The Green Lane Trial

Please do not wait in the green lanes

This trial aims to help improve reliability and safety by reducing congestion

MAYOR OF LONDON

TRANSPORT FOR LONDON
EVERY JOURNEY MATTERS

No waiting in the green lane

"Overcrowding on rail and Tube networks has a big impact on people's lives – often making large portions of people's daily routine unpleasant and stressful – and can deter some people from using public transport at all."

"Unless new ways are found to plan the city as it grows, overcrowding will see some public transport lines and Stations grinding to a halt…"

Mayor of London's – Transport Strategy 2018

REVISION HISTORY

Issue	Date	Revision Overview
Draft A		

INFORMED

Name	Role	Issue	Date

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1 Introduction

1.1 Aims and Objectives

According to the world's busiest Metro's, customer crowding is the biggest contributor to increasing the time a train is stationary in the platform (known as dwell time) and increasing dwell time is a limiting factor to delivering higher frequency railway services [Ref 1 – Summary of Metro Lines Operating High Frequency Services]. Customer crowding and specifically overcrowding is not a new problem, the 1918 behavioural change poster Figure 1-1 with the footnote "Train delays mean overcrowding" blames two main issues; *Passengers Off First* (POF) and *Pass Down the Platform* (PAP). POF is experienced when crowds form in front of train doors impeding progress of customers trying to alight from the train.

PAP occurs when customers crowd at the entrance to the platform blocking others from reaching the space further along the platform. Over the past 100 years POF and PAP have been challenged in numerous behavioural change posters with little affect (Figure 1 2 LU behavioural change campaigns). It is inferred that this is due to the uncertainty of who is at fault in a crowded situation? A question that is simple to answer when it comes to crowds on escalators. When a customer is found standing on the left during busy periods they will be reminded of the rule by the next customer wanting to make quicker progress. The simple rule on escalators of "Please stand on the Right" means there is no question of who is at fault in this situation. The 'Stand on the Right' campaign has been so successful in changing behaviours on the London Underground that a very strong social-norm has developed that has since proved very hard to break [Ref 2 – Holborn Pilot for Standing on Both Sides of the Escalator,].

The Green Lane trial takes inspiration from the social-norm present on escalators and aims to apply it to platforms. Designing with intent by engineering the conditions required for a new social-norm to evolve.

By marking a Green Lane area that runs the length of the platform and up to each set of train doors, whilst simultaneously introducing a new rule of 'No Waiting in the Green Lane' a space is dedicated for customer movement. It is envisaged that it will be clear when customers are standing in the Green Lane they will be at fault breaking the new rule, preventing others from progressing off the train (POF) or further along the platform (PAP). Further it is hypothesised that by reducing the POF and PAP congestion hotspots on the platform not only will an improved customer experience be observed but a reduction in dwell times that will enable quicker and higher frequency train services to be scheduled.

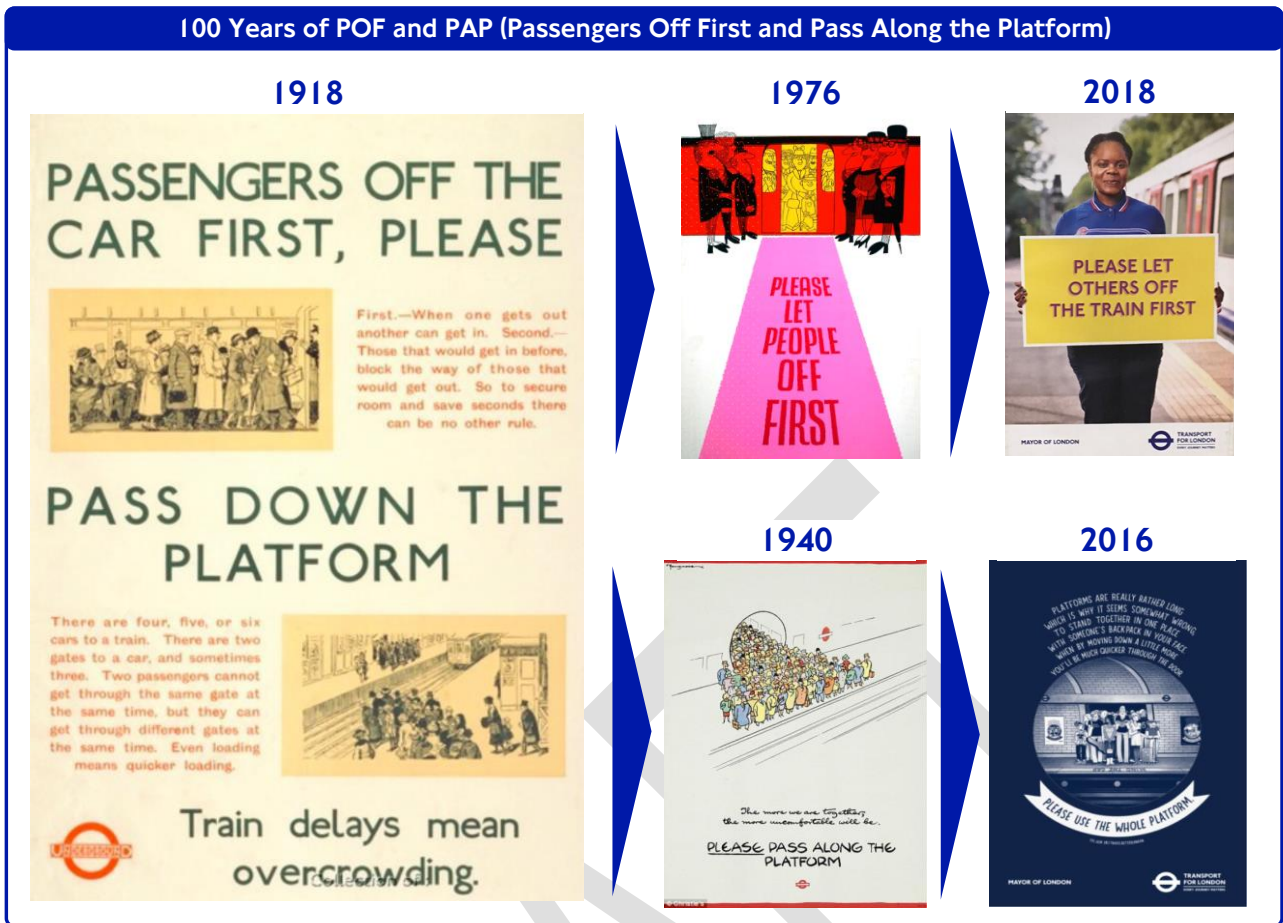**Figure 1-1 Behavioural Change Poster circa 1918**

Figure 1-2 LU behavioural change campaigns

1.1.1 Background & Reason for the change

Higher, than ever, levels of crowding are being experienced on the tube, leading to longer dwell times at the platform. We currently experience overcrowded conditions at around 100 stations every morning. In these crowded conditions clusters of people form bottlenecks at the entrances to platforms and at the outside of the train doors. These bottlenecks form blockages and slow the general progress of customer flow. The clusters of people that form outside train doors constrain the flow of those alighting. When the doors open the cluster splits in two allowing only minimal space for alighters, delaying their progress and therefore increasing the dwell time.

The Victoria Line southbound platform at Kings Cross Station has seen dwell times increase from 35 to 47 seconds between 2015/16 timetables. A one second reduction in dwell time at the pinch point station on the Victoria line alone would provide a £1M customer benefit annually. A dwell time reduction of 10 seconds on the Victoria Line (from 48s-38s) would enable us to go from a 36 to 40 trains per hour (TPH) service .

2 Scope of work

2.1 Project Description

The Green Lanes demarks a space dedicated for customer movement on the platform in the form of green vinyl that runs the length of the platform and up to every set of train doors of a stationary train in the platform. For this trial they will be installed as vinyl's, the lane will run the length of the platform and spur off at locations where it aligns with train doors (Figure 2-1 – Green Lanes).

Figure 2-1 – Green Lanes

The purpose of the green lane is that it is dedicating for moving only (Green for Go). Customers will be reminded to keep moving when in the green lane by platform staff. This will encourage people to move along the platform and find a non-green space to wait for the next train. When the next train arrives the green lane spurs will provide space for those alighting the train to exit the train before boarding commences.

Staff who manage customers on the platform will be able to use new messages to encourage movement along the platform and allowing space for others to alight before boarding. Messages such as "Please keep moving in the Green Lane", "No waiting in the Green Lane", "Stand clear of the Green Lane".

Station Control room staff who monitor crowding levels via CCTV will now have a visible measure for crowding levels on the platform, helping them to make an informed judgement on station control measures. Therefore Station control measures can be used for customer throughput performance.

2.2   Measuring Success

To measure success the trial will capture and compare data during the morning peak hour for two weeks prior to and after installation. As well as using readily available NETMIS data it is proposed that additional CCTV cameras are installed to provide proof of the appropriate behavioural change. The two primary measures are People Off First (POF) and Pass along the Platform (PAP).

1.   POF (People Off First)

2.   PAP (Pass Along the Platform)

2.3   Scope of Work

CCTV cameras were installed at Kings Cross Station on the Victoria Line South bound platform 4 on July the 19th 2017. CCTV footage was recorded and footage extracted and stored 8:00am to 9:00 am Monday to Friday until the end of the trial on 31st May 2018.

The Green Lane Vinyl was fully installed on the 1st September 2017 and fully removed on the 23rd march 2018.

Green lane installation begins	18/07/2017
Green lane completely Installed by	01/09/2017
Green lane removal begins	26/02/2018
Green lane fully removed	23/05/2018

This project installed 170m2 of green vinyl on the south bound Victoria Line platform at Kings Cross station, for a temporary period of 6 months. Four additional CCTV cameras were also installed for data capture.

The Trial delivered the following temporary changes to the Southbound Victoria line platform at Kings Cross Station:

1. Green Lane Vinyl installed along the full platform and upto each set of train doors
2. CCTV cameras installed to measure the impact of the change
3. Station plotter posters and signage
4. Updated SATS and PA announcements

The Green Lane (Figure 2-2 – Green Lane Dimensions) aims to maximise platform space for both waiting and moving and has been dimensioned with the train door widths and anthropometrics in mind

A = Whole body breadth – 95%ile male
B = Whole body depth – 95%ile male

The non-green area against the platform wall is proposed to be 500mm to comfortably accommodate people wanting to stand or sit (whole body depth of 95%ile male is 420mm). The lane that runs the length of the platform is 760mm wide as to not alienate wheelchair users. As well as providing a single point of constraint should a customer stop in this area. Single door spurs are set at 600mm and double door spurs at 1600mm determined by the 2009 Victoria Line Tube Stock dimensions.

Green Lane Dimensions
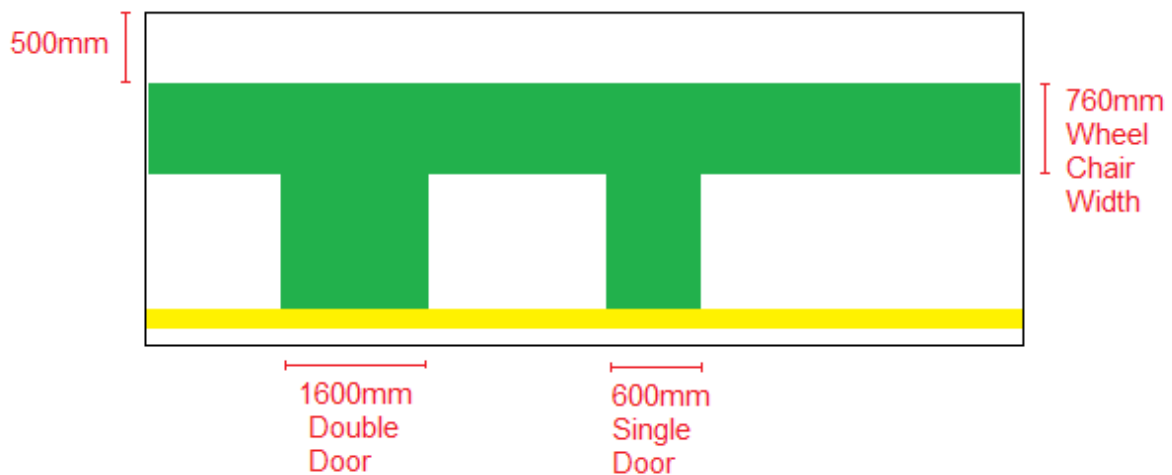
Figure 2-2 – Green Lane Dimensions

3 Results

3.1 Customer Behavioural Change

3.1.1 Hypothesis 1:

The introduction of the green lane trial improved customer behaviour at the platform train interface by reducing the amount of people waiting in front of the train doors.

3.1.2 *Hypothesis 2:*

The removal of the green lane trial regressed customer behaviour at the platform train interface by increasing the amount of people waiting in front of the train doors.

3.1.3 Method:

A fisheye CCTV camera was installed above the busiest set of train doors on the Victoria Line South bound platform at Kings Cross Station. Video footage was captured during the morning peak Monday to Friday between July 2017 and May 2018. A total of 650 still images were captured of the platform train interface just as each train entered shot, between 8:45am and 9:00am. A red line template was then overlaid onto each image marking out 'Area A' in front of the train doors (in the Green Lane) and 'Area B' two spaces beside the train doors (outside of the Green Lane). The combined size of the two 'Area B' spaces are equal in size to 'Area A'. For each image the total amount of customers in each of the areas was counted by 5 separate people and the results averaged. A 30 point moving average of the percentage of people standing in A relative to B was then plotted to analyse trends.

3.1.4 Results:

The results show that at the beginning of the trial there was a significant increase in people standing in Area B compared to Area A. Starting with 3% more people in 'Area B' compared to 'Area A' rising to a peak of 28% after 24 days, Mid trial this dropped off to 12% and then steadily rose again to a high of 29%. When the Green Lane was removed (day 62) we then see the biggest regression down to 7.5%.

Difference in Percetage Between Customers Standing In A Relative to B
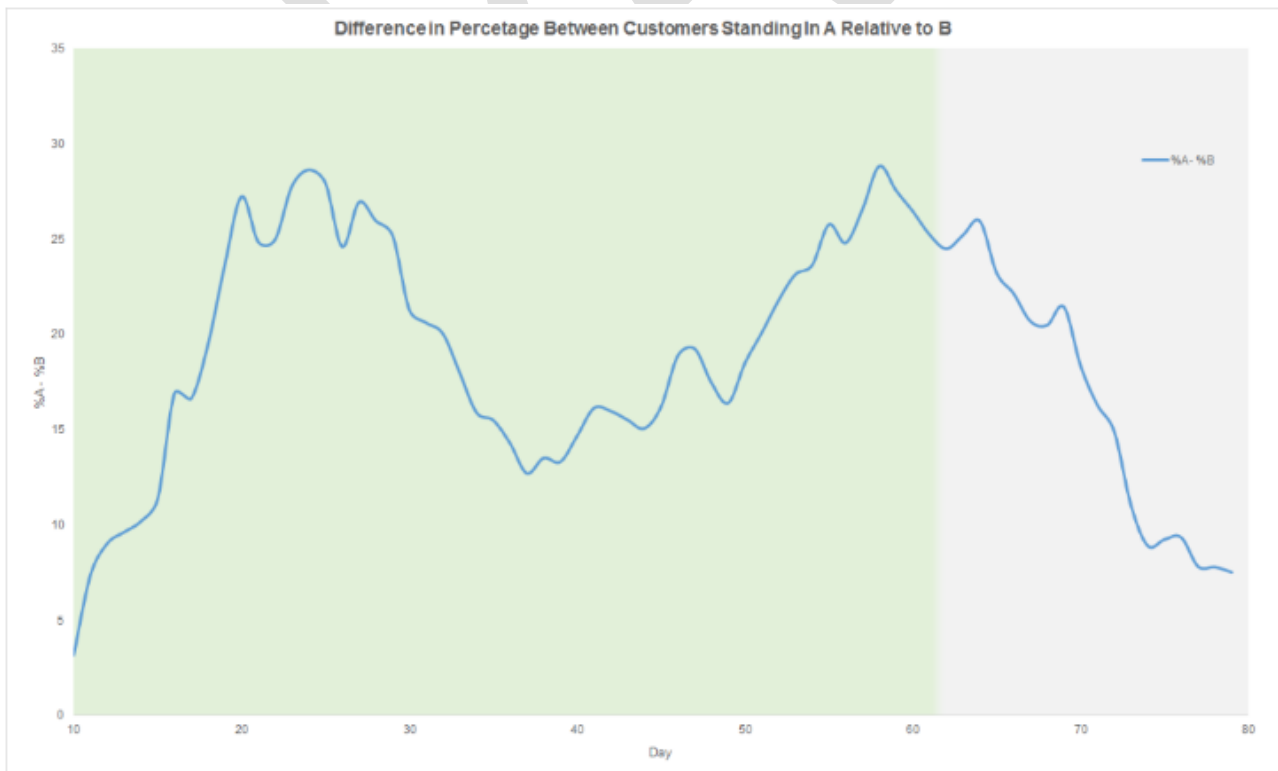
3.1.5   Conclusion:

The introduction of the Green Lane saw an improvement in customer behaviour with fewer people standing in front of the train doors. The removal of the Green Lanes saw a regression in customer behaviour with more people standing in front of the train doors. The removal of the Green Lane saw the loss of a customer reference point for where the doors of the train would line up on the platform.
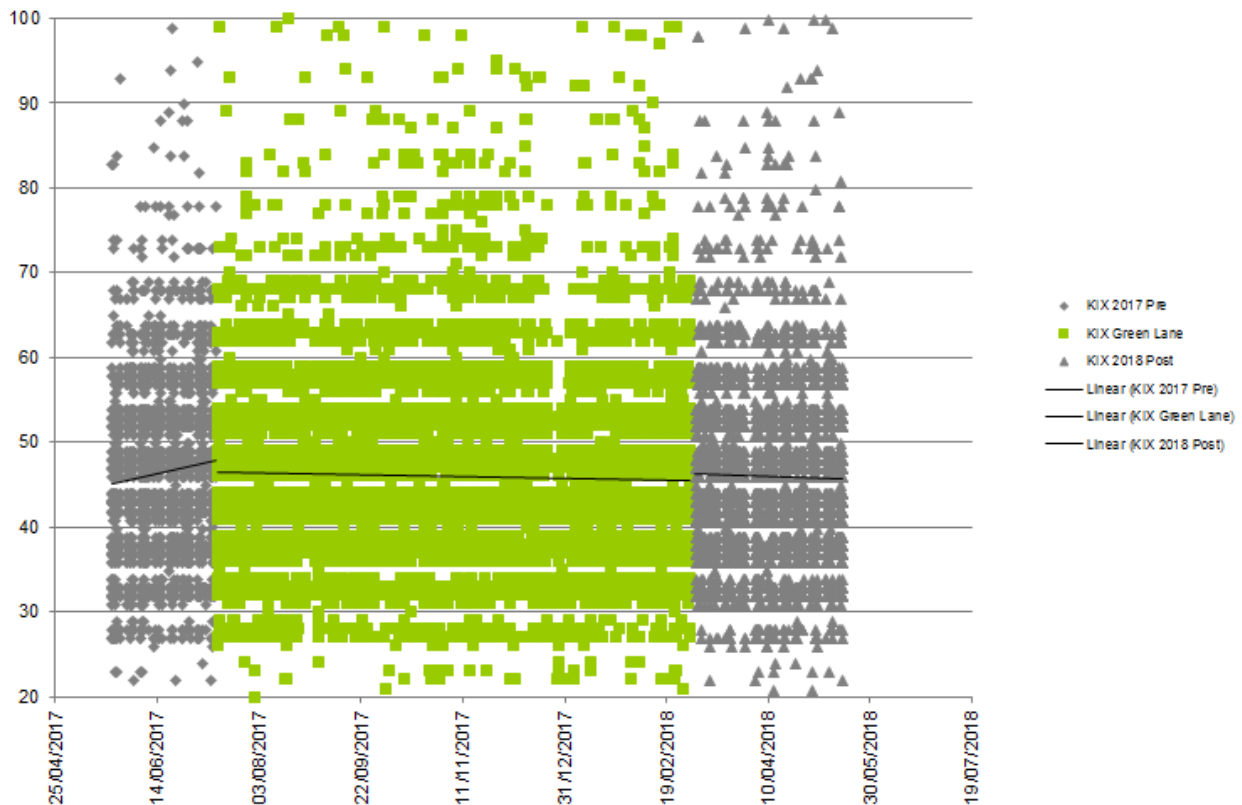
3.2   Dwell time Analysis

3.2.1   *Hypothesis:*

The introduction of the Green Lane treatment will reduce dwell times on the platform

3.2.2   *Method:*

Dwell time data was extracted using the transport planning NETMIS data extraction tool. The results show that there was a small reduction of 0.5 seconds in the average dwell time after the installation of the green lanes.

For AM dwell times (7am-10am) Greater than 10s but less than 100s			
	Before GL	Green Lane	After GL	Total
count	3556	14702	4836	23094
mean	46.50	46.02	45.94	46.07
std	9.49	9.23	9.63	9.72

3.2.3   *Conclusion:*

From the results we can see that there is a slight reduction in average dwell time during the Green Lane period.

3.3   Independent Analysis

Abstract from University of London PhD paper:

Social Norms as a Cost-Effective Measure of Managing Transport Demand: Evidence from an Experiment on the London Underground

Kingsley Offiaeli[1], Firat Yaman[2]

Abstract

In an effort to cope with increasing passenger demand on its network, Transport for London (TfL) implemented in the second half of 2017 an experiment on one of its busiest metro train platforms. The platform surface was painted to highlight the exact location of the train doors once it comes to a full stop and to direct passengers to wait in parts of the platform that would not obstruct passengers from alighting from the train and leaving the platform. We estimate the effect of this intervention to change passenger behaviour on the platform on train waiting and delay times. We use different sets of assumptions about what the counterfactual change in waiting and delay times would have been in the absence of the intervention. Depending on the assumptions, we find that the intervention has reduced train waiting times between 0 and 8.7%. We also find that this reduction came about mainly through reducing delay times of trains once they are delayed, which were cut by 4.7% to 12.6%. The reductions are not evenly distributed throughout the day, but tend to occur during peak traffic hours. The value of the implied time savings are £3,000,000, at a cost of £25,000, amounting to a return of £125 per £1 investment.

JEL classifications: C21, C24, D91, R41

Keywords: Social norm, train waiting times, train delay times, public transport

[1] City, University of London, and Transport for London.
[2] City, University of London.

4 Conclusions

Significant improvements in customer behaviour and platform dwell time have been achieved by the Green Lane Trial.

5 Recommendations

Further trials should be considered for implementation at key sites on London Underground to benefit from improve customer behaviours and reduced platform dwell times .

6 References

[1] NTfL-2344 1 1-LUL-RPT-00021-01 Summary of Metro Lines Operating High Frequency Services (2014-11-20)

[2] Holborn Pilot for Standing on Both Sides of the Escalator, Harrison, Kuladia, Stoneman & Dyer 06 January 2016

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