SGL Unpacked: Kerbside Management Trial

Trialling a Network of Virtual Loading Bays

CROSS RIVER PARTNERSHIP
SMARTER GREENER LOGISTICS
Department for Environment Food & Rural Affairs

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Table 1. List of frequently used terms and their definitions.

TERM	DEFINITION
Civil Enforcement Officer (CEO)	Enforce parking, traffic and other restrictions on the highway and car parks.
Data Protect Impact Assessment (DPIA)	Process aiming to analyse, identify and minimise data protection risks.
Experimental Traffic Management Order (ETMO)	A legal document that imposes traffic and parking restrictions which can stay in force up to 18 months. Often used to trial highways schemes.
Freight	Goods, cargo, products, or merchandise that are transported or carried from one place to another whether by land, water, or air.
General Data Protection Regulation (GDPR)	EU regulation on data privacy and security.
Kerbside	The space at the side of the road closest to the pavement which is most easily recognised as the space where cars park [1]. Multitude of uses including car parking, (un)loading activities, driveways, cycle lanes, bus lanes/stops, outdoor dining, Sustainable Drainage Systems (SuDS) and cycles, scooters and Electric Vehicles (EVs) parking.

[1] https://moderngov.lambeth.gov.uk/documents/s143755/Appendix%20A%20-%20Lambeths%20Kerbside%20Strategy.pdf

Kerb Platform	Digital platform owned by Grid Smarter Cities that enables freight operators to book pre-determined slots at the kerbside to load and unload goods at specified times.
Kerbside Management Technology	Technology used to dynamically manage the kerbside. Digital Kerbside Management enables kerbside loading bay allocations to be digitally lifted on to a booking system / app and allocated in advance.
Memorandum of Understanding (MoU)	Signed agreement between two or more parties that outlines parties' understanding, objectives and shared goals.
Operator	Freight companies booking the Virtual Loading Bays to carry out logistics operations.
Parking Suspension	Where the parking controls, waiting, parking and loading, are suspended and the space is reserved for a particular purpose.
Penalty Charge Notice (PCN)	Issued to motorists when found in contravention of parking restriction, waiting restrictions and some moving traffic orders.
Permit Loading Bay (PLB)	The digitalisation and management of an existing on-street parking or loading bay allowing bookings to be made by time slots via the Kerb platform. This includes physical infrastructure, such as associated dynamic signage.
Road Traffic Regulation Act 1984	Piece of primary legislation that allows highway authorities to regulate or restrict traffic. Traffic Management Orders are made under the Road Traffic Regulation Act 1984 legislation.

Rogue Vehicle	Term used for the Kerb platform defined as an illegally parked vehicle or a vehicle that has 'overstayed' in a booked bay.
Traffic Management Order (TMO)	Statutory legal documents that give the Council the authority to implement and enforce traffic or parking restrictions associated with as a part of highway schemes or works.
Virtual Loading Bay (VLB)	Digitally created dedicated spaces at the kerbside that require no physical signage or infrastructure and can be pre-booked by participating operators to load and unload goods using the Grid Smarter Cities Kerb booking platform.
Vehicle Registration Mark (VRM)	Unique set of numbers and letters used to track a vehicle's ownership and registration.

Table 2. List of abbreviations and their definitions.

ABBREVIATION	DEFINITION
CEO	Civil Enforcement Officer
CRP	Cross River Partnership
DEFRA	Department for Environment, Food and Rural Affairs
DfT	Department for Transport
DPIA	Data Protect Impact Assessment
ETMO	Experimental Traffic Management Order
EV	Electric Vehicle

GDPR	General Data Protection Regulation
HGV	Heavy Goods Vehicle
LA	Local Authority
LB	London Borough
MoU	Memorandum of Understanding
PCN	Penalty Charge Notice
PLB	Permit Loading Bay
SGL	Smarter Greener Logistics
TA	Traffic Authority
TEC	Transport Emissions Calculator
TfL	Transport for London
TMO	Traffic Management Order
VLB	Virtual Loading Bay
VRM	Vehicle Registration Mark

Table 3. List of project partners involved in the trial

PROJECT PARTNERS	ROLE
Cross River Partnership (CRP)	Facilitator and Project Manager
Department for Environment, Food and Rural Affairs (DEFRA)	Trial funder through the Smarter Greener Logistics Programme
Grid Smarter Cities (Grid)	Trial delivery partner and technology provider for the Kerb platform.
City of London Corporation (CoL)	Local Authority project partner and highway authority responsible for managing the local road network in the City.
London Borough of Camden (LB Camden)	Local Authority project partner and highway authority responsible for managing the local road network in Camden.
London Borough of Lambeth (LB Lambeth)	Local Authority project partner and highway authority responsible for managing the local road network in Lambeth.
London Borough of Richmond (LB Richmond)	Local Authority project partner and highway authority responsible for managing the local road network in Richmond.
Transport for London (TfL)	Integrated transport authority for London involved in LB Richmond trial.
Westminster City Council (WCC)	Local Authority leading the Defra-funded Smarter Greener Logistics Programme.

1. Executive Summary

1.1 Overview

Cross River Partnership (CRP) worked in collaboration with Grid Smarter Cities, City of London Corporation, London Borough of Camden, London Borough of Lambeth, London Borough of Richmond and Transport for London to deliver the Smarter Greener Logistics Kerbside Management Trial. The trial aimed to provide local authorities, businesses and operators with the opportunity to test Virtual Loading Bays (VLBs) as a kerbside management technology, and understand the operational, congestion and air quality impacts. The trial was delivered as part of CRP's Defra-funded Smarter Greener Logistics (SGL) programme.

1.2 Kerbside Management Technology & Virtual Loading Bays

Kerbside Management Technology aims to dynamically manage the kerbside with a focus on improving delivery operations for businesses and suppliers, alleviate congestion and improve air quality. VLBs are digitally created dedicated spaces at the kerbside that require no physical signage or infrastructure and can be pre-booked by participating operators to load and unload goods using the Grid Kerb booking platform. The purpose of VLBs is to utilise space, that would normally be used for other purposes, for loading at specific times of the day to make better use of urban space.

VLBs were selected as the technology to test for the SGL Kerbside Management Trial as they have the ability to dynamically manage kerbside space at selected locations without the need for highways infrastructure, which could not have been installed within the time constraints of the trial.

Figure 1. Tradeteam accessing Watling Street VLB in the City of London to complete a brewery logistics delivery.

1.3 Trial Set up

1.3.1. Project Partners

The trial involved 9 project partners, multiple internal teams, and key stakeholder groups.

Project Partner	Role
Cross River Partnership	Facilitator & Project Manager
Department for Environment, Food and Rural Affairs (DEFRA)	Funder
Grid Smarter Cities	Technology Provider
City of London Corporation	Local Authority
London Borough of Camden	Local Authority
London Borough of Lambeth	Local Authority
London Borough of Richmond	Local Authority
Transport for London	Integrated transport authority for London
Westminster City Council	Smarter Greener Logistics lead Partner

Figure 2. Kentish Town Road VLB in the LB Camden.

Local Authority Team	Role
Parking Operations	Support with parking policy, communications with enforcement contractors (including CCTV).
Transport Policy	Involved in selecting suitable sites for the Virtual Loading Bay and assessing Traffic Management Orders.
Climate Response / Sustainability / Air Quality	Advised on trial from climate and air quality perspective.
Communications	Reviewed trial communications materials and circulated trial information.
Legal	Provided guidance on relevant regulations and TMO process.
Data Security	Compliance with GDPR / data sharing.
Streetworks Team	Installed necessary signage for LB Richmond Sheen Lane (South) location.
External Enforcement Contractor	e.g. APCOA, NSL Day-to-day enforcement operations by CEOs. Office team involved in PCN process and exemptions.

Table 5. Internal LA teams and roles in trial (actual team names & role remit may be different across LAs).

1.3.2. VLB Locations

A network of 8 VLBs was developed at locations across London, including busy high streets and pedestrianised zones, and focused on different use cases such as health & safety needs of brewery logistics and large supplier delivery operations.

The VLB locations were selected following desk-based research and site visits to assess VLB suitability. The locations and rationale for selecting each site outlined below:

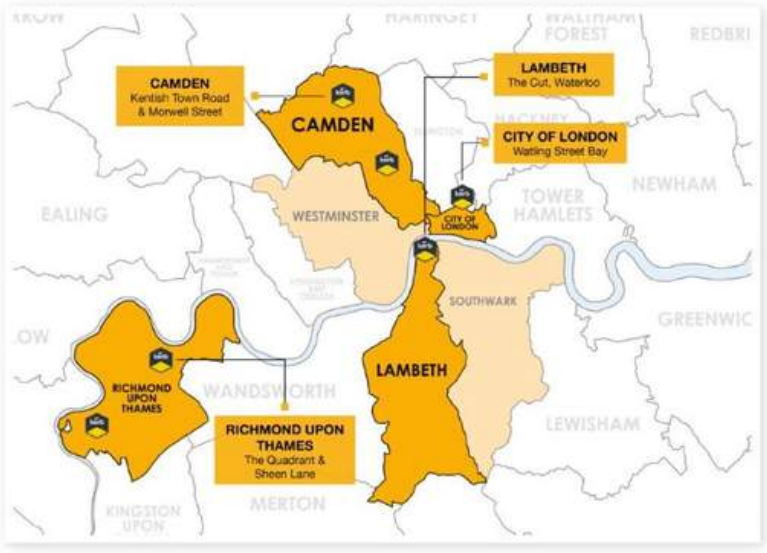


Figure 3: Map of VLB Locations

Local Authority	VLB Location(s)	Location / Hours of Operation	Businesses	Use Case
City of London Corporation	Watling Street (EC4M 9BR)	Pedestrianised street Monday – Sunday Available between 05:00-08:00 & 18:00-21:00	Pubs & Hospitality businesses (independent & large chains)	Support health and safety requirements for brewery logistics.
London Borough of Camden	Kentish Town Road (NW5 2TJ)	Local high street Monday - Sunday Unavailable between 07:00-10:00 & 16:00-19:00	Large retail chains	Support deliveries on a local high street with high traffic flows.
	Morwell Street (W1T 7RB)	Side street Monday – Sunday Available 24 hours	Large retail chains	Support deliveries on a major retail street.
London Borough of Lambeth	The Cut (Rosa's Thai), Waterloo (SE1 8LL)	Local high street Monday – Sunday Available 24 hours	Hospitality businesses (independent & large chains)	Support high volume of deliveries and reduce HGV movement on residential streets.

London Borough of Lambeth	The Cut (Filter Loading Bay), Waterloo (SE1 8LF)	Local high street Monday – Sunday Available 24 hours	Hospitality businesses (independent & large chains)	Support high volume of deliveries and reduce HGV movement on residential streets. Support LA Parking Suspension process.
London Borough of Richmond	The Quadrant, Richmond (TW9 1DN)	Local high street Monday – Sunday Available 07:00 – 23:00 (Unavailable between 08:00-10:00 & 16:30-18:30)	Large retail chains	Support deliveries on a local high street and provide an alternative delivery location to an existing loading bay frequently occupied by delivery motorbikes.
	Sheen Lane (Tesco), Mortlake (SW14 8AB)	Local high street Monday – Sunday Available 07:00 – 22:00	Large retail chain & independent hospitality businesses	Support deliveries to large retail chain and address resident concerns on congestion due to railway crossing in close proximity.
	Sheen Lane (South), Mortlake (SW14 8LP)	Local high street Monday – Sunday Available 07:00 – 23:00 (except 09:30 – 11:30 Tuesdays and Fridays)	Independent retailers and hospitality businesses	Support deliveries to local businesses by opening an underutilised section of highway.

Table 6. Summary of VLB locations, use cases and hours of operation.

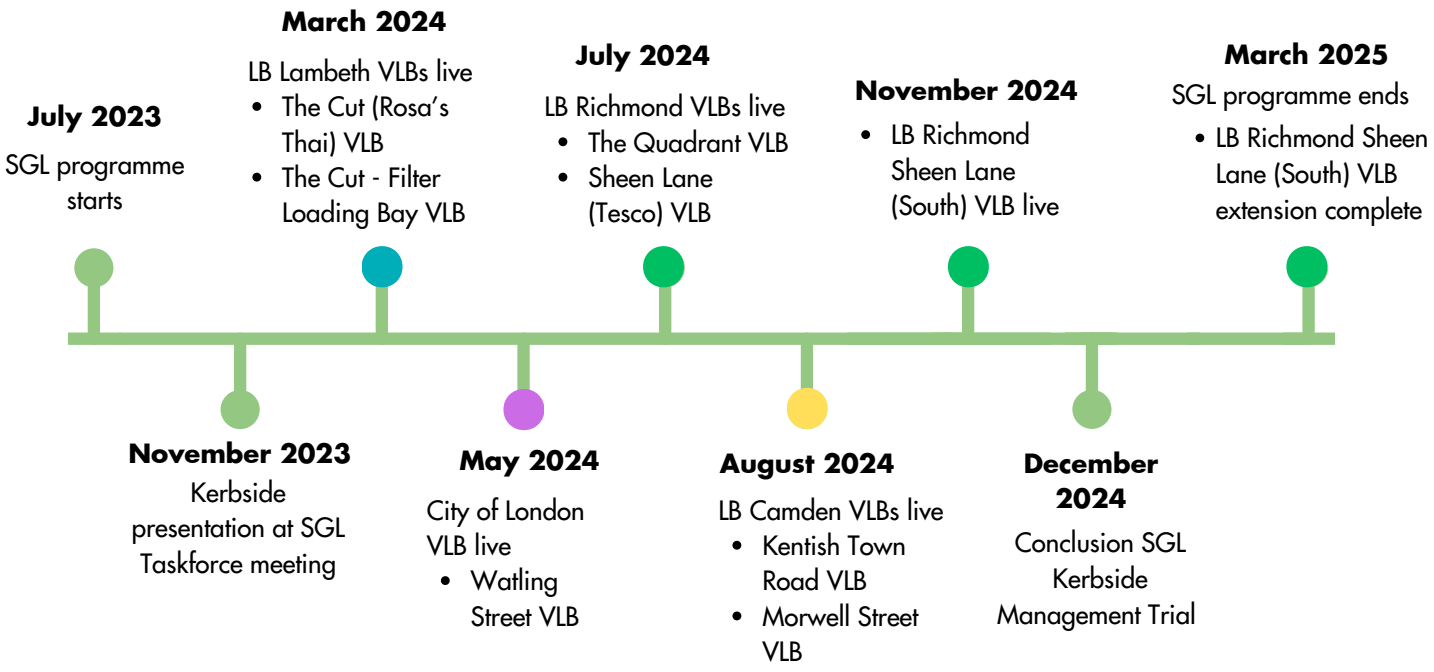


Figure 4: Overall SGL Kerbside Management Trial Timeline

1.3.4. Enforcement & Reporting

The trial ran from July 2023 to March 2025 with VLBs going live at different stages based on the time it took to identify locations, secure the necessary permissions, integrate with enforcement and map the VLBs on the Kerb platform. Local authorities had access to online dashboards which provided VLB usage data and were also provided with regular bookings reports via email throughout the trial.

Figure 5. Traffic filter at the junction of The Cut and Short Street, LB Lambeth

1.3.5. Trial Additions

LB Lambeth added additional elements to their VLB locations to explore how the kerbside management technology could support wider borough initiatives. This included the integration of kerbside management technology with an existing traffic filter to reduce HGV movements on smaller residential roads. The LA also utilised the Kerb booking system to support the Parking Suspension process for an existing physical loading bay that is used for extended periods of time.

1.3.6. Trial Costs

The main cost of the trial was the annual licence fee for the Virtual Loading Bay solution which provided CRP and 4 LAs access to the platform. Grid also supported the trial with additional communications materials, including flyers and signage, that are not included below.

Local Authority	VLB Location(s)	Cost
Virtual Loading Bays – Annual Licence	One annual licence fee which allowed access to platform for CRP and 4 participating LAs. This included: - Mapping of the VLBs - Whitelist reporting - Supplier onboarding & support - Dedicated project webpage	£24,000*
Grid Project Management support	Including but not limited to: - Site visits - CRP x Grid regular project meetings - Local authority project meetings	£6,000*
Communication Materials	Promotional flyers for each local authority trial	£185
	Total cost	**£30,185 (excl. VAT)**

Table 7. Summary of Kerbside Management Trial Costs.

**Annual licence fee, including number of VLB locations and associated support, agreed by Grid in 2023 for the specific purpose of the SGL Kerbside Management Trial. Future cost of platform for individual local authorities subject to commercial discussions and agreement between LA and Grid.*

1.4 Engagement & Communications

The two main target audiences for taking part in the trial were **local businesses** (in close proximity to the VLB) and **suppliers** to those businesses who load and unload near the VLB location. Extensive communications and engagement took place with these audiences throughout the trial to encourage participation, develop a picture of delivery and servicing in the selected locations, and understand the impact of VLBs on deliveries and logistics operations.

Figure 6. CRP Team Members conducting business engagement along Tottenham Court Road, LB Camden.

Local Businesses & Suppliers	Trial-wide Communications
In-person engagement supported by informational flyers	Dedicated trial webpage
Targeted emails and calls with trial information	Email campaigns to logistics sector
'One-time booking' account	Social media posts
Local authority letters to businesses	Logistics sector press articles
In-person & online introductory meetings	Written & video case studies
Informational signage (LB Lambeth)	Logistics sector newsletters

Table 8. Summary of engagement & communications approaches employed throughout the trial.

Overall SGL Kerbside Management Trial Usage Figures

Total of **30 operators** made bookings on the platform

17 regular users of the platform

3 Operators converted from onsite, one-time booking to regular user

655 Total bookings

1 hour 20 mins* average booking time

0 Rogue Vehicles reported

**Omitting Young Vic bookings (The Cut - Filter Loading Bay VLB) due to longer booking periods in conjunction with existing loading bay Parking Suspensions.*

Figure 7. Overall SGL Kerbside Management Trial Usage Figures

Figure 8. The Cut (Rosa's Thai) VLB on The Cut in LB Lambeth.

1.5 Trial Insights and Data Analysis

1.5.1. Operational Insights

The SGL Kerbside Management trial ran from July 2023 to March 2025 with VLBs going live at different dates across the trial period. VLB usage data across the 8 locations was captured from the Kerb platform and analysed to understand VLB usage trends and patterns from the trial.

1.5.2. Air Quality benefits

Using CRP's in-house Transport Emissions Calculator (TEC), the SGL Kerbside Management Trial resulted in **an estimated 66.6 vehicle km saved over the trial period**. This led to the following estimated emissions savings:

61.16g Nox
9.76g PM10
5.66g PM2.5
55.67kg CO2

Based on projected VLB usage figures from the SGL Kerbside Management Trial and CRP's TEC, **an estimated 636.05 vehicle km could be saved over an annual period**. This could result in the following estimated air quality savings:

650.99g Nox
75.41g PM10
39.88g PM2.5
531.55kg CO2

The emissions savings for the LB Lambeth VLBs during the trial period and annual projections are markedly higher in comparison to the other VLBs in the SGL Kerbside Management Trial. This is likely due to the integration with the traffic filter along The Cut and vehicle km being saved for each booking rather than just in the case of a missed delivery (assumption applied to City of London, LB Camden and LB Richmond VLBs).

1.6 Trial Learnings

- There is a clear appetite from LAs to look at use of kerbside space and innovative management approaches. The trial provided LAs with an opportunity to understand and test kerbside management technology with no up-front-cost implications and support from CRP and Grid.
- VLBs operate best where they provide a solution to an existing delivery challenge and / or when an incentive to use the VLB is provided. Without one, or both, behaviour change amongst operators is harder to achieve.
- Effectiveness of VLBs is dependent on developing a network across a certain geographic area or sector (e.g. brewery logistics, chain stores) to support enough Operators with deliveries at multiple locations and achieve real behaviour change within the logistics sector.
- Integrating Kerbside Management Technology with traffic filter exemptions achieved emissions and congestion savings and provided a clear incentive for using the VLBs (evidenced in LB Lambeth).
- VLBs and the engagement process provide valuable data on delivery and servicing activity that can be used to inform LA policy and projects. However, a comprehensive picture is dependent on regular VLB usage and impacted when the VLB(s) is not operational.

- Importance of assessing other highways regulations and restrictions when considering suitable VLB locations, including Traffic Orders (Moving & Static), loading restrictions and pedestrian zones.
- The VLBs took time to embed within local logistics behaviours which often led to low levels of usage within the first few months.
- The engagement and communications approach must be tailored to the specific VLB location and the businesses (and their suppliers) in close proximity to the VLB. Targeted engagement with specific supplier contacts proved an effective engagement method.
- The average booking time across the trials highlighted that the maximum loading time defined in LA Traffic Orders is often shorter than the actual time required for operators to complete their (un)loading activities, particularly for larger chains and brewery logistics.
- Many of the VLB locations in the trial were selected as they did not present a major challenge to existing loading activity or residents/businesses/Council Members. Implementing VLBs in more challenging delivery locations would have likely achieved higher usage figures, however, would have taken longer to consult on and implement.

1.7 Recommendations & Future Opportunities

1.7.1. VLB Use Cases

The trial highlighted that the best use cases for VLBs were when they provided a solution to an existing delivery challenge and / or an incentive to use the VLB was provided.

The following use cases were identified:

- **Brewery Logistics –** VLB supported specific health and safety requirements of the sector including the need for deliveries to take place in close proximity to the delivery point.
- **Integration with traffic filter technology** – VLBs provided delivery vehicles with an automatic dispensation to travel through the traffic filter, reducing HGV circulation on smaller residential streets.
- **Dedicated VLB for large chains at delivery challenge locations** – VLBs supported supplier deliveries to large chain stores with a frequent delivery schedule and dedicated fleet managers responsible for scheduling bookings on the Kerb platform.

Figure 9. The Quadrant VLB in the LB Richmond.

1.7.2. Trial Legacy

The SGL Kerbside Management Trial produced valuable usage and emissions data, and lessons learned for Virtual Loading Bay set-up, operations and best use cases. Both LB Lambeth and LB Richmond have extended the operations of their VLBs beyond the SGL programme and are continuing to work with Grid and local businesses / suppliers to increase VLB usage and identify other suitable VLB locations across the borough. All the LAs that took part in the trial are actively looking at how to make the necessary provision for freight and servicing activity whilst also balancing this against the multitude of other kerbside uses.

> "The Smarter Greener Logistics Project has helped to show how technology can help on street challenges for specific uses at the kerbside. The project has included a range of stakeholders from both council teams, operators and strategic partners. Uncovering areas that have challenges and being able to showcase live data can help to make London a more dynamic kerbside environment."
>
> **Grid Smarter Cities**

1.7.3. Future Opportunities for VLB Technology

Competing demands for kerbside space in dense urban areas means that there is an appetite amongst LAs to consider innovative technologies to dynamically manage kerbside use. The following areas are key opportunities for the future use of VLB technology:

- Full integration with enforcement software.
- VLBs as a potential revenue source.
- Integrating VLBs in future highways schemes.
- Trialling alongside Permit Loading Bays.
- Digitisation of Traffic Orders / Kerbside Information.
- Supporting LA Policy & Strategies.
- Developing network of VLBs & process standardisation.

The trial has demonstrated that logistics operations and management must be considered within existing and future kerbside use to continue to support businesses to receive required goods in an efficient and sustainable way.

Figure 10. Watling Street VLB in the City of London which supported brewery logistics.

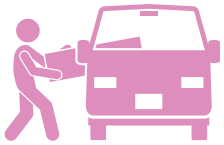
1.8 Next Steps

The SGL Kerbside Management Trial highlights the range of opportunities for VLB technology to enable LAs to dynamically manage kerbside space, address demands from businesses and Operators to cater for logistics activities within urban areas, and achieve savings to delivery vehicle circulation distances with associated congestion and local air quality benefits.

Recommended next steps:

- Continue to **develop LA, Business & Operator knowledge and understanding of VLBs and kerbside management technology** through trials, that provide the opportunity to test within a supported structure without significant financial commitment. Trials that test the integration of the technology across different LA enforcement platforms would also be valuable.
- Ensure a **collaborative approach to the digitisation of kerbside space** between the public and private sector to ensure that the digitisation is **comprehensive, accessible and transparent** for the different users and managers of the space.
- Reframe the narrative around the **kerbside to be viewed as a dynamic and flexible space with multiple uses and users.** LAs should develop kerbside-specific strategies and action plans, e.g. LB Lambeth Kerbside Strategy (2023), that consider the existing and potential uses of the kerbside. The **needs of the freight and logistics sector should be considered** within this, as well as sustainable uses, including urban greening, and sustainable transport parking provision.
- **Trial new use cases for VLBs**, including EV-only VLBs, VLBs designed into schemes at planning stage and complimentary VLBs & PLBs. Further trials would also allow for testing of the integration capability of the technology across different LA platforms and help to streamline the overall integration process.
- **Central government and strategic agencies to acknowledge kerbside management technology as a beneficial tool** to support the logistics sector and build this into upcoming policy and strategy concerned with sustainable logistics / management of the kerbside.
- Further **development and refinement of the methodology for understanding the emissions savings and sustainability benefits** of VLBs beyond the scope of the SGL trial. This can be achieved through further trials of VLBs, both on a larger scale and specifically focused on the emissions savings, which will enable the collection of more accurate data on existing delivery trends, VLB usage and impact to congestion and local air quality.

2. Trial Overview



2.1. Summary of the Trial

Cross River Partnership (CRP) worked in collaboration with Grid Smarter Cities, City of London Corporation, London Borough of Camden, London Borough of Lambeth, London Borough of Richmond and Transport for London to deliver the SGL Kerbside Management Trial.

The trial ran between July 2023 and March 2025 and aimed to provide local authorities, businesses and operators with the opportunity to test Virtual Loading Bays (VLBs) as a kerbside management technology and understand the operational, congestion and air quality impacts.

The trial involved developing a network of 8 VLBs in locations across London, including busy high streets and pedestrianised zones, and focused on different use cases such as health & safety needs of brewery logistics and large supplier delivery operations.

Extensive communications and engagement with local businesses and their suppliers was carried out to encourage trial participation, develop a picture of delivery and servicing in the selected locations, and understand the impact of VLBs on deliveries and logistics operations.

Detailed information on VLB usage and delivery movements were captured throughout the trial and provided insights into VLB operations and air quality benefits.

The final stage of the trial involved comprehensive feedback and trial evaluation which presented a valuable opportunity to reflect on the lessons learned and future application for VLBs and Kerbside Management Technology.

CRP Funding

The Kerbside Management Trial was funded by the Department for Environment, Food and Rural Affairs (Defra) through CRP's Smarter Greener Logistics (SGL) programme.

Smarter Greener Logistics (SGL) is a Defra-funded project led by Westminster City Council in collaboration with 25 project partners. The project aims to minimise the impact of freight on noise, air quality, traffic and pavement space in London by making improvements across 14 London boroughs and two London Business Improvement Districts (BIDs).

This **SGL Unpacked** will outline the process for setting up the trials, communications and engagement approach, VLB usage and emissions savings data, lessons learned, trial legacy and future prospects for Virtual Loading Bays and kerbside management technology. Local authority case studies provide in-depth information on the trial locations.

3. Kerbside Management Technology

The Kerbside can be defined as the space at the side of the road closest to the pavement which is most easily recognised as the space where cars park[1]. The kerbside has a multitude of uses including car parking, (un)loading activities, driveways, cycle lanes, bus lanes/stops, and outdoor dining.

There is also an increased focus on sustainable uses of the kerbside including urban greening, e.g. community parklets and Sustainable Drainage Systems (SuDS) and parking for shared and active travel modes e.g. cycles, scooters and Electric Vehicles (EVs). The competing demands placed on urban kerbside space presents challenges to both LA's, who manage the space, and users of the kerbside, including the general public, transport providers, businesses and delivery organisations.

[1] London Borough of Lambeth: Kerbside Strategy

Examples of Kerbside Use:

- Parking
- (Un)loading activities
- Driveways
- Cycle lanes
- Bus stops & bus lanes
- Outdoor dining
- Community & business parklets
- Pedestrian crossings
- Cycle / scooter / EV parking & charging
- School Keep Clear
- Taxi bays
- Sustainable Drainage Systems (SuDS) & street trees

Figure 11. Examples of kerbside uses. Source: LB Lambeth Kerbside Strategy (2023).

3.1 Kerbside Management Technology

Kerbside Management Technology aims to dynamically manage the kerbside with a focus on improving delivery operations for businesses and suppliers, alleviate congestion and improve air quality. The technology enables kerbside loading bay allocations to be digitally lifted on to a booking system and app and allocated in advance of delivery operations taking place. Grid Smarter Cities provide two main types of kerbside management technology Virtual Loading Bays (VLBs) and Permit Loading Bays (PLBs).

VLBs were selected as the technology to test for the SGL Kerbside Management Trial as they have the ability to dynamically manage kerbside space at selected locations without the need for highways infrastructure, which could not have been installed within the time constraints of the trial. Grid were the only provider of VLBs and the associated booking platform at the time of the trial initiation and therefore were selected as the technology provider.

Figure 12. Kerb Booking Platform Dashboard

3.2 What is a Virtual Loading Bay (VLB)?

Virtual Loading Bays (VLBs) are digitally created dedicated spaces at the kerbside that require no physical signage or infrastructure. They can be pre-booked by participating operators to load and unload goods using the Grid Kerb booking platform.

Features of a VLB:

- No signs and lines required on the highway.
- Online digital booking system that allows users to pre-book pre-determined space on the kerbside to carry out loading activity.
- 'Rogue Vehicle' function for users to report other vehicles parked in the pre-booked space.
- Kerb platform with online dashboard and booking reports that provide the local authority with VLB usage data and delivery vehicle information.

VLB aims:

- Improve the efficiency of deliveries by ensuring reliable access to designated parking at delivery locations.
- Reduce idling times, congestion and emissions by improving traffic flow and optimising delivery routes.
- Reduce the need for physical infrastructure and facilitate dynamic management of the kerbside for different uses throughout the day.
- Provide data on kerbside usage and enable local authorities to monitor and analyse delivery patterns to help inform future transport planning and policy decisions.

4. Trial Set Up

The SGL Kerbside Management Trial began in summer 2023 as part of CRP's Defra-funded Smarter Greener Logistics programme. CRP research into available kerbside management platforms / technologies identified Grid as a suitable provider of kerbside management technology including VLBs and PLBs (no other providers of VLB's were identified).

Following initial conversations with CRP, a proposal was presented by Grid in August 2023 for the trial of their Kerb Technology across multiple local authority locations and for different use cases. VLBs were selected as the technology to test due to the innovative nature of the technology and the limited existing use cases for LAs to draw learnings from, in comparison to PLBs. Additionally, the lack of infrastructure required for VLBs was more suited to the time constraints of the trial as physical infrastructure and Experimental Traffic Orders (ETMOs) were needed for PLBs.

The following section will outline the key stages of the trial set-up process including: project partners, VLB locations & operations, permissions, enforcement, reporting and cost. The specific set-up process and timelines for each local authority are outlined in the individual case studies in Section 6.

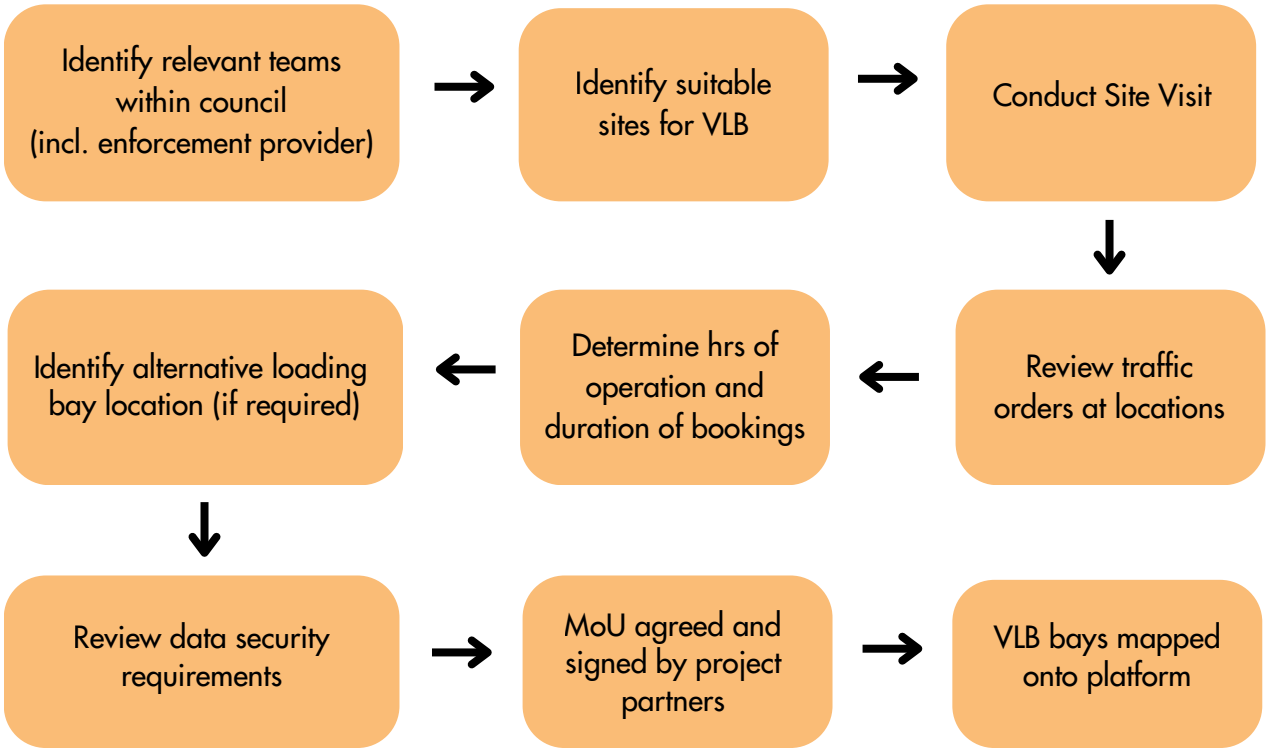


Figure 13. SGL Kerbside Management Trial Set-Up Process

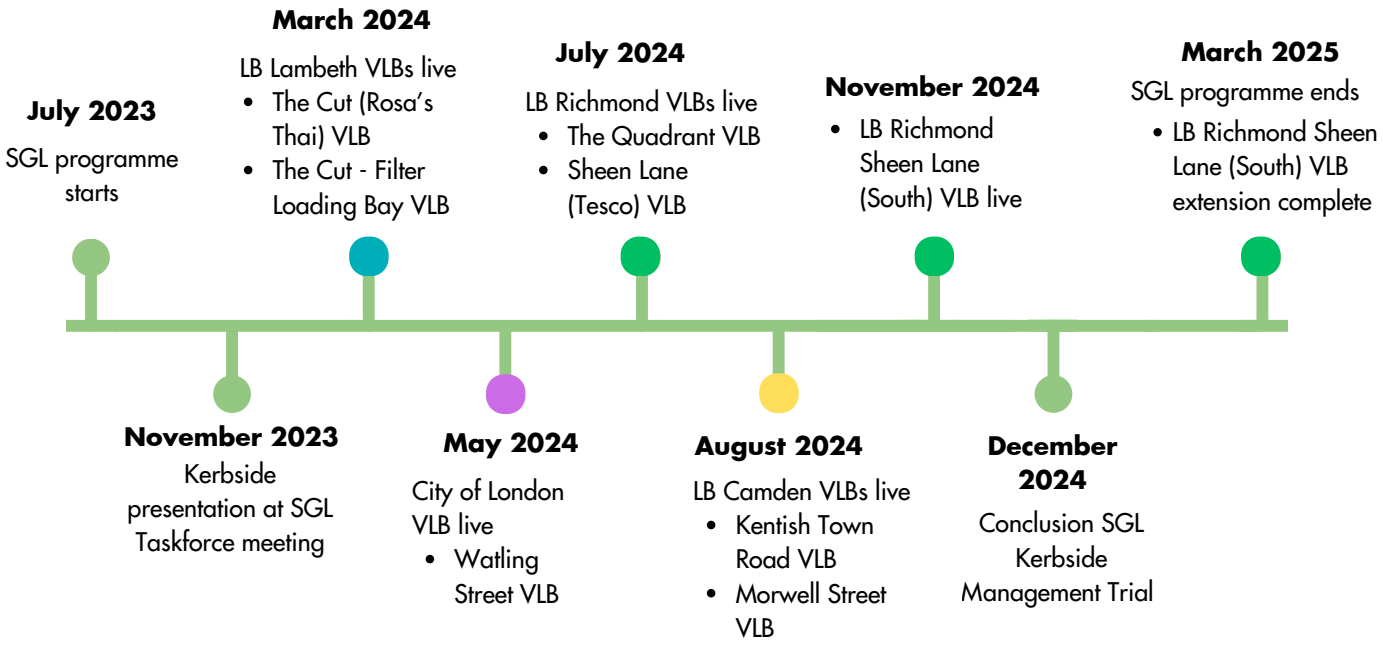


Figure 4: SGL Kerbside Management Trial Timeline.

4.1 Project Partners

The trial involved 9 project partners, multiple internal teams, and key stakeholder groups. Introductory meetings were held with interested local authorities to introduce them to the VLB technology and understand their aims for the trial. An introductory workshop on Kerbside Management Technology and Virtual Loading Bays was also held at a SGL Steering Group meeting in November 2023. Regular project partner meetings took place throughout the trial with the frequency determined by the trial stage.

Figure 14. Kerbside Management Technology Workshop - SGL Steering Group meeting, November 2023.

Project Partner	Role
Cross River Partnership	Facilitator & Project Manager
Department for Environment, Food and Rural Affairs (DEFRA)	Funder
Grid Smarter Cities	Technology Provider
City of London Corporation	Local Authority
London Borough of Camden	Local Authority
London Borough of Lambeth	Local Authority
London Borough of Richmond	Local Authority
Westminster City Council	Smarter Greener Logistics lead Partner

Transport for London	Integrated transport authority for London involved in LB Richmond trial.
Local Authority Enforcement Providers e.g. APCOA, NSL	Supported the enforcement of the trial VLBs.

Table 3. List of project partners involved in trial

Figure 15. SGL Kerbside Management Trial: Stakeholders & Relationships

4.1.1. Local Authority Teams

The trial involved project leads from each LA who acted as the main point of contact and identified specific teams and individuals to be involved at different stages of the trial. Grid and CRP provided information packs on the technology and Kerbside Management Trial to aid internal understanding and also presented to different LA teams to demonstrate the value of taking part in the trial and to answer queries.

Local Authority Team	Role
Parking Operations	Provided support with parking policy and local enforcement (including CCTV). Provided support with communication with external parking teams.
Transport Policy	Involved in selecting suitable sites for the Virtual Loading Bay and assessing Traffic Management Orders.
Climate Response / Sustainability / Air Quality Teams	Advised on trial from climate and air quality perspective.
Communications	Reviewed trial communications materials and shared communication to residents and businesses about the trials.
Legal	Provided guidance on relevant regulations and TMO process.
Data Security	Compliance with GDPR and data sharing.
Streetworks Team	Installed necessary signage for LB Richmond Sheen Lane (South) location.
External Enforcement Contractor	e.g. APCOA, NSL Day-to-day enforcement operations by CEOs. Office team involved in PCN process and exemptions.

Table 5. Internal local authority teams and roles in the trial (actual team names & role remit may be different across LAs).

4.1.2. Stakeholder Groups

There were also multiple stakeholder groups involved in the trial including the businesses and Operators who tested the technology and provided information on their freight and servicing patterns. Additionally, logistics membership organisations advised on challenge areas and connected members with the trial, whilst Business Improvement Districts promoted trial participation within their networks.

Stakeholder Groups	Role
Businesses	Businesses in close proximity to VLB trial locations provided information on their delivery schedules and suppliers.
Business Improvement Districts	Promoted the trial through their business networks via social media and newsletters. e.g. Cheapside Business Alliance (City of London), We Are Waterloo (LB Lambeth).
Operators	Suppliers or logistics companies who supply local businesses and took part in the trial.
Logistics membership organisations	Advised on delivery challenge areas and promoted and connected members with the trial. e.g. Brewery Logistics Group (City of London & LB Lambeth).

Table 10. Stakeholder Groups involved in the trial.

4.2 Selecting VLB Locations

VLB locations were determined through a process of desk-based research, to identify potential areas, and site visits, to assess the built environment and suitability for VLBs. Existing Traffic Orders and loading restrictions were also assessed, as well as existing and upcoming LA strategies / policies and highways schemes.

4.2.1 Desk Based Research

Initial desk-based research was conducted to identify delivery challenge areas and potential VLB locations. The research involved:

- Identifying locations with high density of businesses, which is an indicator of loading pressure that could benefit from a VLB.
- Feedback from businesses and operators on areas they find difficult to receive deliveries, such as existing loading bay occupation and health & safety requirements.
- Penalty Charge Notice (PCN) hotspots.
- Assessing complaints from residents related to delivery vehicles.
- Areas where there were existing loading restrictions in place.
- Identifying where VLBs would support LA strategies / policies and upcoming highways schemes e.g. Local Plan, Freight & Servicing Action Plans, Air Quality Action Plans.
- Locations were there was political appetite for addressing delivery challenges.

Figure 16. Site visit in the City of London (February 2024).

4.2.2 *Site Visits*

Site visits were then carried out to understand the built environment of the areas under consideration. These involved:

- Identifying existing signage and loading restrictions.
- Assessing highways markings and other uses of the highway in close proximity e.g. bus cages.
- Identifying potential businesses who may benefit from the VLB.
- Engaging with local businesses to understand and assess their delivery methods, patterns and needs.

4.2.3 Traffic Management Orders

Once provisional VLB sites were identified, the LAs were required to check the existing traffic restrictions at the locations. This was to ensure there was an appropriate amendment to any current traffic restrictions to include the VLB. In most cases, this was as a dispensation/waiver as the current TO was drafted to allow this.

Traffic Management Order (TMO) - TMOs are statutory legal documents that give the Council the authority to implement and enforce traffic or parking restrictions introduced as a part of highway schemes or works and are made under the Road Traffic Regulation Act 1984 legislation.

TMOs are categorised into two distinct types of restrictions:

- Static restrictions - all waiting, loading and stopping restrictions affecting stationary or parked vehicles and controlled parking zones
- Moving restrictions - any restrictions affecting moving vehicles (for example, 'one-way' streets, 'no entry' points, bus lanes/cycle lanes, "prohibition of vehicles" points e.g. school streets/low traffic neighbourhoods)

Experimental Traffic Management Order (ETMO) – A legal document that imposes traffic and parking restrictions which can stay in force up to 18 months. Often used to trial highways schemes.

Local Authority	Traffic Order Amendments
City of London Corporation	No amendments required
London Borough of Camden	No amendments required
London Borough of Lambeth	No amendments required
London Borough of Richmond	ETMO required to increase maximum loading time from 20 minutes to 40 minutes.

Table 11. Traffic Order amendments by local authority.

4.2.4 Loading Restrictions

Loading restrictions were also reviewed as part of the location selection process. When identifying suitable locations, LB Richmond found that there was a 20-minute loading restriction in place across the borough. An ETMO was required at the 3 locations to increase the maximum loading time from 20 to 40-minutes.

4.2.5. Pedestrianisation

Restrictions around Pedestrian Zones were another consideration to understand the TOs in place. The Watling Street VLB in the City of London was in a pedestrian zone Mon-Fri 08:00 – 18:00 with a physical barrier at both ends of the street. Therefore the VLB needed to operate outside of these restricted hours.

A potential site was identified in the City of London on Telegraph Street, which is pedestrianised Mon-Fri 07:00-19:00 & Saturday 07:00-23:00. However, further investigation of the site found both a Static and Moving Traffic Order and the location was therefore unsuitable for a VLB.

Figure 17. Restricted parking zone (Mon-Fri 8am-6pm) and physical barrier at Watling Street, City of London.

"The Virtual Loading Bays are a game changer for the safety of our staff delivering into pubs in London, they allow us to park closer to the delivery point meaning the manual handling of products is reduced."

Jonathan Penfold, Tradeteam Salfords General Manager

Key questions when assessing the suitability of a VLB location:

- Are there businesses close by that would benefit from a VLB?
- Is there an existing delivery challenge at the location?
- Would the VLB conflict with any ongoing or planned highways schemes?
- What is the existing Traffic Order (both static and moving)? Does this allow for a dispensation?
- What are the existing loading restrictions (location specific and borough wide)?
- How would the VLB impact traffic flow and pedestrian movements?
- Is the VLB in a pedestrian zone? What are the restrictions?
- Are there any physical barriers that would impact VLB operational hours?

Figure 18. Checklist for assessing VLB locations.

4.3 VLB Locations & Rationale

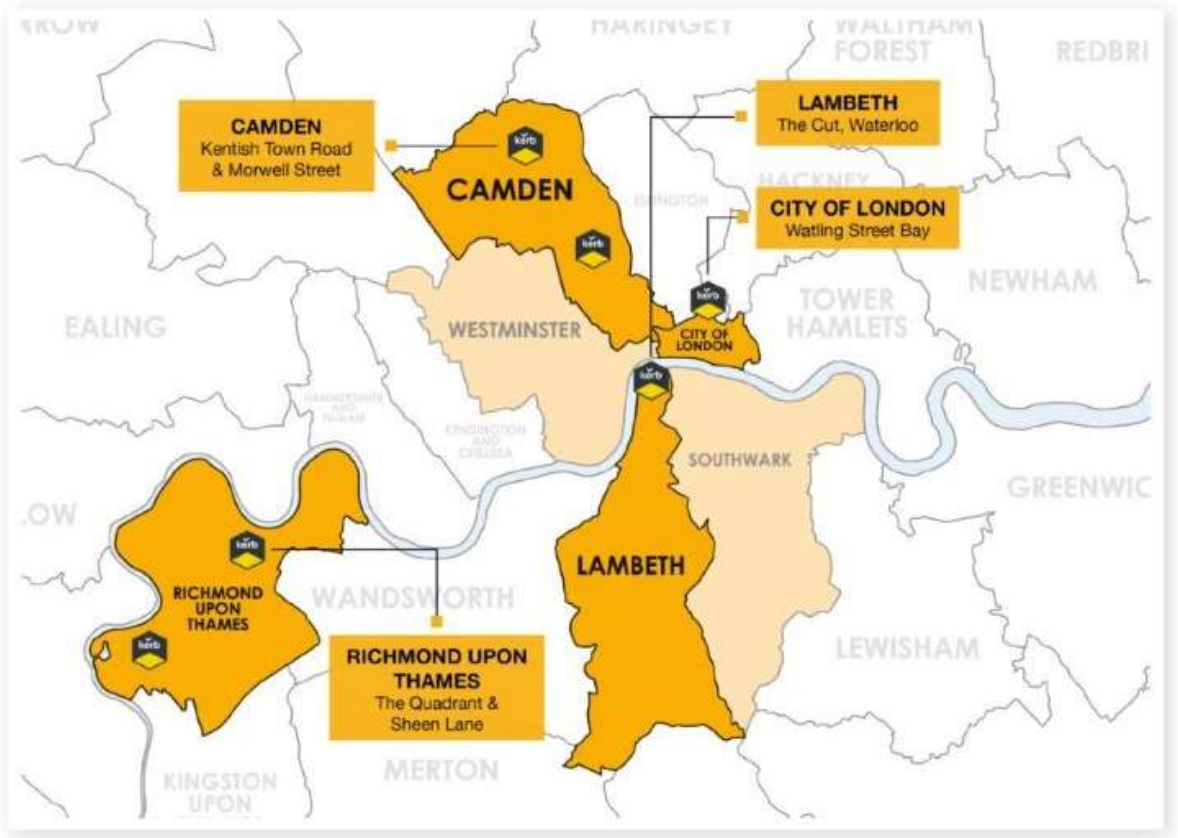


Figure 3. Map of VLB Locations

8 VLB locations were selected to develop a network of Virtual Loading Bays across London within the 4 partner boroughs. The 8 VLB locations and rationale for selecting each site are outlined below.

City of London Corporation

Watling Street VLB

City of London sought to address the challenges of pub deliveries and support specific health and safety requirements for brewery logistics.

The Watling Street location was selected due to weekly deliveries to two pubs that were surrounded by a cluster of businesses, low traffic flows and no loading restrictions beyond the pedestrianised hours, minimising the expected disruption.

Figure 19. Watling Street VLB. 29 Watling Street, London EC4M 9BR

London Borough of Camden

Kentish Town Road VLB

Kentish Town Road was identified as a heavy traffic location, a prominent area for cyclists, and had stretches without side roads.

A particularly challenging area was identified between McDonalds and Iceland, with multiple deliveries happening and often PCNs being accepted as part of the delivery process due to loading demand.

Figure 20. Kentish Town Road VLB. 295 Kentish Town Rd, London NW5 2TJ

Morwell Street VLB

Morwell Street was identified as a delivery location used by suppliers delivering to businesses near Tottenham Court Road.

This being a quieter side street, with more open space and less obstruction, it was identified as a suitable site to test VLBs. The aim for the VLB was to reduce vehicle idling and vehicle circulation near Tottenham Court Road, reducing congestion and emissions.

Figure 21. Morwell Street VLB. Morwell St, London W1T 7RB

London Borough of Lambeth

The Cut (Rosa's Thai) VLB

The Cut, Waterloo was identified as a location with high number of deliveries taking place to service local businesses. Lambeth also sought to integrate booking the VLB with the ability to pass through the traffic filter at the junction of The Cut and Short Street to reduce vehicle circulation on smaller residential streets and reduce emissions

Figure 22. The Cut (Rosa's Thai) VLB. 77 The Cut, London SE1 8LL

The Cut (Filter Loading Bay) VLB

The Cut, Waterloo was identified as a location with high number of deliveries taking place to service local businesses.

Lambeth also sought to integrate booking the VLB with the ability to pass through the traffic filter at the junction of The Cut and Short Street to reduce vehicle circulation on smaller residential streets and reduce emissions. Desire to also utilise the Kerb booking system to support the Parking Suspension process for the existing loading bay that is used for extended periods of time.

Figure 23. The Cut (Filter Loading Bay) VLB. 47A The Cut, SE1 8LF

London Borough of Richmond

The Quadrant VLB

VLB aimed to provide an alternative location to an existing loading bay frequently occupied by delivery drivers and to address local air quality issues identified in the London Borough of Richmond's Air Quality Action Plan 2020-2025 which were found to be in excess of 60µg/m3.

Figure 24. The Quadrant VLB. 34 The Quadrant, Richmond TW9 1DN

Sheen Lane (Tesco) VLB

Issues with congestion along Sheen Lane, Mortlake, due to railway crossing and frequent road closure because of trains travelling in and out of central London (Waterloo).

VLB aimed to manage deliveries to the retail chain and address concerns raised by residents around HGV activities and congestion close to the railway crossing.

Figure 25. Sheen Lane (Tesco) VLB. 39-41 Sheen Lane, London SW14 8AB

Sheen Lane (South) VLB

Engagement with businesses along Sheen Lane raised issues with delivery space and underutilised spaces along the highway. Introducing a VLB within an infrequently used (twice a week) TfL bus stop area presented a unique opportunity to test and facilitate shared, dynamic use of the kerbside.

Figure 26. Sheen Lane (South) VLB. Sheen Lane, SW14 8LP. Image: Google Maps.

4.3.1 Alternative Loading Bays & Rogue Vehicles

LAs also had the option to identify alternative loading locations to provide operators with an alternative location, in close proximity to the VLB, to carry out loading activity in the case that the dedicated VLB was unavailable. Alternative locations were identified to support the 'Rogue Vehicle' reporting function on the Kerb app which Operators have the option to use when another vehicle is parked in the dedicated VLB space.

4.4 Hours of Operation

Once locations were agreed, local authorities determined the hours of operation of the VLBs, duration of booking slots and maximum booking period that loading activity can take place. This was informed by existing freight and servicing activity at the locations as well as the following considerations.

- Local freight and servicing activity
- Existing loading restrictions & Traffic Orders
- Residential dwellings
- Vehicle restrictions (e.g. pedestrianised hours)
- Traffic flow
- Air quality levels

Across the trial, all the VLB locations had a maximum booking time of 40 minutes in-line with borough-wide loading restrictions. As outlined in (section 4.2.4), an ETMO was required at the 3 locations in LB Richmond due to the existing borough-wide 20-minute maximum loading time. 20-minute slots facilitated shorter deliveries, maximising availability at the kerbside, and Operators could also book two adjacent 20-minute slots for longer deliveries.

Local Authority	VLB Location(s)	Hours of Operation	Considerations	Booking Slots
City of London Corporation	Watling Street (EC4M 9BR)	Monday – Sunday Available between 05:00-08:00 & 18:00-21:00	Pedestrianised hours 08:00 – 18:00 (Mon-Fri)	40 minutes (2x 20 min slots)
London Borough of Camden	Kentish Town Road (NW5 2TJ)	Monday - Sunday Unavailable between 07:00-10:00 & 16:00-19:00	In-line with existing loading restrictions and avoiding AM and PM congestion peaks	40 minutes (2x 20 min slots)
	Morwell Street (W1T 7RB)	Monday – Sunday Available 24 hours	Available 24 hours	
London Borough of Lambeth	The Cut, Waterloo (SE1 8LL)	Monday – Sunday Available 24 hours	Available 24 hours	40 minutes (2x 20 min slots)
	The Cut, Waterloo (SE1 8LF)	Monday – Sunday Available 24 hours	Available 24 hours	
London Borough of Richmond	The Quadrant, Richmond (TW9 1DN)	Monday – Sunday Available 07:00 – 23:00 (Unavailable between 08:00-10:00 & 16:30-18:30)	Avoiding AM and PM congestion peaks	40 minutes (2x 20 min slots)
	Tesco Express, Sheen Lane, Mortlake (SW14 8AB)	Monday – Sunday Available 07:00 – 22:00	Avoiding nighttime disruption to residential dwellings	

London Borough of Richmond	Sheen Lane (South) VLB, Sheen Lane, SW14 8LP	Monday – Sunday* Available 07:00 – 23:00* *Tuesdays and Fridays, VLB operational 07:00 - 09:30 / 11:30 – 23:00	Includes no booking period of 2 hours (between 09:30 – 11:30) on Tuesdays & Fridays to buffer bus arrival twice a week (bus arrives at 10:29).	40 minutes (2x 20 min slots)

Table 12. VLBs Operational Information

4.5 Data Sharing

Data collection and sharing was a consideration of the trial as the Kerb platform gathers information when Operators book on the system. This includes information on the organisation, driver name, VRM, and booking date and time.

Operators were also asked to provide specific delivery information at the onboarding stage to address SGL monitoring requirements. To ensure compliance with data sharing across the trial, Memorandums of Understanding were drafted for each LA and additional data security checks were conducted where required.

4.5.1 Memorandum of Understanding

Four Memorandums of Understanding (MoU) were drafted for the purpose of the trial and signed by Grid Smarter Cities (the 'Provider'), CRP (the 'Licensee') and the Local Authority 'the Borough'. The MoU outlined the responsibilities of each party throughout the trial and included information on:

- Trial duration
- VLB locations
- VLB usage and trial reporting data
- Business/operator engagement approach
- Data protection
- Penalty Charge Notice (PCN) process

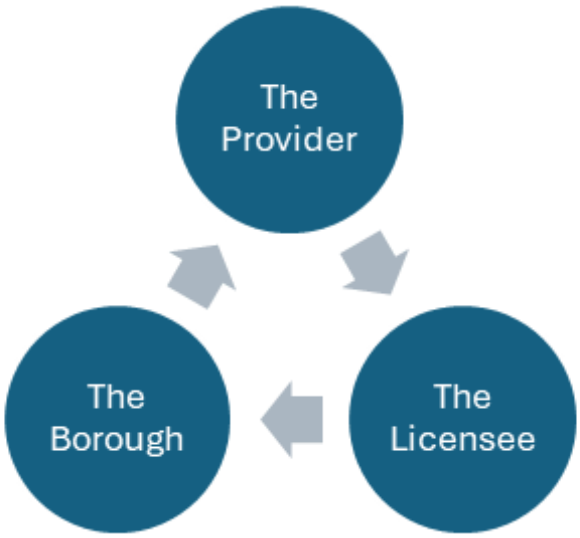


Figure 27. MoU Relationships

4.5.2 Data Security

Data protection was covered within the MoU, however, some LAs required additional data protection assessments to be completed due to internal policy regarding data security. For example, LB Camden completed a Data Protection Impact Assessment (DPIA), an internal assessment that looks at whether any data sharing as part of the trial would lead to non-compliance of GDPR. The LB Camden DPIA was approved for this trial as there were no major data sharing implications for the council.

4.6 Mapping VLBs

Once all the VLB information was confirmed, the Grid team mapped the VLBs on the Kerb platform using specific latitude / longitude coordinates. This information was then made visible to Operators using the Kerb platform from the agreed VLB live date.

Figure 28. Example of VLB mapped on Kerb platform.

4.7 Enforcement & Reporting

4.7.1 Enforcement Approach

Engagement with LA enforcement teams and external providers, such as APCOA and NSL, was an important part of the trial. On-the-ground Civil Enforcement Officers (CEO) enforce against traffic restrictions, whilst office teams deal with PCN processes and exemptions. For the trial, a light touch approach to enforcement was recommended and a LA specific approach for checks and enforcement action associated with the VLBs was agreed.

CRP and Grid provided an in-person trial briefing to the LB Camden NSL enforcement team and met LB Lambeth and APCOA on-site to provide information and to address any queries. Monthly meetings also took place with each LA, some of which were attended by members of LA enforcement teams and external providers.

4.7.2 Integrating with Enforcement

A whitelist of CSV files on VLB bookings were emailed from Grid to LA parking teams to enable them to cross reference the bookings and LA records. Direct integration to LA enforcement teams is a feature of the VLB and Kerb platform, however, this required further back-office integration with associated resource and cost. Consequently it was out of scope for this trial.

As a result, the enforcement approach and reporting frequency, including individuals receiving the information, was specific to each LA and agreed at the trial set-up stage.

4.7.3 Kerb Dashboard

Local authorities were set up with access to an online dashboard which provided VLB usage data and infographics throughout the trial. As the trial coordinator, CRP had access to all LA dashboards to view and analyse usage data. CRP access to LA dashboards was terminated at the end of the SGL trial. Grid hosted dashboard training for CRP and local authority teams to explain the data.

Information provided in the report / dashboard included:

- Vehicle type
- Emissions class
- Time of booking
- Time spent at the bay
- Location
- Occupancy levels
- Rogue vehicles

The dashboard was updated during the project to show advance bookings up to a week in advance and past bookings of 3 months.

Figure 29. Kerb Platform Booking Dashboard

4.8 Trial Additions

LB Lambeth decided to integrate the kerbside management technology with an existing traffic filter to reduce HGV movement on residential streets.

Booking via the Kerb platform provided delivery vehicles with an automatic dispensation to travel through the traffic filter at the junction of The Cut and Short Street and exit directly on to Blackfriars Road. The aim was to reduce the number of freight and servicing vehicles travelling down smaller residential streets (e.g. Boundary Row), reducing vehicle circulation and emissions, and improving delivery driver efficiency. The platform provided the local authority enforcement team with an accurate list of freight vehicle VRMs exempt from the traffic filter as well as data on delivery and servicing activity along The Cut.

LB Lambeth also utilised the Kerb booking system to support the Parking Suspension process for the existing loading bay outside the Young Vic Theatre. This was utilised by the theatre when using the loading bay for longer periods to move large set pieces.

Figure 5. Traffic filter at the junction of The Cut and Short Street, LB Lambeth

4.9 Trial Cost

The main cost of the trial was the annual licence fee for the Virtual Loading Bay solution which provided CRP and 4 LAs access to the platform. Grid also supported the trial with additional communications materials, including flyers and signage, that are not included below.

Local Authority	VLB Location(s)	Cost
Virtual Loading Bays – Annual Licence	One annual licence fee which allowed access to platform for CRP and 4 participating LAs. This included: - Mapping of the VLBs - Whitelist reporting - Supplier onboarding & support - Dedicated project webpage	£24,000*
Grid Project Management support	Including but not limited to: - Site visits - CRP x Grid regular project meetings - Local authority project meetings	£6,000*
Communication Materials	Promotional flyers for each local authority trial	£185
	Total cost	**£30,185 (excl. VAT)**

**Annual licence fee, including number of VLB locations and associated support, agreed by Grid in 2023 for the specific purpose of the SGL Kerbside Management Trial. Future cost of platform for individual local authorities subject to commercial discussions and agreement between LA and Grid.*

Table 13. Summary of Kerbside Management Trial Costs.

5. Engagement & Communications

Engagement and communications formed an essential part of the trial, helping to identify suitable businesses and operators to participate. Engagement took place throughout the duration of the trial and a range of approaches were employed, dependent on the specific location of the VLB and types of businesses and suppliers being targeted. The following section will outline the target audiences, overall engagement and communications approach, and onboarding process for the trial. Local authority specific approaches are outlined in the individual case studies in Section 6.

5.1 Target Audiences

The two main target audiences for taking part in the trial were **local businesses** (in close proximity to the VLB) and **suppliers** to those businesses who load and unload near the VLB location. Engagement with businesses and suppliers around their delivery patterns and timings also informed the process of identifying suitable VLB locations and hours of operation (see Sections 4.3 & 4.4).

Figure 6. CRP Team Members conducting business engagement along Tottenham Court Road, LB Camden.

5.2 Engagement Approaches

A range of approaches were employed to engage with local businesses and suppliers and included:

- **In-person engagement** with local businesses and suppliers to explain trial, understand delivery patterns and identify suitable contact for discussing trial further. Supported by information flyers.
- **On-site observations** of suppliers to the area and delivery timings.
- **Letters** from the LA to local businesses explaining the trial and encouraging participation.

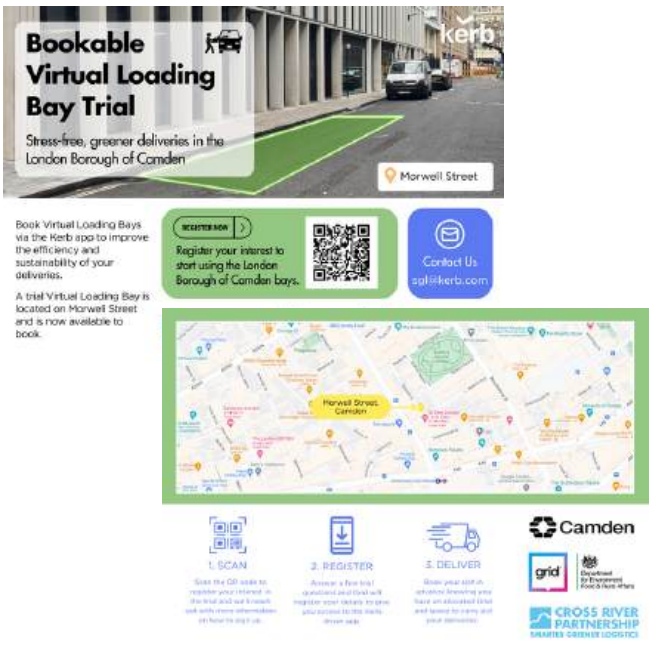


Figure 30. Example information flyers used to promote the trial.

- **Targeted email engagement & phone calls** with identified businesses and suppliers.
- **Dissemination of an onboarding video** for operators demonstrating how to use the platform.
- **In-person & online introductory meetings** with Fleet & Transport Managers to explain the purpose and value of the trial.
- **Engagement with logistics membership organisations**, such as the Brewery Logistics Group, provided a captive audience for the trial, knowledge of the sector, and facilitated introductory meetings.
- **Sharing information** of the trial and new VLB locations with **existing users of the Kerb platform.**
- **Informational signage** was put up at the VLB locations along The Cut in Lambeth with a QR code for Operators to scan to find out more.

Figure 31. Informational signage displayed along The Cut, LB Lambeth to promote trial.

Trial-wide communication assets were also created and shared by CRP, Grid and LA project partners via social media, newsletters and blog posts to promote the trial and reach as wide an audience as possible.

The comms were amplified by logistics sector organisations, membership groups, and local Business Improvement Districts and led to press articles by organisations such as Green Fleet and Parking Review.

Trial-wide comms included:

- **Dedicated trial webpage** with information on the trial and a sign-up form, including VLB locations and trial monitoring questions.

Figure 32. VLBs displayed on Grid's dedicated SGL Kerbside Management Trial webpage.

- **Mailchimp email campaign**
- **CRP Press Release**

CROSS RIVER PARTNERSHIP LAUNCHES TWO VIRTUAL LOADING BAYS IN LONDON BOROUGH OF CAMDEN TO ADD TO GROWING NETWORK

Cross River Partnership (CRP) is excited to announce the launch of two Virtual Loading Bays being trialled in the London Borough of Camden, in collaboration with Grid Smarter Cities. The 2 Virtual Loading Bays (VLBs) are located on Morwell Street and Kentish Town Road and are available to book, free of charge, till the end of 2024.

VLBs are dedicated spaces at the kerbside that can be pre-booked by participating operators to load and unload goods using the Grid Kerb booking platform. VLBs aim to make deliveries more efficient, sustainable and improve congestion and air quality in the local area.

Benefits of Virtual Loading Bays include:

- Dedicated and guaranteed space for freight activities to take place for a safe amount of time
- The ability to book time at the kerbside in line with freight operations
- Being able to beat congested hours and provide safe working environments for drivers
- Enabling local authorities to manage their kerbside and prioritise time and space for freight movements

Figure 33. Press release issued by CRP to promote launch of LB Camden VLBs.

- **Press articles, including in Green Fleet and Parking Review**

Figure 34. Example press headlines promoting the trial.

- **Social media promotion** on platforms such as LinkedIn & X

- **Case studies** (written & video)
  - City of London (written & video)
  - LB Lambeth

Figure 35. City of London and LB Camden VLB Case Studies.

Figure 36. Video created to promote use of the Watling St VLB, City of London.

- **CRP Newsletter Articles**

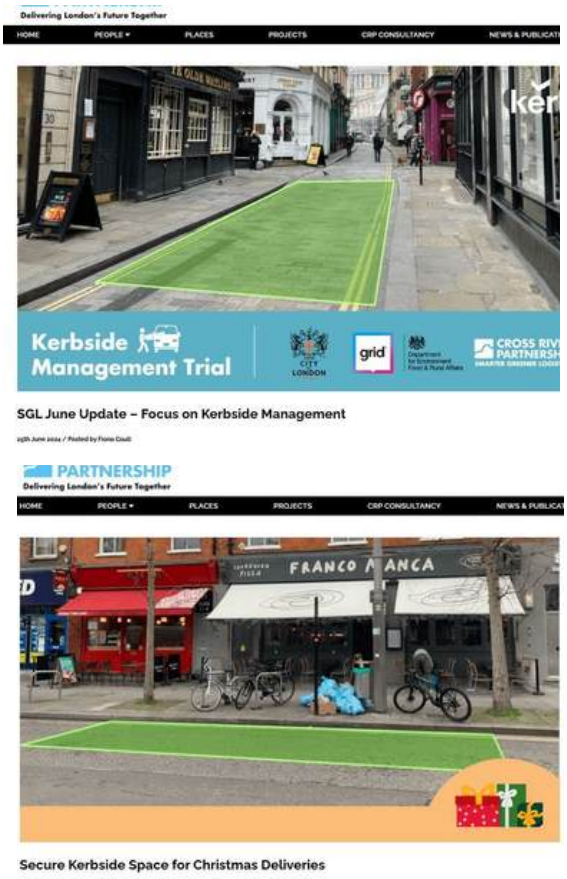


Figure 37. Examples of CRP news articles promoting the trial.

- **Logistics sector newsletters**, including section in Logistics UK weekly

- **Sharing in CRP meetings** e.g. Central London Sub-Regional Transport Partnership

As the trial progressed, Grid started to use a 'One-time Booking Account' when carrying out in-person engagement. This involved the Grid team showing Operators, whilst on-site, how to do an immediate, one-time booking on the Kerb platform mobile app. This enabled them to demonstrate the use of the platform and gather supplier and delivery information. This approach was particularly used for the VLBs along The Cut in Lambeth to demonstrate how the booking system allowed operators to pass through the traffic filter without incurring a PCN.

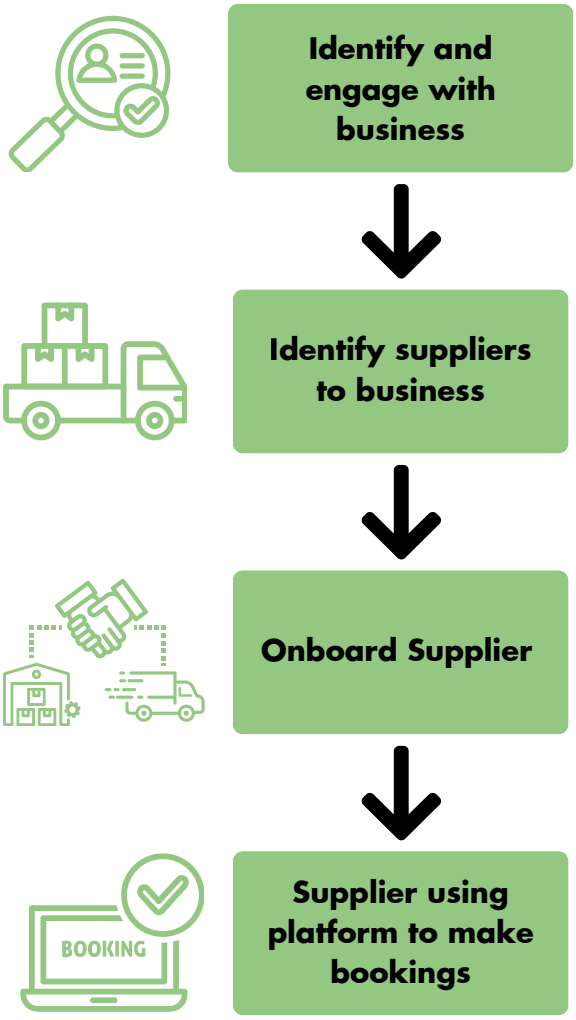


Figure 38. Engagement & Onboarding Process.

5.3 Onboarding Process

Once the supplier organisation and associated contact was identified, Grid guided them through the onboarding process and use of the Kerb platform, either via email or in an introductory meeting. The introduction would show users how to login, navigate the platform, add vehicles & drivers to the account, and make bookings.

Operators were also required to provide information on their current delivery patterns, including type of vehicle used, original depot location, number of missed deliveries and number of PCN's received at the relevant VLB site. Operators were onboarded throughout the duration of the trial and Grid were on hand to provide 1-2-1 user support.

5.4 Bookings

Once an operator was onboarded, they were free to make bookings on the platform via the phone app or desktop browser for the relevant VLB location and specific date and time slot. Users were able to make amendments to their bookings, including date, time, VRM and driver name. Booking information was then shared with LA enforcement teams via a whitelist.

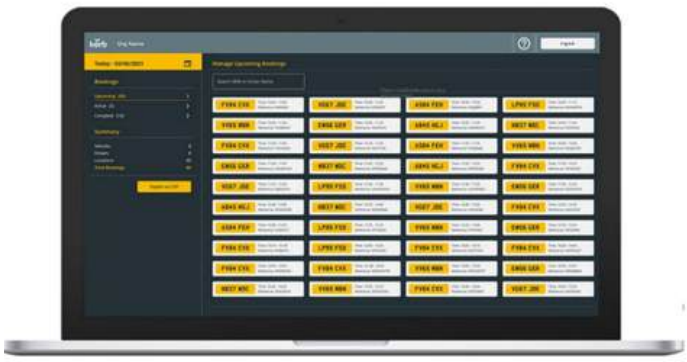


Figure 39. Operator view of Kerb platform and selecting specific vehicle when booking.

6. Case Studies

6.1 City of London

6.1.1. SGL Kerbside Management Trial

The City of London Corporation took part in the Defra-funded SGL Kerbside Management Trial, delivered in partnership with Cross River Partnership (CRP) and Grid Smarter Cities (Grid). The trial provided the City of London with the opportunity to test Virtual Loading Bays (VLBs), a digitally-created dedicated space at the kerbside that can be pre-booked by participating operators to load and unload goods using the Grid Kerb booking platform.

Figure 40. Tradeteam utilising Watling St VLB to complete a pub delivery.

6.1.2. Selecting a Location: Health & Safety Use Case

The City of London sought to address challenges and specific sector requirements of brewery logistics deliveries including the need for deliveries to take place in close proximity to the delivery point to deliver palettes or kegs, as well as reverse logistics.

Engagement with the Brewery Logistics Group (BLG) identified delivery challenge locations for its members and site visits assessed existing traffic flow, pedestrian movements and restrictions in place.

The Watling Street location was selected due to weekly deliveries to two pubs, the cluster of surrounding businesses, low traffic flows and no loading restrictions beyond the pedestrianised hours, minimising the expected disruption. Further research was conducted to identify a 2nd location, however this proved challenging and was not possible within the time constraints of the trial.

Watling Street VLB

The VLB was located on Watling Street outside of the Ye Olde Watling pub and focused on the servicing of Ye Olde Watling and Williamson's Tavern pubs due to the specific health & safety requirements of brewery logistics.

Figure 19. Watling Street VLB. 29 Watling Street, London EC4M 9BR

The VLB was live between May 2024 and the end of December 2024 and had restricted hours of operation (05:00-08:00 & 18:00-21:00) as Watling Street is pedestrianised between 08:00-18:00.

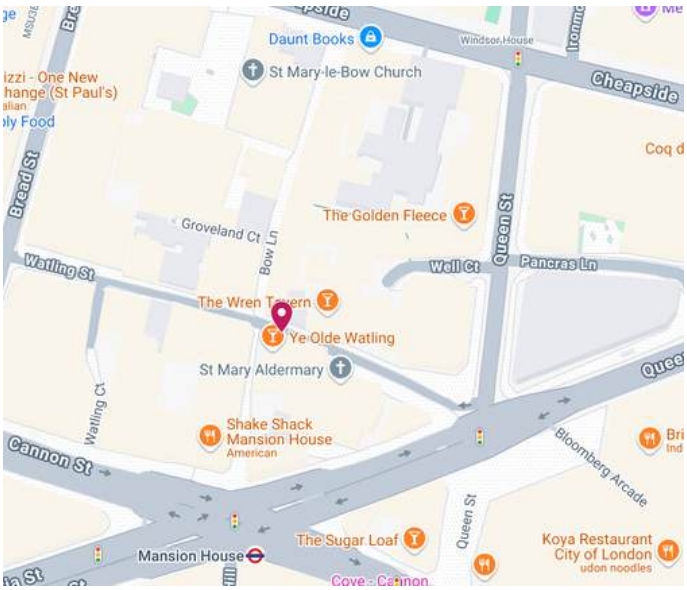


Figure 41. Watling St VLB location (red marker) in the City of London.

Figure 42. Tradeteam accessing Watling Street VLB to complete delivery.

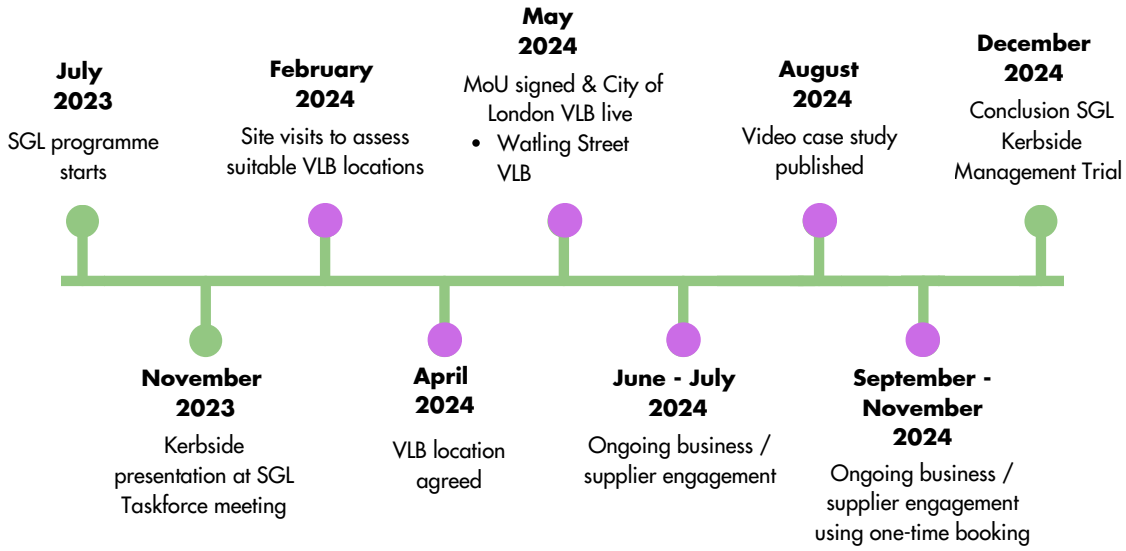


Figure 43. City of London SGL Kerbside Management Trial Timeline

6.1.3. Traffic Orders & Permissions

There are no loading restrictions on Watling Street beyond the pedestrianised hours (08:00-18:00) which is enforced by a physical barrier. The Traffic Order associated with the proposed location was assessed and confirmed to allow the VLB as a dispensation/waiver outside of the pedestrianised hours.

A potential 2nd site was identified in the City on Telegraph Street which is pedestrianised Mon-Fri 07:00-19:00 & Saturday 07:00-23:00. However, further investigation of the site found both a Static and Moving Traffic Order was in place and therefore was unsuitable for a VLB.

6.1.4. Engagement & Communications

In-person engagement with businesses on Watling Street was carried out multiple times before and after VLB implementation. Engagement prior to VLB implementation aimed to develop a picture of delivery and servicing patterns and identify suppliers, whilst engagement once the VLB was live, aimed to promote participation in the trial. Informational flyers supported this engagement as well as targeted emails to businesses & suppliers. Grid's existing relationships with the Brewery Logistics Group enabled a direct contact to Tradeteam/DHL, who service the two pubs, and facilitated an introduction and onboarding meeting. Grid used one-time bookings to demonstrate use of the platform to Operators live on site, which resulted in Fresh Kit London being converted to a regular user of the platform. Cheapside BID (the local Business Improvement District) also promoted the trial within their business network.

Figure 44. Communications material used to promote the Watling Street VLB.

Figure 45. Overall Usage Figure - Watling Street VLB

6.1.5. VLB Usage

Tradeteam/DHL were the primary users of the VLB and made a regular weekly booking to service Ye Olde Watling and Williamsons's Tavern from June 2024 onwards. Fresh Kit London also became a regular user of the platform following successful in-person engagement and Onboarding in October 2024. 2 other Operators used the VLB for on-the-day bookings, however, were not converted to become regular users of the platform. The average booking time of 2 hours 16 minutes reflects the delivery requirement for brewery logistics to be at the kerbside for a longer time period.

6.1.6. Emissions Savings

Emissions savings were calculated using CRP's in-house Transport Emissions Calculator (TEC) which uses Defra's emissions factor toolkit to compare the emissions impact of different delivery methods and distances and the associated values for carbon dioxide, nitrous oxides and particulate matter. Data included delivery information provided at onboarding stage, total VLB bookings and estimates for the number of vehicle km saved as a result of the VLB providing a dedicated space for logistics activities. Further detail on emissions savings methodology and the assumptions applied are outlined in section 12.

These figures are based on the assumption of the trial continuing for a whole year and the trial business/supplier engagement which identified suitable users and vehicle circulation km saved by providing a dedicated space for logistics activities. Engagement during the trial identified a cluster of businesses on Watling Street who could benefit from the VLB, however, many delivered to the businesses during the pedestrianised hours and therefore would not be suitable.

		During the SGL Kerbside Management Trial		Estimated Annual Projections	
Local Authority	**VLB Location**	**Estimated Vehicle Circulation km Savings**	**Estimated Emissions Savings**	**Estimated Vehicle Circulation km Savings**	**Estimated Emissions Savings**
City of London Corporation	Watling Street VLB	0.8	1.08g Nox 0.1g PM10 0.95g PM2.5 0.67kg CO2	30.14km	40.71g Nox 3.64g PM10 1.99g PM2.5 25.2kg CO2

Table 14. City of London VLB Emissions Savings Estimates.

The estimated emissions savings for the trial are low due to the VLB only being used by a single operator on a weekly basis and the pedestrianised hours between 08:00-18:00 which limits VLB usage. However, annual projections estimate that the Watling Street VLB has the potential to save 30.14km vehicle circulation km per year, which could lead to estimated emissions savings of:

- 40.71g Nox
- 3.64g PM10
- 1.99g PM2.5
- 25.2kg CO2

"The City of London Corporation valued the opportunity to trial Grid's VLB technology to investigate its compatibility with our systems and processes and explore it as an opportunity for improving deliveries in the City. Although we do not have immediate plans to roll out the technology across the City, we are grateful to now have a good understanding of its benefits as a tool for kerbside management."

City of London Corporation

6.1.7. Learnings

- The VLB supported brewery logistics by providing a dedicated space for unloading as well as reverse logistics. The VLB allowed Tradeteam/DHL to park in the middle of the road removing the need for drivers to move their vehicle from different sides of the street.
- Length of booking time and feedback from Operators highlights the amount of time required for brewery logistics, due to the volume of tonnage moved, compared to existing loading restrictions. Also evidenced by Tradeteam/DHL continuing to receive PCNs related to delivering past 08:00 (start of pedestrianised hours).
- Extending the time of the VLB into the pedestrian hours to support length of the delivery was raised by the Operator, however, the manual gate closure during the pedestrianised hours means it would not be possible to integrate it as an exemption set up.
- Trial showed the value of working with a membership organisation (BLG) to reach suitable suppliers that would benefit from the VLB.
- City of London reflected on the trade-off required to find a location where a VLB would support deliveries whilst not impacting other users of the street and present enforcement challenges from Members/general public.
- Finding a second location in the City of London proved challenging with the time constraints of the trial as most locations investigated had numerous uses of kerbside space and/or existing Traffic Management Orders which would need to be consulted on before changing.
- Investigation of implementing a VLB on Telegraph Street highlighted that both Moving & Static Traffic Orders would need to be reviewed. The City of London Corporation also reflected on the trade-off between a location with a high degree of delivery activity where a VLB would make a significant positive impact on delivery behaviour but would require a high level of parking enforcement resources and could restrict access to buildings, versus a location like Watling Street which would not negatively impact other users of the street and would not require a high degree of parking enforcement resources, but would have less of a worthwhile impact on delivery behaviour.

6.1.8. Trial Legacy

The trial provided the City of London Corporation with a valuable opportunity to test Virtual Loading Bay as a Kerbside Management technology, explore it as an opportunity for improving deliveries in the City and gain valuable insights into loading patterns and behaviours on Watling Street. Further work is required to identify locations in the City where a VLB would be useful, would not conflict with other highway usage and would not need a high level of enforcement. There is still a challenge on how the City might operate these on a wider area without compromising access rights and our traffic management orders.

6.2 London Borough of Camden

6.2.1. SGL Kerbside Management Trial

LB Camden took part in the Defra-funded SGL Kerbside Management Trial, delivered in partnership with Cross River Partnership (CRP) and Grid Smarter Cities (Grid). The trial provided LB Camden with the opportunity to test Virtual Loading Bays (VLBs), a digitally-created dedicated space at the kerbside that can be pre-booked by participating operators to load and unload goods using the Grid Kerb booking platform.

6.2.2. Selecting a Location

LB Camden focused on addressing congestion and delivery challenges around key high street locations in Kentish Town and Tottenham Court Road.

Kentish Town Road was identified as a suitable VLB location due to the issue of congestion and high traffic flows, double yellow lines, and presence of large chains including McDonalds, Iceland and Greggs who receive multiple deliveries throughout the week.

Morwell Street was identified as a 2nd VLB location to support the servicing of large chains along Tottenham Court Road who receive deliveries via the back of their premises on Morwell Street. The VLB was located on double yellow lines next to a marked disabled bay.

Kentish Town Road VLB

Figure 18. Kentish Town Road VLB. 295 Kentish Town Rd, London NW5 2TJ

The VLB was located on Kentish Town Road, outside of the McDonalds store, and focused on the servicing of businesses along the stretch of high street. The VLB was live between August 2024 and the end of December 2024 and was operational Monday - Sunday with restrictions between 07:00 – 10:00; 16:00 – 19:00, in line with existing delivery restrictions.

Figure 46. Kentish Town Road VLB Location (yellow marker) in LB Camden.

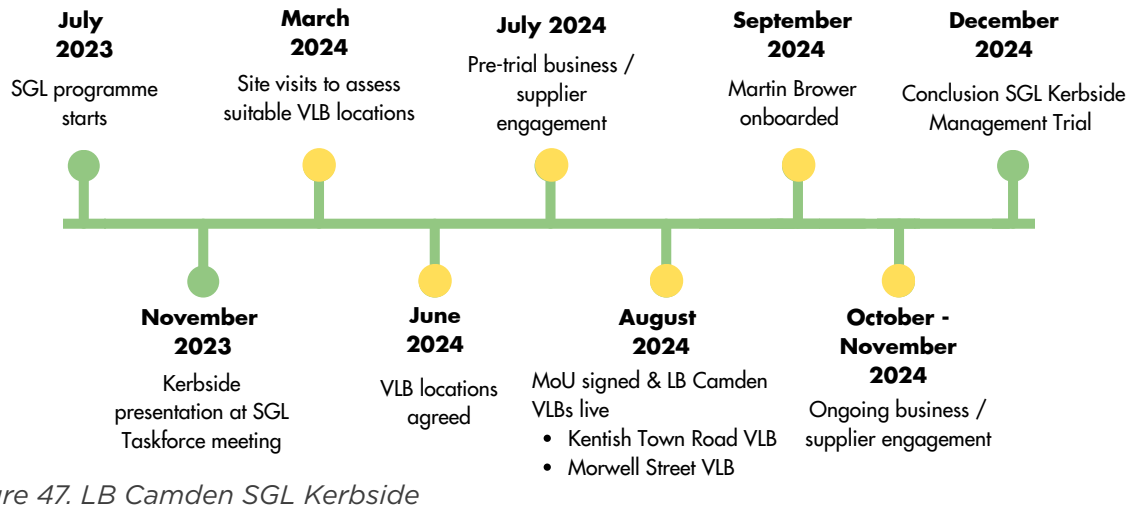


Figure 47. LB Camden SGL Kerbside Management Trial Timeline

Morwell Street VLB

Figure 19. Morwell Street VLB. Morwell St, London W1T 7RB

The VLB was located on Morwell Street and focused on the servicing of businesses along Tottenham Court Road. The VLB was live between August 2024 and the end of December 2024 and was available to book Monday – Sunday, 24 hours a day.

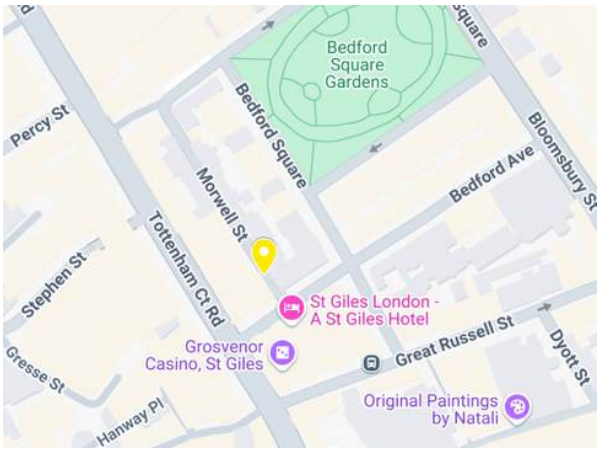


Figure 48. Morwell St VLB Location (yellow marker) in the LB Camden.

6.2.3. Traffic Orders & Permissions

No TMO amendments were required as the locations selected did not require formally changing any loading restrictions in the area. The VLBs were operationalised through exemptions/ dispensations to select businesses to conduct loading activity during specific hours. LB Camden completed a Data Protection Impact Assessment (DPIA) to enable the testing of the VLBs.

6.2.4. Engagement & Communications

In-person engagement with the businesses on Kentish Town Road and near Morwell Street, including Tottenham Court Road, was carried out multiple times, both prior to VLB implementation and once the VLBs were live. Informational flyers supported this engagement as well as targeted emails to businesses & suppliers throughout the VLB live period. Previous engagement and onboarding of Martin Brower to use the VLB that was already live on The Quadrant (LB Richmond – see section 6.4) meant that using a 2nd VLB on Kentish Town Road to supply the Camden McDonalds store was a simple process for the Operator. Whilst engagement with the in-store teams at both locations provided information on current freight & servicing patterns, reaching the correct contacts responsible for fleet management proved challenging, especially for the Morwell Street VLB (as reflected in the usage figures).

6.2.5. VLB Usage

Martin Brower were the primary users of the Kentish Town Road VLB and made multiple bookings a week to service the Kentish Town Road McDonalds store. Antalis were onboarded to use the Morwell Street VLB, however, they did not make any regular bookings. Overall use of the Morwell Street VLB was low, due to challenges of reaching fleet management contacts, and is reflected on in the Learnings section.

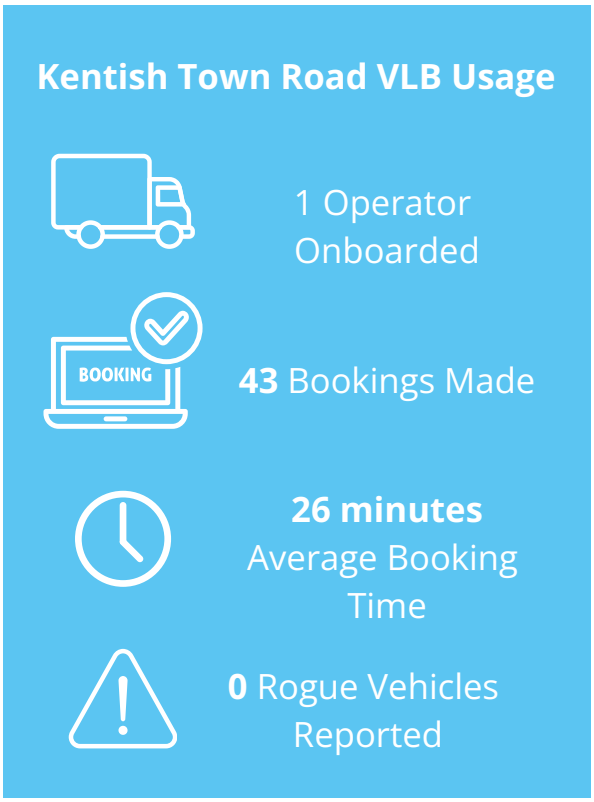


Figure 49 Overall Usage Figure - Kentish Town Road VLB

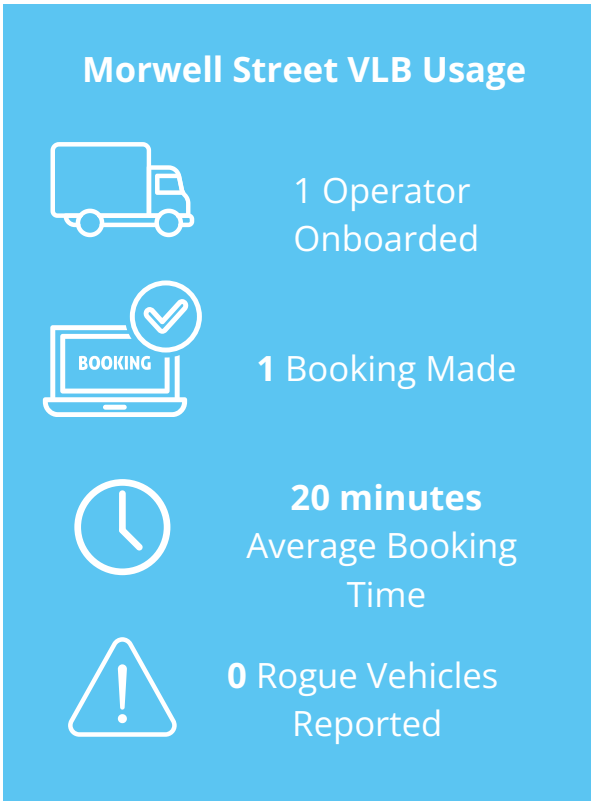


Figure 50. Overall Usage Figure - Morwell Street VLB

6.2.6. Emissions Savings

Emissions savings were calculated using CRP's in-house Transport Emissions Calculator (TEC) which uses Defra's Emissions Factors Toolkit (EFT) to compare the emissions impact of different delivery methods and distances and the associated values for carbon dioxide, nitrous oxides and particulate matter.

Data included delivery information provided at onboarding stage, total VLB bookings and estimates for the number of vehicle km saved as a result of the VLB providing a dedicated space for logistics activities. Further detail on emissions savings methodology and the assumptions applied are outlined in section 12.

"I'm pleased to see virtual loading bays being trialled in Camden. Not only will this improve efficiency for businesses, it will crucially help to free up kerbside space in congested areas and improve air quality – helping us move towards a greener and healthier borough."

Councillor Adam Harrison, Cabinet Member for Planning and A Sustainable Camden

		During the SGL Kerbside Management Trial		Estimated Annual Projections	
Local Authority	**VLB Location**	**Estimated Vehicle Circulation km Savings**	**Estimated Emissions Savings**	**Estimated Vehicle Circulation km Savings**	**Estimated Emissions Savings**
London Borough of Camden	Kentish Town Road VLB	1km	0.8g Nox 0.12g PM10 0.06g PM2.5 0.84kg CO2	32.5km	26.06g Nox 3.81g PM10 2.03g PM2.5 27.16kg CO2
	Morwell Street VLB	0	0	30.14km	46.9g Nox 6.85g PM10 3.66g PM2.5 48.89kg CO2
Total		**1km**	**0.8g Nox 0.12g PM10 0.06g PM2.5 0.84kg CO2**	**62.64km**	**72.96g Nox 10.66g PM10 5.69g PM2.5 76.05kg CO2**

Table 15. LB Camden VLB Emissions Savings Estimates.

Kentish Town Road VLB

Modest emissions savings have been estimated for the Kentish Town Road VLB due to the VLB only being used by a single operator. However, annual projections estimate that the Kentish Town Road VLB has the potential to save 32.5km vehicle circulation km per year, which could lead to estimated emissions savings of:

- 26.06g Nox
- 3.81g PM10
- 2.03g PM2.5
- 27.16kg CO2

These figures are based on the assumption of the trial continuing for a whole year and increased usage of the VLB based on the trial business/supplier engagement which identified suitable users and vehicle circulation km saved by providing a dedicated space for logistics activities. Similarly to the Morwell Street VLB, challenges with reaching the correct individuals responsible for fleet management of the large chain stores would need to be overcome to increase usage and achieve the projected emissions savings.

Morwell Street VLB

Due to very low booking figures, no direct emissions savings were calculated for the Morwell Street VLB during the trial period. However, engagement with businesses and suppliers highlighted a captive audience who could use the VLB to manage deliveries to large chain stores on Tottenham Court Road in future. Annual projections estimate that the Morwell Street VLB has the potential to save 30.14km vehicle circulation km per year, which could lead to estimated emissions savings of:

- 46.9g Nox
- 6.85g PM10
- 3.66g PM2.5
- 48.89kg CO2

These figures are based on the assumption of the trial continuing for a whole year and increased usage of the VLB based on the trial business/supplier engagement which identified suitable users and vehicle circulation km saved by providing a dedicated space for logistics activities. Challenges with reaching the correct individuals responsible for fleet management of the large chain stores would need to be overcome to increase usage and associated emissions savings.

6.2.8. Trial Legacy

The trial provided LB Camden with an opportunity to test Virtual Loading Bays as a Kerbside Management technology and understand the implementation process. Permit Loading Bays, another Kerbside Management Technology, is of interest to the LA, however, would require a compelling internal business case weighing up use and benefit vs. cost and procurement.

6.2.7. Learnings

- In-person engagement with the businesses on Kentish Town Road and near Morwell Street provided a valuable picture of freight and servicing patterns and highlighted delivery experiences and challenges for local businesses.
- Previous engagement and onboarding of Martin Brower to use The Quadrant VLB in the LB Richmond (see section 6.4) highlighted the value of developing a network of VLBs and Operators, particularly for large chains present along typical high streets.
- Relatively low usage of the VLBs presented a challenge for the LA to assess the full value of VLBs to manage congestion and support deliveries. Having a longer duration to test the VLBs would have provided more time for the VLBs to embed and engage with local businesses and suppliers to identify fleet managers, test the VLBs, and provide further usage data.
- Low use of the Morwell Street VLB evidences the challenge of reaching the correct contacts within larger retail chains that the VLB could have serviced.
- Construction taking place in close proximity to the Morwell Street VLB impacted VLB availability for a short period of time whilst the road was closed.
- LA view that VLB technology works best when changes to Traffic Management Orders are being made, rather than retrofitting into existing restrictions.

6.3 London Borough of Lambeth

6.3.1. SGL Kerbside Management Trial

LB Lambeth took part in the Defra-funded SGL Kerbside Management Trial, delivered in partnership with Cross River Partnership (CRP) and Grid Smarter Cities (Grid). The trial provided LB Lambeth with the opportunity to test Virtual Loading Bays (VLBs), a digitally-created dedicated space at the kerbside that can be pre-booked by participating operators to load and unload goods using the Grid Kerb booking platform.

6.3.2. Selecting a Location

The Cut, Waterloo was selected as a location to test VLBs due to the high number of deliveries taking place along the street to service local businesses. Lambeth also sought to address the issue of HGV & LGV delivery vehicles travelling down smaller residential streets after delivering to businesses along The Cut, due to the traffic filter at the junction of The Cut and Short Street (which was installed to prevent through traffic).

The 1st VLB location was identified outside of Rosa's Thai restaurant on double yellow lines to support multiple businesses in close proximity, including Rosa's Thai, Gails, and Balfes Bikes. The existing loading bay directly after the traffic filter at the junction of The Cut and Short Street was selected as a 2nd VLB location to encourage HGVs & LGVs to exit The Cut and support the Young Vic Theatre and proximate businesses.

Grid and LB Lambeth also agreed to a 3rd virtual dispensation bay in the existing loading bay outside Sainsburys to specifically support the health & safety requirements of brewery logistics to the Windmill Pub (Monday – Sunday from 10am to 4pm). This was not incorporated as part of the SGL trial, however, usage figures have been included for analysis due to the interlinkages between the various VLB's and dispensation process.

The Cut (Rosa's Thai) VLB

Figure 22. The Cut (Rosa's Thai) VLB. 77 The Cut, London SE1 8LL

VLB was located on The Cut, outside Rosa's Thai, to service businesses at the western end of The Cut. The VLB was live between March 2024 and the end of December 2024 and was available to book Monday – Sunday, 24 hours a day.

The Cut (Filter Loading Bay) VLB

VLB was located in an existing loading bay outside the Young Vic Theatre on The Cut and focused on the servicing of businesses to the eastern end of the street. The VLB was live between March 2024 and the end of December 2024 and was available to book Monday – Sunday, 24 hours a day.

Figure 23. The Cut (Filter Loading Bay) VLB. 47A The Cut, SE1 8LF

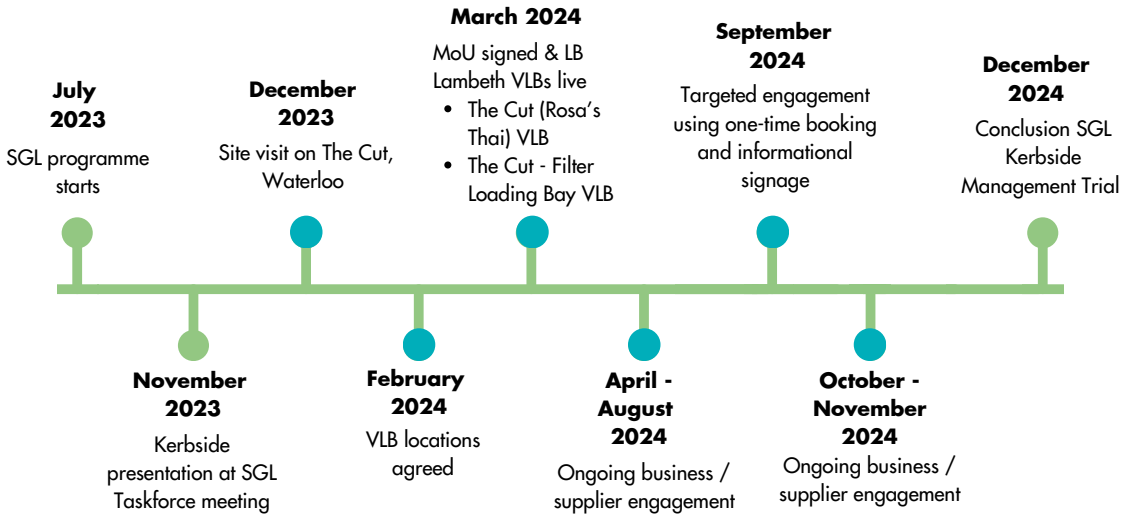


Figure 51. LB Lambeth SGL Kerbside Management Trial Timeline

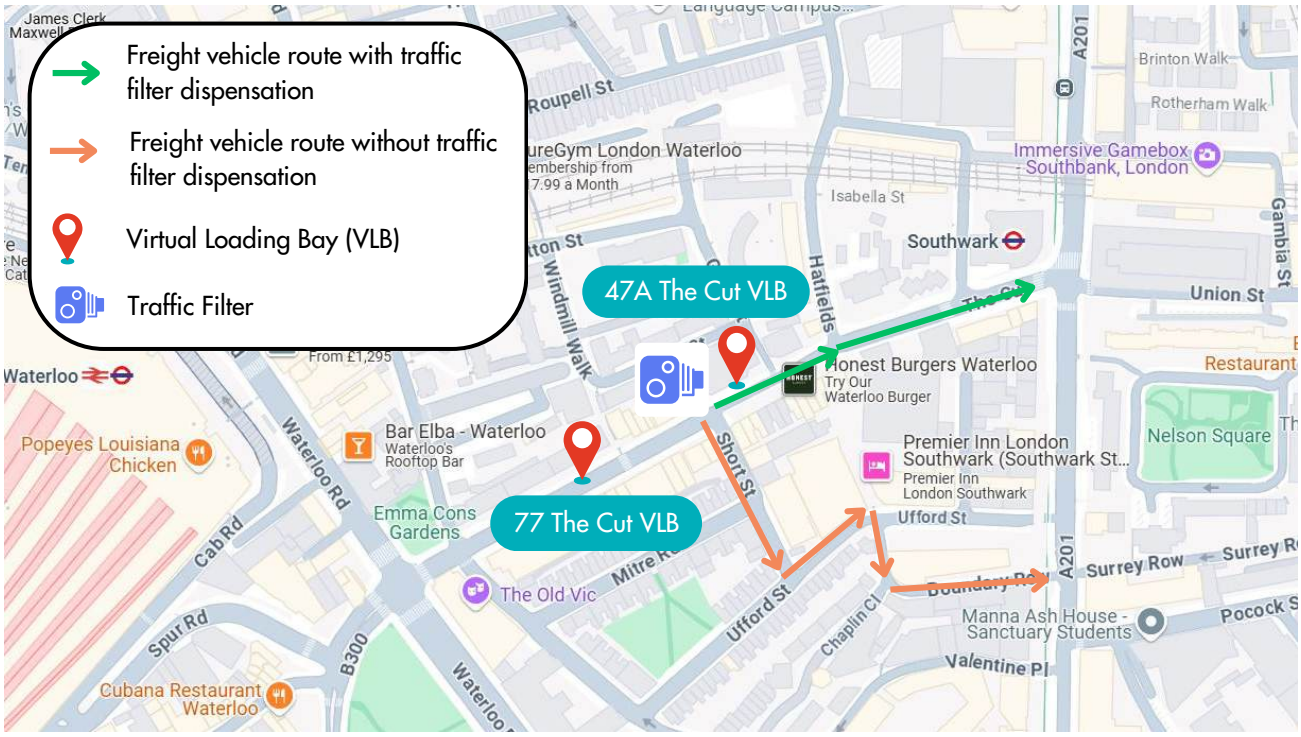


Figure 52. Freight vehicle routes along The Cut, Waterloo with and without the traffic filter dispensation via the Kerb platform (LB Lambeth).

6.3.3. Traffic Orders & Permissions

No TMO amendments were required as the VLB locations selected did not involve formally changing any loading restrictions in the area. The VLBs were operationalised through exemptions/ dispensations to conduct loading activity during the defined operational hours.

6.3.4. Trial Addition: Integrating a Traffic Filter with Kerbside Management

LB Lambeth integrated the kerbside management technology with an existing traffic filter to reduce the number of HGVs & LGVs travelling down smaller residential streets (e.g. Boundary Row), reduce emissions in the area, and improve delivery driver efficiency.

Booking via the Kerb platform provided delivery vehicles with an automatic dispensation to travel through the traffic filter at the junction of The Cut and Short Street and exit directly on to Blackfriars Road. The platform provided the local authority enforcement team with an accurate list of freight vehicle VRMs exempt from the traffic filter as well as data on delivery and servicing activity along The Cut. LB Lambeth also utilised the Kerb booking system to support the Parking Suspension process for the existing loading bay outside the Young Vic Theatre. This was used by the Young Vic Theatre when using the loading bay for longer periods to move large set pieces.

6.3.5. Engagement & Communications

In-person engagement with the businesses along The Cut was carried out throughout the duration of the trial, both prior to VLB implementation and once the VLBs were live. Businesses included chains such as Rosa's Thai, Gails, and Honest Burger, as well as independent businesses and cultural venues. Informational flyers supported this engagement as well as targeted emails to businesses & suppliers throughout the VLB live period. We Are Waterloo (the local Business Improvement District) supported the trial by gaining delivery insights from The Cut businesses via their newsletter and promoted the trial within their business network. Grid's existing relationships with the Brewery Logistics Group enabled a direct contact to suppliers to the Windmill Pub and facilitated introductory and onboarding meetings.

Figure 53. CRP Team carrying out business engagement along The Cut, Waterloo (LB Lambeth).

Temporary signs with a QR code and information on the trial were put up at the VLB locations along The Cut to encourage trial participation and promote the ability to pass through the traffic filter when using the platform. A period of intensive face to face engagement with suppliers in September 2024 was supported by Grid using their one-time booking account to demonstrate the platform to Operators and showcase the ability to pass through the traffic filter with an onsite sign-up. Increased engagement and the one-time booking account resulted in 2 Operators being converted to regular users of the platform.

6.3.6. VLB Usage

Usage of the VLBs along The Cut steadily increased across the trial period in line with the number of Operators onboarded. Regular users of the platform included BLG members, Carnevale and The Young Vic. Balfe's Bikes and Easipac were successfully converted from one-time bookings to regular users of the Rosa's Thai VLB. 6 other Operators used the one-time booking account, however, were not converted to become regular users of the platform. The Young Vic Theatre used the Filter Loading Bay VLB for both deliveries and collections, and booked the space in conjunction with applying for parking suspensions when using the loading bay for longer periods (longest booking of 15 hours).

*Usage figures from the 3rd virtual dispensation bay on The Cut (agreed by LB Lambeth and Grid) have been included within The Cut (Rosa's Thai) VLB figures due to the interlinkages between the other LB Lambeth VLBs and traffic filter dispensation process.

Figure 54. Overall Usage Figures - The Cut (Rosa's Thai) VLB

Figure 55. Overall Usage Figures - The Cut Filter Loading Bay VLB

6.3.7. Emissions Savings

Emissions savings were calculated using CRP's in-house Transport Emissions Calculator (TEC) which uses Defra's Emissions Factors Toolkit (EFT) to compare the emissions impact of different delivery methods and distances and the associated values for carbon dioxide, nitrous oxides and particulate matter. Data included delivery information provided at onboarding stage, total VLB bookings and estimates for the number of vehicle km saved as a result of the traffic filter exemption. A different methodology was used for the LB Lambeth VLBs due to the integration with the traffic filter which provided a known figure for vehicle km saved. Further detail on emissions savings methodology and the assumptions applied are outlined in section 12.

In Lambeth, by allowing HGVs & LGVs booking the VLBs on the Kerb platform to pass through the traffic filter on The Cut, approximately 52 vehicle km were saved over the trial period. This resulted in the following emissions savings*:

· 42g Nox (58% saving)
· 8g PM10 (67% saving)
· 3.8g PM2.5 (67% saving)
· 43.46kg CO2 (58% saving)

*Based on total bookings and vehicle km saved as a result of the traffic filter exemption.

		During the SGL Kerbside Management Trial		**Estimated Annual Projections**	
Local Authority	**VLB Location**	**Estimated Vehicle Circulation km Savings**	**Estimated Emissions Savings**	**Estimated Vehicle Circulation km Savings**	**Estimated Emissions Savings**
London Borough of Lambeth *Combined total due to different emissions savings methodology.*	The Cut (Rosa's Thai)*	52km	42g Nox (58% saving) 8g PM10 (67% saving) 3.8g PM2.5 (67% saving) 43.46kg CO2 (58% saving)	287.65km	230.63g Nox (58% saving) 33.69g PM10 (67% saving) 17.89g PM2.5 (67% saving) 240.40kg CO2 (58% saving)
	The Cut-Filter Loading Bay VLB				

Table 16. LB Lambeth VLB Emissions Savings Estimates.

*Includes usage figures from the 3rd virtual dispensation bay agreed by LB Lambeth and Grid.

6.3.8. Projected Emissions Savings

In Lambeth, by allowing HGVs & LGVs booking the VLBs on the Kerb platform to pass through the traffic filter on The Cut, it is estimated that approximately 287.65 vehicle km could be saved over an annual period. This is based on trial business/supplier engagement and estimated average percentage increase of Operators and monthly bookings. Includes usage figures from the 3rd virtual dispensation bay agreed by LB Lambeth and Grid.

The emissions savings for both the trial period and annual projections are markedly higher in comparison to the other VLBs in the SGL Kerbside Management Trial. This is likely due to the integration with the traffic filter along The Cut and vehicle km being saved for each booking rather than just in the case of a missed delivery (assumption applied to City of London, LB Camden and LB Richmond VLBs).

6.3.9. Learnings

- Taking part in the trial allowed LB Lambeth to understand behaviour of freight vehicles along The Cut, test kerbside management technology and test dynamic exemptions policy through use of the traffic filter.
- Incorporating the ability to pass through the traffic filter was a valuable incentive when engaging with operators and encouraging them to participate in the trial. Integration with the traffic filter also led to a saving in vehicle kilometres and quantifiable air quality and congestion benefits.
- A steady increase in bookings and onboarded Operators over the course of the 9 months demonstrated the time required to engage with businesses and Operators and for VLB technology to become embedded in logistics activities.
- Use of one-time bookings on the ground helped to build rapport with Operators and provide an immediate incentive to providing information for the trial and led to 2 Operators being converted to regular users.
- Businesses along The Cut had received positive feedback from suppliers using the platform and there had been no negative impacts to delivery timings.
- The Young Vic were requested by Lambeth to use the Filter Loading Bay VLB in conjunction with the parking suspension process. The VLB was used the same amount for collections as deliveries, however, the dual system presented an admin burden due to the 30-minute booking slots.
- Some operators that were engaged raised concerns around drivers using mobile phones and did not take part in the trial.

6.3.10. Trial Legacy

LB Lambeth have extended the operations of their VLBs beyond the SGL programme and are working with Grid and local businesses / suppliers to increase existing VLB usage as well as identify other suitable VLB locations across the borough.

6.4 London Borough of Richmond

6.4.1. SGL Kerbside Management Trial

LB Richmond took part in the Defra-funded SGL Kerbside Management Trial, delivered in partnership with Cross River Partnership (CRP) and Grid Smarter Cities (Grid). The trial provided LB Richmond with the opportunity to test Virtual Loading Bays (VLBs), a digitally-created dedicated space at the kerbside that can be pre-booked by participating operators to load and unload goods using the Grid Kerb booking platform.

6.4.2. Selecting a Location

LB Richmond focused on addressing congestion challenges around the key high street locations of Sheen Lane, Mortlake and The Quadrant, Richmond. The 1st VLB location was identified on The Quadrant to provide an alternative location to an existing loading bay frequently occupied by delivery drivers and to address local air quality issues identified in London Borough of Richmond's Air Quality Action Plan 2020-2025 , which were found to be in excess of 60µg/m3. Outside the Tesco Express store on Sheen Lane, Mortlake was identified as the 2nd VLB location. This helped to manage deliveries to the retail chain and address concerns raised by residents around HGV activities and congestion close to the railway crossing.

A 3rd location was identified at the southern end of Sheen Lane near the A205 junction and aimed to support deliveries to local businesses by opening up an underutilised section of highway.

The Quadrant VLB

VLB was located on The Quadrant, next to an existing loading bay, and focused on the servicing of businesses along the stretch of high street. The VLB was live between July 2024 to the end of December 2024 and was available to book Monday – Sunday, 07:00 – 23:00, with restrictions 08:00-10:00 and 16.30-18.30, to avoid peak hours.

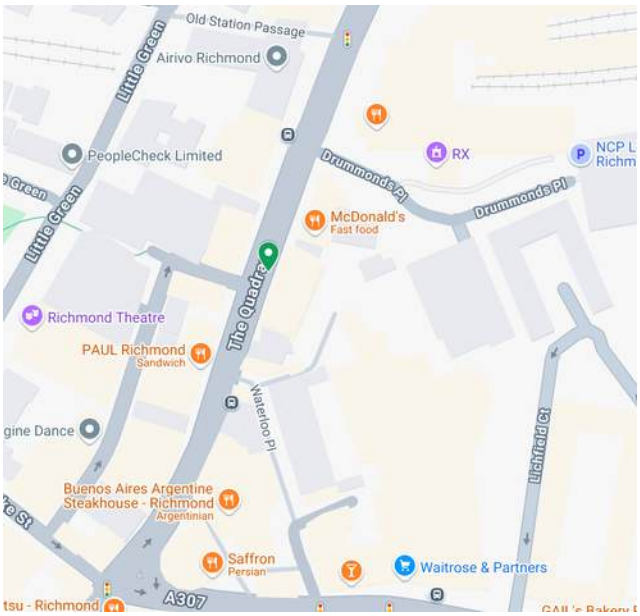


Figure 56. The Quadrant VLB Location (green marker) in LB Richmond.

Figure 24. The Quadrant VLB. 34 The Quadrant, Richmond TW9 1DN

Sheen Lane (Tesco) VLB

VLB was located on Sheen Lane, Mortlake, outside Tesco Express, to primarily service the Tesco store. The VLB was live between July 2024 to the end of December 2024 and was available to book Monday – Sunday, 07:00 – 23:00.

Figure 25. Sheen Lane (Tesco) VLB. 39-41 Sheen Lane, London SW14 8AB

Figure 57. Sheen Lane (Tesco) VLB Location (green marker) in LB Richmond.

Sheen Lane (South) VLB

VLB was located on Sheen Lane, Mortlake, within a TfL bus stop area used by an infrequent bus service twice a week, and focused on the servicing of businesses at the southern end of Sheen Lane near the A205 junction.

The VLB was live between November 2024 to the end of March 2025* and was available to book Monday – Sunday, 07:00 – 23:00 (except 09:30 – 11:30 Tuesdays and Fridays as the bus arrives at 10:29 on these days). *Sheen Lane (South) VLB involving TfL was extended to the end of March 2025 due to the length of the VLB set-up process.

6.4.3. Traffic Orders & Permissions

When identifying suitable locations, LB Richmond identified that there was a borough-wide 20-minute loading restriction. An ETMO was required at the 3 locations to increase the maximum loading time from 20 to 40-minutes. As it was a London bus stop, TfL oversaw and granted permission for a VLB to be placed at this location. Careful monitoring arrangements for bay usage, dwell times and scheduling was required to manage any potential conflicts with local bus performance. Additionally, as vehicles other than buses are not permitted to stop in bus stops, a new sign needed to be approved to allow vehicles to load in this location within the permitted times. This process was undertaken with kind agreement of TfL.

6.4.4. Engagement & Communications

In-person engagement with businesses at the 3 locations was carried out throughout the trial. Informational flyers supported this engagement as well as targeted emails to businesses & suppliers. Grid's existing relationship with Tesco, who were already onboarded and using the platform at other Permit Loading Bay (PLB) locations in LB Southwark (outside of the SGL trial), led to the Tesco Reading and Dagenham depots booking the Sheen Lane (Tesco) VLB within the first month of the VLB going live.

Martin Brower was identified as a supplier to McDonalds during in-person business engagement with The Quadrant store who provided information on the Transport Manager. An in-person meeting with Martin Brower to provide information on the trial and answer queries led to successful onboarding and them becoming a regular user. Whilst engagement with the in-store teams for businesses along The Quadrant, including Greggs and Kokoro, provided information on current freight & servicing patterns, reaching the correct contacts responsible for fleet management proved challenging.

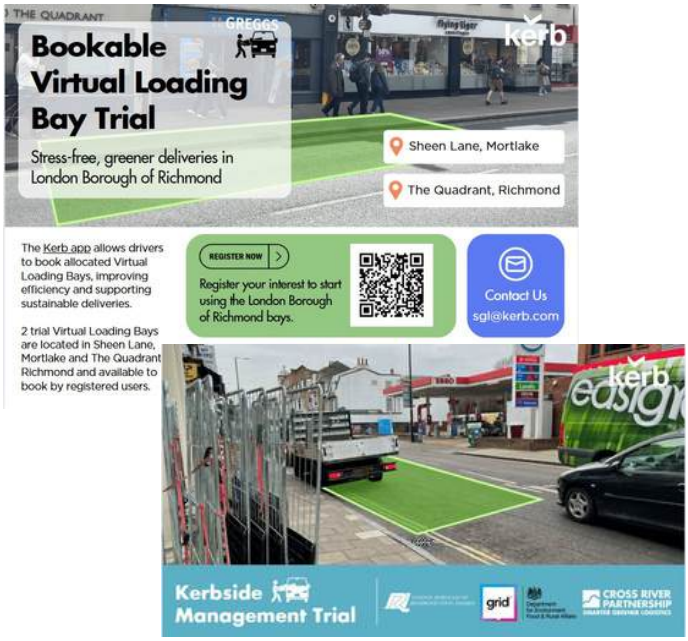


Figure 58. Communication materials used to promote VLBs in LB Richmond.

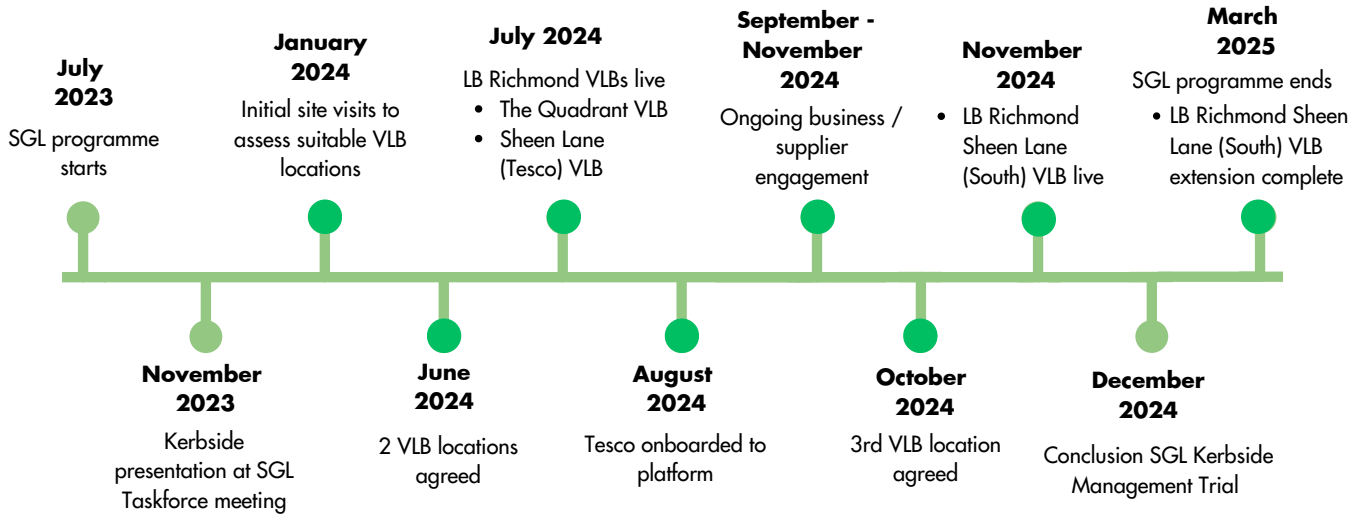


Figure 59. LB Richmond SGL Kerbside Management Trial Timeline

6.4.5. VLB Usage

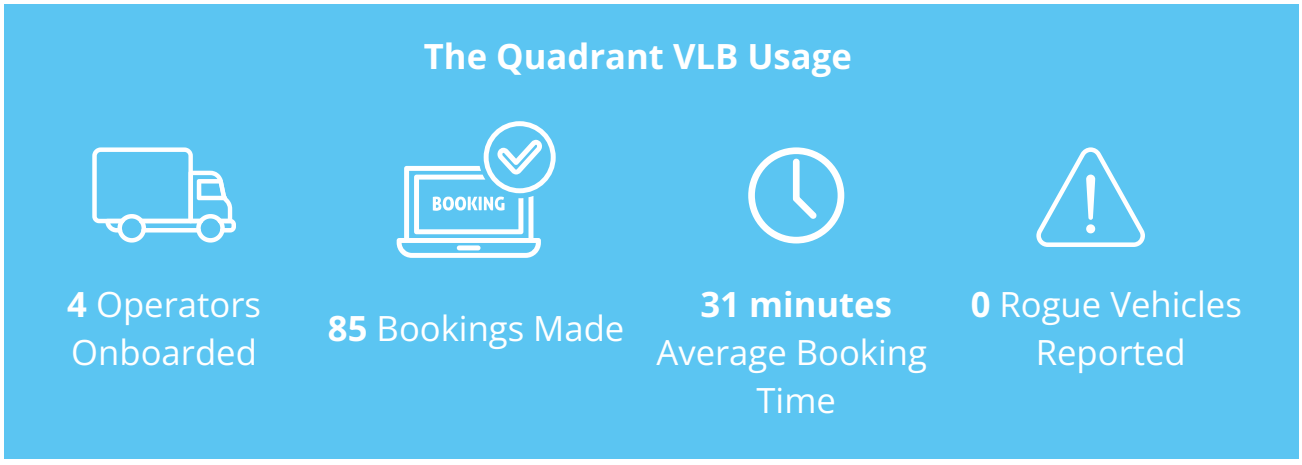


Figure 60. Overall Usage Figures - The Quadrant VLB

Martin Brower was the primary user of The Quadrant VLB and made regular bookings to service the McDonalds store multiple times a week. Ceva Logistics were engaged and onboarded to the platform, however, did not proceed to use the platform. The Sheen Lane (Tesco) VLB was used on a regular basis by both the Tesco Dagenham and Tesco Reading depot, averaging at around 10 bookings a week, and placing a total of 227 bookings – the highest of the trial. The Sheen Lane (South) VLB was live for a shorter period of time compared to the other 2 VLBs, however it was used regularly by Sheen Mobility from December 2024 onwards. The quantity of bookings made reflects the overall time the LB Richmond VLBs were live, and the frequency of bookings to supply supermarkets.

Figure 61. Overall Usage Figures - Sheen Lane (Tesco) VLB

6.4.6. Emissions Savings

Emissions savings were calculated using CRP's in-house Transport Emissions Calculator (TEC) which uses Defra's Emissions Factors Toolkit (EFT) to compare the emissions impact of different delivery methods and distances and the associated values for carbon dioxide, nitrous oxides and particulate matter. Data included delivery information provided at onboarding stage, total VLB bookings and estimates for the number of vehicle km saved as a result of the VLB providing a dedicated space for logistics activities. Further detail on emissions savings methodology and the assumptions applied are outlined in section 12.

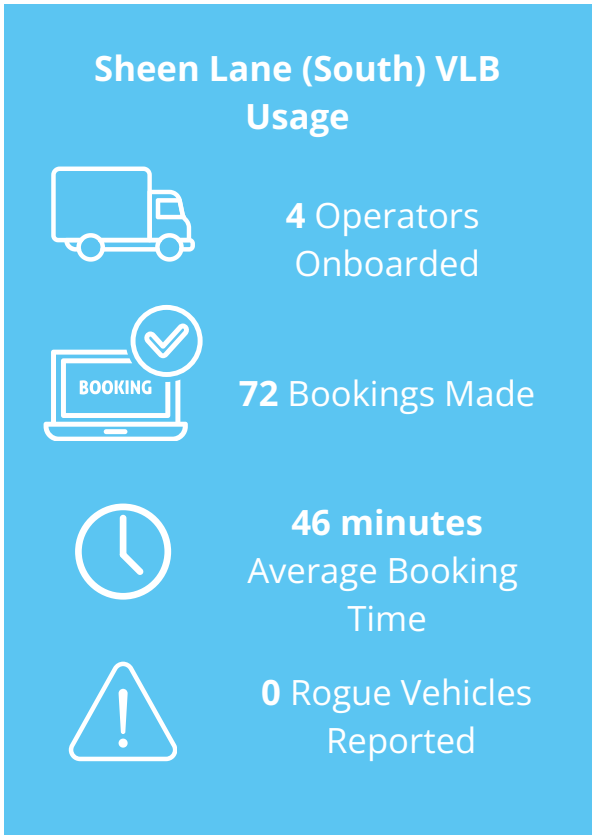


Figure 62. Overall Usage Figures - Sheen Lane (South) VLB

The Quadrant VLB

The Quadrant VLB was predominantly used by Martin Brower for frequent deliveries to the McDonalds store which resulted in the emissions savings outlined in Table 21.

Annual projections estimate that The Quadrant VLB has the potential to save 57.2km of vehicle circulation km per year, which could lead to estimated emissions savings of:

- 77.2g Nox
- 6.9g PM10
- 3.78g PM2.5
- 47.8kg CO2

These figures are based on the assumption of the trial continuing for a whole year and increased usage of the VLB based on the trial business/supplier engagement which identified suitable users and vehicle circulation km saved by providing a dedicated space for logistics activities. Onboarding of suppliers for Greggs and Flying Tiger, which both receive frequent deliveries, would enable emissions savings to be increased.

Sheen Lane (Tesco) VLB

Sheen Lane (Tesco) VLB was used on a frequent basis, multiple times throughout the week by Tesco depots resulting in the emissions savings outlined in Table 21. Annual projections estimate that Sheen Lane (Tesco) VLB has the potential to save 71.76km of vehicle circulation km per year, which could lead to estimated emissions savings of:

- 96.85g Nox
- 8.66g PM10
- 4.74g PM2.5
- 59.97kg CO2

These figures are based on the assumption of the trial continuing for a whole year and increased usage of the VLB based on the trial business/supplier engagement which identified suitable users and vehicle circulation km saved by providing a dedicated space for logistics activities. Onboarding of other suppliers to the Tesco store would increase VLB usage and achieve greater emissions savings.

Sheen Lane (South) VLB

Sheen Lane (South) VLB was used on a frequent basis by a single business throughout the trial period and was live for a smaller period of time (5 months) compared to the other 2 LB Richmond VLB, resulting in lower emissions savings (outlined in Table 21). Annual projections estimate that Sheen Lane (South) VLB has the potential to save 98.28km of vehicle circulation km per year, which could lead to estimated emissions savings of:

- 132.64g Nox
- 11.86g PM10
- 6.49g PM2.5
- 82.13kg CO2

These figures are based on the assumption of the trial continuing for a whole year and increased usage of the VLB based on the trial business/supplier engagement which identified suitable users and vehicle circulation km saved by providing a dedicated space for logistics activities. Further engagement is required with the independent businesses along the section of Sheen Lane and the onboarding of their suppliers to increase VLB usage and achieve greater emissions savings.

		During the SGL Kerbside Management Trial		Estimated Annual Projections	
Local Authority	**VLB Location**	**Estimated Vehicle Circulation km Savings**	**Estimated Emissions Savings**	**Estimated Vehicle Circulation km Savings**	**Estimated Emissions Savings**
London Borough of Richmond	The Quadrant VLB	4.4km	5.94g Nox 0.53g PM10 0.29g PM2.5 3.68kg CO2	57.2km	77.2g Nox 6.9g PM10 3.78g PM2.5 47.8kg CO2
	Sheen Lane (Tesco) VLB	4.8km	6.48g Nox 0.58g PM10 0.32g PM2.5 4.01kg CO2	71.76km	96.85g Nox 8.66g PM10 4.74g PM2.5 59.97kg CO2
	Sheen Lane (South) VLB	3.6km	4.86g Nox 0.43g PM10 0.24g PM2.5 3.01kg CO2	98.28km	132.64g Nox 11.86g PM10 6.49g PM2.5 82.13kg CO2
Total		**12.8km**	**17.28g Nox 1.54g PM10 0.85g PM2.5 10.7kg CO2**	**227.24km**	**306.69g Nox 27.42g PM10 15.01g PM2.5 189.9kg CO2**

Table 17. LB Richmond VLB Emissions Savings Estimates.

6.4.7. Learnings

- Sheen Lane (Tesco) VLB provided evidence on the specific time required by Tesco to carry out deliveries at the kerbside which does not currently align with the loading restrictions in-place.
- Testing of VLB technology provides evidence of LA action to address resident concerns around loading and congestion along Sheen Lane close to the level crossing.

Figure 63. Grid informational flyers promoting use of The Quadrant VLB in LB Richmond.

During the trial an Operator was onboarded but the business they supply did not place a delivery during the trial period so was unable to trial the platform.

- Richmond reflected on the smooth integration of the trial with internal processes and the importance of internal buy-in and frequent communication. The enforcement team primarily relied on email reporting as opposed to the use of the dashboard.

- Cost of platform would need to be considered against social, economic and environmental benefits of VLBs.

- 0 missed deliveries highlights that the Quadrant VLB provided an alternative location to the existing physical loading bay which was frequently occupied by delivery drivers.

- Trialling a VLB in an infrequently used (twice a week) TfL-owned bus stop area demonstrated the potential for dynamic management of the kerbside to meet unmet loading need whilst allowing the highways authority to manage the situation and give the logistics industry certainty about loading locations. However, this was a very unique and specific use-case, due to the bus stop only being used twice a week, and required additional signage and permissions, and therefore limits general applicability.

Figure 64. Sheen Lane (South) VLB being used to service the Tesco Express store (LB Richmond).

6.4.8. Trial Legacy

LB Richmond have extended the operations of their VLBs beyond the SGL programme and are working with Grid and local businesses / suppliers to increase existing VLB usage and identify other suitable VLB locations across the borough.

"Richmond Council are very grateful for the enthusiasm and dedicated leadership of the CRP team in uniting and engaging local businesses, their suppliers, Council departments and TfL to roll out 3 x VLB trials in East Sheen and Richmond town centres. This helped reduce congestion / emissions from double parking and from failed deliveries by better managing limited kerbside space. It also reduced complaints. The Council is looking to extend the VLBs throughout Richmond town centre and beyond."

London Borough of Richmond

7. Trial Insights and Data Analysis

The Kerbside Management Trial involved developing a network of 8 VLBs across 4 London Local Authorities. Usage information for the 8 VLBs was captured throughout the trial via the Kerb platform, which provided information on Operators onboarded and VLB usage. Delivery information from Operators was also captured at the Onboarding stage.

The following section provides insights into the VLB operations and associated air quality benefits. Local authority specific usage and emissions saving information is outlined in the individual case studies in Section 6.

7.1 Operational Insights

The SGL Kerbside Management trial ran from August 2023 to March 2025 with VLBs going live at different dates across the trial period and therefore being tested for different lengths of time. Insights on VLB usage across the 8 locations have been captured from the Kerb platform and analysed to understand VLB usage trends and patterns from the trial.

Overall SGL Kerbside Management Trial Usage Figures

Total of **30 operators** made bookings on the platform

17 regular users of the platform

3 Operators converted from onsite, one-time booking to regular user

655 Total bookings

1 hour 20 mins* average booking time

0 Rogue Vehicles reported

**Omitting Young Vic bookings (The Cut - Filter Loading Bay VLB) due to longer booking periods in conjunction with existing loading bay Parking Suspensions.*

Figure 7. Overall SGL Kerbside Management Trial Usage Figures

Local Authority	VLB Location(s)	Total Operators booking on the platform	Operators converted from 'one-time booking'	'Regular User' Operators	Total Bookings	Average Booking Time	Rogue Vehicles Reported
City of London Corporation	Watling Street VLB	4	1	2	38	2 hours 16 minutes	0
London Borough of Camden	Kentish Town Road VLB	1	0	1	43	26 minutes	0
	Morwell Street VLB	1	0	0	1	20 minutes	0
London Borough of Lambeth	The Cut (Rosa's Thai)*	5	2	5	154	49 minutes	0
	The Cut-Filter Loading Bay VLB	9	0	3	35	6 hours 18 minutes	0
London Borough of Richmond	The Quadrant VLB	4	0	3	85	31 minutes	0
	Sheen Lane (Tesco) VLB	2	0	2	227	2 hours 15 minutes	0
	Sheen Lane (South) VLB	4	0	1	72	46 minutes	0
Total		**30**	**3**	**17**	**655**	**1 hour 20 minutes** **1 hour 37 minutes****	**0**

** Usage figures from the 3rd virtual dispensation bay on The Cut (agreed by LB Lambeth and Grid) have been included within The Cut (Rosa's Thai) VLB figures due to the interlinkages between the other LB Lambeth VLBs and traffic filter dispensation process.*

*** Without Young Vic bookings (LB Lambeth Filter Loading Bay VLB)*

**** With Young Vic bookings (LB Lambeth Filter Loading Bay VLB)*

Table 18. Overall SGL Kerbside Management Trial VLB Usage Data.

7.1.1. Operators

A total of 30 Operators made bookings over the SGL Kerbside Management Trial of which 22 were onboarded on to the Kerb platform and 17 can be classed as 'regular users' (made 2 or more bookings). Operators using the platform included suppliers from brewery logistics, retail, and hospitality and included known providers such as Tradeteam/DHL, Martin Brower and Tesco. A range of smaller Operators and businesses also took part in the trial including Balfes Bikes, The Young Vic Theatre and Sheen Mobility.

Operators were onboarded throughout the duration of the trial dependent on the live date of the VLB and engagement methods used.

A total of 11 Operators made their 1st booking using Grid's one-time booking account, of which 3 were then onboarded and converted from a one-time booking to a regular user. Several other Operators were also onboarded to the platform after showing interest in the platform, however, did not make a booking due to factors such as internal processes, lack of orders from businesses in close proximity to the VLB and buy-in from transport managers.

Martin Brower was the only Operator that used multiple VLBs during the trial (The Quadrant VLB in LB Richmond and Kentish Town Road VLB in LB Camden) as the supplier services both the McDonald's stores in both high street locations.

Figure 65. Graph showing monthly bookings for each VLB by month of operation.

The total number of Operators booking each VLB and the number of months that the VLB was operational is shown in Figure 17. The Cut – Filter Loading Bay in LB Lambeth had the highest number of Operators booking the VLB (9 Operators) which likely reflects the length of time available for business/supplier engagement. The use of Grid's one-time booking account from September 2024 onwards and clear incentive for Operators to pass through the traffic filter will have also impacted Operator numbers. Both VLBs in LB Camden (Kentish Town Road VLB and Morwell Street VLB) were operational for the lowest amount of time (5 months) and had the lowest number of Operators booking the VLB (1 Operator), suggesting that more time was required for engagement and onboarding.

Whilst there is an overall positive trend between the time a VLB is operational and the total number of Operators using the VLB, the specific use case and target businesses for each of the 8 VLBs should be considered. For example, the Watling Street VLB in the City of London was operational for 8 months with 4 Operators making bookings, however, weekly bookings were made by Tradeteam/DHL to support brewery logistics, the main use case for the VLB. It should also be noted that the number of Operators using the platform does not necessarily correlate to the total number of bookings, as discussed below.

7.1.2. VLB Bookings

A total of 655 bookings were made over the course of the SGL Kerbside Management Trial. Figure 18 shows the breakdown of bookings for each VLB in the 8 locations and the relationship between the total number of bookings for each VLB and the months the VLB was operational.

Figure 66 evidences that there was no strong correlation between the total number of bookings for each VLB and the months the VLB was operational. Sheen Lane (Tesco) VLB in LB Richmond had the highest total bookings figures (227) after being operational for 6 months, whereas The Cut – Filter Loading Bay (LB Lambeth) had one of the lower total booking figures (35) after being operational for 11 months. Factors more likely to influence booking numbers include the VLB use case and number of suppliers/frequency of deliveries to business within the VLB vicinity, e.g. Sheen Lane (Tesco) VLB used to service the Tesco store which receives multiple regular deliveries from a small number of suppliers. This is discussed further in section 8.

Total number of bookings per VLB and number of Operators booking the VLB has also been analysed. Figure 67 highlights that the higher the total number of Operators booking the VLB does not directly correlate to a higher number of bookings. For example, Sheen Lane (Tesco) VLB in LB Richmond has the highest number of bookings (227) but only 2 Operators using the Kerb platform. This is due to the specific use case of the VLB to service the Tesco Express on Sheen Lane, Mortlake which receives a high number of deliveries and was frequently booked by 2 Tesco depots. In comparison, The Cut Filter Loading Bay in LB Lambeth has the highest number of Operators booking the VLB but one of the lower total booking numbers. This is likely due to 6 of the Operators making their 1st booking using the one-time booking account, of which 0 were converted to regular users. In addition, the main user of The Cut Filter Loading Bay VLB was the Young Vic Theatre, who used the platform to support the Parking Suspension process for the existing loading bay which they booked for longer period of time for delivery and collection of large set pieces.

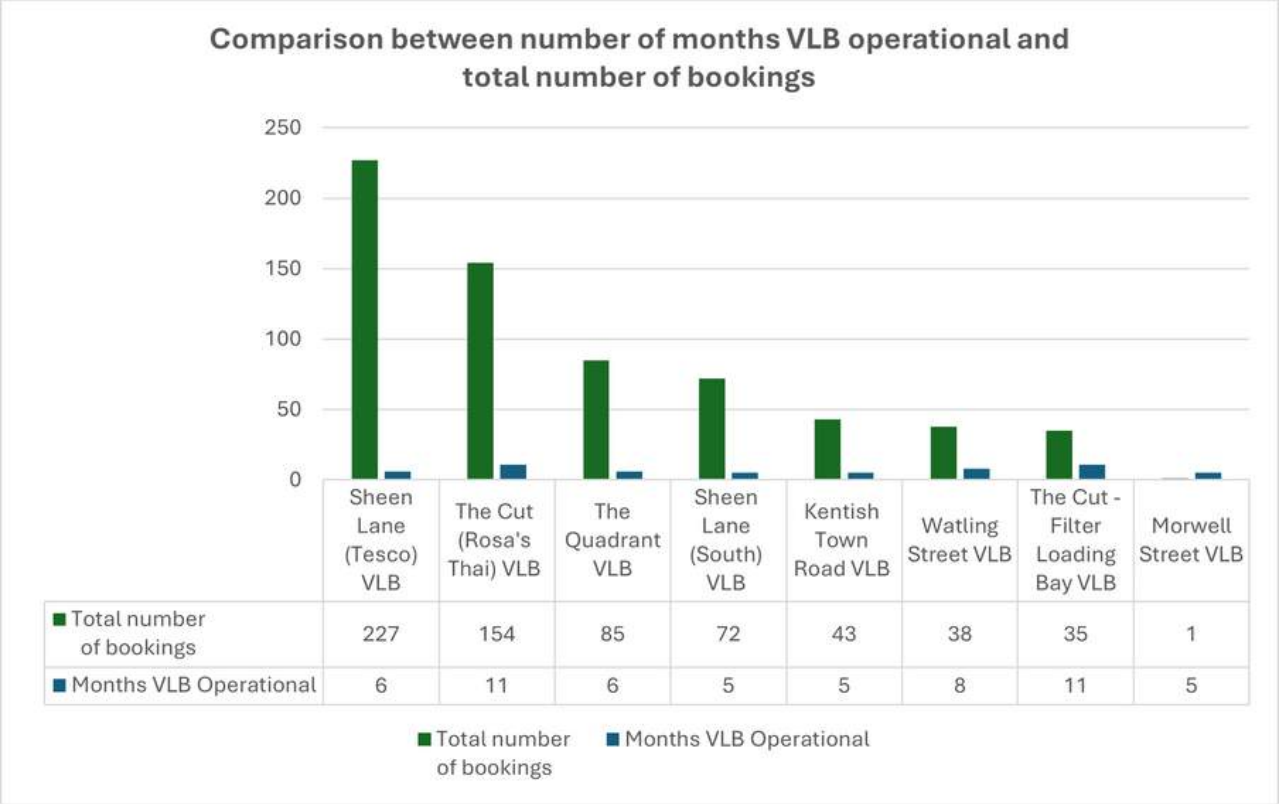


Figure 66. Graph comparing total number of bookings per VLB vs. number of months VLB operational.

Figure 67. Graph showing comparison between total number of bookings per VLB and total number of Operators booking each VLB.

Figure 68 shows overall VLB bookings during the SGL Kerbside Management Trial and highlights a general pattern of bookings increasing as the VLBs went live, with a marked increase from July 2024 onwards, at which point VLBs were live in City of London, LB Lambeth and LB Richmond. There was also a major increase in bookings in August 2024 due to the Sheen Lane (Tesco) VLB going live in July 2024. This is due to Tesco, the primary user of the VLB, already being onboarded on the Kerb platform from using other established bookable bays outside of the SGL trial and highlights the value of a network of bookable bays. Bookings for the VLBs along The Cut in LB Lambeth increased steadily between March 2024 – July 2024, with a visible increase from August 2024 onwards which correlates to the period of intensive face to face engagement with suppliers along The Cut in September 2024. This suggests that using Grid's one-time booking account to demonstrate the platform to Operators and the ability to pass through the traffic filter with an onsite sign-up resulted in an increase in bookings. VLB operations for the trial concluded on 31st December 2024, however, operations of the Sheen Lane (South) VLB was extended to the end of March 2025 due to the length of the VLB set-up process.

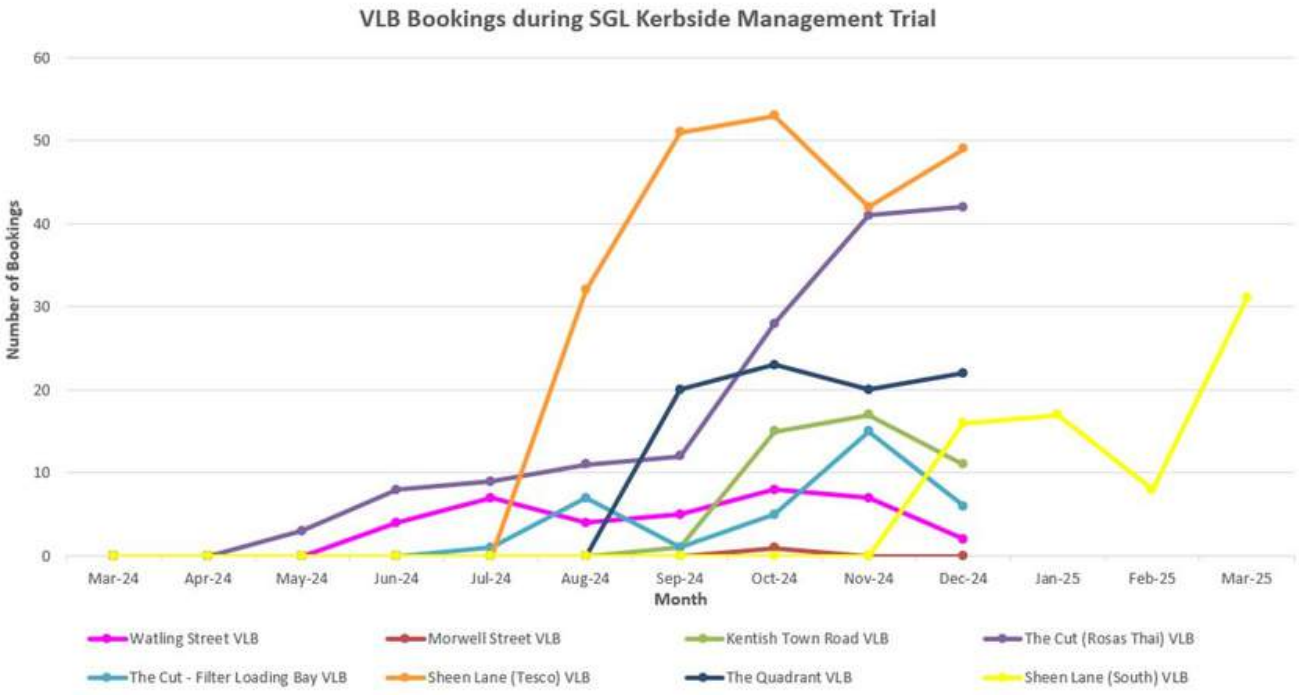


Figure 68. Graph showing VLB bookings during the SGL Kerbside Management Trial.

Figure 69 compares the operational months for each of the VLBs and the total number of bookings. As a general trend, the VLBs that went live later in the trial (e.g. LB Richmond & LB Camden) had a higher number of bookings within months 1-3 compared to the first VLBs to go live in LB Lambeth. In LB Lambeth, bookings began to increase for The Cut (Rosa's Thai) VLB in month 4 and The Cut – Filter Loading Bay VLB in month 5. This trend can be attributed to the refinement of the engagement approach as the trial progressed and identifying , the most effective engagement methods including targeted in-person engagement, one-time bookings and pre-VLB implementation engagement. Additionally, Sheen Lane (Tesco) VLB (LB Richmond) and Kentish Town Road VLB (LB Camden) benefitted from Operators already using the Kerb platform (Tesco & Martin Brower) which sped up the usage process. The Watling Street VLB in the City of London maintains a consistent level throughout the trial likely due to the specific use case for supporting brewery logistics.

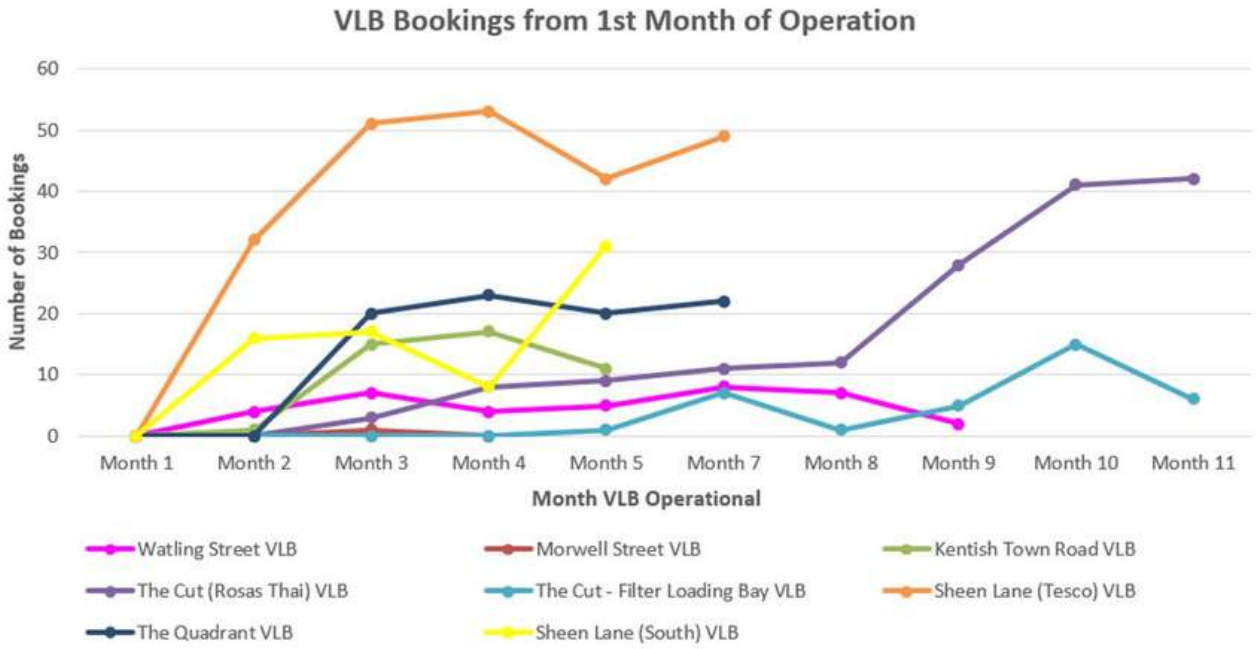


Figure 69. Graph showing trends in the number of bookings for each VLB from 1st month of operation.

7.1.3. Average VLB Booking Times

The average booking time for the 8 VLBs was 1 hour 20 mins. However, this omits the Young Vic bookings for The Cut – Filter Loading Bay (LB Lambeth) due to longer booking periods in conjunction with existing loading bay Parking Suspensions (average of 6 hours 18 minutes). The overall average booking time highlights that the maximum loading time defined in LA Traffic Orders is often shorter than the actual time required for Operators to complete (un)loading activities. This is particularly the case for larger chains and brewery logistics as evidenced by the booking times for Watling Street VLB (average of 2 hours 16 minutes with Tradeteam/DHL as the primary user) and Sheen Lane (Tesco) VLB (average of 2 hours 15 minutes with Tesco as primary user).

VLB Location(s)	Local Authority	Average Booking Time
The Cut-Filter Loading Bay VLB	London Borough of Lambeth	6 hours 18 minutes
Watling Street VLB	City of London Corporation	2 hours 16 minutes
Sheen Lane (Tesco) VLB	London Borough of Richmond	2 hours 15 minutes
The Cut (Rosa's Thai) VLB	London Borough of Lambeth	49 minutes
Sheen Lane (South) VLB	London Borough of Richmond	46 minutes
The Quadrant VLB	London Borough of Richmond	31 minutes
Kentish Town Road VLB	London Borough of Camden	26 minutes
Morwell Street VLB	London Borough of Camden	20 minutes
	Whole trial average booking time	1 hour 20 minutes

Table 19. Average VLB Booking Times

7.1.4. Rogue Vehicles

0 Rogue Vehicles were reported across the whole SGL kerbside Management Trial. This suggests that there were no vehicles in the pre-booked VLB spaces when Operators arrived at the dedicated loading location. This can be regarded as the VLB supporting better management of the kerbside through providing a dedicated or alternative space for logistics. Trial feedback also pointed to larger Operators often having dedicated Transport Managers to schedule bookings and therefore delivery drivers not interacting with the app which may have led to lower use of the Rogue Vehicle button.

7.1.5. Summary

It is evident that there are limits to the value of comparison between the 8 VLBs in the trial due to the specific LA aims, use case, and geographical context for each of the VLB locations. However, the overall pattern of VLB bookings over the course of the trial, and comparison of the operational months, points to a refinement in the engagement approach as the trial progressed which is explored further in section 8. For true trends or insights to be gained, VLBs would need to be tested for longer periods of time and comparison on a use case basis, rather than VLBs in general, may allow for more valuable comparison.

7.2 Air Quality Benefits

Freight emissions account for a quarter of London's total carbon emissions from transport [3]. The SGL Kerbside Management Trial aimed to understand the impact of VLBs on local air quality and whether providing a dedicated bookable space for loading activities reduces vehicle circulation km and associated emissions.

7.2.1. Trial Emissions Savings Methodology

The emissions savings from the trial have been calculated using CRP's in-house Transport Emissions Calculator (TEC) and delivery information provided at onboarding stage, total VLB bookings and estimating the number of vehicle km saved as a result of the VLB providing a dedicated space for logistics activities. A number of assumptions have been applied, informed from extensive business and supplier engagement, including average missed deliveries at each VLB location and circulation routes (prior to the VLBs) used by drivers when loading locations were unavailable.

To note, different assumptions have been applied to the LB Lambeth VLBs due to the traffic filter exemption. Emissions have then been quantified using CRP's TEC which compares the emissions impact of the original delivery methods, including carbon dioxide, nitrous oxides and particulate matter, to the new VLB delivery method. See Section 12 for detailed information on the quantitative evaluation process.

Figure 70. Businesses along Tottenham Court Road in LB Camden. Morwell Street VLB was tested to support deliveries along Tottenham Court Road.

7.2.2. Estimated Trial Emissions Savings

Using CRP's TEC, the SGL Kerbside Management Trial resulted in an estimated 66.6 vehicle km saved over the trial period. This led to the following estimated emissions savings:

61.16g Nox
9.76g PM10
5.66g PM2.5
55.67kg CO2

The estimated emissions savings for each VLB tested during the trial are outlined below:

[3] Worth the Weight Report, Centre For London

Local Authority	VLB Location	During the SGL Kerbside Management Trial	
		Estimated Vehicle Circulation km Savings	Estimated Emissions Savings
City of London Corporation	Watling Street VLB	0.8km	· 1.08g Nox · 0.1g PM10 · 0.95g PM2.5 · 0.67kg CO2
London Borough of Camden	Kentish Town Road VLB	1km	· 0.8g Nox · 0.12g PM10 · 0.06g PM2.5 · 0.84kg CO2
	Morwell Street VLB	0	0
London Borough of Lambeth Combined total due to different emissions savings methodology – see below.	The Cut (Rosa's Thai)*	52km	· 42g Nox (58% saving) · 8g PM10 (67% saving) · 3.8g PM2.5 (67% saving) · 43.46kg CO2 (58% saving)
	The Cut-Filter Loading Bay VLB		
London Borough of Richmond	The Quadrant VLB	4.4km	· 5.94g Nox · 0.53g PM10 · 0.29g PM2.5 · 3.68kg CO2
	Sheen Lane (Tesco) VLB	4.8km	· 6.48g Nox · 0.58g PM10 · 0.32g PM2.5 · 4.01kg CO2
	Sheen Lane (South) VLB	3.6km	· 4.86g Nox · 0.43g PM10 · 0.24g PM2.5 · 3.01kg CO2
	Total	**66.6km**	· 61.16g Nox · 9.76g PM10 · 5.66g PM2.5 · 55.67kg CO2

*Includes usage figures from the 3rd virtual dispensation bay agreed by LB Lambeth and Grid.

Table 20. Estimated vehicle km savings and emissions savings for each VLB in the SGL Kerbside Management Trial.

Table 20 clearly shows a correlation between the estimated vehicle km saved during the trial period and estimated emissions savings for carbon dioxide, nitrous oxides and particulate matter. The estimated emissions savings of each VLB reflect the overall booking figures (discussed in Section 7.1) highlighting a clear link between emissions savings and VLB usage. The LB Lambeth VLBs (The Cut (Rosa's Thai) VLB & The Cut – Filter Loading Bay VLB) have markedly higher emissions savings which is likely due to the integration with the traffic filter on The Cut which provided Operators booking the VLBs with an exemption to travel through the traffic filter. This led to a saving of approximately 275m (original delivery method – new delivery method) each time the VLB was booked. The length of time the LB Lambeth VLBs were operational (11 months) is likely to have also impacted emissions savings.

However, there are multiple considerations for the above figures including the difference in time that the different VLBs were tested, for example LB Lambeth VLBs were tested for 11 months whereas LB Camden VLBs were tested for 5 months (based on VLB live dates), the specific use case of each VLB, and any integration with other traffic management systems. Due to the specific locations of each VLB, the comparison between the VLBs tested is limited in value and should therefore be considered on an individual basis.

7.2.3. Projected Annual Emissions Savings Methodology

Estimated annual vehicle km saved have also been calculated using CRP's TEC based on the estimated potential bookings over an annual period, informed by trial business/supplier engagement and identification of potential VLB users (e.g. appropriate proximity to VLB), and the estimated vehicle km saved as a result of the VLB providing a dedicated space for logistics. A different methodology for estimating the projected emissions savings for the LB Lambeth VLBs was applied due to the traffic filter exemption.

7.2.4. Projected Annual Emissions Savings

Based on projected VLB usage figures from the SGL Kerbside Management Trial and CRP's TEC, an estimated 636.05 vehicle km could be saved over an annual period. This could result in the following estimated air quality savings:

650.99g Nox
75.41g PM10
39.88g PM2.5
531.55kg CO2

The projected annual emissions savings for each VLB tested during the trial are outlined below:

Local Authority	VLB Location	Estimated Annual Projections	
		Estimated Vehicle Circulation km Savings	Estimated Emissions Savings
City of London Corporation	Watling Street VLB	30.14km	· 40.71g Nox · 3.64g PM10 · 1.99g PM2.5 · 25.2kg CO2
London Borough of Camden	Kentish Town Road VLB	32.5km	· 26.06g Nox · 3.81g PM10 · 2.03g PM2.5 · 27.16kg CO2
	Morwell Street VLB	30.14km	· 46.9g Nox · 6.85g PM10 · 3.66g PM2.5 · 48.89kg CO2
London Borough of Lambeth Combined total due to different emissions savings methodology – see below.	The Cut (Rosa's Thai)*	287.65km	· 230.63g Nox (58% saving) · 33.69g PM10 (67% saving) · 17.89g PM2.5 (67% saving) · 240.40kg CO2 (58% saving)
	The Cut-Filter Loading Bay VLB		
London Borough of Richmond	The Quadrant VLB	57.2km	· 77.2g Nox · 6.9g PM10 · 3.78g PM2.5 · 47.8kg CO2
	Sheen Lane (Tesco) VLB	71.76km	· 96.85g Nox · 8.66g PM10 · 4.74g PM2.5 · 59.97kg CO2
	Sheen Lane (South) VLB	98.28km	· 132.64g Nox · 11.86g PM10 · 6.49g PM2.5 · 82.13kg CO2
	Total	**636.05km**	· 650.99g Nox · 75.41g PM10 · 39.88g PM2.5 · 531.55kg CO2

*Includes usage figures from the 3rd virtual dispensation bay agreed by LB Lambeth and Grid.

Table 21. Estimated Annual projections for vehicle km saved and associated emissions savings.

Table 21 outlines the annual emissions savings that each VLB could achieve based on assumptions around potential users of the VLB. The figures highlight the potential for the VLBs to result in emissions savings if usage is maximised by a larger number of Operators. There is a clear relationship between trial and projected annual emissions savings across the VLBs and the LB Lambeth VLBs produce the highest emissions savings across the trial VLBs.
The assumptions applied to the projected annual emissions savings must be noted. Moreover, the same considerations as discussed for the trial emissions savings should be applied to the projected annual emissions savings figures and therefore the limited value of comparison between the VLBs should be recognised.

7.2.5. Integrating a Traffic Filter with Kerbside Management – LB Lambeth VLBs

The VLBs located along The Cut in the LB Lambeth had the most easily quantifiable emissions savings due to the integration with the traffic filter which provided a known figure for vehicle km saved (see Figure 52). Therefore, a different emissions savings methodology was applied which calculated the estimated vehicle km saved from the new delivery method vs. original delivery method:

(Original delivery method – New Delivery Method) x Total Bookings

Original Delivery Method = Vehicle Distance WITHOUT traffic filter dispensation
New Delivery Method = Vehicle Distance WITHOUT traffic filter dispensation

In Lambeth, by allowing HGVs & LGVs booking the VLBs on the Kerb platform to pass through the traffic filter on The Cut, an estimated 52 vehicle km were saved over the trial period. This resulted in the following air quality savings*:

- 42g Nox (58% saving)
- 8g PM10 (67% saving)
- 3.8g PM2.5 (67% saving)
- 434.7kg CO2 (58% saving)

*Includes usage figures from the 3rd virtual dispensation bay agreed by LB Lambeth and Grid.

The projected emissions saving from the LB Lambeth VLBs can also be estimated based on trial business/supplier engagement and estimated average percentage increase of Operators and monthly bookings. Based on VLB usage trends*, it is estimated that by allowing HGVs & LGVs booking the VLBs on the Kerb platform to pass through the traffic filter on The Cut, an estimated 287.65 vehicle km could be saved over an annual period. This could result in the following estimated air quality savings:

- 230.63g Nox (58% saving)
- 33.69g PM10 (67% saving)
- 17.89g PM2.5 (67% saving)
- 240.40kg CO2 (58% saving)

*Includes usage figures from the 3rd virtual dispensation bay agreed by LB Lambeth and Grid.

The emissions savings for both the LB Lambeth VLBs during the trial period and annual projections are markedly higher in comparison to the other VLBs in the SGL Kerbside Management Trial. This is likely due to the integration with the traffic filter along The Cut and vehicle km being saved for each booking rather than just in the case of a missed delivery (assumption applied to City of London, LB Camden and LB Richmond VLBs).

7.2.6. VLB Emissions Savings Complexities

Emissions savings have been estimated for each of the 8 VLB locations which are discussed in further detail in individual LA case studies (section 6). However, the limitations of the VLB emissions saving methodology should be noted due to the reliance on assumptions around average number of missed deliveries, estimated vehicle circulation routes and projected VLB usage figures. As previously discussed, emission savings of the LB Lambeth VLBs are the most easily quantifiable due to the known number of vehicle km saved as a result of passing through the traffic filter. Further development and refinement of the emissions savings methodology, particularly when VLBs are not integrated with other vehicle management technology, is required to more accurately quantify emissions savings of VLBs. This can be achieved through further trials of VLBs which last for longer periods of time and develop a larger VLB network which will enable the collection of more accurate data on existing delivery trends, VLB usage and impact to congestion and local air quality.

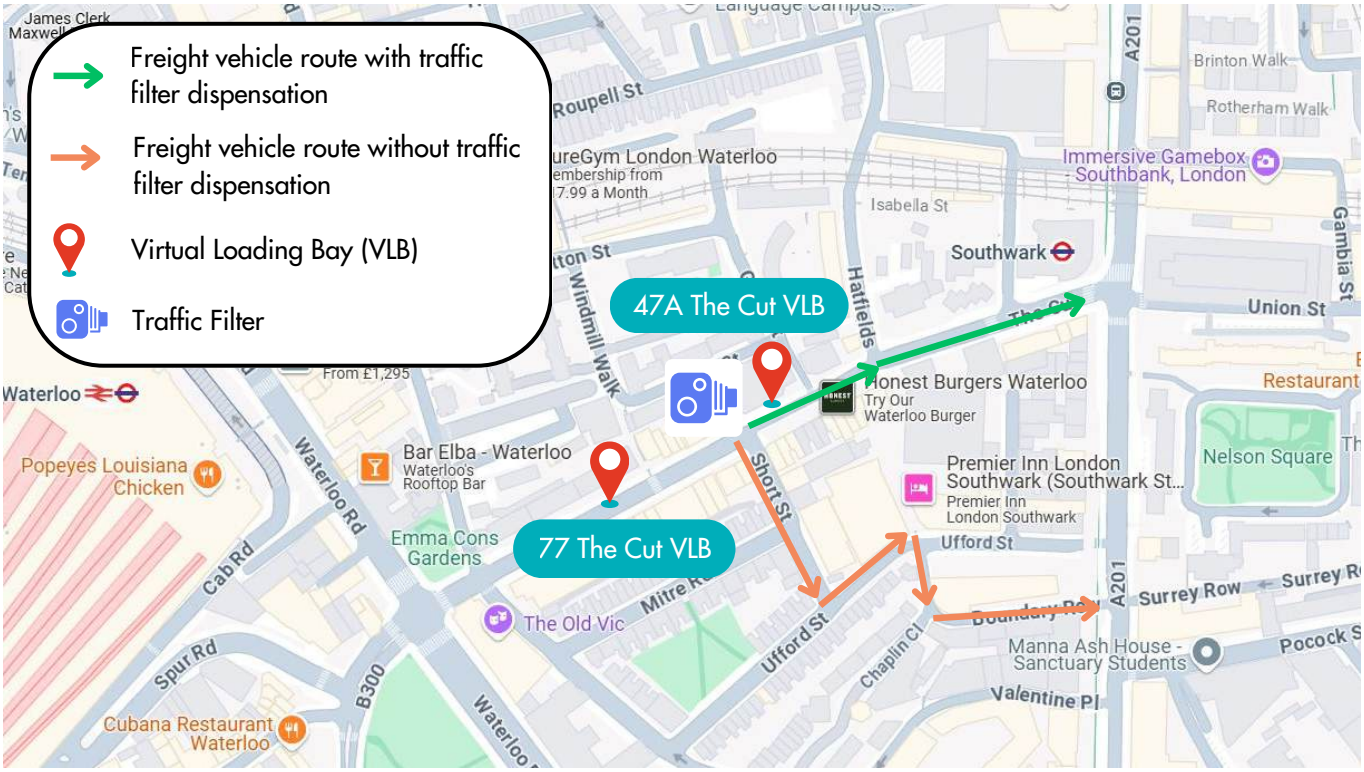


Figure 52. Freight vehicle routes along The Cut, Waterloo with and without the traffic filter dispensation via the Kerb platform (LB Lambeth).

8. Trial Learnings

The SGL Kerbside Management Trial provided a valuable opportunity to understand the process of implementing VLBs across different London boroughs, effective engagement & communications approaches, and the most suitable use-cases and locations for VLB technology. Trial feedback from project partners and trial participants was gathered through a range of different methods, including in-person and online feedback sessions, evaluation forms, and feedback via phone and email (see Section 11 for detailed information on the qualitative evaluation process).

8.1 Key Learnings

The following section summarises the key learnings from the Kerbside Management Trial evaluation process and best uses-cases for VLBs that were identified from the trial, including:

- Location selection
- Providing an incentive
- Effective engagement
- User friendly platform
- Delivery data
- Solution at scale

Location Selection: Address an existing delivery challenge

- Feedback from Operators highlighted **the value of the VLBs in providing a guaranteed delivery space** to support more efficient freight activities. Instances where regular deliveries were being made by large suppliers e.g. Tesco, Martin Brower to McDonalds, led to multiple weekly bookings on a regular schedule.
- Many of the VLB locations in the trial were selected as they did not present a major challenge to existing loading activity or residents/businesses/Council Members and could be implemented within the time constraints of the trial. This led to low usage of VLBs in some cases. **Implementing VLBs in more challenging delivery locations would have likely achieved higher usage figures,** however, would have taken longer to consult on and implement.

Understand the highway: Assess existing highways restrictions	• Feedback from LA project partners highlighted the **importance of assessing other highways regulations and restrictions** when considering suitable VLB locations, including Traffic Orders (both Moving & Static), loading restrictions and pedestrian zones. Upcoming highways schemes that may impact VLB usage should also be considered. • Traffic Orders and data assessments for some of the trials took longer than expected which delayed VLBs going live.
Provide an incentive: Traffic Filter Exemptions	• **Integrating Kerbside Management Technology with traffic filter exemptions** achieved emissions and congestion savings and provided a **clear incentive** for using the VLBs (evidenced in LB Lambeth).
Effective Engagement: In-person and tailored engagement approach	• **Engagement and communications approach must be tailored to the specific VLB location**, as well as the type of businesses and their suppliers in close proximity to the VLB. Targeted engagement with specific supplier contacts, supported by visual materials, was refined throughout the trial period and proved an effective engagement method, e.g. Transport Managers. • The **VLBs took time to embed within local logistics behaviours** which often led to low levels of usage within the first few months. • Creation of **on the ground, one-time bookings was viewed as a key turning point** within the engagement approach as this helped to build rapport and understanding amongst Operators to take part in the trial.
Effective Engagement: Build on existing relationships	• **Existing relationships** with membership organisations, e.g. Brewery Logistics Group, and existing Kerb platform users, e.g. Tesco and Martin Brower, enabled direct contact with a network of suitable suppliers who would benefit from the VLBs. This **facilitated information sharing, introductory meetings and the use of new VLBs**.

Engagement Challenges: Speaking to the right contact & remaining visible

- Whilst engagement with the in-store teams provided information on current freight & servicing patterns, **reaching the correct contacts responsible for fleet management proved challenging** and time consuming in some instances (e.g. LB Camden).
- Developing knowledge of the trial amongst businesses and Operators was challenging when not carrying out engagement on-site as the VLBs have no visible infrastructure, e.g. signs and lines, associated with them.

Integrating Enforcement: Work with LA Enforcement Teams to embed VLB technology

- Importance of **comprehensively engaging with LA enforcement teams** to provide information on the trial, technology and enforcement approach and information sharing process.
- A **desire was expressed by LAs for full integration with enforcement handhelds** to provide real-time booking data for on-site CEOs, however, this was outside the scope of the trial due to cost and resource required.

User-friendly platform: Simple booking platform with some small tweaks needed

- Feedback from Operators and LAs highlighted that the **booking platform is user friendly with clear infographics and comprehensive support provided by the Grid team**. Additionally, the platform was updated during the trial period to show future bookings, which was beneficial to LA enforcement teams.
- Desire from Operators to receive an emailed booking confirmation or downloadable document for situations when **proof of booking** is required.
- Concerns were raised around drivers using mobile phones to book / use VLBs as part the trial, however, larger Operators often had dedicated Transport Managers who made all the bookings on the platform. Reduced driver interaction with the app may have led to lower use of the Rogue Vehicle button (0 Rogue Vehicles recorded across the trial).
- Feedback from the LB Lambeth Filter Loading Bay VLB highlighted that the ability to **block book the VLB for large periods in conjunction with parking suspensions** would reduce admin burden. However, this would need to be considered against limiting booking duration at other locations.

Delivery Data: Valuable delivery & servicing data & insights

- The **engagement process provided valuable data on delivery and servicing activity** within the VLB area that can be used by LAs to inform policy and projects. However, a comprehensive picture is dependent on regular VLB usage and impacted when VLBs are not operational e.g. within restricted loading windows.
- The average booking time across the SGL Kerbside Management Trial highlighted that the **maximum loading time defined in LA Traffic Orders is often shorter than the actual time required for operators** to complete their (un)loading activities, particularly for larger chains and brewery logistics.
- Using VLBs to support the Parking Suspension process (LB Lambeth) provided the LA with accurate usage data for the loading bay, however, presented greater admin burden for businesses required to use the two systems.

Solution at Scale: Developing a network of VLBs

- There is a **clear appetite from LAs to look at the use of kerbside space and different innovative approaches to management**. The trial provided LAs with an opportunity to understand and test how kerbside management technology works without significant cost implications and with support from CRP and Grid.
- Effectiveness of VLBs is dependent on **developing a network across a certain geographic area or sector** (e.g. brewery logistics, chain stores) to support enough Operators with deliveries at multiple locations and achieve real behaviour change within the logistics sector.

Preference for PLBs: Desire for another type of kerbside management technology in some cases

- **Some locations were more suitable for Permit Loading Bays rather than VLBs**, however VLBs were selected anyway to allow LA's to test the technology. Due to the time constraints of the trial it would not have been possible to acquire the ETMOs and physical infrastructure needed for Permit Loading Bays.

8.2 VLB Use Cases

The trial highlighted that the best use cases for VLBs were when they provided a solution to an existing delivery challenge, or when an incentive to use the VLB was provided.

The following use cases were identified:

- **Brewery Logistics** – VLBs supported specific health and safety requirements of the sector including the need for deliveries to take place close to the delivery point (evidenced by CoL VLB).
- **Integration with traffic filter technology** – VLBs provided delivery vehicles with an automatic dispensation to travel through the traffic filter, reducing HGV circulation on smaller residential streets (evidenced by LB Lambeth VLBs).
- **Dedicated VLBs for large chains at delivery challenge locations** – VLBs supported supplier deliveries to large chain stores with a frequent delivery schedule and dedicated fleet managers responsible for scheduling bookings on the Kerb platform (evidenced by LB Camden & LB Richmond VLBs).

Figure 1. Tradeteam accessing Watling Street VLB in the City of London to complete a brewery logistics delivery.

"The trial of Virtual Loading Bays has allowed a total review of how the kerbside can be accessed by providing safe and efficient access for those operators that have health and safety as their number one concern, by providing this virtual space at the kerb deliveries can now be made without the fear of delivery failure, GRIDs booking platform provides the basis for a completely new way for operators to plan and action their deliveries,"

Brewery Logistics Group

9. Recommendations and Future Opportunities

The following section summarises the best use cases for VLBs, legacy of the trial and considerations / opportunities associated with around future use of Kerbside Management Technology.

9.1 Trial Legacy

The aim of the trial was to provide local authorities, businesses and operators with the opportunity to test VLBs as a kerbside management technology and to understand the operational, congestion and air quality impacts. The positive legacy of the trial is evidenced by both LB Lambeth and LB Richmond extending the operations of their VLBs beyond the SGL programme. Both these LAs are continuing to work with Grid, local businesses and suppliers to increase existing VLB usage and to identify further VLB locations across the borough. All the LAs that took part in the trial are actively looking at how to make the necessary provision for freight and servicing activity whilst also balancing this against the multitude of other kerbside uses / demand.

9.2 Identifying VLB Use Cases

The trial allowed for VLBs to be tested in 8 different locations in inner and outer London, and focused on different use cases specific to the VLB location. Based on the findings from the trial, the best use-cases for future VLBs are identified as:

- Areas where an exemption to a vehicular restriction is required to enable necessary delivery activities and efficiently move freight vehicles out of an area e.g. traffic filters as part of Healthy Neighbourhood schemes.
- Pedestrianised areas on an exemption basis e.g. to support delivery requirements for businesses on pedestrianised high streets.
- Areas with larger delivery vehicles that need to stop for health and safety reasons, e.g. for brewery logistics or along red routes or main roads.

However, there are other future use cases for VLBs that could be explored including:

- VLBs that are used only by Electric Vehicles (EVs)
- VLBs that charge for usage
- VLBs that are designed into highways / development schemes at planning stage
- Complimentary VLBs & PLBs

The future opportunities for VLB technology are discussed in the following section.

9.3 Future Opportunities for VLB Technology

The trial has demonstrated that logistics operations and management must be considered within existing and future kerbside use to continue to support businesses to receive goods in an efficient and sustainable way. Moreover, competing demands for kerbside space in dense urban areas means that there is an appetite amongst LAs to consider innovative technologies to dynamically manage kerbside use. The following areas have been identified as opportunities for the future use of VLB technology.

9.3.1. Full Integration with Enforcement

The SGL Kerbside Management Trial highlighted a desire for VLB technology to be fully integrated with enforcement handhelds to provide full booking information to on-street enforcement officers and back-office teams. This would enable the sharing of real-time data to support accurate on-street enforcement as evidenced by the Walworth Road PLB scheme in LB Southwark (not part of the SGL trial).

Full integration would require engagement and integration with external mapping software providers, e.g. Taranto, and would have associated costs and resource requirements. The opportunity to test the integration capability of the technology in further depth across different LA enforcement platforms would develop understanding and help to streamline the overall integration process.

Figure 71. Permit Loading Bay on Walworth Road in LB Southwark. Source: Grid Smarter Cities website.

19.3.2. VLBs as a potential revenue source

The monetisation of VLB technology presents an opportunity for a potential revenue income source for LAs to support other highways schemes and operations. Within the trial feedback some of the larger Operators commented that they would not view paying for VLBs as a deterrent due to the costs associated with missed deliveries. Consequently, charging could be built into their business models.

However, it should be noted that approaches to the monetisation of Kerbside Management Technology and charging users to book were different between the local authorities. Some raised concerns around deterring Operators using the platform through charging and therefore reducing the impact of the technology. The trial showed that charging may be more of a deterrent for smaller Operators, and in less challenging delivery locations where (un)loading can occur in another location. Clearly, the cost of the platform vs. monetisation of the technology would need to be considered against social, economic and environmental benefits of VLBs.

9.3.3. Integrating VLBs in Future Highways Schemes

Feedback from LAs highlighted the opportunity to incorporate VLBs into the design of new highways schemes and developments. Defining the use of VLBs at the planning stage of developments would ensure freight & servicing needs are adequately provided for and potentially reduce demand on existing highways infrastructure. Incorporating the implementation of VLBs, as part of the wider consultation process, would gather information on freight and servicing patterns within the area which would both inform decision making on VLB operating hours and raise awareness of the technology to encourage behaviour change towards digital kerbside management technologies. Moreover, implementing VLBs as part of new highways schemes or developments would also enable VLBs to be drafted into the TMO for the specific location rather than retrospectively fitting a VLB into an existing scheme.

9.3.4. Trialling Permit Loading Bays

The SGL Kerbside Management Trial highlighted that there is an appetite amongst LAs to also test Permit Loading Bays (PLBs). This is because they can be more easily used at existing loading bays and are supported by dynamic signage, which provides visible infrastructure for the technology. However, the cost and time associated with installing the physical infrastructure and ETMOs is a consideration for LAs. There is an opportunity to trial the interaction between VLBs and PLBs on a wider network scale to understand the most suitable use case for the two technologies. Further trials would provide LAs with specific use case examples for when considering either

Figure 72. Permit Loading Bay outside The Swan in Bankside, LB Southwark. Source: Grid Smarter Cities website.

PLBs or VLBs and develop an evidence-base to support a suite of options for dynamic kerbside management.

9.3.5. Digitisation of Traffic Orders

The Department for Transport (DfT) is developing a single data standard for publishing a Digital Traffic Regulation Order (D-TROs) and creating a centralised digital depository for all TROs and Temporary Traffic Regulation Orders (TTROs). The D-TRO is a move away from the text-based legal documents that were previously "made" and published by Traffic Authorities. The aim of the D-TRO initiative is to improve access to traffic management information for a range of audiences including local residents, neighbouring LAs, connected kerb services, and sat-nav services [4]. The digitisation of traffic orders will benefit kerbside management technology by streamlining the process of reviewing and amending (when required) TOs when assessing the suitability of a location for Kerbside Management Technology. Similarly to the digitalisation of kerbside space, accessibility to TO information across different platforms & providers is essential for maximising the benefit of TO digitisation and ensuring data is available and accessible for existing and future kerbside users / managers and future highways schemes / developments.

[4] DTRO Guide for Decision Makers, TfL

9.3.6. Supporting LA Policy & Strategies

VLB technology has the potential to support LA Policy and Strategies through a proactive and flexible approach to kerbside space. Examples include implementing VLBs that can be used by Electric Vehicles (EV) only as a way of supporting and incentivising EV use for logistics and reducing associated emissions. EV-only PLBs were launched by Grid and Westminster City Council (WCC) (not part of the SGL trial) at the start of 2024, to support WCC's Freight, Servicing and Deliveries Strategy and Action Plan 2020–2040 and strategic action on proactive kerbside management. However, the bookable loading bays were opened up to all delivery vehicles in November 2024 due to low uptake of EV across the logistics sector, highlighting the need to balance strategic vision against existing operational landscape.

VLBs could also support efficient logistics operations within LA Healthy Neighbourhood schemes by providing exemptions to specific delivery vehicles at traffic filters, as evidenced by LB Lambeth. Recognition of VLBs and Kerbside Management Technology within LA policy is key to successful implementation and widespread approach to dynamic kerbside management.

Figure 73. The Cut in LB Lambeth where VLB supported traffic filter exemption.

Figure 74. Russell Street Permit Loading Bay in Covent Garden, City of Westminster. Source: Grid Smarter Cities website.

9.3.7. Network of VLBs & Process Standardisation

Findings from the SGL trial have shown that the success of VLBs is dependent on developing a VLB network across borough boundaries that target a specific sector (e.g. brewery logistics, chain stores). More widespread use of VLBs would put pressure on Operators to use the technology and achieve a tipping point where real behaviour change to kerbside management technologies can be achieved within the logistics sector. One barrier to developing a cross-borough network is the different mechanisms for implementing VLBs across LAs. Standardisation of the VLB implementation and enforcement process would support the large scale roll out at suitable locations, as well as recognition of the technology in both LA and strategic agencies, e.g. GLA / TfL, policies and strategy.

10. Next Steps

The SGL Kerbside Management Trial highlights the range of opportunities for VLB technology to enable LAs to dynamically manage kerbside space, addressing demands from businesses and Operators to cater for logistics activities within urban areas, and achieve savings to delivery vehicle circulation distances with associated congestion and local air quality benefits.

Figure 75. Watling Street VLB supporting brewery logistics in the City of London.

Recommended next steps:

- Continue to **develop LA, Business & Operator knowledge and understanding of VLBs and kerbside management technology** through trials, such as the SGL Kerbside Management Trial. This will raise awareness around the different technology available and provide the opportunity to test the technology within a supported structure without significant financial commitment. Trials that test the integration of the technology across different LA enforcement platforms would also be valuable.

- Ensure a c**ollaborative approach to the digitisation of kerbside space** between the public and private sector to ensure that the digitisation is **comprehensive, accessible and transparent** for the different users and managers of the space.

- Reframe the narrative around the **kerbside to be viewed as a dynamic and flexible space with multiple uses and users**. LAs should develop kerbside-specific strategies and action plans, e.g. LB Lambeth Kerbside Strategy (2023), that consider the existing and potential uses of the kerbside. The needs of the freight and logistics sector should be considered within this, as well as sustainable uses, including urban greening, and sustainable transport parking provision.

- **Trial new use cases for VLBs**, including EV-only VLBs, VLBs designed into schemes at planning stage and complimentary VLBs & PLBs. Further trials would also allow for testing of the integration capability of the technology across different LA platforms and help to streamline the overall integration process.

- **Central government and strategic agencies to acknowledge kerbside management technology as a beneficial tool to support the logistics sector** and build this into upcoming policy and strategy concerned with sustainable logistics / management of the kerbside.

- Further **development and refinement of the methodology for understanding the emissions savings and sustainability benefits of VLBs** beyond the scope of the SGL trial. This can be achieved through further trials of VLBs, both on a larger scale and specifically focused on the emissions savings, which will enable the collection of more accurate data on existing delivery trends, VLB usage and impact to congestion and local air quality.

"We would use Virtual loading bays in the future if the cost of the scheme out weighed the cost of failed deliveries. We spend a lot of time, resource and transportation of stock due to failed deliveries but if we knew we could book a space where we could park and deliver first time that would be a game changer for us and our industry."

DHL / TradeTeam

"We have been happy with the booking system, it makes booking the space simple and is easy to use."

Sheen Mobility

11. Useful Resources

Please find a list of relevant resources below:

Cheat Sheet

- SGL Cheat Sheet: WS3 Kerbside Management

Case Studies

- SGL Express: Traffic Filter Integration with Kerbside Management Technology in Lambeth
- SGL Express: City of London Virtual Loading Bay Trial

Video

- Smarter Greener Logistics - The Watling Street Virtual Loading Bay

Flyers

- LB Camden: Kentish Town Road VLB
- LB Camden: Morwell Street VLB
- LB Lambeth: The Cut VLBs
- CoL: Watling Street VLB
- LB Richmond: The Quadrant & Sheen Lane VLBs

Press Release

- Cross River Partnership Launches Two Virtual Loading Bays in London Borough of Camden to add to a Growing Network - Sept 24

Figure 76. SGL Kerbside Management Trial Informational Flyer for VLBs on The Cut, LB Lambeth.

12. Appendix

12.1 Emissions Savings Methodology

The emissions savings methodology applied to the SGL Kerbside Management Trial is based on actual VLB usage figures and Operators delivery information, as well as logical assumptions informed by trial business engagement and delivery behaviours in London.

12.1.1. VLB Usage Information

Usage information for the 8 VLBs was captured throughout the trial via the Kerb platform which provided information on Operators onboarded and VLB usage. Grid provided CRP with comprehensive usage data at the end of the trial, including further details on users of the one-time bookings, emissions class and wheel plan (e.g. number of wheels, axis & the arrangement of the vehicle which provides an indication of vehicle type & size). To note, usage figures for the 3rd virtual dispensation bay on The Cut in Lambeth (agreed by LB Lambeth and Grid) have been included for analysis as part of The Cut (Rosa's Thai) VLB figures due to the interlinkages between the other LB Lambeth VLBs and traffic filter dispensation process. The following data was provided and analysed:

- Local Authority
- Company name
- VRM
- Vehicle type
- Fuel type
- Wheel plan
- Emissions class
- VLB address
- Date of booking
- Time start & end
- Duration of booking
- Status – Active or Cancelled
- Rogue Vehicle Reported

12.1.2. Operators Delivery Information

Operators onboarded to the Kerb platform were also required to provide information on existing delivery behaviour at the specific VLB location at the onboarding stage to be able to take part in the trial and understand current delivery patterns and how the VLB can support. The following data was provided and used within the evaluation process:

- Company name
- Delivery vehicle type
- Postcode of original delivery depot
- Average number of deliveries at location per week
- Average number of missed deliveries at location per week
- Average number of PCNs received per week

Local Authority	VLB Location(s)	Total Operators booking on the platform	Operators converted from 'one-time booking'	'Regular User' Operators	Total Bookings	Average Booking Time	Rogue Vehicles Reported
City of London Corporation	Watling Street VLB	4	1	2	38	2 hours 16 minutes	0
London Borough of Camden	Kentish Town Road VLB	1	0	1	43	26 minutes	0
	Morwell Street VLB	1	0	0	1	20 minutes	0
London Borough of Lambeth	The Cut (Rosa's Thai)*	5	2	5	154	49 minutes	0
	The Cut-Filter Loading Bay VLB	9	0	3	35	6 hours 18 minutes	0
London Borough of Richmond	The Quadrant VLB	4	0	3	85	31 minutes	0
	Sheen Lane (Tesco) VLB	2	0	2	227	2 hours 15 minutes	0
	Sheen Lane (South) VLB	4	0	1	72	46 minutes	0
Total		**30**	**3**	**17**	**655**	**1 hour 20 minutes*** **1 hour 37 minutes****	**0**

** Usage figures from the 3rd virtual dispensation bay on The Cut (agreed by LB Lambeth and Grid) have been included within The Cut (Rosa's Thai) VLB figures due to the interlinkages between the other LB Lambeth VLBs and traffic filter dispensation process.*
*** Without Young Vic bookings (LB Lambeth Filter Loading Bay VLB)*
**** With Young Vic bookings (LB Lambeth Filter Loading Bay VLB)*

Table 18. Overall SGL Kerbside Management Trial VLB Usage Data.

12.1.3. Transport Emissions Calculator

Emissions savings have been quantified using CRP's in-house Transport Emissions Calculator (TEC) which compares the emissions impact of different delivery methods and distances and the associated values for carbon dioxide, nitrous oxides and particulate matter. The TEC is based on Defra's Emissions Factors Toolkit (EFT) version 11, which was released in November 2021. The EFT is published by DEFRA and the Devolved Administrations to assist local authorities in carrying out Review and Assessment of local air quality as part of their duties under the Environmental Act 1995 as amended by the Environment Act 2021. The EFT allows users to calculate road vehicle pollutant emission rates for CO_2, NOx, PM2.5 and PM10 for a specified year, road type, vehicle speed and vehicle fleet composition.

12.1.4. Estimated Vehicle Circulation Distances & Emissions

For each of the 8 VLBs in the trial, a vehicle circulation distance was calculated using Google Maps to quantify the emissions savings for each VLB. For 6 of the VLBs (excluding LB Lambeth VLBs), the vehicle circulation distance figure is based on the distance a delivery vehicle would have to travel to get back to the loading space if it was unavailable on arrival. The distances vary between the different VLB locations dependent on street layouts and vehicle restrictions (e.g. one-way streets). The vehicle circulation distance for the VLBs in LB Lambeth were calculated based on the distance a vehicle would have to travel with or without the exemption to travel through the traffic filter.

An assumption has been made that prior to the VLB, 5% of deliveries were required to do the vehicle circulation route as the loading location was unavailable. This is based on data from business/supplier engagement and the onboarding process that indicated 0-10% of deliveries are not made on the 1st attempt and vehicles are required to circulate and return.

It is assumed that the VLB led to 0 missed deliveries, based on the report of 0 'Rogue Vehicles' during the trial period, by either creating an alternative loading location or removing conflicting delivery times through the booking platform. Therefore, the emissions savings have been calculated based on vehicle circulation km the VLB saved.

Local Authority	VLB Location(s)	Vehicle Circulation Distance
City of London Corporation	Watling Street VLB	400m
London Borough of Camden	Kentish Town Road VLB	500m
	Morwell Street VLB	650m
London Borough of Lambeth	The Cut (Rosa's Thai)	450m (WITHOUT traffic filter dispensation) 200m (WITH traffic filter dispensation)
	The Cut-Filter Loading Bay VLB	
London Borough of Richmond	The Quadrant VLB	1100m
	Sheen Lane (Tesco) VLB	1200m
	Sheen Lane (South) VLB	900m

Table 22. Estimated Vehicle Circulation Distances for the 8 VLB locations.

12.1.5. Estimated Single VLB Emissions Savings – During Trial Period (except LB Lambeth)

The estimated emissions savings for each VLB (except LB Lambeth) were worked out based on the total bookings during the trial period and the estimated vehicle km saved as a result of the VLB providing a dedicated or alternative space for logistics.

12.1.6. Estimated Single VLB Emissions Savings – Annual Projections (except LB Lambeth)

The projected annual emissions savings for each VLB (except LB Lambeth) has been worked out based on the estimated potential bookings over an annual period, informed by trial business/supplier engagement and identification of potential VLB users (e.g. appropriate proximity to VLB), and the estimated vehicle km saved as a result of the VLB providing a dedicated space for logistics.

Figure	Rationale
VLB total bookings during trial period	Actual number of journeys that took place
Vehicle circulation route when loading location unavailable	Quickest route to return to VLB if unavailable
Number of deliveries that the VLB prevented from having to do full vehicle circulation route	5%* of total bookings during trial period *Based on assumption that before the VLB was implemented %5 of deliveries were required to do the vehicle circulation route as loading location unavailable.*
Vehicle circulation distance saved	Circulation route x number of missed deliveries the VLB saved

Table 23. Methodology for calculating Estimated Single VLB Emissions Savings - During Trial Period (except LB Lambeth).

Figure	Rationale
Average number of deliveries per week	Number of deliveries received by suitable businesses who could use the VLB* **Informed from trial business engagement & assessed based on proximity to VLB, delivery times, information supplied by business.*
Approx. total deliveries per year	Total deliveries per week x 52
Number of deliveries the VLB prevented from having to do full vehicle circulation route	5% of Approx. total deliveries per year
Vehicle circulation route when loading location unavailable	Quickest route to return to VLB if unavailable
Delivery circulation route distance	Circulation route x Approx. times loading location is occupied

Table 24. Methodology for Calculating Estimated Single VLB Annual Emissions Savings – Annual Projections (except. LB Lambeth).

12.1.7. Estimated LB Lambeth VLBs Emissions Savings – During Trial Period

LB Lambeth VLBs emissions savings were calculated based on the vehicle km saved throughout the trial period from the new delivery method and ability to pass through the traffic filter when booking via the Kerb platform. Usage figures from the 3rd virtual dispensation bay on The Cut (agreed by LB Lambeth and Grid) have been included within The Cut (Rosa's Thai) VLB figures due to the interlinkages between the other LB Lambeth VLBs and traffic filter dispensation process.

12.1.8. Estimated LB Lambeth VLBs Emissions Savings – Annual Projections

LB Lambeth estimated annual projections for VLBs usage were calculated based on trial usage figures and an estimated average percentage increase of number of Operators using the VLB and increase of total monthly bookings. Usage figures from the 3rd virtual dispensation bay on The Cut (agreed by LB Lambeth and Grid) have been included within The Cut (Rosa's Thai) VLB figures due to the interlinkages between the other LB Lambeth VLBs and traffic filter dispensation process. The projected annual emissions savings were then calculated based on the estimated vehicle km saved from the new delivery method and ability to pass through the traffic filter when booking via the Kerb platform.

Figure	Rationale
VLB total bookings during trial period	Actual number of journeys that took place
Original delivery method: Vehicle Distance WITHOUT traffic filter dispensation	Distance of route when unable to pass through traffic filter
New delivery method: Vehicle Distance WITH traffic filter dispensation	Distance of route when able to pass through traffic filter
Original delivery method – Total Vehicle Distance WITHOUT traffic filter dispensation	Total bookings x Original delivery distance
New delivery method – Total Vehicle Distance WITH traffic filter dispensation	Total bookings x New delivery distance
Vehicle circulation distance saved	Total original delivery distance – Total new delivery distance

Table 25. Methodology for calculating Estimated LB Lambeth VLB Emissions Savings - During Trial Period.

Table 26. SGL Kerbside Management Trial Emissions Savings.

Local Authority	VLB Location	During the SGL Kerbside Management Trial	
		Estimated Vehicle Circulation km Savings	Estimated Emissions Savings
City of London Corporation	Watling Street VLB	0.8km	· 1.08g Nox · 0.1g PM10 · 0.95g PM2.5 · 0.67kg CO2
London Borough of Camden	Kentish Town Road VLB	1km	· 0.8g Nox · 0.12g PM10 · 0.06g PM2.5 · 0.84kg CO2
	Morwell Street VLB	0	0
London Borough of Lambeth Combined total due to different emissions savings methodology – see below.	The Cut (Rosa's Thai)*	52km	· 42g Nox (58% saving) · 8g PM10 (67% saving) · 3.8g PM2.5 (67% saving) · 43.46kg CO2 (58% saving)
	The Cut-Filter Loading Bay VLB		
London Borough of Richmond	The Quadrant VLB	4.4km	· 5.94g Nox · 0.53g PM10 · 0.29g PM2.5 · 3.68kg CO2
	Sheen Lane (Tesco) VLB	4.8km	· 6.48g Nox · 0.58g PM10 · 0.32g PM2.5 · 4.01kg CO2
	Sheen Lane (South) VLB	3.6km	· 4.86g Nox · 0.43g PM10 · 0.24g PM2.5 · 3.01kg CO2
	Total	**66.6km**	· 61.16g Nox · 9.76g PM10 · 5.66g PM2.5 · 55.67kg CO2

*Usage figures from the 3rd virtual dispensation bay on The Cut (agreed by LB Lambeth and Grid) have been included within The Cut (Rosa's Thai) VLB figures due to the interlinkages between the other LB Lambeth VLBs and traffic filter dispensation process.

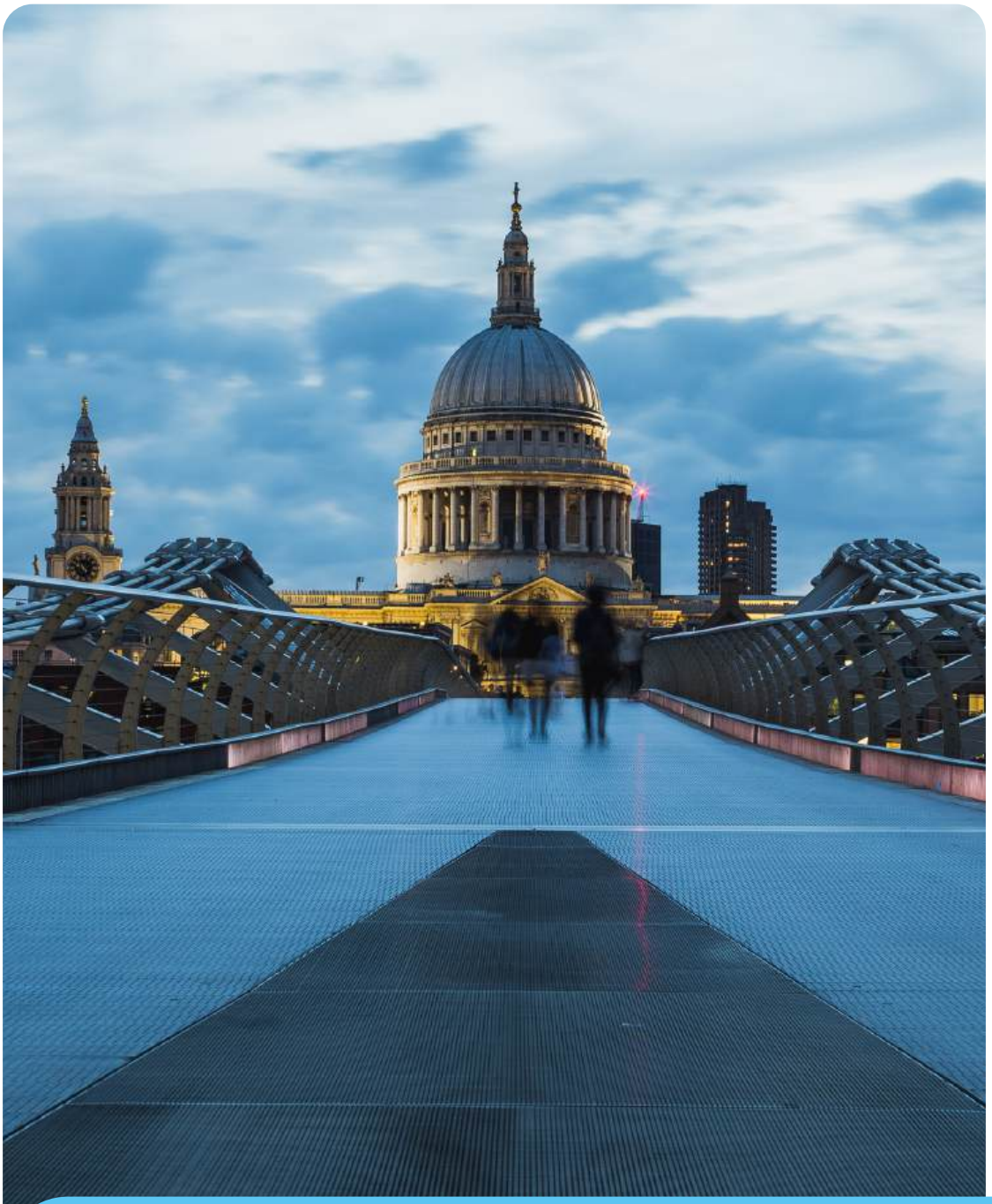
12.2 Qualitative Feedback Methodology - Trial Project Partners and Participants

Trial feedback from project partners and trial participants was gathered during and at the end of the trial through a range of different methods. The methods included: in-person and online feedback sessions, evaluation forms, and feedback via phone and email. The following table summarises the different approaches and organisations involved:

The key themes from the feedback on the trial from project partners and participants are summarised in Trial Learnings (section 8) and discussed in Recommendations & Future Opportunities (section 9).

Method	Aim	Stakeholder Groups
In-depth feedback sessions	Opportunity for organisations involved in the trial to provide in-depth feedback on trial aims, set-up process, operations and future use of VLBs. Provided opportunity for discussion and follow-up questions.	Project Partners Businesses Operators Logistic membership organisations
Evaluation Forms	Trial evaluation form for organisations involved in the trial to provide written feedback on trial aims, set-up process, operations and future use of VLBs. Used as conversation steer for in-depth feedback sessions.	Project Partners Businesses Operators Logistic membership organisations
Email & Verbal Feedback	Qualitative feedback on the trial from businesses and Operators involved with focus on use of the platform and impacts on deliveries.	Businesses Operators

Table 27. Qualitative Feedback Methodology - Trial Project Partners & Participants



If you would like further information about anything that has been included in this report, please get in touch:

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