

LED street lighting trial assessment report

10052

March 2011



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1. Executive summary

Abstract

Transport for London (TfL) has run two trials to test LED street lighting. 402 interviews with drivers and residents were completed in the two trial areas. A small proportion of respondents were aware of either the LED street lighting and/or the trial. Most of those who were aware of the LED lighting had a positive response to it. Comparing LED lighting with conventional lighting, most aware of the LED lights considered them to be better. Just one respondent reported a problem with the lights; they had been dazzled when they looked *directly* at the lights. No one had any issues with glare or reflection. Amongst all respondents, the majority think that TfL should introduce LED street lights.

Key findings

402 people, drivers and residents, were interviewed face-to-face in two trial areas (A201 Blackfriars Road and A40 Western Avenue). Fieldwork was carried out during January and February 2011.

39 (10%) of all 402 respondents noticed changes to the lighting. Unprompted recall of the LED lighting/trial among all respondent was 2%. After prompting recall of LED/lighting trial increased to 7% (28 respondents).

22 of the 28 respondents who were aware of the LED lighting had a positive response to it – 22 rated it excellent/good. None gave the LED lighting a poor rating.

Comparing LED with conventional lighting, LED was considered to be:

- Better – 21 respondents
- Allows you to see more clearly – 16
- Better for road safety – 11

One person experienced a problem with the LED lighting; they were dazzled when they looked *directly* at the LED lights.

None of the other respondents aware of the LED lighting experienced any problems, or had issues with glare or reflection.

Asked why TfL is considering introducing LED street lights, 35% of all respondents mentioned '*more energy efficient/better for the environment*' and/or '*the new lights are cheaper*'. 10% mentioned '*light pollution*.'

Most (68%) think TfL should introduce LED street lights. One in ten (10%) do not think the LED lights should be introduced and 22% '*don't know*'.

Perceived cost is the most frequent mention for NOT rolling out LED street lighting (17 of the 40 respondents who do not think the LED lights should be introduced by TfL). This equates to 4% of the total sample. Seven (2%) think that the LED lights ought not to be introduced as they are '*too bright*.'

2. Background

TfL is responsible for street lighting on the TfL Road Network (TLRN), which comprises routes of strategic importance such as trunk roads as well as specific street lighting on a small number of remote or segregated footways.

TfL provides street lights to:

- Reduce the number/severity of accidents at night
- Reduce crime and the fear of crime
- Facilitate the safe and reliable transport of all road users on the TLRN

As part of a trial, TfL replaced current streetlight luminaires in selected locations with LED lighting. By introducing LED lighting, TfL hopes to:

- Reduce energy costs
- Reduce maintenance costs
- Reduce CO₂ emissions
- Reduce sky glow and night time pollution
- Reduce disruption to the network

Research was required to determine if the lumen output is adequate, whether the systems work in practice, and whether there is any impact on drivers and the local community.

The findings presented in this report are taken from research conducted in January/February 2011. This comprised of 402 face-to-face interviews with drivers and residents in two trial areas (A201 Blackfriars Road and A40 Western Avenue).

3. Research objectives

The key objectives of the customer research are to:

- Understand awareness of the new lighting
- Identify customer opinions
- Uncover any issues that arise
- Determine if there are any barriers to more widespread introduction of LED lighting



4. Research methodology

The research was carried out at the two locations where LED lighting had been installed:

- Road site 1: A201 Blackfriars Road; junction with Webber Road – junction with Borough Road
- Road site 2: A40 Western Avenue; in the vicinity of Leaver Gardens (immediately west of the footbridge)

At both locations face-to-face interviews were conducted. Each location required a slightly different approach with different groups qualifying:

Blackfriars A201

1. **Door to door residential housing and offices** – respondents must have access to car/van **AND** have driven or walked within the last 2 months along the site of the lights to qualify.

Western Avenue A40

1. **Door to door residential housing** – all who have driven or walked along the site of the lights within the last 2 months qualify.
2. **Intercepted drivers** – all who have just driven WEST (heading out of central London) along the A40 qualify.

Interviewing took place between 3.30pm and 9pm when it is sufficiently dark for lighting to be in use.

No specific quotas were set.

The intercept interviews were carried out from the Greenford MacDonalds car park.

Interviews with residents focused on those whose residences overlooked the streetlights.

5. Main findings

Awareness of changes in street lighting

Of the 402 people interviewed, 39 (10%) said they had noticed changes to the lighting along the route.

Chart 5.1 Awareness of changes to street lighting by site

Base: all (number of respondents in brackets below)

	Total (402)	A40 Western Avenue – driver intercept (157)	A40 Western Avenue – door to door (152)	A201 Blackfriars – door to door (93)
Aware	10%	10%	11%	8%
Not aware	90%	90%	89%	92%

Among local residents, awareness was higher for those who drive at least once a week (14%) compared to those who drive less frequently (0%-).

Awareness of the different lighting was not affected by any other factors.

Awareness of LED lighting/trial

When asked what changes they had noticed, two of the 39 respondents who noticed there was a difference to the street lighting mentioned LED lighting and 6 that there was a 'lighting trial'. This equates to 2% of the total sample.

Other mentions included:

- Lighting was new/different – 5% (19 respondents)
- Lighting was brighter - 3% (14)
- Lampposts have changed – 2% (8)
- Lighting is slightly different colour/whiter – 1% (6)
- Lighting trial – 1% (6)
- Lighting is clearer – 1% (4)
- LED lighting - > 1% (2)

Verbatim responses included:

'New different lighting - brighter/clearer other - more efficient.'

'Light is brighter and a slightly different colour.'

'Better for pedestrians, much brighter, safer!'

'Appeared brighter on the roads.'

'Appearance of the area looked whiter, brighter.'

'Whiter and clearer.'

'Brighter and new type of lamppost.'

394 respondents were not aware of a change to the lighting or were aware of a difference in the lighting but did not mention LED lighting or lighting trial when asked what had changed. This group were prompted for their awareness of the LED trial.

20 (5%) recalled the LED trial on prompting. This brings the total number aware of LED up to 28 (7%).

Chart 5.2 Prompted/unprompted awareness of LED street lighting by site

Base: all (number of respondents in brackets below)

	Total (402)	A40 Western Avenue – driver intercept (157)	A40 Western Avenue – door to door (152)	A201 Blackfriars – door to door (93)
Unprompted aware	2%	1%	3%	2%
Prompted aware	5%	5%	6%	3%
Not aware	93%	94%	91%	95%

Perception of new lighting

The 28 respondents who were aware of LED lighting were asked to rate their overall perception of the new lighting. 22 had a positive response to the lighting. None gave a poor rating.

Chart 5.3 Perception of the new lighting by site

Base: all aware of LED (number of respondents in brackets below)

	Total (28)	A40 Western Avenue – driver intercept (9)	A40 Western Avenue – door to door (14)	A201 Blackfriars – door to door (5)
Excellent	3	1	9	2
Good	19	7	3	3
Average	4	1	-	-
Poor	-	-	-	-
Don't know	2	-	2	-

Asked to explain the rating given, 13 of the 28 respondents mentioned '*brighter lights*'. A further 6 said '*better lighting*'. Four mentioned '*increased visibility*' and/or '*feels safer in the dark*'.

Table 5.4 Reasons for overall perception rating

Base: all who were aware of LED street lighting (28) – multiple response question

Response	Number of responses
Brighter lights	13
Better lighting	6
Feel safer in dark	4
Increased visibility	4
Better for the environment	3
Cost effective	3
Energy efficient	2
Not much difference	2
Don't know/not stated	4

Comparing LED and conventional lighting

The 28 respondents who were aware of the LED lighting/lighting trial were asked to compare the types of lighting on three factors, saying which lighting they considered to be better.

The majority (21) thought the LED lighting was *'better'*. Just one preferred conventional lighting; four thought they were *'both the same'*.

16 said the LED lighting allowed them to see more clearly than conventional lighting. Again, just one thought conventional lighting was preferable to LED on this measure. However, 10 said that both types of lighting were the same in this respect.

Comparing the lights in respect of road safety, results were split; 11 thought LED lights better for road safety, 10 that they were both the same.

Chart 5.5 Lighting considered 'better' when comparing LED and conventional lighting

Base: all who were aware of LED street lighting (28)

	Number considering type of lighting better	Number considering type of lighting allows them to see more clearly	Number considering type of lighting better for road safety
LED lighting	21	16	11
Conventional	1	1	1
Both the same	4	10	10
Don't know	2	1	6

Problems caused by LED street lighting

One respondent had experienced a problem caused by the LED street lighting. The problem experienced by this person was dazzle when looking *directly* at the light.

'If you look at them directly, they can dazzle you.'

None of the respondents reported experiencing 'glare' caused by the LED lights.

Neither did any respondent experience any problems with 'reflection on standing water, or puddles, caused by the LED lights'.

Chart 5.6 Whether LED lighting caused any problems

Base: all who were aware of LED street lighting

	Any problems (28)	Glare (28)	Reflection (28)
Yes	1	-	-
No	26	24	25
Don't know	1	4	3

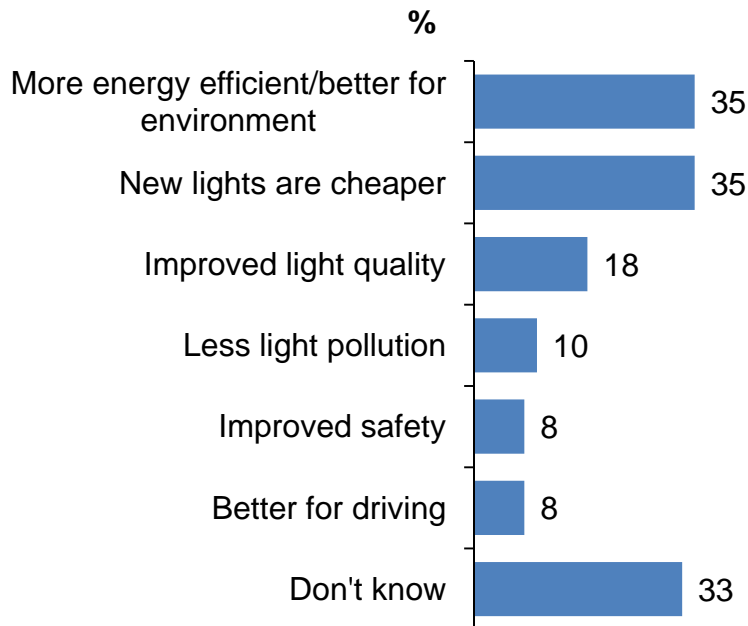
Benefits of LED street lighting

Asked why they think TfL is considering introducing LED street lights just over a third of all respondents said *'more energy efficient/better for the environment'* and/or *'the new lights are cheaper'*.

Just under one in five mentioned *'improved light quality'*.

Chart 5.7 Reasons why TfL is considering introducing LED street lighting

Base: all (402), multiple response question



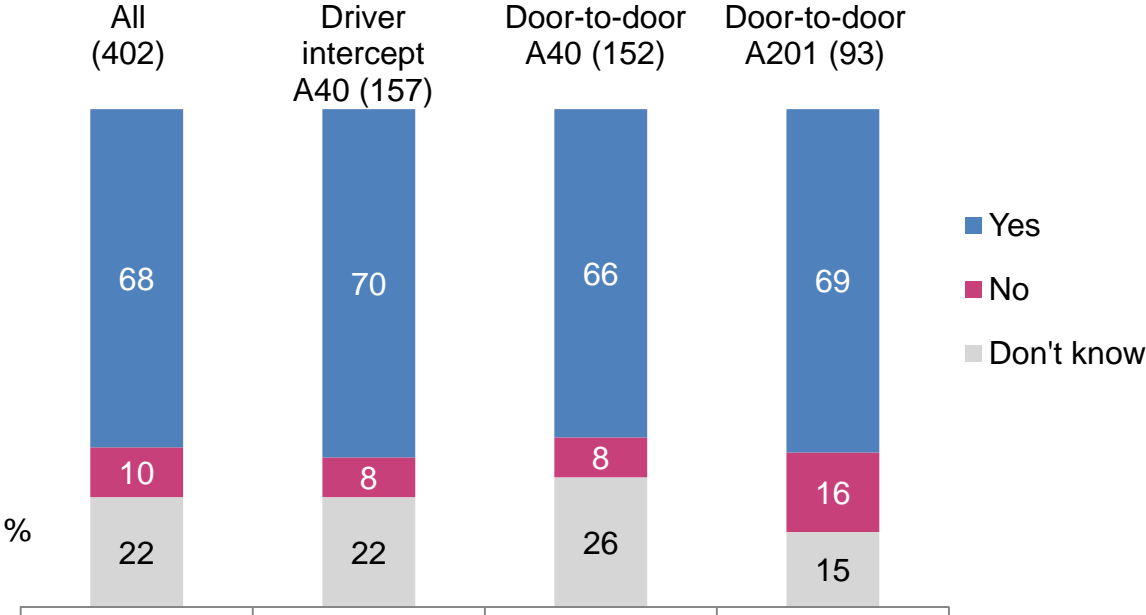
The 253 respondents who did not mention that LED lights are either *'more energy efficient/better for the environment'* or *'less light pollution'* were asked whether they knew that LED lights provide significant environmental benefits in terms of lower energy use and less light pollution.

Two in five (43%, 109) said they were aware of the environmental/light pollution benefits of LED lighting, 57%, 144 that they were not aware.

Switching to LED street lighting

Most respondents (68%) think TfL should introduce LED street lights to roads they are responsible for. One in ten (10%) do not think LED lights should be introduced and 22% 'don't know'.

Chart 5.8 Whether TfL should introduce LED street lighting to more roads
Base: all (402)



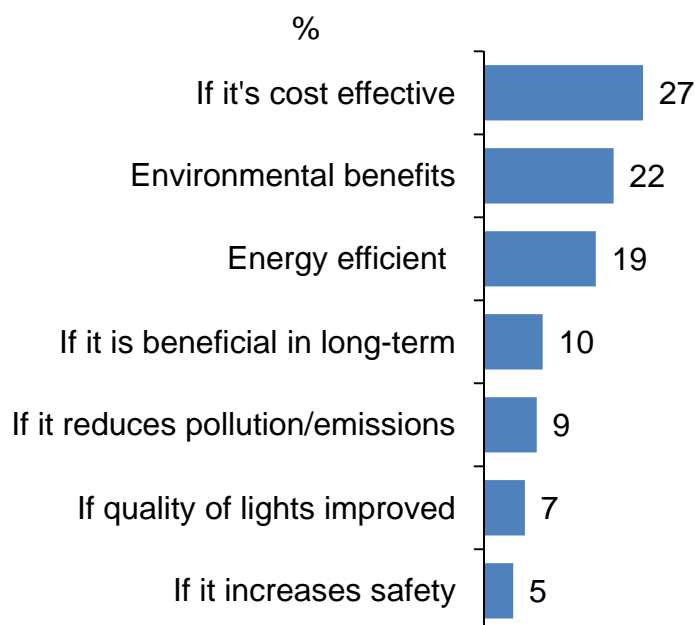
A larger proportion of A201 respondents (16%) said the lights ought not to be introduced compared to the A40 driver intercepts (8%) and door-to-door (8%) respondents.

Half of all respondents said that LED street lighting should be introduced as they will benefit the environment: environmental benefits (22%), energy efficient (19%) and/or reduces pollution/emissions (9).

Just over a quarter (27%) said that the lights should be introduced *'if it is cost effective'*.

Chart 5.9 Reasons why TfL should introduce LED street lighting

Base: all (402) – multi response question, mentions made by fewer than 5% of the sample are not included



Verbatim comments made by those in favour of TfL introducing LED lighting included:

'To improve safety. Better for the environment.'

'Definitely. Anything that benefits the environment is worth investing in!'

'Yes I do! If there are long term benefits and you say there are then they have a responsibility to.'

'Anything that is energy efficient is a good thing for London and for the environment.'

'They are cheaper to run in the long term and less carbon dioxide for cities. Good idea.'

'Well for the obvious cost effective reasons and that they are good for the environment.'

'Environmentally friendly, cost effective, increased safety, would benefit all roads cost cutting. Environmentally friendly.'

'If it saves money and energy.'

'If they are cheaper and give less pollution.'

'To save pollution and energy for future generations.'

'Safer for drivers and pedestrians. Lighter - would be a benefit to the neighbourhoods.'

'Brighter and whiter (less hard on the eyes).'

Amongst the 40 respondents who do not think the LED lights should be rolled out by Transport for London, the highest proportion of mentions related to the perceived cost involved (4% of total sample, 15). Seven (2%) thought that the LED lights ought not to be introduced as they were *'too bright'*.

Chart 5.10 Reasons why TfL should not introduce LED street lighting

Base: all (402) – multiple response question, responses of 2 or more included

Response	Number of responses
Waste of money	2% (7)
Too bright	2% (6)
Too expensive to roll-out	2% (6)
Councils ought to look after own lights	2% (6)
Glow is too weak	1% (3)
Long-term expense	>1% (2)

Verbatim responses given by those who did not think the LED lights should be rolled out include:

'The cost would be too great for London.'

'With all the people who are out of work it's a waste of money. They should be creating more jobs!'

'Cost too much money at a time when things are very tight.'

'Too much brightness.'

'I don't think it is good, too bright, can't sleep.'

6. Appendices

Table 6.1: Respondent profiles

	Total (402)	Driver intercept A40 (157)	Door-to-door A40 (152)	Door-to-door A201 (93)
Gender				
Male	226 (56%)	105 (67%)	74 (49%)	47 (51%)
Female	176 (44%)	52 (33%)	78 (51%)	46 (49%)
Age				
16-24	50 (12%)	26 (17%)	11 (7%)	13 (14%)
25-34	84 (21%)	38 (24%)	25 (17%)	21 (23%)
35-44	101 (25%)	38 (24%)	40 (26%)	23 (25%)
45-54	79 (20%)	34 (22%)	28 (18%)	17 (18%)
55-64	53 (13%)	17 (11%)	22 (15%)	14 (15%)
65+	35 (9%)	4 (2%)	26 (17%)	5 (5%)
Ethnicity				
White	294 (73%)	109 (69%)	107 (70%)	78 (84%)
BAME	105 (26%)	47(30%)	44(29%)	14 (15%)
Refused	3 (1%)	1 (1%)	1 (1%)	1 (1%)

Table 6.2: Whether wear glasses/contact lenses when driving

	Total (402)	Driver intercept A40 (157)	Door-to-door A40 (152)	Door-to-door A201 (93)
Yes	134 (33%)	50 (32%)	46 (30%)	38 (41%)
No	257 (64%)	107 (68%)	95 (63%)	55 (59%)
Do not drive	11 (3%)	-	11 (7%)	-

4% of the total sample had a long-term physical or mental impairment which limits their daily activities or the work they can do, including problems due to old age.

Table 6.3: Respondent’s experience of LED lighting – multiple answers possible

	Total (402)	Driver intercept A40 (157)	Door-to- door A40 (152)	Door-to- door A201 (93)
Pedestrian	146 (36%)	-	60 (39%)	84 (90%)
Driver	338 (84%)	157 (100%)	140 (92%)	43 (46%)
Street lights visible from home	1 (>1%)	-	1 (>1%)	-

Table 6.4: Frequency of driving along the A40/A201

	Total (402)	Driver intercept A40 (157)	Door-to- door A40 (152)	Door-to- door A201 (93)
5 or more days a week	27% (110)	32% (50)	34% (51)	10% (9)
3-4 days a week	18% (74)	20% (31)	24% (37)	7% (6)
1-2 days a week	25% (99)	28% (45)	24% (37)	18% (17)
Once a fortnight – once a month	11% (42)	16% (24)	9% (13)	5% (5)
Within last 2 months	4% (15)	4% (7)	2% (3)	5% (5)
Not in last 12 months	15% (62)	-	7% (11)	55% (51)

Table 6.5: Frequency of walking along the A40/A201

	Total (245)	Door-to- door A40 (152)	Door-to- door A201 (93)
5 or more days a week	22% (54)	2% (3)	55% (51)
3-4 days a week	11% (26)	9% (13)	15% (13)
1-2 days a week	13% (32)	11% (17)	16% (15)
Once a fortnight – once a month	9% (22)	13% (19)	3% (3)
Within last 2 months	8% (20)	12% (18)	2% (2)
Not in last 12 months	37% (91)	53% (82)	9% (9)