Transport for London Lane Rental Scheme

Monitoring Report – April 2015 to March 2016

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EVERY JOURNEY MATTERS

Contents

1. Document Control

1.1 Author

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1.2 Document Summary

This document provides updated information on the impacts of the Transport for London Lane Rental Scheme for the period 1 April 2015 to 31 March 2016.

1.3 Reference Documents

Transport for London Lane Rental Scheme
TLRS Cost Benefit Analysis v2.1, January 2012
TLRS First Annual Monitoring Report v0.5, February 2014
TLRS Interim Monitoring Report Oct 2013 to Jun 2014, March 2015
TLRS Monitoring Report Jul 2014 to Mar 2015, October 2015
London's Road Modernisation Plan, What's the Plan?

1.4 Reference Resources

Transport Research Laboratory Reducing Congestion from Highway Works
TfL's Our Plan for London's Roads – What we've done

1.5 Distribution

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1.6 Document Quality Assurance

Step	Step Description	Undertaken by	Date	Remarks
1	First draft 0.1	JM	22/07/2016	
2	Second draft 0.2	HK, KK	27/07/2016	Refinements
3	Third draft 0.3	JM, JT	08/09/2016	Additional data
4	Fourth draft 0.4	JM, HK, KK, GOT	14/09/2016	Refinements
5	Version 1.0	JM, HK, KK, GOT	03/10/2016	Refinements
6	Final 2.0	JM, HK, KK, GOT	18/10/2016	Final

2. Executive Summary

The Transport for London Lane Rental Scheme (TLRS) was introduced on 11 June 2012. It was designed to incentivise all activity promoters to minimise disruption due to roadworks and streetworks by applying a daily charge for occupation of the most traffic sensitive streets at traffic-sensitive times. On 1 July 2014, following thorough analysis and stakeholder consultation, the areas covered by the TLRS were changed to ensure the scheme continued to cover the areas where it will bring about the most benefit. This report is the first annual monitoring report which aligns to TfL's financial year and covers the period of 1 April 2015 to 31 March 2016. The baseline used to compare data is from 1 October 2010 to 30 September 2011. This baseline was chosen as it was prior to the implementation of the TLRS and does not conflict with other schemes such as the Olympics Clearway; and aligns with that used in the first annual report.

The huge amount of construction work to facilitate London's extraordinary economic and population growth announced in the previous report has again seen pressure on the TLRN continue. In addition, the works required as part of the £4bn Road Modernisation Plan (RMP) has ramped up significantly with some schemes now fully delivering benefits to London's road users by transforming some of the busiest roads and junctions to make them safer, more attractive and more liveable. As expected, the overall performance of the network is still being affected by this intense construction activity, which peaked in this reporting period, and is reflected in the decline of journey times and journey time reliability (JTR) across the network; although the TLRS has had a positive effect in mitigating this impact on journey times within major work impact areas (MWIA's) when compared to MWIA's that are not covered by the scheme.

Analysis has shown that for the period 1 April 2015 to 31 March 2016:

- 99 per cent of TfL works and 88 per cent of utility works taking place in TLRS segments avoided incurring a TLRS charge
- 13 applications for LRGC funding were approved between April 2015 and March 2016 totalling £1,968,406. Where it has been possible to calculate, the estimated social cost of delay saved is £30,226,403
- Average collaborative work sites per TfL period has increased from 16 to 111 (616 per cent) compared to the 2010-11 baseline
- Average number of days of disruption avoided per TfL period has increased from 110 to 353 (221 per cent)
- 1,878 days of lane rental were saved through early discussions with work promoters
- There has been a 32 percentage point increase in planned utility works taking place overnight on TLRS segments since the scheme was implemented from 11 to 43 per cent
- There has been a significant reduction of nearly 3500 immediate (emergency) works lasting one day carried out by Highway Authority (TfL) in TLRS segments
- Average 24 hour vehicle flows on TLRS segments increased by 2 per cent
- Average vehicle flows per lane in the TLRS are 21 per cent higher than in non-TLRS segments
- Serious and severe congestion caused from planned utility works fell by 51 per cent in TLRS segments compared to before TLRS was implemented
- Journey times and JTR saw deterioration in both TLRS and non-TLRS segments. However it was found that within Major Work Impact Areas (MWIA's) this deterioration was much more significant, and outside of MWIA's the increases in both TLRS and non-TLRS were very similar, which indicates a general deterioration of road network performance caused from increases in demand and the knock on effect of the RMP

- Further analysis has revealed that much of this JTR deterioration (81per cent during the AM peak and 46 percent during the PM peak in TLRS segments) is attributable to sections of the A406 North Circular Road. This was a result of three major schemes as part of the RMP, increased vehicles flows and any knock on congestion or incidents occurring on the three motorways feeding into the A406.
- The greatest improvements in customer satisfaction between 2014 and 2015 were reductions in frustrations associated with 'repeated roadworks on the same stretch of road within the same year' and 'seeing streets partially closed, but no-one working there' (7 and 6 percentage points respectively)
- Frustrations associated with 'roadworks carried out at busy times' have continued to reduce (2 percentage points compared to last year and 11 percentage points since 2011). It is reasonable to assume that the implementation of TLRS has had a positive influence on these results.

3. Introduction

3.1 Scheme Scope

The Transport for London Lane Rental Scheme (TLRS) was introduced on 11 June 2012, applying to 57 per cent of the Transport for London Road Network (TLRN). It was designed to minimise disruption due to roadworks and streetworks in specified traffic-sensitive locations by applying a daily charge for each day that the street is occupied by an activity promoter's works. The daily charge is not applied if the works take place outside traffic-sensitive times providing all activity promoters with an incentive to change behaviour and adopt less disruptive practises.

The three charge bands and their typical times are shown below:

Table 1: Lane Rental Charges

Charge Band	Type	Daily Charge	Typical Charging Times	
			Monday to Friday	Saturday and Sunday
1	Segment	£800	06:30-10:00 and 15:30-20:00	12:00-18:00
2	Segment	£2,500	06:30-22:00	12:00-18:00
3	Pinch point	£2,500	07:00-20:00	12:00-18:00

Following analysis and stakeholder consultation the TLRS areas were changed with the new areas taking force on 1 July 2014 and covering 56 per cent of the TLRN, down from 57 per cent originally.

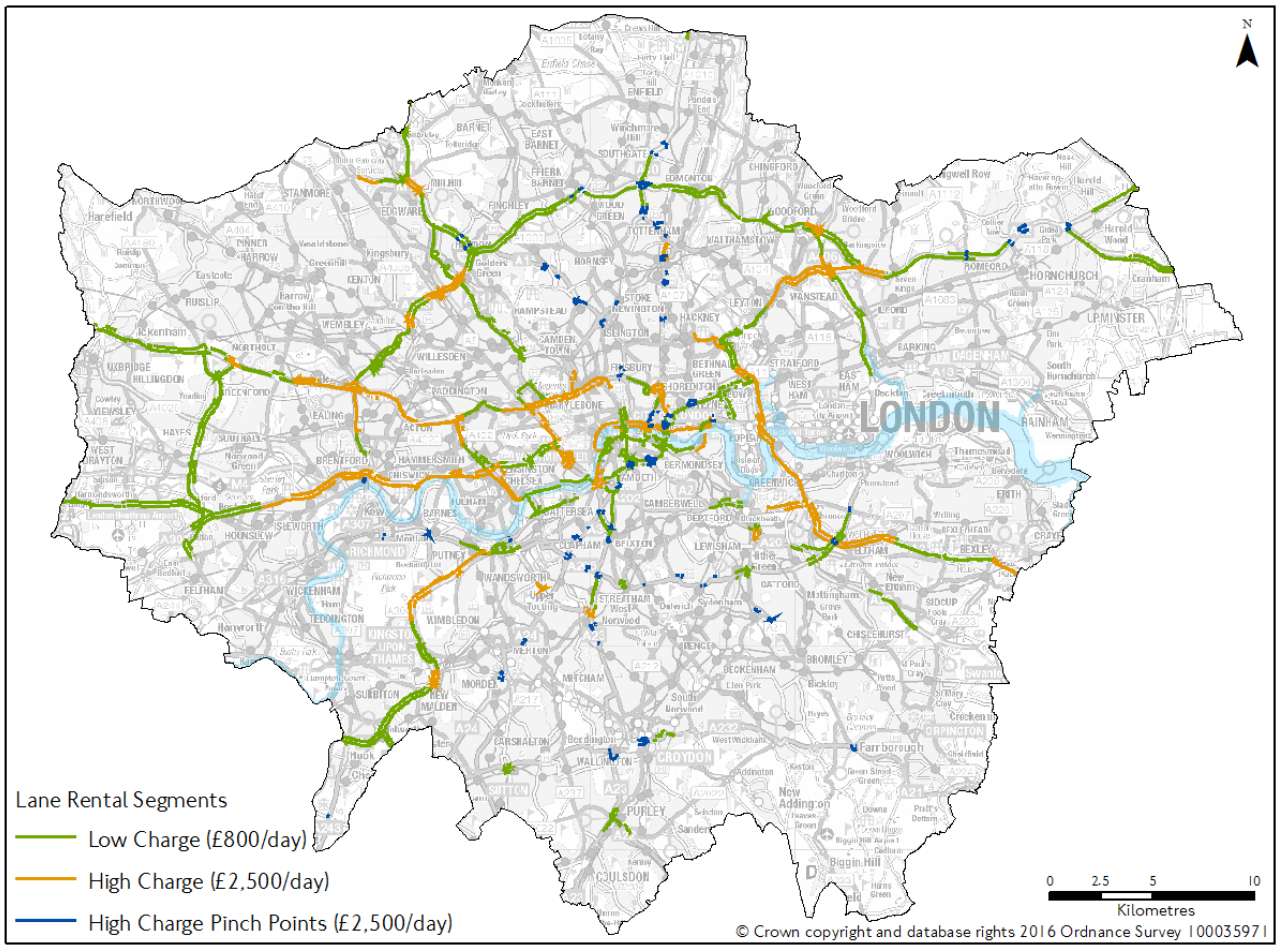
The change was driven by the need to ensure the scheme still covers the most traffic sensitive parts of the network and where it can bring about the most benefit, as changes to certain parts of the network meant they were no longer appropriate to be TLRS. The previous algorithm used to determine those areas on the TLRN that are most susceptible to disruption from roadworks has also been refined to focus on the movement of people rather than vehicles.

The same permitting regime is applied to all works on the TLRN. TfL liaise with work promoters to reduce the length of time that the carriageway is occupied, especially in traffic-sensitive times and could typically include changing works timings to overnight, off-peak or weekends – actions that TfL takes on proposed works across the TLRN, in both TLRS and non-TLRS segments.

As part of the preparation for the launch of the TLRS, TfL and the Department for Transport (DfT) jointly funded a research project into innovative methods of reducing the disruption from roadworks. The outputs of this project are published on the Transport Research Laboratory website and were shared with works promoters to assist in minimising the disruption on the network and reducing or avoiding TLRS charges[1]. Areas researched include plating and bridging, rapid cure materials and temporary backfill materials.

[1] Transport Research Laboratory - http://www.trl.co.uk/solutions/asset-management/asset-condition-monitoring/pavement-investigation/reducing-congestion-from-highway-works/

Figure 1: Lane Rental Segments by Charge Bands - July 2014 to Present



3.2 Reporting Periods

This report is the first annual monitoring report which aligns to TfL's financial year and covers the period of 1 April 2015 to 31 March 2016. The baseline which will be used to compare the data with will be between 1 October 2010 and 30 September 2011. This baseline has been chosen as it is: prior to the implementation of the TLRS and does not conflict with other schemes such as the Olympics Clearway; and aligns with that used in the first annual report. Table 2 details the previous reports and which lane rental designation they analyse.

Table 2: Lane Rental Monitoring Reports

Lane Rental Monitoring Report	Baseline	Lane Rental Areas
Lane Rental Monitoring Report July 2014 to March 2015	July 2010 to March 2011	New TLRS Areas (designated July 2014)
Lane Rental Monitoring Report October 2013 to June 2014	October 2010 to June 2011	Original TLRS Areas (designated June 2012)
Lane Rental Monitoring Report October 2012 to September 2013	October 2010 to September 2011	Original TLRS Areas (designated June 2012)
Lane Rental Monitoring Report October 2012 to March 2013	October 2011 to March 2012	Original TLRS Areas (designated June 2012)

3.3 Scope of Analysis

The change to TLRS segments in July 2014 means that the TLRN can be split into four categories as listed in Table 3. For the purposes of this report, and to align with previous TLRS reports, analysis has been restricted to non-TLRS and Updated TLRS (henceforth referred to as TLRS). TLRS is a combination of category 'C' and 'D' which reflect the current TLRS extents adopted 1 July 2014.

Table 3: Areas Defined by LR Category

	TLRS Category	Description	Included within Report
A	Non-TLRS	Areas of the TLRN that were neither part of the original TLRS nor the updated TLRS	Yes as 'non-TLRS'
B	In Original TLRS not Updated TLRS	The original LR scheme extents which were valid between July 2012 and June 2014 and not included within the updated TLRS	Excluded
C	In Updated TLRS not Original TLRS	Areas of the updated scheme extents which were not part of the original TLRS	Yes as 'TLRS'
D	In Original TLRS and Updated TLRS	Areas which are within the original TLRS and updated TLRS	Yes as 'TLRS'

4. Objective of the TLRS

The TLRS seeks to encourage the undertaking of works at the least traffic-sensitive times, and timely completion of works. It also applies the following guiding principles:

- Safety must be ensured
- Inconvenience to people using a street, particularly 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].

[2] TfL Lane Rental Scheme - https://consultations.tfl.gov.uk/streets/lane-rental/results/tfl-lane-rental-scheme-submission.pdf

5. Road Network Context

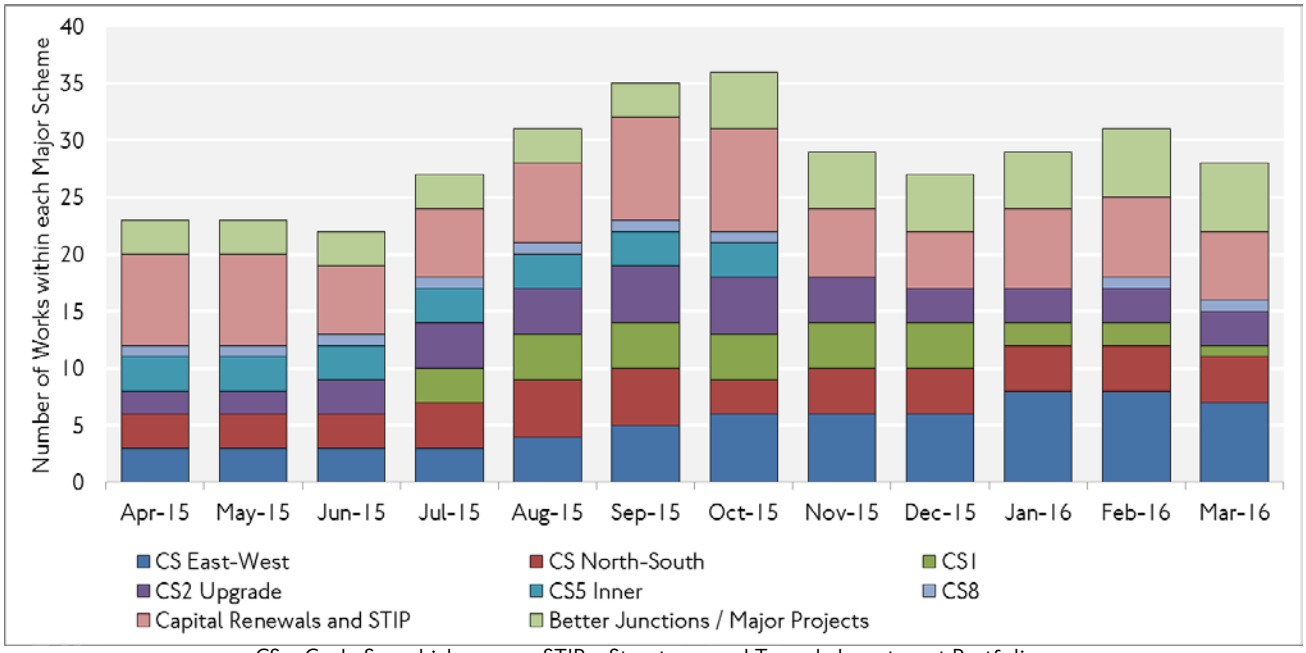
For over a decade London's population has been growing at a rate of over 100,000 people per year and is expected to reach 10 million people by 2031; whilst the number of international visitors increased by more than half a million in 2014 alone. This combined with strong economic growth and the consequent increase in building and construction is leading to more traffic, and therefore congestion.

As part of TfL's efforts to tackle this challenge the Roads Modernisation Plan (RMP) was launched – a £4 billion investment programme[3]. This is currently underway to transform junctions, bridges, tunnels, cycling lanes and pedestrian areas; all of which are putting even more pressure on the network in the short term. This and the increased traffic flow have led to deterioration in journey times and journey time reliability across the network, making effective traffic management, including operating the TLRS, more vital than ever.

Figure 2 shows the number of works which were actively being carried out during the financial year 2015-16, associated with each major scheme within the Road Modernisation Plan. Between April 2015 and March 2016 there were more than 20 different major works being carried out each month; including over 35 during September and October 2015.

Figure 3 shows approximately how many days the works were carried out within each major scheme between April 2015 and March 2016, regardless of the time of day they took place. This figure is only approximate as it assumes works were carried out 7 days a week between the start and end dates provided and that there were no breaks between phases. There were over 6,000 work days for Cycle Superhighways and over 2,500 work days for the capital renewals and structures and tunnels investment portfolio (STIP) which includes A406 Neasden, A406 Fore Street Tunnel (see Table 6) and Hammersmith Flyover.

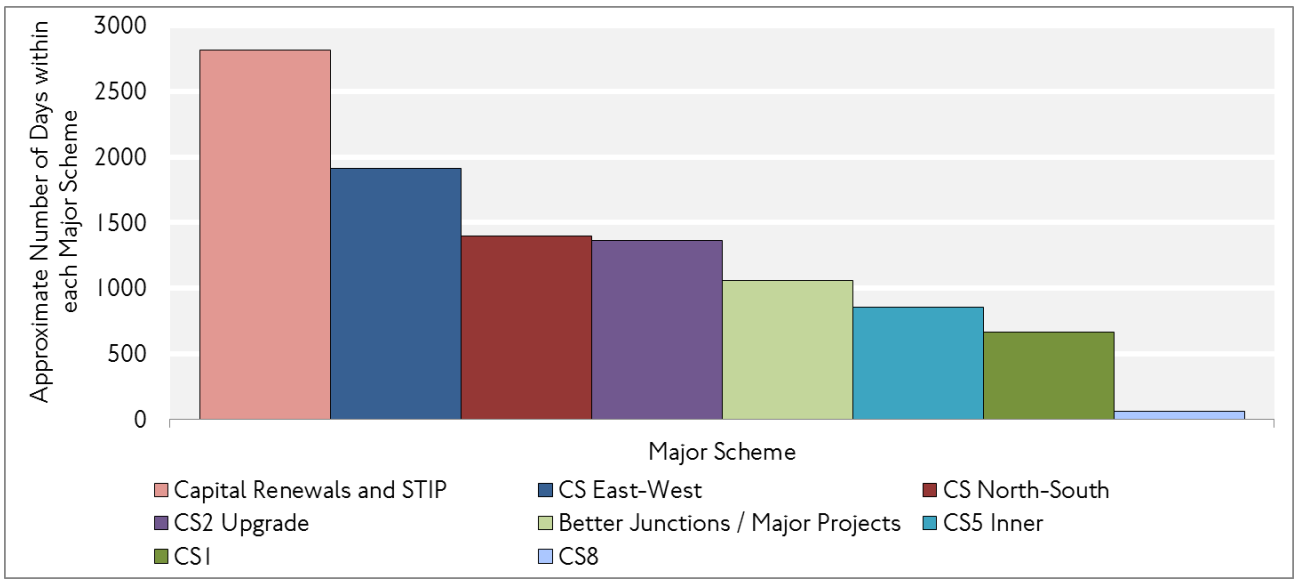
Figure 2: Number of Works within Each Major Scheme



CS – Cycle Superhighway STIP – Structures and Tunnels Investment Portfolio

[3] Road Modernisation Plan, What's the Plan? - https://tfl.gov.uk/travel-information/improvements-and-projects/whats-the-plan

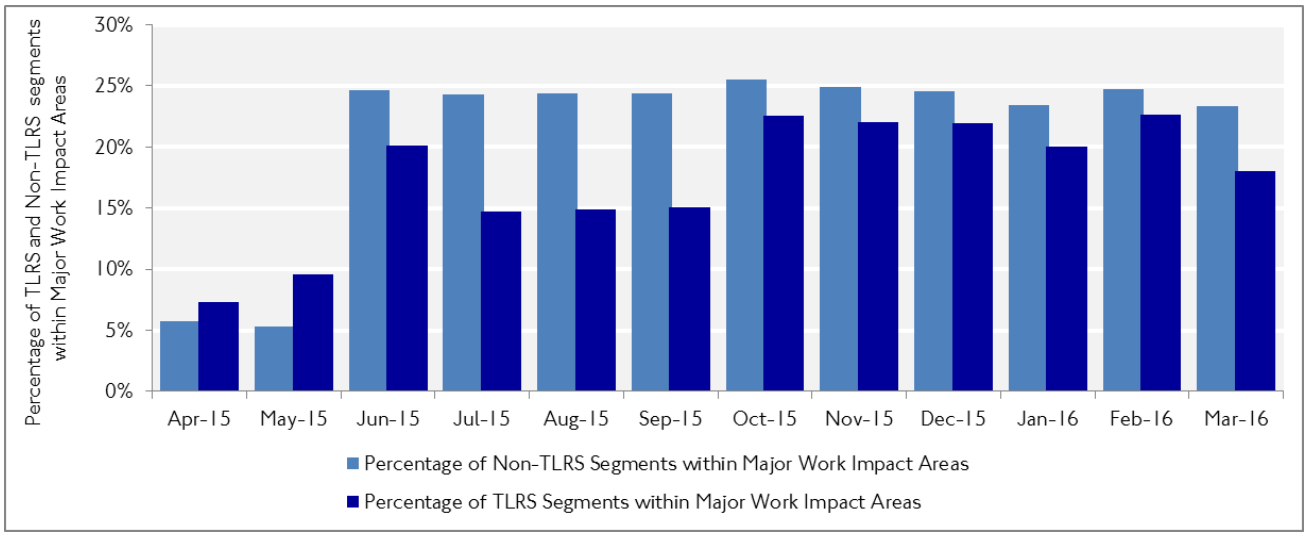
Figure 3: Approximate Number of Days within each Major Scheme



Major Work Impact Areas (MWIAs) were designated to roads within London to help plan for and mitigate the disruption from the Road Modernisation Plan. The areas were created based on an estimated impact agreed by various departments within TfL and in some cases modelling input. The areas are not exclusive but are aimed to give an indication of where the impact will be worse because of construction work. Impact areas are reviewed regularly and modified where appropriate.

Figure 4 compares the percentage of TLRS and Non-TLRS segments within MWIAs per month. Between October 2015 and February 2016 over 20 per cent of TLRS segments were located within MWIAs. It can be seen that there is a larger percentage of Non-TLRS segments located within MWIAs for the majority of the year compared to TLRS. The TLRS was originally designated to the parts of the road network with high sensitivity. Although the proportion of TLRS segments located within MWIAs is not quite as high as Non-TLRS their performance will have been more adversely affected (see Section 6).

Figure 4: Percentage of TLRS and Non-TLRS segments within Major Work Impact Areas



6. Impact on the Road Network

6.1 Road Network Analysis

To assess the TLRS impact on the road network this report will analyse the recorded journey times, journey time reliability, vehicle flows, disruption and the number of works on the TLRN during the financial year 2015-16 (1 April 2015 to 31 March 2016) and compare it to the 2010-11 baseline period (1 October 2010 to 30 September 2011) prior to the TLRS implementation.

Analysis where possible will be broken down into peak periods. This will help assess the influence the TLRS has had on peak period roadworks. The peak period definitions used throughout this report are shown in Table 4.

Table 4: Peak Period Times

AM Peak	Inter Peak	PM Peak	Overnight
07:00 to 10:00	10:00 to 16:00	16:00 to 19:00	19:00 to 07:00

6.2 Background to Journey Time and Journey time Reliability

An objective of the TLRS is to contribute to Journey Time Reliability (JTR) as part of the Mayor's traffic smoothing initiative by improving travel conditions on the road network.

JTR is measured as the percentage of nominal 30 minute journeys completed within 35 minutes. For example, if a corridor can be managed such that 9 out of 10 journeys can be completed within the expected journey time then the corridor would be considered 90 per cent reliable.

JTR is calculated using journey time data from the London Congestion Analysis Project (LCAP), which in turn is based on Automatic Number Plate Recognition (ANPR) camera data.

6.3 TLRN Journey Time Reliability

A comparison of JTR for the TLRS and non-TLRS segments on the TLRN has been performed. The results are summarised in Table 5.

Table 5: Change in JTR on the TLRN between 2010-11 and 2015-16

Average Journey Time Reliability (%)												
	Oct 10 - Sept 11				April 15 - Mar 16				% Point Difference 10/11 to 15/16			
	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	89.5%	91.3%	86.9%	97.2%	87.4%	91.0%	84.4%	97.2%	-2.1%	-0.3%	-2.5%	0.0%
Non-TLRS Segments	90.7%	92.5%	88.2%	96.0%	89.7%	91.5%	86.8%	95.5%	-1.0%	-1.0%	-1.6%	-0.5%
Difference									-1.1%	0.7%	-0.9%	0.5%

Table 5 shows that both TLRS and non-TLRS segments have seen a decrease in JTR. The decline in JTR has been more marked on TLRS segments, with negative impacts in AM, Inter and PM peaks ranging from 2.5 and 0.3 per cent; the overnight has remained the same. Although the decline in average JTR has been greater in TLRS segments it should be noted that for the financial year 2015-16 the key AM JTR target for the Transport for London Road Network (TLRN) was 87 per cent which was achieved on both TLRS and non-TLRS segments.

Sections of the A406 accounted for 81 per cent of the overall TLRS results in the AM peak and 46 per cent in the PM peak. Figure 5 shows the sections of road which have contributed to this result and areas where major works have been carried out as part of the Road Modernisation Plan (further detail in Table 6). The durations listed in Table 6 are those which fall within the monitoring period of this report (April 2015 to March 2016). It also assumes that works were carried out 7 days a week and does not account for any small breaks there may have between phases of the works.

It was found that vehicle flows on the A406 at Bowes Road have increased by 22 per cent from the 2004 to 2009 average to the 2013 to 2016 average putting a huge amount of pressure on the A406. Vehicle flows just prior to TLRS implementation were not analysed as these were considerably lower due to Henly's Corner works. The sections illustrated in Figure 5 would also be affected by incidents which have occurred on any of the three motorways which feed into the A406. All of the above highlights the pressures the A406 have seen during the financial year 2015-16 which has led to deterioration on the A406 resulting in a significant impact on the overall JTR results.

Figure 5: Sections of the A406 Affecting AM and PM Peak JTR

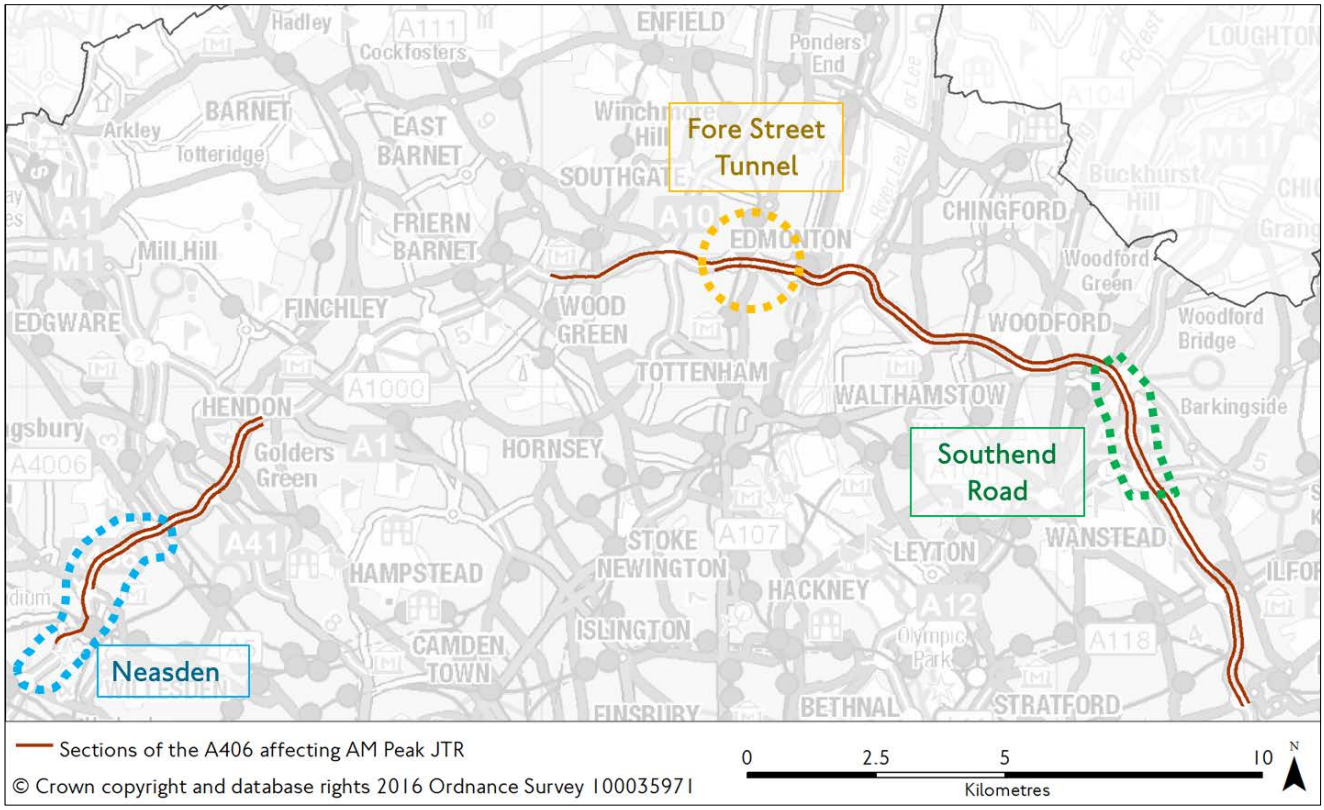


Table 6: Works Impacting the JTR Performance within TLRS Segments

Location	Works	Duration (days during monitoring report only)
A406 near Neasden	To repair the bridge and other structures. Redesigning the Brentfield Road junction to improve safety and reliability.	178 Days Works: 5th October 2015 to 2017
A406 near Fore Street Tunnel	Work to upgrade the Fore Street Tunnel including minimizing damage caused by groundwater leakage and replacing the existing lighting with LEDs for lower energy consumption and safety.	173 Days Works: 19th May 2014 to 21st September 2015
A406 Southend Road	Waterproofing the bridge deck on the A406 Nightingale Accommodation and replacement of bridge expansion joints on the A406 Woodford Viaduct. The works included 24 hour lane closures and night closures.	23 Days Works: 29th August to 21st September 2015

6.4 TLRN Journey Time

Journey time data has also been analysed for each time period throughout the day and has been separated into TLRS and non-TLRS segments.

As with JTR, journey times have deteriorated across the TLRN. Table 7 shows the largest negative impact in TLRS areas is seen in the AM and PM peaks where journey times increased on average by 18 and 20 per cent respectively.

Table 7: Change in Journey Times on the TLRN between 2010-11 and 2015-16

Average Journey Times (mins/km)												
	Oct 10 - Sept 11				April 15 - Mar 16				% Difference 10/11 to 15/16			
	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	1.75	1.56	1.89	1.16	2.07	1.80	2.26	1.29	18.4%	15.0%	19.6%	11.4%
Non-TLRS Segments	1.93	1.82	2.18	1.33	2.16	1.95	2.39	1.40	12.2%	7.3%	9.8%	4.7%
Difference									6.3%	7.7%	9.9%	6.6%

The A406 North Circular near Neasden and A1203 The Highway have been identified as contributing 25 per cent to journey time deterioration within TLRS segments during the AM peak. Two sets of major works have been carried out on both roads including bridge repairs and associated works on the A406 Neasden (more information found in Table 6 and Section 6.8) and the East West Cycle Superhighway construction on A1203 The Highway.

6.5 Journey Times and JTR within Major Work Impact Areas

Journey times and JTR on the TLRN have been analysed further to try and determine how much the Major Work Impact Areas (MWIAs) (referenced in section 5) have had an impact on performance.

Table 8: JTR Inside of Major Work Impact Areas

Average Journey Time Reliability (%)												
Inside Major Work Impact Areas (MWIAs)	Oct 10 - Sept 11				April 15 - Mar 16				% Point Difference 10/11 to 15/16			
	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	89.3%	89.4%	83.2%	96.4%	86.2%	88.0%	82.4%	94.7%	-3.1%	-1.4%	-0.8%	-1.7%
Non-TLRS Segments	89.2%	91.5%	86.0%	96.4%	87.8%	89.3%	84.2%	95.4%	-1.4%	-2.2%	-1.8%	-1.0%

Table 8 shows JTR inside Major Work Impact Areas (MWIAs) has deteriorated at a higher rate within non-TLRS segments during the Inter and PM peaks; the PM peak decreased by 1 percentage point more than TLRS segments. This is despite TLRS segments representing a larger part of the network and being more sensitive. Although there has been a larger decrease during the AM peak, there has also been decreases during the inter peak and overnight. This provides evidence that the TLRS is successfully limiting the deterioration by encouraging more non-peak working.

Table 9 shows that JTR has deteriorated at a slightly higher rate in TLRS segments outside of major work impact areas (MWIAs) during the PM peak.

Table 9: JTR Outside of Major Work Impact Areas

Average Journey Time Reliability (%)												
Outside Major Work Impact Area (MWIAs)	Oct 10 - Sept 11				April 15 - Mar 16				% Point Difference 10/11 to 15/16			
	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	89.5%	91.6%	87.5%	97.3%	87.6%	91.5%	84.8%	97.5%	-1.9%	-0.1%	-2.7%	0.2%
Non-TLRS Segments	91.2%	92.8%	89.0%	95.9%	90.2%	92.2%	87.6%	95.5%	-1.0%	-0.6%	-1.4%	-0.3%

Table 10: Journey Times Inside of Major Work Impact Areas

Average Journey Times (mins/km)												
Inside Major Work Impact Areas (MWIAs)	Oct 10 - Sept 11				April 15 - Mar 16				% Difference 10/11 to 15/16			
	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	1.99	1.89	2.39	1.36	2.97	2.80	3.22	1.76	49.6%	48.2%	34.8%	29.2%
Non-TLRS Segments	1.83	1.66	2.14	1.30	2.25	1.95	2.46	1.40	23.2%	17.5%	15.0%	8.3%

Table 10 shows that inside the MWIAs journey times increased between 8 and 23 per cent on non-TLRS segments and 30 and 50 per cent on TLRS segments. This is logical as the TLRS was designated to the most sensitive parts of the network. Whereas journey times outside of the MWIAs increased between 4 and 15 percent (Table 11). Increases in journey times for both TLRS and non-TLRS segments outside of MWIAs were much more similar during the AM, Inter and Overnight periods emphasising a general deterioration in network performance.

Table 11: Journey Times Outside of Major Work Impact Areas

Average Journey Times (mins/km)												
Outside Major Work Impact Areas (MWIAs)	Oct 10 - Sept 11				April 15 - Mar 16				% Difference 10/11 to 15/16			
	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	1.69	1.49	1.77	1.12	1.86	1.57	2.04	1.19	10.2%	5.5%	15.1%	6.5%
Non-TLRS Segments	1.97	1.87	2.19	1.34	2.13	1.95	2.36	1.39	8.5%	4.0%	8.0%	3.5%

Table 8 to Table 11 highlight the scale of the impact the Road Modernisation Plan has had on the performance on the network. It should be noted that the Road Modernisation Plan is considered to be a one off occurrence and the TLRS was not originally designed to mitigate impacts from such a large scale build scheme. Prior to implementation of the Road Modernisation Plan, Lane Rental reports[4] showed improvements within TLRS segments and it can be seen that deterioration in TLRS segments outside of MWIAs are substantially lower that those within.

6.6 Vehicle Flows

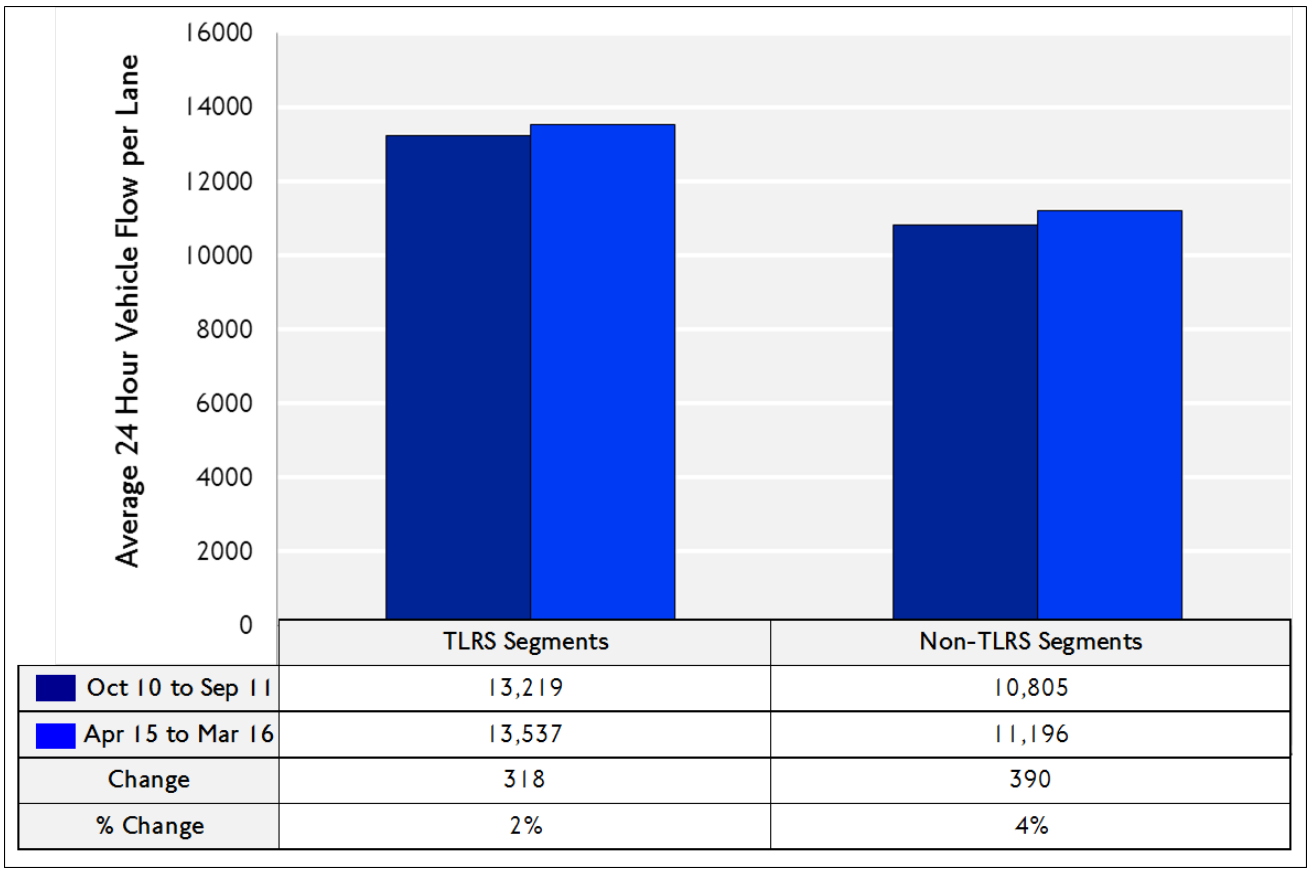
Vehicle flows within TLRS segments have much higher flows per lane than non-TLRS segments, approximately 21 per cent higher (as shown in Figure 6). This is logical, as vehicle flows were one component used to determine the TLRS segments, as they are expected to be more susceptible to congestion and disruption as a result of incidents such as roadworks.

Figure 6 shows the average 24 hour vehicle flows over the monitoring period (April 15 to March 16) and compared to the baseline (October 10 to September 11) as measured from Automatic Traffic Counters (ATCs) located in TLRS and non-TLRS segments. Vehicle flow averages were calculated using weekday flow data only (i.e. excluding weekends and bank holidays), where there is data available for both the monitoring period and equivalent dates in the baseline period.

Average 24 hour vehicle flows increased within TLRS segments by 2 per cent whilst flows within non-TLRS segments increased by 4 per cent. The combination of both increasing vehicle flows over time and much higher average 24 hour flows has led to increasing pressure on TLRS segments. This has been a major contributing factor to the deterioration in JTR and JT in TLRS segments.

[4] Transport for London Lane Rental Scheme First Annual Monitoring Report 2012/13 - http://content.tfl.gov.uk/lane-rental-monitoring-report-oct-2012-sep-2013.pdf
Transport for London Lane Rental Scheme Interim Monitoring Report Oct 2013 to Jun 2014 - http://content.tfl.gov.uk/lane-rental-monitoring-report-oct-2013-jun-2014.pdf

Figure 6: Average 24 Hour Vehicle Flow per Lane



6.7 Background to Disruption

Disruption data is taken from both the London Traffic Information System (LTIS) and its successor the Traffic Information Management System (TIMS). Data is aligned to TfL financial accounting periods whereby Period 1 always starts on 1 April and each period is 28 days (with the possible exception of Periods 1 and 13). Therefore data for Periods 1 to 13 2015/16, corresponding to 1 April 2015 to 31 March 2016 has been used for the monitoring period. As the baseline has been set to October 2010 to September 2011 the closest TfL periods have been chosen, running from Period 8 2010/11 to Period 7 2011/12. The most disruptive events are labelled 'serious' and 'severe' as defined in Table 12.

Table 12: Serious and Severe Disruption

Type	Description
Serious	0.Traffic Congestion unusual for that time of day 1.Traffic which has been stopped for less than five minutes but in excess of the red signal time for traffic signals operating on the road 2.The traffic queuing is longer than normal for the time of day 3.The incident causes inconvenience to road users within a short space of time
Severe	Similar to above however: 0.The traffic has been stopped for more than five minutes 1.The incident can quickly cause significant inconvenience of at least an additional 20 minutes to the road users' journeys

A reduction in the duration 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 analysis has been separated into works undertaken by the highway authority (TfL) and those by utility companies, within TLRS and non-TLRS areas. Serious and severe disruption is calculated as a total amount regardless of the time of day it occurred. Other causes of disruption such as collisions and congestion have been excluded from this analysis as the TLRS targets roadworks only.

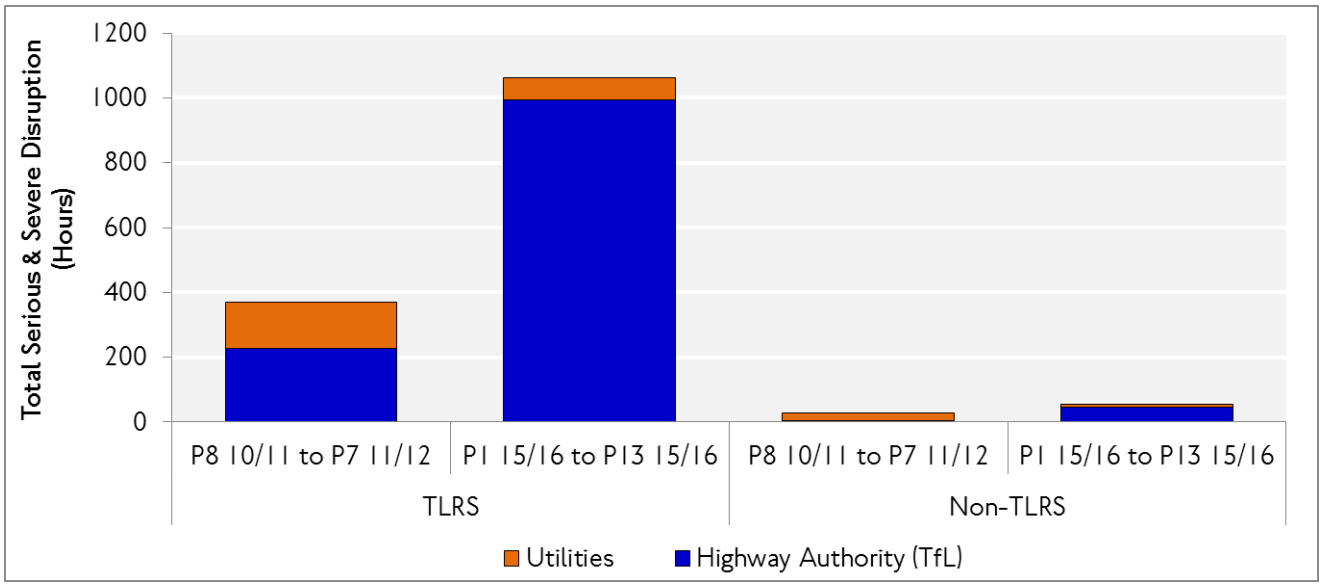
6.8 Serious and Severe Disruption

Serious and severe disruption hours have increased across the TLRN due to the aforementioned conditions on the road network. Table 13 and Figure 7 show the contribution of highway authority (TfL) and utility planned works by TLRS and non-TLRS segments.

Table 13: Hours of Serious and Severe Disruption due to Planned Works

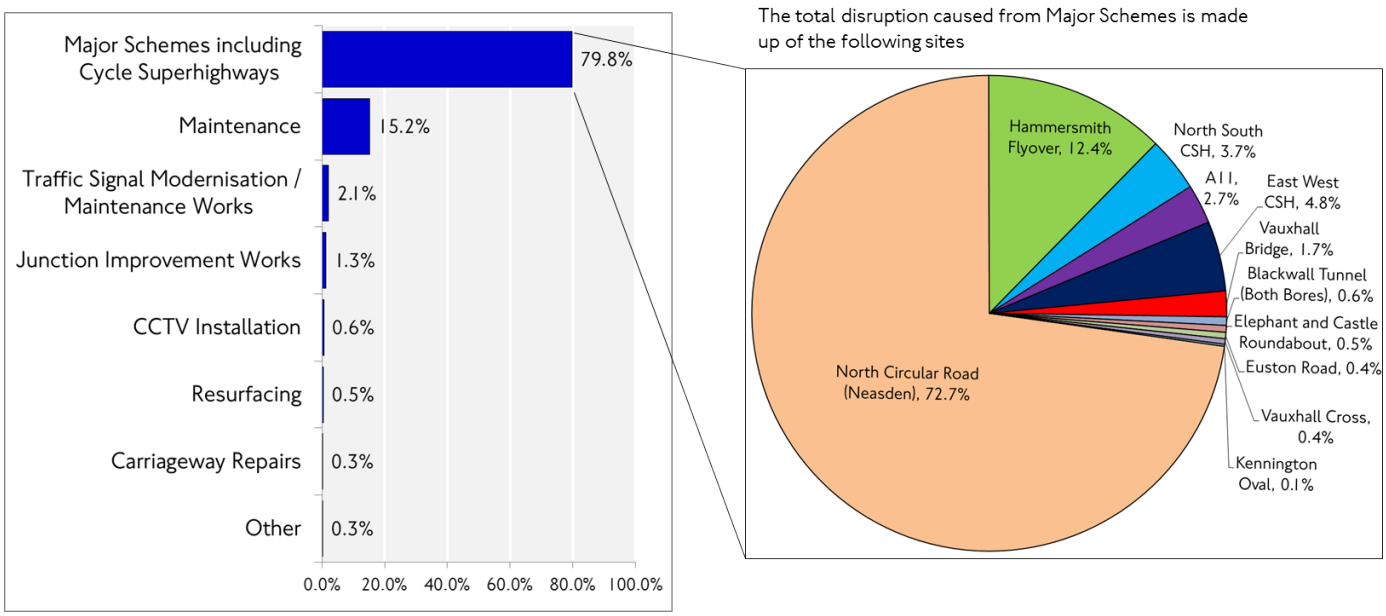
Total Serious & Severe Disruption Associated with Planned Works (Hours)				
	P8 10/11 to P7 11/12	P1 15/16 to P13 15/16	Change	% Change
TLRS Segments	**369**	**1,063**	**695**	**188%**
Highway Authority (TfL)	226	994	768	340%
Utilities	143	70	-73	-51%
Non-TLRS Segments	**29**	**55**	**26**	**87%**
Highway Authority (TfL)	6	46	40	707%
Utilities	24	9	-15	-63%

Figure 7: Total Serious and Severe Disruption Associated with Planned Works



TLRS segments experienced an increase of 695 hours and non-TLRS segments 26 hours. Disruption caused by highway authority (TfL) planned works within TLRS segments has been broken down further into categories to see what is causing this increase (Figure 8).

Figure 8: Percentage of Total Serious and Severe Disruption (hours) by Highway Authority (TfL) Planned Works within TLRS Segments



It was found that 80 per cent of all serious and severe disruption was caused by Major Schemes.

The roadworks on the A406 North Circular (Neasden), as described in Table 6 caused over 70 per cent of the Major Schemes serious and severe disruption hours and 58 per cent overall. The works began in October 2015 and part one was completed in May 2016. To complete the works as quickly as possible, work took place 24 hours a day, seven days a week which emphasises the scale of the work which was carried out. The second part starts during autumn 2016 and continues until 2017.

It was found that 42 per cent of serious and severe disruption caused by highway authority (TfL) planned works within non-TLRS segments, was caused by the junction improvement works on the A13 Ripple Road.

Table 14 shows the changes to the numbers of works associated with serious and severe disruption (representing less than half a percent of all works).

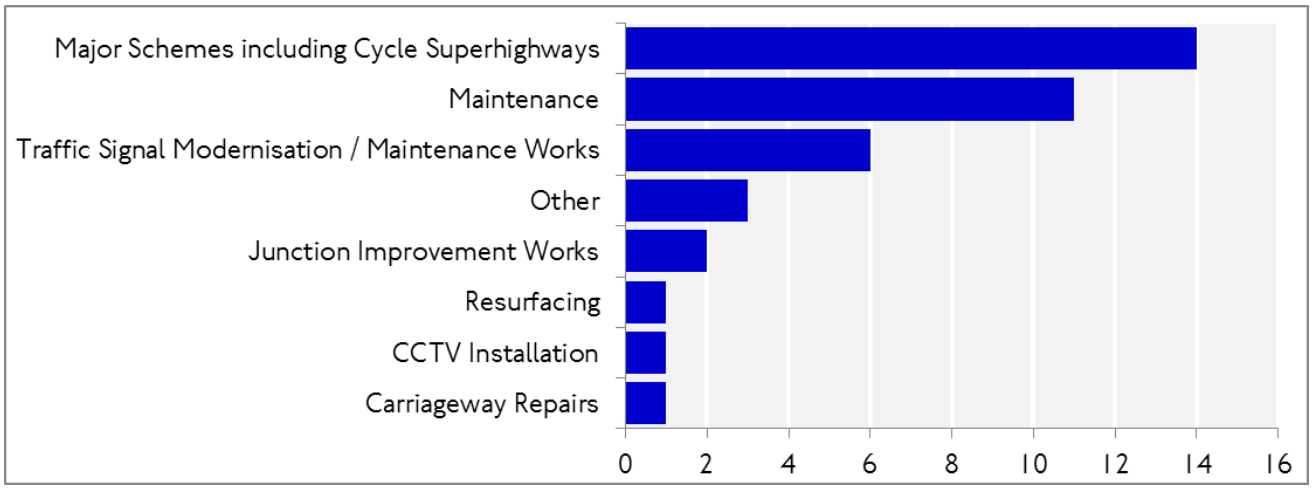
Table 14: Number of Works Resulting in Serious and Severe Disruption

Total Number of Planned Works Resulting in Serious & Severe Disruption				
	P8 10/11 to P7 11/12	P1 15/16 to P13 15/16	Change	% Change
TLRS Segments	**46**	**53**	**7**	**15%**
Highway Authority (TfL)	26	39	13	50%
Utilities	20	14	-6	-30%
Non-TLRS Segments	**10**	**11**	**1**	**10%**
Highway Authority (TfL)	6	9	3	50%
Utilities	4	2	-2	-50%

The number of works causing serious and severe disruption has increased by 7 works (15 per cent) across TLRS segments. Highway authority (TfL) planned works resulting in serious and severe disruption has risen by 13 works (50 per cent) within TLRS segments.

Figure 9 shows that nearly two thirds of planned highway authority (TfL) works resulting in serious and severe disruption within TLRS segments were caused by major schemes and maintenance, whilst Figure 8 showed they were responsible for 95 per cent of disruption. Even accounting for the two largest works, they caused a disproportionate amount of disruption hours.

Figure 9: Highway Authority (TfL) Planned Works Resulting in Serious and Severe Disruption within TLRS Segments



The total number of hours of serious and severe disruption has increased by a significant amount. A large proportion is attributable to major schemes on the network in particular, the Neasden roadworks on the A406 North Circular Road. As established in previous sections of this report there has been a huge strain on the network from the build phases of the Road Modernisation Plan. It can be seen that this and a number of other factors including the increase in vehicle flows has led to less resilience on the TLRN.

Where possible other works have been carried out in conjunction with these major works such as laying ducting along the Cycle Superhighways. Although serious and severe disruption has increased this could have been worse if some works had not been collaborative and had to be carried out at alternative times. The Road Modernisation Plan is a one off programme with 2015-16 expected to have the most impactful build stages which has been reflected in the results so far.

7. Customer Satisfaction

Using an online survey, TfL began measuring customer satisfaction with TLRN users in 2010 and overall satisfaction with the management of roadworks in 2011. Table 15 shows this component rose from a score of 70 in 2011 to an average of 72 in 2012-14 before falling 3 percentage points to 69 in 2015.

Table 15: Customer Satisfaction Survey (Q3)

Customer Satisfaction Survey (Q3)						
Customer Satisfaction	2011	2012	2013	2014	2015	% Points Change
Customer satisfaction with the management of roadworks	70%	73%	71%	72%	69%	-1%

In all previous Lane Rental Monitoring Reports Quarter 3 (Q3) which runs approximately from mid-September to mid-December, has been used to show a snapshot of satisfaction on the TLRN. The drop in customer satisfaction seen above is likely to be a result of Q3 falling within the peak of the Road Modernisation Plan (RMP) works (see Figure 2).

Table 16 shows a breakdown of each quarter for 2015/16. It can be seen that Q3 is the weakest performing quarter. Q1 and Q2 both have the same satisfaction of the previous year indicating that the RMP had a significant impact during Q3. It was also found that 20 per cent of customers experienced roadworks on their journey during Q3, the highest score for 2015/16, further establishing why Q3 didn't score as well as previous years.

Table 16: Customer Satisfaction 2015-16

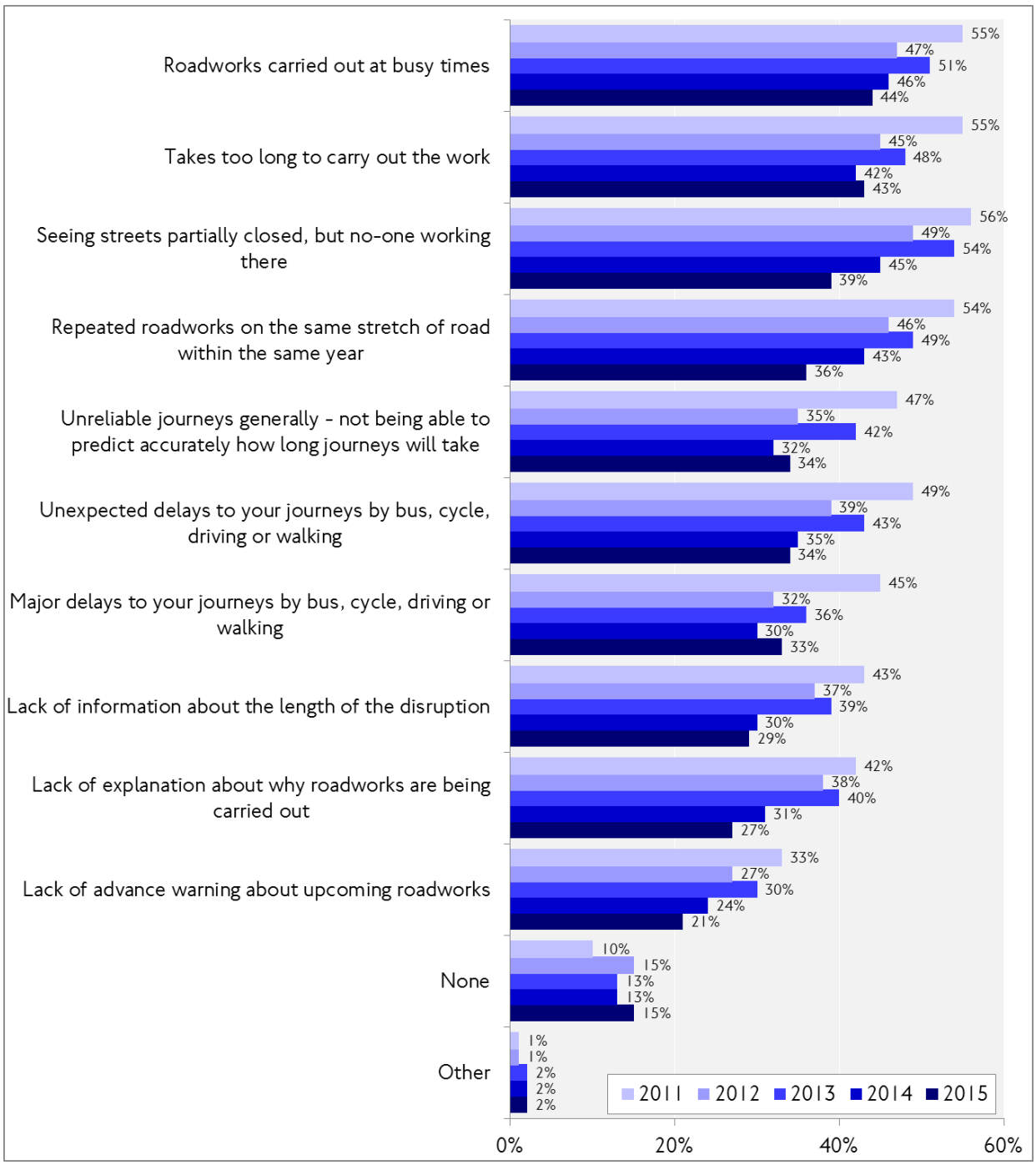
Customer Satisfaction Survey (2015/16)					
Customer Satisfaction	**Q1**	**Q2**	**Q3**	**Q4**	**% Points Change**
Customer satisfaction with the management of roadworks	72%	72%	69%	71%	-1%
Percentage who experienced roadworks on journey	16%	17%	20%	17%	+1%

In 2011 the user satisfaction survey started recording the most frustrating aspects of roadworks for TLRN users and all results are shown in Figure 10.

Customer satisfaction has improved in all areas since the survey began. There was a small drop in results between 2012 and 2013, likely to be a result of the survey taking place during the Olympic and Paralympic periods. Compared to the previous year 'major delays to your journeys by bus, cycle, driving or walking' has deteriorated by 3 percentage points.

The greatest improvements in customer satisfaction between 2014 and 2015 were reductions in frustrations associated with 'repeated roadworks on the same stretch of road within the same year' and 'seeing streets partially closed, but no-one working there' (7 and 6 percentage points respectively). Frustrations associated with 'roadworks carried out at busy times' have continued to reduce (2 percentage points compared to last year and 11 percentage points since 2011). It is reasonable to assume that the implementation of TLRS has had a positive influence on these results.

Figure 10: Roadworks Related Frustrations for TLRN Users



8. Behaviour Change

8.1 Number of Works Taking Place

Using data obtained from the Local Streetworks Register (LSWR), Table 17 shows the number of works that took place within TLRS and non-TLRS segments, separated into highway authority (TfL) and utility works, regardless of time of day and whether traffic sensitive or not.

Table 17: Number of Works on TLRS and Non-TLRS Segments

Number of Works Completed on TLRS and Non-TLRS Segments			
	Oct 10 to Sept 11	Apr 15 to Mar 16	% Change
Highway Authority (TfL) Total	**26,196**	**23,483**	**-10%**
TLRS Segments	17,202	15,078	-12%
Non-TLRS Segments	4,098	3,692	-10%
Utility Companies Total	**10,461**	**10,113**	**-3%**
TLRS Segments	5,933	5,922	0%
Non-TLRS Segments	1,881	1,829	-3%
Grand Total	**29,114**	**26,521**	**-9%**
TLRS Segments	23,135	21,000	-9%
Non-TLRS Segments	5,979	5,521	-8%

Note that the 'grand total' reflects only TLRS and Non-TLRS categories as described in Table 3 and does not represent the entire Transport for London Road Network (TLRN).

The total number of works undertaken on TLRS and non-TLRS segments combined has decreased by 9 per cent with both experiencing very similar decreases (9 per cent and 8 per cent respectively). The number of utility works remained the same in TLRS segments and reduced by 3 per cent in non-TLRS segments (52 works).

The number of highway authority (TfL) works decreased by 10 per cent (nearly 2,800 works). It is worth noting that, while there over 23,000 completed highway authority (TfL) works in TLRS segments, 99 per cent of these works did not attract a lane rental charge (as shown in Section 11.1). This indicates that while a relatively large number of highway authority (TfL) works took place, they are generally restricted to overnight or 'off-peak' hours (i.e. less traffic-sensitive times of day) or took part in other measures such as collaborative working to avoid the lane rental charge.

8.2 Changes to Planned Carriageway Works

Lane Rental days are those where works took place during chargeable hours. Table 18 shows the total number of Lane Rental days for carriageway works (only) that utility companies applied for and were approved in the monitoring period. As such it relates to just a subset of all works reported in Table 17.

As it can be seen from Table 18 below a total of 1,878 Lane Rental days were saved between April 2015 and March 2016 due to TfL liaising with promoters to reduce the length of time that the carriageway is occupied. The charges recovered between April 2015 and March 2016 were on average made up of 30 per cent low charge band and 70 per cent high charge band (See Table 25 below). Assuming the ratio between low and high charge bands on the network is 30:70 then there would be an average daily charge of £1,800, resulting in £3,380,000 worth of charges avoided.

Table 18: Planned Carriageway Utility Works on TLRS Segments (LR Days)

Planned Carriageway Utility Works on TLRS Segments (Lane Rental Days)						
	Oct 13 to Jun 14		Jul 14 to Mar 15		Apr 15 to Mar 16	
	Total	Proportion	Total	Proportion	Total	Proportion
Total Requested Lane Rental Days	3,900	-	2,736	-	4,940	-
Agreed Lane Rental Days	1,003	26%	1,419	52%	3,088	62%
Lane Rental Days Saved	2,987	74%	1,317	48%	1,878	38%

8.3 Changes to Works in Traffic Sensitive Times

TfL has been proactive in approaching borough Environmental Health teams to allow extended working hours during night time periods and has already reached an agreement with a number of boroughs. The proportion of works taking place during the day or overnight is shown in Table 19.

Table 19: Proportion of Daytime or Night Time Planned Utility Works

Proportion of Planned Utility Works Taking Place During the Day or Night					
	Oct 10 to Sept 11		Apr 15 to Mar 16		Percentage point increase in night time works
	Daytime	Night time	Daytime	Night time	
TLRS Segments	89%	11%	57%	43%	32%
Non-TLRS Segments	81%	19%	66%	34%	15%

Table 19 shows that the proportion of utility works taking place at night has increased from 11 to 43 per cent in TLRS segments. Night time works also increased in non-TLRS segments, albeit to a lesser extent. The increase was 17 percentage points higher in TLRS segments than non-TLRS segments, showing that the TLRS is having a direct impact on the time of day that works take place in the TLRS; whilst the TLRN-wide increase hints at a wider indirect impact.

9. Other Benefits of the Scheme

9.1 Collaborative Working

As discussed earlier, the TLRS encourages works promoters to minimise their duration of occupation of the street. One of the ways this can be achieved is through collaborative working, where promoters work within the same traffic management footprint or share trenches in order to avoid having to dig up the road a number of times. To further encourage collaborative works, as of

June 2015, all charges are waived for the period of collaboration where prior agreement has been given.

Collaborative works that have taken place across the whole of the TLRN have been examined and are shown in Table 20. While it is not possible to separate out the numbers for the TLRS, these figures give a good indication of changes which have occurred in these segments.

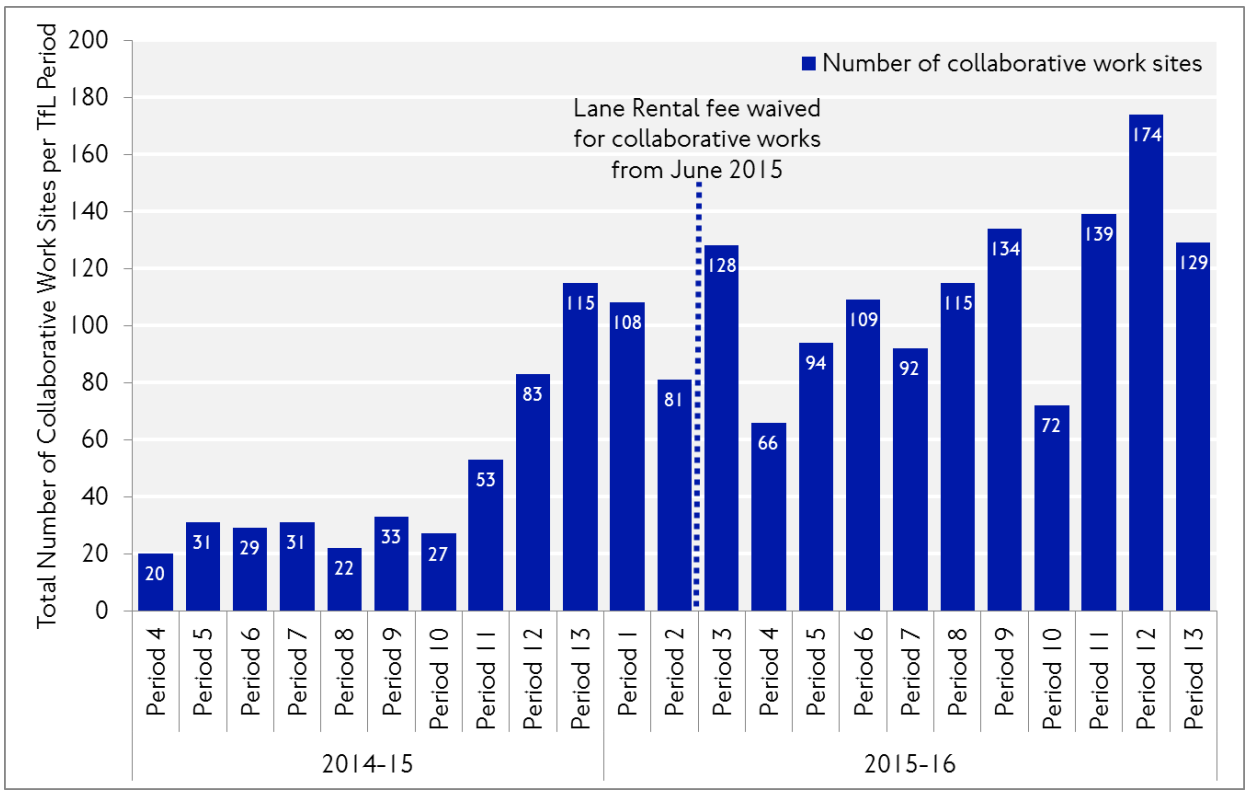
Table 20: Collaborative Working Figures across the TLRN

Collaborative Working				
	Period 8 2010/11 to Period 7 2011/12	Period 1 to Period 13 2015/16	Change	% Change
Average number of collaborative work sites per period	16	111	95	613%
Average number of days of disruption avoided per period	110	353	243	221%

Table 20 shows works promoters are undertaking (on average 95) more collaborative works per period, demonstrating a significant number of works promoters are undertaking works in this way. The average number of days of disruption that were avoided as a result of collaborative working each period has increased by over 240 days (221 per cent), demonstrating the positive impact collaborative working has had.

Figure 11 shows that the total number of collaborative work sites has increased significantly since Period 4 2014-15 (when the latest TLRS areas were adopted). With the exception of Period 4 and 10 2015-16, collaborative work sites have exceeded 90 per TfL Period after the waiver was introduced. Period 11 and 12 saw the highest number of collaborative work sites (139 and 174 respectively). Figure 11 and Table 20 reflect that the waiver has had a positive impact on the number of collaborative work sites.

Figure 11: Collaborative Work Site per TfL Period



9.2 Reduced or Waived TLRS Charges

As mentioned above the TLRS charge is waived for collaborative working. There are a number of scenarios where consideration will be given to reduce or waive TLRS charges[5], which can include:

- Using innovative technology
- Where there is no net loss to carriageway space – the traffic management or work space takes up the same footprint as an existing island or when an existing island has been removed in order to create adequate temporary working space
- Implementing future proofing methods to the road network – such as providing additional ducting and access chambers to reduce the number of future interventions on the network from utility providers
- Using extraordinary measures – where special provisions have been made to reduce congestion that are over and above normal practices

Between April 2015 and March 2016 a total of 138 waiver applications were submitted, with 61 per cent receiving approval (84).

One example where promoters have used extraordinary measures and collaborative works to reduce and waive the TLRS charge was the major works on Finchley Road around the Swiss Cottage gyratory to repair old cast iron water mains that had been leaking. These were undertaken collaboratively with major gas main replacement works where the traffic management could be shared.

[5] Transport for London Lane Rental Scheme Supplementary Guidance V5.0 July 2016 - http://content.tfl.gov.uk/tlrs-supplementary-guidance.pdf

TfL required the works to be carried out 7 days a week with each working day extended as long as possible within the constraints of noisy operations required within a residential area. Through implementing this approach the overall duration of the works was reduced by 14 months.

In addition, National Grid Gas implemented extraordinary measures by removing the central reservation on Finchley Road so that two lanes of traffic could be maintained in both directions. Also, the most disruptive phase of work was carried out during the Christmas and New Year period when vehicle flows are much lower.

The TLRS charge not only incentivises promoters to work quickly or out of hours, but it can also lead to the promoter considering innovative solutions that result in reduced disruption. This can sometimes be at extra cost to the promoter in lieu of having the TLRS charge reduced or waived.

9.3 Cost of Delay Savings

Within Appendix 1 a case study has been analysed to assess the benefit of the TLRS. Costs of delay have been calculated which assess the impact of the roadworks and then compare them to the estimated impacts if the TLRS had not been in place.

The case study below shows that through block closures, the TLRS is preventing hundreds of thousands if not millions of pounds of delay per annum, in addition to a suite of other benefits (such as reducing the number of noisy nights, exposing traffic to unfamiliar traffic management, and improving safety).

9.4 Funding Congestion Reduction Measures

The Lane Rental Governance Committee (LRGC) is formed of senior managers from TfL and utility companies who have responsibility for ensuring that the expenditure of surplus income generated from the TLRS in in accordance with DfT regulations and guidance.

The LRGC meet quarterly to review requests for funding from the net proceeds, which must be applied for purposes intended to reduce the disruption and other adverse effects caused by street works.

Applications must also directly or indirectly benefit London. This is not to say that items outside of London would not be considered, but they must have the potential to be used within London, for example the use of innovative technology.

Between April 2015 and March 2016 13 applications for LRGC funding were approved totalling £1,968,406. Where it has been possible to calculate, the estimated social cost of delay saved is approximately £30,226,403.

The following is a list of funding requests that have been approved by the LRGC in 2015-16:

Table 21: Funding Requests Approved by LRGC 2015-16

Title	Summary
Elephant & Castle – Shared Ducting Strategy	Utilise the redundant subway network by installing additional ducting capacity during the major improvement scheme of the roundabout.

Utilisation of TUCA for Pan-London / National Training and R&D	Develop a business case for expanding the current remit of the Tunnelling and Underground Construction Academy (TUCA) to include training and R&D with utility companies, highway authorities and developers.
Multi-Sensor Robotic Inspection Survey	Trial of multi-sensor inspection survey robot for use on large sewers to determine levels of deformation, corrosion and sediment build-up without excavation.
Cycle Superhighway 5 Inner - Future Proofing Network	Installation of additional ducting capacity, as part of the Cycle Superhighway scheme, with the intention of reducing future interventions of the network.
Southwark Borough – Future Proofing Network	Installation of additional ducting capacity to future proof network ahead of proposed known developments in the locality.
Advanced Inspection Device for Large Diameter Cast Iron Mains	Development of a crawler system capable of traversing Weko Seals within gas mains between 24”-48” pipes to enable pre-inspection of mains prior to rehabilitation and accurate mapping of buried infrastructure.
Improving Bound Layer Reinstatement Process	Independent assessment of bagged bituminous material for compliance with industry standards. Benefits identified include reductions in material waste, travel time between asphalt plants and site; and overall reinstatement time.
Inter-Agency CCTV Video Sharing	Develop a future digital CCTV 'sharing' interface protocol to ensure the continuation of service from analogue. Joint funding arrangement between LRGC, the Metropolitan Police and Highways England.
Improving the Visibility and Resilience of our Buried Services	Establish a standard national format for gathering and recording underground apparatus spatial data in the form of a Publically Available Specification (PAS).
Moving Variable Messaging Signs (Taxi Top)	Trial to display traffic related information on taxis. Targeted messages will inform road users of traffic conditions and planned works at 50 areas where there are known or expected delays as a result of roadworks.
Bridge Strike Mitigation Programme - Phase 1	Install telemetry and CCTV at 8 over height vehicle detectors protecting the 4 highest risk structures to analyse data captured and establish future mitigation.
London Infrastructure Mapping Application	Development and testing of the application over the next twelve month period to ensure integration with existing databases and systems across the industry securely.
Surface Playbook	Development of iteration 2 work to enable London Boroughs, the GLA, and utilities to access and interrogate details of the schemes and programmes planned for the London Road Network over the next 10 years through an interactive mapping application.

Since the scheme commenced a total of 23 applications have been approved by committee with a funding value of £3,940,014 and an estimated social cost of delay saving of £41,145,453. The projects funded can be broadly categorised as follows:

Table 22: Project Categories for Funding

Congestion Busting Measures	Future Proofing Measures	Extraordinary Measures
Autonomous Robot Technology	IT Software	Material Testing
Industry Training	Solutioneering Workshops	Utility Infrastructure Mapping

The surplus funds generated from the scheme are considered to be a highly valuable ring-fenced source that can be reinvested into facilitating continuous innovation and improvements within the industry for the purposes of reducing road network disruption.

10. The Financial Impact of the TLRS

Although TLRS charges do not apply 24 hours of the day, the scheme has increased the cost of carrying out works on the TLRN. This can be in the form of charges for undertaking works during traffic-sensitive times in TLRS segments, or as a result of changing working practices to avoid working during these periods of the day, such as additional overtime for staff working at night.

10.1 Number of Works Avoiding TLRS Charges

Table 23 shows that 99 per cent of TfL works and 88 per cent of utilities works in TLRS areas completed within the reporting periods of 1 April 2015 to 31 March 2016 avoided TLRS charges. This is where works took place within TLRS segments but were planned to take place outside the chargeable, traffic-sensitive hours of the day or took additional measures such as collaborative working to avoid the TLRS charge.

Telecoms avoided the highest amount of TLRS charges within the utilities category with 2,412 works avoiding a charge (94 per cent) whereas gas promoters had 420 works avoiding a charge (76 per cent).

Table 23: Proportion of Works Avoiding TLRS Charges

Proportion of Works in TLRS Areas Avoiding TLRS Charges	
Promoter	**Apr 15 to Mar 16**
Transport for London	**99%**
Utility	**88%**
Water	86%
Telecoms	94%
Electric	87%
Gas	76%

10.2 Number of Works Incurring TLRS Charges

Table 24 relates to the value of TLRS charges recovered or invoiced between 1 April 2015 and 31 March 2016, regardless of whether the work took place in this period or earlier. Previously lane rental charges were split between promoters where collaborative working was being carried out. The data was recorded where for example 3 promoters worked collaboratively for 1 day the daily TLRS charge would be split equally between them but the total number of days would be recorded per promoter (in this case totalling 3); this is reflected in Table 24. TLRS charges from June 2015 are fully waived for collaborative working.

Table 24: Charges Recovered (Apr 15 - Mar 16) from Works Incurring a TLRS Charge

Sector	No. of Works where Charges were Recovered	Number of Days	% Low Charges (£800/day)	% High/PP Charges (£2,500/day)	Total Charges Recovered	% of Total Charges Recovered
Water	241	912	25%	75%	£1,501,000	13%
TfL	165	4,598	23%	77%	£7,615,250	64%
Telecoms	147	326	33%	67%	£460,300	4%
Electric	135	592	28%	72%	£925,900	8%
Gas	131	997	40%	60%	£1,324,750	11%
Total	**819**	**7,425**			**£11,827,200**	**100%**

All works sectors (except Water) were charged for a similar numbers of works (131 to 165) and all sectors attracted similar proportions of higher charges (60 to 77 per cent); TfL, gas and water sectors paid considerably more charges in total (over £1 million each). Gas primarily had higher average charges per work (approximately £10,000 compared with £3-6,000 for water, electric and telecoms). Water had a considerably higher number of works accounting for 13 per cent of the total.

Despite 99 per cent of TfL works avoiding a TLRS charge, over £7.6 million has been invoiced for 2015/16 accounting for 64 per cent of the total of the charges recovered. The number of days exceeds 4,500 which are 62 per cent of the total number of days charged for. This helps to comprehend the scale of the Road Modernisation Plan (RMP) works and the impact they have had on the network.

Compared to the previous 9 month Lane Rental Report which ran from July 2014 to March 2015 there has only been a 13 per cent increase in the total number of works which charges were recovered for but a 137 per cent increase in total number of days incurring a charge. Therefore the total monetary amount has increased by almost 150 per cent. As mentioned throughout the report this signifies the magnitude of the RMP works and the impact they have had whereby TfL works incurred over £7.6 million in one year alone.

11. Summary

There is a complexity to the Transport for London Road Network (TLRN) which is incomparable to many other cities within the UK. In particular 2015-16 saw the most intense build phase of the Road Modernisation Plan (RMP) which seeks to improve a large proportion of the road network

within London. This has put a huge amount of pressure on the performance of the network and the results within this report reflect this.

One major issue to consider when understanding the results of this report and the influence the TLRS has had, is that the TLRS was not designed to mitigate or manage the substantial number of major works which has been seen in the last year. Every effort has been made to try and disentangle the Road Modernisation Plan from the results to try and understand the more day to day or regular sets of roadworks that the TLRS helps mitigate.

There were more than 20 different major works taking place each month as part of the RMP during 2015-16 with over 35 between September and October. For 5 consecutive months over 20 per cent of TLRS segments were located within Major Work Impact Areas (MWIAs).

Journey time reliability (JTR) experienced deterioration in both TLRS and non TLRS segments and across all time periods. The greatest decrease in JTR in TLRS segments was during the PM (2.5 per cent). Although there was deterioration in JTR, the AM peak 87 per cent JTR target for the TLRN during 2015-16 was met in both TLRS and non-TLRS segments.

Journey times increased within TLRS segments by 18 and 20 per cent during the AM and PM peaks respectively. However journey times were significantly more affected within MWIAs which heavily influenced the overall results (journey time increases of 30-50 per cent in MWIAs and 5-15 per cent outside of MWIAs). JTR inside MWIAs deteriorated at a higher rate within non-TLRS segments with the PM peak decreasing by 1 percentage points more than TLRS segments. This indicates that the TLRS is providing a level of protection of the network performance within TLRS segments. Increases in journey time and JTR in both TLRS and non-TLRS outside of MWIAs are very similar which indicates a general deterioration in network performance.

Vehicle flows have increased in both TLRS and non-TLRS segments (2 and 4 per cent respectively). Vehicle flows in TLRS segments were found to be 21 per cent higher per lane than non-TLRS segments; this highlights the need for the TLRS due to the increasing demand over time compared to other parts of the network. The increased vehicle flows also contributed to the overall deterioration of the road network.

Both TLRS and non-TLRS segments experienced a similar decrease in the total number of works (9 and 8 per cent respectively). The number of utility works has remained the same in TLRS segments and reduced by 3 per cent in non-TLRS segments. Whilst there were over 15,000 completed highway authority (TfL) works in TLRS segments, 99 per cent did not attract a lane rental charge. This indicates that while a relatively high number of works took place, they were generally restricted to overnight or off peak hours, or took part in other measures such as collaborative working to avoid the charge.

80 per cent of serious and severe disruption caused from highway authority (TfL) planned works were associated with major schemes. Of this, 73 per cent were related to the A406 works at Neasden (accounting for the 58 per cent overall). This further demonstrates the impact the RMP has had on the TLRN and the overall results within this report. It can be seen that this and a number of other factors including the increase in vehicle flows has led to less resilience on the TLRN.

There was an increase in the average monthly number of collaborative work sites amongst work promoters of 95 (613 per cent) between the baseline and monitoring period. The average number of days of disruption that were avoided as a result of collaborative working each period has

increased by over 240 days (221 per cent), demonstrating the positive impact collaborative working has had.

It was found that 99 per cent of TfL works and 88 per cent of utility works avoided attracting a TLRS charge over the period monitored in this report. Further analysis has shown that 43 per cent of utility works took place at night in TLRS segments; up 32 percentage points from before the scheme was implemented. This demonstrates that promoters have been actively avoiding traffic-sensitive times of day since the TLRS began, and therefore avoiding charges.

Customer satisfaction with the management of roadworks decreased by 1 per cent compared to 2011 during Q3. It was found that Q3 fell within the peak of the RMP build phase and as a result had the worst scores for the year. Q1 and Q2 both have the same satisfaction of the previous year indicating that the RMP had a significant impact during Q3. Customer satisfaction increased with 'repeated roadworks on the same stretch of road within the same year' and 'seeing streets partially closed, but no-one working there' (an increase of 7 and 6 percentage points respectively). Other frustrations associated with 'roadworks carried out at busy times' have continued to reduce (2 percentage points compared to last year and 11 percentage points compared to 2011). Despite the impact the RMP has had on the network, the TLRS has still had a positive impact.

The charges recovered between April 2015 and March 2016 was on average made up of 30 per cent low charge band and 70 per cent high charge band. Assuming the ratio between the low and high charge bands on the network is 30:70 then there would be an average daily charge of £1,800. With 1,878 Lane Rental days saved between April 2015 and March 2016, charges of £3,380,000 were avoided.

Overall the analysis of the TLRS areas adopted in July 2014 has shown benefits ranging from increased works overnight and increased collaborative working. Customer satisfaction with aspect that the TLRS was designed to address has increased significantly indicating that TLRS is having a positive impact on London residents.

This report shows that the TLRS has resulted in numerous benefits including increasing the amount of roadworks taking place during less traffic sensitive times and the increased use of innovative traffic management and works techniques, leading to substantial savings in delay to road users. London's growing population and TfL's continuing roll-out of its Road Modernisation Plan means the TLRS will be more critical than ever in minimising the impact this extra utilisation of the road network will bring.

Appendix 1: Case Study

i. Block Closures

The Lane Rental Scheme incentivises work promoters to carry out roadworks either off peak or overnight. To further encourage more work to be carried out during those times, Transport for London (TfL) has begun implementing block closures. This is where certain sections of road are shut overnight or off peak and as many routine maintenance works are carried out at the same time as possible; thus avoiding the disruption the works would have had if they have been carried out individually or during different parts of the day.

There are currently 179 locations where block closures are carried out as often as every 6 to 8 weeks, as long as work is required. The works are planned in advance and can involve testing lights, gully cleansing, sign maintenance, horticultural works and debris patrols. In the financial year 2015-16 over 62,000 assets were maintained through this collaborative approach.

The block closure programme is expanding to include direct working with utility companies, other highway authorities and third parties to offer them the opportunity to carry out their own maintenance activities within these sites. Increasing the number of utility works and sites within the block closure programme will result in multiple unnecessary work sites being avoided and hundreds of hours of disruption saved for the public.

This case study will explore the impacts of block closures and make comparisons to previous similar works. Journey times have been analysed using LCAP data to compare the effects of the various sets of works. The estimated cost of disruption saved from implementing block closures is also explored.

ii. Change in the Duration of Works

The A406 North Circular Road and the A4 Talgarth Road are two locations where block closures are regularly carried out to complete routine maintenance works. Both locations have been analysed between 2008 and 2016 to assess the change in number and duration of works prior to the implementation of block closures. The analysis has excluded any works which are scheme and Olympics related and anything outside of general maintenance works. The analysis has been spilt into three main categories as described below in Table 25.

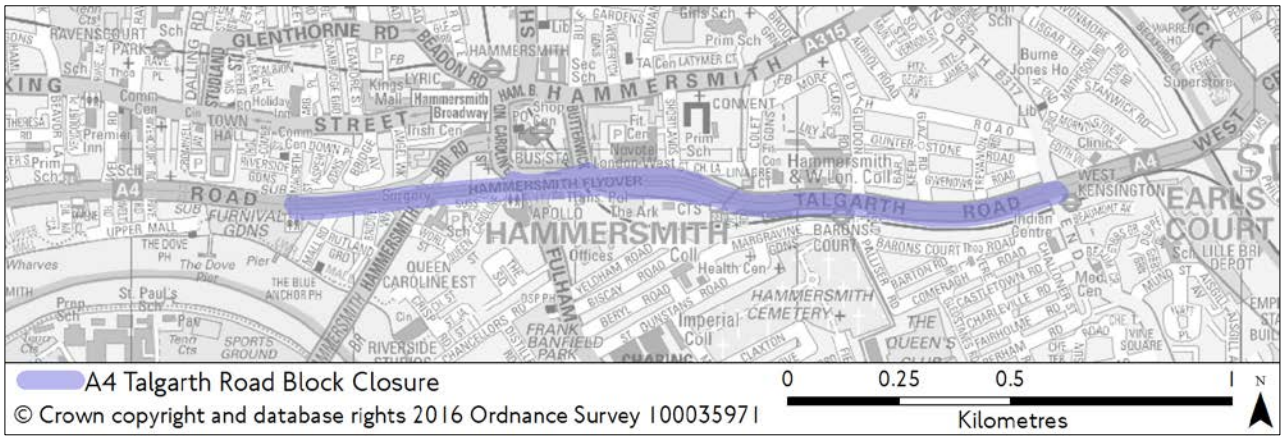
Table 25: Block Closure Analysis Categories

Category	Description
Pre Lane Rental 2008 - 11	Works which were carried out prior to the implementation of TLRS in 2012
Pre Block Closure 2012 -14	Works which were carried out after the implementation of the TLRS and before the block closure program was implemented
Block Closures 2015-16	Works carried out within planned block closures in 2015-16

a. A4 Talgarth Road

A4 Talgarth Road is located within the London Borough of Hammersmith and Fulham and is within the high charge band of the TLRS, applying to works from 06:30 to 20:00 weekdays and 12:00 to 18:00 weekends (Figure 12).

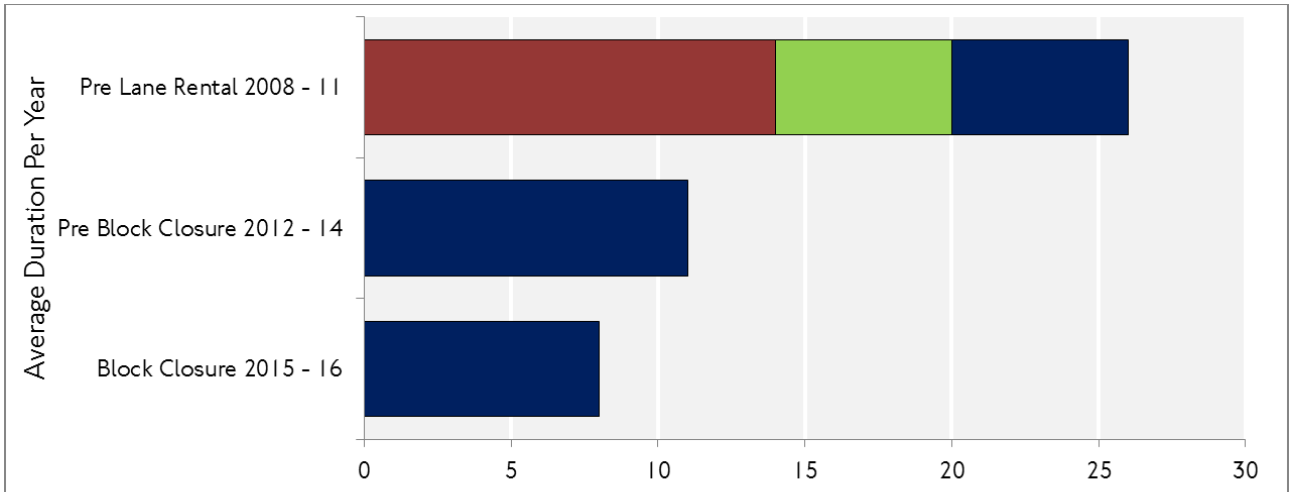
Figure 12: A4 Talgarth Road - Block Closure



Prior to the TLRS implementation data collection methods were not standardised so for some records a work time has not been provided therefore has been marked as unknown.

The Pre Lane Rental category is the only time where maintenance works have been carried out during the day, making up 23 per cent of all works recorded on average per year. This is a minimum figure as some of the 'unknown' works would have been carried out during the daytime. The clear shift seen in Figure 13 to no daytime maintenance works being carried out after TLRS implementation demonstrates the impact the TLRS has had on work timings. The average number of night time closures per year has reduced by 27 per cent from the Pre Block Closure period and Block Closure implementation (11 to 8), demonstrating the positive impact the block closure programme has had.

Figure 13: A4 Talgarth Road - Duration of Works within Block Closures compared with previous years



	Block Closure 2015 - 16	Pre Block Closure 2012 - 14	Pre Lane Rental 2008 - 11
Unknown	0	0	14
Day	0	0	6
Night	8	11	6

b. A406 North Circular Road

The A406 North Circular Road is located within the London Borough of Barnet and is within the low charge band of the TLRS, applying to works from 06:30 to 10:00 and 15:30 to 20:00 weekdays and 12:00 to 18:00 weekends (Figure 12).

Figure 14: A406 North Circular Road - Block Closure

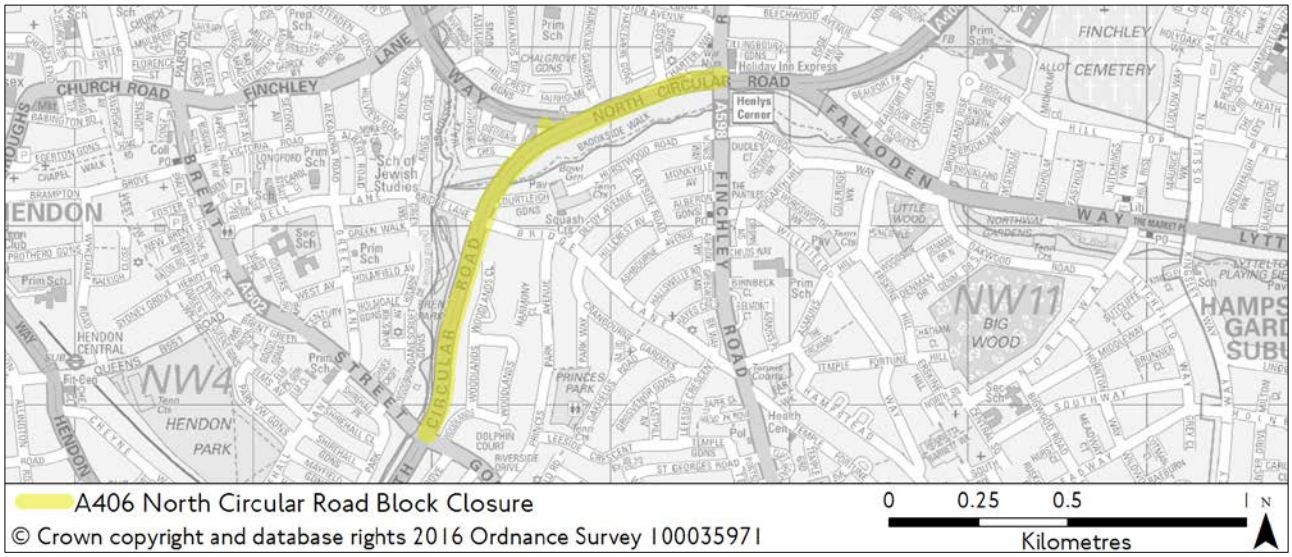
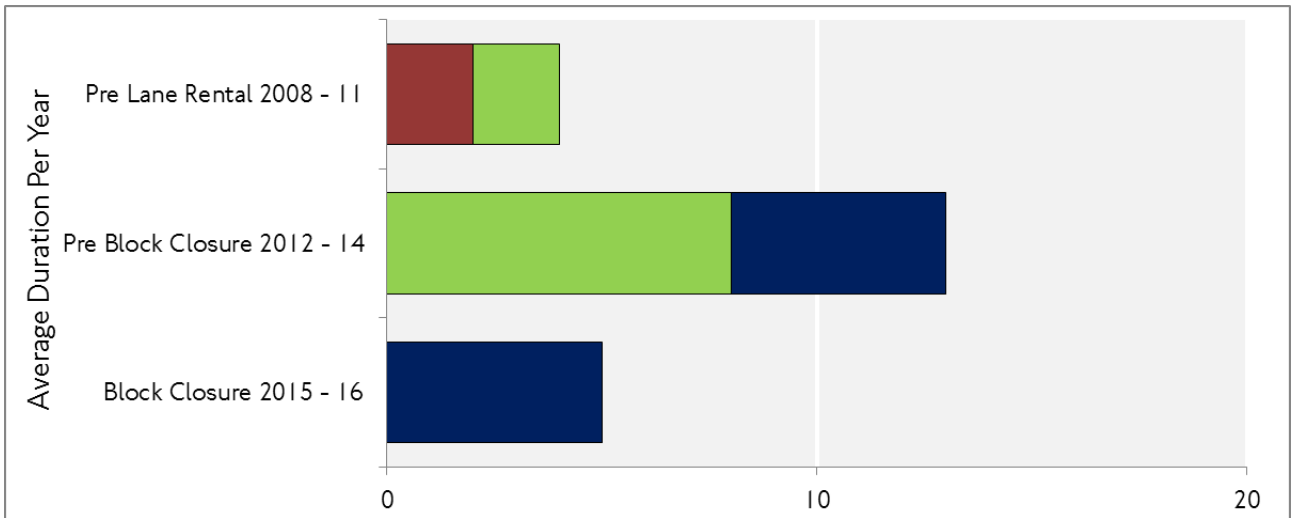


Figure 15 shows the breakdown of works in each category on the A406 North Circular Road. 38 per cent of the average number of works per year within the Pre Block Closure period was carried out during the day. Since the introduction of Block Closures, the total duration of works has reduced by 62 per cent (13 to 5) and all of the works have taken place overnight in 2015-16.

Figure 15: A406 North Circular Road - Duration of Works within Block Closures compared with previous years



	Block Closure 2015 - 16	Pre Block Closure 2012 - 14	Pre Lane Rental 2008 - 11
Unknown	0	0	2
Day	0	8	2
Night	5	5	0

Both examples show a significant reduction in the duration of maintenance works, with all works now taking place over night. From the two examples alone there has been a work duration reduction of 11 days per year (46 per cent) between the Pre Block Closure period and Block

Closure, highlighting the substantial changes which have been made by the implementation of the block closure programme.

iii. Average Journey Times

The average journey time across all works at both locations increased by approximately 2 minutes during the Pre Lane Rental period and 1 minute in Pre Block Closure and Block Closure. Although this additional delay appears to be low, vehicle flows overnight are much lower (approximately a half to a third of what they are compared to during the day) and therefore journey times are not as adversely affected, hence the preference for overnight working. Taking into account the number of works per year and the lower average delay, there has been a reduction of 64 per cent and 81 per cent in congestion in the Pre Block Closure and Block Closure periods at A4 Talgarth Road and A406 North Circular Road respectively.

iv. Estimated Cost of Delay Saved

Using the A4 Talgarth Road case study as an example, £24,000 has been saved in reduced delay by implementing block closures, compared to prior to TLRS implementation (Table 26). Although some delay (approximately 1 minute on average) is expected, delay is considerably reduced due to the decrease in the number of closures as well as thoroughly planned and mitigated diversion routes.

Table 26: Estimated Cost of Delay Saved – A4 Talgarth Road

Category	Description	Pre Lane Rental 2008 – 11	Pre Block Closure 2012 – 14	Block Closure 2015 – 16
Number of Days Affected	Average recorded number of days or nights per year. Assuming the works took place overnight between 23:00 – 05:00	14	11	8
Average Additional Delay	Journey times and JTR has been analysed using LCAP data to compare the effects of the works	2 minutes	1 minute	1 minute
Average Vehicles per Hour	Overnight vehicle flows (using Department for Transport Traffic Count database)	566	566	556
Cost of Delay	An approximate average cost per vehicle delay, per hour	£20.83	£20.83	£20.83
Estimated Cost of Delay	The cost of delay dependent on number of days affected and average delay experienced	£33,011	£12,969	£9,432
Estimated benefit in reduced delay per year (Pre Lane Rental Works vs Block Closures)		£23,580		

v. Impact of Coordination and Planning Block Closures

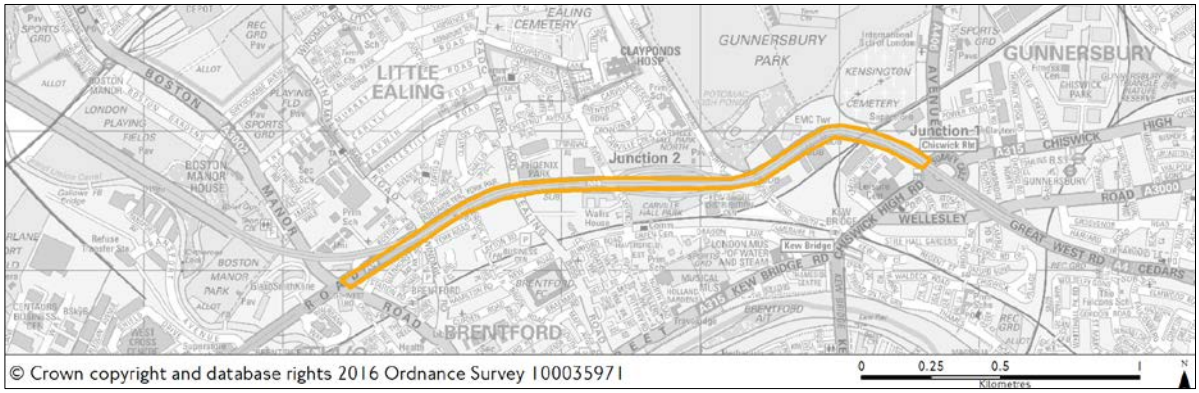
Consolidating the number of works into single closures and moving works to overnight requires forward planning and coordination with all stakeholders. The block closure programme now means

that permits are approved in advance and coordinated with London Streets Traffic Control Centre (LSTCC) and Outcomes Delivery (OD) within TfL. They work together to ensure disruption is kept to a minimum by ensuring signal timings are adjusted accordingly on the diversion routes. The following two examples analyse situations where block closures have not been planned in advance or coordinated and the impact they both had.

a. A4 Great West Road

The A4 Great West Road is located within the London Borough of Hounslow and is within the high charge band of the TLRS, applying to works from 06:30 to 20:00 weekdays and 12:00 to 18:00 weekends (Figure 16).

Figure 16: A4 Great West Road

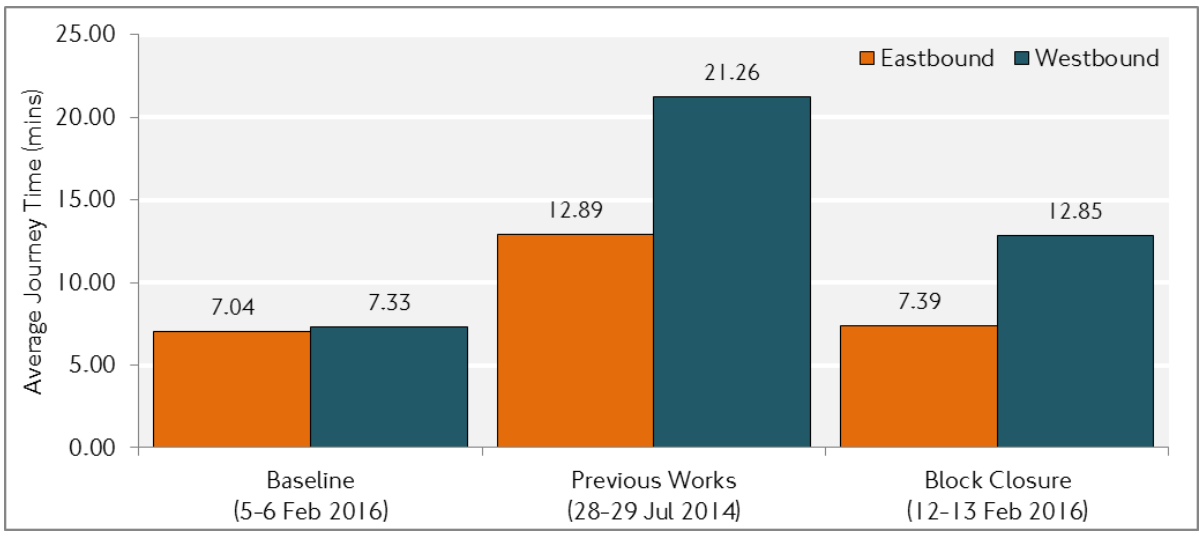


Works were carried out without a permit between 22:00 28 July to 02:00 29 July 2014. It was assumed that this would not be an issue due to the times of the works. However planned works were also being carried out on the M4 westbound between junction 1 and 3. This resulted in congestion within the area. If the unplanned works had been carried out during a block closure then the disruption would have been avoided as they would have been planned to not coincide with nearby works.

The impacts will be compared to a block closure which was carried out on the A4 Great West Road westbound between 22:00 12 February 2016 and 05:00 13 February 2016. Works included maintenance of lighting, sign and guard cleaning, barrier works and grass cutting.

Figure 17 shows the average journey times recorded on the A4 Great West Road in both directions. Journey times were highest during the previous unplanned works (July 2014) up 6 minutes eastbound and 14 minutes westbound compared to the baseline. The block closure journey times did deteriorate by 5 minutes westbound (direction of block closure) whilst the inbound only increased slightly, compared to the baseline. There is a significant difference between the impacts of the unplanned works and the block closure highlighting the importance of forward planning.

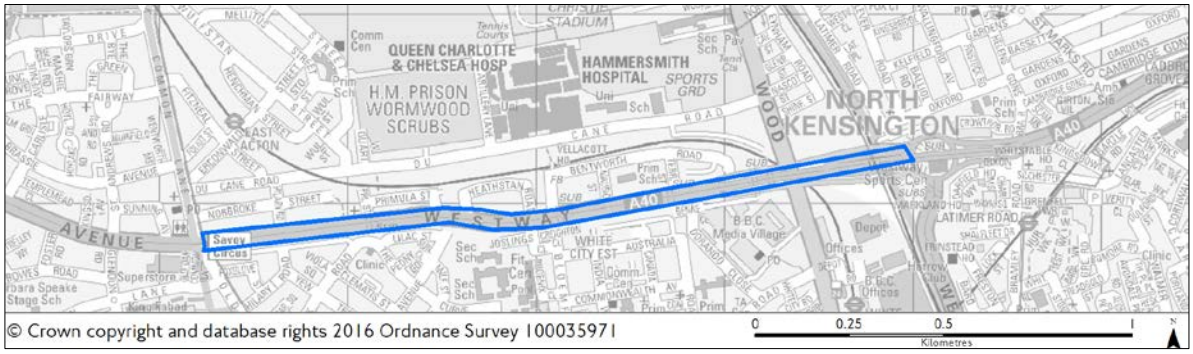
Figure 17: Average Journey Times 22:00 to 05:00 – A4 Great West Road



b. A40 Westway

The A40 Westway is located within the London Borough of Hammersmith and Fulham and is within high TLRS charge band of the TLRS, applying to works from 06:30 to 20:00 weekdays and 12:00 to 18:00 weekends (Figure 18).

Figure 18: Average Journey Times – A40 Westway

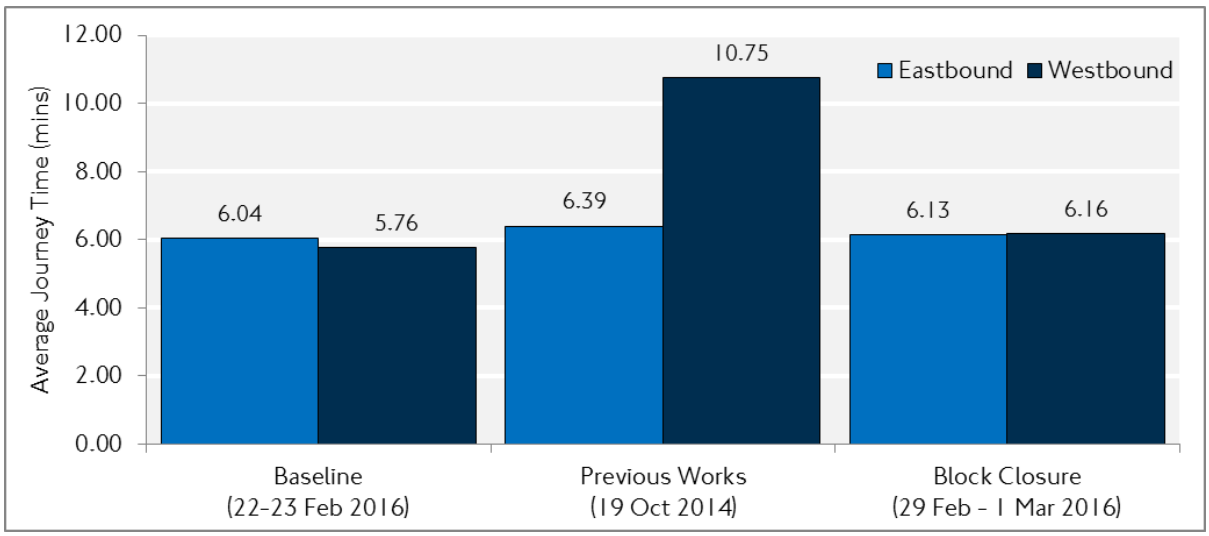


Works were previously carried out on 19 October 2014 between 00:00 and 05:00 which involved a westbound closure for maintenance. The works carried out in October resulted in disruption as the works were not coordinated with LSTCC and OD and signal timings on the diversion route were not adapted to deal with the additional traffic which was being rerouted.

Another block closure was carried out between 23:00 29 February 2016 and 05:00 1 March 2016 and was coordinated with LSTCC and OD; this has been used as a comparison within the analysis. Works carried out were similar to those listed above in the A4 Great West Road example.

The planned works in October 2014 which were not coordinated with LSTCC and OD resulted in journey times increasing by 5 minutes westbound. Whereas the block closure which took place at the end of February 2016 had very little impact with journey times increasing by under half a minute (Figure 19). This demonstrates the importance of coordinating works with all those involved to minimise disruption as far as possible.

Figure 19: Average Journey Times 23:00 to 05:00 - A40 Westway



vi. Benefits Associated with Block Closures

The estimated cost of delay per block closure is £1,360. This is based on each block closure adding 2 minutes to average journey times and affecting vehicles between 23:00 and 05:00. Even if only one overnight intervention was saved per year through the Block Closure programme at each of the 179 sites the estimated cost of delay saved exceeds £121,000 (Table 27). Using a figure of 5 interventions saved (c.f. 11 across two sites), then this figure rises to over £600,000. In addition block closures allow for more regular maintenance, preventing the need for day time and/or emergency maintenance works. Additionally we have seen that block closures often prevent higher levels of disruption that arise from uncoordinated working. Finally there are additional benefits, such as a reduced number of nights where noisy operations are taking place and reduced risk exposure.

Table 27: Estimated Cost of Delay Saved - Block Closure Programme

Category	Description	Variable
Block Closure Timing	Based on an average overnight block closure between 23:00 to 05:00.	6 hours
Vehicle Flows	Based on TLRN average overnight reduced vehicle flows	326 vehicles per hour
Interventions	The number of interventions saved at a location where block closures are implemented	1
Average Additional Delay	A conservative additional delay based on overnight works	1 minutes
Block Closure Locations	The current number of block closure locations (2015-16)	179 sites
Estimated benefit in reduced delay if only one intervention was saved per year		£121,551

vii. Summary

Figure 13 and Figure 15 highlight the significant reduction in duration of maintenance works between the Pre Block Closure period and the implementation of the Block Closure programme with all works now taking place overnight (up from 73 per cent taking place overnight for A4 Talgath Road).

It is estimated that the cost of delay saved through the block closure programme if only one intervention is avoided each year at each of the 179 location would exceed £121,000. This is a considerably conservative figure as it is likely that there would be several interventions saved per site each year.

Thorough planning and coordinating of block closures will lead to even more disruption avoided as seen in Figure 17 and Figure 18. It is estimated that through coordinating with LSTCC and OD the block closure on the A40 Westway saved over £4,300 compared to an occasion when works had not been as well coordinated.

The block closure programme also leads to many other benefits which include: more regular maintenance preventing the need for emergency maintenance; a reduced number of nights where noisy operations are taking place; and a reduced number of chances for collisions due to unfamiliar traffic management both during the day and night time.

The block closure programme is just one initiative generated from TLRS by incentivising promoters to carry out work off peak and overnight; providing a platform for routine maintenance works to be carried out in this way. The block closure programme is expanding with certainly hundreds of thousands if not millions of pounds per annum saved from disruption avoided.

Appendix 2: Financial Summary

Table 28 displays the financial summary of the TLRS by financial year.

Table 28: Financial Summary

£m	01 Apr 12 to 31 Mar 13	01 Apr 13 to 31 Mar 14	01 Apr 14 to 31 Mar 15	01 Apr 15 to 31 Mar 16
Income	1.9	3.6	6.3	12.0
Scheme Development, Running Cost and Lane Rental Governance Funding Approved Bids	-1.6	-1.4	-1.9	-4.9
Net Income from Lane Rental Charges	0.3	2.2	4.3	7.1

Contact

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www.tfl.gov.uk/lanerental

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