing.
Do Something	A future year scenario which includes changes to the road network and planned development that is forecast to go ahead, and the Lower Thames Crossing.
EB	Eastbound
GEH	A formula used to compare two traffic volumes, named after its originator, Geoff E. Havers. It is similar to a chi-squared test.
HGV	Heavy Goods Vehicle
LGV	Light Goods Vehicle
LinSig	A Design and Assessment Tool for Traffic Signal Junctions and Urban Networks
LMVR	Local Model Validation Report
LTC	Lower Thames Crossing
NB	Northbound
OS	Ordnance Survey
PCU	Passenger Car Unit – a metric used to convert traffic volumes in vehicles to a standard unit. One car = 1 PCU; One HGV = 2.3 PCUs
PTV	German for Planning Transport and Traffic Software package
SATURN	Simulation and Assignment of Traffic to Urban Networks
SB	Southbound

Term	Explanation
TAG	Transport Analysis Guidance published by DfT
TfL	Transport for London - The integrated body responsible for London's transport system
VISSIM	Micro-simulation software developed by PTV. Verkehr In Städten - SIMulationsmodell (German for "Traffic in cities - simulation model)
WB	Westbound

Annexes

Annex A Version and run ID log

A.1.1 Table A.1 provides the model version and run ID log for the Orsett Cock VISSIM model.

Table A.1 Orsett Cock VISSIM model version and run ID log

Version	Run ID	Modelled Year	Changes	LTAM version	Date issued
Base model					
v3	3.0	2016	-	N108R1	July 2022
Forecasting model					
v1	1.5	2030 DM	-	CM45	Sept 2022
		2045 DM		CM45	Sept 2022
		2030 DS		CS67	Sept 2022
		2045 DS		CS67	Sept 2022
v2	2.4	2030 DM	Matrices updated due to SATURN LTAM model version change CM45 to CM49 and CS67 to CS72. Updated speeds on slip roads to match the posted speeds on Drawing HE540039-CJV-HGN-A13_ZZ000000_Z-SK-CH-90001. Reduced 40mph to 30mph at slip from LTC (South) to Orsett Cock and from 70mph to 50mph at slip from A1089 to LTC (South). Standstill distance on slip roads reduced from 6.0m to 3.0m as vehicles generally stop closer to the vehicle in front on the slip roads compared to the mainline.	CM49	July 2023
		2045 DM		CM49	July 2023
		2030 DS		CS72	July 2023

Version	Run ID	Modelled Year	Changes	LTAM version	Date issued
		2045 DS	Link behaviour type was changed to "15 - Slip Road" at 5 slip roads. This link behaviour is similar to Freeway (A13) but with shorter standstill distance to allow vehicles to stop/ queue closer to the vehicle in front compared to the mainline. Conflict area 489 changed to passive as part of model refinement. Lane change distance adjusted at various connectors to refine lane change behaviour in the model. Node delay segment increased to 2000m to capture the full delay due to long queues.	CS72	July 2023
v3	3.0	2030 DM	Extended links LTC North and South, A128 North and South, A13 (E) and (W), Rectory Road. Added connector 910726 and modification with DM edge updates to use the outside lane in the southbound circulatory for travelling to A128 (S). Added modification in DS which changes the edges to use the middle lane in the southbound circulatory for travelling to Brentwood Road (S) as part of provisional improvements. Removed DSD at LTC slip roads (DSD no 97, 55, 56, 49) and converted these to RSA (with one slip of 50mph, 2x 30mph).	CM49	6 October 2023
		2045 DM		CM49	6 October 2023
		2030 DS		CS72	6 October 2023

Version	Run ID	Modelled Year	Changes	LTAM version	Date issued
		2045 DS	Amended RSA lengths in circulatory. Fixed geometry of link 10076 (recalculate the spline). Allow HGV to use the offside lane on 2-lane sections of LTC and A13. Updated all slip roads in the model to use the "Slip Road" link behaviour for consistency. Added additional journey time routes for analysis. DS: Link type change at slip road to be "1003 - Slip Road". Added Pegasus crossing modification. Includes relocation of PT Stop No. 2 Set Node No. 4 evaluation to “False” Activated discharge records at signal stop lines and evaluation for collection of saturation flows	CS72	6 October 2023
v3	3.6	2030 DM	Updated all DS forecasting matrices to correct a miscalculation of the DS forecasting matrices. Trips from zones 1-5 and 7 to zones 10 and 11 were affected. Updated PM matrices of the DM to correct a miscalculation. Trips to zone 4 were affected. Updated location of journey time marker from zone 4 in DS. Updated DSD number 33 location in DS as it was	CM49	20 October 2023
		2045 DM		CM49	20 October 2023

Version	Run ID	Modelled Year	Changes	LTAM version	Date issued
		2030 DS	previously moved when extending the link. Adjusted signal timings due to updated matrices	CS72	20 October 2023
		2045 DS		CS72	20 October 2023

Annex B Rectory Road sensitivity testing on Orsett Cock VISSIM

B.1 Introduction

B.1.1 This annex provides outputs of the Rectory Road sensitivity tests which formed Action Points 9 and 10 as set out in Annex A of Joint Position Statement: Orsett Cock junction [**REP5-084**]. These tests manually reassigned varying proportions of traffic on Rectory Road to examine the implications at the Orsett Cock junction.

B.1.2 VISSIM micro-simulation modelling of the Orsett Cock junction was developed to undertake operational assessment of the junction.

B.1.3 The development of the 2016 base year model is recorded in Localised Traffic Modelling Appendix B - Orsett Cock VISSIM Local Model Validation Report [**REP1-188**]. The modelling for the forecast years is recorded in Localised Traffic Modelling Appendix C – Orsett Cock Forecasting Report v 2.0 [**REP6-058**], submitted at Deadline 6.

B.1.4 The two sensitivity tests set out in this annex are:

a. Re-assign a proportion of Rectory Road traffic to the A128 (Action Point 9)

b. Re-assign all of Rectory Road traffic to the A128 except public transport and active travel modes (Action Point 10).

B.1.5 Both tests are based on the Orsett Cock version 3 VISSIM forecast model Core Scenario (run ID 3.6).

B.1.6 The only changes applied to the model for the tests were the trips related to zone 7 (Rectory Road) and zone 1 (A128) in the matrices and signal timings. The remainder of the model network and other network parameters are the same as for run ID 3.6.

B.1.7 Run ID 3.10 is the sensitivity test 1 (version 3 VISSIM forecast model run ID 3.10) and run ID 3.11 is the sensitivity test 2 (version 3 VISSIM forecast model run ID 3.11).

B.1.8 Relative delay plots for each test are shown in Chapter B.4.

B.2 Sensitivity test 1 – Re-assign a proportion of Rectory Road traffic to the A128

B.2.1 This test re-assigns a proportion of Rectory Road traffic to the A128. It assumes that the total number of trips using Rectory Road in 2030 and 2045 remains at the 2016 base levels and the rest re-allocate to the A128. This allocation of trips between Rectory Road and the A128 overrides the allocation produced by the Lower Thames Area Model (LTAM).

B.2.2 The test was carried out for both the Do Minimum (DM) (without the Project) and Do Something (DS) (with the Project) scenario, for AM periods 07.00 – 08.00 (denoted AM1 in tables) and 08.00 – 09.00 (AM2 in tables), and PM period 17.00 – 18.00.

B.2.3 Total trips from/ to zone 7 (Rectory Road) in the 2030 and 2045 matrices from run ID 3.6 were reduced to the values in the 2016 base year matrices shown in Table B.1 and the difference allocated to zone 1 (A128). The adjustment was not applied if the total trips from/ to zone 7 in 2030 and 2045 is lower in 2016 than in the run ID 3.6 matrices.

B.2.4 In this test, some of the Rectory Road trips have been allocated to the A128 and therefore would use the Orsett Cock junction.

B.2.5 The 2016 base year flows at zone 7 (Rectory Road) are shown in Table B.1.

Table B.1 2016 Base year total flows at zone 7 (Rectory Road)

Time period	Zone 7 Origin	Zone 7 Destination
2016 AM1 (07:00 – 08:00)	134	163
2016 AM2 (08:00 – 09:00)	205	260
2016 PM (17:00 – 18:00)	310	162

B.2.6 Table B.2 provides a summary of the number of trips re-allocated from zone 7 (Rectory Road) to zone 1 (A128).

Table B.2 Test 1 – Total trips re-allocated from zone 7 to zone 1

Time period	Run ID and trip movement	Total			
		Origin		Destination	
		Zone 1	Zone 7	Zone 1	Zone 7
2030 DM AM1	Run ID 3.6 Core Scenario	736	230	1,124	162
	Run ID 3.10 Sensitivity Test 1	832	134	1,124	162
	Trips moved to zone 1	**96**	**-96**	**0**	**0**
2030 DM AM2	Run ID 3.6 Core Scenario	799	374	1,101	158
	Run ID 3.10 Sensitivity Test 1	967	205	1,101	158

Time period	Run ID and trip movement	Total			
		Origin		Destination	
		Zone 1	Zone 7	Zone 1	Zone 7
	Trips moved to zone 1	**169**	**-169**	**0**	**0**
2030 DM PM	Run ID 3.6 Core Scenario	1,036	345	907	306
	Run ID 3.10 Sensitivity Test 1	1,071	310	1,051	162
	Trips moved to zone 1	**35**	**-35**	**144**	**-144**
2045 DM AM1	Run ID 3.6 Core Scenario	846	266	1,105	256
	Run ID 3.10 Sensitivity Test 1	978	134	1,198	163
	Trips moved to zone 1	**132**	**-132**	**93**	**-93**
2045 DM AM2	Run ID 3.6 Core Scenario	917	437	1,073	263
	Run ID 3.10 Sensitivity Test 1	1,149	205	1,078	258
	Trips moved to zone 1	**232**	**-232**	**5**	**-5**
2045 DM PM	Run ID 3.6 Core Scenario	1,126	345	976	396
	Run ID 3.10 Sensitivity Test 1	1,161	310	1,210	162
	Trips moved to zone 1	**35**	**-35**	**234**	**-234**
2030 DS AM1	Run ID 3.6 Core Scenario	659	294	994	129
	Run ID 3.10 Sensitivity Test 1	819	134	994	129
	Trips moved to zone 1	**160**	**-160**	**0**	**0**
2030 DS AM2	Run ID 3.6 Core Scenario	722	490	991	125
	Run ID 3.10 Sensitivity Test 1	1,007	205	991	125
	Trips moved to zone 1	**285**	**-285**	**0**	**0**
2030 DS PM	Run ID 3.6 Core Scenario	829	349	843	302
	Run ID 3.10 Sensitivity Test 1	868	310	982	163
	Trips moved to zone 1	**39**	**-39**	**139**	**-139**
2045 DS AM1	Run ID 3.6 Core Scenario	701	267	1,214	174
	Run ID 3.10 Sensitivity Test 1	834	134	1,226	162
	Trips moved to zone 1	**133**	**-133**	**12**	**-12**
2045 DS AM2	Run ID 3.6 Core Scenario	767	448	1,193	177
	Run ID 3.10 Sensitivity Test 1	1,010	205	1,197	173
	Trips moved to zone 1	**243**	**-243**	**4**	**-4**
2045 DS PM	Run ID 3.6 Core Scenario	895	367	886	379
	Run ID 3.10 Sensitivity Test 1	952	310	1,102	163
	Trips moved to zone 1	**57**	**-57**	**216**	**-216**

Results summary

B.2.7 The results of the throughput flow, average delay and mean maximum queue of the core scenario (run ID 3.6) and sensitivity test 1 (run ID 3.10) are presented in Table B.3 to Table B.9.

B.2.8 The results from test 1 show that there would only be small changes in delays and queues on the A128 in 2030 and in the AM peak of 2045 for both DM and DS scenarios. The largest increase in queue on the A128 is in the PM peak of 2045 DS but the longest queue on the A128 remains in the 08:00 – 09:00 peak hour of 2045 DS.

B.2.9 Brentwood Road (S) is a priority-controlled entry onto the Orsett Cock junction in the DM scenario, that is there are no traffic signals. It is forecast to be over-saturated in the DM with long delays and queues. Test 1 shows that this approach would have additional delays and queues with the re-allocation of Rectory Road trips without the Project due to the increase in the opposing flow on the southern circulatory.

B.2.10 The trip re-assignment in the DS scenario also has an impact on the A1013 (E) approach which experiences longer delays and queues in 2030 and 2045 under test 1 in the AM peak. This is due to the increase in the opposing flow on the southbound circulatory.

B.2.11 Rectory Road was over-saturated in the core DM and DS scenarios with long delays and queues. Test 1 shows delays and queues are predicted to reduce significantly on Rectory Road in the AM peak.

B.2.12 Queues on A1013 (W) increase in both the DM and DS scenarios in the PM peak due to the additional traffic on the A1013 (W) eastbound and more opposing traffic on the circulatory carriageway. There is an increase in flow on the A1013 (W) as some traffic that would be using Rectory Road northbound is assigned to use the A1013 (W) all the way to the Orsett Cock junction and using it to reach the A128. The eastbound queue on the A1013 (W) extends back to the Rectory Road junction with the A1013. As a result, delays and queues on Rectory Road also increase slightly in test 1 despite the lower flows due to the blocking back and higher eastbound conflicting flow on the A1013 (W).

B.2.13 Plate B.9 shows that there would be small increases in latent demand in test 1 for some scenarios but they remain a relatively small proportion of the overall traffic in the network except for the 08:00 – 09:00 hour in the 2045 DM scenario which has high latent demand in both the core scenario and in the sensitivity test. The change in overall level of latent demand in 2045 DM for the 08:00 – 09:00 hour is small as latent demand on Rectory Road in the core scenario shifts to the Brentwood Road (S) in test 1.

Result comparison Sensitivity test 1 (run ID 3.10) vs Core scenario (run ID 3.6)

B.2.14 Throughput flow, average delay and mean maximum queue results comparison of the Core scenario (run ID 3.6) and Sensitivity Test 1 (run ID 3.10) are presented in the tables below.

Table B.3 Traffic conditions, 2030, AM peak 07:00 - 08:00

Junction	Approach	Run ID 3.6 Core Scenario						Run ID 3.10 Sensitivity Test 1					
		Flow (veh)		Avg. Delay per veh [s]		Mean Max. Queue [m]		Flow (veh)		Avg. Delay per veh [s]		Mean Max. Queue [m]	
		DM	DS	DM	DS	DM	DS	DM	DS	DM	DS	DM	DS
Orsett Cock	A128 Brentwood Rd (North)	713	639	44	80	31	67	802	789	47	76	34	88
	A13 (East)	940	805	30	52	61	56	941	804	31	59	62	63
	A1013 Stanford Rd (East)	663	651	27	61	38	88	662	601	28	127	41	222
	Brentwood Rd (South)	700	728	145	99	369	168	674	730	171	98	429	167
	A1013 Stanford Rd (West)	795	625	76	79	186	102	769	597	60	71	124	76
	A13 (West)	471	1,484	36	29	38	65	472	1,484	37	29	39	65
A1013 Stanford Road / Rectory Road	Rectory Rd	183	263	62	50	59	57	127	126	27	22	24	21
	Stanford Rd (East)	977	862	8	7	14	35	1,022	949	8	7	14	39
	Stanford Rd (West)	725	565	4	3	-	-	724	565	4	3	-	-

Table B.4 Traffic conditions, 2030, AM peak 08:00 - 09:00

Junction	Approach	Run ID 3.6 Core Scenario						Run ID 3.10 Sensitivity Test 1					
		Flow (veh)		Avg. Delay per veh [s]		Mean Max. Queue [m]		Flow (veh)		Avg. Delay per veh [s]		Mean Max. Queue [m]	
		DM	DS	DM	DS	DM	DS	DM	DS	DM	DS	DM	DS
Orsett Cock	A128 Brentwood Rd (North)	801	725	49	81	39	75	968	992	54	122	46	272
	A13 (East)	897	770	30	54	59	58	895	773	30	62	59	64
	A1013 Stanford Rd (East)	618	648	25	73	34	94	617	585	27	521	36	725
	Brentwood Rd (South)	809	807	601	142	1,405	272	718	808	768	133	1,441	250
	A1013 Stanford Rd (West)	848	762	171	228	670	580	891	725	132	110	471	182
	A13 (West)	473	1,537	36	32	38	70	470	1,537	36	32	38	70
A1013 Stanford Road / Rectory Road	Rectory Rd	203	369	1,029	494	698	533	201	199	138	31	81	35
	Stanford Rd (East)	985	873	10	10	27	62	1,054	1,039	9	8	20	47
	Stanford Rd (West)	802	624	85	64	-	-	806	624	29	4	-	-

Table B.5 Traffic conditions, 2030, PM peak 17:00 - 18:00

Junction	Approach	Run ID 3.6 Core Scenario						Run ID 3.10 Sensitivity Test 1					
		Flow (veh)		Avg. Delay per veh [s]		Mean Max. Queue [m]		Flow (veh)		Avg. Delay per veh [s]		Mean Max. Queue [m]	
		DM	DS	DM	DS	DM	DS	DM	DS	DM	DS	DM	DS
Orsett Cock	A128 Brentwood Rd (North)	940	824	109	74	270	68	944	864	133	80	376	82
	A13 (East)	888	553	74	330	112	217	887	553	72	318	110	206
	A1013 Stanford Rd (East)	588	520	51	112	56	112	592	510	53	107	57	93
	Brentwood Rd (South)	494	509	66	91	55	49	497	505	65	117	53	53
	A1013 Stanford Rd (West)	1,043	913	50	97	78	74	1,130	909	62	194	179	375
	A13 (West)	772	2,159	39	137	39	672	772	2,184	39	120	39	636
A1013 Stanford Road / Rectory Road	Rectory Rd	316	347	260	81	212	96	307	278	119	145	106	117
	Stanford Rd (East)	931	886	9	10	22	56	887	861	8	9	12	52
	Stanford Rd (West)	1,035	896	6	4	-	-	1,032	890	7	23	-	-

Table B.6 Traffic conditions, 2045, AM peak 07:00 - 08:00

Junction	Approach	Run ID 3.6 Core Scenario						Run ID 3.10 Sensitivity Test 1					
		Flow (veh)		Avg. Delay per veh [s]		Mean Max. Queue [m]		Flow (veh)		Avg. Delay per veh [s]		Mean Max. Queue [m]	
		DM	DS	DM	DS	DM	DS	DM	DS	DM	DS	DM	DS
Orsett Cock	A128 Brentwood Rd (North)	817	630	52	145	39	205	947	760	53	116	37	210
	A13 (East)	981	732	33	53	64	52	983	732	32	59	63	55
	A1013 Stanford Rd (East)	805	608	47	148	83	258	817	548	47	217	80	343
	Brentwood Rd (South)	524	918	323	137	635	435	505	913	419	135	753	422
	A1013 Stanford Rd (West)	770	548	173	118	532	162	719	547	198	105	623	129
	A13 (West)	512	1,893	39	35	39	85	514	1,888	38	35	39	87
A1013 Stanford Road / Rectory Road	Rectory Rd	138	249	207	49	192	53	98	129	178	22	75	23
	Stanford Rd (East)	1,002	823	16	7	75	38	1,031	893	11	7	37	36
	Stanford Rd (West)	800	577	63	5	-	-	732	582	112	4	-	-

Table B.7 Traffic conditions, 2045, AM peak 08:00 - 09:00

Junction	Approach	Run ID 3.6 Core Scenario						Run ID 3.10 Sensitivity Test 1					
		Flow (veh)		Avg. Delay per veh [s]		Mean Max. Queue [m]		Flow (veh)		Avg. Delay per veh [s]		Mean Max. Queue [m]	
		DM	DS	DM	DS	DM	DS	DM	DS	DM	DS	DM	DS
Orsett Cock	A128 Brentwood Rd (North)	915	750	57	417	47	961	1,145	930	60	426	66	1,418
	A13 (East)	940	696	33	55	61	51	937	699	31	60	60	56
	A1013 Stanford Rd (East)	769	679	54	357	105	605	754	508	41	666	70	738
	Brentwood Rd (South)	576	886	1,154	445	1,443	1,364	503	893	1,350	442	1,443	1,366
	A1013 Stanford Rd (West)	812	637	191	298	786	707	831	665	196	188	870	345
	A13 (West)	517	1,982	40	38	39	95	516	1,985	40	40	39	97
A1013 Stanford Road / Rectory Road	Rectory Rd	150	336	2,040	386	1,261	405	127	207	1,243	41	470	40
	Stanford Rd (East)	1,044	857	15	10	78	65	1,108	974	13	8	66	55
	Stanford Rd (West)	881	612	121	128	-	-	872	637	152	19	-	-

Table B.8 Traffic conditions, 2045, PM peak 17:00 - 18:00

Junction	Approach	Run ID 3.6 Core Scenario						Run ID 3.10 Sensitivity Test 1					
		Flow (veh)		Avg. Delay per veh [s]		Mean Max. Queue [m]		Flow (veh)		Avg. Delay per veh [s]		Mean Max. Queue [m]	
		DM	DS	DM	DS	DM	DS	DM	DS	DM	DS	DM	DS
Orsett Cock	A128 Brentwood Rd (North)	798	890	356	117	1,061	182	817	899	331	247	1,118	677
	A13 (East)	1,018	501	78	230	131	144	1,018	504	69	242	117	143
	A1013 Stanford Rd (East)	696	514	192	159	326	175	690	511	179	126	293	116
	Brentwood Rd (South)	571	647	107	171	117	191	570	640	120	195	133	204
	A1013 Stanford Rd (West)	1,040	887	63	127	83	131	1,206	817	95	275	442	675
	A13 (West)	765	2,163	47	318	39	2,257	765	2,271	47	284	39	2,148
A1013 Stanford Road / Rectory Road	Rectory Rd	269	366	445	121	347	134	270	122	433	339	294	280
	Stanford Rd (East)	1,044	914	12	10	44	65	973	46	9	21	15	85
	Stanford Rd (West)	1,127	976	7	6	-	-	1,129	0	21	-	-	-

5.1.6 The latent demand for the core run ID 3.6 and sensitivity test 1 run ID 3.10 are presented in Table B.9 below.

Table B.9 Latent demand comparison Test 1 run ID 3.10 vs Core run ID 3.6

Run	AM 07:00-08:00		AM 08:00-09:00		PM 17:00-18:00	
	Core run ID 3.6	Test 1 run ID 3.10	Core run ID 3.6	Test 1 run ID 3.10	Core run ID 3.6	Test 1 run ID 3.10
DM 2030	3	11	23	110	3	7
DM 2045	82	163	458	435	166	185
DS 2030	64	65	2	34	2	2
DS 2045	79	121	48	243	88	122

B.3 Sensitivity Test 2 – Rectory Road closed to all traffic except public transport and active travel modes

B.3.1 This test re-allocates all of the Rectory Road traffic except public transport and active travel modes to the A128. It assumes that the number of trips from/ to zone 7 (Rectory Road) in the 2030 and 2045 demand matrices for car, LGV and HGV are zero and all the trips re-allocated to zone 1 (the A128). This allocation of trips between Rectory Road and the A128 overrides the allocation produced by the Lower Thames Area Model (LTAM).

B.3.2 The test was carried out for both the DM (without the Project) and DS (with the Project) scenario, for AM periods 07.00 – 08.00 (AM1 in tables) and 08.00 – 09.00 (AM2 in tables), and PM period 17.00 – 18.00.

B.3.3 In this test, all trips using Rectory Road, except public transport and active travel modes, have been allocated to the A128 and therefore would use the Orsett Cock junction.

B.3.4 The 2016 base year flows at zone 7 (Rectory Road) are shown in Table B.1. Plate B.10 provides a summary of the number of trips re-allocated from zone 7 (Rectory Road) to zone 1 (A128).

Table B.10 Test 2 – Total trips re-allocated from zone 7 to zone 1

Time period	Run ID and trip movement	Total			
		Origin		Destination	
		Zone 1	Zone 7	Zone 1	Zone 7
2030 DM AM1	Run ID 3.6 Core Scenario	736	230	1,124	161
	Run ID 3.11 Sensitivity Test 2	966	0	1,285	0
	Trips moved to zone 1	**230**	**-230**	**161**	**-161**
2030 DM AM2	Run ID 3.6 Core Scenario	799	374	1,101	158
	Run ID 3.11 Sensitivity Test 2	1,173	0	1,259	0
	Trips moved to zone 1	**374**	**-374**	**158**	**-158**
2030 DM PM	Run ID 3.6 Core Scenario	1,036	345	907	306
	Run ID 3.11 Sensitivity Test 2	1,381	0	1,213	0
	Trips moved to zone 1	**345**	**-345**	**306**	**-306**
2045 DM AM1	Run ID 3.6 Core Scenario	846	266	1,105	256
	Run ID 3.11 Sensitivity Test 2	1,112	0	1,362	0
	Trips moved to zone 1	**267**	**-266**	**256**	**-256**
2045 DM AM2	Run ID 3.6 Core Scenario	917	438	1,073	263
	Run ID 3.11 Sensitivity Test 2	1,355	0	1,337	0
	Trips moved to zone 1	**438**	**-438**	**263**	**-263**

Time period	Run ID and trip movement	Total			
		Origin		Destination	
		Zone 1	Zone 7	Zone 1	Zone 7
2045 DM PM	Run ID 3.6 Core Scenario	1,126	345	976	396
	Run ID 3.11 Sensitivity Test 2	1,126	345	1,373	0
	Trips moved to zone 1	**0**	**0**	**396**	**-396**
2030 DS AM1	Run ID 3.6 Core Scenario	659	293	994	129
	Run ID 3.11 Sensitivity Test 2	952	0	1,124	0
	Trips moved to zone 1	**293**	**-293**	**129**	**-129**
2030 DS AM2	Run ID 3.6 Core Scenario	722	490	991	125
	Run ID 3.11 Sensitivity Test 2	1,213	0	1,115	0
	Trips moved to zone 1	**490**	**-490**	**125**	**-125**
2030 DS PM	Run ID 3.6 Core Scenario	829	350	845	301
	Run ID 3.11 Sensitivity Test 2	1,179	0	1,146	0
	Trips moved to zone 1	**349**	**-349**	**301**	**-301**
2045 DS AM1	Run ID 3.6 Core Scenario	701	273	1,214	174
	Run ID 3.11 Sensitivity Test 2	974	0	1,388	0
	Trips moved to zone 1	**273**	**-273**	**174**	**-174**
2045 DS AM2	Run ID 3.6 Core Scenario	767	448	1,193	177
	Run ID 3.11 Sensitivity Test 2	1,215	0	1,370	0
	Trips moved to zone 1	**448**	**-448**	**177**	**-177**
2045 DS PM	Run ID 3.6 Core Scenario	896	367	887	378
	Run ID 3.11 Sensitivity Test 2	1,263	0	1,264	0
	Trips moved to zone 1	**367**	**-367**	**378**	**-378**

Results summary

B.3.5 The results of the throughput flow, average delay and mean maximum queue of the Core Scenario (run ID 3.6) and Sensitivity Test 2 (run ID 3.11) are presented in Table B.11 to Table B.17.

B.3.6 The results from test 2 show that re-allocating all trips from Rectory Road to the A128 has a greater impact on the junction compared to test 1, with increases in queues on the A128 in both 2030 and 2045 for the DM and DS scenarios.

B.3.7 Brentwood Road (South) is priority control in the DM scenario and is forecast to be over-saturated with long delays and queues in the DM. Similar to test 1, test 2 shows that this approach will have additional delays and queues with the re-allocation of all Rectory Road trips due to more opposing flow from the A128 on the southern circulatory.

B.3.8 The trip re-assignment in the DS scenario also has an impact on the A1013 (E) approach which experiences longer delays and queues in 2030 and 2045 under test 2 in the AM peak. This is due to more opposing flow on the southbound circulatory.

B.3.9 Queues on the A1013 (W) increase in both the DM and DS scenarios in the PM peak due to additional traffic on the A1013 (W) eastbound approach at the Orsett Cock junction and more opposing traffic on the circulatory carriageway. Buses using Rectory Road in test 2 would have an unimpeded journey along this corridor but would experience delays at the junction with the A1013. Bus routes 5A, 5B, 11 and 100 using the A1013 up to the Orsett Cock junction would experience greater delay.

B.3.10 Table B.17 shows that there is significant increase in latent demand in test 2 compared to the Core Scenario (run ID 3.6) particularly in 2045 for both the DM and DS scenarios. This indicates the junction is a lot more saturated under test 2 with more vehicles unable to enter the modelled network due to the long queues.

Result comparison Sensitivity test 2 (run ID 3.11) vs Core Scenario (run ID 3.6)

B.3.11 Throughput flow, average delay and mean maximum queue results comparison of the Core Scenario (run ID 3.6) and Sensitivity Test 2 (run ID 3.11) are presented in the tables below.

Table B.11 Traffic conditions, 2030, AM peak 07:00 - 08:00

Junction	Approach	Run ID 3.6 Core Scenario						Run ID 3.11 Sensitivity Test 2					
		Flow (veh)		Avg. Delay per veh [s]		Mean Max. Queue [m]		Flow (veh)		Avg. Delay per veh [s]		Mean Max. Queue [m]	
		DM	DS	DM	DS	DM	DS	DM	DS	DM	DS	DM	DS
Orsett Cock	A128 Brentwood Rd (North)	713	639	44	80	31	67	922	862	50	118	37	260
	A13 (East)	940	805	30	52	61	56	941	802	32	60	59	60
	A1013 Stanford Rd (East)	663	651	27	61	38	88	662	614	30	110	39	185
	Brentwood Rd (South)	700	728	145	99	369	168	657	723	188	104	459	169
	A1013 Stanford Rd (West)	795	625	76	79	186	102	703	534	76	79	151	75
	A13 (West)	471	1,484	36	29	38	65	472	1,482	36	29	38	67
A1013 Stanford Road / Rectory Road	Rectory Rd	183	263	62	50	59	57	3	3	27	24	0	0
	Stanford Rd (East)	977	862	8	7	14	35	931	877	8	5	2	5
	Stanford Rd (West)	725	565	4	3	-	-	725	564	5	3	-	-

Table B.12 Traffic conditions, 2030, AM peak 08:00 - 09:00

Junction	Approach	Run ID 3.6 Core Scenario						Run ID 3.11 Sensitivity Test 2					
		Flow (veh)		Avg. Delay per veh [s]		Mean Max. Queue [m]		Flow (veh)		Avg. Delay per veh [s]		Mean Max. Queue [m]	
		DM	DS	DM	DS	DM	DS	DM	DS	DM	DS	DM	DS
Orsett Cock	A128 Brentwood Rd (North)	801	725	49	81	39	75	1,166	1,005	59	390	56	1,528
	A13 (East)	897	770	30	54	59	58	897	774	31	63	58	60
	A1013 Stanford Rd (East)	618	648	25	73	34	94	614	609	29	461	37	695
	Brentwood Rd (South)	809	807	601	142	1,405	272	651	812	874	161	1,443	311
	A1013 Stanford Rd (West)	848	762	171	228	670	580	798	649	179	125	583	165
	A13 (West)	473	1,537	36	32	38	70	471	1,540	36	33	38	72
A1013 Stanford Road / Rectory Road	Rectory Rd	203	369	1,029	494	698	533	1	1	64	27	0	0
	Stanford Rd (East)	985	873	10	10	27	62	992	976	8	5	2	8
	Stanford Rd (West)	802	624	85	64	-	-	804	625	59	4	-	-

Table B.13 Traffic conditions, 2030, PM peak 17:00 - 18:00

Junction	Approach	Run ID 3.6 Core Scenario						Run ID 3.11 Sensitivity Test 2					
		Flow (veh)		Avg. Delay per veh [s]		Mean Max. Queue [m]		Flow (veh)		Avg. Delay per veh [s]		Mean Max. Queue [m]	
		DM	DS	DM	DS	DM	DS	DM	DS	DM	DS	DM	DS
Orsett Cock	A128 Brentwood Rd (North)	940	824	109	74	270	68	1,268	942	141	427	674	1,428
	A13 (East)	888	553	74	330	112	217	888	557	67	306	102	193
	A1013 Stanford Rd (East)	588	520	51	112	56	112	590	514	63	130	68	102
	Brentwood Rd (South)	494	509	66	91	55	49	495	507	105	141	97	53
	A1013 Stanford Rd (West)	1,043	913	50	97	78	74	1,040	752	64	298	179	630
	A13 (West)	772	2,159	39	137	39	672	772	2,242	37	81	38	346
A1013 Stanford Road / Rectory Road	Rectory Rd	316	347	260	81	212	96	1	1	30	41	0	0
	Stanford Rd (East)	931	886	9	10	22	56	939	873	7	5	2	8
	Stanford Rd (West)	1,035	896	6	4	-	-	1,034	802	6	111	-	-

Table B.14 Traffic conditions, 2045, AM peak 07:00 - 08:00

Junction	Approach	Run ID 3.6 Core Scenario						Run ID 3.11 Sensitivity Test 2					
		Flow (veh)		Avg. Delay per veh [s]		Mean Max. Queue [m]		Flow (veh)		Avg. Delay per veh [s]		Mean Max. Queue [m]	
		DM	DS	DM	DS	DM	DS	DM	DS	DM	DS	DM	DS
Orsett Cock	A128 Brentwood Rd (North)	817	630	52	145	39	205	1,065	816	55	186	40	534
	A13 (East)	981	732	33	53	64	52	984	727	33	61	62	54
	A1013 Stanford Rd (East)	805	608	47	148	83	258	813	560	48	214	80	337
	Brentwood Rd (South)	524	918	323	137	635	435	494	913	398	145	741	435
	A1013 Stanford Rd (West)	770	548	173	118	532	162	628	518	243	137	615	168
	A13 (West)	512	1,893	39	35	39	85	515	1,892	39	35	39	85
A1013 Stanford Road / Rectory Road	Rectory Rd	138	249	207	49	192	53	3	3	63	27	0	0
	Stanford Rd (East)	1,002	823	16	7	75	38	984	840	8	5	3	4
	Stanford Rd (West)	800	577	63	5	-	-	662	573	128	8	-	-

Table B.15 Traffic conditions, 2045, AM peak 08:00 - 09:00

Junction	Approach	Run ID 3.6 Core Scenario						Run ID 3.11 Sensitivity Test 2					
		Flow (veh)		Avg. Delay per veh [s]		Mean Max. Queue [m]		Flow (veh)		Avg. Delay per veh [s]		Mean Max. Queue [m]	
		DM	DS	DM	DS	DM	DS	DM	DS	DM	DS	DM	DS
Orsett Cock	A128 Brentwood Rd (North)	915	750	57	417	47	961	1,345	922	63	534	90	1,645
	A13 (East)	940	696	33	55	61	51	938	701	32	63	58	56
	A1013 Stanford Rd (East)	769	679	54	357	105	605	762	536	42	618	65	737
	Brentwood Rd (South)	576	886	1,154	445	1,443	1,364	452	886	1,484	455	1,444	1,369
	A1013 Stanford Rd (West)	812	637	191	298	786	707	688	650	272	297	872	624
	A13 (West)	517	1,982	40	38	39	95	516	1,985	39	39	40	97
A1013 Stanford Road / Rectory Road	Rectory Rd	150	336	2,040	386	1,261	405	1	1	71	40	0	0
	Stanford Rd (East)	1,044	857	15	10	78	65	1,045	909	8	5	1	8
	Stanford Rd (West)	881	612	121	128	-	-	688	640	231	92	-	-

Table B.16 Traffic conditions, 2045, PM peak 17:00 - 18:00

Junction	Approach	Run ID 3.6 Core Scenario						Run ID 3.11 Sensitivity Test 2					
		Flow (veh)		Avg. Delay per veh [s]		Mean Max. Queue [m]		Flow (veh)		Avg. Delay per veh [s]		Mean Max. Queue [m]	
		DM	DS	DM	DS	DM	DS	DM	DS	DM	DS	DM	DS
Orsett Cock	A128 Brentwood Rd (North)	798	890	356	117	1,061	182	1,091	904	264	564	1,166	1,647
	A13 (East)	1,018	501	78	230	131	144	1,016	508	65	242	113	139
	A1013 Stanford Rd (East)	696	514	192	159	326	175	697	508	301	136	503	108
	Brentwood Rd (South)	571	647	107	171	117	191	580	652	209	238	264	227
	A1013 Stanford Rd (West)	1,040	887	63	127	83	131	1,130	651	94	437	424	866
	A13 (West)	765	2,163	47	318	39	2,257	764	2,365	43	232	39	1,706
A1013 Stanford Road / Rectory Road	Rectory Rd	269	366	445	121	347	134	1	1	50	51	0	0
	Stanford Rd (East)	1,044	914	12	10	44	65	1,007	908	8	5	2	11
	Stanford Rd (West)	1,127	976	7	6	-	-	1,127	652	21	240	-	-

B.3.12 The latent demand for the core run ID 3.6 and sensitivity test 2 run ID 3.11 is presented in Table B.17 below.

Table B.17 Latent demand comparison sensitivity test 2 run ID 3.11 vs core run ID 3.6

Run	AM 07:00-08:00		AM 08:00-09:00		PM 17:00-18:00	
	Core run ID 3.6	Test 2 run ID 3.11	Core run ID 3.6	Test 2 run ID 3.11	Core run ID 3.6	Test 2 run ID 3.11
DM 2030	3	21	23	183	3	35
DM 2045	82	216	458	725	166	249
DS 2030	64	59	2	158	2	219
DS 2045	79	148	48	484	88	666

B.4 Relative delay plots

B.4.1 Relative delay plots are shown in Plate B.1 to Plate B.12.

Plate B.1 DM Relative delay plots run ID 3.6 (Core) vs 3.10 (Test 1) vs 3.11 (Test 2) 2030 AM1

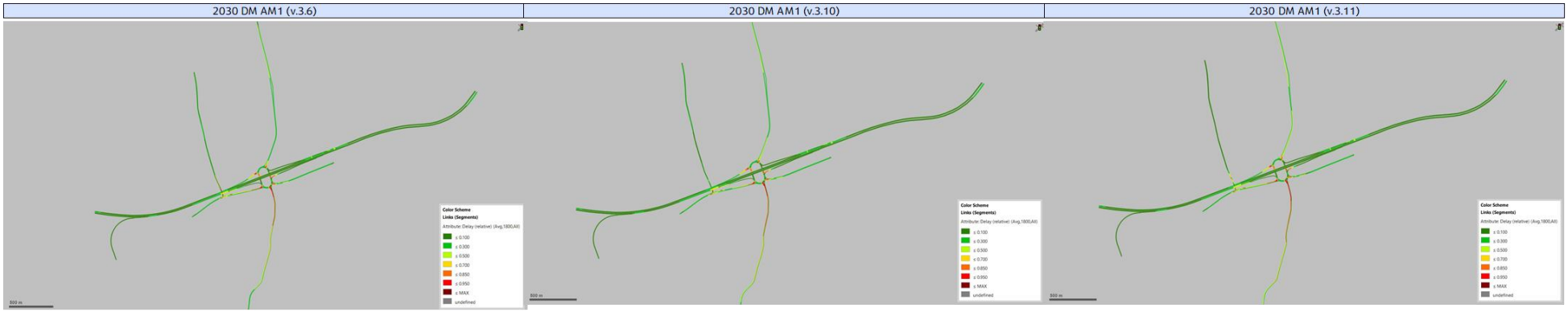


Plate B.2 DS Relative delay plots run ID 3.6 (Core) vs 3.10 (Test 1) vs 3.11 (Test 2) 2030 AM1

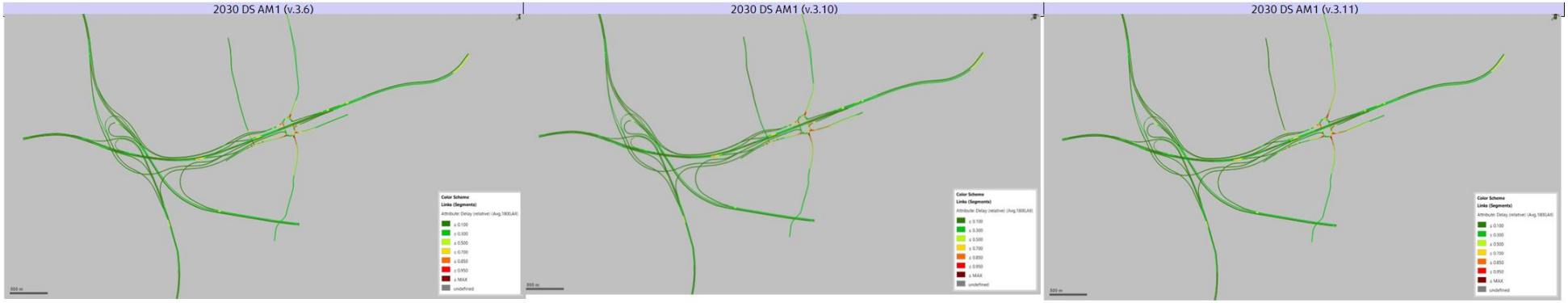


Plate B.3 DM Relative delay plots run ID 3.6 (Core) vs 3.10 (Test 1) vs 3.11 (Test 2) 2030 AM2

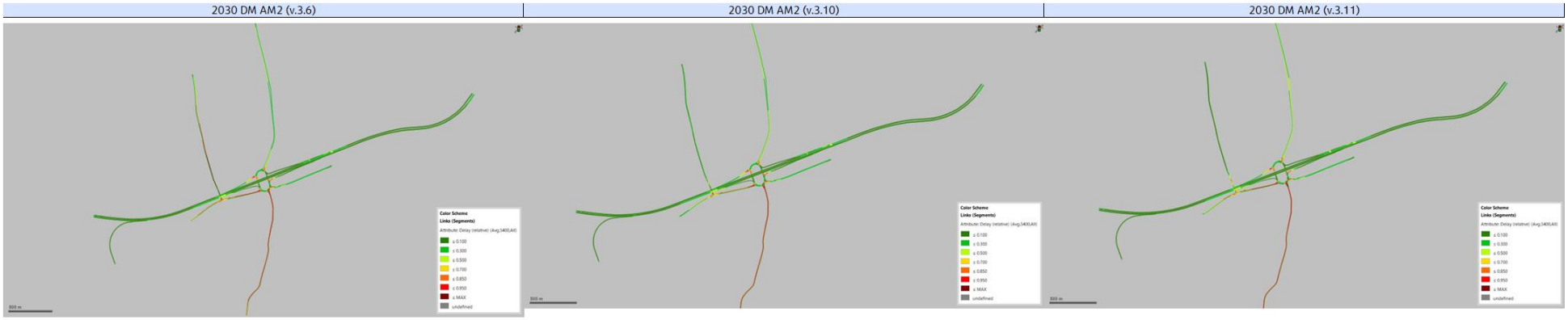


Plate B.4 DS Relative delay plots run ID 3.6 (Core) vs 3.10 (Test 1) vs 3.11 (Test 2) 2030 AM2

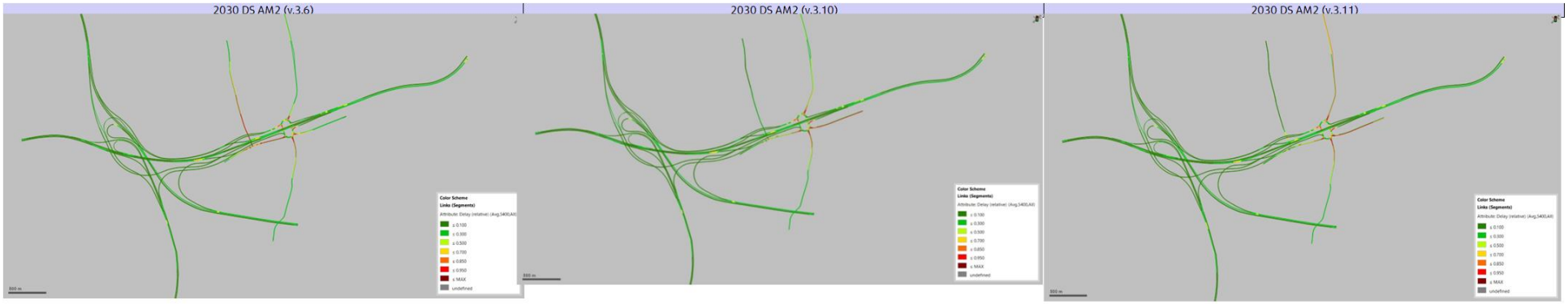


Plate B.5 DM Relative delay plots run ID 3.6 (Core) vs 3.10 (Test 1) vs 3.11 (Test 2) 2030 PM

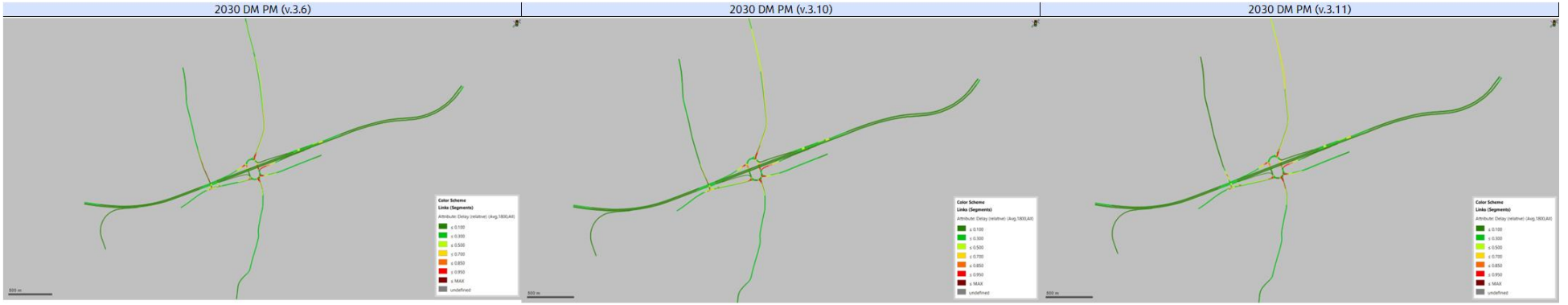


Plate B.6 DS Relative delay plots run ID 3.6 (Core) vs 3.10 (Test 1) vs 3.11 (Test 2) 2030 PM

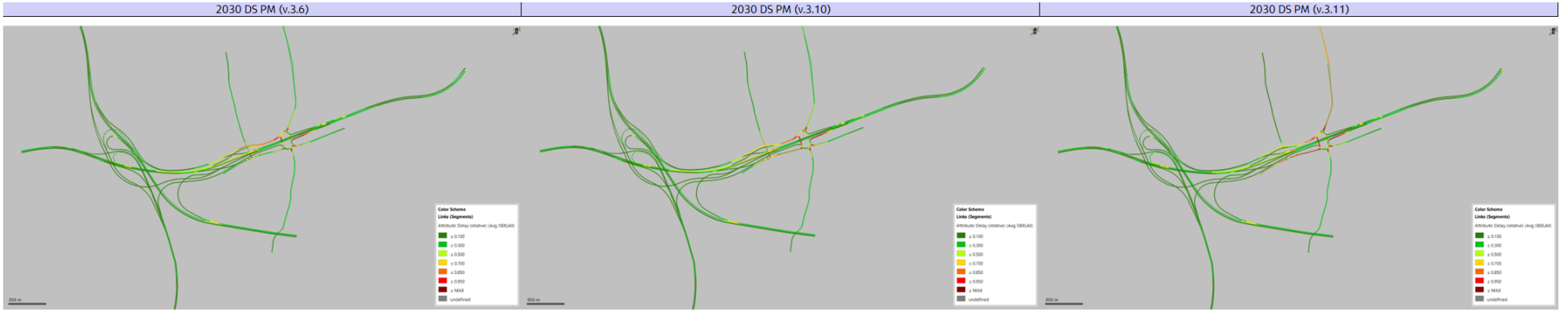


Plate B.7 DM Relative delay plots run ID 3.6 (Core) vs 3.10 (Test 1) vs 3.11 (Test 2) 2045 AM1

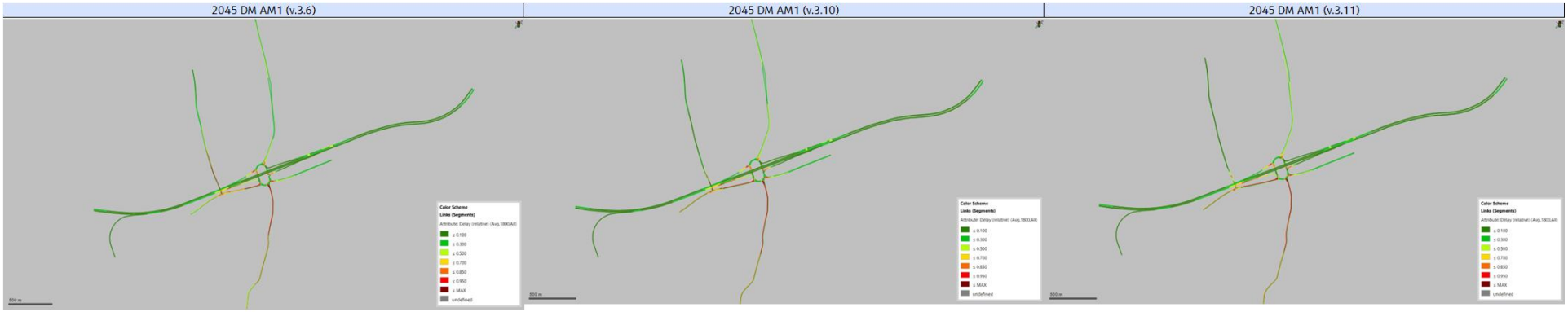


Plate B.8 DS Relative delay plots run ID 3.6 (Core) vs 3.10 (Test 1) vs 3.11 (Test 2) 2045 AM1

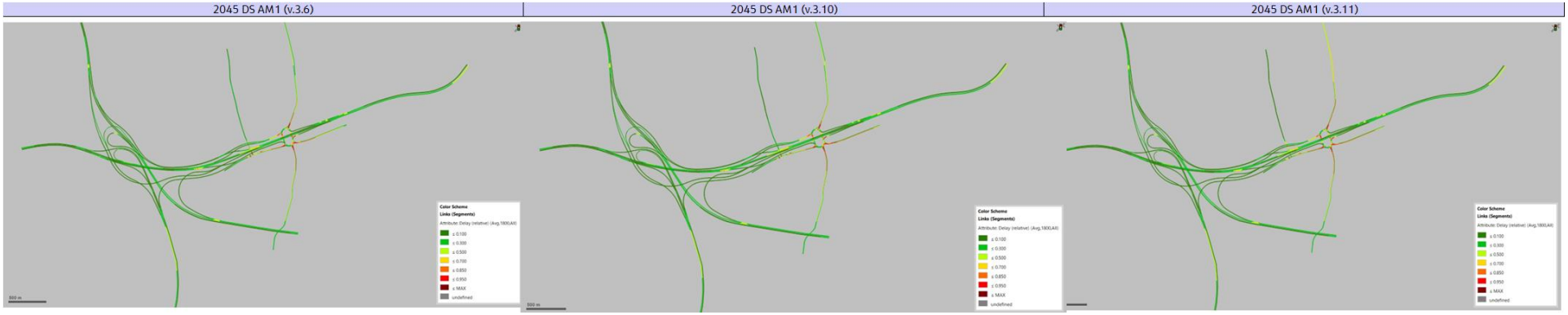


Plate B.9 DM Relative delay plots run ID 3.6 (Core) vs 3.10 (Test 1) vs 3.11 (Test 2) 2045 AM2

Plate B.10 DS Relative delay plots run ID 3.6 (Core) vs 3.10 (Test 1) vs 3.11 (Test 2) 2045 AM2

Plate B.11 DM Relative delay plots run ID 3.6 (Core) vs 3.10 (Test 1) vs 3.11 (Test 2) 2 2045 PM

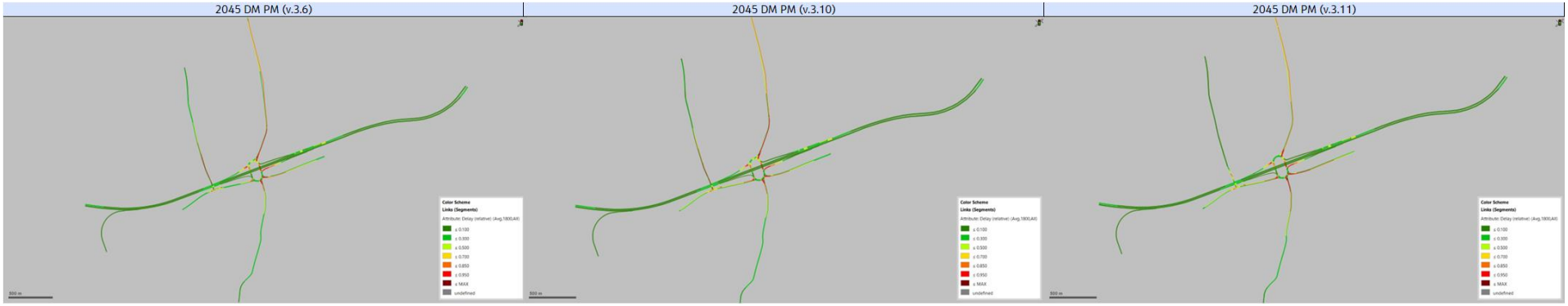
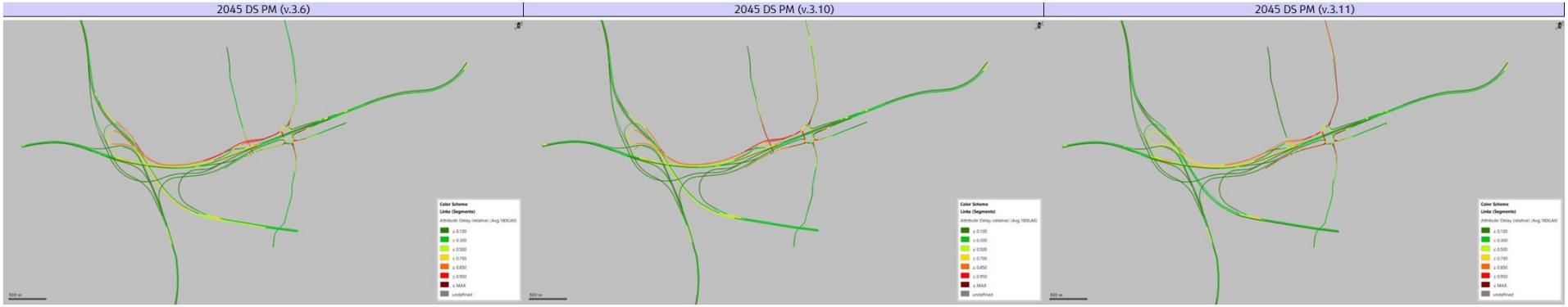


Plate B.12 DS Relative delay plots run ID 3.6 (Core) vs 3.10 (Test 1) vs 3.11 (Test 2) 2045 PM



If you need help accessing this or any other National Highways information, please call **0300 123 5000** and we will help you.

If you have any enquiries about this publication email **info@nationalhighways.co.uk** or call **0300 123 5000***.

*Calls to 03 numbers cost no more than a national rate call to an 01 or 02 number and must count towards any inclusive minutes in the same way as 01 and 02 calls.

These rules apply to calls from any type of line including mobile, BT, other fixed line or payphone. Calls may be recorded or monitored.

Printed on paper from well-managed forests and other controlled sources when issued directly by National Highways.

Registered office Bridge House, 1 Walnut Tree Close, Guildford GU1 4LZ

National Highways Limited registered in England and Wales number 09346363