London Streets

Transport for London Lane Rental Scheme Monitoring Report 2012/13

Status: Final
Version: 1.5
Date: 18/06/13

MAYOR OF LONDON

Transport for London

STREETS

Contents

0. Document Control

0.1. Author(s)

Louise Hall and James Cockerton

0.2. Document Summary

This document provides information on the impacts of the Transport for London Lane Rental Scheme since it was implemented in June 2012.

0.3. Document History

Version	Date	Changes since previous issue
0.1	22/04/13	First draft
0.2	23/04/13	Second draft
1.0	29/04/13	Final draft
1.1	17/05/13	Final draft – with extra data source
1.2	29/05/13	Final draft – with extra data source
1.3	03/06/13	Final draft
1.4	11/06/13	Final draft
1.5	18/06/13	Final

0.4. Reference Documents

Transport for London Lane Rental Scheme fv Submission
TLRS Cost Benefit Analysis v2.1, January 2012

0.5. Distribution

Andy Emmonds – Chief Traffic Analyst, Traffic Analysis Centre
Mark Beasley – Head of Planned Interventions, Planned Interventions
Gerard O'Toole – Operational Analysis Manager, Planned Interventions
Helena Kakouratos – Works Co-ordination and Permitting Manager, Planned Interventions
Becky Gray – Network Analysis Team Leader, Traffic Analysis Centre

0.6. Document Quality Assurance

Step	Step Description	Undertaken by	Date	Remarks
1	First draft 0.1	LH & JC	22/04/13	
2	Review 0.1	BG & AE	23/04/13	
3	Review 0.2	LH	23/04/13	
4	Final draft 0.2 checked	LH & AS	23/04/13	
5	Final draft 1.0 approved for distribution	AE	24/04/13	
6	Final draft 1.1 checked	AE & MB	17/05/13	
7	Final draft 1.2 check	AE & MB	29/05/13	
8	Final draft 1.3 approved for distribution	AE & MB	03/06/13	
9	Final 1.4	GE	11/06/13	
10	Final 1.5	GE	18/06/13	

1. Executive Summary

The Transport for London Lane Rental Scheme (TLRS) was introduced on 11th June 2012. The TLRS applies to 57% of the Transport for London Road Network (TLRN) and is designed to minimise disruption due to road works and street works in specified traffic-sensitive locations by applying a daily charge for each day that the street is occupied by the works. The daily charge is not applied or is reduced if the works take place outside traffic-sensitive times. The scheme therefore provides a mechanism for providing all activity promoters with an incentive to change behaviour and minimise their occupation of the street at traffic-sensitive times at the most traffic-sensitive locations.

As well as promoting behaviour change to minimise the duration of street works in TLRS segments, other key objectives of the scheme are to minimise the number of works taking place during traffic-sensitive times and the disruption caused to traffic in these locations, by reducing journey times and improving journey time reliability (JTR).

The introduction of the TLRS coincided with the Clearway 2012 works embargo which was implemented to restrict works taking place on the Olympic Route Network (ORN). This had a huge impact on the numbers of works taking place inside TLRS areas during this period. As such the journey time, JTR and works numbers analysis described in this paper covers the six month period October 2012 to March 2013 compared to the same six months in the previous year to provide a direct comparison of the impact of the scheme. However serious and severe disruption and the number of works incurring a charge have been examined using additional data which includes the Olympic and Paralympic period in order to assess some of the impact that the scheme has had since its implementation.

Following the implementation of the TLRS 99% of Transport for London (TfL) works and 92% of utility works avoided incurring a TLRS charge. However it should be noted that there were some instances where TLRS fees were waived or where works were exempt from charges due to transitional arrangements and therefore the full effect of the scheme may not yet have been felt.

Serious and severe disruption associated with road works decreased by 36% in TLRS segments year on year between June 2011 to March 2012 and June 2012 to March 2013.

In TLRS segments journey times improved by 3.2% in the AM peak and 2.6% in the PM peak during this time. This is over and above the expected journey time reduction of 0.61% across the road network in London. Not only are the numbers realised much larger than this, they have been achieved on the TLRN alone, showing that the TLRS has had a much greater impact than expected on journey times. In addition, this benefit has been seen much sooner than expected as it was forecast for the first year after the TLRS was implemented.

The journey time savings equate to an 8% reduction in delays which could be valued at more than £50m per annum in travel time savings on the TLRN. This figure represents annualised data. In addition JTR also improved in the TLRS segments by 1.2 percentage points in the AM peak and 0.4 percentage points in the PM peak.

Analysis shows just 32% of days where works were requested to take place during traffic-sensitive times were approved, showing that TfL is taking an active role in ensuring that the number of days that works take place during traffic-sensitive times is kept to a minimum.

Several case studies highlight the impact that the TLRS has had in particular areas. Major works are currently taking place at Tottenham Hale. The majority of these are being performed at night in order to avoid TLRS charges. Analysis shows the success of this strategy as journey times and JTR have improved in the AM and PM peaks despite the scale of the works.

A case study of an area which is not included in the TLRS was also examined for comparison. The works studied largely took place outside of traffic-sensitive times, however on certain days the AM and PM peaks were affected with evidence of increased disruption and journey times and worsening JTR.

This report shows that the TLRS has been successful since it was implemented. Journey times and JTR have improved beyond what was expected and serious and severe disruption due to road works has decreased. This is true for the scheme as a whole and for individual case studies.

2. Introduction

The TLRS was introduced on 11th June 2012. The TLRS applies to 57% of the TLRN and is designed to minimise disruption due to road works and street works in specified traffic-sensitive locations by applying a daily charge for each day that the street is occupied by the works. The daily charge is applied or is reduced if the works take place outside traffic-sensitive times.

The TLRS therefore provides a mechanism for providing all activity promoters with an incentive to change behaviour and minimise their occupation of the street at traffic-sensitive times at the most traffic-sensitive locations.

The TLRS charge bands are as follows:

- *Charge Band 1*: £800 a day; charging times are 07:00-10:00 and 15:30-19:00 Monday to Friday and 12:00-18:00 Saturdays and Sundays
- *Charge Band 2 (segments)*: £2500 a day; charging times are 07:00-20:00 Monday to Friday and 12:00-18:00 Saturdays and Sundays
- *Charge Band 3 (pinch points)*: £2500 a day; charging times are 07:00-20:00 Monday to Friday and 12:00-18:00 Saturdays and Sundays

The introduction of the TLRS coincided with the Clearway 2012 works embargo which was implemented to restrict works taking place on the Olympic Route Network (ORN). This had a huge impact on the number of works taking place inside TLRS areas during this period. As such the journey time, JTR and works numbers analysis described in this paper covers the six month period October 2012 to March 2013 compared to the same six months in the previous year to provide a direct comparison of the impact of the scheme. However serious and severe disruption and the number of works incurring a charge have been examined using additional data which includes the Olympic and Paralympic period in order to assess the impact that the scheme has had on some aspects since its implementation.

Journey time data is taken from London Congestion Analysis Project (LCAP) Automatic Number Plate Recognition (ANPR) cameras. The LCAP network is primarily focussed on the Transport for London Road Network (TLRN) and therefore analysis described in this paper is for the TLRN only. The TLRS covers 57% of the TLRN; the remaining 43% of the TLRN is categorised 'non-TLRS' in the analysis outlined below. As a result any impact that the TLRS has had on the Borough Principal Road Network is not examined in this paper. This analysis will be carried out at a later date using a different source of journey time data[1].

There are three major caveats to this analysis. Firstly, the analysis does not cover the first full year of operation and secondly, there is an assumption that all things apart from the implementation of the TLRS are equal across the TLRN in terms of network outcomes. Finally TfL also operates Congestion Management Areas (CMAs) where resources are concentrated as part of the 'smoothing traffic' agenda. As the

[1] The TrafficMaster GPS journey time data is available on a quarterly basis and is delivered one quarter in arrears. Therefore further analysis will be carried out using this data at a later date.

CMAs are located on the same traffic-sensitive areas of the network as the TLRS, the relative contribution of the scheme as measured by journey times and JTR cannot be separated from CMA measures.

As part of the preparation for the launch of TLRS, TfL and the Department for Transport (DfT) jointly funded a research project into innovative methods of undertaking road works with a view to reducing disruption. The outputs of this project have included a faster curing concrete specification, improved plating products covering larger areas, promoting greater use of the “Core and Vac” technology which utilises keyhole surgery techniques to reduce works durations and investigation of bridging over large excavations. These were all shared with works promoters to assist in minimising the disruption on the network and avoiding TLRS charges.

3. Objectives of the TLRS

The TLRS seeks to contribute to JTR, by encouraging the undertaking of works at the least traffic-sensitive times, and an early completion of works. It also applies the following guiding principles:

- safety must be ensured;
- inconvenience to people using a street, including in particular people with a disability, must be minimised.

Other objectives of the TLRS are to:

- treat all activity promoters on an equal basis,
- promote behaviour change to minimise the duration of occupation of the street at the busiest locations at traffic-sensitive times on the network,
- minimise the number of works taking place during traffic-sensitive times and
- contribute to JTR as required under the Mayor’s Transport Strategy

TfL will measure these objectives so as to evaluate whether they are being met[2]. This report sets out an overview of the impact that the TLRS has had since its implementation. The report scrutinises the effect of the scheme as a whole, and also looks at detailed case studies which focus on particular areas of the network.

[2] TfL Lane Rental Scheme fv Submission

4. Analysis Since the TLRS was Implemented

The number of works avoiding a charge since the implementation of the TLRS in June 2012 has been analysed below. Changes to serious and severe disruption have also been examined for the nine month period. This shows some of the impact that the scheme had in its first nine months.

4.1. Number of Works Avoiding a Charge

The number of works taking place within TLRS segments has been examined. These are works which could have been subject to TLRS charges. Table 1 shows the proportion of works which took place within Lane Rental locations but avoided attracting a Lane Rental charge.

Table 1: Proportion of works avoiding TLRS charges

Proportion of works avoiding TLRS charges	
Promoter	**Total June 12 to March 13**
Transport for London	99%
Utilities	92%

It can be seen that 92% of utilities works and 99% of TfL works did not attract a TLRS charge.

These figures show impressive early behaviour changes by all works promoters. There has been a small number of works which have been exempt from charges due to transitional arrangements but these have not resulted in any serious and severe disruption whilst being undertaken.

4.2. Number of Hours of Disruption

A reduction in the number of works taking place in traffic-sensitive times should lead to a reduction in the amount of disruption taking place on the road network. The number of hours of serious and severe disruption associated with road works has been obtained using incident data and is summarised in Table 2. Other causes of disruption such as accidents and congestion have been excluded from this analysis as the TLRS targets road works only.

Table 2: Serious and severe disruption

Total Serious & Severe Disruption Associated with Works (Hours) in TLRS Segments			
	June 11 - March 12	**June 12 - March 13**	**% Change 11/12 to 12/13**
Highway authority	**370.71**	**191.58**	**-48%**
Planned	182.30	155.51	-15%
Unplanned	188.42	36.06	-81%
Utilities	**258.19**	**209.87**	**-19%**
Planned	136.73	88.18	-36%
Unplanned	121.46	121.69	0%
TLRS-wide	**628.90**	**401.45**	**-36%**

The results show that serious and severe disruption associated with road works fell by 36% inside all TLRS segments. Disruption associated with works carried out by utility companies fell by 19% and disruption associated with TfL works (the highway authority) fell by 48%.

Table 2 shows that disruption associated with planned utility works decreased by 36% year on year, suggesting that these works have been moved to take place outside of traffic-sensitive times and thereby causing less disruption.

5. Analysis Excluding the Clearway 2012 Embargo

Whilst the Clearway 2012 works embargo outlined earlier impacted on the numbers of works taking place inside TLRS areas between June and September 2012, this would not have had a direct impact on the way those works that still went ahead were carried out, for example in relation to the proportions of works carried out 'out of hours'. Other measures such as ORN Games Lanes and the Active Traffic Management (ATM) scheme put in place for the Olympics had a large impact on general traffic journey times and JTR. As such the remainder of the analysis described in this paper covers the six month period October 2012 to March 2013 compared to the same six months in the previous year to provide a direct comparison of the impact of the scheme. This offers a greater insight into these datasets than analysis since the implementation of the TLRS in June 2012 would have.

5.1. Behaviour Change

One of the objectives of the TLRS is to promote behaviour change among works promoters in order to minimise disruption on the road network during traffic-sensitive times.

i. Number of works taking place

Using data obtained from the Local Streetworks Register (LSWR) a comparison of the number of works taking place inside and outside of TLRS segments has been performed and a summary of the data is provided below in Table 3. The results have been separated into works undertaken by the highway authority (TfL) and those by utility companies.

Table 3: Number of works on the TLRN

Number of completed works inside or outside of TLRS segments			
	Oct 11 to Mar 12	**Oct 12 to Mar 13**	**% change**
Transport for London Total	**12,120**	**12,408**	**2%**
Transport for London – TLRS segments	8,648	9,488	10%
Transport for London - Non-TLRS segments	3,472	2,920	-16%
Utility Total	**6,206**	**4,923**	**-21%**
Utility – TLRS segments	4,106	3,628	-12%
Utility - Non-TLRS segments	2,100	1,295	-38%
Total TLRS segments	**12,754**	**13,116**	**3%**
Total Non-TLRS segments	**5,572**	**4,215**	**-24%**
Grand Total	**18,326**	**17,331**	**-5%**

NB: Table 3 refers to activity inside/outside the TLRS area, regardless of time of day; it does not refer to activity inside/outside of traffic-sensitive times

It can be seen that the total number of works undertaken on the TLRN fell by 5% year on year for the period studied. The data shows that this decrease was due to a reduction in works carried out by utility companies. The number of works carried out by TfL (the highway authority) increased by 10% in TLRS segments, resulting in a total of 9,488 works taking place. Despite this increase in the overall number of works TfL avoided TLRS charges in 99% of all cases as shown in Table 1, thus reinforcing the behaviour change as a result of the introduction of the TLRS. In a similar vein utility companies have avoided charges in 92% of all works.

ii. Changes to planned carriageway works

Information is also available on the total number of days that were approved for planned carriageway works undertaken by utilities in the period studied. This data comes from a subset of that used in Table 3 and does not represent all works which took place in TLRS areas. The number of 'Lane Rental' days applied for and approved is available and has been examined below. Lane Rental days are those where works took place during chargeable hours. As they are an accumulation of works by all utilities one day could be counted several times.

Table 4: Duration of planned works on TLRS segments

Duration of planned carriageway utility works on TLRS segments (days)	
	Oct 12 - Mar 13
Total requested lane rental days	1,606
Total agreed lane rental days	508
Total lane rental days saved	1,099
Proportion of approved lane rental days	32%
Proportion of lane rental days saved	68%

Table 4 shows that the number of 'lane rental days saved' in 2012/13 equated to 68% of all requested lane rental days. Approved lane rental days made up just 32% of all requested lane rental days. This shows that TfL is taking an active role in ensuring that works promoters' exposure to lane rental is minimised, whilst also minimising serious and severe disruption by ensuring the number of days that works take place during traffic-sensitive times is kept to a minimum.

There are a number of examples where works promoters have deliberately altered planned works in order to avoid TLRS charges. One such case is when National Grid (NGG) originally planned to close a lane on the A40 for site access to a mains replacement. Following the implementation of the TLRS, NGG arranged for a path to be constructed on private land instead. The number of days of disruption saved was in the region of 120. In another instance Network Rail undertook a bridge refurbishment between 22:00 and 06:00 and removed all traffic management at the end of each working day so that charges weren't incurred.

A further example is Tottenham Hale Gyratory where TfL are undertaking major improvement works to remove the gyratory system. Throughout the duration of the works most highway works will be undertaken outside of traffic-sensitive times so that no TLRS charges are incurred. This example is explored further in Case Study 1.

iii. Changes to night time works

Although the results in Table 4 show that the number of lane rental days fell, that does not mean that the works did not take place at all as they may have been moved to non-chargeable hours. TfL has also been proactive in approaching borough Environmental Health teams to allow extended working at night time periods and has already reached agreement with a number of boroughs.

Analysis has been undertaken on any changes to the time of day that the works shown in Table 4 took place. The proportion of works taking place during the day or overnight can be seen in Table 5.

Table 5: Proportion of day time or night time planned utility works

Proportion of planned utility works taking place during the day or at night			
	Oct 11 - Mar 12	Oct 12 - Mar 13	% points difference
TLRS segments - Day time	81%	73%	-8%
TLRS segments - Night time	19%	27%	8%
Non-TLRS segments - Day time	81%	77%	-4%
Non-TLRS segments - Night time	19%	23%	4%

It can be seen that the proportion of works which took place at night increased in both TLRS and non-TLRS areas. This suggests that there has been a shift to night time working by utility companies across the whole TLRN. As the increase was larger on TLRS segments this suggests that the TLRS has had an impact on times of day that works take place.

5.2. Journey Times and Journey Time Reliability

An objective of the TLRS is to contribute to JTR as part of the Mayor's traffic smoothing initiative. The TLRS could contribute to this by improving travel conditions on the road network. Another benefit that we could expect is an improvement in journey times in TLRS segments.

TfL's approach to measuring JTR is based on using ANPR camera data. The target for JTR on the TLRN was 89.2% between October 2012 and March 2013.

i. Journey times

A comparison of TLRS and non-TLRS journey times has been performed. Data has been analysed for each time period throughout the day, and has been separated into TLRS and non-TLRS segments.

Table 6: Change in journey times

Change in Average Journey Times												
	Oct 11 - Mar 12				Oct 12 - Mar 13				Change 11/12 to 12/13			
	AM Peak	Inter Peak	PM Peak	Over night	AM Peak	Inter Peak	PM Peak	Over night	AM Peak	Inter Peak	PM Peak	Over night
TLRS Segments	2.9	2.8	3.1	1.5	2.8	2.7	3.1	1.5	-3.2%	-4.0%	-2.6%	0.5%
Non-TLRS Segments	2.8	2.8	3.0	1.5	2.7	2.8	3.0	1.6	-1.1%	-1.6%	-1.1%	2.8%
TLRS Impact									-2.1%	-2.4%	-1.4%	-2.3%

Table 6 shows that journey times improved in the AM, inter and PM peaks on both TLRS and non-TLRS segments. If we assume that all other things are equal in terms of network outcomes, than we can surmise that any difference in outcomes between the two groups of segments can be attributed to the implementation of the TLRS, or the TLRS impact. The data shows a greater reduction in journey times on TLRS segments, suggesting that the scheme has had a positive impact during chargeable hours. The TLRS Cost Benefit Analysis (COBA)[3] showed that the short term journey time benefit of the TLRS was an expected reduction of 0.61% across the road network in London. Not only are the numbers realised much larger than this they have been achieved on the TLRN alone, showing that the TLRS has had a much greater impact than expected on journey times. In addition, this benefit has been seen much sooner than expected as it was forecast for the first year after the TLRS was implemented. This is consistent with the greater than expected shift to out of peak hours working described earlier.

The journey time savings shown in Table 6 equate to an 8% reduction in delays as delays make up 37% of travel times on the TLRN between 7am and 7pm. This could be valued at more than £50m per annum in travel time savings, excluding any savings caused on parallel and surrounding Borough roads by traffic reassigning to the TLRN. This figure represents annualised data.

ii. Journey time reliability

Journey Time Reliability (JTR) for the TLRS and non TLRS segments of the TLRN has been analysed in the same way. The results are summarised in Table 7.

Table 7: Change in JTR

Change in Journey Time Reliability												
	Oct 11 - Mar 12				**Oct 12 - Mar 13**				**% Point Difference 11/12 to 12/13**			
	AM Peak	**Inter Peak**	**PM Peak**	**Over night**	**AM Peak**	**Inter Peak**	**PM Peak**	**Over night**	**AM Peak**	**Inter Peak**	**PM Peak**	**Over night**
TLRS Segments	87%	87%	85%	93%	88%	88%	85%	93%	1.2%	1.1%	0.4%	0.0%
Non-TLRS Segments	88%	88%	87%	91%	88%	88%	86%	91%	-0.4%	0.0%	-0.5%	-0.2%
TLRS Impact									1.5%	1.1%	0.8%	0.2%

Table 7 shows that JTR improved in all time periods on both TLRS and non-TLRS segments. Although the improvements were small in both areas, the key result is that the increase in TLRS segments was greater, showing that vehicle journeys were more reliable inside the scheme.

5.3. Flows

Table 8 shows that average vehicle flows remained the same in each monitored period, both inside and outside of the TLRS. This indicates that any variations detected in journey times and JTR are not a result of changes to flows.

[3] TLRS Cost Benefit Analysis v2.1, January 2012

Table 8: Average vehicle flows

Average Vehicle Flows			
	Pre-TLRS	**Post-TLRS**	**% Change 11/12 to 12/13**
TLRS Segments	40,165	39,713	-1%
Non-TLRS Segments	25,346	25,327	0%
TLRN	30,709	30,533	-1%

6. Summary

The TLRS provides a mechanism for behaviour change amongst works promoters in order to minimise the occupation of works at traffic-sensitive times in TLRS segments. The analysis shown above demonstrates that the scheme has been successful in achieving this goal.

Following the implementation of the TLRS 99% of TfL works and 92% of utilities works avoided incurring a TLRS charge. It is important to note that there were some instances where fees were waived or works were exempt from the charges such as Camden Street and Tooley Street where works were deferred due to the Clearway 2012 works embargo. In these cases the works did not incur charges despite taking place in traffic-sensitive time in TLRS areas. As a result the full effects of the scheme have not yet been felt.

Serious and severe disruption associated with road works decreased by 36% in TLRS segments year on year between June 2011 to March 2012 and June 2012 to March 2013.

Analysis shows that the number of days where works were requested to take place during traffic-sensitive times totalled 1,606. However just 32% of these days were approved showing that TfL is taking an active role in ensuring that the number of days that works take place during traffic-sensitive times (and therefore incurring changes) is kept to a minimum.

Analysis also shows that the implementation of the TLRS has had a positive impact in TLRS segments with journey times improving by 3.2% in the AM peak and 2.6% in the PM peak during this time. This is over and above the expected journey time reduction of 0.61%. Not only are the numbers realised much larger than this they have been achieved on the TLRN alone, showing that the TLRS has had a much greater impact than expected on journey times. In addition, this benefit has been seen much sooner than expected as it was forecast for the first year after the TLRS was implemented.

The journey time savings equate to an 8% reduction in delays which could be valued at more than £50m per annum in travel time savings on the TLRN. This figure represents annualised data. In addition JTR also improved in the TLRS segments by 1.2 percentage points in the AM peak and 0.4 percentage points in the PM peak.

7. Case Studies

The previous section analysed data for the whole of the TLRS. Whilst it was vital to undertake a scheme-wide study it is also useful to consider individual works and the impact that they have had on the road network. This section outlines four case studies which do this; three analyse data for works which took place within TLRS areas and one looks at works which took place outside of the TLRS.

Case Study 1: Tottenham Hale Improvement Works

Tottenham Hale gyratory forms part of the A10 corridor in the London Borough of Haringey. It was chosen as a case study because the major improvement works taking place to remove the gyratory system fall within the TLRS area, and there are a relatively good number of data sources available for the area.

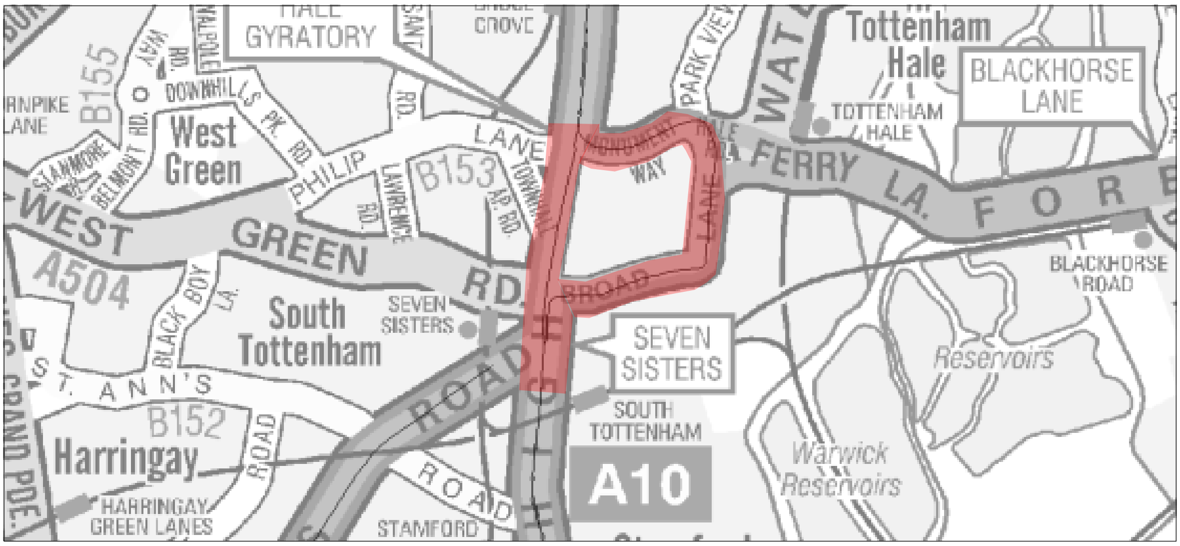
The nature of the improvement works at Tottenham Hale is to remove the current one-way system, allowing traffic to flow in both directions, as well as improving facilities for pedestrians and cyclists. The works commenced in October 2012 and are estimated to be completed by December 2014. The gyratory itself in is Charge Band 1 of the TLRS, with charges applying from 06:30 – 10:00 and 15:30 – 20:00 on weekdays, and 12:00 – 18:00 on weekends. An exception is the Seven Sisters junction, which is classified as a Band 3 area, with charges applying on weekdays from 06:30 – 22:00 and from 12:00 – 20:00 on weekends.

To date works have started on the northbound stretch of the High Road between Seven Sisters and Monument Way. Throughout the duration of the works most highway works will be undertaken overnight thereby not incurring any TLRS charges. However, any works deemed noisy must take place in the daytime, and various restrictions remain in place at all other times.

Consistent and reliable travel time data for the LCAP links in and around Tottenham Hale was only available for October and November, and therefore these are the only periods being looked at for this case study: 5th October 2012 – 30th November 2012 will be compared against the same period in the previous year.

Figure 1 shows the extent of the monitoring area.

Figure 1: Monitoring area



a. Average Journey Times

The average journey time over the two periods was measured using LCAP data.

Table 9: Change in average journey times (mins/km)

	Pre TLRS 5th October 2011 – 30th November 2011		Post TLRS 5th October 2012 – 30th November 2012		% Change	
Direction	**NB**	**SB**	**NB**	**SB**	**NB**	**SB**
AM Peak	2.51	3.04	2.53	3.08	0.9%	1.4%
Inter Peak	3.29	2.40	3.63	2.41	10.3%	0.6%
PM Peak	5.12	2.53	4.84	2.53	-5.4%	0.0%
Overnight	1.52	1.61	2.20	1.77	44.8%	10.5%

Table 9 above shows that for the period where the major works were taking place, there was a slight increase in AM peak journey times, a larger increase in inter peak journey times (particularly northbound), and substantially longer journey times overnight (again, especially northbound). However, in the PM peak there was a decrease in northbound journey times, whilst southbound did not change. This suggests that works were taking place during non-chargeable hours. The fact that journey times decreased in the PM peak and only increased marginally in the AM peak implies that either works were not carried out in these peak periods, or that very efficient traffic management was in place.

b. Journey Time Reliability

The JTR for each period was measured using LCAP data.

Table 10: Change in average JTR

	Pre TLRS 5th October 2011 – 30th November 2011		Post TLRS 5th October 2012 – 30th November 2012		% Points Difference	
Direction	**NB**	**SB**	**NB**	**SB**	**NB**	**SB**
AM Peak	88.9%	78.4%	89.6%	77.4%	0.7%	-1.0%
Inter Peak	80.0%	82.9%	79.3%	81.3%	-0.7%	-1.6%
PM Peak	74.4%	82.3%	74.5%	82.2%	0.1%	-0.1%
Overnight	89.0%	88.5%	85.8%	90.0%	-3.2%	1.5%

There was very little change to JTR during the works period compared to the same period before the TLRS; however it did deteriorate northbound in the overnight period. This is in line with the journey time results shown above. Conversely, the overnight JTR improved on the gyratory, but overall there has been little change to JTR as a result of TLRS.

c. Disruption

The total hours of disruption due to planned highway works increased by 693% in the TLRS period being monitored. This disruption can be attributed to the improvement works taking place. Since journey times only deteriorated significantly in off-peak hours, this highlights further that works detrimental to traffic were not being undertaken in peak times.

d. Flow

Table 11 shows the weekday average hourly vehicle flows for each peak period and overnight, and the percentage change before and after TLRS was implemented for each direction.

Table 11: Average vehicle flow per hour – High Road Tottenham

	Pre TLRS 5th October 2011 – 30th November 2011		Post TLRS 5th October 2012 – 30th November 2012		% Change	
Direction	**NB**	**SB**	**NB**	**SB**	**NB**	**SB**
AM Peak	732	791	747	708	2.1%	-1.3%
Inter Peak	822	672	832	684	1.2%	1.8%
PM Peak	933	728	979	742	4.9%	2.0%
Overnight	440	350	444	372	0.9%	6.3%

On weekdays, despite the presence of the works, flows increased in the TLRS period throughout the day, with the exception of southbound in the AM peak.

Case study 2: Brompton Road

Brompton Road forms part of the A4 corridor in the Royal Borough of Kensington and Chelsea. Being within the TLRS area, it was chosen as a case study due to the similar nature of two separate work schemes that occurred – one before and one after the TLRS was implemented, both in the exact same location. Brompton Road itself varies in the number of lanes along its length, having three lanes at its widest point. The area examined for this case study runs from the junction of the A4 with Exhibition Road in the west, to Scotch Corner in the east (where Brompton Road meets Knightsbridge and Sloane Street).

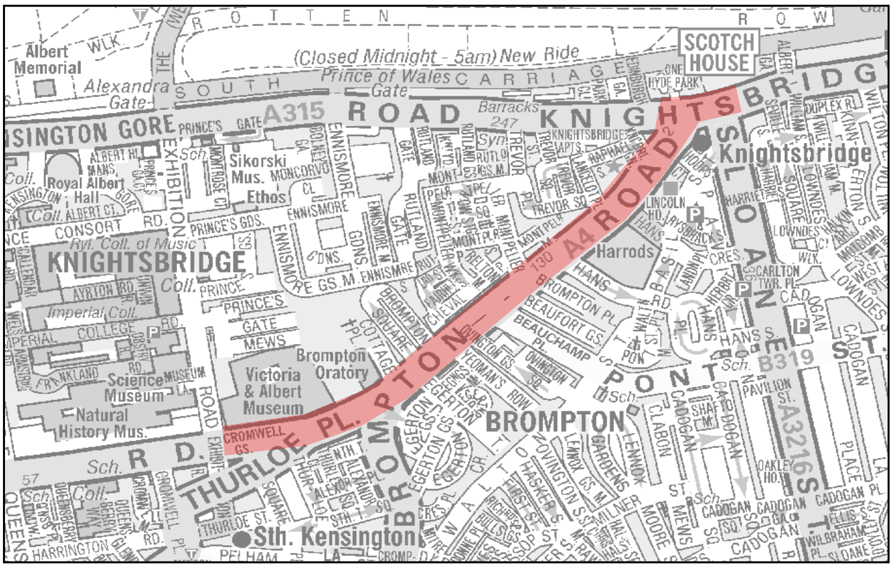
The works in question were both "*Street lighting column installations and removals Lane Closures EB and WB*" with activity from Cromwell Gardens to Knightsbridge, and were undertaken by TfL. Because of the seemingly identical nature, promoter and location of the two sets of works, the similar duration and the ideal location of monitoring equipment, this was thought to be a very suitable case study to compare the effects of TLRS at a specific location both before and after its implementation.

Brompton Road is in Band 1 of the TLRS, with charges applying from 07:00 – 10:00 and 15:30 – 20:00 on weekdays, and 12:00 – 18:00 on weekends. An exception to this is the Scotch Corner junction at the eastern extent, which is in Band 3 with charges applying 07:00 – 22:00 on weekdays and 12:00 – 20:00 on weekends.

Data was analysed from 21st January 2013 to 22nd February 2013 and was compared with a baseline of 3rd November 2011 to 2nd December 2011 to account for data availability.

Figure 2 shows the area that the works are assumed to have covered, and the area for which the data analysed was captured.

Figure 2 – Monitoring area



a. Average Journey Times

The average journey time over the two periods was measured using LCAP data. Journey times on weekends were not included.

Table 12 shows the average journey times for both the north-east and south-west bound directions on Brompton Road and the percentage change.

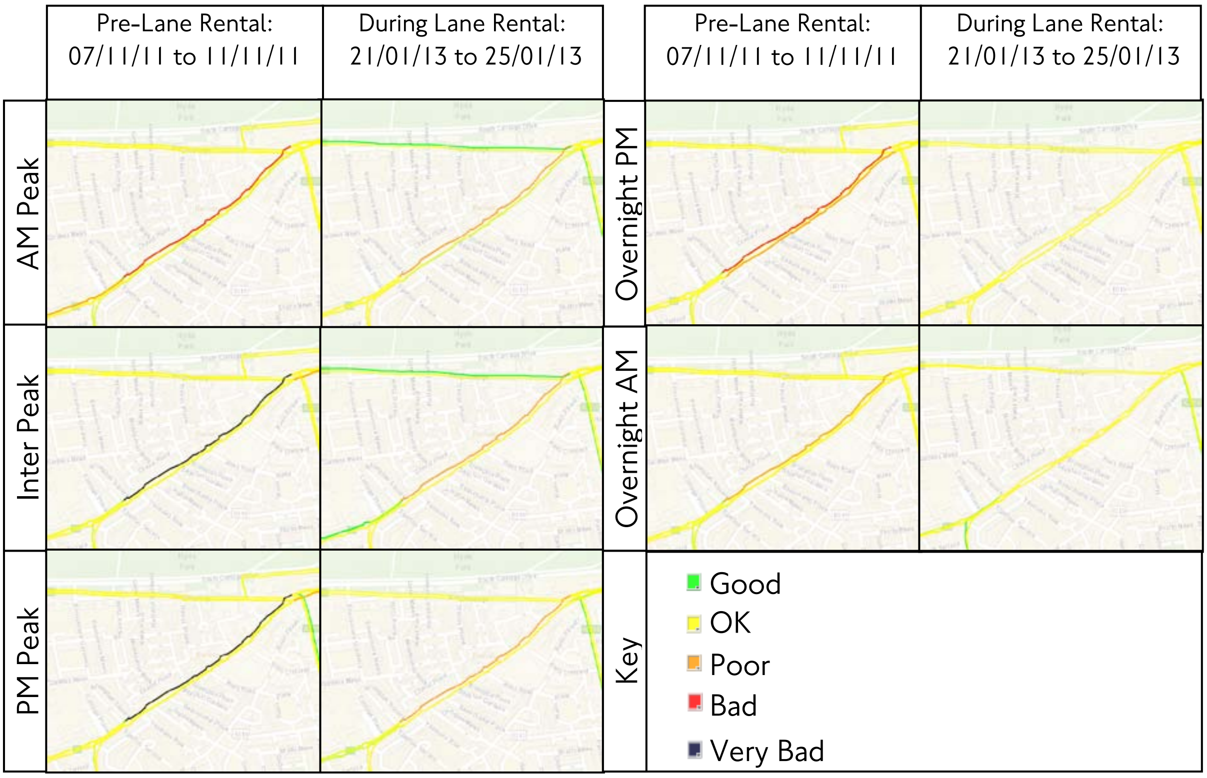
Table 12: Change in average journey times (min/km)

	Pre TLRS 3rd November 2011 – 2nd December 2011		Post TLRS 21st January 2013 – 22nd February 2013		% Change	
Direction	**SW**	**NE**	**SW**	**NE**	**SW**	**NE**
AM Peak	5.41	2.51	2.58	4.69	-52.3%	86.8%
Inter Peak	4.44	10.43	3.86	6.69	-13.1%	-35.9%
PM Peak	4.89	9.63	4.46	6.03	-7.7%	-37.4%
Overnight	1.79	1.57	1.71	1.33	-4.3%	-14.8%

Journey times during the TLRS works improved on average in both directions compared to the works before TLRS, with the exception of north-eastbound in the AM peak (going towards central London), which increased by 87%. This increase is likely to be due to gas mains replacement works which were taking place on Knightsbridge during traffic-sensitive times and was not a result of the works examined here. The most significant improvement in journey time was south-west bound in the AM peak where journey times were on average over 50% quicker. These figures show that with the one exception, traffic was flowing faster during the TLRS works period compared to the works before TLRS was in force.

Figure 3 shows snapshots from the LCAP Dashboard for two selected weeks, one in each works period. It can be seen that northeast bound journey times were generally considered bad or very bad in the peak periods before TLRS implementation, but were OK or poor during the TLRS period. Overnight journey times were also better in this direction. This could be due to more efficient traffic management and works being undertaken outside of peak times.

Figure 3: Average journey times on LCAP links



b. Journey Time Reliability

Table 13: Change in average JTR

	Pre TLRS 3rd November 2011 – 2nd December 2011		Post TLRS 21st January 2013 – 22nd February 2013		% Points Difference	
Direction	**SW**	**NE**	**SW**	**NE**	**SW**	**NE**
AM Peak	91.1%	72.9%	95.3%	75.6%	4.2%	2.7%
Inter Peak	80.3%	65.2%	86.8%	71.2%	6.5%	6.0%
PM Peak	78.4%	76.6%	80.4%	71.4%	2.0%	-5.2%
Overnight	93.4%	87.8%	91.9%	87.6%	-1.4%	-0.2%

Despite the average journey time increasing significantly during the TLRS period in the north-eastbound direction for the AM peak, the JTR actually improved by nearly 4%. There were also JTR improvements of around 8% and 9% for the inter peak in each direction. However, the JTR fell by nearly 7% going towards central London in the PM peak, whilst improving by 3% going the other direction. Overnight, the JTR decreased slightly during the TLRS works period, which could possibly be explained by the occurrence of night-time works.

c. Disruption

None of the disruption taking place in these periods was found to have been as a result of these works taking place.

d. Flow

Table 14 shows the average vehicle flows per hour, averaged across the duration of the works for each peak, and the percentage change for before and after TLRS was implemented for each direction.

Table 14: Average vehicle flow per hour

	Pre TLRS 3rd November 2011 – 2nd December 2011		Post TLRS 21st January 2013 – 22nd February 2013		% Change	
Direction	**NE**	**SW**	**NE**	**SW**	**NE**	**SW**
AM Peak	1488	1117	1589	1180	6.8%	5.7%
Inter Peak	1385	1291	1463	1390	5.6%	7.7%
PM Peak	1419	1468	1467	1552	3.4%	5.7%
Overnight	846	871	827	822	-2.2%	-5.6%

In both directions, there was an increase in flows in the AM, inter and PM peaks during the TLRS period when compared to the similar works before the TLRS was implemented, however there was a decrease in flows in the overnight period. This could suggest that after TLRS implementation, the works were being carried out overnight in order to avoid paying charges, contributing to higher flows in the day time but lower flows overnight.

Case Study 3: Mile End Road

Mile End Road forms part of the A11 corridor in the London Borough of Tower Hamlets. Being within the TLRS area, it was chosen as a case study due to the similar nature of two separate work schemes that occurred – one before and one after the TLRS was implemented, and geographically near each other.

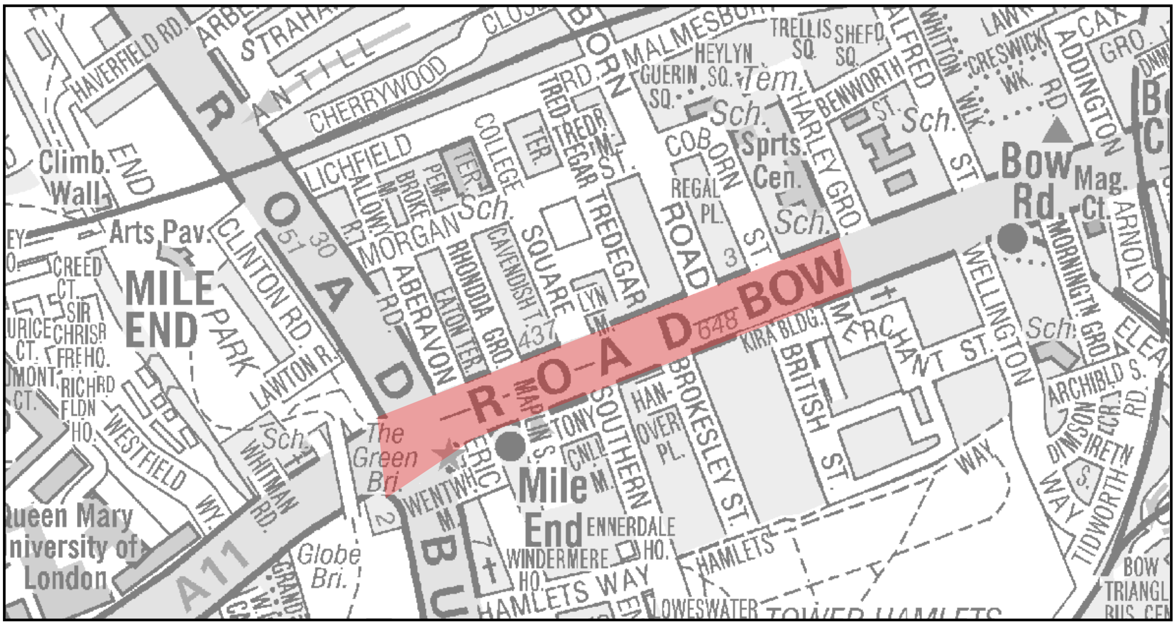
The pre-TLRS works ran from 21/02/2012 to 18/04/2012, both east and westbound between Burdett Road and Coburn Street and involved partial lane closures as well as footway and side road closures to facilitate carriageway and footway works, whilst the post-TLRS implementation works ran from 11/02/2013 to 05/04/2013, east and westbound between Eric Street and Merchant Street with localised lane 1 closures for lighting column replacement and UK Power Networks connections. Because this study only considers works falling between October and March, data will only be measured from the start of the works until the end of March.

This section of Mile End Road is in Charge Band 1 of the TLRS, with charges applying from 06:30 to 10:00 and 15:30 to 20:00 on weekdays, and 12:00 to 18:00 on weekends.

Data was analysed from 11th February 2013 to 29th March 2013 and was compared with a baseline of 21st February 2012 to 30th March 2012

Figure 4 shows the area of impact of the works.

Figure 4: Works monitoring area – Mile End Road



a. Average Journey Times

The average journey time over the two periods was measured using LCAP data. Unfortunately, data was only available for the westbound direction (travelling into central London), and the LCAP link used is relatively long (4.4km, from Bow Roundabout to Aldgate). The issue this creates is in being able to attribute changes in journey times to the works that took place.

Table 15: Change in average journey time (mins/km) – Mile End Road

	Pre TLRS 21st February 2012 – 30th March 2012	Post TLRS 11th February 2013 – 29th March 2013	% Change
AM Peak	4.72	3.90	-17.44%
Inter Peak	3.32	2.94	-11.53%
PM Peak	3.19	3.13	-2.08%
Overnight	1.62	1.64	1.14%

Table 15 shows that journey times improved during the day time on Mile End Road, most significantly in the AM peak, however they increased overnight. This could be an indication that post-TLRS implementation, works were not taking place in the peak periods and were instead being carried out overnight.

b. Journey Time Reliability

Table 16: Change in average journey time reliability – Mile End Road

	Pre TLRS 21st February 2012 – 30th March 2012	Post TLRS 11th February 2013 – 29th March 2013	% Points Difference
AM Peak	77.6%	86.1%	8.6%
Inter Peak	87.2%	93.9%	6.7%
PM Peak	91.0%	93.4%	2.4%
Overnight	91.8%	93.3%	1.6%

Table 16 shows that JTR across the works periods improved in the TLRS period throughout the day, especially in the AM peak. Improved journey times and improved JTR indicate that works in this area have had less of an impact since the TLRS was implemented.

c. Disruption

None of the disruption occurring in these periods was found to have been as a result of the works taking place.

d. Flow

Table 17 shows the average vehicle flows per hour, averaged across the duration of the works for each peak, and the percentage change before and after TLRS was implemented for each direction.

Table 17: Change in average hourly vehicle flow – Mile End Road

	Pre TLRS 21st February 2012 – 30th March 2012		Post TLRS 11th February 2013 – 29th March 2013		% Change	
Direction	**EB**	**WB**	**EB**	**WB**	**EB**	**WB**
AM Peak	899	513	859	474	-4.45%	-7.59%
Inter Peak	745	767	726	740	-2.58%	-3.53%
PM Peak	773	851	732	827	-5.31%	-2.83%
Overnight	480	532	466	501	-2.95%	-5.70%

The average hourly flow was lower in the TLRS period throughout the day, in both directions. This could have contributed to the lower journey times experienced along the route.

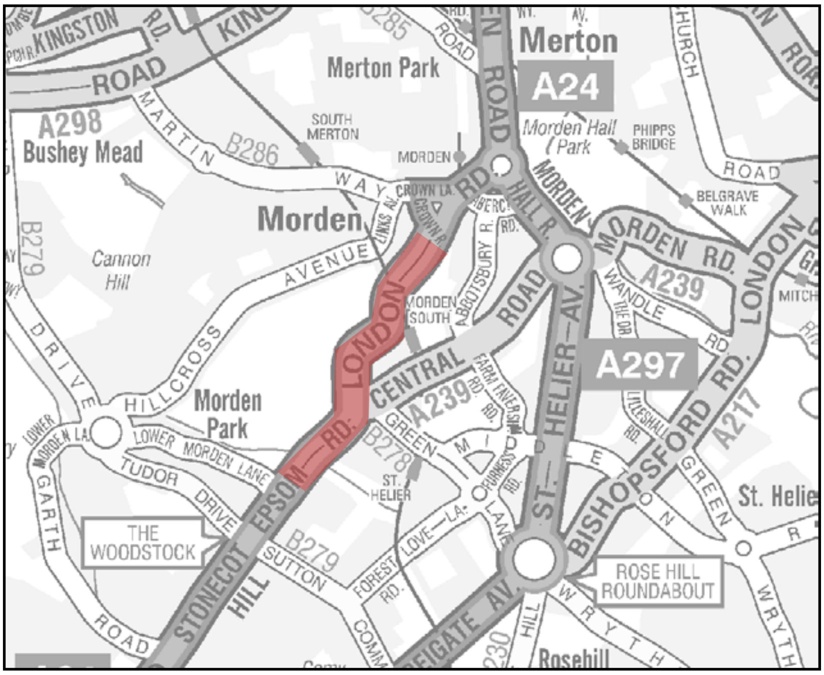
Case Study 4: Epsom Road / London Road

Epsom Road /London Road is a dual carriageway and forms part of the A24 corridor in the London Borough of Merton. Not being within a TLRS area, it was chosen as a case study in order to gauge any differences due to road works taking place outside of the TLRS. It is appropriate as a case study because two major works schemes took place in the same section of the road, one before the TLRS started and the other after. Both works employed lane closures and traffic management, and work was carried out outside of peak times.

Despite there being an ATC on Epsom Road, it was not in operation during the pre-TLRS works and therefore no flow information is available for comparison.

The pre-TLRS works took place in October 2011, whilst the post-TLRS works took place in November/December 2012. Analysis was carried out for 19th November 2012 to 21st December 2012 and was compared with a baseline of 10th October 2011 to 31st October 2011. The difference in months was to account for availability of data.

Figure 5: Works monitoring area



a. Average Journey Times

The average journey time over the two periods was measured using LCAP data. The numbers do not consider journey times on weekends.

Table 18: Change in average journey times (in mins/km)

	Pre TLRS 10th October 2011 – 31st October 2011		Post TLRS 19th November 2012 – 21st December 2012		% Change	
Direction	**NB**	**SB**	**NB**	**SB**	**NB**	**SB**
AM Peak	2.09	1.93	2.30	1.88	10.0%	-2.3%
Inter Peak	1.84	2.09	1.83	2.01	-0.4%	-4.1%
PM Peak	1.95	2.60	1.94	2.43	-0.5%	-6.6%
Overnight	1.36	1.54	1.35	1.56	-0.8%	0.7%

Table 18 above shows that journey times improved northbound, except in the AM peak where they were 10% worse. Given that works did not take place during the AM peak, this increase cannot be attributed to the road works at the time. Southbound journey times improved in the day time, but were slightly worse overnight, which could be an indication of night time works.

b. Journey Time Reliability

Table 19: Change in journey time reliability

	Pre TLRS 10th October 2011 – 31st October 2011		Post TLRS 19th November 2012 – 21st December 2012		% Points Difference	
Direction	**NB**	**SB**	**NB**	**SB**	**NB**	**SB**
AM Peak	92.5%	94.3%	89.6%	93.1%	-2.9%	-1.2%
Inter Peak	95.7%	93.8%	95.5%	90.8%	-0.2%	-3.0%
PM Peak	96.0%	87.7%	95.1%	83.4%	-0.9%	-4.3%
Overnight	96.6%	96.4%	97.8%	96.9%	1.2%	0.5%

JTR worsened in both directions during chargeable hours, but improved overnight. This may indicate that the works taking place when the TLRS was operational had more of an impact on traffic than the works taking place pre-TLRS.

c. Disruption

Whilst no disruption in the pre-TLRS period was a result of works taking place, 119 hours of disruption can be attributed to the works taking place since TLRS implementation. The timing of this disruption shows it to have taken place throughout the day, which implies that traffic management was in operation during the peak periods.

8. Case Study Summary

The Tottenham Hale case study has highlighted the positive impact that the TLRS has had with the majority of works being undertaken overnight so as not to incur TLRS charges. Analysis shows the success of this strategy as journey times and JTR have improved in the AM and PM peaks despite the scale of the works, and the significant increase of overnight journey times here suggests that the works would have been of considerable detriment to traffic had they have taken place during peak periods. This pattern of improvement was also noted in the Mile End Road case study; however the benefits of TLRS proved inconclusive at Brompton Road where there were instances of journey times and JTR both increasing and decreasing at different times of day.

Despite the Epsom Road case study not falling within the TLRS area, the works were still undertaken largely outside peak hours, and would therefore not have incurred and TLRS charges. This demonstrates that works on the TLRN are encouraged to take place off-peak regardless of whether or not they fall within a TLRS area. However, the disruption data for Epsom Road shows the works to have had an impact throughout the day on certain days, suggesting that out of hours working was not always adhered to. Had this been a TLRS area this may not have been the case, because of the risk of the promoter incurring charges, and the resulting increase in AM peak journey time and the deterioration of JTR seen here may not have been as significant.

Whilst the results of the case studies have not been entirely conclusive, they point towards TLRS generally improving journey times and JTR in peak periods.