

Agenda

**Meeting: Safety, Sustainability and
Human Resources Panel**

Date: Wednesday 16 November 2022

Time: 10:00am

**Place: Conference Rooms 1 and 2,
Ground Floor, Palestra, 197
Blackfriars Road, London, SE1
8NJ**

Members

Dr Lynn Sloman MBE (Chair)

Dr Nina Skorupska CBE (Vice-Chair)

Kay Carberry CBE

Bronwen Handyside

Dr Mee Ling Ng OBE

Mark Phillips

Marie Pye

Copies of the papers and any attachments are available on [tfl.gov.uk How We Are Governed](https://tfl.gov.uk/How-We-Are-Governed).

This meeting will be open to the public and webcast live on [TfL YouTube channel](#), except for where exempt information is being discussed as noted on the agenda.

There is access for disabled people and induction loops are available. A guide for the press and public on attending and reporting meetings of local government bodies, including the use of film, photography, social media and other means is available on www.london.gov.uk/sites/default/files/Openness-in-Meetings.pdf.

Further Information

If you have questions, would like further information about the meeting or require special facilities please contact:

James Varley, Secretariat Officer, Email: JamesVarley@TfL.gov.uk.

For media enquiries please contact the TfL Press Office; telephone: 0343 222 4141; email: PressOffice@tfl.gov.uk

Howard Carter, General Counsel
Tuesday 8 November 2022

Agenda
Safety, Sustainability and Human Resources Panel
Wednesday 16 November 2022

1 Apologies for Absence and Chair's Announcements

2 Declarations of Interests

General Counsel

Members are reminded that any interests in a matter under discussion must be declared at the start of the meeting, or at the commencement of the item of business.

Members must not take part in any discussion or decision on such a matter and, depending on the nature of the interest, may be asked to leave the room during the discussion.

3 Minutes of the Meeting of the Panel held on 29 June 2022 (Pages 1 - 10)

General Counsel

The Panel is asked to approve the minutes of the meeting of the Panel held on 29 June 2022 and authorise the Chair to sign them.

4 Matters Arising and Actions List (Pages 11 - 16)

General Counsel

The Panel is asked to note the updated actions list.

5 Safety, Health and Environment Report - Quarter 1 and 2 2022/23
(Pages 17 - 150)

Chief Safety, Health and Environment Officer

The Panel is asked to note the report.

6 Safety, Health and Environment Assurance Report - Quarter 1 and 2 2022/23 (Pages 151 - 172)

Director of Risk and Assurance

The Panel is asked to note the paper.

7 TfL Sustainability Report and Corporate Environment Plan Progress Report (Pages 173 - 200)

Chief Safety, Health and Environment Officer

The Panel is asked to note the paper.

8 Direct Vision Standard and Safety Permit Scheme for Heavy Goods Vehicles (Pages 201 - 204)

Chief Customer and Strategy Officer

The Panel is asked to note the paper

9 Vision Zero Action Plan Progress Report – One Year On (Pages 205 - 212)

Chief Safety, Health and Environment Officer

The Panel is asked to note the paper.

10 SHE Vision Zero Plan for TfL's River-Based Operations (Pages 213 - 244)

Chief Safety, Health and Environment Officer

The Panel is asked to note the paper.

11 Bus Safety Programme Update (Pages 245 - 366)

Chief Operating Officer

The Panel is asked to note the report.

12 Responsible Procurement (Pages 367 - 374)

Chief Finance Officer

The Panel is asked to note the paper.

13 Human Resources Quarterly Report (Pages 375 - 388)

Chief People Officer

The Panel is asked to note the report.

14 Leadership at Transport for London (Pages 389 - 392)

Chief People Officer

The Panel is asked to note the report.

15 Plan for Managing Our Safety, Health and Environment (SHE) Enterprise Risks (Pages 393 - 402)

Chief Safety, Health and Environment Officer

The Panel is asked to note the paper.

16 Members' Suggestions for Future Discussion Items (Pages 403 - 406)

General Counsel

The Panel is asked to note the forward plan and is invited to raise any suggestions for future discussion items for the forward plan and for informal briefings.

17 Any Other business the Chair Considers Urgent

The Chair will state the reason for urgency of any item taken.

18 Date of Next Meeting

Wednesday 22 February 2023 at 10.00am

Transport for London

Minutes of the Safety, Sustainability and Human Resources Panel

Conference Rooms 1 and 2, Ground Floor, Palestra,
197 Blackfriars Road, London, SE1 8NJ
10.00am, Wednesday 29 June 2022

Members

Dr Lynn Sloman MBE (Chair)
Dr Nina Skorupska CBE (Vice Chair)
Kay Carberry CBE
Bronwen Handyside
Dr Mee Ling Ng OBE
Mark Phillips (via Teams)
Marie Pye

Executive Committee

Howard Carter	General Counsel (via Teams)
Lilli Matson	Chief Safety, Health and Environment Officer
Tricia Wright	Chief People Officer

Staff

Katherine Adams	Business Partner, Procurement (via Teams for Minute 23/06/22)
Kerri Cheek	Senior Bus Safety Development Manager
Louise Cheeseman	Director of Bus Operations
Nick Dent	Director of Customer Operations
Laura Grant	Head of Procurement (via Teams for Minute 23/06/22)
Jonathon Hawkes	HR Strategic Planning Manager (for Minute 25/06/22)
Donna McGuigan	Diversity and Inclusion Lead (for Minute 27/06/22)
Siobhra Murphy	Engagement Manager – Vision Zero (via Teams for Minute 20/06/22)
Stuart Reid	Head of Insights and Direction
Mike Shirbon	Head of Integrated Assurance
Karen Wallbridge	Skills and Employment Lead (via Teams for Minute 26/06/2226)
Hannah White	Senior Safety and Strategy Manager (for Minute 29/06/22)
James Varley	Secretariat Officer

Also in attendance

Jon Emmett	Principal Policy and Programme Officer, Greater London Authority (via Teams)
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16/06/22 Apologies for Absence and Chair's Announcements

The Chair welcomed everyone to the meeting. The meeting was also being webcast live to TfL's YouTube channel to ensure the public and press could observe the proceedings and decision making.

The Chair reminded those present that safety was paramount to TfL and encouraged Members to raise any safety issues during discussions on a relevant item or with the appropriate member of the Executive Committee after the meeting. Members confirmed there were no other safety matters they wished to raise, other than those to be discussed on the agenda.

Mark Philips was attending via Teams and was able to take part in the discussions but was not counted toward the quorum. Andy Lord, Gareth Powell and Alex Williams were unable to attend and Kerri Cheek, Louise Cheeseman and Nick Dent were attending in their place. Howard Carter was attending via Teams.

17/06/22 Declarations of Interests

Howard Carter introduced the item.

Members' declarations of interests, as published on [tfl.gov.uk](https://www.tfl.gov.uk), were up to date and there were no additional interests to declare that related specifically to items on the agenda.

18/06/22 Minutes of the Meeting of the Panel held on 24 February 2022

The minutes of the meeting of the Panel held on 24 February 2022 were approved as a correct record and signed by the Chair.

19/06/22 Matters Arising and Actions List

Howard Carter introduced the paper, which set out progress against actions agreed at previous meetings of the Panel.

The information provided to Dr Nina Skorupska CBE relating to the removal of the requirements to wear a face covering on the transport network would be shared with Panel Members. **[Action: Secretariat]**

The Panel noted the actions list.

20/06/22 Safety, Health and Environment Report

Lilli Matson, Louise Cheeseman and Nick Dent introduced the report, which provided an overview of safety, health and environmental performance for London Underground, TfL Rail, Surface Transport (including London Overground) and Crossrail for Quarter 4 of 2021/22 (12 December 2021 to 31 March 2022) and notable incidents outside the reporting period.

This week saw the launch of Vision Zero Week and Siobhra Murphy introduced a video created for stakeholders and a wider audience as part of the work taking place. Members reflected on the content, and found it a moving and powerful reminder of the relentless need to address road safety. Significant mobilisation activity was taking place during the week which included a Parliamentary briefing, the Youth Panel, issuing a

communications toolkit, and social media engagement. Stakeholders such as the London boroughs, Metropolitan Police and London Ambulance Service were also involved. The Office of Rail and Road (ORR) had decided to bring legal proceedings against TfL in respect of the tram overturning at Sandilands in Croydon on 9 November 2016. TfL had worked closely with the ORR and the Rail Accident Investigation Branch (RAIB) to make the network safer. TfL had entered a guilty plea at the Magistrates' Court earlier this month. The next hearing at the Crown Court was scheduled for next week. The Panel would be kept updated.

The incident at Sandilands remained at the heart of safety performance. The recommendations of the RAIB report had been fully implemented and resulted in an increase in performance. TfL would continue to reflect on it and consider what more could be done.

There had been three fatalities involving London's buses since the last meeting which were currently under investigation.

A contractor carrying out a routine maintenance track patrol on the Metropolitan line had been struck by a train. Although the contractor was not hurt, it was a serious incident and the RAIB were investigating. At the same time, track access procedures were being reviewed.

Although the coronavirus pandemic was no longer at the front and centre of activities, it was still a significant factor and was considered in decision making as controls were lifted. Staff would continue to be supported, particularly those with symptoms of long Covid.

It was acknowledged that it was not likely that the target for reductions in the number of people killed or seriously injured on roads would be reached. Progress had been made, with a reduction of 44 per cent against the 2005-09 baseline but the 65 per cent target would be difficult to achieve. The rate of improvement was different across the modes. TfL was doing all it could, but it was a collective effort with other stakeholders. The right measures were in place, though these were at risk in a managed decline scenario.

All new buses since 2019 had been compliant with the Bus Safety Standard. Work to retrofit the standard was taking place on a further 1,200 buses that had come into service prior to 2019 with 959 completed so far. Funding uncertainty had caused a pause in the programme for a further 1,800 buses. A breakdown of whether injuries were caused on or by a bus would be included in the Safety, Health and Environment Report going forward.

[Action: Lilli Matson / Louise Cheeseman]

There was a clear link between fare evasion and workplace violence, with it linked to 40 per cent of incidents. The current cost of living situation was being monitored to understand if and how it might take effect. The approach to fare evasion had been light touch during the pandemic although as restrictions were relaxed, activity was increasing.

The Bus Action Plan had been published in March 2022 and it set out the steps being taken to improve the safety of buses including driver fatigue, health and wellbeing initiatives, building on the success of the Destination Zero programme and implementing a strategic, data-led approach to reducing passenger injuries.

Members commented on the ability to understand and manage driver consistency, particularly in braking and to a lesser extent acceleration. The Advanced Braking system was part of the Bus Safety Standard to be introduced in 2024. Research had taken place, and this would drive forward the system performance levels, although it was noted that systems that had a faster and more powerful reaction could impact on risk to passengers travelling inside the bus. Driver training standards were monitored across operators and individual garages/depots where appropriate and had been found to be consistent. Safety performance rates tended to be related to the distance travelled.

The removal of pandemic related public health restrictions had seen an increase in ridership although a demographic breakdown of customers was not available. It was known that weekend and leisure journeys showed the most significant return to previous levels. It remained to be seen if customers from more vulnerable groups were returning at the same rate as others. TfL was continuing to encourage and normalise the use of face coverings to ensure customers felt safe.

The Health and Safety Executive (HSE) had visited the TfL site at Acton and highlighted the need for a better health risk management system. Systems and processes were in place, however enhanced management was needed. Improvements were implemented and the HSE had confirmed that it was satisfied with the action taken.

Members welcomed the Mayoral and TfL's commitment to purchasing renewable energy. It was noted that it was also important not to lose sight of the need to reduce energy usage wherever possible.

The Panel noted the report.

21/06/22 Safety, Health and Environment Assurance Report

Mike Shirbon introduced the paper, which provided an overview of the effectiveness of the risk controls for Enterprise Risk 1 – Major safety, health or environmental incident or crisis.

At the year-end, 94 per cent of the Audit Plan had been completed. The range of audits had been expanded to include matters such as security. The ability to provide assurance was a result of the ability to analyse data. A new digital assurance system had been procured which would allow front line assurance to be more effectively delivered.

The Panel noted there were a number of overdue actions. A series of protocols existed for assessing whether overdue actions should be extended or whether subsequent changes meant they were no longer appropriate following communication with the action owners. The Panel would receive an update on the approach to the most overdue actions at the next meeting. **[Action: Mike Shirbon]**

The Panel noted the paper.

22/06/22 2021 Road Safety Performance

Lilli Matson and Stuart Reid introduced the paper, which set out road safety data from London in 2021 as well as analysis of the trends and patterns of interest for the Panel.

For the year 2021, 75 people had been killed, 3,501 people seriously injured and 23,071 people slightly injured on London's roads. This had been an improvement on the previous year which was acknowledged to be anomalous due to the public health situation. 2021 had seen reductions in the number of pedestrians and motorcyclists killed or seriously injured but with an increase in the number of cyclists killed or seriously injured. The geographical distribution of incidents had also changed with an increase in the share of people killed or seriously injured while walking in Outer London boroughs, in particular Croydon and Ealing. Members noted that further improvements would be difficult to achieve if funding was not made available.

The increase in deaths and injuries to cyclists was a concern, however the programme remained appropriate and had the flexibility to address the change in geography that was seen in 2021. Incidents on the TfL Road Network were returning to pre-pandemic levels and it was important to recognise that Vision Zero applied across London and not just the central zone.

The use of e-scooters was increasing and Government was considering further legalising their use. In terms of risk, any assessment would need to consider the origins of any modal shift.

The impact of roadworks on safety was taken into consideration. Roadworks activity was managed and advice and guidelines were issued to operators. The Network Management Centre provided surveillance and monitoring activities to assist with coordination.

The Panel noted the paper.

23/06/22 Responsible Procurement

Laura Grant and Katherine Adams introduced the paper, which presented the draft Modern Slavery Statement and provided an update on activities related to responsible procurement.

From March 2024, suppliers would be requested to complete a Modern Slavery Assessment Tool with the expectation that a score of 70 per cent or above was achieved. This was for those suppliers who were not subject to a legal requirement to have their own Modern Slavery Statement in place. TfL would work with suppliers to achieve the score, with the aim of promoting responsible procurement and raising the standards of suppliers rather than it being a barrier to entry for suppliers. The target figure was subject to review to ensure it was appropriate. Confirmation would be provided on whether the responsible procurement programme applied to organisations with a commercial relationship with TfL who were not supplying a good or a service, such as lessees of commercial property.

[Action: Katherine Adams / Laura Grant]

TfL was working with Electronics Watch on its Low Emission Vehicle programme to promote transparency in the supply chain and improve conditions of workers in the mining and mineral extraction industry.

An update on Responsible Procurement would be provided to the Panel meeting scheduled for 16 November 2022. This would include further detail on environmental and sustainability issues.

[Action: Katherine Adams / Laura Grant]

The Panel noted the paper.

24/0622 Human Resources Quarterly Report

Tricia Wright introduced the paper, which provided an update on key Human Resources led activities and performance for the period February – June 2022.

The TfL Scorecard set out the measures that would be reported against in future reports. The diversity declaration rate had seen a downward trend and the target of 56 per cent required a reversing of the trend. It was an important indicator as it reflected efforts to make TfL a more inclusive place to work. A communications programme was being put in place and this would be shared with the Panel. **[Action: Tricia Wright]**

In response to a request from Bronwen Handyside, the status in terms of union membership and collective bargaining of staff withing the graduate and apprentice programmes would be confirmed. **[Action: Tricia Wright]**

The gender, ethnicity and disability pay gap reports had been published. The results were mixed, and a more detailed paper was due to be presented at the next meeting to set out work that was taking place to address gaps.

A number of initiatives to help staff had been launched including: provision of guidance for staff and managers to better support colleagues who were trans or non-binary; the TfL Anti-racism charter; the first Domestic Abuse Policy which would strengthen TfL's ability to provide a safe and inclusive work environment for those affected by domestic abuse; and a partnership with two credit unions to provide access to financial services for colleagues at potentially more competitive rates for savings and loans.

On 1 April 2022 the transition to hybrid working was completed, with colleagues coming into the office a minimum of two days per week, and the priority remained to keep people safe. There were benefits to attending a place of work such as the social and collaborative nature of the environment. In addition, using the public transport network to travel to and from work helped staff have empathy with and an understanding of customers.

The Panel noted the paper.

25/06/22 Attraction and Retention of Our Employees

Jonathan Hawkes introduced the paper, which set out the approach to the attraction and retention of employees, the current challenges, the range of initiatives and programmes currently in place and critical skills in the organisation. This item was considered in conjunction with the paper on Enterprise Risk 2 – Attraction, Retention and Wellbeing of Our Employees as there was a significant amount of overlap.

TfL was a people led organisation and the pursuit of its vision and purpose could only be achieved through its people.

Attraction and retention of staff and skills was a long-term challenge. The employment market was increasingly competitive and employees were making different choices about their career direction. The traditional employee offer was becoming less competitive, particularly in the areas of information technology and engineering, making it harder to attract people.

Skills retention was also important. A turnover of staff was normal and skills and knowledge needed to be retained through succession planning.

It was noted that roles in information technology and engineering were the most immediate to face the challenges posed by the strong employment market.

An emerging rewards strategy was being developed which would look beyond salaries but also career paths and address elements of the current package which may be less attractive to some people. The overall offer, beyond just salary, included career development, upskilling and reskilling, and the benefit of having worked at TfL for a period, which could draw people towards TfL. It was difficult to analyse and understand why people may not apply to TfL or not accept a job.

Attraction and retention pressures in pay band one roles had not been as acute as other pay bands, however all the initiatives would also be applied to those roles.

Analysis of leavers had shown that there was some disproportionality. Women, LGBT+ and staff with disabilities groups were leaving at a faster rate than being employed. This correlated with the Viewpoint staff survey scores. Data would be shared with the Panel.

[Action: Tricia Wright]

The Panel noted the paper.

26/06/22 Everyone's Future Counts

Karen Wallbridge introduced the paper, which provided an update on the employability programmes, which sought to create opportunities and mitigate against barriers to employment for Londoners. The scheme generally applied to people who were not TfL staff and the purpose was to make them 'work ready'.

TfL had a key role in London's recovery, not only in providing a clean, safe transport network but also in ensuring everyone could thrive and flourish and not leave anyone behind.

It was known that there were social, economic and health inequalities in London. For example, women were more likely to be unemployed or have their working hours reduced than men, young black people were more likely to be unemployed than their white counterparts, and young people who were eligible for free school meals were more likely to have lower grades at GCSE levels.

The programme benefited participants by providing them with employability skills or educational attainment and giving them a level playing field in the employment market. TfL also benefitted, as it became a better organisation by learning from people who faced barriers and also had a better understanding of diverse groups who made up its customers. Staff who supported the programme also received personal and career development opportunities as a result.

The Panel noted the paper.

27/06/22 Acting on Viewpoint

Donna McGuigan introduced the paper, which provided an update on our activities in response to the findings of the 2021 Viewpoint staff survey, including the work taking place to address the lower engagement and inclusion scores experienced by disabled and LGBT+ colleagues.

Engagement had taken place with the Staff Network Group for Disability and the OUTBound Staff Network Group and action was being taken to respond to the feedback provided.

The Staff Network Group for Disability had raised its members' concerns regarding possible backlash resulting from being perceived as receiving preferential behaviour. Panel Members highlighted the need to tackle this and move to a focus on workplace adjustments rather than reasonable adjustments which would provide a broader range of actions.

Going forward, disaggregated data would become available to allow an understanding of engagement across TfL's business areas. This would be shared with the Panel in due course.

[Action: Tricia Wright]

The Panel noted the paper.

28/06/22 Enterprise Risk Update – Attraction, Retention and Wellbeing of Our Employees (ER2)

This item was considered in conjunction with the paper on Attraction and Retention of Our Employees, as detailed in Minute 25/06/22 above.

The Panel noted the paper.

29/06/22 Enterprise Risk Update – Failure to prevent Safety, Health or Environment incident / meet commitments (ER1)

Lilli Matson and Hanna White introduced the paper, which set out the activities to manage risk relating to the failure to prevent a major safety, health and environment (SHE) incident and/or meet/comply with either applicable SHE regulations, SHE commitments or targets in the Mayor's Transport Strategy (MTS) and/or TfL's own Vision and Values SHE ambitions and roadmap deliverables.

A clearer, more specific interpretation of Enterprise Risk 1 (ER1) had taken place following feedback from the Panel when the item was presented in 2021. This made the risk more relevant at business unit level through the risk cascade. It also allowed the risk to be better aligned with TfL's Vision and Values and the MTS.

The risk was complex and ongoing. Progress had been made in mitigations and processes. The assessment of 'Requires Improvement' reflected uncertainty over funding, possible further actions by the Office of Rail and Road, climate related incidents and other factors.

A priority list of SHE Risk Topics had been created which were identified as the most likely to result in the risk being realised. It was noted that this did not cover all the risks but those that presented the greatest risk to mitigating the revised definition of ER1.

The prioritisation enabled a more joined up approach and visibility across the business units in TfL.

Climate change risk and its location with the Enterprise Risk system was a subject of significant discussion and ongoing work.

Members commented that funding, and in particular, the managed decline scenario was a common thread in this risk and safety management in general. A paper on risk and prioritisation of safety matters in relation to budgets was on the Forward Plan and would be presented when a clearer picture of funding was available .

Members noted that the risk was currently higher than target and requested the next update to include detail on plans to reduce the risk. **[Action: Lilli Matson]**

30/06/22 Members' Suggestions for Future Discussion Items

Howard Carter introduced the item.

The Chair requested that the Corporate Environment Plan updates scheduled for the 14 September 2022 meeting should include reports from various directorates such as Capital Investment and Operations to inform the Panel on how the Plan was cascaded through TfL.

The Action on Inclusion Report was added to the Forward Plan.

The Panel noted the forward plan.

31/06/22 Any Other Business the Chair Considers Urgent

There was no urgent business.

32/06/22 Date of Next Meeting

The next scheduled meeting of the Panel would be held on Wednesday 14 September 2022 at 10.00am.

33/06/22 Exclusion of the Press and Public

The Panel agreed to exclude the press and public from the meeting, in accordance with paragraph 3 of Schedule 12A to the Local Government Act 1972 (as amended), when it considered the exempt information in relation to the items on: Enterprise Risk Update – Attraction, Retention and Wellbeing of Our Employees (ER2); and Enterprise Risk Update – Failure to prevent Safety, Health or Environment incident / meet commitments (ER1).

The meeting closed at 12.30pm.

Chair: _____

Date: _____

Date: 16 November 2022

Item: Actions List

This paper will be considered in public

1 Summary

1.1 This paper informs the Panel of progress against actions agreed at previous meetings.

2 Recommendation

2.1 **The Panel is asked to note the Actions List.**

List of appendices:

Appendix 1: Actions List

List of Background Papers:

Minutes of previous meetings of the Panel

Contact Officer: Howard Carter, General Counsel
Email: HowardCarter@tfl.gov.uk

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Safety, Sustainability and Human Resources Panel Actions List (reported to the meeting on 16 November 2022)

Actions from the meeting held on 29 June 2022

Minute No.	Description	Action By	Target Date	Status/note
19/06/22	<p>Matters Arising and Action List: Face Coverings</p> <p>Information relating to the removal of the requirements to wear a face covering on the transport network would be shared with Panel Members.</p>	Secretariat	July 2022	Completed. Information sent on 28 July 2022.
20/06/22	<p>Safety, Health and Environment (SHE) Report: Injuries on buses</p> <p>A breakdown of whether injuries were caused on or by a bus would be included in the SHE Report going forward.</p>	Lilli Matson	14 September 2022	Completed. Data included in the SHE Report elsewhere on the agenda.
21/06/22	<p>Safety, Health and Environment Assurance Report: Overdue actions</p> <p>The Panel would receive an update on the approach to the most overdue actions at the next meeting.</p>	Mike Shirbon	14 September 2022	Completed. Information contained within the latest report.
23/06/22	<p>Responsible Procurement: Commercial Relationships</p> <p>Confirmation would be provided on whether the responsible procurement programme applied to organisations with a commercial relationship with TfL such as lessees of property.</p>	Katherine Adams/ Laura Grant	16 November 2022	Completed. Update provided on the item on the agenda.

Minute No.	Description	Action By	Target Date	Status/note
23/06/22 (2)	Responsible Procurement: Environment and sustainability The next update to the Panel would include further detail on environmental and sustainability issues.	Katherine Adams/ Laura Grant	16 November 2022	Completed. Update provided on the item on the agenda.
24/06/22	Human Resources Quarterly Report: Diversity declarations A communications programme relating to diversity declarations was being put in place and this would be shared with the Panel.	Fiona Brunskill	Autumn 2022	Information will be provided when available.
24/06/22 (2)	Human Resources Quarterly Report: Graduate and Apprentice cohorts Confirmation would be provided on whether TfL have looked at collective bargaining agreements for the Graduate and Apprentice cohorts.	Tricia Wright	14 September 2022	Completed. Graduates and Apprentices are training and preparatory roles often spanning several disciplines across the TfL Group, rather than substantive employment roles. As such, they are not included as part of collective bargaining.
25/06/22	Attraction and Retention of Our Employees: Diversity data The Panel would be provided with diversity data relating to leavers.	Tricia Wright	August 2022	Completed. Information sent on 1 August 2022.
27/06/22	Acting on Viewpoint: Disaggregated data Disaggregated data would become available to allow an understanding of engagement across TfL's business areas. This would be shared with the Panel in due course.	Tricia Wright	August 2022	Completed. Information sent on 1 August 2022.

Minute No.	Description	Action By	Target Date	Status/note
29/06/22	Enterprise Risk 1 Update Members noted that the risk was currently higher than target and requested the next update to include detail on plans to reduce the risk.	Lilli Matson	16 November 2022	Completed. Update provided on the item on the agenda.

Actions from previous meetings

Minute No.	Description	Action By	Target Date	Status/note
05/02/22 (1)	Quarterly SHE Report: Face Masks Provide the data used to inform the removal of the face covering requirement from the Conditions of Carriage to Dr Nina Skorupska CBE.	Lilli Matson	July 2022	Completed. Information sent on 28 July 2022 (as per 19/06/22 above).
05/02/22 (3)	Quarterly SHE Report: Safety risk prioritisation Provide an update on how safety risk is prioritised across the network in the context of decision making and business planning.	Lilli Matson	September / November 2022	To be addressed in business planning discussions with Members.
05/02/22 (5)	Quarterly SHE Report: Sustainable Development Framework Provide an update on the Sustainable Development Framework to the Panel or the Land and Property Committee.	Lilli Matson / Graeme Craig	To be scheduled	An update will be provided to the Land and Property Committee. All Members will be notified.

Minute No.	Description	Action By	Target Date	Status/note
08/02/22 (1)	<p>Bus Safety Programme: Funding uncertainty A summary of projects within the programme that were paused due to funding uncertainty would be presented to a future meeting.</p>	Louise Cheeseman	16 November 2022	Completed. Update provided on the item on the agenda.
08/02/22 (2)	<p>Bus Safety Programme: Pedal confusion Circulate the report of Pedal Confusion when available.</p>	Louise Cheeseman	16 November 2022	Completed. Update provided on the item on the agenda.

Date: 16 November 2022

Item: Safety, Health and Environment Quarterly Report, Quarter 2 2022/23

This paper will be considered in public

1 Summary

- 1.1 This paper summarises key information and trends reported in the Safety, Health and Environment (SHE) Quarterly Report for the second quarter (Q2) of the 2022/23 financial year.
- 1.2 Q2 covers the dates 26 June to 17 September 2022. Most data presented covers this date range, except for some road safety and work-related violence data. It is clearly highlighted when data falls outside this period.

2 Recommendation

- 2.1 The Panel is asked to note the report.

3 Key information presented in the Q2 report

Scorecard

Measure	Unit	Q2 Target	Q2 Actual
People killed or seriously injured in road traffic collisions per million journey stages	Killed or seriously injured per million journey stages	0.33	0.24
People killed or seriously injured in road traffic collisions in or by a London bus (per million surface journey stages)	Killed or seriously injured per million journey stages	0.020	0.020
Customer all injuries per million passenger journeys	All injuries per million journeys	2.58	2.69
Workforce all injuries	Number of workforce injuries	311	341

- 3.1 The report shows that our safety scorecard measures of rate of people killed or seriously injured on the roads and rate of people killed or seriously injured on or by a London bus have been met for Q2 2022/23.
- 3.2 We did not achieve our public transport customer safety scorecard measure this quarter, but this is a slight improvement on the rate of 2.73 in Q1 and represents an improving trend compared to the result of 2.91 in Q2 2021/22. This quarter, 68 per cent of the total customer serious injuries that occurred were slips, trips, or falls and this remains the most common incident type. On London Underground (LU) the main factors in these incidents were intoxication, not holding on to handrails and being overburdened by luggage. Our Customer Experience team held workshops with station staff to undertake deep dives to understand the most common customer behaviours that contribute to incidents occurring at these stations. The outcomes of these workshops have been used to identify actions such as improved signage to encourage customers travelling with luggage to use lifts, in order to get us back on target in the longer-term.
- 3.3 It is disappointing that we did not meet our target for workforce all injuries this quarter. Our target for workforce injuries is 311, which is more stretching than the target of 427 in Q2 last year, which shows our ambition and desire to make more progress on this issue. The total of 341 injuries sustained by our workforce reflects a return to pre-pandemic levels of some workforce injury causes, such as assaults. The greatest increase in workforce injuries was within LU, with 184 injuries in Q2 2022/23 compared to 122 in Q2 2021/22. This could in part be explained by both an increase in reporting with the introduction of body-worn cameras and the rollout of the Workplace Violence and Aggression programme, along with the increase in customer numbers.

4 Safety

Public Transport

- 4.1 During Q2, total customer numbers on the public transport were 0.72bn, a decrease of 0.01bn when compared with Q1. This represents an improvement on Q2 2021/22 when we had 0.54bn customers travelling on the network. Our customer numbers – whilst recovering – still have some way to go to resume to pre-pandemic levels (0.9bn in Q2 2019/20 and 1.08bn in Q4 2019/20).
- 4.2 Sadly, 50 customers were seriously injured in Q2, which is 13 more than Q2 2021/22. However, in Q2 2021/22 three customers were killed on the public transport network, compared to zero in Q2 2022/23.
- 4.3 The number of customers injured per million passenger journeys was 2.69, which is above our target of 2.58 per million journeys. Slips, trips and falls remain the most common type of incident type, constituting 68 per cent of the serious injuries on public transport.
- 4.4 On LU, 66 per cent of serious injuries involved a slip, trip or fall and on buses this rises to 90 per cent. Of these serious injuries eight occurred on an escalator and six on stairs, with intoxication, not holding onto handrails and being overburdened with luggage being additional factors (see paragraph 3.2 above).

- 4.5 On buses, 90 per cent of serious injuries involved a slip, trip or fall. People aged 65 years and over made up one third of those seriously injured, and there were also three incidents involving small children in prams or buggies. One of the main factors cited was the bus braking in response to the behaviour of other road users. This was a factor in two of the serious injuries involving an older person, and all of the serious injuries involving infants.
- 4.6 In September 2022, the jury delivered its conclusion in the inquest into the tragic death of Gama Warsame at Waterloo LU station on 26 May 2020. Previously the Rail Accident Investigation Branch (RAIB) had made three recommendations to LU. We communicated regularly with the Office of Rail and Road (ORR) to ensure they were satisfied we were addressing the recommendations made in the RAIB report.
- 4.7 The jury's conclusion was that Mr Warsame's death was an accident. The jury also concluded that a factor possibly underlying the accident was that LU had neither fully quantified the level of risk at the platform at Waterloo during the coronavirus pandemic, nor considered additional measures to reduce the likelihood of a person falling down the gap and remaining at this location.
- 4.8 This quarter, the RAIB published its safety digest into several incidents on the London Overground which involved customers, or their possessions becoming trapped in the doors and dragged at Seven Sisters station (23 June 2022), Wembley Central station (27 June 2022) and Crouch Hill station (29 June 2022).
- 4.9 The RAIB report outlined the importance of:
- (a) ensuring that drivers are properly supported in the task of train dispatch through suitable training, briefings and maintenance of equipment;
 - (b) drivers relying on their final safety check rather than the door interlock when making a decision to dispatch a train, because of the limitations of such systems in detecting small objects trapped in the doors; and
 - (c) train operating companies continuing to raise passengers' awareness of the particular hazards that train doors can present when closing.

Streets

- 4.10 Q2 2022/23 was the third successive quarter in which we have continued to see a return to pre-pandemic levels of road journeys. There was an increase in walking, cycling and motorised journeys when compared with Q2 2020/21 and Q2 2021/22.
- 4.11 In Q2 2022/23 23 people were killed, which is broadly similar to Q2 2020/21 (26) and Q2 2021/22 (21). While this number represents a tragic level of death on our roads, it is 32 per cent lower than the 34 people who were killed on London's roads in Q2 2019/20.
- 4.12 The number of people walking who were killed in Q2 2022/23 (eight) is less than half of the Q2 2019/20 pre-pandemic figure (17).

- 4.13 The total number of people seriously injured on London's roads in Q2 has significantly decreased by 15 per cent when compared with Q2 2021/22 (758 in Q2 2022/23 and 895 in Q2 2021/22). This is markedly lower than Q2 2019/20 before the pandemic when 940 people were seriously injured.
- 4.14 This overall reduction in the numbers of people killed or seriously injured on London's roads can, in part, be put down to the successful rollout of our road safety programmes, but also reflects changes in how and when people are travelling. Our Lowering Speed Limits Programme is now in its second phase, to reduce speeds by 10mph on a further 140km of the TfL Road Network (TLRN). This programme also includes raised pedestrian crossings, due to be introduced in eight locations to further reduce danger to people walking. This work aims to increase compliance with the speed limit and also introduce accessibility benefits for mobility impaired customers.
- 4.15 Our Safer Junctions programme is also delivering safety benefits to multiple road users. At the York Road roundabout and Holloway Road/Drayton Park, we are delivering safety measures to make this junction safer for motorcycle riders and people walking respectively. At the junction of A205 Upper Richmond Road and Putney Hill/Putney High Street we have started work on delivering a 20mph speed limit. At Battersea Bridge where a person walking was tragically killed at the beginning of 2021, we are developing plans to address safety issues by introducing brand new crossings and better facilities for people cycling.
- 4.16 Over the last three quarters we have seen an increase in the number of car occupants killed on the roads, when compared to before the pandemic. Provisional analysis of raw casualty data suggests that excessive speed is a key factor, with loss of control of the vehicle being recorded in several fatal incidents.
- 4.17 In Q2 we delivered Operation London Bridge with no serious incidents recorded during this time. This is a testament to the collaboration of the many teams involved.

Workforce

- 4.18 In our Capital Delivery teams, this quarter was one of good safety performance. There was only one incident reported under the Reporting of Injuries, Diseases and Dangerous Occurrences Regulations (RIDDOR). Accident frequency rates continued to decrease across the Capital area of the business, with the overall rate ending the quarter at 0.04, below the 2022/23 annual target of 0.10.
- 4.19 Lost time injuries (LTIs) are injuries which cause an employee to be absent for one or more shifts. There were five LTIs reported in our Capital teams during Q2, an increase of two when compared with Q1. All five reported LTIs were minor injuries: four occurring in our London Underground teams and one in Project and Programme Delivery. The use of machinery and equipment were a factor in three of the incidents, and so we made sure that teams received additional briefings on how to safely conduct activities to avoid future injury.
- 4.20 Fare evasion remained the biggest trigger for work-related violence and aggression (WVA) during Q2, resulting in 30 per cent of all WVA incidents.

4.21 Taking action at WVA hotspots (where we see a high number of incidents, or particularly harmful incidents occurring) is a core part of our prevention work. In September 2022, we launched a year-long project at Stratford LU station, a consistent WVA hotspot. We are working with the local team, specialists from across the organisation and external stakeholders, including our policing partners, to coordinate activity to tackle this behaviour and better support staff who experience it. Another part of our prevention activity is engaging with frontline staff directly, including bus drivers. The WVA team has attended engagement events at Thornton Heath bus garage, Atlanta Boulevard bus stand, Croydon bus garage and Palmers Green bus garage. All feedback from staff has been noted and discussed with our colleagues in Police Liaison and TfL's Network Management Control Centre.

5 Health

- 5.1 Covid-19 remained the top cause of short-term absence in the quarter, significantly increasing from 30 per cent in Q1 to 44 per cent in Q2 and was the fourth most common cause of long-term absence. Absences related to mental health and musculoskeletal issues remained the most significant causes of long-term absences and remain the focus of our preventative measures, alongside measures to mitigate the risk of Covid-19 to our workforce and customers.
- 5.2 Our Occupational Health team is constantly working hard to prevent ill health but also working with our leaders to help them to support those who become unwell, to return to work. Some events hosted this quarter included a Wellbeing roadshow and a free webinar on Mental Health First Aid Awareness.

6 Environment

- 6.1 Our electricity consumption was one per cent higher this quarter when compared with Q2 2021/22. In response to the increased consumption reported during Q1 2022/23 due to Network Rail traction energy billing, London Overground have installed new metering on their trains and continue to engage with Network Rail to resolve the issue.
- 6.2 Carbon dioxide emissions from operations, excluding buses, track closely to electricity consumption. Emissions decreased by approximately eight per cent this quarter compared to the same period in 2021/22, partly due to a reduction in emissions intensity of grid electricity.
- 6.3 In July 2022, we published the Expanded Ultra Low Emission Zone (ULEZ) six months on report. Already the data indicates that both the ULEZ and the Low Emission Zone are having a huge impact. These schemes have reduced the number of older, more polluting vehicles seen driving in London and the levels of harmful pollution Londoners are exposed to.
- 6.4 The GLA group-wide Responsible Procurement Implementation Plan of which TfL is a signatory was launched in September 2022 and supports the delivery of our Corporate Environment Plan through procurement. One example of a result following the plan is that all suppliers of contracts over £5m must provide carbon reduction plans.

- 6.5 TfL's first Power Purchase agreement was launched in June 2022 but, following a disappointing response it has been withdrawn and revised. A new tender notice was due to be issued in October 2022 with altered parameters which would bring additional projects into eligibility. The sudden announcement of the Energy Prices Bill has created further uncertainty in the energy market and consequently, the decision has been taken to wait for more clarity in the market before relaunching the tender.
- 6.6 As part of action to reduce the risk of surface water flooding, we are developing four major Sustainable Drainage Systems (SuDS) projects. Supported by funding from the Greater London Authority Group's Green & Healthy Streets programme and Thames Water, the four schemes will support run off from more than 23,000 square metres of catchment, improve water quality, support biodiversity and improve the visual amenity of the urban realm.

List of Appendices

Appendix 1: Safety, Health and Environment Quarterly Report, Quarter 2 2022/23

List of Background Papers

None

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Safety, Health and Environment Quarterly report

Quarter 2 2022/23

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Introduction and Executive Summary

This report summarises our performance in Quarter 2 of 2022/23 and identifies strategic trends covering 26 June to 17 September 2022, unless specified.

The report sets out ways in which we have continued to keep our customers and workforce safe as we have transitioned to living with coronavirus. In January 2022, the Government removed the mandate to wear a face covering in public spaces, meaning that they were no longer enforceable on our services. In June 2022, we changed our customer and staff messaging, which now encourages people to take appropriate action to keep themselves safe, including wearing a face covering if this helps them to travel and work with confidence.

We also received the final report from Imperial College London on their sampling of our public transport network's surfaces. Between September 2020 and June 2022, only one positive sample was found and as a low-level result, it would not be expected to result in a transmissible level of viral load. The testing of samples was based on frequently touched surfaces at three London Underground stations (London Waterloo, London Euston and London Paddington) There were also some air samples that were taken on a Northern line train and on the route 205 bus.

During Quarter 2, we saw customer numbers decrease slightly across the TfL network, ending the quarter at 0.72 billion customer journeys, representing a 0.01 billion decrease from the end of Quarter 1 2022/23. Overall, we still have some way to go before reaching the pre-pandemic customer journey figures of 0.9 billion (Quarter 2 2019/20). This means many of our key safety, staff and environmental performance indicators remain at different levels than they might have been previously. The data available shows that although weekend demand has almost recovered to pre-pandemic levels, the weekday demand is lower which may be as a result of new hybrid working arrangements since the pandemic.

We have continued to implement measures to improve our short- and long-term safety, health and environmental performance. We have continued to perform well on most of our safety metrics. In Quarter 2, we met our targets for reducing injuries to people in road traffic collisions and injuries to people on or in collision with a bus. The data behind these scores is explained in the road safety section of this report. Conversely, we did not meet our targets for customer injuries and workforce injuries and the reasons behind this are discussed in the public transport safety section of this report.

COVID-19 remained the top cause of short-term staff absence but significantly increased as a proportion of total staff absence, from 30 per cent in Quarter 1 to 44 per cent in Quarter 2. Mental health and musculoskeletal-related health remained the top two causes of long-term absence, which is in line with the national average. Our Occupational Health team continues to run events aimed at giving staff the tools to better look after their mental health.

In Quarter 1, the Government confirmed continued short-term rollovers in funding support whilst discussions continued about a longer-term arrangement. This quarter, we reached a longer-term agreement with the Government on a funding settlement until 31 March 2024. This guarantees our passenger revenue and confirms our ability to deliver investment, including on the Piccadilly line and Docklands Light Railway (DLR). We can also now increase infrastructure renewals, invest in London's streets, invest in improving bus priority, as well as work in partnership with the Department for Transport (DfT) and the London Borough of Hammersmith & Fulham to reopen Hammersmith Bridge.

About this report

This report explores and highlights the performance, trends and measures we are implementing to improve safety, health and environment performance.

Throughout this report, our 'customers' refers to direct users of our services, and our 'workforce' includes our directly employed staff as well as people working in our supply chain. For both groups, we use data collected directly from our operational businesses. Some assault data comes from both our own internal reporting systems and the police.

When referring to people killed or seriously injured, the following causes of injury are excluded: an injury which results from an incident arising from a pre-existing medical condition; intentional self-harm resulting in a physical injury or death; criminal activities perpetrated by customers or members of the public on other customers or members of the public.

Unless otherwise stated, 'streets' refers to all of London's roads, including those managed by London's boroughs which make up the majority (95 per cent) of London's roads. Where we report safety data for streets, we use data collected by the Metropolitan Police Service (MPS) and the City of London Police (CoLP), in line with Government requirements. All road safety data is provisional and subject to review and assurance, with the final data published annually in line with DfT requirements.

Reporting period

Most data covers the quarter from 26 June to 17 September 2022, except for some work-related violence and aggression data which is reported six months in arrears. Some data is provisional and is subject to change.

Mayor's Transport Strategy and Scorecard

Our role is to enable London to move safely and sustainably, in line with the goals of the Mayor's Transport Strategy (MTS). This includes increasing the attractiveness of public transport and making cycling and walking safer, easier and more convenient. One of the central tenets of the MTS is Vision Zero, aiming to eradicate all loss of life and serious injuries from London's streets by 2041. We are also striving to achieve Vision Zero on our public transport network and amongst our workforce.

Scorecard

Figure 1: Quarter 2 2022/23 Scorecard

Measure	Unit	Q2 Target	Q2 Actual
People killed or seriously injured in road traffic collisions per million journey stages	Killed or seriously injured per million journey stages	0.33	0.24
People killed or seriously injured in road traffic collisions in or by a London bus (per million surface journey stages)	Killed or seriously injured per million journey stages	0.020	0.020
Customer all injuries per million passenger journeys	All injuries per million journeys	2.58	2.69
Workforce all injuries	Number of workforce injuries	311	341

The table sets out the relevant scorecard metrics, accompanying targets and actual performance. Below are brief explanations of the performance of each measure. More detailed explanations, with accompanying graphs, are set out in the relevant sections of this report.

Road safety measure

Our aim in Quarter 2 2022/23 was to reduce the number to fewer than 0.33 people killed or seriously injured on the roads per million journeys. In Quarter 2, there were 0.24 people killed or seriously injured on the roads per million journeys.

Bus safety measure

Our ambition is for no one to be killed in, or by, a London bus by 2030. In Quarter 2, our aim was to have no more than 0.020 deaths or serious injuries per million journey

stages. During Quarter 2 there were 0.020 deaths or serious injuries per million surface journey stages.

Public transport safety measure

Our aim in Quarter 2 2022/23 was to have fewer than 2.58 injuries to our customers per million journeys.

During Quarter 2, there was a rate of 2.69 injuries per million journeys, unfortunately missing this target, but a marginal improvement on the previous quarter, which had a rate of 2.73.

Across the quarter, our customer injury rate is lower than the 2.91 recorded in Quarter 2 of 2021/22.

Workforce safety measure

In Quarter 2 our aim was to have fewer than 311 workforce injuries. During Quarter 2 there were 341 injuries sustained by our workforce. This total reflects a return to pre-pandemic levels of some workforce injury causes, such as assaults. Workforce injuries on the Elizabeth line are currently excluded from this target and measure due to it being a new operation lacking the historical data necessary to understand of trends and set meaningful targets. We will continue to monitor the available Elizabeth line data and include within scorecard measures when we have more comprehensive data.

Safety

This section summarises our safety performance across London's roads, public transport, capital delivery activities and work-related violence. It provides an overview of key trends for the year and the areas we are targeting for improvement.

Road safety performance

In Quarter 2, the trend towards pre-pandemic levels of road use continued, with journeys reaching the highest levels since the pandemic. We have seen an increase in walking, cycling, and motorised journeys compared to the same quarter in 2020/21 and 2021/22. Customer journeys on buses are also at the highest levels since the pandemic began but remain below pre-pandemic levels.

Fewer people were killed or seriously injured on London's roads in this quarter (781) compared to last quarter (899), with a corresponding drop in the risk rate of death or serious injury.

Quarterly performance

Figure 2: Number of people killed on London's roads*

Transport Mode	Q2 2019/20	Q2 2020/21	Q2 2021/22	Q2 2022/23
Pedestrian	17	12	9	8
Pedal cycle	2	1	2	1
Powered two-wheeler**	10	11	2	3
Car	4	1	5	7
Bus or coach	0	1	1	0
Taxi	0	0	0	0
Private hire	0	0	0	0
Goods vehicle	0	0	0	2
Other vehicle	1	0	2	2
Total	34	26	21	23

*Quarter 2 2022/23 figures are provisional and subject to change.

**Powered two-wheeler refers to motorcycles, mopeds and scooters.

It is useful to compare Quarter 2 2022/23 to Quarter 2 in 2019/20 because of the significant changes seen in the number of people using the road network over the last few years of the pandemic. A total of 23 people were killed on London's roads in Quarter 2 2022/23, which is broadly similar to the same quarter in 2020/21 and 2021/22. However, the number of people killed in this quarter is significantly less than the equivalent pre-pandemic quarter (Quarter 2 2019/20).

Notably, the number of people killed while walking in Quarter 2 2022/23 was just under half of the 2019/20 pre-pandemic figure, and approximately a third for powered two-

wheelers. This is similar to the trend seen last quarter (Quarter 1 2022/23), which also observed a significant decrease in pedestrian and powered two-wheeler fatalities.

Over the last three quarters, we have seen an increase in the number of car occupants killed on the roads, when compared to the equivalent pre-pandemic quarters. In this quarter there were seven car occupants killed, compared to five in the same quarter last year and four in Quarter 2 2019/20 (pre-pandemic). Provisional analysis of the available raw casualty data suggests that excessive speed is a key factor, with loss of control of the vehicle leading to a collision. The trend has been particularly prevalent on A-roads and our roads policing teams are factoring this into their operations.

Figure 3: Number of people seriously injured on London's roads

Transport Mode	Q2 2019/20	Q2 2020/21	Q2 2021/22	Q2 2022/23
Pedestrian	263	162	204	193
Pedal cycle	216	306	253	209
Powered two-wheeler	273	199	250	186
Car	140	97	128	124
Bus or coach	25	6	22	1
Taxi	3	1	0	22
Private hire	3	0	2	4
Goods vehicle	8	2	3	17
Other vehicle	9	22	33	2
Total	940	795	895	758

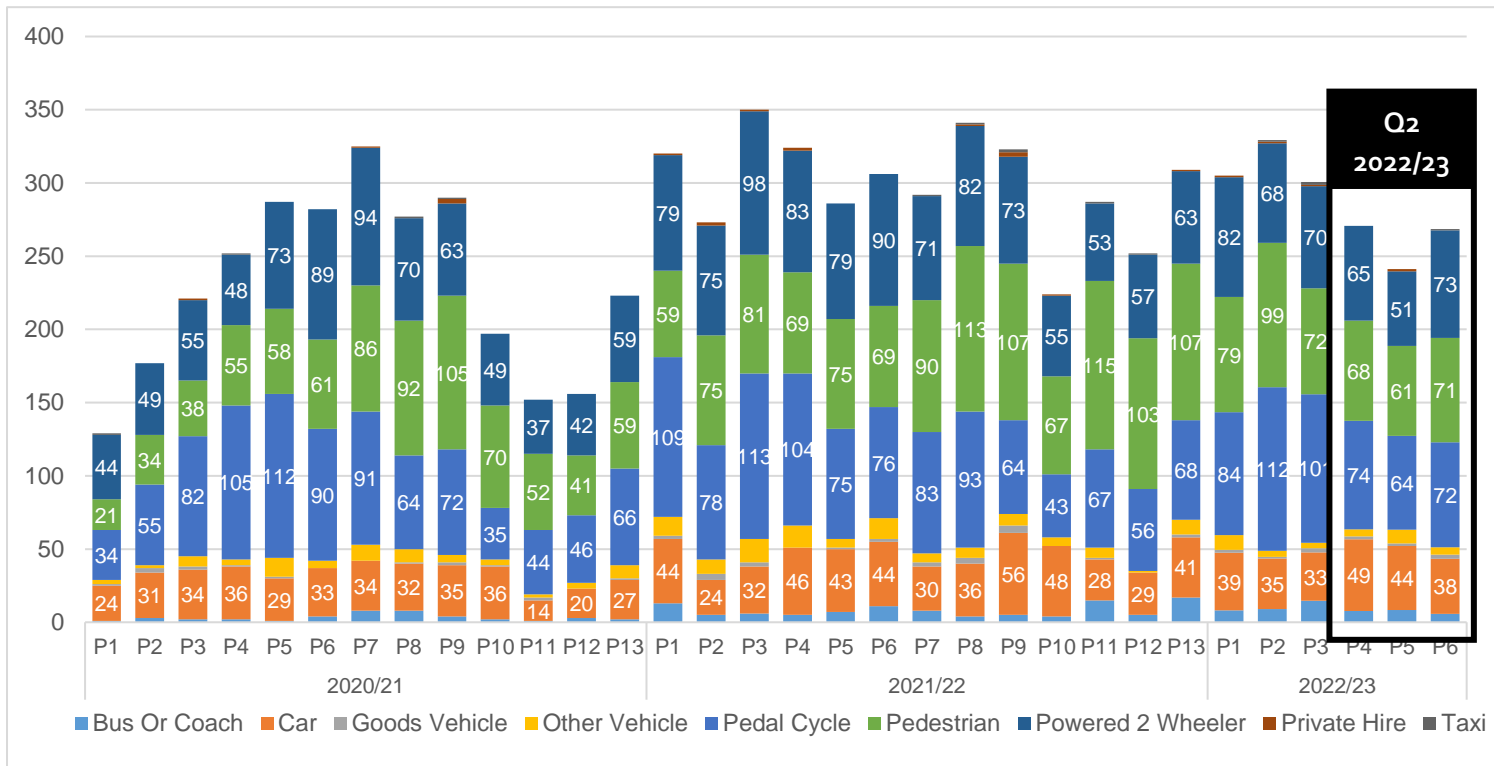
**Quarter 2 2022/23 figures are provisional and subject to change.*

The number of people seriously injured has decreased compared to the same period last year (758 serious injuries compared to 895 in Quarter 2 - 2021/22) and is also lower than the equivalent period in 2019/20 (pre-pandemic). Against this trend, the number of people seriously injured in a taxi was greater in Quarter 2 - 2022/23 compared to the equivalent pre-pandemic quarter, as well as Quarter 2 - 2020/21 and Quarter 2 - 2021/22. This is also in contrast with the trend seen in previous quarters this calendar year, and where serious injuries for taxi occupants have all been in single digit figures. We will continue to monitor this trend as this is a cause for concern.

Serious pedal cycle injuries remained broadly similar in Quarter 2 - 2022/23 when compared with the pre-pandemic figure. This is an improvement on last quarter (Quarter 1 - 2022/23) which showed an increase on the pre-pandemic serious injury figure for people cycling.

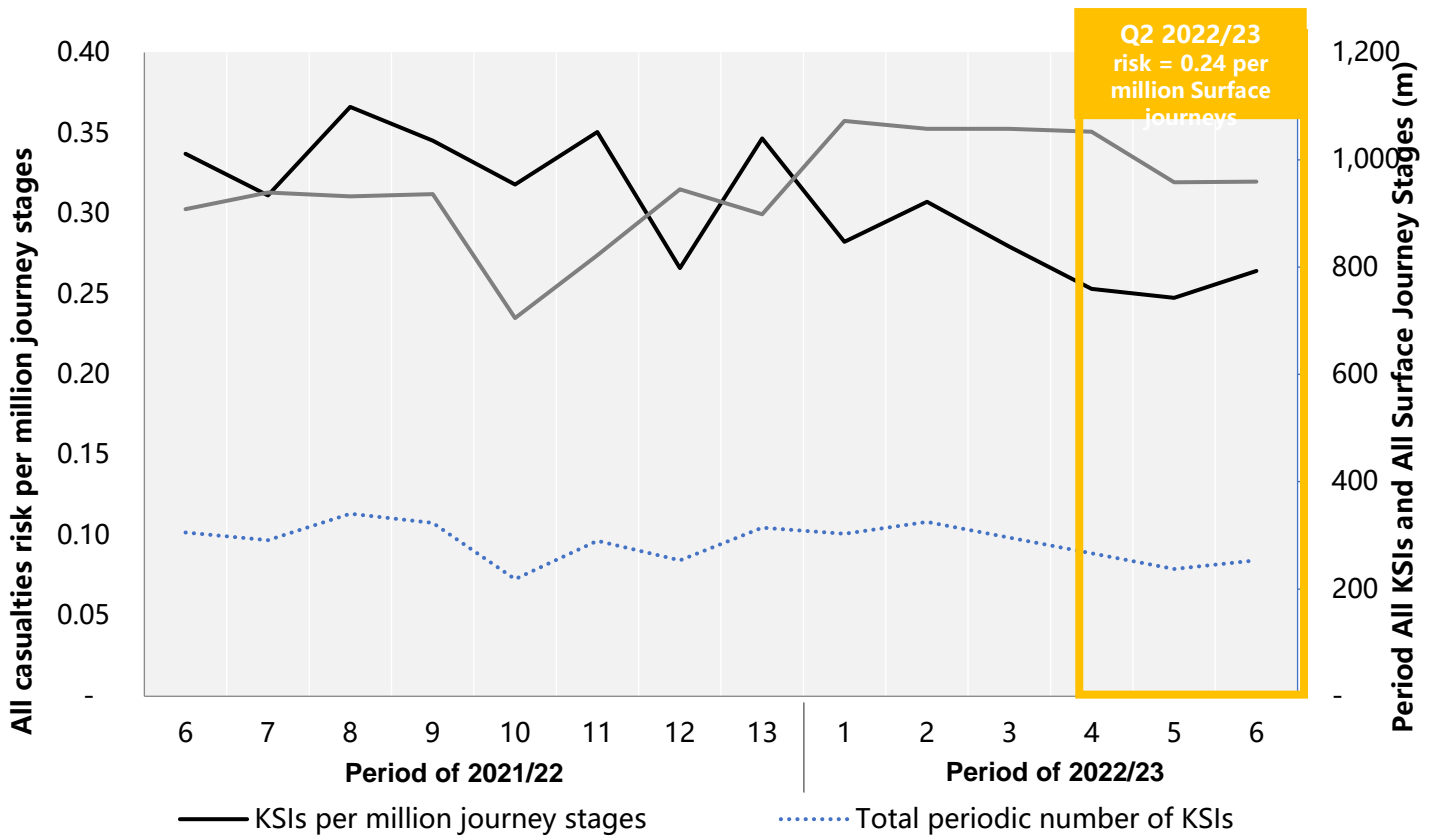
The number of people seriously injured on or by a bus or coach decreased in Quarter 2 - 2022/23 compared to the equivalent quarter for the last two years and the pre-pandemic year (2019/20). This is significant because we had been seeing an increase in serious injuries on or by a bus or coach over the last year when compared to 2019/20.

People killed or seriously injured on London's roads (by mode travelled)



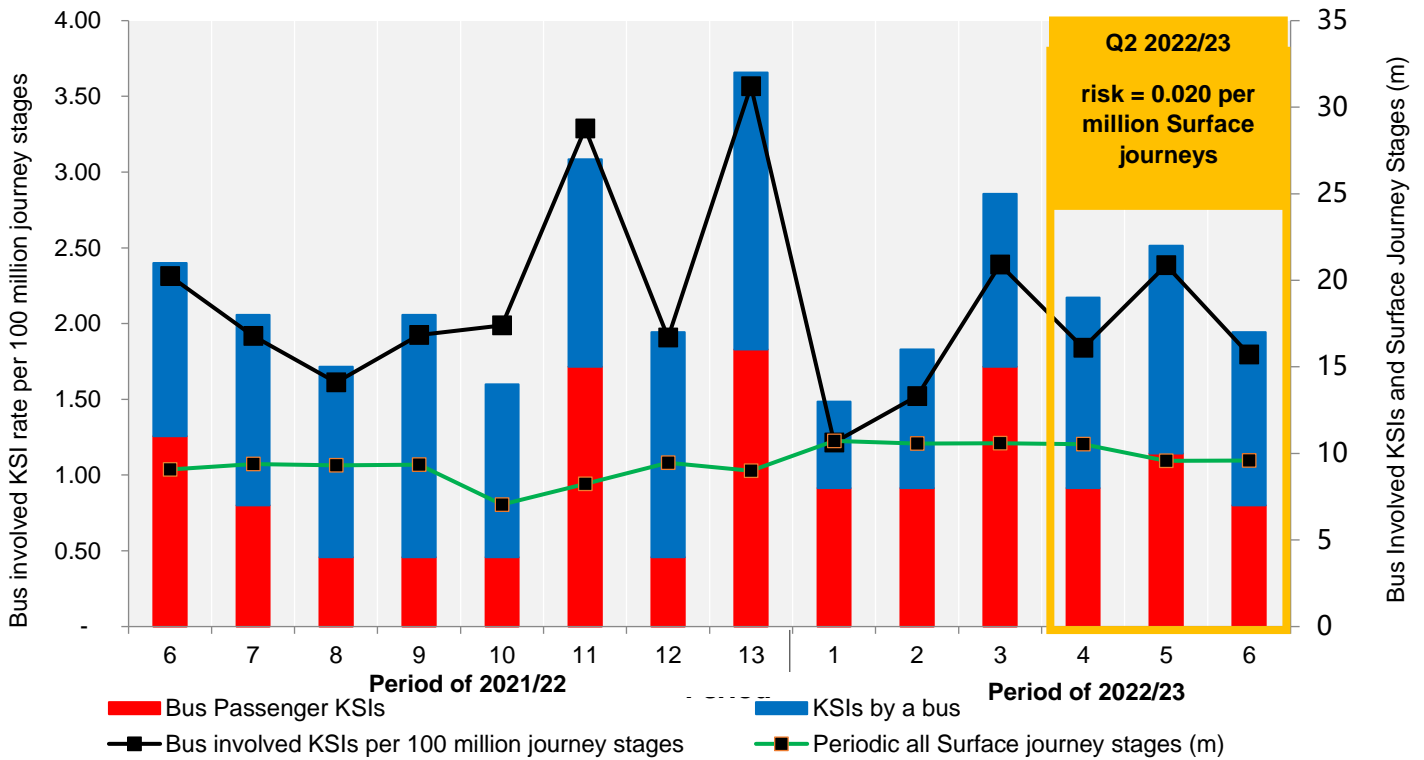
In Quarter 2 - 2022/23, 781 people were killed or seriously injured on London's roads. People walking, cycling and motorcycling accounted for 77 per cent of those killed or seriously injured. This proportion is slightly lower than the past few quarters as a result of fewer motorcycle and cycle injuries. Since the pandemic and a return of motorised traffic, the longer-term trend appears to be roughly 300 people killed or seriously injured each period, which is similar to the 2017-19 average, albeit with changes in the composition of who is injured. This highlights the challenges London faces in making continual progress towards its Vision Zero goal.

Scorecard measure: All casualties in road traffic collisions (per million journeys)



During Quarter 2, there were 0.24 people killed or seriously injured on the roads per million journeys, which meets our scorecard target and forms part of a continuing downward trend, but shows that there is still much more to be done.

Scorecard measure: Rates of fatal or serious injury experienced by people in collision with buses



Our ambition is that no one is killed or seriously injured on, or by, a London bus by 2030. The risk of a bus being involved in a collision that kills or seriously injures either a bus passenger or someone else on the roads remains extremely low.

In Quarter 2, our aim was to have no greater than 0.020 deaths or serious injuries per million journey stages. Our aim for bus safety is more stretching than the general road safety aim, to reflect our ability to directly influence bus services. In Quarter 2 there were 0.020 deaths or serious injuries per million surface journey stages. We have met our target this quarter, and we have also seen a decrease in the number of deaths or serious injuries on or by a bus for the first time this calendar year as COVID 19 pandemic recovery continues.

Road safety updates

Vision Zero action plan progress report

The [Vision Zero action plan progress report](#), published in November 2021, reiterates our focus on actions that contribute to creating a safe road network.

Safe Speeds

Lowering Speed Limits Programme

The second phase of the programme is underway to reduce speeds by 10mph on a further 140km of our roads. Currently 108km of the TfL Road Network (TLRN) has a 20mph speed limit, against a target of 220km by May 2024. We remain on target to achieve this. We will shortly be engaging with local residents and businesses on proposals to lower a further 28km of the TLRN in north London. This will see a consistent 20mph speed limit across the majority of roads in Camden, Islington, Hackney, Tower Hamlets and Haringey.

Raised pedestrian crossings will soon be introduced in eight locations to further reduce danger to people walking and increase compliance with the new speed limit, as well as introducing accessibility benefits for mobility impaired customers. This work is currently in detailed design and construction will commence in early 2023.

Works to extend the 30mph speed limit at Gants Hill town centre are imminent and underway for the planned 20mph speed limit on 1.5km of the A205 in Wandsworth. Detailed design work is in progress to lower the speed limit on a total of 35km of the TLRN including the introduction of a 40mph speed limit on the A4 Bath Road which will also support planned pedestrian safety improvements at this location.

Concept design work has also started to lower the posted speed limit on a further 73km of our roads, which comprises the third wave of delivery of this programme. Phase 2 of the Lowering Speed Limits programme is due to complete in May 2024.

Safe Streets

Safer Junctions

Design work continues on 30 junctions, including detailed design of York Road roundabout and Holloway Road/Drayton Park, where we are delivering safety measures for motorcycle riders and people walking respectively. Subject to funding, we aim to commence construction of these projects in early 2023.

After having done work on the detailed design, works have commenced on site for a new 20mph speed limit through the junction of A205 Upper Richmond Road with

Putney Hill/Putney High Street. This marks the first phase of a three-stage approach to improve road danger at this location.

In November 2021 a new pedestrian crossing was introduced over Battersea Bridge, where a person walking was tragically killed at the beginning of 2021. The second phase of this project is planned for public engagement in Autumn 2022. We are currently developing plans to address safety issues at Battersea Bridge by introducing brand new crossings and better facilities for people cycling.

Safe Vehicles

Direct Vision Standard

The Direct Vision Standard (DVS) scheme requires owners of heavy goods vehicles (HGVs) weighing more than 12 tonnes to apply for a free permit. Vehicles are assigned a star rating based on how much the driver can see directly through their cab windows to be able to drive safely in London. Those with the largest blind spots, rated as zero-star vehicles, must be fitted with enhanced safety features, known as the safe system, as a condition of the permit.

Since its introduction we have issued more than 220,874 permits. Over 131,586 of these were issued for zero-star rated HGVs that have now had safe systems fitted, addressing blind spots and warning other road users of the danger. A total of 104,365 penalty charge notices were issued where HGVs entered London without a permit up to the end of Quarter 2 2022/23.

Electric Scooters

The e-scooter rental trial¹ has expanded significantly since its launch on 7 June 2021., Up to 25 September 2022, approximately 1,770,000 hire trips were made across the three operators taking part in London's trial – Dott Lime and TIER. These journeys have averaged a distance of 2.6km per trip and have covered more than 4.6m kilometres in total, with June and July 2022 the busiest months for the trial so far. Operators have reported no fatalities, and a total of 21 serious injuries have been reported based on the STATS19 injury classification definitions.

Transport for London (TfL) and London Councils have extended the capital's trial of rental e-scooters from 6 June 2022 until 31 May 2024.

London's trial launched in June 2021 and has expanded significantly since then, with 10 boroughs, more than 500 designated parking locations and 4,425 e-scooter vehicles now involved. Updated DfT guidance allows existing trials in the UK to be

¹ <https://tfl.gov.uk/modes/driving/electric-scooter-rental-trial>

extended until May 2024, enabling local authorities to continue to test the vehicles in a safe and legal way.

Thousands of users have benefitted from the operators' discount schemes, which make the rental vehicles more affordable for people on low incomes and with disabilities.

The e-scooter operators involved in the trial collaborated well during Operation London Bridge by updating geo-fencing to exclude their use in key areas. They deployed additional resources during this period to ensure that devices were suitably parked and to minimise obstructions.

Bus Safety Standard

We are continuing to roll out the Bus Safety Standard (BSS) to new vehicles joining the fleet. The number of new buses meeting the BSS specification continues to climb, with approximately 837 buses now in the fleet. The safety measures include Intelligent Speed Assistance (ISA) technology which limits buses speed to the posted speed limit.

Around 25 per cent of London's bus fleet now has ISA, including buses which have been retrofitted. Other measures in the BSS include an Acoustic Vehicle Alerting System (AVAS) which is now on 697 quiet-running buses, and 743 buses fitted with Camera Monitoring Systems (CMS), which aim to reduce blind spots.

The next milestone for the BSS is 2024, when a range of further safety measures will be required. We have also included two additional new safety measures for implementation in 2024 within our latest New Bus Vehicle Specification and will publish a revised Roadmap later this year to reflect these changes.

Pedal Confusion

Research commissioned from AECOM has now been completed and this study has been published on [our website](#).

The report sets out several recommendations which are being incorporated into the work overseen by the joint TfL and bus operator Working Group and Steering Group for pedal confusion. The Steering Group is attended by Senior Managers representing some of our Bus Operators and Senior TfL representatives across Bus Operations and Engineering.

Managing Bus Driver Fatigue

In July 2021, we commissioned the University of Surrey to undertake research to support TfL and bus operators in understanding the suitability, limitations and potential for using existing fatigue and/or risk assessment scheduling and rostering tools. As part of Stage 1 of this work, an additional validation exercise was undertaken to

validate existing tools that have been explored during this project against real world data from a trial of Fatigue Detection Technology. The University of Surrey has submitted the draft report for end of Stage One which is being reviewed by TfL.

Safe Behaviours

Enforcement

The Metropolitan Police Service (MPS) have dealt with 321,825 road traffic offences through enforcement action in 2022/23 (April – August 2022). This is 49 per cent higher than April – August 2021 (an additional 105,848 offences).

Enforcement action includes Traffic Offence Reports which are issued by police at the roadside, arrests or Notices of Intended Prosecution for offences enforced through safety cameras or evidence provided members of the public (for example, through headcam or dashcam footage).

The MPS prioritises its enforcement on the offences that cause the greatest risk and harm on London's roads. This includes speeding, mobile phone offences, driving under the influence of drugs and alcohol, red light offences, careless or dangerous driving, driving without a licence or in an uninsured vehicle or driving while disqualified. During 2022/23 (April – August 2022), 89 per cent of all road traffic enforcement action taken by the MPS was for priority offences, six per cent lower than 95 per cent during April – August 2021. Speed enforcement accounted for 80 per cent of all traffic enforcement, reflecting the risk and harm this causes.

In 2022/23 (April – August 2022), the MPS enforced 257,590 speeding offences. This was 46 per cent higher than April – August 2021 (an additional 81,626 offences). This is due to the planned uplift in safety camera enforcement, as part of the shared collaborative programme between the MPS and TfL, to improve the MPS's capability to enforce greater volumes of offences captured by safety cameras. This is not an indication that speeding is worsening but that the MPS's capacity to issue more penalties has improved.

The above traffic enforcement results are provisional and are subject to change as more offences are processed.

At the end of January 2022, we introduced a new mobile safety camera capability (five lasercam devices) operated by Roads Policing Police Community Support Officers. This capability complements police roadside enforcement activity and the fixed safety camera network and will enable us to deal with more offences. The MPS has enforced

over 28,000 speeding offences through mobile safety cameras since they were introduced.

Mandatory Cycle Lane Enforcement

In June 2022, we announced we will begin issuing fines to vehicles that drive within, or cross, the white lines of cycle lanes that are marked by a solid white line and cycle tracks on the TLRN.

We have carried out civil enforcement of vehicles entering cycle lanes using our existing CCTV network, with drivers failing to comply being subject to a fine of £160. There is also a six-month warning notice in place for first-time offences to educate motorists, with the aim of increasing compliance.

Between 27 June and 3 August 2022, 235 warning notices were issued to drivers and we are closely monitoring how successful the warning notice campaign has been and the compliance levels at these locations. To support this, we launched an advertising campaign in July 2022, targeting private and commercial drivers, to raise awareness of the new fine and direct drivers to the red route section of our website to find out more. This campaign included adverts in the Metro newspaper and on buses.

Powered two-wheeler (P2W) Training Courses

Demand and attendance on both TfL's motorcycle safety training courses remains strong. Year-to-date (January to September 2022), 464 riders have completed one-to-one Motorcycle Skills and 320 riders have completed Beyond CBT (Compulsory Basic Training), the training course aimed specifically at those who ride for work.

Since the inception of TfL's P2W courses, 4,708 individuals have been trained across the two courses.

Information on all TfL's motorcycle training courses can be found [here](#).

Post Collision and Criminal Justice

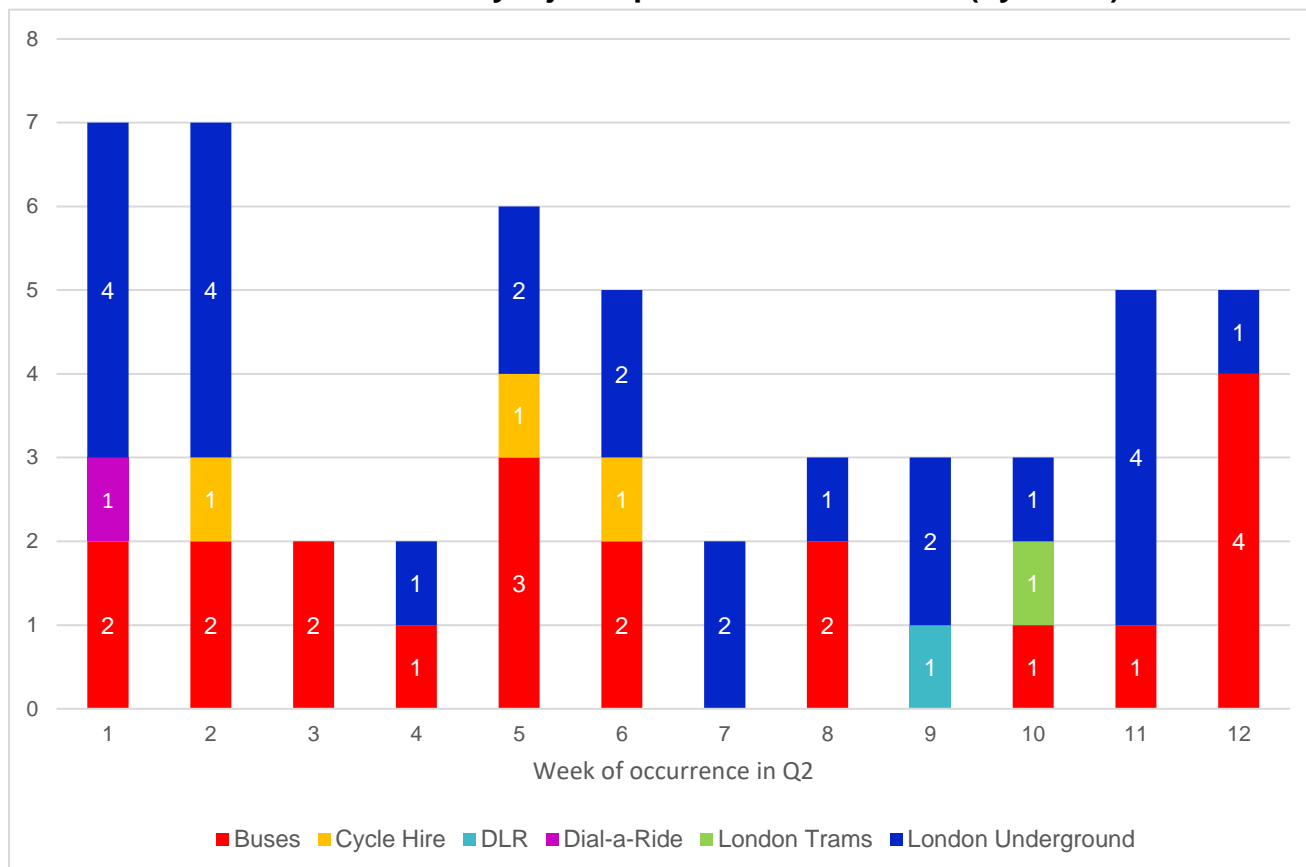
We are carrying out analysis of inequalities in London's road casualties and plan to publish initial findings by the end of this year.

On 21 September 2022, we held a listening session with victims of road trauma with the Mayor of London, TfL Commissioner, the MPS and London Councils. The session gave victims of road trauma in London the opportunity to share their stories with key decision makers, setting out what needs to improve across the system to enhance victim support after a collision. We are grateful to Roadpeace for their role in facilitating the organisation of this session. We will look to continue these sessions to ensure the voices of victims are at the centre of decision making and policy development.

Public transport safety performance

Quarterly performance

Customers killed or seriously injured per week in Quarter 2 (by mode)



No customers were killed on our public transport network during Quarter 2, but sadly, 50 customers were seriously injured. In the previous quarter, one customer was tragically killed on our public transport network and 43 customers were seriously injured.

The serious injuries occurred across the following public transport modes: on London Underground (LU) 24 injuries (48 per cent), 20 on buses (40 per cent), three on Cycle Hire and one each on Dial-a-Ride, London Trams and the DLR. There were no serious injuries on the newly opened Elizabeth line or London Overground services in Quarter 2.

Slips, trips and falls remain the most common incident type, with 68 per cent of serious injuries on public transport involving a form of slip, trip and fall.

On LU, 66 per cent of serious injuries involved a slip, trip or fall, with eight occurring on an escalator and six on stairs. Intoxication was a factor in five of the incidents. Not

holding on and being overburdened by luggage were further potential factors. A number of workshops with station colleagues and the Customer Experience Team have taken place to undertake data deep dives to understand the most common customer behaviours that contribute to incidents occurring at these stations. The outcomes of these workshops have been used to identify actions, such as improved signage to encourage customers carrying luggage to use lifts.

On buses, 90 per cent of serious injuries involved a slip, trip or fall. Those over 65 years old, made up one third of those seriously injured on buses. There were also three serious incidents on buses involving infants in prams or buggies. In line with the previous quarter one of the main factors cited was the bus braking in response to other road users. This was a factor in two of the serious injuries involving an older person and all of the serious injuries involving infants.

In collaboration with TfL, a number of the bus operating companies are trialling technology that scans for hazards in the road ahead to help with the anticipation of potential collisions and maximising the time available for safely braking. Following on from the successful Destination Zero driver training course, we are now developing an Equality, Diversity and Inclusion course for bus drivers. Delivery will commence in 2023 and will increase driver awareness and empathy with customers, including the elderly and vulnerable, and reinforce the need for correct stop alignment, lowering the height of the bus and allowing sufficient time for customers to settle.

The three serious Cycle Hire injuries in Quarter 2 all involved collisions with motorised vehicles. One customer collided with a taxi, another with a car while exiting side roads and another was involved in a collision with a motorcycle. A person walking was injured in a collision at the front of a London Tram.

A Dial-a-Ride passenger was seriously injured when using their mobility scooter to exit the vehicle. On the DLR, an intoxicated customer fell between the train and the platform when the train was stationary.

There is no significant change in trends in the serious injury data between quarters, but in looking at the circumstances and people involved, there continues to be a need to consider more vulnerable people and modes and ensure a joined-up approach across road and public transport safety interventions.

Customers killed or seriously injured per quarter this year

Compared to Quarter 1, 10 more customers were seriously injured this quarter, despite passenger numbers being similar (0.73bn in Quarter 1 and 0.72bn in Quarter 2). There

is no obvious reason for the increase, though it is possible that the summer period influenced travel patterns and behaviour differently to Quarter 1.

There were also 10 more customer serious injuries than in Quarter 2 - 2021/22, when there were three deaths and 40 serious injuries. Although this is a 25 per cent increase in customers seriously injured from the same quarter in the previous year, it has not been proportionated to the 100 per cent increase in passenger numbers, doubling from 0.36bn in Quarter 2 - 2021/22 to 0.72bn Quarter 2 - 2022/23.

Scorecard measure: Customer all injuries rate (per million passenger journeys)

The number of customer injuries per million passenger journeys this quarter is 2.69. Unfortunately, the Quarter 2 customer injury rate is above our 2022/23 target of 2.58 injuries per million passenger journeys.

This target customer injury rate represents a five per cent reduction in our customer injury rate performance last financial year. This rate of improvement, if sustained year-on-year, is equivalent to the elimination of all customer injuries by 2041.

While we are not yet meeting our scorecard target, our customer injury rate this quarter is lower than our customer injury rate of 2.91 in Quarter 2 2021/22, suggesting we are progressing in the right direction.

As with the previous quarter, this quarter there has been an overall reduction in the rate of customer injuries per million passenger journeys resulting from slips, trips, or falls compared to Quarter 2 2021/22. The rate of customer injuries mentioning a slip, trip, or fall reduced by 23 per cent on LU, with buses showing no significant change.

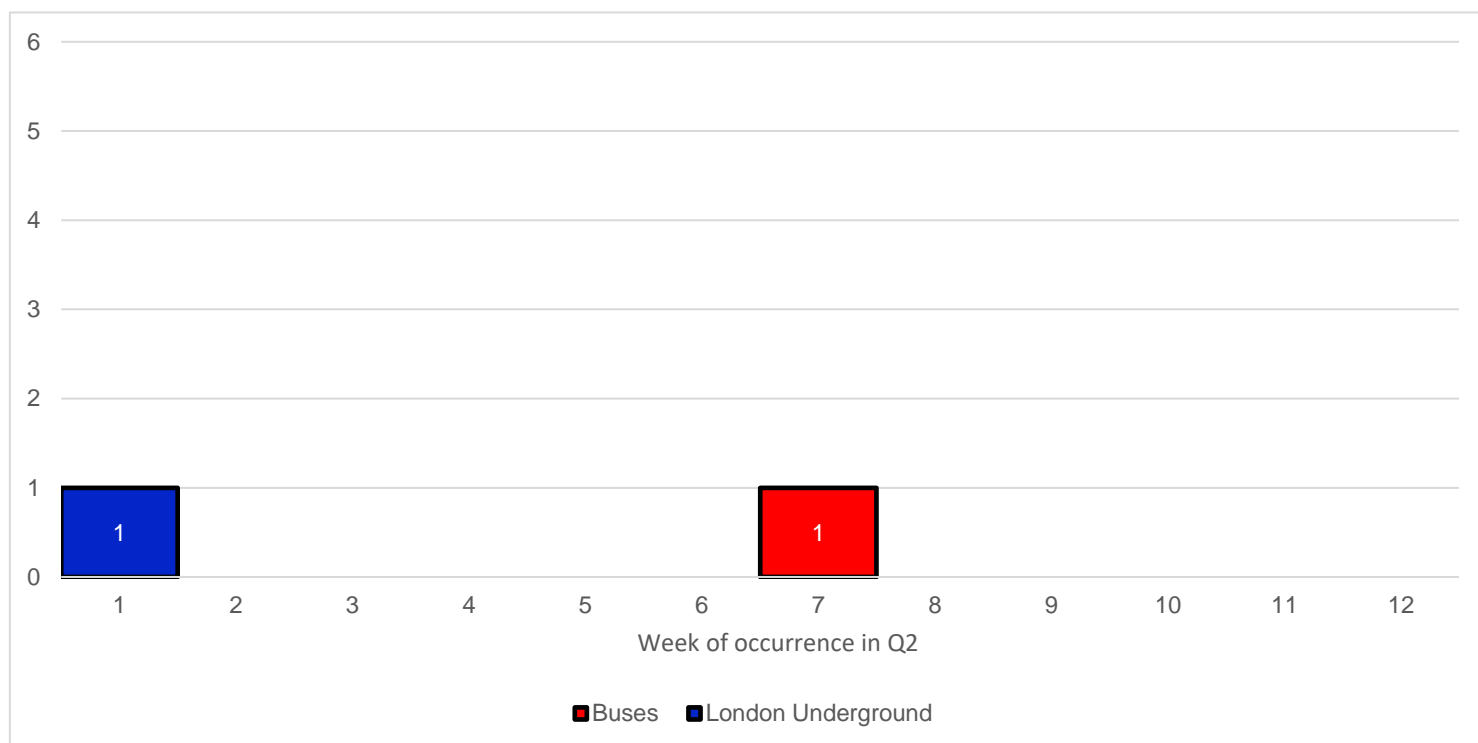
As detailed in the Quarter 1 2022/23 report, often slips, trips and falls occur on specific station or vehicle infrastructure such as stairs and escalators. We are currently seeing different trends in relation to risk on stairs and escalators. For slips, trips and falls on the bus network, we've recently started a pilot with several bus operators of gathering additional information by reviewing the available CCTV of these incidents. This will help to create a more comprehensive dataset of the contributory factors which can often come together leading to an incident.

While the risk of injury on escalators remains the same in Quarter 2 in both 2021/22 and 2022/23, there is an encouraging trend in reduced risk of injury on stairs in LU. Reduction in risk of injury on stairs has been seen across both Quarter 1 and 2 2021/22. Stair-related customer injury risk this quarter is 32 per cent lower than in 2021/22. It was 39 per cent lower in Quarter 1 2022/23 than Quarter 1 2021/22.

On buses, the rate of customer injuries mentioning a collision or sudden braking has remained the same as Quarter 2 2021/22. Tackling this issue remains a priority and is

something we continue to work on through our Bus Safety Standard, bus driver training and road safety interventions.

Workforce killed or seriously injured per week in Quarter 2 (by mode)



This section does not include injuries to our construction and projects workforce, which are covered in the Capital safety section below.

No one was killed whilst working on our public transport network in Quarter 2. Unfortunately, two members of our workforce were seriously injured, one on buses and one on LU. Both incidents involved a slip, trip or fall.

This compares to four serious injuries sustained by people working on our public transport network in Quarter 2 2021/22 (three on London Underground and one on buses).

Scorecard measure: All Workforce injuries

Our target across this financial year is to reduce workforce injuries by five per cent compared to the previous financial year, 2021/22.

In Quarter 2, 317 members of our public transport workforce were injured (not including colleagues involved in construction and projects). This is an increase of 12 per cent compared to 296 workforce injuries in Quarter 2 2021/22.

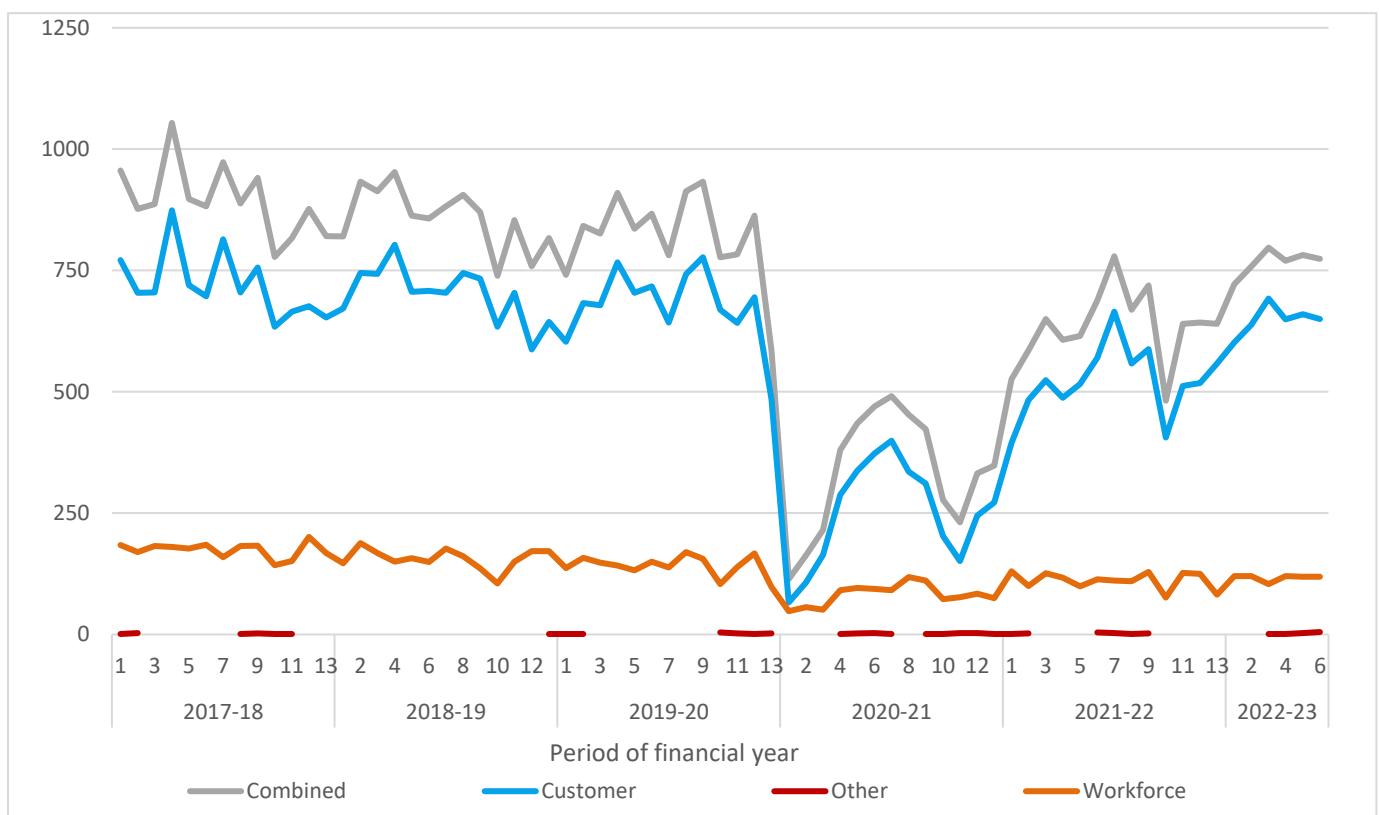
As with customer injuries, although there has been an increase in workforce injuries, this has not been proportional to the increase in passenger numbers which increased by 100 per cent between Quarter 2 2021/22 and Quarter 2 2022/23.

In line with the previous quarter, the most prominent incident types and contributory factors include assaults and crime-related incidents, slips, trips and falls and collisions.

The greatest increase in workforce injuries was within LU, with 184 injuries in Quarter 2 2022/23 compared to 122 in Quarter 2 2021/22. This could in part be explained by both an increase in reporting with the introduction of body-worn cameras and the rollout of the Workplace Violence and Aggression programme, along with the increase in customer numbers.

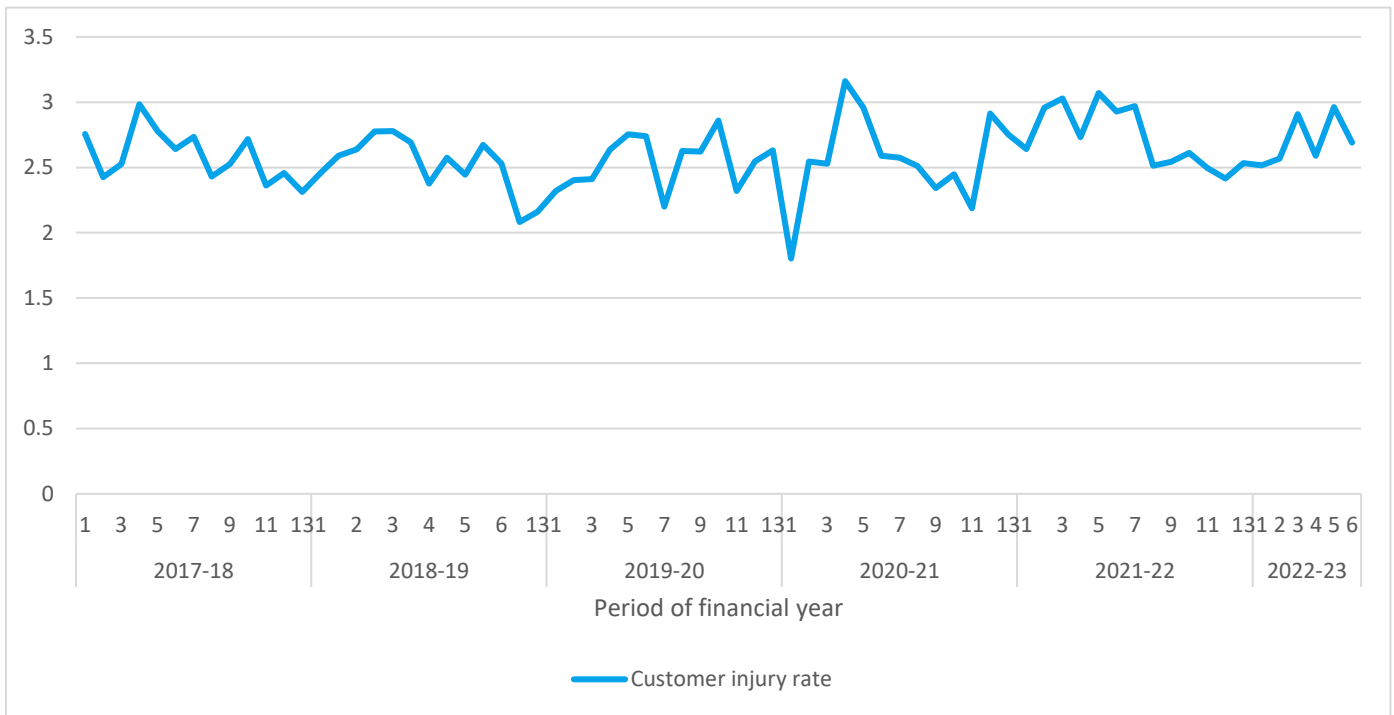
Long term trend

Customer and workforce injury numbers per period since 2017-18 (total)



As our customer numbers have begun to recover towards pre-pandemic levels, we have seen corresponding increases in both customer and workforce injuries. The number of customer injuries this quarter is at a level equivalent to some of the lower periodic customer injury totals pre-pandemic. This has remained stable in both Quarter 1 and Quarter 2 2022/23. Workforce injury numbers remain lower than pre-pandemic.

Customer injury rates per period since 2017/18 (total)



Despite this recent increase in periodic customer injury totals, we have seen relatively stable injury rates compared to the spikes seen during periods of the pandemic. These rates have more closely resembled pre-pandemic levels than the heightened customer injury rates experienced during much of the pandemic.

Public transport safety updates

Suicide Prevention Programme

Year-on-year data comparison tells us that since 2018, our Suicide Prevention Programme has helped reduce the number of suicides by 45 per cent across the LU network.

We have trained 90 per cent of the 6,000 LU station staff in suicide prevention so far and we continue to train all new starters as part of their induction. The training is open to all TfL staff, and we have recently opened the course to some of our stakeholders, including the British Transport Police (BTP) and the London Fire Brigade (LFB).

In Quarter 2, we made 163 life-saving interventions, bringing the total over the last few years up to 2,515. Our current intervention rate is 95.6 per cent for the 2022/23 financial year so far, which is the highest in the programme's history.

In Quarter 2 we trained a further 26 Safeguarding Officers. The total number of accredited Level 3 LU Safeguarding Officers is now 64.

We are working towards accreditation in the DfT's Safeguarding on Rail Scheme and hope to gain full accreditation by November 2022.

We delivered the Thrive LDN Grab Bags (or Mental Health First Aid Kits) to 161 LU stations so far and we are aiming to deliver the remaining bags to all LU stations by the end of 2022.

Fatigue and Dial-a-Ride

As part of rolling out our pan-TfL Fatigue Management Programme, this quarter we carried out screening to understand and manage fatigue and wider wellbeing in our Dial-a-Ride (DaR) team.

Office-based staff, management, drivers, attendants, mechanics and other operational staff were all included in the screening.

The screening looks at objective information such as the types and lengths of shifts, working environment and other practices which may increase the potential of fatigue. It also looks at what is in place to raise awareness and reduce the impact of fatigue such as training and management conversations.

Across all seven DaR locations and 283 staff, we identified relevant fatigue factors present for staff and the existing mitigation activities. Using this information, we are developing a bespoke plan to further strengthen our management of fatigue, reduce fatigue factors and improving staff wellbeing.

Rail and Sponsored Services Wellbeing Expo

The second annual Rail and Sponsored Services Wellbeing Expo was held from 12 to 14 September 2022. The first day saw in-person events, with the TfL Wellbeing Bus at Croydon offering 15-minute health checks, whilst at Poplar Depot there was a programme of breathwork, meditation and sound healing with The Zen Project.

A packed virtual programme was offered on days two and three with sessions run by TfL staff as well as external speakers. Sessions ranged from Mindfulness to Fatigue, Stress Management Techniques to Yoga, Self-care to Avoiding Distractions. It was also an opportunity to raise awareness on wellbeing support within TfL and the role of our Independent Disability Advisory Group in helping customer wellbeing. All the sessions were recorded so colleagues across the business can catch up on any they missed.

Cycle Hire

Cycle Hire continued to perform well, with a total of 3,248,920 hires in Quarter 2. August 2022 marked the 12th successive month of record hires. Added to this, we have continued to provide a 50 per cent discount for NHS staff (those with an NHS email address) with a total of 168,427 rides redeemed via the promotional code since

the NHS discount came into operation in the pandemic to September 2022. We continue to work closely with the police to retrieve lost or stolen bicycles.

New electronic vehicles (five vans and six cargo bikes) are in operational deployment with new livery. This complements the launch of 500 e-bikes on Monday 12 September 2022, opening the possibility of cycling to more of our customers.

Capital safety performance

Capital works cover a broad range of activities across our former Major Projects, Project and Programme Delivery and LU Capital Delivery areas. Some are essential asset renewals and maintenance to keep our frontline service operating efficiently. Other activities represent new and significant investments to improve existing infrastructure. Within the Capital area, teams comprise employees from both TfL and supplier organisations. Likewise, work sites may be managed by TfL or by suppliers acting as our Principal Contractor. We do not distinguish between TfL or supplier hours worked or incidents within this section of the report.

During Quarter 2, on 1 September 2022, a new director structure was implemented within TfL. The changes will see the majority of capital works fall under TfL Capital, the area overseen by the Chief Capital Officer. However, more detailed assessments to determine which teams sit within each director area are still ongoing and so for consistency with Quarter 1, there has been no change to how safety performance data is displayed in this report. Looking ahead, the most notable changes for Capital will include the incorporation of the TfL Engineering and Asset Strategy teams, and the separation of the former LU Capital Delivery teams between the Capital and the Operations areas. It is important to note that none of this will have any noticeable adverse impact on the day-to-day safety performance of our projects.

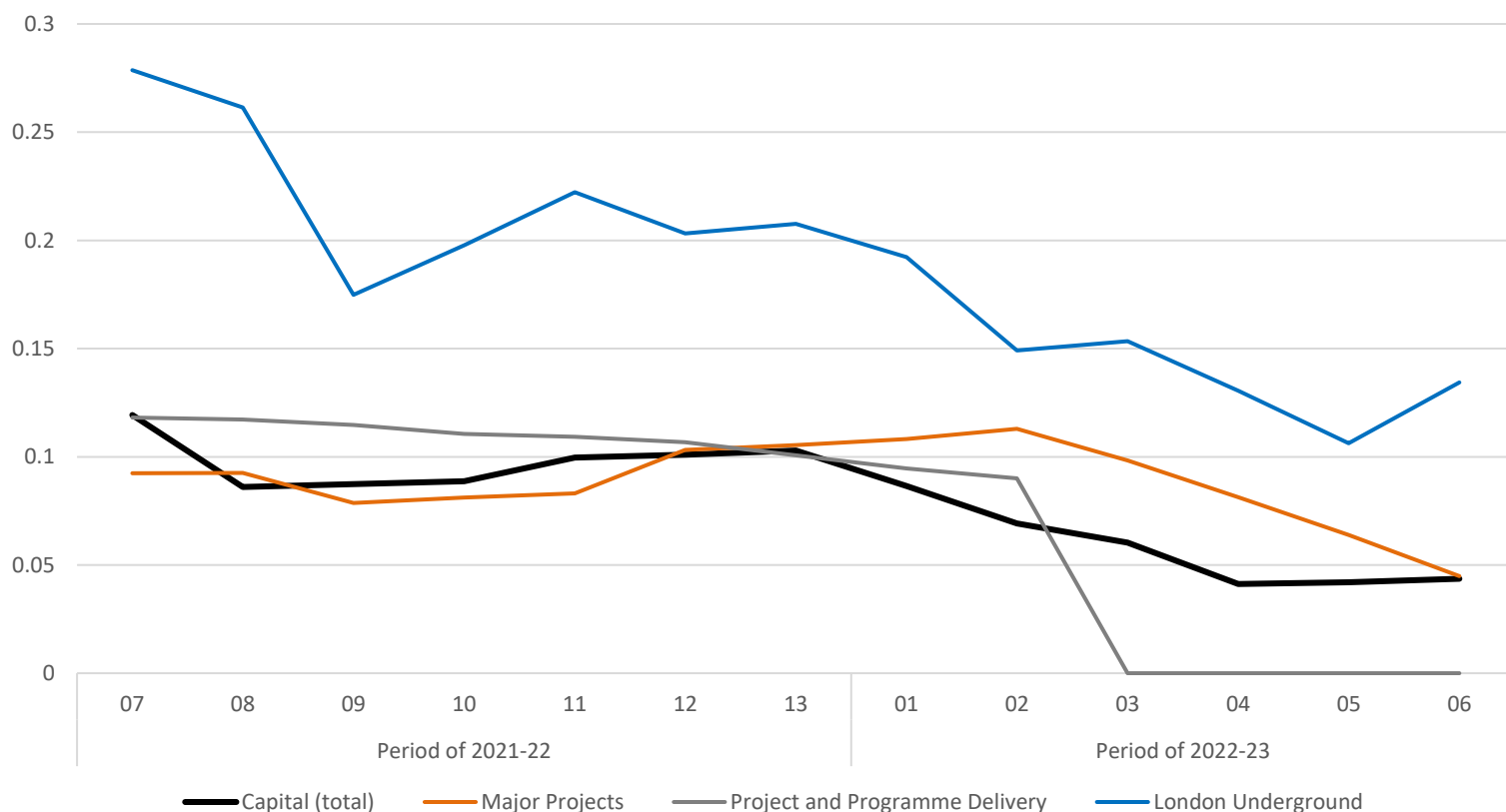
During Quarter 2 the Capital area workforce completed 2 million hours worked, just below the 2.1 million hours worked during the previous quarter. Compared with Quarter 2 of 2021/22, there has been a 25 per cent reduction in the number of hours worked, predominantly as a result of some of our major projects, such as the Northern Line Extension, Bank Station Capacity Upgrade and Barking Riverside Extension, reaching or nearing their conclusion. However, with a new Capital funding agreement now in place with the Government, we hope to be able to make some increased capital investment in key areas. This is likely to lead to an increase in hours worked in the longer term.

Quarterly performance

To enable accurate analysis of data, some of our key measurables are quoted as a frequency rate per 100,000 hours worked. Frequency rates are calculated using a moving annual average based on performance over the previous 13 periods.

In addition to reporting on performance across the three Capital teams individually, we also report on our overall Capital performance. Over the coming quarters, the composition of the Capital area and the data we report on within this section will continue to evolve in line with changes to TfL's organisational structure.

RIDDOR accident frequency rate (per 100,000 hours worked)

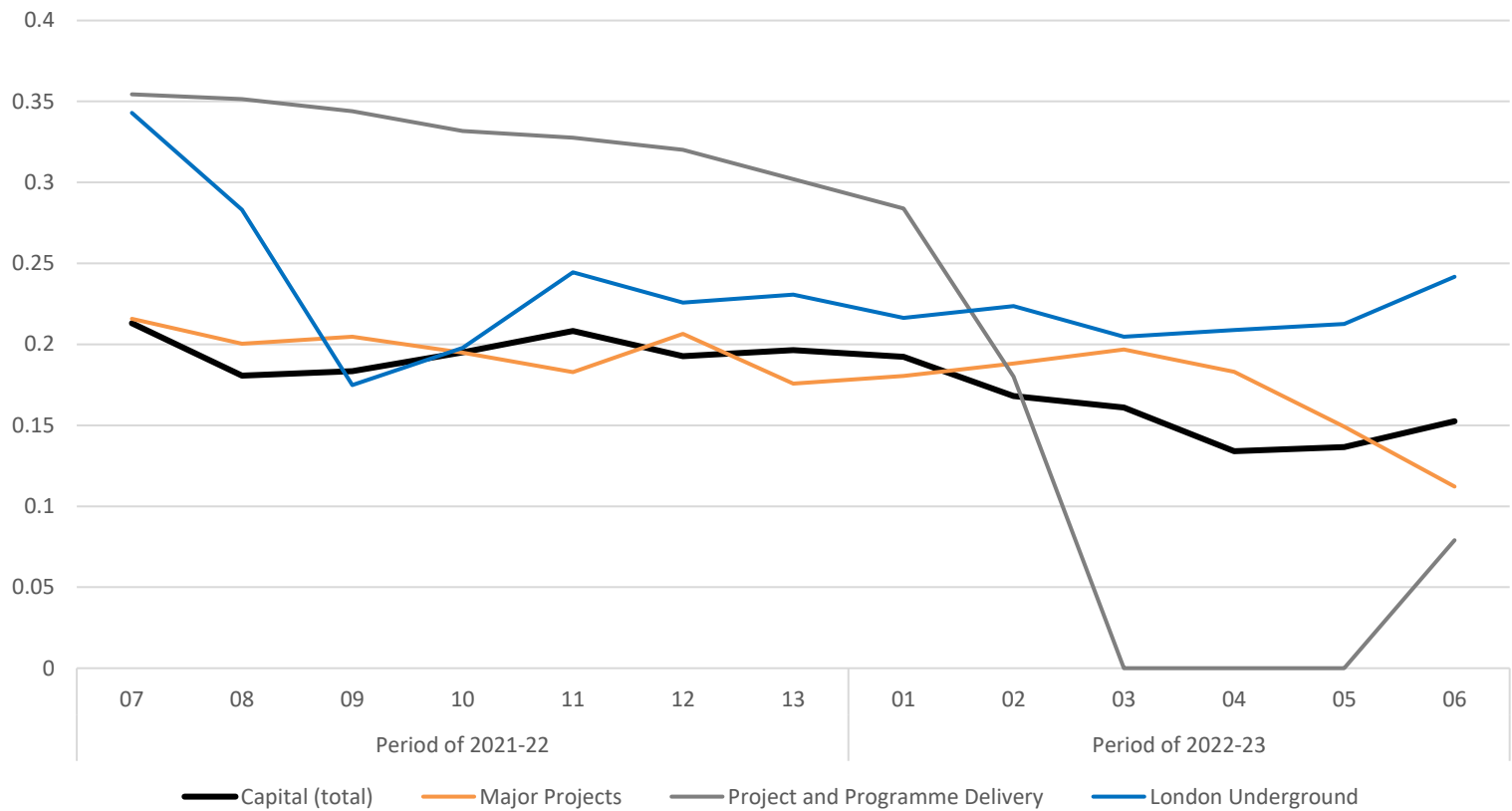


In Quarter 2, there was only one incident reported under the Reporting of Injuries Diseases and Dangerous Occurrences Regulations (RIDDOR) within the Capital area. As a result, the accident frequency rates continued to decrease across the Capital area of the business, with the overall rate ending the quarter at 0.04, below the 2022/23 annual target of 0.10. Our Major Projects and Project and Programme delivery areas have now gone two consecutive quarters without a RIDDOR being reported, demonstrating significantly improved performance from the same period last year.

The RIDDOR this quarter occurred in LU, where a member of the rolling stock team was hit in the eye by a piece of debris from a sanding belt. The injury required hospital treatment but was classified as minor, with the debris removed from the eye. The injured person remained off work for more than seven days.

In addition, there was a RIDDOR reported in TfL Engineering where a surveyor on the Piccadilly Line Upgrade programme slipped on track ballast at night, sustaining a chipped bone and remained off work for over seven days. Whilst Engineering data is not currently featured within the Capital section of this report, we work closely with the team to identify root causes and share learnings so that we can continue to work together to reduce harm to our workforce.

Lost time injury frequency rate (per 100,000 hours worked)

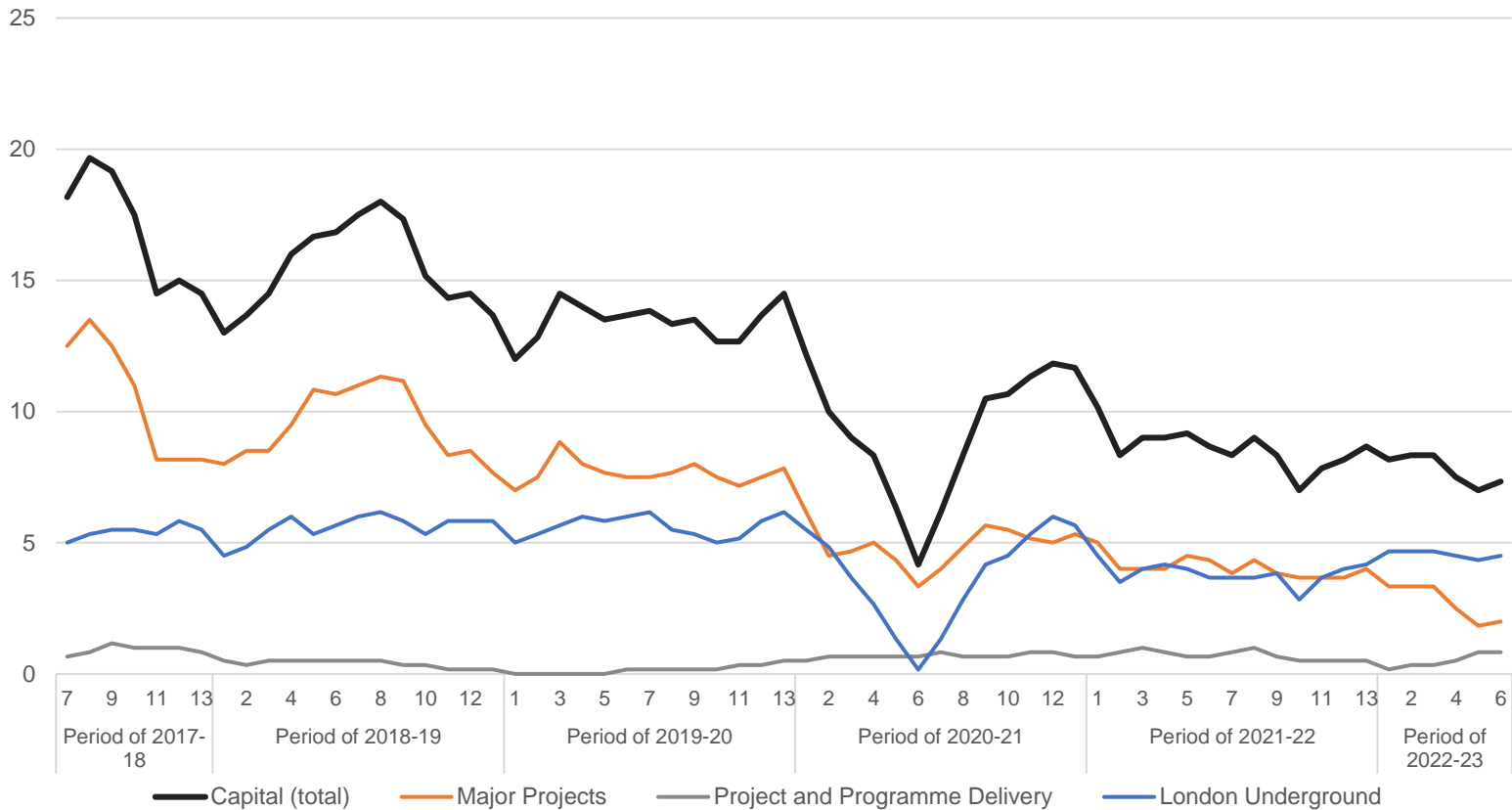


Lost time injuries (LTIs) are injuries which cause an employee to be absent for one or more shifts. There were five LTIs reported in our Capital teams during Quarter 2, an increase of two compared with Quarter 1. However, due to an overall reduction in the number of LTIs reported over the past 12 months, the lost time frequency rate for Capital ended the quarter at 0.15, below the target of 0.25.

All five LTIs in Quarter 2 were classified as minor injuries, with four occurring in our LU teams and one in Project and Programme Delivery. The use of machinery and equipment were a factor in three of the incidents, resulting in teams receiving additional briefings on how to safely conduct activities to avoid future injury. At Old Street Roundabout, an operative was injured when the lid of a generator he was refuelling closed on his hand. Whilst issues were identified with the communication between the operatives, subsequent investigation found that the risk assessment did not sufficiently consider how such a hazard should be effectively controlled and safety mechanisms put in place to prevent the lid from shutting. This resulted in a review of all relevant risks assessments, operatives being re-briefed on the refuelling of generators and the team investigating the procurement of alternative models of generators with enhanced safety features.

Long-term injury trend

Total Capital workforce injuries (six-period average since 2017/18)



There were 24 injuries reported in the Capital area during Quarter 2, which is an increase of four on the previous quarter. All were classified as minor injuries, which, given the range of activities and working environments our teams operate in, demonstrates a satisfactory degree of risk management. Manual handling was the top immediate cause of injury, with lack of communication and lack of physical controls identified as among the most common root causes. The number of injuries falls well within our “stretch targets” in Major Projects and Project and Programme Delivery of five injuries or fewer per four-week period, which is in line with our drive for improvement from last year.

SHE Performance in Capital Projects

As illustrated by the data above, Quarter 2 can be characterised as one of good performance. There have been no major injuries, or serious environmental impacts. However, when analysing the details, we can identify a variety of incidents which had the potential for something worse, or to provide us with a warning that failure to improve will lead to a more undesirable outcome.

A brief selection of such incidents (in no order of significance):

Four Lines Modernisation

The Quarter 1 report outlined concerns raised about the new train control system when it was introduced into Signal Migration Area five on the sub-surface part of the LU network. There were a number of Operational Restrictions required which have been the subject of several meetings with the Office of Rail and Road (ORR) and their inspectors.

There is very close involvement with the project from operational colleagues, and a desire to minimise the number of operational restrictions that service controllers have to be aware of. Action has been taken to try and eliminate these, and an independent review is also in progress, due to report its findings early in Quarter 3. Although the ORR has indicated that they will not be considering enforcement action in relation to this, they are maintaining their interest, and will look at how the train control software is developed by the supplier, and human factors issues for service controllers.

Bank Station Capacity Upgrade

Construction works for the new parts of Bank station and the new escalators are controlled by the Principal Contractor. One of the newly installed escalators not yet in service to the public was activated by one contractor, whilst workers from another contractor were in the machine chamber close to the dangerous moving parts of the machine. There was no injury, but the near miss was reported and investigated by the Principal Contractor. Failures were evident in the permit process, control of keys/access, and communication. These have now been addressed on site and learnings shared.

A102M Traffic Management

Whilst a worker for one of our suppliers was installing cones for temporary traffic management, a car breached the cones into the worksite and ran over the worker's toecap (no injury) before speeding off and going through a red traffic light. It was found that the Traffic Management (TM) operatives had not followed the safe working procedure to install the closure with the correct coning spaces when the incident occurred, which would have closed the slip road quicker as live traffic was still travelling in the adjacent lane. A side road was also open when they deployed the TM, which should have been closed in advance or an Impact Protection Vehicle used to protect the operatives. Local CCTV did pick up the incident. However, there was an issue with the recording meaning the driver could not be identified.

SHE in Capital

SHE Capital Delivery & Maintenance Strategy

This quarter, the main strategic focus for safety, health and environment (SHE) within Capital was the continued integration of safety, health and environment requirements within our procurement and supplier management processes. At the beginning of September 2022, a new internal Management Framework for TfL's Procurement & Commercial (P&C) activities was launched, accompanied by training, which provides teams across the business with best-in-class guides, tools and templates to support them through each stage of the P&C Lifecycle. Significantly, SHE is now fully embedded within the management framework, providing colleagues with increased support for managing SHE and creating a more consistent approach across TfL. This will be of particular benefit to the Capital area, where suppliers are regularly appointed to deliver project activity on our behalf.

Work-related violence and aggression

Work-related violence and aggression (WVA) towards our people and those of our operators and contractors is unacceptable. Concerted action is underway to tackle it.

Triggers of WVA incidents

Fare evasion continues to be the most common trigger for WVA accounting for 30 per cent of all incidents. During Quarter 2 2022/23, 423 WVA incidents were triggered by fare evasion on the London Underground (LU) Network, and 295 across the other travel modes (buses, roads, Elizabeth line (formerly known as TfL Rail), London Overground (LO), DLR and London Trams). Despite fare evasion remaining the most common trigger of WVA, the proportion of incidents decreased in Quarter 2 by two per cent on the LU Network and by seven per cent across other travel modes.

In Quarter 1, analysis of WVA had shown a link between youth offending and fare evasion. The proportion of WVA incidents allegedly involving a young person (with the appearance of under 20 years) decreased slightly in Quarter 2 by one and a half per cent on other travel modes and by almost two per cent on the LU Network from the previous Quarter. This is most likely due to schools, colleges and academies being closed for six of the twelve weeks that made up Quarter 2.

The number of WVA incidents motivated by hate towards staff on the LU network increased from 73 in Quarter 1 to 93 in Quarter 2 2022/23. The volume of WVA incidents motivated by hate steadily increased from Period 2 to Period 5 (1 May to 20 August 2022). In Period 5 (24 July to 20 August 2022) they represented nine and a

half per cent of all recorded WVA incidents. The proportion decreased to five per cent in Quarter 2.

The number of WVA incidents recorded on the LU Network triggered by a customer using an e-scooter decreased from 31 in Quarter 1 2022/23 to 18 in Quarter 2 2022/23.

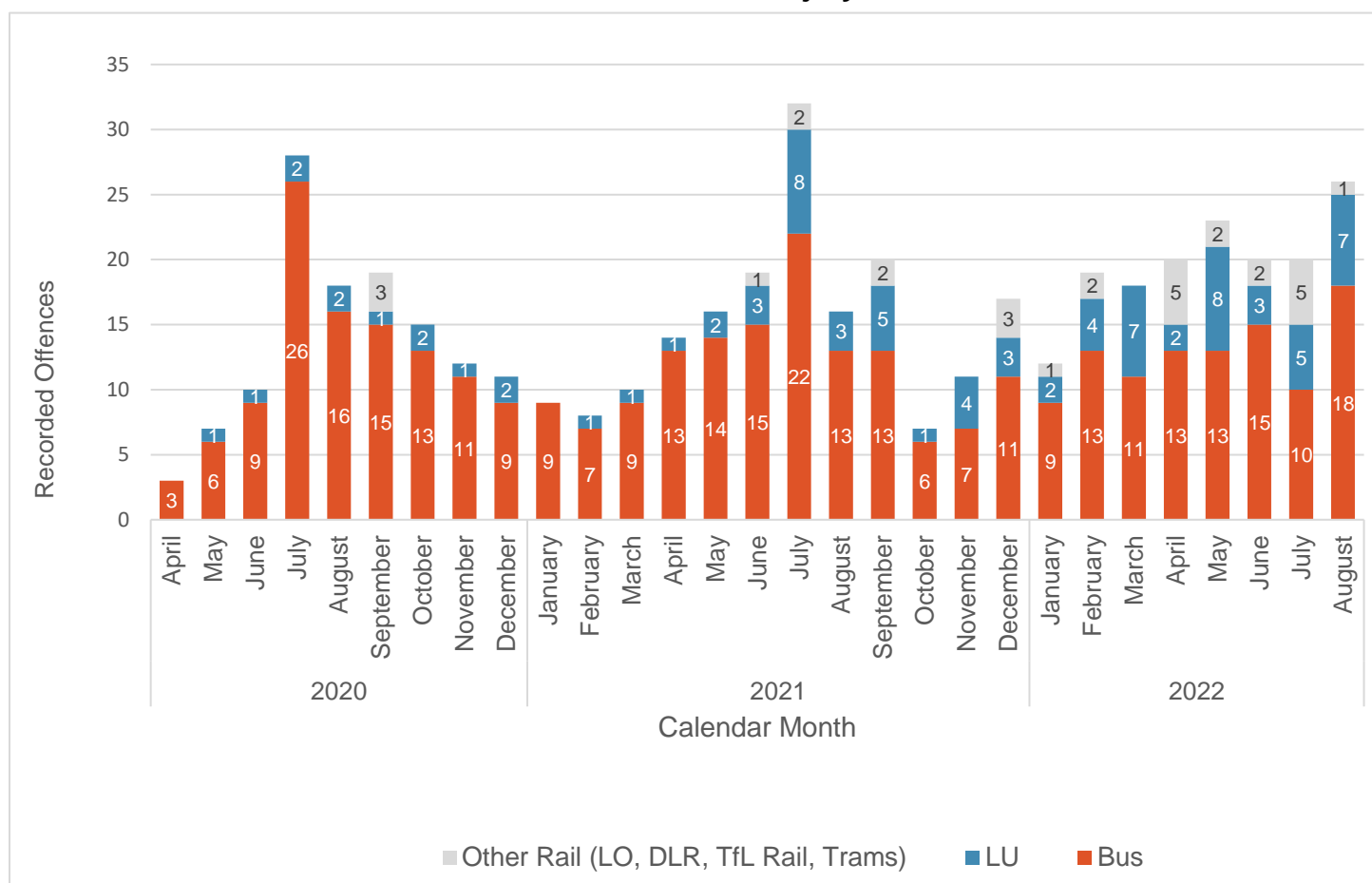
Volume of incidents in Quarter 2

During Quarter 2 2022/23, there were 2,406 incidents of WVA reported across all modes. This is an additional 101 incidents compared to Quarter 1 2022/23.

In Quarter 2 2022/23, there were 1,144 incidents of WVA reported by staff working on LU. This is 147 more than in Quarter 1 2022/23.

In Quarter 2 2022/23 there were 1,255 incidents of WVA reported on all other modes (buses, roads, Elizabeth Line, LO, DLR and London Trams. This is 106 fewer incidents than recorded during Quarter 1 2022/23.

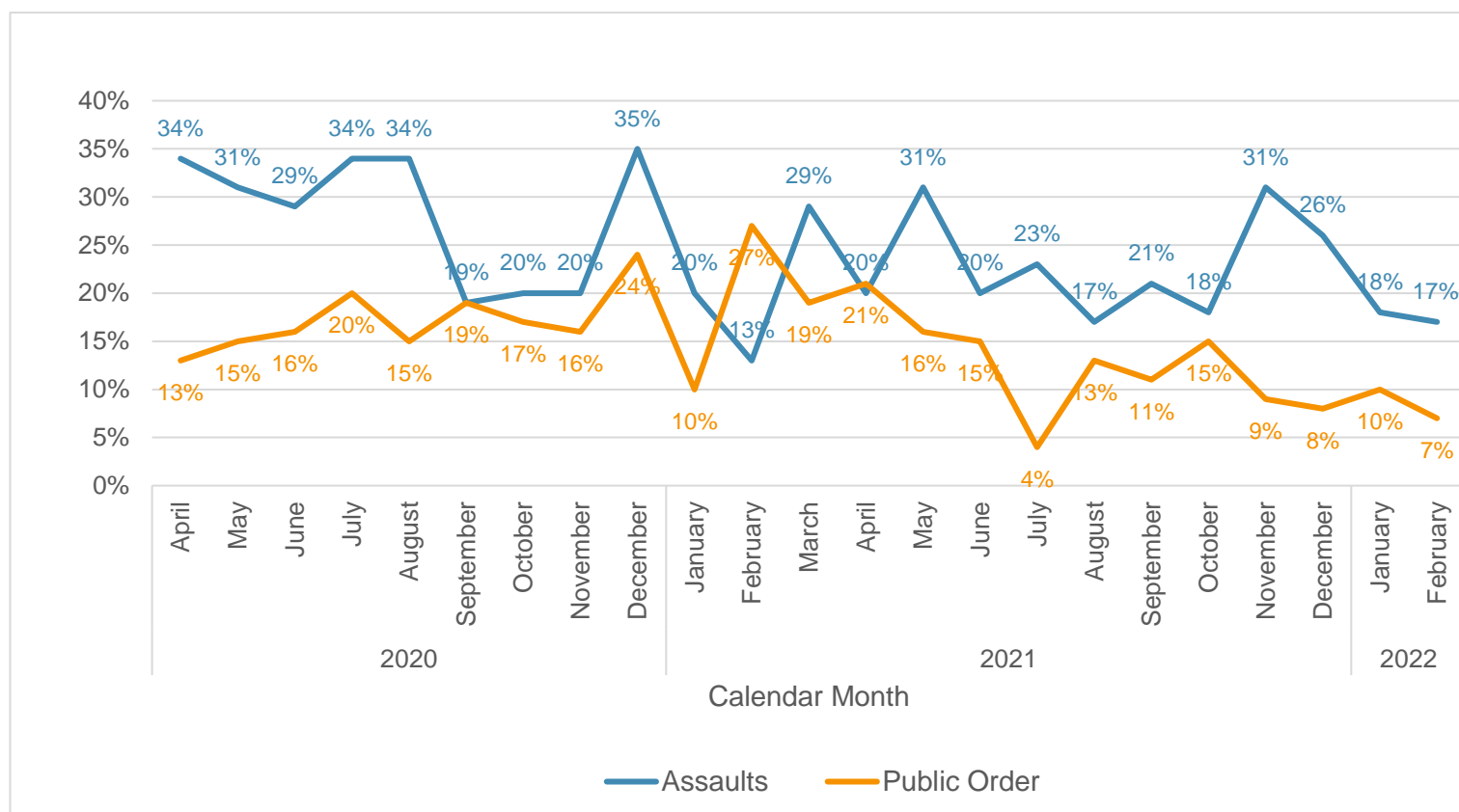
Police recorded work-related violence with injury offence from 2020 to 2022



We know from feedback from our workforce and trade unions that WVA is underreported, particularly verbal abuse. Changes in the reporting of incidents, compounded by the impact of the pandemic on overall crime levels, make it difficult to draw clear conclusions about trends in offending. Our assumption is violent offences that result in injury (actual bodily harm or grievous bodily harm) are more likely to be reported given that staff members may require support, treatment or time off. Police data for violence with injury offences is a more reliable data source for monitoring trends. Work is ongoing to improve staff confidence to report and make it easier for them to do so.

The level of bus-related violence with injury offences between April to August 2022 (69 offences) is 10 per cent lower than the same period in 2021 (77 offences). Police data for LU and other rail modes (LO, DLR, Elizabeth line and London Trams) shows there were 40 violence with injury offences between April to August 2022, compared with 20 in the same five months in 2021. The lower offence numbers on the rail network in 2021 reflect the lower levels of passenger journeys at the time.

Solved rate for WVA offences investigated by the police from January 2020 to February 2022



We are working closely with policing partners to improve the solved rate of offences. This includes prioritising the investigation of WVA incidents, providing access to body-worn video cameras, and continuing to support police investigations by providing Oyster card and CCTV information and victim and witness statements.

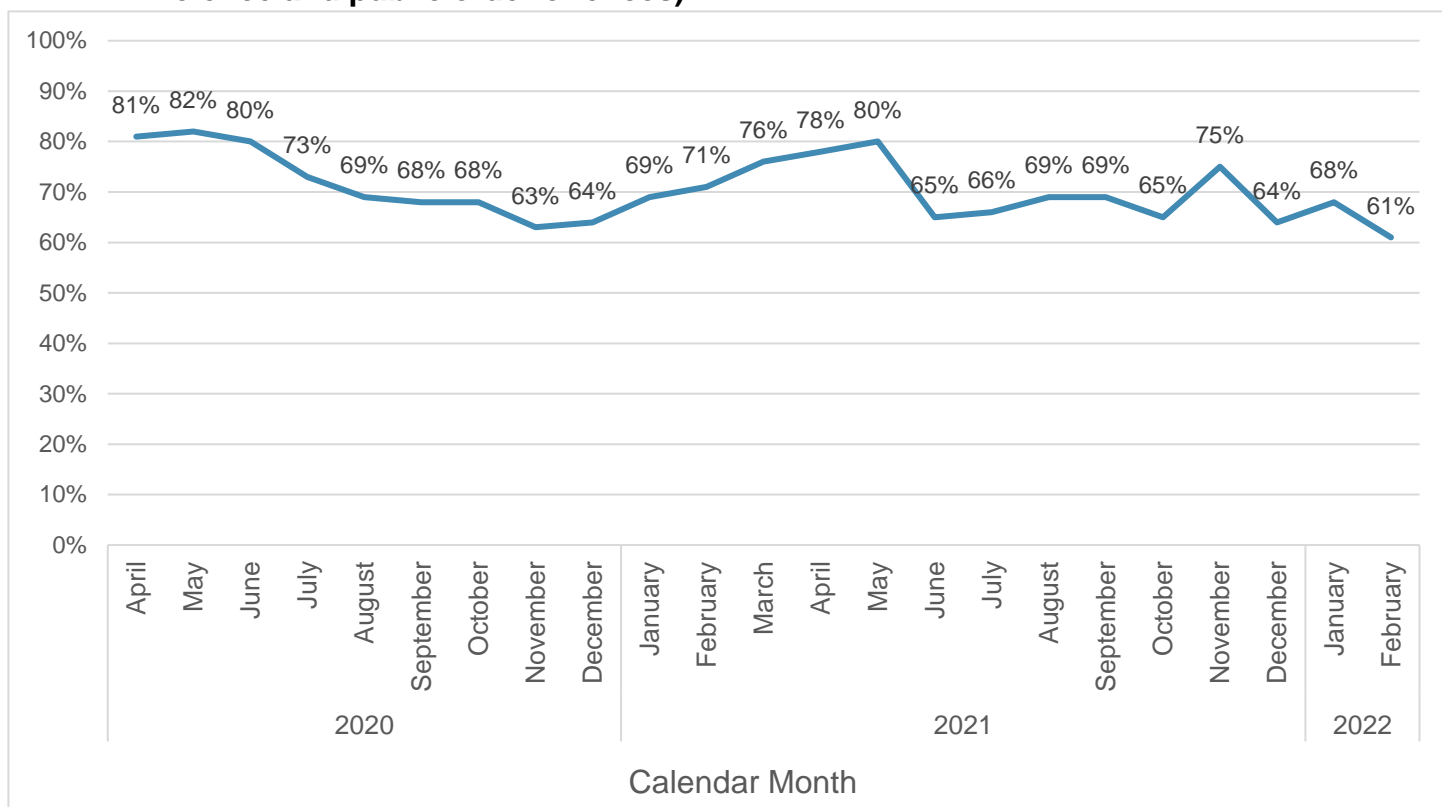
The solved rate is the percentage of offences investigated by the police that have resulted in action against the suspect, for example being charged with the offence, summonsed to attend court, or a restorative justice outcome. Figures are reported six months in arrears to allow time for the police investigation and for cases to progress through the criminal justice process. This section compares figures for the 12-month periods March 2021 to February 2022 (current), with March 2020 to February 2021 (previous).

During the current period the combined solved rate was 18 per cent for violence and public order recorded offences against our workforce – slightly lower than the previous 12-month period (21 per cent).

The solved rate varies by mode during the current period, with a solved rate of 18 per cent for bus-related offences, 21 per cent for LU, and 10 per cent for all other rail modes combined. Across all modes, the solved rates increase in line with the severity

of the incident. The solved rate is higher for violent offences (with or without injury) compared to public order (for example verbal abuse or threatening behaviour), as the police will allocate more resources to identifying and apprehending offenders for the former, with, for example, media appeals for information for violent incidents. The solved rate in the current 12-month period for violence (with/without injury) offences was 23 per cent, compared with 14 per cent for public order offences.

Percentage of Staff Willing to Support from January 2020 to February 2022 (all violence and public order offences)



A key factor in being able to bring offenders to justice is staff support for and consent to partake in the criminal justice process. As part of our strategy, we are encouraging the reporting of incidents, working closely with the police to address staff concerns and improve the support we collectively provide throughout the process.

During the current period, the percentage of staff willing to support a police investigation was 70 per cent for violence and public order recorded offences against staff, down from 73 per cent compared to the previous 12-month period. Due to changing customer numbers, bus drivers make up a greater proportion of staff victims and our data shows they are less likely to support police investigations, particularly public order offences. We are working with the police and bus operating companies to better understand the reasons for this and to address any issues.

Progress against the 2021/22 annual action plan

To deliver our work-related violence and aggression (WVA) Strategy, we committed to doubling the size of our WVA team. In September 2022, we began recruitment for five new roles within the team, with recruitment for another six planned for Quarter 3. We are aiming to have the newly expanded WVA team in place by December 2022. These new roles will work on activity to prevent WVA and provide support to colleagues who may experience it including providing investigation services to our policing partners.

Taking action at WVA hotspots (where we see a high number of incidents, or particularly harmful incidents occurring) is a core part of our prevention work. In September 2022, we launched a year-long project at Stratford LU station, a consistent WVA hotspot. We are working with the local team, specialists from across the organisation and external stakeholders, including our policing partners, to coordinate activity to tackle the causes of this behaviour and understand how we can better support staff that experience it, including understanding better the barriers staff face in reporting incidents.

We are also enhancing reassurance, enforcement and problem-solving capability at the station with a team of Transport Support and Enforcement (TSE) Officers. The team of officers is dedicated to Stratford station and support all TfL modes to prevent WVA and tackle antisocial behaviour. Officers have been deployed from September 2022, and a dedicated “hub team” will be in place from January 2023. The team of TSEs will continue to work very closely with our transport policing partners in the BTP and Metropolitan Police Roads and Transport Policing Command to keep customers and staff safe.

The BTP has enhanced its support for tackling WVA through the establishment of a new Workplace Violence Coordination Unit working in partnership with rail operators to tackle relevant WVA hotspots. In August 2022, we agreed to use Earl’s Court LU station as a pilot location to see how we can work with the BTP to tackle the triggers of work-related violence and aggression together. If successful, we hope to roll this out to other locations across our network.

Another part of our prevention activity is engaging with frontline staff directly, including bus drivers. The WVA team has attended engagement events at Thornton Heath bus garage, Atlanta Boulevard bus stand, Croydon bus garage and Palmers Green bus garage. All feedback from staff has been noted and discussed with our colleagues in Police Liaison and TfL’s Network Management Control Centre.

As students returned to school in September 2022, we helped them use our network safely and respectfully. We identified key locations across our bus and LU network

and coordinated engagement activity with our frontline staff, TSE Officers, and our policing partners to encourage the behaviours that are expected on the transport network. The officers were deployed to priority locations and routes and focused on engaging with students and educating them on safe and responsible travel behaviours, including using a Zip Oyster Card to make their journeys.

Our TSE Officers continue to play a key role in tackling WVA against our people by dealing with anti-social behaviour and enforcing TfL byelaws. In Quarter 2, our officers carried out over 2,000 station/network visits, offering advice and guidance to over 2,000 non-compliant individuals, directing over 400 individuals to leave our network or premises, refusing entry to 353 and physically removing 24 individuals from our service for anti-social behaviour. Officers reported 198 individuals for prosecution. Officers also dealt with 85 safeguarding incidents, providing support for vulnerable customers.

Examples of Successful Prosecutions in Quarter 2

Camden Town LU station

On 11 May 2021, station staff at Camden Town received reports of a male customer making repeated attempts to pull another customer off a train in order to fight them. Two members of staff were repeatedly pushed, and one was punched. The suspect was arrested and charged with assault, assault occasioning actual bodily harm (ABH) against a member of the public, criminal damage and an assault against an emergency services worker. On 22 August 2022, the defendant was sentenced to 17 weeks' imprisonment suspended for 18 months, alcohol abstinence and monitoring for 120 days, 80 hours unpaid work and a victim surcharge of £128.

Stratford LU station

On 3 November 2021, at Stratford station while checking if a customer was fit to travel as he appeared very drunk, a member of staff was grabbed (causing pain and bruising) and sexually harassed. On 16 August 2022, the defendant was found guilty and sentenced for assault and being drunk and disorderly. He was fined £350 and ordered to pay costs of £350, a total cost to the defendant of £700.

Farringdon LU station

On 22 February 2022, two members of staff were assaulted and racially abused at Farringdon station. Police were called and a female was arrested. During the arrest she then assaulted a police officer. On 18 August 2022 the defendant plead guilty to four charges and was ordered to pay £75 compensation to all four victims and a £75 fine for each offence, a total cost to the defendant of £600.

Route 483

On Saturday 21 May 2022 a bus driver of the route 483 bus (Metroline) was spat at by a male over a fare dispute. The bus driver used his spit kit, and the police were able to identify the suspect. He was charged with common assault and appeared at North West London Magistrates Court on 19 July 2022 and was sentenced to eight weeks imprisonment and ordered to pay an £128 victim surcharge.

Route 427

On Thursday 23 June 2022 a bus driver of the route 427 (Abellio) was racially abused by a male and threatened with stabbing (no knife was seen). The police were called, and the male was arrested at the scene. He appeared in West London Magistrates Court on 8 July 2022 and remanded on bail until 29 July 2022 when he was given a community order, an unpaid work requirement, a rehabilitation order and ordered to pay costs totalling £199.

Route 422

On Friday 8 April 2022 a bus driver of the route 422 (Stagecoach) was assaulted by a male after a fare dispute. The male was so angry and violent that the bus driver tried to restrain him for his own safety and was subsequently bitten and punched. The police were called and arrived at the scene where they arrested the male and charged him with ABH. The male appeared at South East London Magistrates court on 10 August 2022 where he received a community order, an unpaid work requirement for 100 hours, and ordered to pay a victim surcharge of £95, compensation of £100 and £85 costs.

Significant incidents

This section outlines significant incidents that have occurred during Quarter 2 and since the last report. It also provides an update to significant incidents of note.

Fatal incident at Waterloo LU station – 26 May 2020

In September 2022, the inquest touching on the tragic death of Gama Warsame at Waterloo station on 26 May 2020 took Mr Warsame boarded a northbound Bakerloo line train at Lambeth North station on the morning of 26 May 2020. When he exited the train at Waterloo, he fell into the gap between the northbound platform and the train. He was tragically struck by a train while he was trying to get back on the platform. Our thoughts and deepest condolences remain with Mr Warsame's family and friends.

Previously the Rail Accident Investigation Branch (RAIB) had made three recommendations to LU. We communicated regularly with the ORR to ensure they were satisfied we were addressing the recommendations made in the RAIB report.

T, the jury's conclusion was that Mr Warsame's death was an accident. The jury also concluded that a factor possibly underlying the accident was that LU had neither fully quantified the level of risk at the platform at Waterloo during the COVID-19 pandemic, nor considered additional measures to reduce the likelihood of a person falling down the gap and remaining at this location

The Coroner will not be issuing a prevention of future deaths report in relation to this incident. At the end of the inquest, he thanked the witnesses who gave evidence and gave a very touching tribute to Mr Warsame's family.

Fatal high-speed loss of control at Park Royal – 22 August 2022

In the early hours of Monday 22 August 2022, the driver of a sports utility vehicle (SUV) that was travelling at very high speed lost control of the vehicle as it headed west on the A40 Western Avenue. The vehicle left the carriageway and landed on the tracks of the Piccadilly line at Park Royal tube station.

Sadly, one of two female passengers in the car was killed, while the other sustained life-changing injuries. The driver was also seriously injured. The SUV also passed through a charging point for electric vehicles and in doing so injured (though not seriously) the driver of a vehicle that was being charged. As a result of the vehicle coming to rest on the Piccadilly line, the incident was reported to the ORR and the RAIB.

Fatal e-scooter and tram collision – 22 August 2022

On 22 August 2022, a tram collided with a person riding a privately owned e-scooter at an uncontrolled pedestrian crossing point between Ampere Way and the tram stops

at Waddon Marsh. The tram driver applied the emergency brake but could not prevent the collision.

Tragically, the e-scooter rider died in hospital a few days later. A full investigation is under way and both the RAIB and the ORR have been informed. Customers on board the tram at the time who may have witnessed the incident have been offered assistance through our incident support service, the [Sarah Hope Line](#).

Health

COVID-19

Since the start of the coronavirus pandemic, our focus has been to protect the safety and health of our customers and workforce. This remains our focus as we emerge out of the pandemic and transition to living with COVID-19.

Deaths in service

Our sincere condolences remain with the families and loved ones of the 105 members of our workforce who have sadly passed away from COVID-19 since the start of the pandemic. We are working on a memorial site which will provide a permanent location to remember those transport workers who lost their lives to COVID-19. We expect this to open early in 2023. Everyone at TfL pays tribute to the vital role they played in our fight against the pandemic.

Our Employee Assistance Programme continues to be available to all employees and their dependants, and provides support, guidance, and information on a range of topics, including bereavement. The safety of all our staff and customers continues to be our top priority, and we are absolutely committed to doing everything in our power to keep everyone safe on our network.

Face coverings on public transport

The Government announced that it would no longer be compulsory for people to wear a mask on public transport and in shops from 27 January 2022. From 24 February 2022, we removed the requirement set out in our Conditions of Carriage for customers to wear face coverings.

From 13 June 2022, we changed our customer and staff messaging from strongly recommending to encouraging people to take appropriate action to keep themselves safe, including wearing a face covering if this helps them to travel and work with confidence.

We are continuing to provide free Type IIR masks for those working in our operational areas.

Reusable masks for our staff

Following a huge uptake of the TfL-branded reusable face masks and the initial issue across TfL of 20,000 the masks, they have now been added to the Hayley Rail catalogue for ordering as required for each business area.

COVID-19 testing schemes

Having transitioned from COVID-19 test centres to giving out free lateral flow test kit boxes to staff, we are in a new phase of providing COVID-19 testing to our staff. Managers can now order lateral flow test kit boxes for their team through the Hayley Rail catalogue.

Findings from Imperial College London's study

We have now received the full TfL-commissioned study from Imperial College London, who carried out monthly air and surface sampling for coronavirus across the bus and Tube network from September 2020 to June 2022. The sampling and analysis techniques adopted were consistent with the latest research approaches and World Health Organisation protocols.

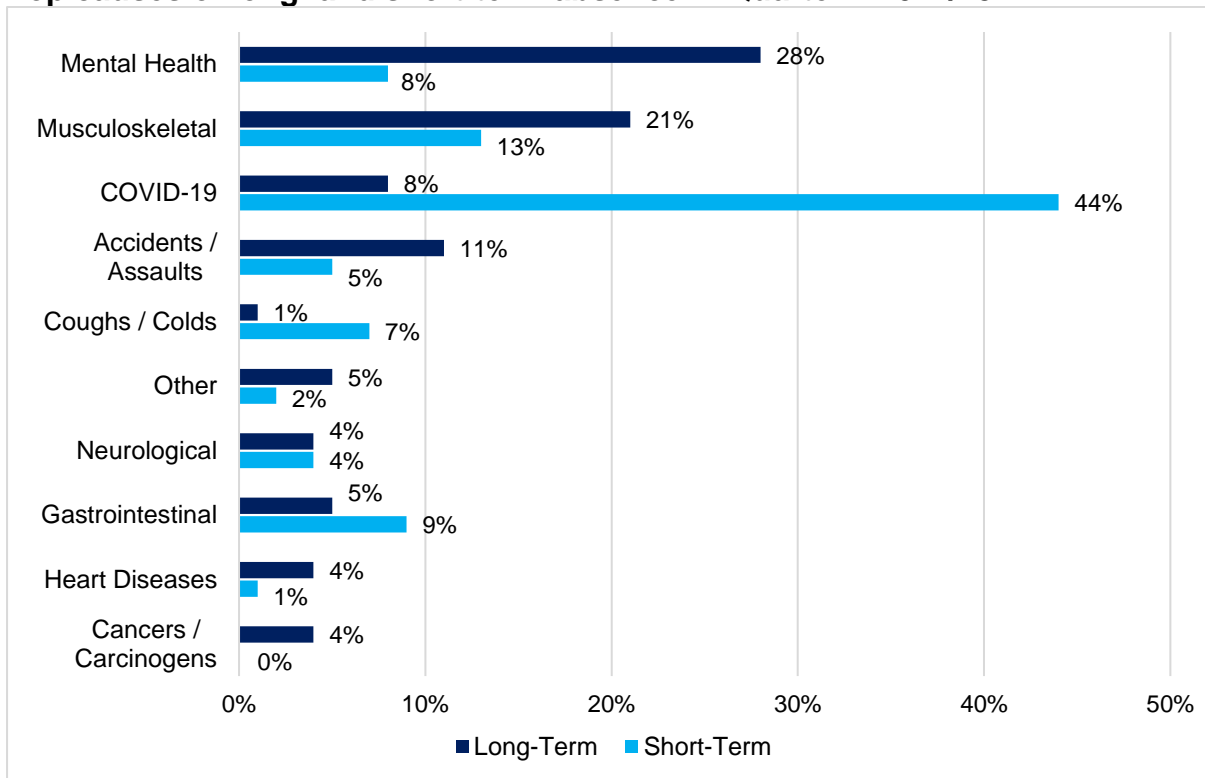
During the extensive sampling period, only one positive sample was detected, on an Oyster/contactless reader on the ticket barriers at Waterloo London Underground station in May 2022. This positive sample was not expected to result in a transmissible level of viral load, and all other samples taken during the period were negative. This is lower than any other public transport network in five different studies (Barcelona, Spain; Abruzzo, Italy; Tehran, Iran; Quito, Ecuador; and Recife, Brazil) where traces of coronavirus were found in between two to 67 per cent of samples.

Sickness absence data

When looking at our sickness absence data, short-term absence is any absence of fewer than 28 days and long-term absence is of 28 days or more.

By looking at the underlying causes of absence in detail, we gain meaningful insight into where we can best target preventative measures. Around 60 per cent of absences at any time are caused by long-term sickness.

Top causes of long- and short-term absence in Quarter 2 2022/23



In Quarter 2 2022/23, COVID-19 remained the top cause of short-term absence and has significantly increased from 30 per cent in the previous quarter to 44 per cent in Quarter 2 2022/23. This can be explained by the latest Government figures of the R rate for England increasing from 1.1 to 1.3. For the week ending 3 October 2022 in England 1,513,700 people tested positive, equating to 2.78 per cent of the population or around one in 35 people. All other absence types are holding fairly stable and the main spike in absence levels occurred in period 4 (26 June to 23 July 2022).

In Quarter 2 2022/23, the top two causes of long-term sickness absence remained at the same levels as Quarter 1. Mental health remained the top cause, accounting for 28 per cent of all long-term absences. Musculoskeletal-related absence was again the second highest cause at 21 per cent. These categories remain the top two causes typically accounting for the majority of long-term sickness absence in the UK. Our Occupational Health team has several initiatives aimed at prevention of ill health and to support those who become unwell to return to work earlier. Some of the events we hosted this quarter included a Wellbeing Roadshow and a free webinar on Mental Health First Aid Awareness.

Health updates

Health Surveillance

Earlier this year, we increased our focus on improving how we manage health risks to our workforce. We updated our approach to managing health surveillance, implementing health surveillance programmes for areas of our workforce who may need it.

Our Health Surveillance Action Plan focuses initially on potential risk to the respiratory health, dermal health and exposure to lead of our workforce. Over 430 members of staff have been trained to deliver skin checks to their teams, which allows us to ensure that anyone who needs it gets the right medical attention.

Our health surveillance plan has helped us identify where we could replace hazardous substances with safer substances, e.g. using non-lead solder instead of lead solder. Where some of our workforce still need to work with lead, because of the age of some of the assets they work with, we are ensuring their health is monitored regularly through the use of respiratory sensitisers. Over 250 staff have been referred to our Occupational Health team for assessment.

This quarter, we have started to monitor and report on health surveillance to our senior teams. This will help us identify areas where further support, action and intervention is required quickly.

Well@TfL

Well@TfL Mobile Health Bus

The Well@TfL mobile health bus continues to make its way around the network, delivering wellbeing checks, health surveillance and medical checks onsite. The mobile health bus has now visited 10 locations, staying at most for two to three weeks. The next locations are Poplar, Stratford Market and Northumberland Park depot.

- 1,200 employees have received an onsite wellbeing check
- 467 employees have visited the health bus
- 123 employees have attended a medical/health surveillance on the health bus
- The average GP referral rate via wellbeing checks is 21.3 per cent
- The clinician utilisation to available slots on the health bus is 93.4 per cent

Acton Pilot Project

The Well@TfL Acton pilot project continues to deliver health and wellbeing priorities, including the appointment of wellbeing champions, with one champion specifically for night staff, a traditionally hard-to-reach group. Other positive outcomes include changes to staff areas to provide more engaging spaces, implementing wellbeing into

projects from the design phase and working with canteen contractors to improve food choices.

Roczen (previously called RESET Health)

TfL joined forces with the health platform Roczen in December 2021 to support our employees in taking control of their health. Specifically, the programme aims to reverse the conditions of those living with diabetes or prediabetes, as well as those who are obese or overweight.

The table below presents the outcomes of members at the key 24-week milestone:

Indicators	Week 24 Average (Reduction)	Percentage
Weight (Kg)	8.6kg	-8.5 per cent
BMI (kg/m2)	3.0kg/m2	-8.6 per cent
Waist Circumference (cm)	9.0cm	-8.5 per cent
HbA1c	1.9 mmol/mol	- 4.4 per cent

Headline Outcomes: (data from 38 employees who onboarded the programme more than 24 weeks ago)

- Of the 38 members who have reached the 24-week mark, over 45 per cent lost more than five per cent of their body weight and of these, 10 members lost more than 10 per cent of their body weight.

There has been a 17 per cent reduction in the proportion of members who are living with obesity compared with when they first joined the programme.

A second tranche has been launched and a further 50 employees have had the change to join Roczen. From those, 41 per cent are operational staff, of which 26 per cent perform safety critical roles.

Environment

Air Quality

Expanded Ultra Low Emission Zone six months on report

The report updates on the impact from six months since the Ultra Low Emission Zone (ULEZ) expanded and more than a year on from the enforcement of tighter Low Emission Zone (LEZ) standards. The data indicates that these schemes are having a significant impact on the number of older, more polluting vehicles seen driving in London and the levels of harmful pollution Londoners are exposed to.

A bigger share of vehicles in London are cleaner

Six months after the launch of the ULEZ expansion, nearly 94 per cent of vehicles seen driving in the whole zone meet the strict ULEZ standards on an average day. This is up from 87 per cent in the weeks before the zone expanded and up from 39 per cent in 2017 when impacts associated with the ULEZ began. The compliance rate on boundary roads is 90 per cent and the compliance rate in outer London is 85 per cent.

There are fewer older, more polluting vehicles in the zone

There were 67,000 fewer non-compliant vehicles in the zone on an average day in May 2022 compared with the period right before the ULEZ expanded, down from an average of 124,000 daily vehicles (based on indicative data gathered between 12 and 20 October 2021 prior to launch). This is a reduction of 54 per cent.

The Low Emission Zone continues to have an impact

Large and heavy vehicles, which fall under the London-wide LEZ, have a compliance rate of 96 per cent, up from an estimated 48 per cent in February 2017.

There has been an overall reduction in vehicles and traffic flows in the zone

Overall, the daily average number of vehicles seen in the zone in May 2022 was 21,000 fewer compared to October 2021 prior to the scheme being launched, a reduction of two per cent. Early estimates suggest traffic flows are also around two per cent lower within the expanded zone than the weeks before the expansion launched. However, many factors are currently affecting traffic trends in London and we will continue to review the data to better understand the impact of ULEZ expansion in the longer term.

Drivers are ditching diesel cars

On average there were 44,000 fewer diesel cars driving in the zone each day, a 20 per cent decrease since the weeks before the ULEZ expanded.

This means people in the zone are breathing cleaner air

The amount of pollution in the air – the concentration - is what ultimately impacts people's health. Harmful nitrous oxide (NO₂) concentrations alongside roads in inner London are estimated to be 20 per cent lower than they would have been without the ULEZ and its expansion. In central London, NO₂ concentrations are estimated to be 44 per cent lower than they would have been. This decrease in concentrations close to roads would have also led to reduced air pollution in locations away from traffic.

The air is also cleaner on the boundary

All monitoring sites on the boundary of the expanded zone have seen reductions in NO₂ concentrations, with an estimated 17 to 24 per cent reduction in pollution on the boundary compared to without the ULEZ.

Climate Emergency

Trial of cooling solutions for the deep Tube network

This summer we completed the next stage of trials of a new state-of-the-art cooling panel solution. The trial was completed on a disused platform at Holborn LU station and was undertaken to test its suitability for reducing temperatures on TfL's deep Tube network (Bakerloo, Central, Jubilee, Northern, Piccadilly, Victoria and Waterloo & City lines).

The cooling panel aims to provide cooler air to passengers waiting on platforms, as well as mitigating potential temperature increases associated with increased train frequencies introduced by in-flight and future trains and signalling upgrade programmes.

The cooling panel works by circulating cold water around pipework within a curved metal structure to chill it. It then circulates air, using an industrial-sized fan, through gaps in the panel's structure, which in turn is cooled. The panel could also have the additional benefit of halving operational and maintenance costs compared to existing technology used to manage temperatures on Tube lines.

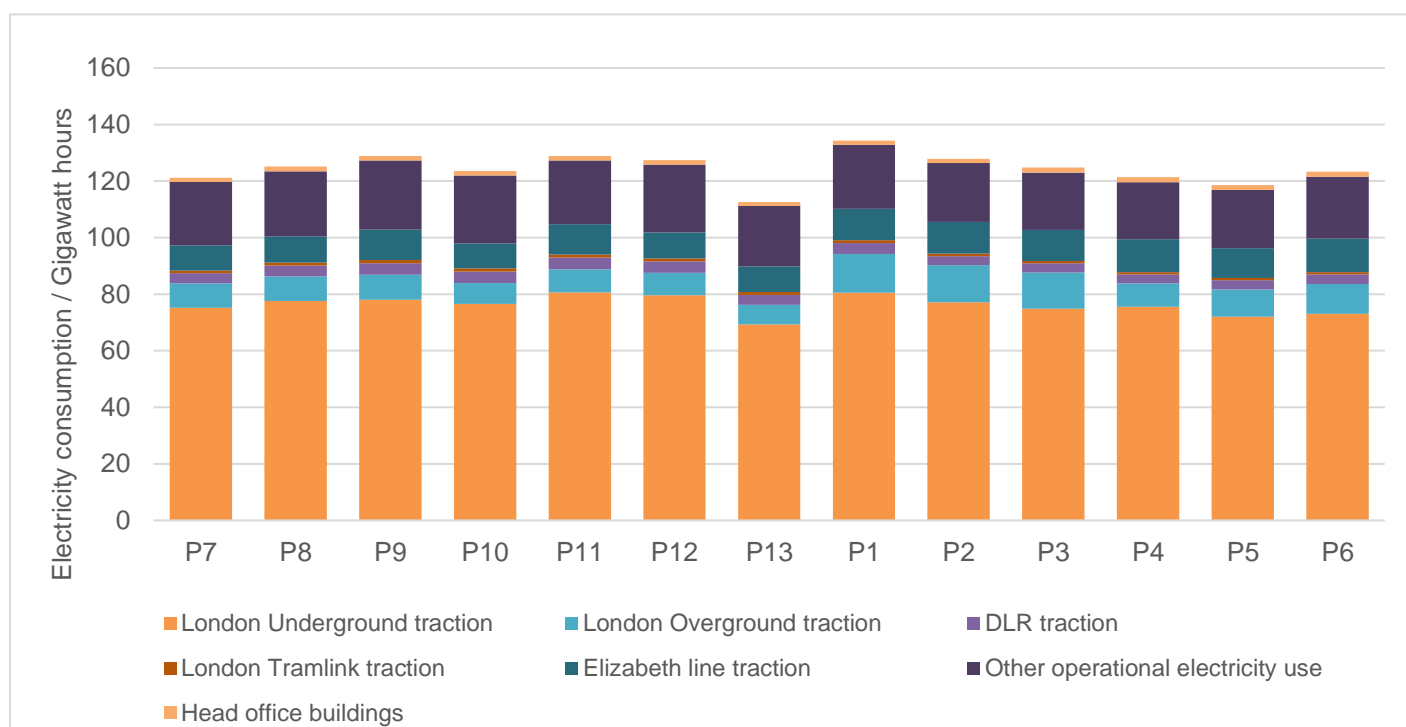
The trial was part of the Government's TIES Living Lab programme, a collaboration of 25 partners focusing on 10 infrastructure, data research and digital demonstrator projects, of which the cooling panels are one. The cooling panel project was 70 per cent funded by the Department for Transport and Innovate UK following a successful bid by the Piccadilly Line Upgrade (PLU) team. The convection cooling system has

been designed by TfL and developed by SRC Infrastructure, which also managed its build.

Following the successful trial at Holborn LU station, the intention is to complete the proof of concept with a trial in an operational platform, currently planned for Knightsbridge LU station. This will take no more than a year and will facilitate a ready-to-roll-out cooling solution to be included in plans for future upgrades, or which could be available for a future standalone scheme in response to emerging adaptation challenges.

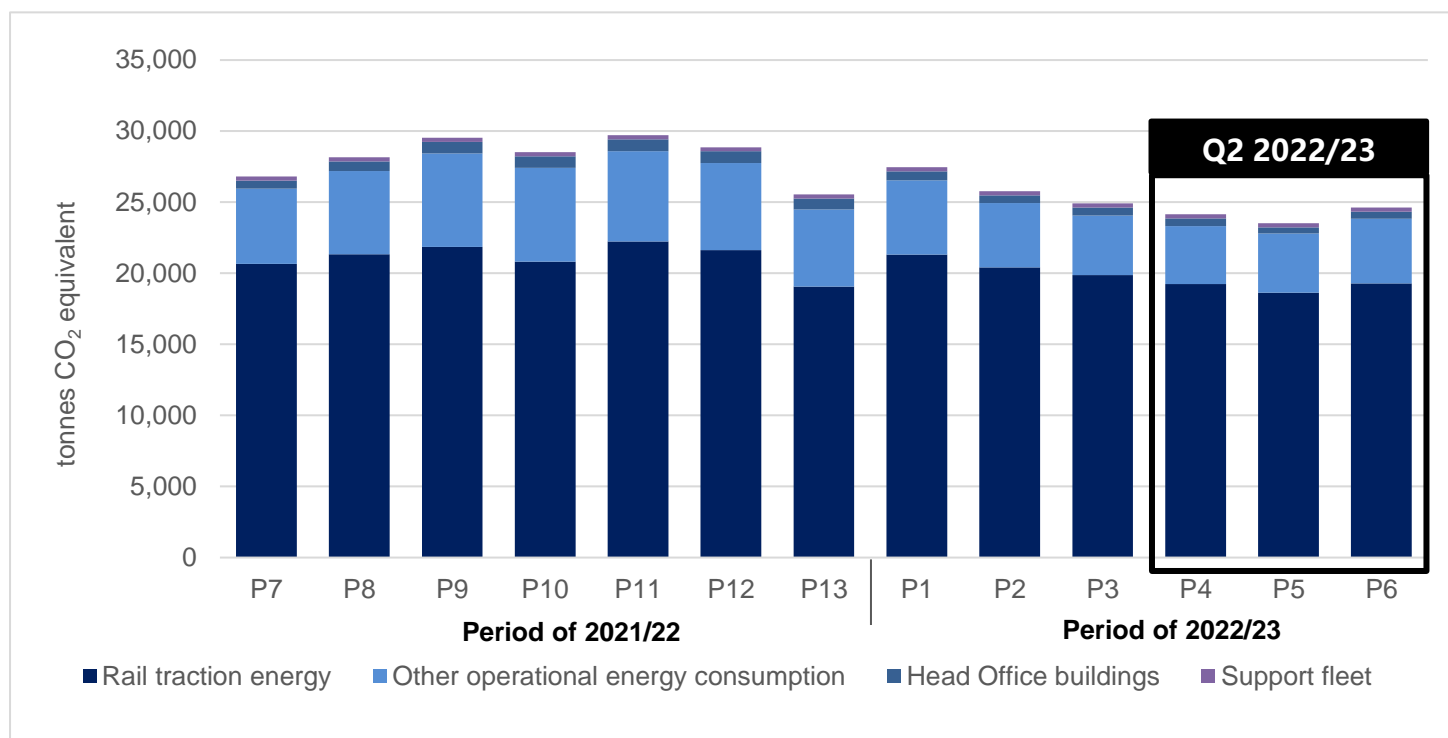
Energy consumption and carbon emissions from our operations

Electricity consumption – provisional – Quarter 2 2022/23 (Gigawatt hours)



Our electricity consumption this quarter was one percent higher than Quarter 2 2021/22. In response to the increased consumption reported during Quarter 1 2022/23 due to Network Rail traction energy billing, LO has installed new electricity meters on its trains and continues to engage with Network Rail to resolve the issue.

CO₂ emissions (excluding buses) Quarter 2 2022/23 (tonnes CO₂ equivalent)



Carbon dioxide emissions from operations, excluding buses, track closely to electricity consumption. Emissions decreased by approximately eight per cent this quarter compared to the same period in 2021/22, partly due to a reduction in emissions intensity of grid electricity.

Sustainability training, engagement and embedding

Executive Sustainability Training and Sustainability Summit

In November 2022, we will be running sustainability training for the TfL Executive Committee. The training will be hosted at a local social enterprise (to be confirmed) with a briefing and workshop sessions run by Will Day, Sustainability Advisor to PricewaterhouseCoopers UK. Will is also a fellow of the University of Cambridge Institute for Sustainability Leadership and previously sat on the UK's Sustainable Development Commission.

As result of the training, the TfL Executive Committee will have a stronger understanding of sustainability and the lens through which they see the world, their work and their lives, and a solid understanding of the issues and key information. It will enable them to engage and lead with confidence on sustainability.

Following this, we will explore how to best roll out this training to all of TfL's senior leaders, as well as making the key messages, information and tools available to everyone in TfL.

To support this, we are also planning a TfL Sustainability Summit in 2023. It will be internally focused, similar to TfL's Anti-Racism Journey event held on 9 June 2022. It will help us to continue to build momentum and strengthen our engagement and understanding amongst TfL colleagues in relation to the issues of sustainability. Importantly, it will encourage our people to have brave conversations about some of the more challenging aspects of sustainability and bring their whole selves to work.

Green Bond

The Greater London Authority (GLA) is planning to raise over £500m via green bonds to finance zero carbon projects across the GLA group and London. TfL is planning to bid for this opportunity, and as such has been developing a pipeline of projects that could be considered for funding, which we will be submitting to the GLA. The bond is expected to be issued in early 2023 and, if successful, provide funding from 2023 to 2026 and accelerate our progress to achieve net zero carbon from our operations by 2030.

Responsible Procurement Implementation Plan published

The GLA group-wide Responsible Procurement Implementation Plan (RPIP), of which TfL is a signatory, was launched in September 2022 and supports the delivery of our Corporate Environment Plan (CEP) through procurement.

As a result of the plan:

- All suppliers of contracts over £5m must provide carbon reduction plans
- New contracts from 2025 will require zero-emission deliveries to GLA Group sites
- The GLA Group will work towards purchasing 20 per cent of goods and services from small and medium-sized enterprises (SMEs), either directly or indirectly, in line with the London Anchor Institutions Charter. This ambition will involve further work to understand the constraints, deliver and effectively measure
- Suppliers are expected to be willing to have trade union recognition agreements
- Tenders above certain values will have a minimum of 10 per cent weighting applied to Social Value, which recognises bidders who will deliver community, environmental and local economic benefits

More detail on the specific targets of the RPIP will be provided under a separate paper and agenda item at the November 2022 meeting of the SSHR Panel.

Carbon Literacy Training Programme

We have successfully completed the pilot phase of our Carbon Literacy training programme, in which a total of 150 colleagues attended a one-day course on the basics of carbon and climate change.

We have now launched further courses which are available more widely and are on track to train 500 people by the end of 2022/23.

Sustainable Resources

Devices for schools initiative

As part of an employee-led 'Devices for Schools' initiative, TfL's Technology & Data teams have been working with a number of primary, secondary and specialised schools across London to supply them with redundant TfL IT equipment.

In the summer term of the 2021/22 academic year, laptops and iPads were distributed to two schools in Bromley and Muswell Hill, where they will be used in classrooms. In September 2022, two further schools in Bermondsey and Enfield benefitted.

This initiative helps reduce electronic waste through the reuse of obsolete tech (personal or corporate devices) which has a relatively low/non-existent resell value to TfL and which might otherwise have been recycled. There is a significant cost saving for the schools involved where there is a continuous demand for equipment in classrooms and new technology is increasingly expensive to purchase. TfL's obsolete tech has now contributed to 10 schools receiving over 150 perfectly usable devices as part of this initiative.

Date: 16 November 2022

Item: Safety, Health and Environment Report – Quarter 1

This paper will be considered in public

1 Summary

- 1.1 This paper summarises key information and trends reported in the first Quarterly (Q1) Safety, Health and Environment (SHE) report for the 2022/23 financial year.
- 1.2 Q1 covers the dates 1 April – 25 June 2022. Most data presented covers this date range, except for some road safety and work-related violence data. It is clearly highlighted when data falls outside this period.
- 1.3 This paper was prepared and published for the meeting scheduled for 14 September 2022, which was cancelled as it fell within the period of public mourning of the death of Queen Elizabeth II.

2 Recommendation

- 2.1 The Panel is asked to note the report.

3 Key information presented in the Q1 report

Scorecard

Measure	Unit	Q1 Target	Q1 Actual
People killed or seriously injured in road traffic collisions per million journey stages	Killed or seriously injured per million journey stages	0.33	0.27
People killed or seriously injured in road traffic collisions in or by a London bus (per million surface journey stages)	Killed or seriously injured per million journey stages	0.020	0.019
Customer all injuries per million passenger journeys	All injuries per million journeys	2.58	2.73
Workforce all injuries	Number of workforce injuries	325	335

- 3.1 The report shows that our safety scorecard measures of rate of people killed or seriously injured on the roads and rate of people killed or seriously injured on or by a London bus have been met for Q1 2022/23.
- 3.2 We did not achieve our public transport customer safety scorecard measure this quarter. In period 3 (29 May to 25 June 2022) 40 per cent of the total Q1 customer serious injuries occurred, driven principally by a spike in slip, trip, fall customer injuries. However, the recorded rate of 2.73 still represents an improving trend compared to the result of 2.85 in Q1 2021/22.
- 3.3 It is disappointing that we did not meet our target for workforce all injuries this quarter, however again the recorded results represent an improving trend compared to the 351 in Q1 2021/22. Our target for workforce injuries is 325, in contrast to 438 in Q1 last year which demonstrates our significant progress on this issue.

4 Safety

- 4.1 When comparing trends between Q1 2022/23 and Q4 2021/22, it is worth noting that Q4 consists of four periods, rather than three (almost four weeks longer than Quarters 1 to 3).

Public Transport

- 4.2 During Q1, total customer numbers on the public transport were 0.72bn, a decrease of 0.08bn when compared with Q4. Our customer numbers – whilst recovering – still have some way to go to resume to pre-pandemic levels (1.08bn in Q4 2019/20).
- 4.3 Across our public transport network, tragically, one customer died on London Underground from a fatal head injury that they sustained when they fell down some stairs. Sadly, 43 customers were seriously injured in Q1, which is 11 less than Q4. Since the pandemic began, the number of customers killed or seriously injured has increased as customers returned to our network, however injury rates have declined.
- 4.4 The number of customers injured per million passenger journeys was 2.73, which is above our target of 2.58 per million journeys but is lower than the customer injury rate in Q1 2021/22. We have seen a reduction in the rate of injuries attributed to customers not holding on to handrails. This has decreased by 33 per cent on buses and 25 per cent on London Underground when compared with Q1 2021/22. Reducing the risk of customer slips, trips and falls remains a key priority. The rate of customer injuries mentioning a slip, trip, or fall has reduced by 19 per cent on London Underground and eight per cent on buses.

Streets

- 4.5 In Q1 2022/23 we have continued to see a return to pre-pandemic levels of road journeys. This is the second successive quarter which has seen travel patterns and casualties on the roads return to pre-pandemic levels. There were more walking, cycling and motorised journeys when compared with Q1 2020/21 and Q1 2021/22.

- 4.6 In Q1 2022/23 15 people were killed, which is broadly similar to Q1 2020/21 and 2021/22. While this number represents a tragic level of death on our roads, it is 46 per cent lower than the 28 people who were killed on London's roads in Q1 2019/20.
- 4.7 The number of people walking who were killed in Q1 2022/23 (five) is less than a third of the Q1 2019/20 pre-pandemic figure (18). This contrasts with Q4 2021/22, which appeared to suggest a return to pre-pandemic casualty patterns. This could mean that travel patterns remain unsettled in the wake of the pandemic, and we will monitor emerging trends as 2022/23 progresses.
- 4.8 The number of people seriously injured on London's roads has slightly decreased in Q1 by five per cent when compared with Q1 2021/22 (883 in Q1 2022/23 and 929 in Q1 2021/22) but is marginally higher than Q1 2019/20 before the pandemic when 839 people were seriously injured. The number of people seriously injured on or by a bus or coach (33) also increased when compared with Q1 2021/22 (24) and Q1 2019/20 (20). Work is underway to analyse this data and mitigate the trend, but initial analysis suggests more customers are suffering falls on buses, and more people walking were involved in collisions with buses.

Workforce

- 4.9 In our Capital Delivery teams, this quarter was one of good performance. It is positive that there were zero incidents reported under the Reporting of Injuries, Diseases and Dangerous Occurrences Regulations (RIDDOR). As a result, the accident frequency rates decreased across all of our Capital teams. The Project and Programme Delivery team have now maintained zero RIDDOR-reportable incidents on their projects for a year.
- 4.10 Lost time injuries (LTIs) are injuries which cause an employee to be absent for one or more shifts. There were three LTIs reported in our Capital teams during Q1, a decrease of four when compared with Q4 2021/22. All three reported LTIs were minor injuries: two were slips and trips, and one was classified as a misuse of hand tools. The most significant root cause related to issues with task planning. As a result, changes have been made at site levels with operatives being re-briefed and learnings shared across Capital teams.
- 4.11 Two of the LTIs occurred at the Bank Station Capacity Upgrade project, where the Bank branch of the Northern line was closed from January to May 2022. It is a testament to the teamwork of everyone who worked on this intricate project that no major incidents or injuries occurred during the closure.
- 4.12 Fare evasion remained the biggest trigger for work-related violence and aggression (WVA) during Q4, resulting in 39 per cent of all WVA incidents. Following the ban on the carrying of electric scooters on TfL's public transport network due to fire risk in December 2021, we have been monitoring the number of WVA incidents involving a customer attempting to bring an e-scooter onto the network. This quarter this has decreased by 44 per cent from 50 incidents in Q4, to 28 in Q1. It is too early to say whether this is as a result of increased customer compliance with the ban, but at the very least our workforce are not being subjected to violence and aggression when reminding customers of the ban.

5 Health

- 5.1 COVID-19 remained the top cause of short-term absence in the quarter (although this reduced from 59 per cent of short-term absences in Q4 to 30 per cent this quarter) and was the fourth most common cause of long-term absence. Absences related to mental health and musculoskeletal issues were the most significant causes of long-term absences and remain the focus of our preventative measures, alongside measures to mitigate the risk of Covid-19 to our people and customers.
- 5.2 Our Occupational Health team is constantly working hard to prevent ill health but also to support those who become unwell, to return to work. Some events hosted this quarter included sessions on Breathing and Meditation, as well as Diabetes Week 13-19 June 2022.

6 Environment

- 6.1 Our electricity consumption was three per cent higher this quarter when compared with Q1 2021/22. This has largely been driven by increased reported energy consumption on London Overground, resulting from changes by Network Rail to estimates for traction energy consumption. This is under review.
- 6.2 Carbon dioxide emissions from operations, excluding buses, track closely to electricity consumption. Emissions decreased by approximately five per cent this quarter compared to the same period in 2021/22, partly due to a reduction in emissions intensity of grid electricity.
- 6.3 In May 2022, we launched a public consultation on plans to further extend the Ultra Low Emission Zone (ULEZ), to cover almost the whole of the capital from 29 August 2023. On 18 and 19 July 2022 the UK experienced record-breaking temperatures and we strongly advised people not to travel. Tube and bus customer numbers vastly reduced compared to the previous week. We are working to understand and build learning from these incidents into our forthcoming pan-TfL Adaptation Plan.
- 6.4 In Q1 we launched the tender for our first Power Purchase Agreement, which aims to purchase more than 10 per cent of our required electricity from renewable energy sources and new build assets. Our carbon literacy training programme continues to gather pace after having been accredited by the Carbon Literacy Project in June 2022. We are now working to increase the number of trainers and make courses more widely available.

List of appendices to this report

Appendix 1: Q1 Safety, Health and Environment Report

List of Background papers

None

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Safety, Health and Environment Quarterly report

Quarter 1 2022/23

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Introduction and Executive Summary

This report summarises our performance in Quarter 1 of 2022/23 and identifies strategic trends covering 1 April to 25 June 2022, unless specified.

The report sets out ways in which we have continued to keep our customers and workforce safe as, after the lifting of all restrictions we have transitioned to living with coronavirus. In January 2022, the Government removed the mandate to wear a face covering in public spaces, meaning that they were no longer enforceable on our services. This quarter we changed our customer and staff messaging to encourage people to take appropriate action to keep themselves safe, including using hand sanitiser and wearing a face covering if this helps them to travel and work with confidence. In parallel, we have continued to make progress towards our longer-term safety, health and environmental objectives.

During Quarter 1, we saw customer numbers decrease slightly, ending the quarter at 0.72 billion customer journeys, representing an 0.08 billion decrease from the end of Quarter 4 2021/22. However, it is worth remembering that Quarter 4 is a four-period quarter – rather than three – covering 12 December 2021 to 31 March 2022, so these numbers should be treated with caution. We still have some way to go before reaching the pre-pandemic customer journey figures of 1.08 billion (Quarter 4 2019/20). This means many of our key safety, staff and environmental performance indicators remain at different levels than they might have been previously.

We have progressed with the implementation of measures to improve our short- and long-term safety, health and environmental performance. We have continued to perform well on most of our safety metrics. In Quarter 1, we met our targets for injuries to people in road traffic collisions and injuries to people on or in collision with a bus. The data behind these scores is explained in the roads safety section of this report. Conversely, we did not meet our targets for customer injuries and workforce injuries and the reasons behind this are discussed in the public transport safety section of this report.

COVID-19 remained the top cause of short-term staff absence but significantly decreased as a proportion of staff absence from 59 per cent in Quarter 4 to 30 per cent in Quarter 1. Mental health and musculoskeletal-related health remained the top two causes of long-term absence, which is in line with the national average. Following the Government's decision to phase out free lateral flow tests, we have continued to make free lateral flow tests available to our staff.

On 4 April 2022, we responded to the Department for Environment, Food & Rural Affairs consultation on Biodiversity Net Gain regulations and implementation. On 26 May 2022, our Head of Corporate Environment attended the London Assembly Environment Committee to discuss London's wild spaces. On 24 June 2022, we

responded to the London Rewilding Taskforce's Call for Evidence, to feed into a Local Nature Recovery Strategy for London.

In Quarter 1, the Government confirmed continued short-term rollovers in funding support whilst discussions continue about a longer-term arrangement [n.b on 30 August 2022 a funding arrangement to 31 March 2024 was agreed with the Government]. Government funding is critical to guarantee the operation and maintenance of essential and safe transport services in London, allowing us to continue our full and vital contribution to the Mayor's economic recovery programme for London as well as national priorities on decarbonisation, air quality and making transport better for users.

About this report

This report explores and highlights the performance, trends and measures we are implementing to improve safety, health and environment performance.

Throughout this report, our 'customers' refers to direct users of our services, and our 'workforce' includes our directly employed staff as well as people working in our supply chain. For both groups, we use data collected directly from our operational businesses. Some assault data comes from both our own internal reporting systems and the police.

When referring to people killed or seriously injured, the following causes of injury are excluded: an injury which results from an incident arising from a pre-existing medical condition; intentional self-harm resulting in a physical injury or death; criminal activities perpetrated by customers or members of the public on other customers or members of the public.

Unless otherwise stated, 'streets' refers to all of London's roads, including those managed by London's boroughs which make up the majority (95 per cent) of London's roads. Where we report safety data for streets, we use data collected by the Metropolitan Police Service (MPS) and the City of London Police (CoLP), in line with Government requirements. All road safety data is provisional and subject to review and assurance, with the final data published annually in line with Department for Transport (DfT) requirements.

Reporting period

Most data covers the quarter from 1 April to 25 June 2022, except for some work-related violence and aggression data which is reported six months in arrears. Some data is provisional and is subject to change.

Mayor's Transport Strategy and Scorecard

Our role is to enable London to move safely and sustainably, in line with the goals of the Mayor's Transport Strategy (MTS). This includes increasing the attractiveness of public transport and making cycling and walking safer, easier and more convenient. We work with many partners, including London borough councils, businesses, the police, local communities and consumer organisations to achieve the MTS objectives.

Scorecard

Figure 1: Quarter 1 2022/23 Scorecard

Measure	Unit	Q1 Target	Q1 Actual
People killed or seriously injured in road traffic collisions per million journey stages	Killed or seriously injured per million journey stages	0.33	0.27
People killed or seriously injured in road traffic collisions in or by a London bus (per million surface journey stages)	Killed or seriously injured per million journey stages	0.020	0.019
Customer all injuries per million passenger journeys	All injuries per million journeys	2.58	2.73
Workforce all injuries	Number of workforce injuries	325	335

The table sets out the relevant scorecard metrics and accompanying targets and actual performance. Below are brief explanations of the performance of each measure. More detailed explanations, with accompanying graphs are set out in the relevant sections of this report.

Road safety measure

As part of our continuing trajectory towards Vision Zero; eliminating death and serious injury on the roads by 2041, our aim in Quarter 1 2022/23 was to reduce the number to fewer than 0.33 people killed or seriously injured on the roads per million journeys. For Quarter 1, there were 0.27 people killed or seriously injured on the roads per million journeys.

Bus safety measure

Our ambition is for no one to be killed in, or by, a London bus by 2030. In Quarter 1, our aim was to have no greater than 0.020 deaths or serious injuries per million journey stages. During Quarter 1 there were 0.019 deaths or serious injuries per million surface journey stages.

Public transport safety measure

Working towards our Vision Zero ambition to eliminate deaths and injuries to customers travelling on our public transport network by 2041, our aim in Quarter 1 2022/23 was to have fewer than 2.58 injuries to our customers per million journeys. This target represents a five per cent performance improvement compared to last financial year.

During Quarter 1 there was a rate of 2.73 injuries per million journeys, unfortunately missing this target. Periods 1 and 2 (1 April to 28 May 2022) were within target, however we saw a spike in our customer injury rate during Period 3 (29 May to 25 June 2022). Across the quarter, our customer injury rate is lower than in Quarter 1 of the previous financial year, 2021/22. This is discussed in more detail in the public transport safety performance section later on in this report.

Workforce safety measure

Working towards our Vision Zero ambition to eliminate deaths and injuries to our workforce, in Quarter 1 our aim was to have fewer than 325 workforce injuries. During Quarter 1 there were 335 injuries sustained by our workforce. This total reflects a return to pre-pandemic levels of some workforce injury causes, such as assaults.

This is a reminder we must strive for continuous improvement towards Zero Harm when it comes to the safety of our workforce.

Safety

This section summarises our safety performance across London's roads, public transport, capital delivery activities and work-related violence. It provides an overview of key trends for the year and the areas we are targeting for improvement.

Violence Against Women and Girls

We continue to make good progress with our programme of activities to end violence against women and girls, while also looking at what more we can do. On 15 June 2022, the Mayor published his strategy for tackling violence against women and girls. We are proud to have been involved in its development and will work with the Mayor's Office for Policing and Crime and other partners to deliver on it. Additionally, on 4 July 2022, the British Transport Police (BTP) released the first edition of their new mobile reporting app, 'Railway Guardian', making it easier for customers to report crime and access support. It also provides customers with information on what to do if they see sexual harassment on trains or at stations. We have collaborated with them on the design and continue to work closely on integrating this platform into other apps and tools.

The delivery of our 'zero tolerance to sexual harassment' training to frontline customer-facing transport staff continues. Our 500 enforcement officers have been trained, and training programmes have launched for staff that work in our bus and Tube stations. This training is supported by a comprehensive internal communications plan to raise awareness and provide guidance to staff. Sexual harassment will also be covered in the new diversity and inclusion training being rolled out to all of our bus drivers starting later this year.

We continue to run our communications campaign across our networks that reinforces our zero tolerance of sexual harassment. The primary aim of the campaign is to send a strong message to offenders that sexual harassment behaviours are wrong, harmful and not tolerated on our network. We want to encourage those who experience any form of sexual harassment on our rail network to report it and to reassure that those reports will be believed and handled sensitively, and to that end, we have seen an increase of 74 per cent in the reporting of sexual harassment behaviours. There were 1,363 reports of sexual harassment made between October 2021, when the campaign launched, and the end of April 2022. This is up from 575 reported offences in the same period the year before. Government launches the Road Safety Investigation Branch

In June 2022 the Government announced that it will recruit a specialised team of inspectors to join the country's first ever Road Safety Investigation Branch (RSIB). They will be charged with the responsibility of looking at how and why collisions

happen and to provide insight into how new technologies such as self-driving and electric vehicles can be rolled out on our roads.

The branch will investigate themes in the causes of collisions, as well as specific incidents of concern, to learn valuable road safety lessons. It will make independent safety recommendations to organisations, such as government and police forces, to better shape the future of road safety policy and provide better, greener and safer journeys.

The specialised unit will also provide vital insight into safety trends related to new and evolving technologies, which could include self-driving vehicles, e-scooters and electric vehicles, to ensure the country maintains some of the highest road safety standards in the world and exciting new technology is deployed safely.

The Government has not yet announced a timeline for the launch of the RSIB, but we will provide notable updates in future quarterly reports.

Road safety performance

In Quarter 1, we continued to see a trend towards pre-pandemic levels of road use, with journeys reaching the highest levels since the pandemic. This is the second successive quarter which has seen journeys on the roads return to pre-pandemic levels, with more walking, cycling, and motorised journeys compared to the same quarter in 2020/21 and 2021/22. Customer journeys on buses are at the highest levels since the pandemic began but remain approximately 22 per cent lower than pre-pandemic levels.

Fewer people were killed or seriously injured in this quarter (899) compared to last quarter (1050), with a corresponding drop in the risk rate of death or serious injury. The exception is that slightly more people were killed or seriously injured while cycling this quarter (272 people compared to 222 last quarter).

Quarterly performance

Figure 2: Number of people killed on London's roads

Transport Mode	Q1 2019/20	Q1 2020/21	Q1 2021/22	Q1 2022/23
Pedestrian	18	3	8	5
Pedal cycle	0	2	1	3

Powered two wheeler	8	9	4	4
Car	1	2	0	3
Bus or coach	1	0	0	0
Taxi	0	0	0	0
Private hire	0	0	0	0
Goods vehicle	0	0	0	0
Other vehicle	0	0	1	0
Total	28	16	14	15

**Quarter 1 2022/23 figures are provisional and subject to change.*

Due to the large changes in the number of people using the road network over the last few years of the pandemic, it is useful to compare Quarter 1 2022/23 to Quarter 1 in 2019/20. A total of 15 people were killed on London's roads in Quarter 1 2022/23, which is broadly similar to the same quarter in 2020/21 and 2021/22. However, the number of people killed in this quarter is significantly less than pre-pandemic (Quarter 1 2019/20).

Notably, the number of people walking who were killed in Quarter 1 2022/23 was less than a third of the 2019/20 pre-pandemic figure, and approximately half for powered two wheelers. This is in contrast with Quarter 4 2021/22, which appeared to suggest a return to pre-pandemic casualty trends. Taken together, this suggests that travel patterns may remain unsettled in the wake of the pandemic, and we will closely scrutinise this data as emerging trends become clearer.

Figure 3: Number of people seriously injured on London's roads

Transport Mode	Q1 2019/20	Q1 2020/21	Q1 2021/22	Q1 2022/23
Pedestrian	267	90	207	231
Pedal cycle	192	169	299	269
Powered two wheeler	227	139	248	210

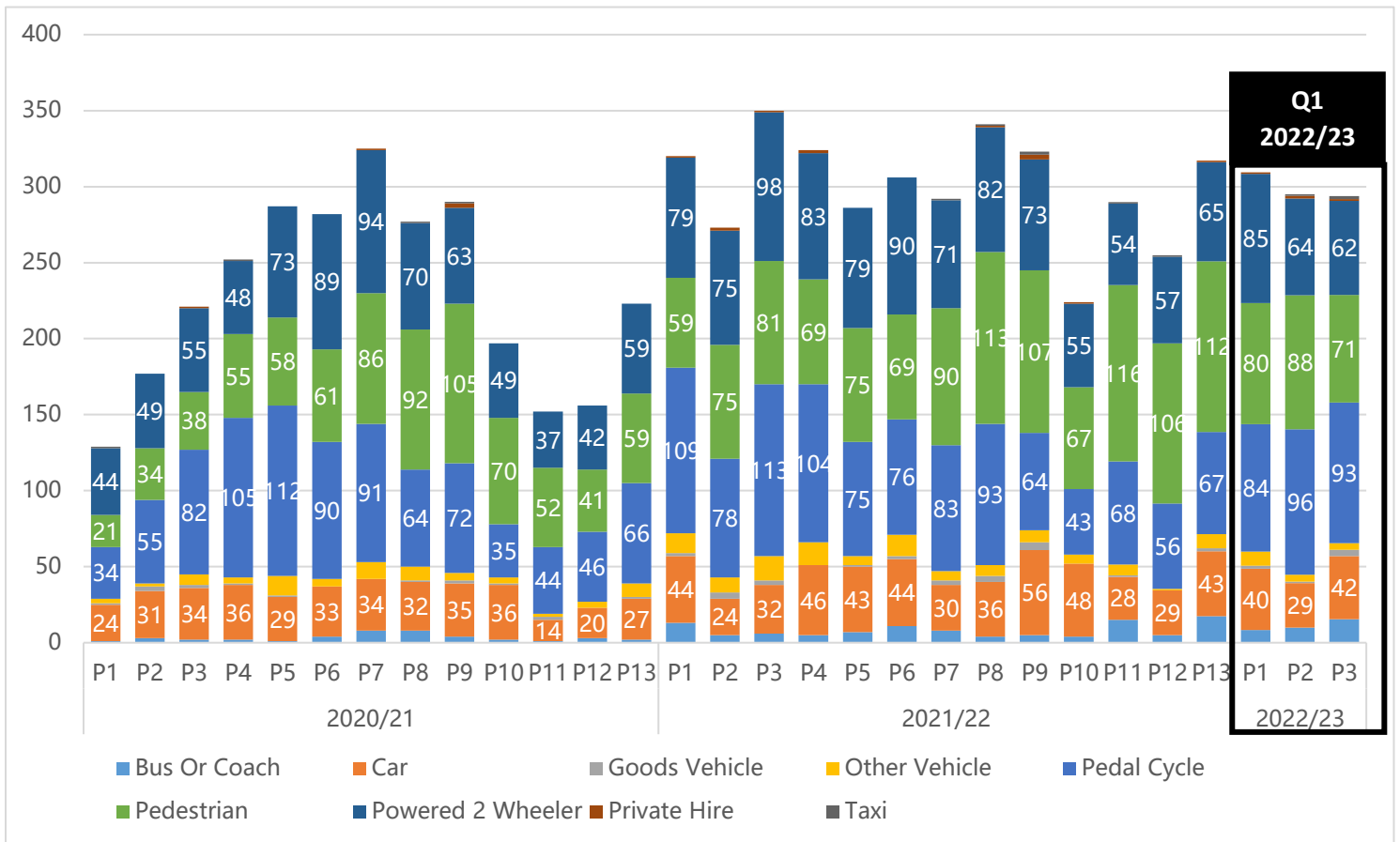
Car	109	87	100	108
Bus or coach	20	6	24	33
Taxi	7	1	0	3
Private hire	3	1	4	4
Goods vehicle	12	6	9	7
Other vehicle	2	12	38	18
Total	839	511	929	883

**Quarter 1 2022/23 figures are provisional and subject to change.*

The number of people seriously injured has slightly decreased by five per cent compared to the same period last year (883 serious injuries compared to 929 in Quarter 1 2021/22) but is a little higher than the equivalent period in 2019/20 (pre-pandemic). Against this trend, serious pedal cycle injuries remained higher in Quarter 1 2022/23 than the pre-pandemic figure although they fell slightly compared to the same quarter last year (299 and 269 serious injuries respectively). This may be due to changes in where and when people are cycling since the pandemic, and we are working to better understand how shifting travel patterns are shaping this trend.

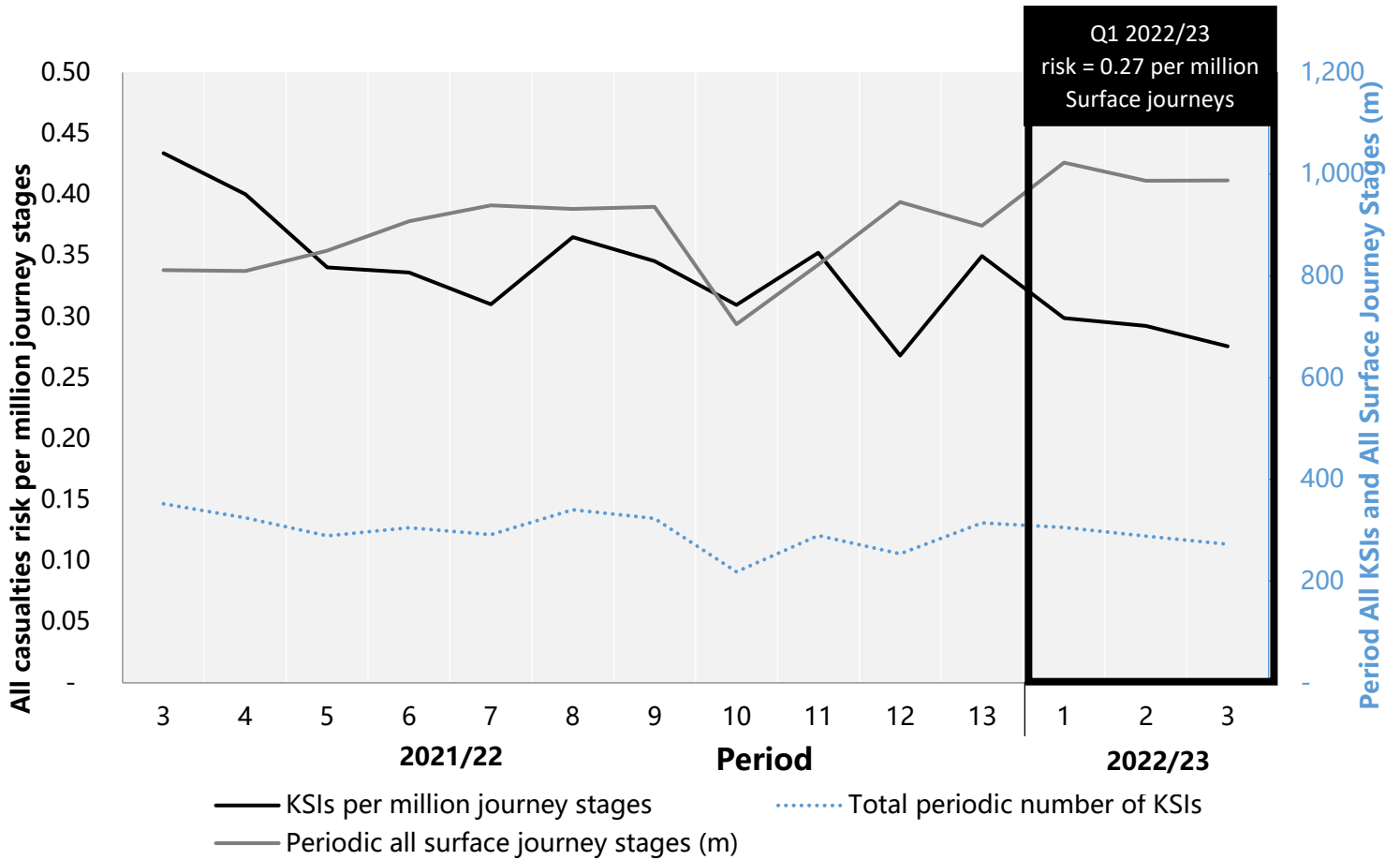
The number of people seriously injured on or by a bus or coach also increased in Quarter 1 2022/23 compared to the same quarter last year and pre-pandemic. The road traffic collision data collected by the police (STATS19) indicates that more bus occupants were injured, and a greater number of people outside the bus were injured in collisions with buses, than during the same quarter last year and the equivalent quarter pre-pandemic. Work is underway to understand and mitigate this trend, but initial analysis suggests more customers are suffering falls on the bus, and more people walking were involved in collisions with buses.

People killed or seriously injured on London's roads (by mode travelled)



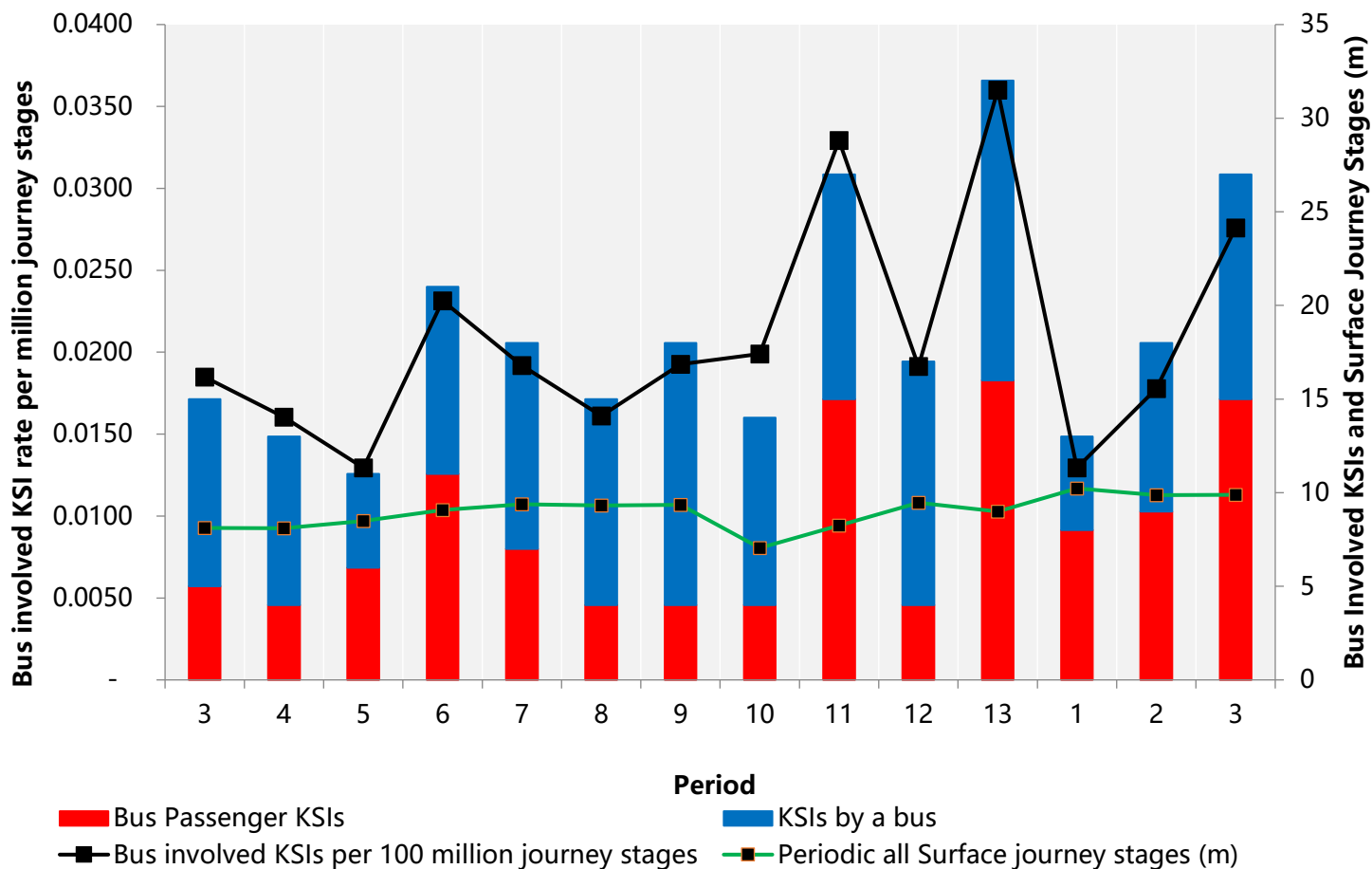
In Quarter 1 2022/23, 899 people were killed or seriously injured on London's roads. People walking, cycling and motorcycling continued to account for 81 per cent of those killed or seriously injured. Since the pandemic, and a return of motorised traffic, the longer-term trend appears to be roughly 300 people killed or seriously injured each period, which is similar to the 2017-19 average, albeit with changes in the composition of who is being injured as mentioned previously. This highlights the challenges London faces in making continual progress towards its Vision Zero goal.

Scorecard measure: People killed or seriously injured in road traffic collisions (per million journeys)



Working towards our Vision Zero ambition to eliminate death and serious injury on the roads by 2041, our scorecard aim for the quarter was for fewer than 0.33 deaths or serious injuries per million journeys. During Quarter 1, there was 0.27 people killed or seriously injured on the roads per million journeys.

Scorecard measure: Rates of fatal or serious injury experienced by people in collision with buses



Our ambition is that no one is killed or seriously injured on, or by, a London bus by 2030. The risk of a bus being involved in a collision that kills or seriously injures either a bus passenger or someone else on the roads remains extremely low.

In Quarter 1, our aim was to have no greater than 0.020 deaths or serious injuries per million journey stages. Our aim for bus safety is more stretching than the general road safety aim, to reflect our ability to directly influence bus services. In Quarter 1 there were 0.019 deaths or serious injuries per million surface journey stages. Whilst we have met our target this quarter, we are noticing an increase this calendar year in the number of deaths or serious injuries on or by a bus as pandemic recovery continues. We are monitoring this trend and conducting further analysis into whether any specific trends or causes are driving this recent increase.

Road safety updates

Vision Zero action plan progress report

The [Vision Zero action plan progress report](#), published in November 2021, reiterates our focus on actions that contribute to creating a Safe System:

- Safe speeds: lowering speeds to reduce the severity of collisions.
- Safe streets: redesigning streets to reduce conflict between road users – which is integral to our Healthy Streets approach.
- Safe vehicles: allowing only the safest vehicles to use our roads.
- Safe behaviours: engaging and educating people about travelling safely and enforcing road rules.
- Post-collision learning and justice: learning from collisions and better supporting the people who have been involved.

Vision Zero Summit

On 5 July 2022, we hosted the Vision Zero Summit. We brought together TfL colleagues as well as representatives from London Councils, academia, the Greater London Authority (GLA), emergency services, victims of road trauma, road safety charities and organisations.

A moving highlight of the day was hearing from Yair Shahar, a road crash victim whose life had been irrevocably changed on the day that he was knocked off his bicycle by a car driver. He spoke about the far-reaching impact this had on his family's lives, and how he has channelled his experience into campaigning for safer streets. His call to action touched attendees in a way that no one else could, and his story has featured on our staff intranet so that people who weren't present at the event can learn about his experience.

TfL's Chief Safety, Health and Environment Officer, Lilli Matson, opened proceedings and Commissioner, Andy Byford and the Deputy Mayor for Transport, Seb Dance both spoke at the event. Walking and Cycling Commissioner, Will Norman chaired the panel discussion at the end of the session and Chief Operating Officer, Andy Lord, provided closing remarks.

Safe Speeds

Lowering Speed Limits Programme

Lowering the speed of vehicles in London is key to reducing both the likelihood of a collision occurring and the severity of the outcome. This programme is vital to the Mayor's Vision Zero ambition to eradicate fatal and serious injury collisions from London's roads by 2041.

The second phase of the programme is underway, and - as detailed in the Vision Zero action plan progress report - seeks to reduce speeds by 10mph on a further 140km of our roads.

Raised pedestrian crossings will soon be introduced in eight locations to further reduce danger to people walking and increase compliance with the new speed limit, as well as introducing accessibility benefits for mobility impaired customers.

Detailed design work is complete on proposals for a 30mph speed limit in Gants Hill town centre and is in progress for the introduction of a 40mph speed limit on the A4 Bath Road, and 20mph in Putney town centre. Concept design work is complete to introduce a new 20mph speed limit on a further 31km of our roads which - subject to funding - we plan to deliver by the end of 2022. This will see a consistent 20mph speed limit across most roads in Camden, Islington, Hackney, Tower Hamlets and Haringey.

Concept design work has also started to lower the posted speed limit on a further 73km of our roads, which includes the third wave of delivery under Phase Two of the programme.

Safe Streets

Safer Junctions

In April 2017, the Safer Junctions programme highlighted 73 of the most dangerous junctions on our road network. These junctions are defined as those with the highest vulnerable road user collision rates. Work to 43 of these junctions has now been completed.

Design work continues on the remaining 30 junctions, including detailed design of York Road roundabout and Holloway Road/Drayton Park, which are respectively delivering motorcycle and pedestrian safety measures. Detailed design work has started on a new 20mph speed limit through the junction of A205 Upper Richmond Road with Putney Hill/Putney High Street, the first phase of a three-stage approach to improve road danger at this location.

In November 2021, a new pedestrian crossing was introduced over Battersea Bridge, where a person walking was tragically killed at the beginning of 2021. The second phase of this project is planned for public engagement at a future date to be confirmed.

Subject to funding, we propose to engage on 10 further Safer Junctions by 2024.

Safe Vehicles

Direct Vision Standard

TfL's world-first Direct Vision Standard (DVS), which reduces lethal blind spots on lorries is already helping to save lives and prevent life-changing injuries. The scheme requires owners of heavy goods vehicles (HGVs) weighing more than 12 tonnes to apply for a free permit that assigns vehicles a star rating based on how much the driver can see directly through their cab windows to be able to drive safely in London.

Since its introduction, more than 177,067 HGVs have had safe systems fitted, improving the direct vision of the driver from the cab. 277,478 permits have been issued and 90,220 penalty charge notices were issued up to the end of Quarter 1 2022/23.

Collision severity involving HGVs has been falling, indicating that interventions undertaken by both TfL and the freight industry in recent years are already making a positive impact. The overall number of serious injuries involving HGVs has fallen from a total of 48 in 2017 to 17 in 2021. The first year of enforcement of the DVS and the HGV safety permit scheme has also seen a reduction in fatal collisions where vision is cited as a contributing factor. In 2021, there were a total of 11 fatal collisions involving HGVs and people walking or cycling. Of these, six fatal collisions occurred where vision was cited as a contributing factor. This compared to eight in 2020 and nine in 2019 where vision was cited as a contributing factor. Four of the six fatal collisions in 2021 involved zero-star rated vehicles, further demonstrating the enhanced value of direct vision over other safe system equipment. TfL has published the DVS One Year On report which can be accessed [here](#).

Electric Scooters

The e-scooter rental trial¹ has expanded significantly since its launch on 7 June 2021. By 3 July 2022, over 1,280,000 hire trips had been taken, averaging a distance of 2.6km per trip. Operators have reported that there have been no fatalities and 20 serious injuries based on the STATS19 injury classification definition in the same time period. Thousands of users have also benefitted from the operators' discount schemes, which make the rental vehicles more affordable for people on low incomes and with disabilities.

TfL and London Councils have extended the capital's trial of rental e-scooters from 6 June until 20 November 2022, which will allow the trial to build on its successes and

¹ <https://tfl.gov.uk/modes/driving/electric-scooter-rental-trial>

continue to explore how e-scooters could play a role in a sustainable transport network.

London's trial has expanded significantly since its launch, with 10 boroughs, more than 500 designated parking locations and 4,100 e-scooter vehicles now involved. Updated DfT guidance allows existing trials in the UK to be extended until November 2022, enabling local authorities to continue to test the vehicles in a safe and legal way.

Bus Safety Standard

We continue to roll out the Bus Safety Standard (BSS) to new vehicles joining the fleet. The number of new buses meeting the BSS specification continues to climb with approximately 800 buses now in the fleet. The safety measures include Intelligent Speed Assistance (ISA) technology which limits buses speed to the posted speed limit.

Including buses retrofitted with ISA, approximately 25 per cent of London's bus fleet now has ISA. Other measures in the BSS include an Acoustic Vehicle Alerting System (AVAS) for quiet-running buses, circa 650 new buses now fitted with AVAS, and circa 700 buses fitted with Camera Monitoring Systems which aims to reduce blind spots.

We are now focusing on supporting delivery of the safety measures required in 2024 and looking at what new safety requirements we will add into the BSS beyond 2024.

Pedal Confusion

Pedal confusion has been defined as the manoeuvre where a driver confuses the acceleration pedal with the brake pedal, resulting in either sudden unintended acceleration or harsh braking.

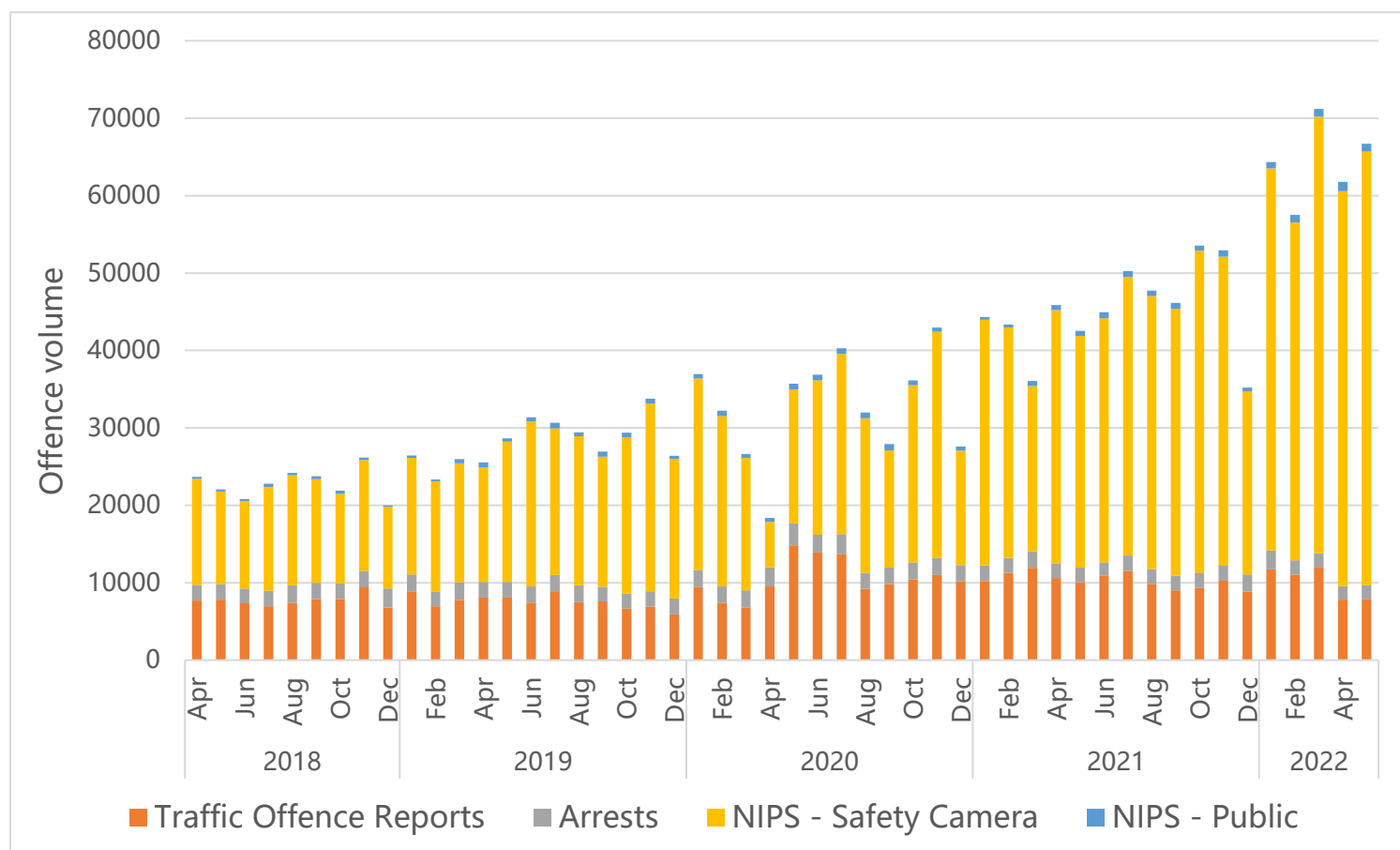
We commissioned the engineering company AECOM to produce a report on pedal confusion and are currently considering the recommendations.

Safe Behaviours

Enforcement

The Metropolitan Police Service (MPS) undertakes significant and wide-ranging activity to reduce road danger and prevent harm to all road users. This includes prevention and intelligence gathering activities, problem-solving to tackle the root causes of problems, community engagement and education initiatives and actively monitoring and targeting high risk vehicles and drivers.

Enforcement of road traffic offences volume 2018-2022



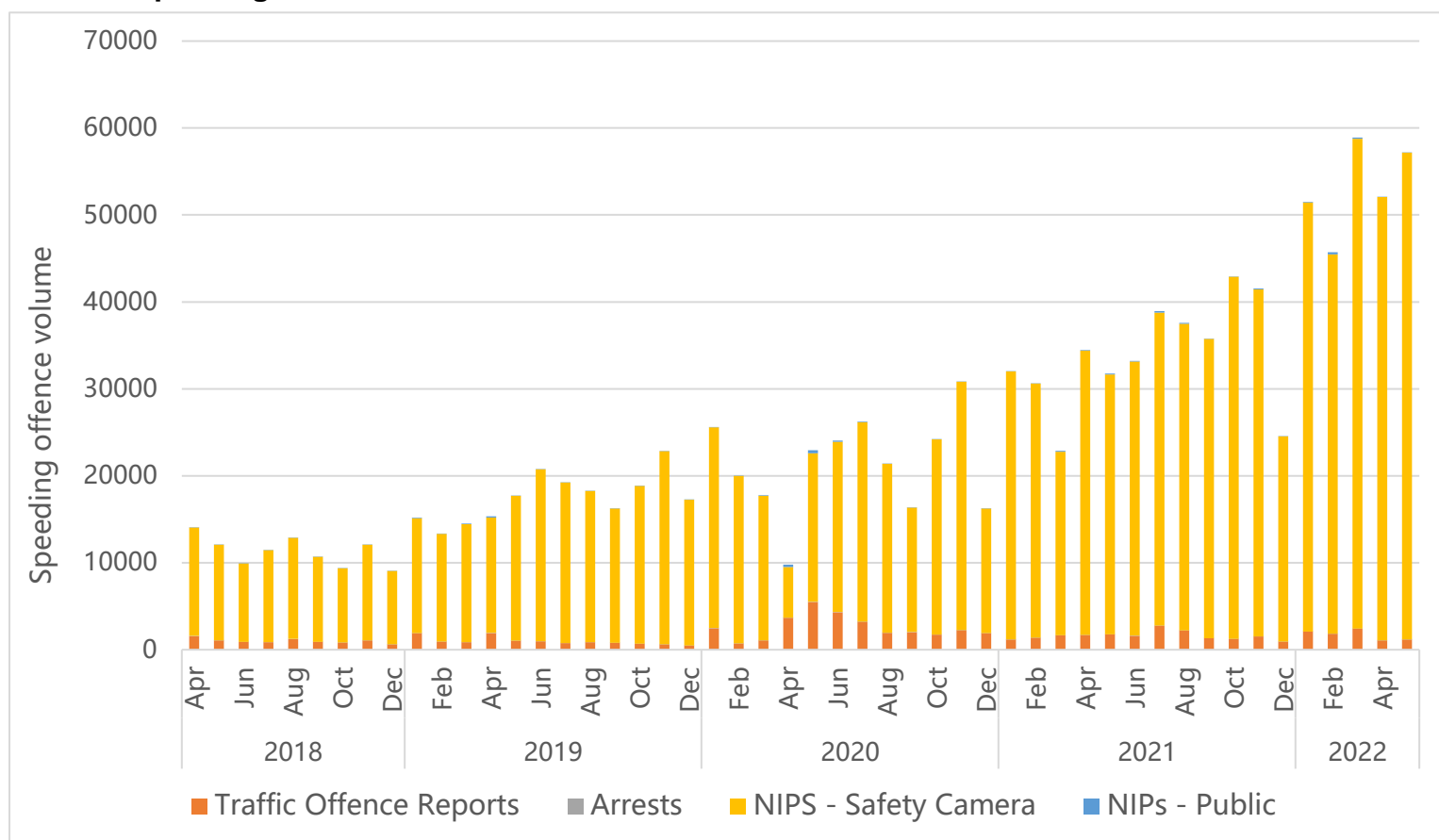
*NIP = Notice of Intended Prosecution

The MPS dealt with 128,498 road traffic offences through enforcement action in Quarter 1 2022/23 (April – May 2022). This was 45 per cent higher than April – May 2021 (an additional 40,092 offences).

Enforcement action includes Traffic Offence Reports which are issued by police at the roadside, arrests or Notices of Intended Prosecution for offences enforced through safety cameras or evidence provided members of the public (for example, through headcam or dashcam footage).

The MPS prioritises its enforcement on the offences that cause the greatest risk and harm on London’s roads. This includes speeding, mobile phone offences, driving under the influence of drugs and alcohol, red light offences, careless or dangerous driving, driving without a licence or in an uninsured vehicle or driving while disqualified. During Quarter 1 2022/23 (April – May 2022), 93 per cent of all road traffic enforcement action taken by the MPS was for priority offences, five per cent higher than 88 per cent during April – May 2021. Speed enforcement accounted for 85 per cent of all traffic enforcement, reflecting the risk and harm this causes.

Speeding offences volume 2018-2022



*NIP = Notice of Intended Prosecution

In line with our commitments in the Vision Zero action plan progress report, we have been working with the MPS to increase the level of police enforcement to tackle speeding and the harm it causes. This has included a programme of activity to increase the effectiveness of the safety camera operation, working towards having the capacity to enforce up to one million speeding offences by 2024/25.

In Quarter 1 (April – May 2022), the MPS enforced 109,307 speeding offences. This was 65 per cent higher than April – May 2021 (an additional 43,087 offences). This is due to the planned uplift in safety camera enforcement, as part of the shared collaborative programme between the MPS and TfL, to improve the MPS’s capability to enforce greater volumes of offences captured by safety cameras. This is not an indication that speeding is worsening but moreover that the MPS’s capacity to issue more penalties has improved.

The above traffic enforcement results are provisional and are subject to change as more offences are processed.

In Quarter 4 2021/22, we introduced the new mobile safety camera capability (five lasercam devices) that are operated by Roads Policing Police Community Support

Officers. This capability complements police roadside enforcement activity and the fixed safety camera network, and it will enable us to deal with more offences. The MPS has enforced 13,984 speeding offences through mobile safety cameras since they were introduced at the end of January 2022.

New Enforcement Powers to be used to Improve Cycle Safety

In June 2022, we announced we will begin issuing fines to vehicles that drive within, or cross, the white lines of cycle lanes that are marked by a solid white line and cycle tracks on TfL's Road Network (TLRN). Reducing non-compliance will help improve safety and the confidence of people cycling as part of TfL's Cycling Action Plan and help us work towards our Vision Zero goal of eliminating death and serious injury on the road network by 2041.

The Government has introduced new powers allowing us and London borough councils to fine motorists who infringe on cycle lanes and cycle tracks in the same way that they currently do for bus lanes and yellow box junctions. These powers were introduced in May 2022, at the same time as wider national changes giving local authorities in England outside of London the powers to enforce moving traffic contraventions such as illegal U-turns and stopping in a yellow box junction. Initially, we will use existing CCTV cameras to enforce contraventions in cycle lanes and cycle tracks at key locations across London's road network.

Road danger remains a barrier to people walking and cycling, with more than half of Londoners choosing not to cycle because of safety concerns. The new enforcement powers will help protect designated space for people cycling and make the capital's roads more attractive for Londoners to cycle on, helping to build on the huge increases in cycling seen in the capital since the start of the pandemic.

Powered two-wheeler (P2W) Training Courses

Demand and attendance on our motorcycle safety training courses remains strong. Year-to-date (January to July 2022), 228 riders have completed one-to-one Motorcycle Skills and 148 riders have completed Beyond CBT, the training course aimed specifically at those who ride for work. Since the inception of TfL's P2W courses, 4,300 individuals have been trained across the two courses.

The MPS has delivered 111 CourierSafe workshops to 93 riders year-to-date (January to July 2022). CourierSafe is a one-day workshop specifically designed for gig economy riders to boost biking ability and improve safety on the road while working.

Information on all of TfL's motorcycle training courses can be found [here](#).

Marketing Behaviour Change Campaign - Speed

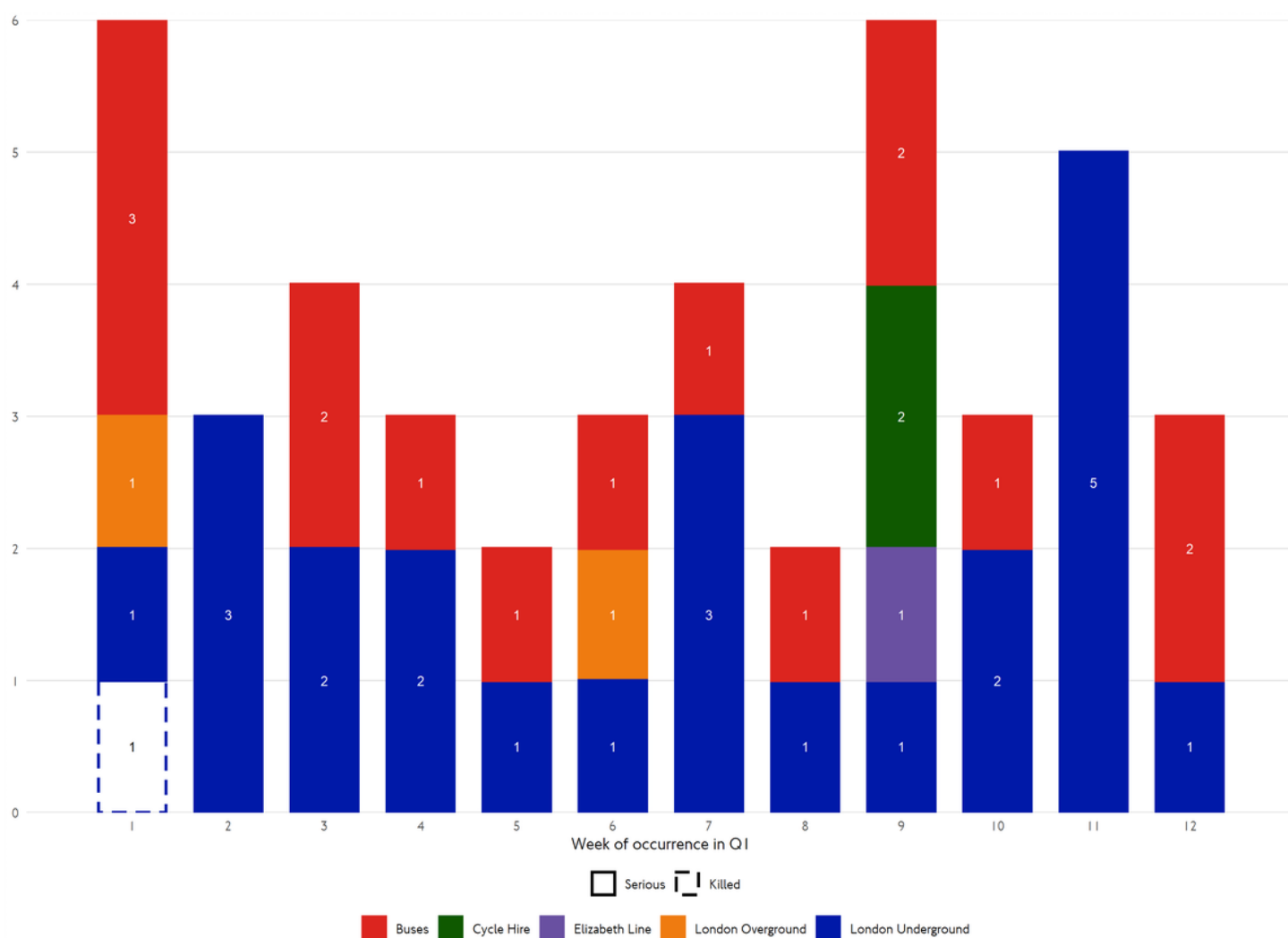
The Mayor of London's Vision Zero objective is to eliminate all deaths and serious injuries from road collisions from London's roads by 2041. We must inspire a change to the way people feel about road danger in London, influence specific behaviours such as speeding. Towards this aim, in spring 2023 we will launch a revised behaviour change campaign tackling speed, targeting drivers. We are currently working with our creative and media agencies to develop a new strategy and will update stakeholders for input soon.

Public transport safety performance

This section does not include injuries sustained by our construction and projects workforce, which are covered in the Capital safety performance section.

Quarterly performance

Customers killed or seriously injured per week in Quarter 1 (by mode)



One customer was tragically killed on our public transport network during Quarter 1. Sadly, 43 customers were also seriously injured.

We have seen customers being seriously injured on a greater variety of modes this quarter compared to Quarter 1 2021/22. This includes two customers seriously injured whilst using Cycle Hire, two customers seriously injured when travelling on London Overground (LO), and one customer seriously injured when travelling on the Elizabeth line. This is in addition to a customer death and serious injuries on LU (55 per cent) and serious injuries on buses (34 per cent).

On LU, there were eight falls on escalators and eight falls on stairs, resulting in serious customer injuries and one fatality in which the customer fell down a set of stairs at Walthamstow Central London Underground station, resulting in a fatal head injury.

Five of the eight falls on escalators and five of the eight falls on stairs involved intoxication as a possible contributory factor. Other factors include carrying luggage, wet weather and the customer losing balance whilst using a walking aid. Other notable serious injuries sustained on LU included an accidental fall onto the track, and a customer's head being crushed as they urinated between two train carriages of a Piccadilly line train which was in motion at the time.

On buses, customers sustained serious injuries in a number of scenarios. The most common factor continued to be other road users' behaviour, requiring the bus driver to take avoiding action which led to serious injuries being sustained by bus passengers. Although this remains a common injury scenario, as discussed in more detail below, it is encouraging to note the downward trend in this type of incident. Two bus customers were also seriously injured whilst using the stairs: one whilst descending and another as the bus moved off. Other circumstances this quarter included a fall from a seat; a fall on the same level as the bus approached the bus stop; and a road traffic collision between a customer and a car after the customer had alighted the bus and attempted to cross the road.

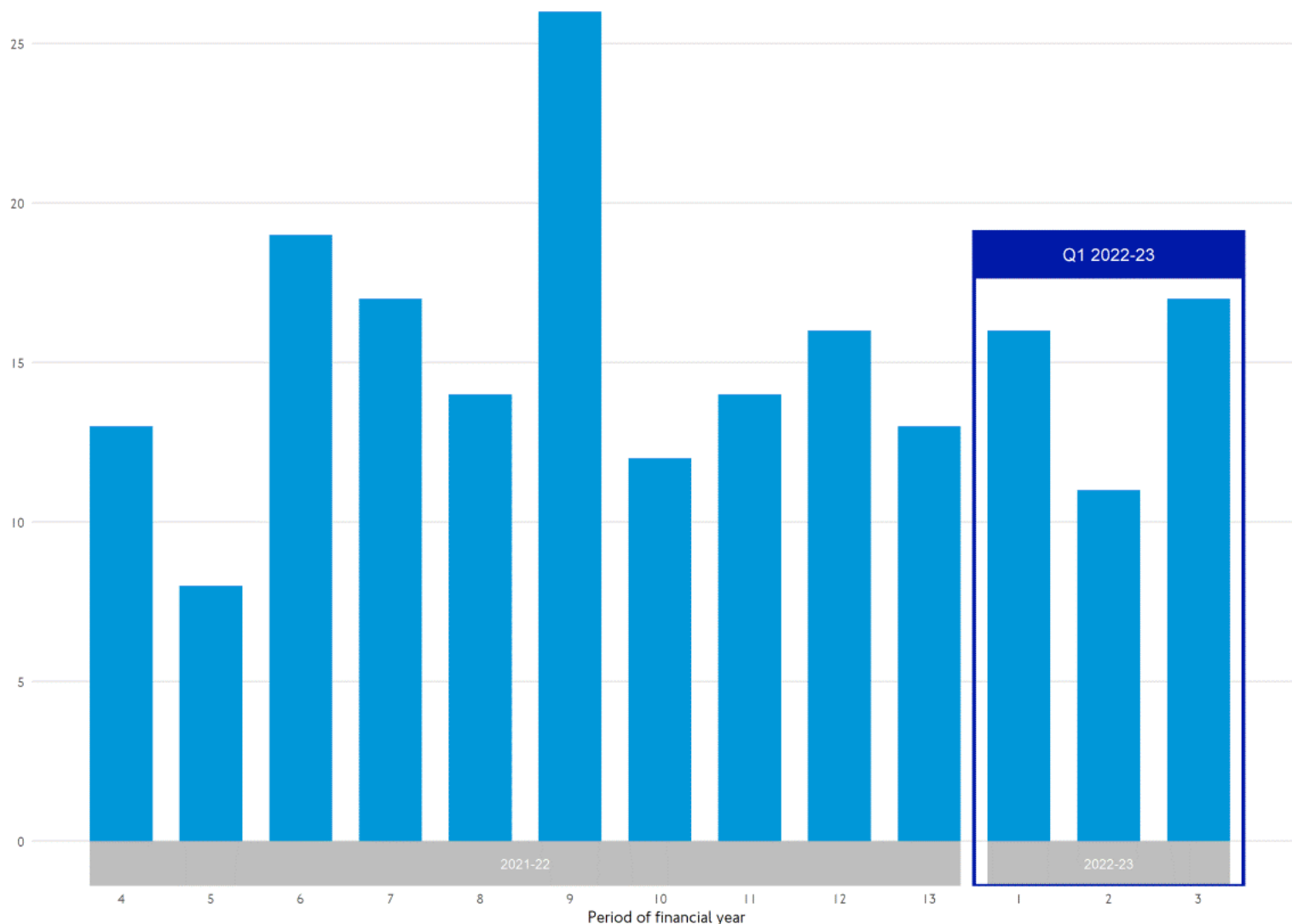
On LO, there were two incidents: one in which a visually impaired customer fell from the train onto the platform, and another where a customer fell on the platform.

On Cycle Hire, one customer was seriously injured in a collision with a car, and in a separate incident a Cycle Hire bike collapsed when the front wheel detached, causing the customer to sustain a serious injury. Serco's usual process was followed whereby the bike was collected and underwent a full service and engineer's check, before being tested again and then released back into hire.

As the central section of the Elizabeth line has recently opened, we are still in the process of establishing a streamlined approach of how data on customer injuries will be collected, due to the stations being operated by various partners such as LU, MTR and Network Rail. Accordingly, information about serious injuries sustained on the Elizabeth line is limited. However, we do know one serious injury occurred at Paddington as a result of a slip, trip or fall, and that the customer was taken to hospital as a result of their injuries.

We continue to strive to improve the safety of our public transport network. We are embarking on a new strategic approach to working in a risk-based way: building a broader understanding of our safety performance; diagnosing and prioritising our top safety concerns; and enabling transport modes and teams to take local action on these concerns. In taking this approach, we have initially prioritised common customer safety concerns including slips, trips and falls; passenger/transport interfaces; and road risk. First and foremost, we will focus on improving what is within our control. However, we acknowledge that customer incidents will always be influenced by human behaviour. Our Customer Experience teams across TfL continue to work hard to identify effective strategies to positively impact customer behaviour on our network.

Customers killed or seriously injured per period this year (total)

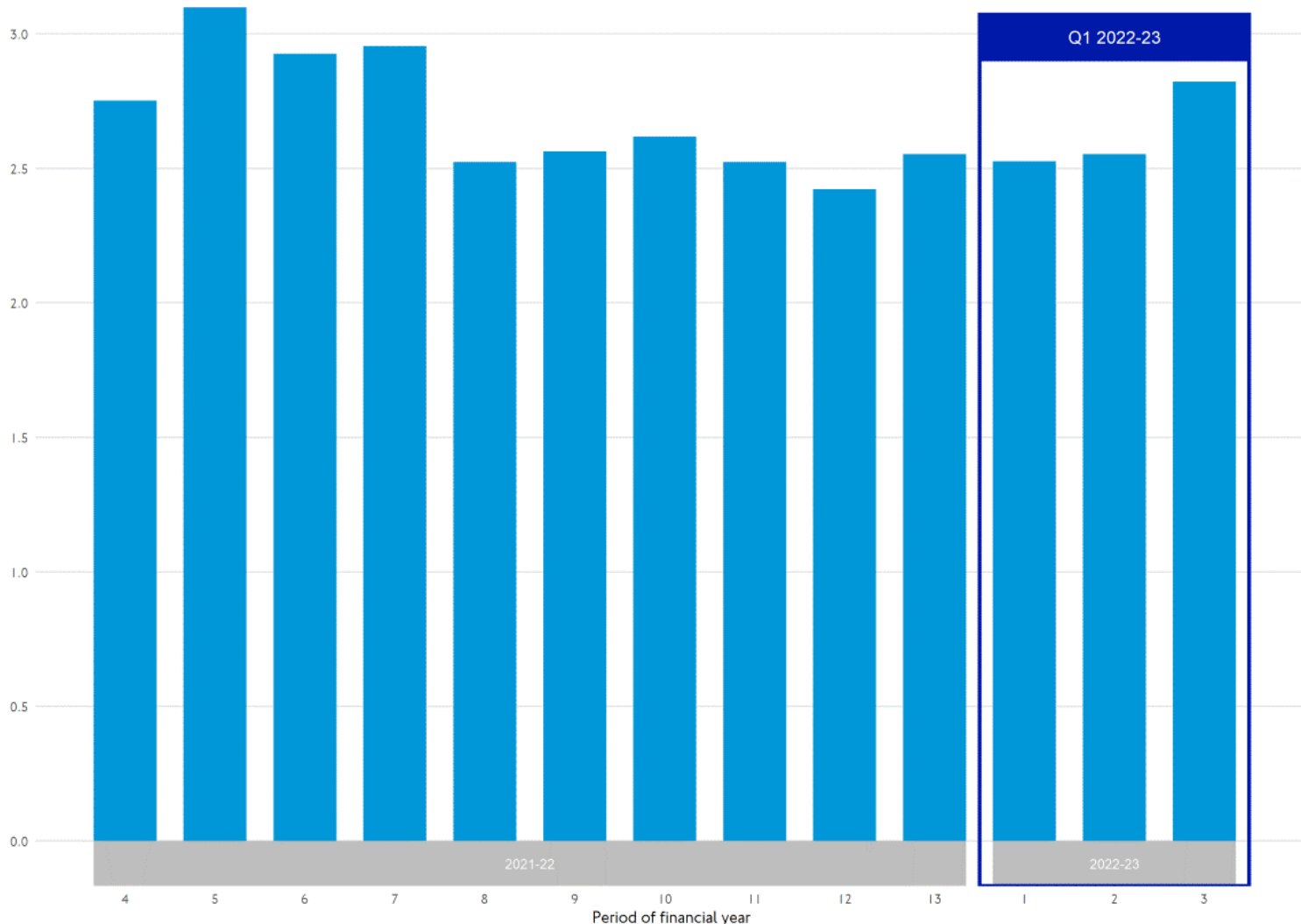


Overall, more customers were killed or seriously injured this quarter than in Quarter 1 of 2021/22.

To put this into context, compared to Quarter 1 of 2021/22, the number of passengers travelling on our public transport network this quarter has increased by 47 per cent. In the same quarter last financial year, many pandemic measures either remained in place or eased during the quarter. This included the opening of non-essential retail and outdoor venues (12 April 2021) the rule of six and opening of indoor venues (17 May 2021); and the lifting of restrictions on funerals and weddings (19 July 2021). The final closed sectors of the economy, including nightclubs, remained shut for the entirety of Quarter 1 2021/22. These measures influenced the number of people we saw travelling on our network, their reasons for travel, and the contribution of different travel behaviours, for example travelling with luggage or whilst in an intoxicated state.

Comparing the same quarters, although passenger numbers have increased by nearly half, the number of customers killed or seriously injured has increased by 13 per cent. This does mean more customers have unfortunately encountered significant harm this financial year, but it is encouraging that the number of customers killed or seriously injured has not increased to the same proportional extent as customer numbers.

Scorecard measure: Customer all injuries rate (per million passenger journeys)



The number of customer injuries per million passenger journeys this quarter is 2.73. Unfortunately, the Quarter 1 customer injury rate is above our target across 2022/23 of 2.58 injuries per million passenger journeys. This target customer injury rate represents a five per cent reduction in our customer injury rate performance last financial year. This rate of improvement, if sustained year-on-year, is equivalent to the elimination of all customer injuries by 2041. While we are not yet meeting our

scorecard target, our customer injury rate this quarter is lower than our customer injury rate in Quarter 1 2021/22, suggesting we are progressing in the right direction.

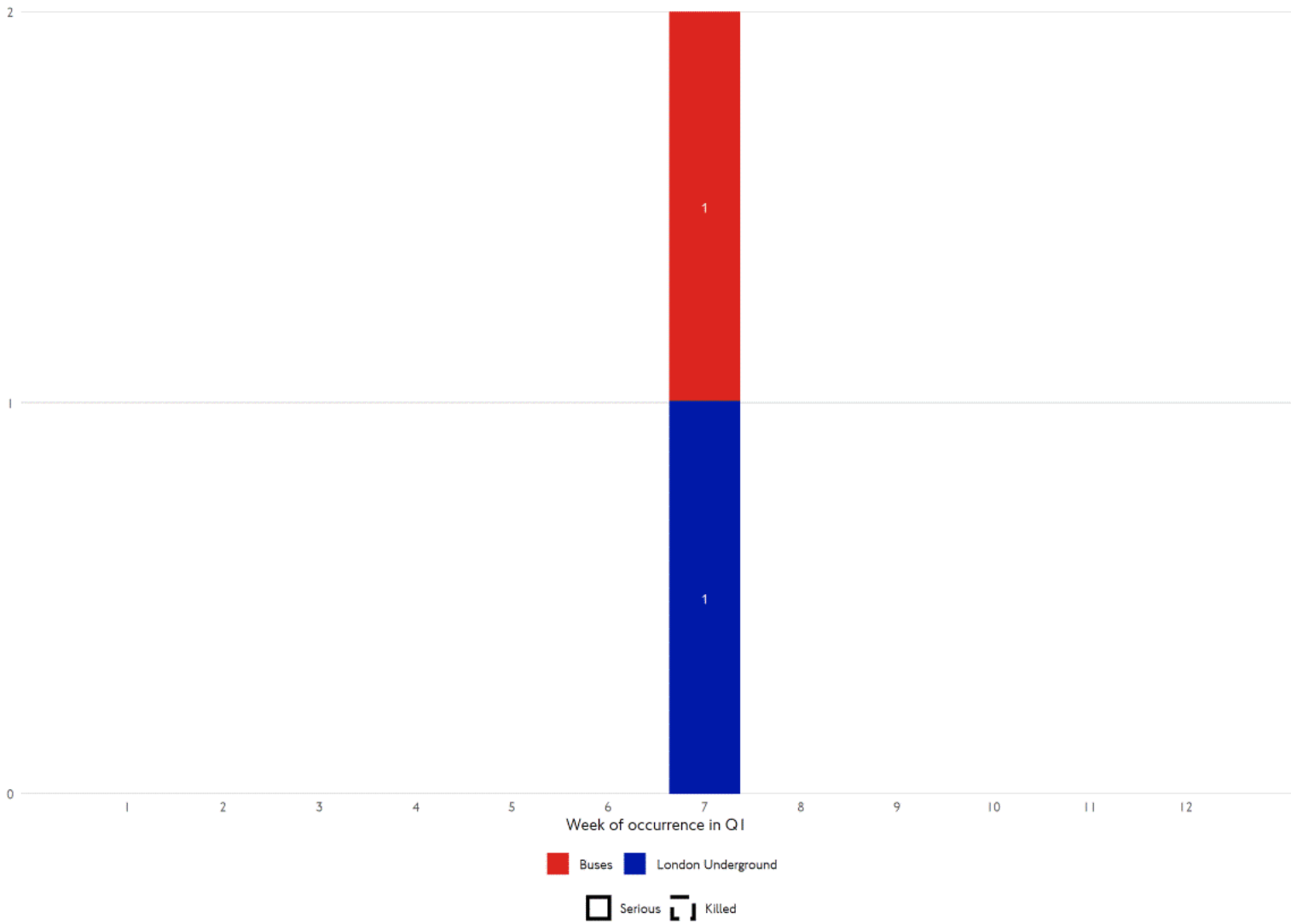
One positive change is a reduction in the rate of injuries mentioning that customers were not holding on to handrails and poles in our stations and on our vehicles. This has decreased by 33 per cent on buses and 25 per cent on LU compared to Quarter 1 2021/22. We observed over the pandemic that customers were not holding on to handrails and poles, due to a fear of catching coronavirus. It is encouraging to see that as the pandemic eases, the number of injuries sustained per million passenger journeys where a customer was not holding on is decreasing.

The risk of customers slipping, tripping, or falling whilst travelling on our network has been a key part of our risk profile for as long as we have been transporting customers. This injury type remains a priority. Encouragingly, this quarter there has been a reduction in the number of customer injuries per million passenger journeys resulting from slips, trips, or falls compared to Quarter 1 2021/22. The rate of customer injuries mentioning a slip, trip, or fall has reduced by 19 per cent on LU and eight per cent on buses.

Often slips, trips and falls occur on specific station or vehicle infrastructure such as stairs and escalators. We are currently seeing different trends in relation to risk on stairs and escalators. On stairs, there is an encouraging trend in reduced risk. Stair-related customer injury risk this quarter is 27 per cent lower on LU and 39 per cent lower on buses when compared to Quarter 1 2021/22. However, on the LU network, we have seen a 12 per cent increase in the rate of customer injuries involving escalators when comparing the same quarters. This may be linked to customers increasingly being laden with luggage as international travel increases. The rate of customer injuries mentioning the customer being encumbered or carrying luggage increased by 53 per cent between this quarter and Quarter 1 2021/22. By contrast, the risk of injuries mentioning intoxication, another common contributor to falls on escalators, has decreased by 17 per cent. This is particularly encouraging given that the hospitality industry has been continuously open this quarter, compared to when restrictions remained in place for some sectors of the hospitality industry, such as nightclubs, in the same quarter last year.

On buses, we are seeing encouraging downward trends in the rate of customer injuries mentioning a collision or sudden braking. The rate of bus customer injuries mentioning a collision has reduced by over 30 per cent compared to Quarter 1 2021/22. Meanwhile, the rate of bus customers injuries mentioning sudden braking events has reduced by 27 per cent.

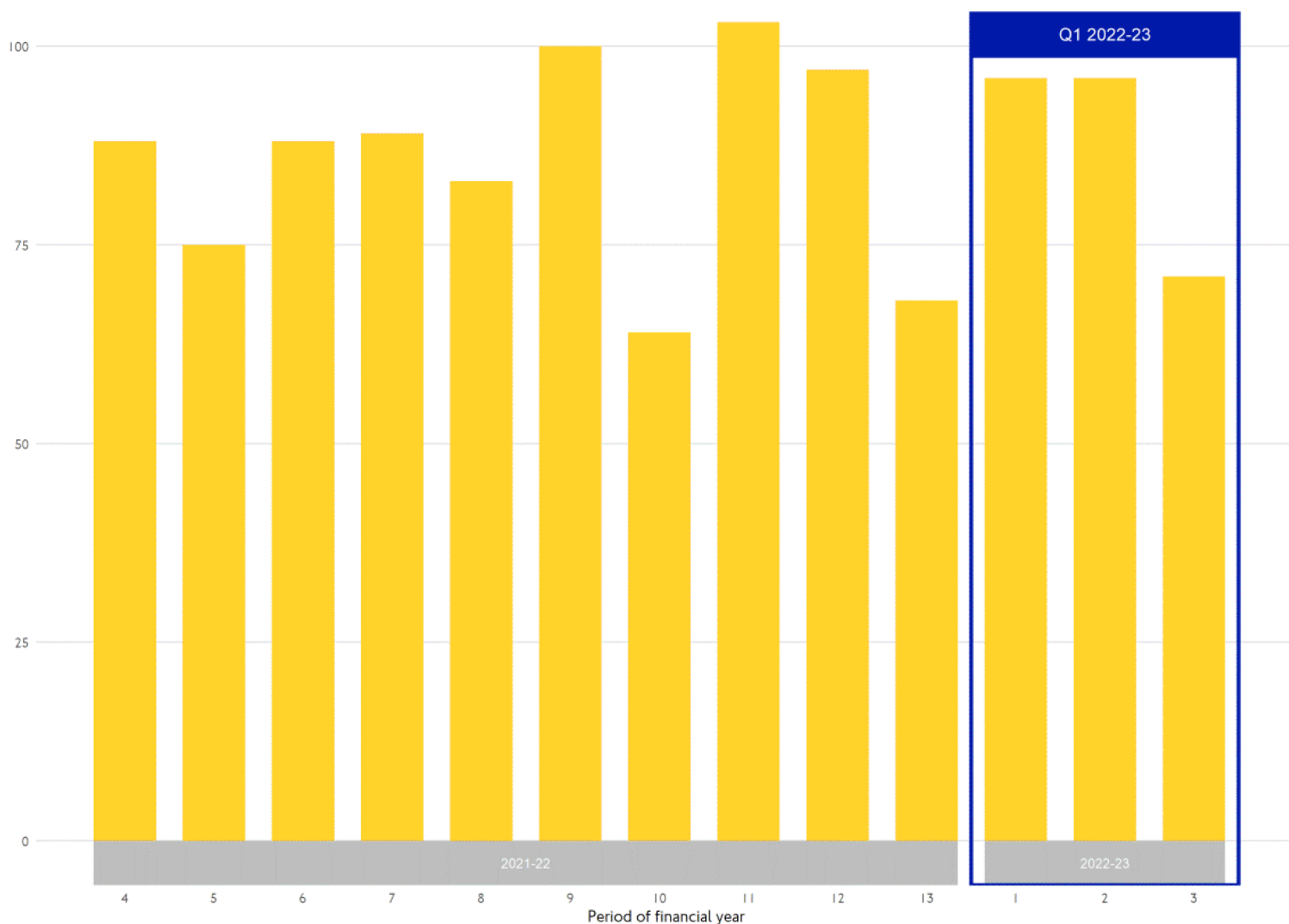
Workforce killed or seriously injured per week in Quarter 1 (by mode)



This section does not include injuries to our construction and projects workforce, which are covered in the Capital safety section below.

No one was killed whilst working on our public transport network in Quarter 1. Unfortunately, two members of our workforce were seriously injured, one on buses and one on LU. This compares to five serious injuries sustained by people working on our public transport network during Quarter 1 2021/22.

Scorecard measure: Workforce injuries



In Quarter 1, 263 members of our public transport workforce were injured (not including colleagues involved in construction and projects). Everyone who works for us should go home safe and healthy every day. Our Vision Zero ambition is to significantly reduce all injuries sustained by our workforce by 2030 and eliminate death and serious injury by 2041.

When we include our Capital-related workforce injuries, we have not met our target scorecard performance this quarter. Our target across this financial year is to reduce workforce injuries by five per cent compared to the previous financial year, 2021/22.

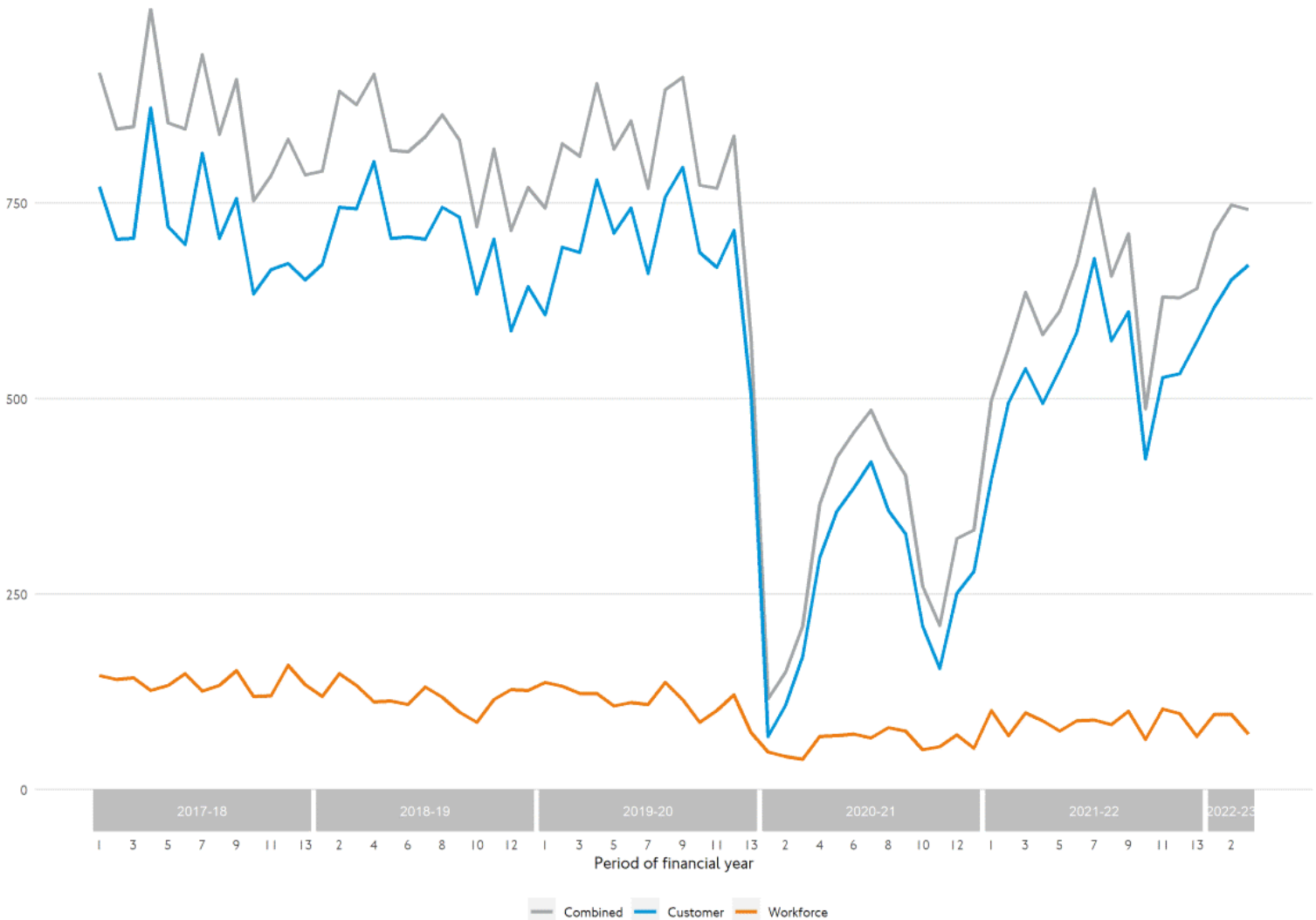
By mode, there have been a greater number of workforce injuries on LO, Dial-a-Ride and the Elizabeth line (formerly TfL Rail) than in Quarter 1 2021/22. Notably fewer people working on or for London buses have been injured this quarter in comparison to Quarter 1 2021/22.

Overall, workforce injuries remain below pre-pandemic levels. However, certain injury causes or types have returned to pre-pandemic levels. For example, assaults appear

to have recovered to pre-pandemic levels for LU, however the introduction of body-worn cameras may be encouraging an increase in reporting rates. Sudden braking, whilst contributing to far fewer workforce injuries per quarter than other causes, also shows signs of a return to pre-pandemic levels. Conversely, workforce injuries relating to slips, trips, or falls; trapped hands; or as a result of distraction remain below pre-pandemic levels.

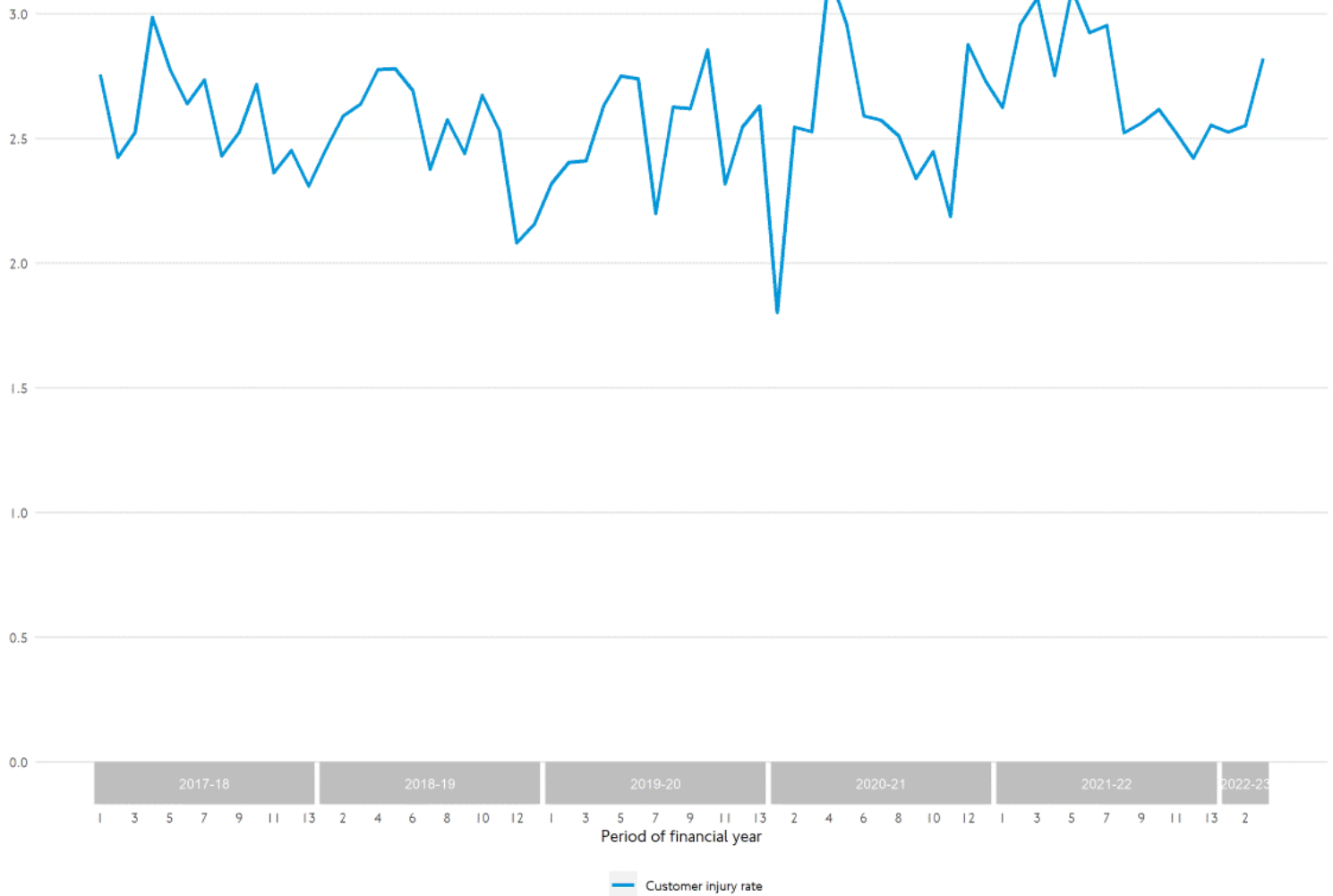
Long term trend

Customer and workforce injury numbers per period since 2017-18 (total)



As the pandemic eases and our passenger numbers grow, we are witnessing increases in both customer and workforce injuries. In the final period of this quarter (29 May to 25 June 2022), the number of customer injuries had increased to a level equivalent to some of the lower periodic customer injury totals pre-pandemic. This is despite passenger numbers not having fully recovered.

Customer injury rates per period since 2017/18 (total)



Despite this recent increase in periodic customer injury totals, over the past nine months we have seen an encouraging trend in lower customer injury rates. These rates have more closely resembled pre-pandemic levels than the heightened customer injury rates experienced during much of the pandemic. However, as noted in the final period of Quarter 1, there has been a spike in this trend. We will continue to monitor this to better understand if it is a sustained trend or part of an expected fluctuation in our customer injury rate.

Public transport safety updates

Elizabeth line opening

On Tuesday 24 May 2022, the Elizabeth line opened with services between Paddington and Abbey Wood. The new railway is the most significant addition to the capital’s transport network for a generation.

The Elizabeth line has been designed to keep our customers safe and to make our network more accessible. Platform edge doors have been installed at eight new stations to reduce the risk of a customer falling onto the track. Step-free access is available from street to train across all Elizabeth line stations between Paddington and Woolwich to assist customers who are older, disabled, travelling with children, or encumbered (for example with luggage/other large items) to travel safely by avoiding escalators and stairs.

At all other stations on the Elizabeth line, staff will deploy a manual boarding ramp between the platform and train.

Existing stations have been refurbished, with improvements to safety and security including brighter and more spacious ticket halls and waiting areas, and platform enhancements such as CCTV and help points.

Barking Riverside London Overground station opens

On 18 July 2022, Barking Riverside station opened to customers ahead of schedule, and helping to transform journeys to this rapidly developing area of east London. Around 3,000 homes have been built or are under construction, and this new railway will unlock more than 7,000 further homes as well as leisure facilities, schools and riverside walks. Barking Riverside station forms part of the extended Gospel Oak to Barking route, complementing the existing bus network and providing a new direct transport option. Journey times to Barking have been dramatically cut by more than two thirds to around seven minutes, while the city is now accessible in just 22 minutes.

Sustainable travel is a key part of the plans for the Barking Riverside development. Public transport, walking and cycling feature heavily in plans supported by local bus services, easily connected with the new railway station, and a network of footpaths and cycleways. Cycle parking for 180 cycles is provided at a dedicated new facility as part of the new station making it easier for people to start or end their journeys by cycle. Accessibility is another core focus of this extension, as the station is fully step-free. This brings the total number of step-free stations across the London Overground network to 60, helping to make London a more accessible city for all and supporting independent travel.

Re-opening of the Bank branch of the Northern line

On 16 May 2022, the Bank branch of the Northern line reopened between Kennington and Moorgate after a 17-week closure, with all planned work for this stage of the programme successfully delivered on time. This has enabled us to bring the first stage of the station upgrade into customer use. It includes a new southbound running tunnel and platform, along with a new spacious central concourse. The focus now turns to introducing new interchanges between the Northern, Central and Docklands Light Railway platforms, along with the new station entrance at Cannon Street. When

completed, this will increase station capacity by 40 per cent and significantly improve interchange and evacuation times.

Suicide Prevention Programme

Year-on-year data comparison tells us that since 2018, our Suicide Prevention Programme has helped reduce the number of suicides by 36 per cent across the LU network.

We have trained 91 per cent of LU station staff in suicide prevention so far and we are now training all new starters as part of their induction. The training is open to all TfL staff, and we have recently opened the course to some of our stakeholders, including the British Transport Police and the London Fire Brigade (LFB). In Quarter 1, we made 147 life-saving interventions, bringing the total over the last few years up to 2,365.

We have recently expanded the Safeguarding Award and LifeSaver Award schemes to all staff within TfL Customer Operations. The Safeguarding award recognises those who go above and beyond to ensure effective safeguarding across our transport network and display excellent practice and behaviours in helping safeguard vulnerable customers travelling on our services. The LifeSaver award is given to staff who make a suicide intervention based on best practice criteria. There are slightly different criteria for LU staff from other operational colleagues, as in LU there is an existing mode of logging suicide interventions, using an electronic incident reporting form.

In Quarter 1 we trained a further 14 Safeguarding Officers. The total number of accredited Level 3 LU Safeguarding Officers is now 53.

We are working towards accreditation in the DfT's Safeguarding on Rail Scheme and hope to gain full accreditation by September 2022.

Rail and Sponsored Services Safety in the Spotlight sessions

As part of Rail and Sponsored Services' (R&SS) Vision and Values Programme, we hosted a series of events for 'Safety in the Spotlight'. The purpose of the spotlight period was to raise awareness of the importance of safety, health and environment (SHE) within R&SS.

It was a fantastic way to bring wider SHE messages to R&SS colleagues, with insight sessions held on topics such as SHE Improvement Plans, our Public Transport Scorecard, our SHE Insights Framework, and a workshop to discuss our safety concerns.

We also shared key work happening within buses to mitigate slips, trips and falls, a session on the role of the SHE Business Partner within R&SS; and a session with the Head of SHE Business Partnering (Surface) on our SHE priorities as well as looking at the SHE Culture Programme.

The sessions were well received and have helped increase the understanding and support of SHE initiatives within R&SS. It was also a great example of collaboration between two teams in SHE: the R&SS SHE team and the SHE Insights and Direction team.

Capital safety performance

Capital works cover a broad range of activities across the Major Projects, Project and Programme Delivery and LU Capital Delivery. Some are essential asset renewals and maintenance to keep our frontline service operating efficiently. Other activities represent new and significant investments to improve existing infrastructure. Within the Capital area, teams comprise employees from both TfL and supplier organisations. Likewise, work sites may be managed by TfL or by suppliers acting as our Principal Contractor. We do not distinguish between TfL or supplier hours worked or incidents within this section of the report.

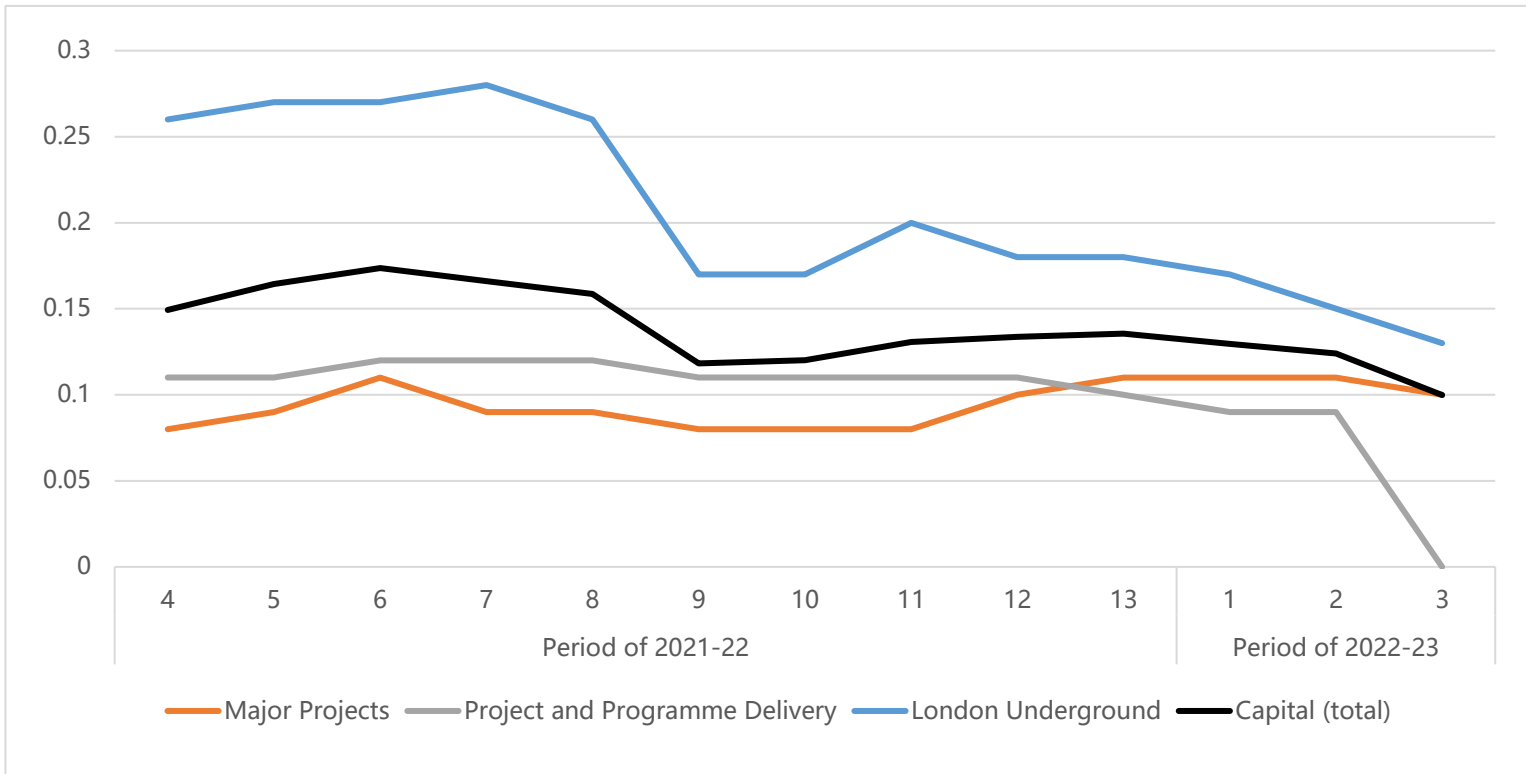
During Quarter 1, the Capital area workforce completed 2.1 million hours worked, a decrease of 0.6 million on the previous quarter, which comprised of one additional period. Compared with Quarter 1 of 2021/22, there has been a 30 per cent reduction in the number of hours worked, predominantly as a result of some of our major projects, such as the Northern Line Extension, Bank Station Capacity Upgrade and Barking Riverside Extension, reaching or nearing their conclusion.

Quarterly performance

To enable accurate analysis of data, some of our key measurables are quoted as a frequency rate per 100,000 hours worked. Frequency rates are calculated using a moving annual average based on performance over the previous 13 periods.

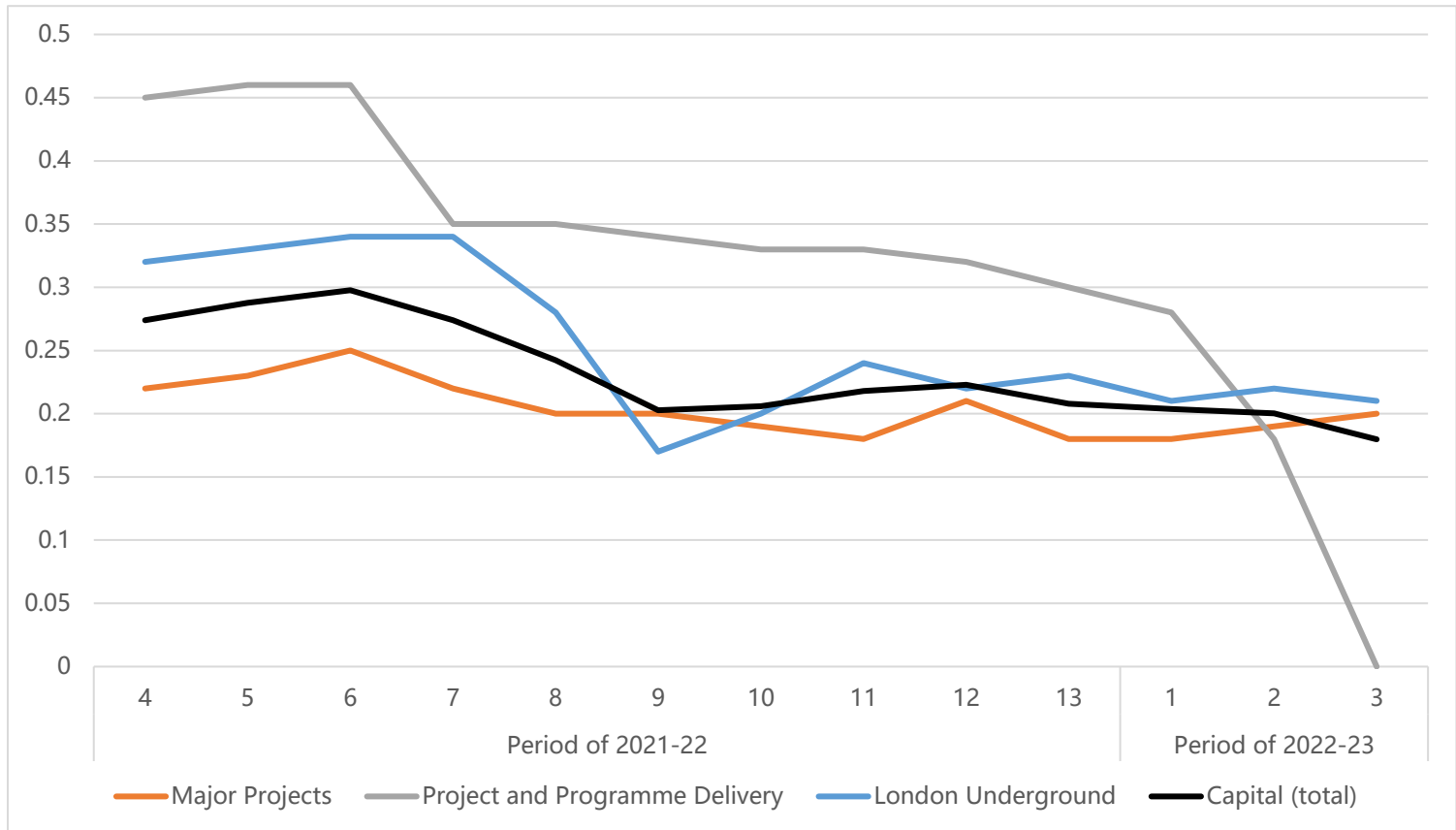
In addition to reporting on performance across the three Capital teams individually, we now also report on our overall Capital performance. The composition of the Capital area and the data we report on within this section will continue to evolve in line with changes to TfL's organisational structure.

RIDDOR accident frequency rate (per 100,000 hours worked)



In Quarter 1, there were no incidents reported under the Reporting of Injuries, Diseases and Dangerous Occurrences Regulations (RIDDOR) in our Capital teams, a significant improvement on the previous quarter. As a result, the accident frequency rates decreased across all of our Capital teams, with the overall Capital rate ending the quarter in line with our 2022/23 annual target of 0.10. The Project and Programme Delivery team have now maintained zero RIDDOR incidents reported on their projects for a year.

Lost time injury frequency rate (per 100,000 hours worked)



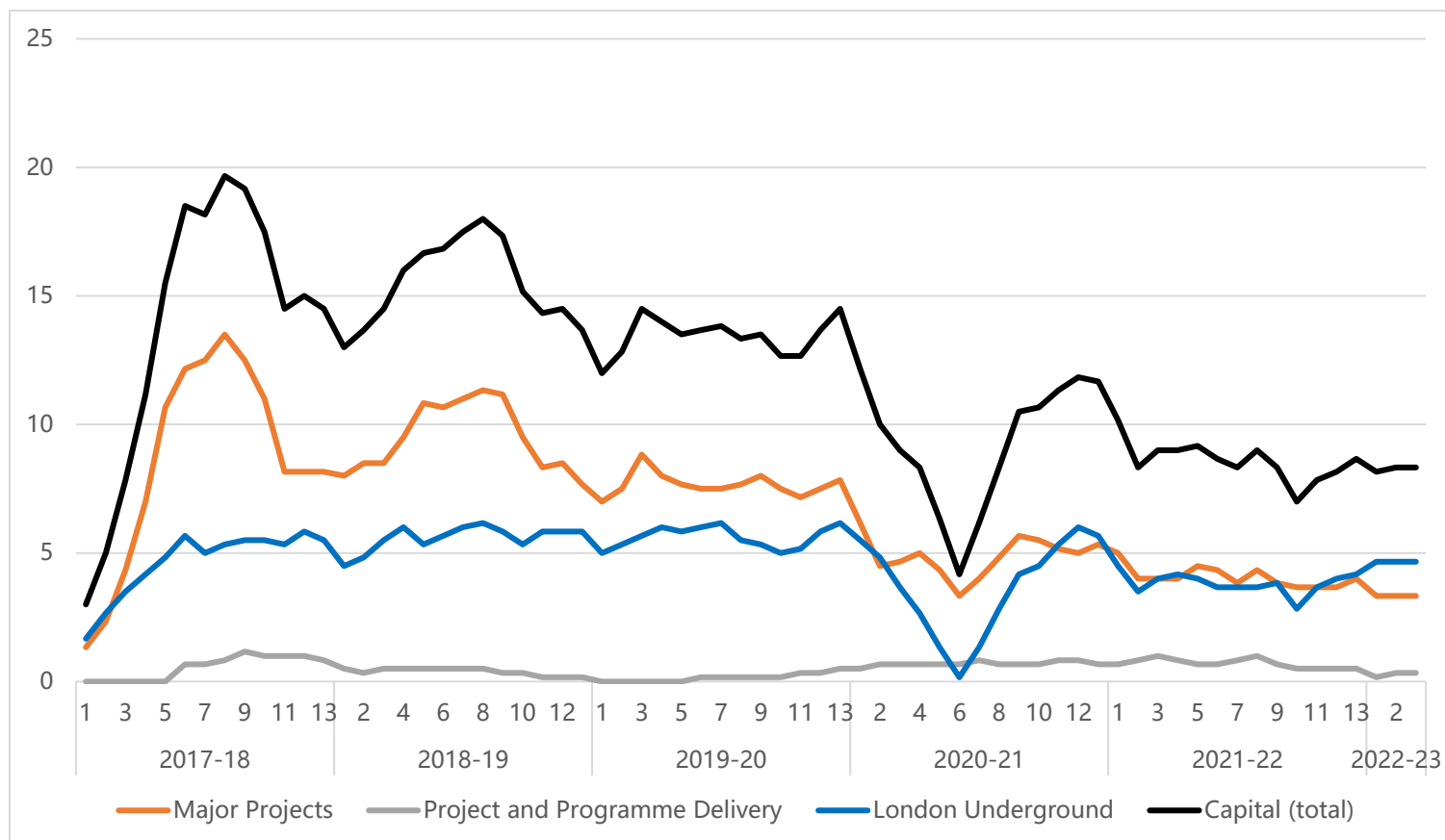
Lost time injuries (LTIs) are injuries which cause an employee to be absent for one or more shifts. There were three LTIs reported in our Capital teams during Quarter 1, a decrease of four compared with Quarter 4 2021/22. Consequently, the lost time injury frequency rate for the Capital area, and all teams within it, ended the quarter below the target of 0.25. The Project and Programme Delivery rate dropped to zero having now experienced a year without an LTI report. This, along with a quarterly fall in the rate of RIDDORs and LTIs across the Capital teams, demonstrates positive progress, although this is down from a relative peak of injuries witnessed in the first half of 2021/22.

All three LTIs reported during Quarter 1 were minor injuries, with two classified as slips and trips and the other classified as a misuse of hand tools. Human behaviour factors were identified as a theme in two of the incidents, but a more significant root cause identified across all three LTIs related to issues with task planning. As a result, changes have been made at site level, operatives have been re-briefed and learnings shared across the Capital teams.

Two of the LTIs occurred at the Bank Station Capacity Upgrade project, where an intense period of construction work took place with the Bank branch closure of the Northern line in order to open the new platform and concourse. The closure started in January 2022 and concluded in May 2022. Despite the minor injuries reported this quarter, no major injuries or incidents occurred during the closure, which is a real testament to the teamwork of everyone who worked on the project.

Long-term injury trend

Total Capital workforce injuries (six-period average since 2017/18)



There were 20 injuries reported in the Capital area during Quarter 1, which is a decrease of 13 on the previous quarter. The number of injuries continues to fall year-on-year and remains well below pre-pandemic levels. This remains the case when hours worked are considered, which have seen a lesser decline over the same period, suggesting a continued reduction in the risk of injury. Slips, trips and falls, and manual handling remain the most common immediate causes. Due to changes in the structure of our Capital teams, the numbers featured in this section of the report may be prone to some fluctuation during the coming quarters.

SHE Performance in Capital Projects

Quarter 1 can be characterised as one of good performance. There have been no major injuries, or serious environmental impacts. However, when analysing the details, we can identify a variety of incidents which had the potential for something worse, or to provide us with a warning that failure to improve will lead to a more undesirable outcome.

A brief selection of such incidents (in no order of significance):

Old Street Roundabout

A member of our workforce avoided injury when drilling into a live 415V cable with a handheld drill. The Principal Contractor has investigated, and the findings will be a useful reminder to many of the hazards of not following all procedures to the letter.

As a proactive Client, we will be dedicating one of our quarterly Chief Capital Officer safety, health and environment Keeping in Touch events (KIT) to discussing the identification and management of buried services with our supply chains.

Docklands Light Railway Rolling Stock Replacement Project

A three-metre-deep excavation was dug on site without adequate support. There was a real risk of collapse, and a danger to anyone who may have entered the excavation. This was backfilled for support, and an investigation carried out. TfL is working with the Principal Contractor to ensure that temporary works are properly designed and executed.

Temporary works have been identified as a causal factor in a number of our recent near misses and incidents. Consequently, those visiting our sites have been asked to check compliance with temporary works arrangements and our first KIT event this year will focus on Temporary Works lessons learned and good practice to follow.

Threat of Assault

A member of the public flagged down one of our engineers in his van. The man pulled out a knife and tried to open a door, whilst another person tried to open the rear doors. Fortunately, our engineer kept the doors of the vehicle locked and managed to drive away safely without being harmed. The engineer was provided with appropriate support, and we issued company-wide internal communications highlighting the Urban Safety training available on TfL's internal learning platform, ezone.

Four Lines Modernisation

This quarter saw Signalling Migration Area 5 (SMA5) go live on the 27 March 2022. SMA5 is the section of signalling between Sloane Square, Paddington, Fulham Broadway and Barons Court. This will improve journey time by around five per cent on average on the Circle and District lines between Monument, Fulham Broadway, Barons Court and Paddington in September 2022. The completion of SMA5 represented a major achievement for the programme as it involved upgrading the highly complex junction at Earl's Court and completed the implementation of Communication Based Train Control (CBTC) across the entire Circle line.

It is normal practice for the introduction of new software to include Operational Restrictions (OR) to address issues where the software is not performing exactly as required. The introduction of SMA05 included a high number of ORs which was brought to the attention of the Office of Rail and Road (ORR), who are giving consideration to the issue of a formal Improvement Notice. A number of meetings have been held with the ORR to demonstrate the safety improvements that the CBTC introduction has over the legacy signalling. We are also undertaking an independent review of the SMA05 introduction to identify lessons that can be learned, and a post revenue software uplift is planned to reduce the number of ORs.

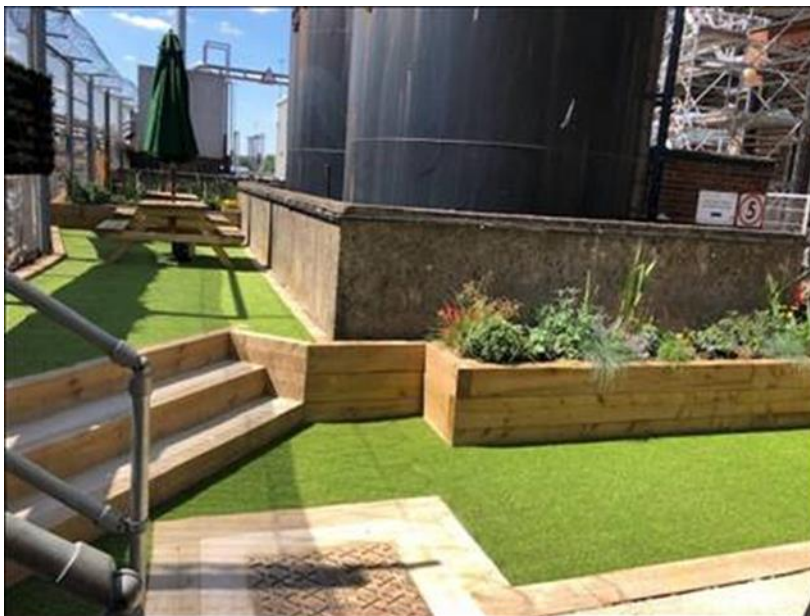
Focus on improvement

In many areas during Quarter 1, there was also a significant amount of proactive work done to further improve how we deliver on our projects.

The Piccadilly Line Upgrade continues to lead on carbon baselining and will shortly be extending its innovation to a new Signal Equipment Room being designed and built at the Tunnelling and Underground Construction Academy.

The London Overground Barking Riverside Extension opened to customers on 18 July 2022, which was ahead of schedule.

The Neasden Depot team have continued to go beyond their official scope, by doing what they have done before at other depots – building a wellbeing garden area near their site office – which will be available to all of the workforce in the longer-term.



Neasden Depot Wellbeing Garden

Within Capital, we held our first quarterly safety, health and environment (SHE) and Construction governance meeting in Quarter 1. Bringing together Directors and Leadership from Capital, Construction and SHE, these strategic sessions consider and

propose activity to improve our SHE performance, the wellbeing of our staff and our environmental impacts in the medium- to long-term. In the Quarter 1 session we focused on our SHE performance last year and lessons for the year ahead, our strategies for workplace violence and aggression and health risk management, carbon management, our SHE improvement plan for 2022/23 and supplier engagement.

SHE in Capital

SHE Capital Delivery & Maintenance Strategy

Quarter 1 saw the one-year anniversary of the publication of the SHE Capital Delivery & Maintenance (SHE CD&M) Strategy. The main highlights from year one included the development of a standardised framework for SHE improvement across the Capital teams (see below), the improvement of our SHE performance reporting, and commencement of a review of the SHE requirements within our procurement and supplier management processes.

In year two, we will continue to focus on establishing greater consistency in the way we conduct improvement activities, ensuring that learning and expertise can be shared across the Capital teams. This will be guided by the six core themes of the strategy, whose programmes have been updated to reflect progress during the first year, new insight and changes to our strategic priorities. In turn, these will continue to be informed by engagement and benchmarking with other large industry clients.

SHE Improvement Framework for Capital

Throughout Quarter 1, the former “Capital Delivery” areas of the business have been undergoing change to become part of TfL Capital, under the Chief Capital Officer. For the SHE team in support of Capital, the change is quite minimal, as the SHE team had already supported the constituent parts of the Major Projects Directorate (MPD), Surface Projects, and Capital within LU.

The projects have not changed, the people are largely the same, but the new structure will provide a better opportunity to share learning and experience. Built on the SHE CD&M Strategy, the new SHE Improvement Framework for the Capital area aims to bring the expertise together in a different way. The new area is bigger and more diverse, so a single Improvement Framework has been introduced, which then enables local project/programme team plans where the framework can be fine-tuned to local needs and priorities.

The framework has four areas of priority:

1. People

We recognise that achieving and sustaining long-term improvement requires a shift in the way that our people think, feel and act in relation to SHE. This part

of the strategy is purposefully designed to enable and complement the delivery of TfL's SHE Culture Programme.

2. Assurance

Those with responsibility for delivery of Capital and its projects have to have certainty on how we are able to manage our risks. This must be done within the recognised legal framework of the "principles of prevention", be risk-based and suitable. Bureaucracy is not required, but a streamlined approach where people recognise what needs to be done is paramount.

3. Environment

We need to be treating the management of environmental risks in as critical a way as we manage health and safety risks. There is further progress required before managing our environmental impacts becomes truly "business as usual". Carbon baselining and reduction is a key part of this, but not to the exclusion of all else.

4. Learning & Innovation

Perhaps the greatest potential offered by the Capital area is the opportunity it presents for shared learning, collaboration and innovation. Not only do we have a more diverse and experienced team internally within TfL, but we have brought together a more diverse and experienced group of suppliers too.

The framework will provide a structure for strategic improvements, and initiatives carried out at a local level.

Major Projects Carbon Baseline

In June 2022, we completed the Major Projects Carbon Baseline Report. This is the first time the whole life carbon baseline for all 10 current Major Projects have been modelled in detail, including the scope and carbon hot spots for each.

As it stands, the carbon baseline contains approximately 2.3 million tonnes of CO₂ equivalent and Major Projects will be aiming to reduce its whole life carbon impacts in the coming years, by management of carbon through the design process and in collaboration with our supply chain. We are now working to expand the carbon baseline across our capital investment portfolio.

Work-related violence and aggression

Work-related violence and aggression (WVA) towards our people and those of our operators and contractors is unacceptable. Concerted action is underway to tackle it.

Triggers of WVA incidents

Fare evasion continues to be the most common trigger for WVA. During Quarter 1 2022/23, 390 WVA incidents were triggered by fare evasion on the London Underground (LU) network, and 338 across the Other Rail modes (buses, roads, London Overground (LO), Docklands Light Railway (DLR), Elizabeth line (formerly known as TfL Rail), and London Trams). This amounts to 39 per cent of all WVA incidents. The proportion of incidents triggered by fare evasion increased by six per cent on the LU network compared with the previous quarter. The proportion remained at a similar level on Other Rail modes.

The percentage of incidents on the LU network that involved a repeat offender rose by two per cent to 20 per cent, equal to one in five offenders. There is a strong link between repeat offending, fare evasion and WVA on LU.

The percentage share of WVA incidents on Other Rail modes allegedly involving a young person (with the appearance of under 20 years) rose by three per cent to eight per cent of all incidents. There remains a strong link between fare evading, youth offending and WVA on the LU network. On Other Rail modes, only 36 per cent of youth WVA is triggered by fare evasion.

The number of WVA incidents motivated by hate has remained static, with 93 reported across Other Rail modes and 73 reported across the LU network. This represents 7 per cent of all incidents.

The number of WVA incidents that involved a customer attempting to bring an e-scooter on to the LU network during Quarter 1 2022/23 fell from 50 incidents in Quarter 4 2021/22 to 28 incidents. This suggests that customers attempting to bring an e-scooter on to the LU network has become less problematic for staff.

Volume of incidents in Quarter 1

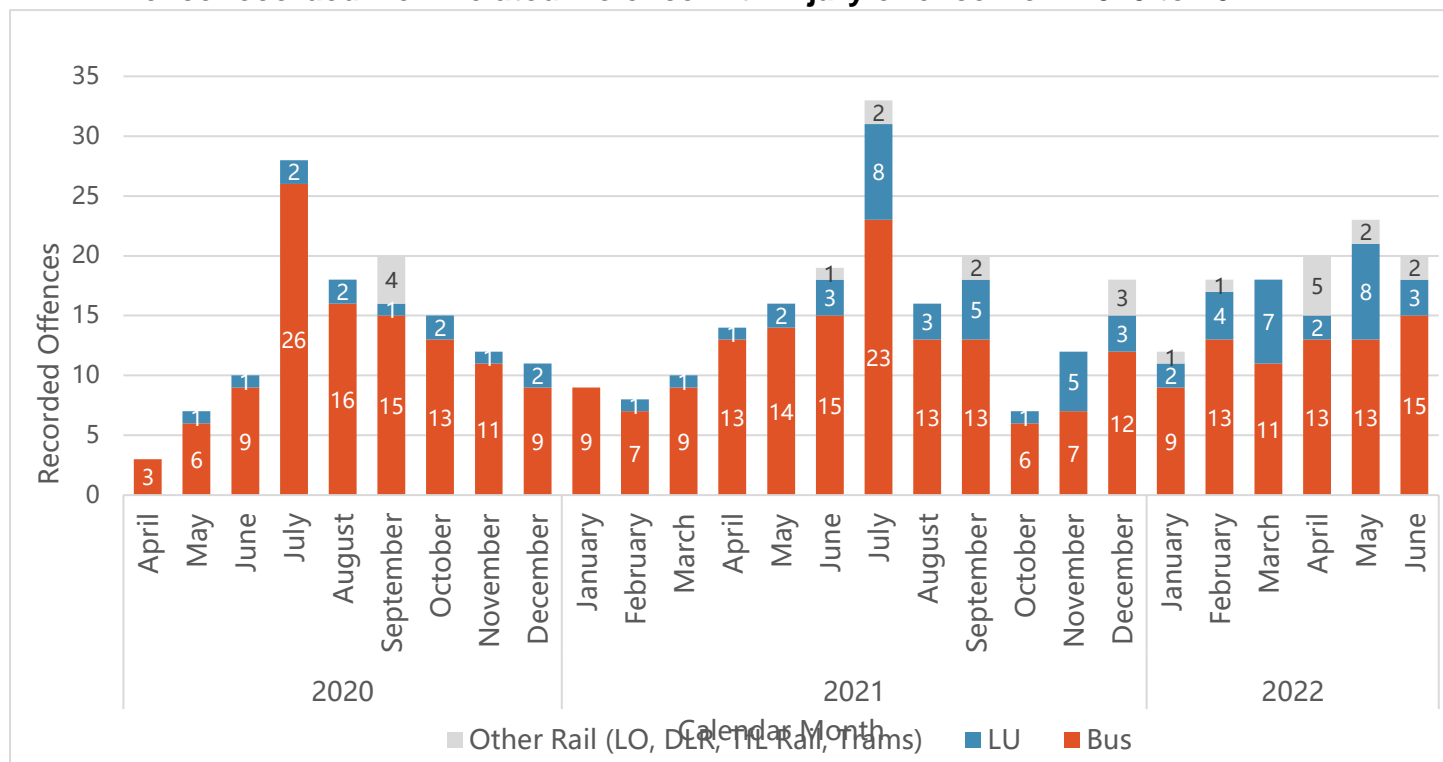
Due to the different time frames for the last two quarters, Quarter 1 2022/23 (12 weeks) and Quarter 4 2021/22 (16 weeks), we are not making data volume comparisons between these two quarters. The information below compares Quarter 1 2022/23 to Quarter 1 2021/22 but this has its own limitations due to the impact of lockdown restrictions and lower passenger numbers on incident levels last year.

During Quarter 1 2022/23, there were 2,305 incidents of WVA reported across all modes. This is an additional 362 incidents compared to the number recorded during Quarter 1 in 2021/22.

In Quarter 1 2022/23, there were 997 incidents of WVA reported by staff working on LU. This is 119 more than in Quarter 1 2021/22.

In Quarter 1 2022/23, there were 1,308 incidents of WVA reported across Other Rail modes. This is 123 more than were recorded during Quarter 1 2021/22.

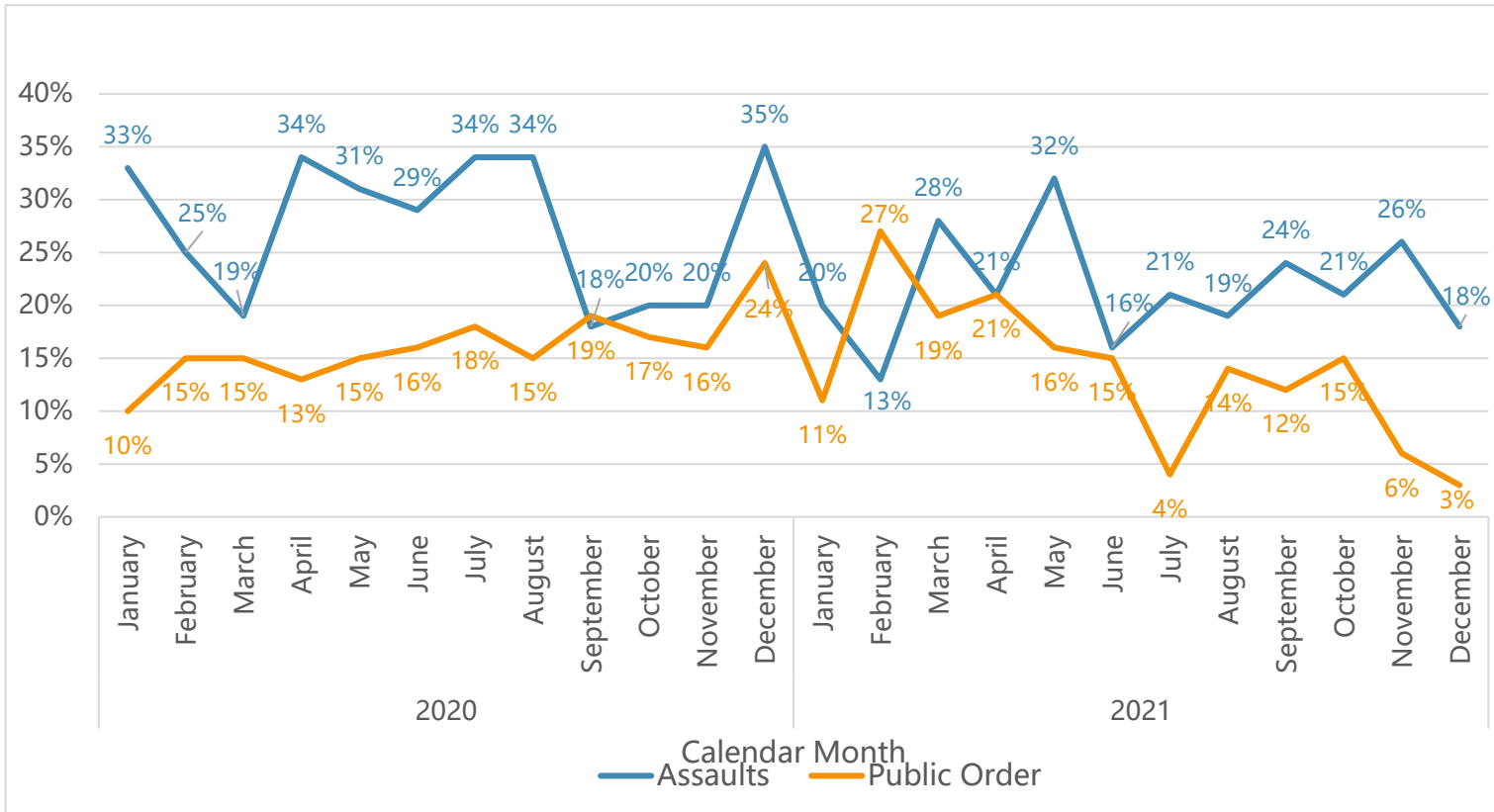
Police recorded work-related violence with injury offence from 2020 to 2022



We know from feedback from our workforce and trade unions that WVA is underreported, particularly verbal abuse. Changes in the reporting of incidents, compounded by the impact of the pandemic on overall crime levels, make it difficult to draw clear conclusions about trends in offending. Our assumption is violent offences that result in injury (actual bodily harm or grievous bodily harm) are more likely to be reported given that staff members may require support, treatment or time off. Police data for violence with injury offences is a more reliable data source for monitoring trends. Work is ongoing to improve staff confidence to report and make it easier for them to do so.

The level of bus-related violence with injury offences in Quarter 1 2022/23 (41 offences) was at a similar level to Quarter 1 2021/22 (42 offences). Police data for LU and Other Rail modes (LO, DLR, Elizabeth line – formerly TfL Rail - and London Trams) shows there were 22 violence with injury offences in Quarter 1 2022/23, compared with seven for Quarter 1 2021/22. The lower offence numbers on the rail network in 2021 reflect the lower levels of passenger journeys at this time.

Solved rate for WVA offences investigated by the police from January 2020 to December 2021



We are working closely with the police to improve the solved rate of offences. This includes prioritising the investigation of WVA incidents, providing access to body-worn video cameras, and continuing to support police investigations by providing Oyster card and CCTV information and victim and witness statements.

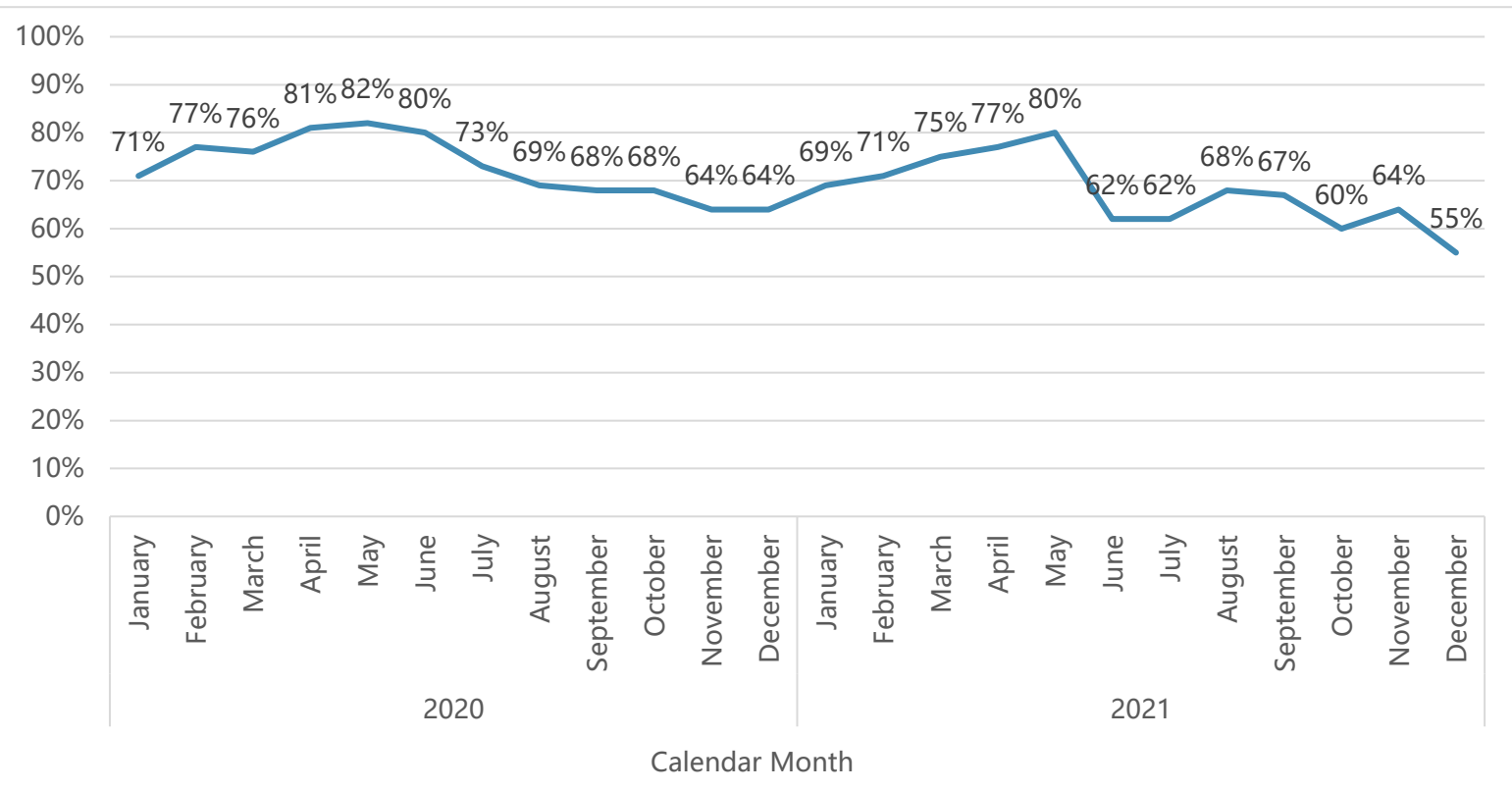
The solved rate is the percentage of offences investigated by the police that have resulted in action against the suspect, for example being charged with the offence, summonsed to attend court, or a restorative justice outcome. Figures are reported six months in arrears to allow time for the police investigation and for cases to progress through the criminal justice process. This section compares figures for the 12-month periods January to December 2021 (current) with January to December 2020 (previous).

During the current period the combined solved rate was 18 per cent for violence and public order recorded offences against our workforce – slightly lower than the previous 12-month period (21 per cent).

The solved rate varies by mode during the current period, with a solved rate of 19 per cent for bus-related offences, 19 per cent for LU, and 10 per cent for all other rail modes combined. Across all modes, the solved rates increase in line with the severity of the incident. The solved rate is higher for violent offences (with or without injury)

compared to public order (for example verbal abuse or threatening behaviour), as the police will allocate more resources to identifying and apprehending offenders for the former, with, for example, media appeals for information for violent incidents. The solved rate in the current 12-month period for violence (with/without injury) offences was 22 per cent, compared with 14 per cent for public order offences.

Percentage of Staff Willing to Support from January 2020 to December 2021 (all violence and public order offences)



A key factor in being able to bring offenders to justice is staff support for and consent to partake in the criminal justice process. As part of our strategy, we are working closely with the police to address staff concerns and improve the support we collectively provide throughout the process.

During the current period, the percentage of staff willing to support a police investigation was 68 per cent for violence and public order recorded offences against staff, down from 74 per cent compared to the previous 12-month period. Due to changing customer numbers, bus drivers make up a greater proportion of staff victims and they are less likely to support police investigations, particularly public order offences. We are working with the police and bus operating companies to address this.

Progress against the 2021/22 annual action plan

This report now includes updates against actions within the WVA annual action plan. Wherever staff are on our network, we are committed to their safety and preventing violence and aggression, tackling its causes, and providing support to those who experience it.

To deliver our WVA Strategy, we have committed to doubling the size of our WVA team. This will provide dedicated resource and a clearer focus on victim support, investigation services to support the Police, and preventative work. We have consulted with our people and our trade unions on our proposals for the new team and have confirmed the structure and closed consultation. We will now begin recruitment and the transition, with the aim to have the new WVA team in place by December 2022.

We continue to work with British Transport Police (BTP) colleagues on Operation Steed and other targeted operations to improve staff safety. Operation Steed is an ongoing operation which aims to increase both staff and public confidence, improve feelings of safety, and bring offenders to justice. Deployments have continued at West Ham, Plaistow, Upton Park and East Ham, with arrests made for a variety of offences and a number of safeguarding interventions made to protect young people. Camden Town has been targeted recently as part of Operation Steed. Police officers have focused on high visibility patrols but have also used plain clothes officers to target offenders.

Running staff engagement sessions is an important element of our work and provides us with an opportunity to pass on key messages about TfL's zero-tolerance approach to WVA, the importance of using spit kits, body-worn video and reporting. These engagement sessions take place across TfL and with our bus operating companies. Recent visits to bus garages include Enfield Bus Garage, Uno Buses – Barnet, Edmonton Bus Station, Canada Water, Dartford Bus Garage and Thornton Heath Bus Garage.

We have produced guidance videos on fare evasion on buses and what to do after a spitting incident - which includes detailed instructions on how to collect a DNA sample using a spit kit, and how to report the incident. The WVA spitting video is due to launch soon and will be disseminated to bus drivers and used in our engagement sessions with them.

Care immediately following a WVA incident is critical to our employees' recovery, participation in criminal proceedings and engagement with TfL as an employer. We have updated our Stations Incidents Duty of Care training aimed at operational staff and managers in LU. This will ensure that frontline LU managers are aware of how to

provide proper duty of care following a WVA incident, including correct reporting procedures and how to ensure staff get the support they need.

We are working with the BTP and our Rail & Sponsored Services (R&SS) team to increase the number of investigators in the BTP staff assaults team. This team is currently dedicated to investigating work-related violence against staff working on LU but is being expanded to cover all TfL rail modes to improve the consistency in police investigation and victim support.

The Transport Support and Enforcement (TSE) Officer role was created from a commitment in our WVA strategy, and our officers play a key part in tackling violence and aggression against our people through tackling the triggers of WVA. The team currently comprises 105 highly skilled officers with plans to recruit an additional 70 officers this year. These officers provide a visible and reassuring presence across our network, supporting all our frontline staff, dealing with antisocial behaviour on the network, and enforcing TfL byelaws to address some of the main causes of WVA.

TSEs have undertaken over 2,000 station/network visits in Quarter 1. The majority of engagements saw compliance achieved by offering advice and guidance to non-compliant individuals. However, 317 individuals were directed to leave the network, 276 were refused entry and 30 individuals physically removed from our service for antisocial behaviour. Officers reported 24 individuals for prosecution and five arrests were made as a direct consequence of the team's work.

Examples of Successful Prosecutions in Quarter 1

Liverpool Street LU Station

In October 2021, a group pushed through the ticket barrier with a hire bike. They were challenged by staff but ignored them. One man abandoned the bike on the platform but as the train doors were closing spat at a member of staff. A swab was taken on scene using a spit retrieval kit and a DNA match was made. In May 2022, the suspect was sentenced to 60 hours of unpaid work and ordered to pay compensation to the victim of £100 and a victim surcharge of £95.

Moorgate LU Station

In August 2021, a woman climbed down onto the tracks at Moorgate and onto the opposite platform. As she made another attempt to access the tracks, staff blocked her path, but she pushed them away, pulling staff members towards the tracks, holding their arms whilst being verbally abusive and then spat into the face of one of the arresting police officers. She was charged with assault, racially aggravated Public Order and trespass. On 6 May 2022, she was sentenced to two weeks imprisonment.

suspended for 12 months, 180 hours of unpaid work and ordered to pay a total of £508 in fines and victim compensation.

East Acton LU Station

In April 2022, a member of the public accessed a closed station and when confronted was verbally abusive. He lashed out at a member of staff, smacking his arm and flicking a cigarette at the staff member's face. In May 2022, the suspect pleaded guilty to assault and trespass and was ordered to participate in a Rehabilitation Programme and 50 hours of unpaid work.

Route 86

In May 2022, a bus driver of route 86 was racially abused. The customer was intoxicated and made racially abusive comments to the bus driver throughout his journey. The bus driver used his code red button to alert TfL staff who called the police. On 9 May 2022, at East London Magistrates Court the suspect was found guilty of racially aggravated public order and imprisoned for four months.

Route 29

In March 2022, a bus driver of route 29 was abused by a customer that boarded the bus and went on to punch the assault screen several times. The police arrested the man at the scene. On 31 May 2022, the suspect appeared at North London Magistrates Court and was ordered to pay a victim surcharge of £34, a fine of £80 and was given a one-day detention at the courthouse for being disorderly.

Route 191

In February 2022, a bus driver of route 191 was spat at by the driver of another vehicle. The bus driver used his spit kit to collect a sample, which enabled police to identify the man and arrest him. On 19 May 2022, the suspect appeared at North London Magistrates Court where he was ordered to pay fines and costs totalling £885.

Significant incidents

This section outlines significant incidents that have occurred during Quarter 1 and since the last report. It also provides an update to significant incidents of note.

Significant London Underground incidents

There were no Rail Accident Investigation Branch (RAIB) reports pertaining to London Underground (LU) published in Quarter 1.

Incorrect Profiling of S8 Stock Wheels – 8 April 2022

During routine maintenance, we identified an issue with the profile of wheels on the LU Metropolitan line trains. The issue had the potential to cause track points to become fatigued which could, under certain circumstances, potentially lead to a more serious safety incident.

The affected trains (approximately 50 per cent of the fleet) were taken out of service for the issue to be rectified and a special timetable was implemented on the Metropolitan line. All trains have now been checked and the profile of the wheels restored to the correct standard. This incident is subject to an internal formal investigation.

Contractor hit by a train – 15 April 2022

A contractor who was assisting with the protection of other staff carrying out routine track patrol duties near Chalfont & Latimer station on the Metropolitan line, was struck by a Metropolitan line train. They were taken to hospital by ambulance and released later that day.

The incident is subject to formal investigations by both the RAIB and the Office of Rail and Road (ORR). We have also commissioned our own internal formal investigation. When these investigations have concluded, we will share the findings both internally and in this report.

Power failure and trackside fire at Barking – 29 and 30 May 2022

A significant failure of power at Barking sidings resulted in a trackside fire which severely damaged other critical power, signalling and communications services occupying the same cable route management systems and significantly disrupted the District line service. We have commissioned a formal investigation to determine the root cause(s) and other causal factors leading to the incident and to identify any measures necessary to minimise the risk of recurrence.

Customer fatalities on our network

On 7 April 2022, a customer fell down the stairs at station entrance into Walthamstow station ticket hall. She sustained a serious head injury, and we were subsequently informed that the customer had sadly died as a result of her injuries. On 8 April 2022, a customer lost their balance, fell against the side of a moving train and then fell into the gap between the train and the platform. It appears that the customer lost their balance as a result of a medical episode, and tragically, they died as a result of their injuries. On 15 June 2022, a customer fell from the platform at Chalk Farm station and onto the track. It appears that the man fell as a result of a medical episode and died as a result of his injuries.

The ORR has been informed about all incidents and further information provided as required.

Significant incidents on the Surface transport network

London Overground Collision with Buffer Stop – 12 October 2021

On 12 October 2021, a London Overground train, operated by Arriva Rail London, hit the buffer stops at Enfield Town at slow speed, causing damage to the infrastructure and the first carriage of the train to partially derail.

The driver of the train had a positive drugs test post incident and was suspended by Arriva Rail London. He has been charged with endangering the safety of passengers on the train. He appeared at Highbury Corner magistrates court early in July 2022. The pre-trial hearing took place at Inner London Crown Court in August 2022, where the driver pled not guilty. The case will proceed to trial. Further details will be provided in this report as the case develops.

The RAIB released their draft report to TfL on 3 August 2022 for comment. We are still awaiting final publication.

Sandilands Tram Derailment - 9 November 2016

Our thoughts remain with those who lost their lives, their family and friends, and all the other people affected by this incident, and we continue to offer support to those people directly affected as well as the wider community.

We have worked closely with the RAIB and the ORR since November 2016 to introduce a new safety regime and implement all the recommendations from the organisations across the tram network. This has made the network safer for everyone, and we continue to work tirelessly to ensure that such a tragedy could never occur again. We agreed to all of the RAIB's safety recommendations and accepted liability to ensure civil claims could proceed as soon as possible. We have also worked to address the issues raised by the Coroner in her Prevention of Future Deaths report following the Inquests.

We have delivered robust and lasting safety improvements since 2016 and we continue to review our operations and work with the wider tram industry to ensure that we have the safest possible network.

Following the conclusion of the Inquests, the ORR issued criminal proceedings against TfL, Tram Operations Limited (TOL) and the driver of the tram for breaches under the Health and Safety at Work etc, Act 1974 (the 1974 Act). TfL and TOL have both been charged with an offence under section 3 of the 1974 Act which requires employers to ensure that their employees and third parties are not exposed to risks to their health

and safety. The driver is charged with an offence under section 7 of the 1974 Act which requires employees while at work to take reasonable care for their own health and safety, as well as the health and safety of others who may be affected by their acts or omissions at work.

After careful consideration, at the first procedural hearing that took place at Croydon Magistrates' Court on 10 June 2022, TfL indicated a guilty plea to the charge. TOL also pleaded guilty at the same hearing. The driver indicated a not guilty plea. All three cases were transferred to Croydon Crown Court. On 8 July 2022, a procedural hearing took place in Croydon Crown Court concerning the driver. TfL and TOL attended and the Court confirmed that they would not be needed until after the conclusion of the driver's trial. The Court granted the driver's application to transfer the case to a different court in London in the interests of justice. The trial is estimated to last around 4-5 weeks and is listed to start on 15 May 2023 at the Central Criminal Court (also known as the Old Bailey).

Potters Bar Garage Bus Fires – 22 May 2022

On 22 May, a bus fire occurred at Potters Bar Bus Garage, which started with an electric bus, in which a further five buses caught fire. As a precaution, the manufacturer of the electric buses, Switch Mobility, asked all operators to temporarily withdraw its double-deck electric buses from service while investigations were carried out into the root cause of the incident.

Investigations have been concluded by an independent bus fire specialist and short- and medium-term recommendations to prevent a recurrence are currently being addressed and tracked. All Switch Mobility buses have re-entered service, with immediate interventions to ensure operatives identify the correct system to put coolant into.

London Overground – Three Trap and Drag Events, June 23 – June 29 2022

In June 2022, on three separate occasions London Overground (LO) reported trap and drag events. The details are:

- **23 June at Seven Sisters station:** Three customers ran up off the station escalators area onto the LO northbound platform as the train doors had just closed. One of them put their hand in as the doors were almost closed. The driver stopped the train, and the customer withdrew their hand seemingly without any difficulty.
- **27 June at Wembley Central station:** On the southbound platform, a customer put their walking stick in the closing doors of a train. The customer let go of the stick and the train moved a short distance before the driver observed the stick

in the CCTV, and stopped the train, which then allowed the customer to get off the train.

- **29 June at Crouch Hill station:** It appears an umbrella got caught in the train door as it closed.

All three incidents have been notified to the RAIB and are now part of a panel review undertaken by Arriva Rail London with LO representation.

TfL Formal Investigation Report (FIR) 02-2022: Tower Millennium Pier, Detached Bollard hit vessel – 12 June 2021

The final FIR has now been published on this incident in which a mooring line for a vessel was secured onto a bollard on the pier. No one was injured during the incident.

A corroded bollard broke away during mooring procedures. The investigation found issues around maintenance, inspections, lines of responsibility, operating procedures and transfer of assets to the asset management system. The FIR has made ten recommendations which are being implemented.

TfL FIR 03-2022: Wandle Park - Tram Door Near Miss – 13 September 2021

The final FIR has now been published on this incident in which a tram stopped in advance of Wandle Park tram stop, awaiting a proceed signal. Whilst the tram was stationary, an Emergency Door Release was operated by a member of the public travelling on the tram. The passenger disembarked the tram at a non-platform location.

The FIR made eight recommendations. The recommendations have been allocated to the appropriate personnel and actions are currently being addressed to close out these recommendations.

Engagement with regulators

This section looks at how we have engaged with our regulators on safety issues over the past quarter.

Engagement with the Environment Agency

We report our progress on removal of polychlorinated biphenyls (PCBs) to the Environment Agency. PCBs are substances that are toxic to humans and animals. They were banned from sale in the UK in the 1980s, but LU has equipment which contains components such as old electrical capacitors that predates this ban and therefore sometimes contain PCBs. There is also legislation in England and Wales as well as an international agreement which aims to ban PCBs entirely. Progress on our

programmes for identification, replacement and removal of components that may contain PCBs continued in Quarter 1.

Engagement with London Fire Brigade

We meet the London Fire Brigade (LFB) every quarter to share the progress of our Fire Safety Programme and to discuss any significant fire incidents in the previous months. As well as a joined-up response to incidents on our network, the LFB carry out a number of detailed inspection visits to review our approach to fire safety. These collaborative discussions have allowed us to share the detail of our fire risk assessment programme and training with the LFB, as well as sharing detail on how we manage and maintain our fire assets with LFB inspectors. It has also allowed us to identify areas where we can work together more closely to ensure we manage the risk of fire on our network.

Engagement with the Office of Rail and Road

We continue to work closely with the ORR to ensure we manage health and safety effectively across our network. We have regular discussions around our ongoing response to the coronavirus pandemic, as well as constructive, open and honest discussions about any incidents on our network and our plans for improving how we manage health and safety. We continue to work together closely to identify opportunities for improvement.

Health

COVID-19

Since the start of the coronavirus pandemic, our focus has been to protect the safety and health of our customers and workforce. This remains our focus as we emerge out of the pandemic and transition to living with COVID-19.

Deaths in service

Our sincere condolences remain with the families and loved ones of the 105 members of our workforce who have sadly passed away from COVID-19 since the start of the pandemic. Everyone at TfL pays tribute to the vital role they played in our fight against the pandemic.

Our Employee Assistance Programme continues to be available to all employees and their dependants, and provides support, guidance, and information on a range of topics, including bereavement. The safety of all our staff and customers continues to

be our top priority, and we are absolutely committed to doing everything in our power to keep everyone safe on our network.

We are continuing to make free lateral flow tests available, even after the Government phased out the free tests from 1 April 2022. We have clearly communicated this to our workforce through articles on the staff intranet and posters displayed in workplaces.

Face coverings on public transport

The Government announced that it would no longer be compulsory for people to wear a mask on public transport and in shops from 27 January 2022. From 24 February 2022, we removed the requirement set out in our Conditions of Carriage for customers to wear face coverings.

From 13 June 2022 we changed our customer and staff messaging to encourage people to take appropriate action to keep themselves safe, including using hand sanitiser and wearing a face covering if this helps them to travel with confidence.

We continue to encourage our workforce to wear face coverings when in enclosed spaces. We are continuing to provide free Type IIR masks for those working in our operational areas.

Reusable masks for our staff

In Quarter 4 2021/22, we made TfL-branded reusable face masks, complete with our iconic rondel logo, available to all of our staff. These could be acquired by team managers or team administrators who were able to order up to two face coverings per team member. This quarter, the first batch of 20,000 masks was distributed to those who had ordered them. We are currently awaiting delivery of our second batch.

COVID-19 testing schemes

We have set up locations at our head office buildings where staff can collect one lateral flow test kit box each per week, or order for their team via an online form available on the intranet. We have given out over 12,000 test kit boxes since we started this transition on 1 April 2022 and continue to use staff intranet articles and posters in the workplace to publicise the availability of the free lateral flow test kits.

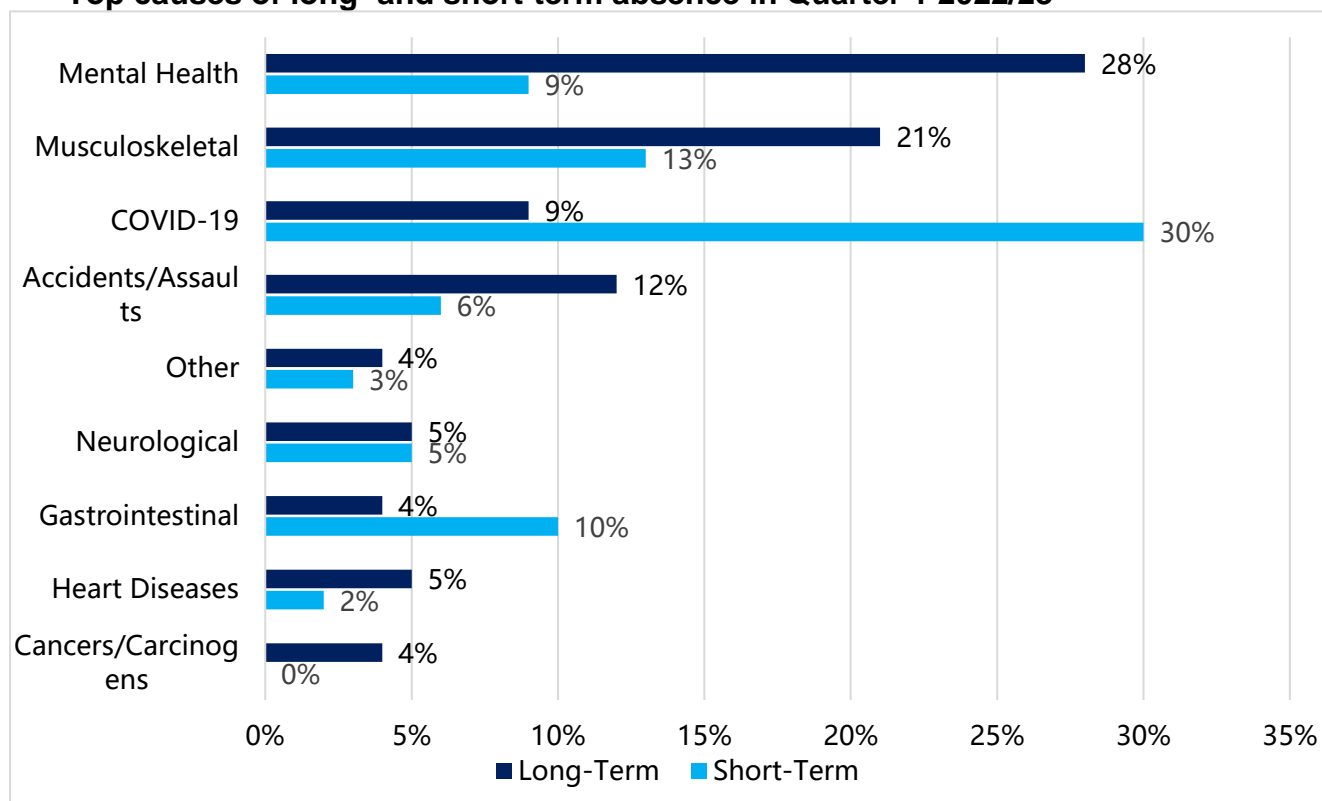
Monthly air and surface sampling for coronavirus by Imperial College London on the bus and Tube network which started in September 2020 has now ceased, as the managing of the pandemic moves into its next phase. We continue to investigate potential areas for future COVID-19-related research and investigation on the network.

Sickness absence data

When looking at our sickness absence data, short-term absence is any absence of less than 28 days and long-term absence is of 28 days or more duration.

By looking at the underlying causes of absence in detail, we gain meaningful insight into where we can best target preventative measures. Around 60 per cent of absences at any time are caused by long-term sickness.

Top causes of long- and short-term absence in Quarter 1 2022/23



In Quarter 1 of 2022/23, COVID-19 remained the top cause of short-term absence but has significantly decreased from 59 per cent in the previous quarter, returning to 30 per cent as last seen in Quarter 3 2021/22. All other absence types are holding fairly stable and the main spike in absence levels occurred at the start of the quarter in period 10 (12 December 2021 – 8 January 2022), which is when we normally see an increase in short-term absences.

In Quarter 1 of 2022/23, mental health remained the top cause of long-term absence, accounting for 28 per cent of all long-term absences. Musculoskeletal-related absence was again the second highest cause at 21 per cent. These two categories have reduced by two per cent and one per cent since the end of Quarter 4. They remain the top two causes typically accounting for the majority of long-term sickness absence in the UK. Our Occupational Health team has several initiatives aimed at prevention of ill health but also to support those who become unwell, to return to work earlier. Some

of the events we hosted this quarter included several sessions on Breathing and Meditation as well as Diabetes Week 13-19 June 2022.

Health updates

Health Surveillance

Since being issued with a contravention notice and two improvement notices by the Health and Safety Executive (HSE) in March 2022, TfL have made significant progress in highlighting areas of possible risk to health and implementing health surveillance programmes for these areas. Over 340 members of staff have been trained to deliver skin checks to their teams, so that any cases of possible skin disease can be identified and referred to Occupational Health (OH) for further assessment. A total of 182 skin referrals have been received by OH and action taken where appropriate.

Blood samples have been taken from staff who have been identified as at risk of exposure to lead and will continue to be monitored as required.

Respiratory surveillance has also commenced for staff identified as at risk of exposure to respiratory sensitisers.

A quick and easy decision support tool has been implemented to assist managers in deciding whether health surveillance is required for their teams for both skin and respiratory; this will be expanded to include all other types of health surveillance in the near future.

All health surveillance forms are now available online which makes it quick and easy for managers to complete the required information and send to TfL's Occupational Health team via one simple route.

As a result of the improvements we have made in this area, the HSE notices have been closed out. Work continues to ensure that we meet our legal requirements in implementing health surveillance across the whole of TfL for all other types of hazards and risks.

Well@TfL

Well@TfL Mobile Health Unit

The Well@TfL health bus arrived late May 2022 and will be delivering onsite mobile health checks, health surveillance and periodic medicals. The mobile health bus will provide a convenient and cost-effective way for employees to receive onsite support on their health and wellbeing, as well as to attend medicals. Since launching the Well@TfL project in August 2021, over 1,000 employees have received a mobile health check. The Commissioner visited the Well@TfL Health Bus at the end of June

2022, discussing the benefits with the team of early identification of health risks and receiving onsite wellbeing support.

Phase Two of Well@TfL Acton pilot project

The Acton pilot project aimed to help our colleagues to learn more about their health and how they can improve it. The project started with wellbeing checks, including measurements like cholesterol, blood glucose and blood pressure. Participants were then invited for a three-month follow-up call and six-month follow-up appointment. The six-month follow-up health checks outlined a significant benefit to employee wellbeing. The comparison between first and last health check physical results indicated:

- A reduction in mean waist circumference,
- A reduction in the mean diastolic and systolic blood pressure recordings,
- A reduction in mean relative risk (the risk of a cardiovascular event) and an increase in individuals who had the recommended relative risk of 1.0 or below,
- 100 per cent of employees that attended three-month follow-up calls said they had made changes to improve their health and wellbeing.

RESET Health

TfL joined forces with RESET Health in December 2021 to support our employees in taking control of their health. Specifically, the programme aims to reverse the conditions of those living with diabetes or prediabetes, as well as those who are obese or overweight.

The table below presents the outcomes of members at the key 12-week milestone:

Indicators	Week 12 Average (Reduction)	Percentage
Weight (Kg)	5.6 kg	-5.5 per cent
BMI (kg/m ²)	1.7kg/m ²	-5.1 per cent
Waist Circumference (cm)	6.5cm	-6.0 per cent
Systolic Blood Pressure	1mmHg	-0.3 per cent
HbA1c	3.7 mmol/mol	- 8.1 per cent

Headline Outcomes: (data from 29 employees who onboarded the programme more than 12 weeks ago)

- Of the 29 members who have reached the 12-week mark, over 60 per cent lost more than five per cent of their body weight and of these, six members lost more than 10 per cent of their body weight.
- There has been a 19 per cent reduction in the proportion of members who are living with obesity compared with when they first joined the programme.
- Four members who were living with prediabetes when joining the programme reversed their condition after 12 weeks.

Environment

Air Quality

TfL launches a public consultation on further ULEZ expansion

In May 2022, TfL launched a consultation on plans to further expand the Ultra Low Emission Zone (ULEZ), to cover almost the whole of the capital from 29 August 2023.

The Mayor considered a range of options when deciding the next steps to take in dealing with the 'triple emergency' facing the capital. In the short-term, expanding the ULEZ London-wide will have the biggest effect on air pollution emissions relative to the cost to Londoners as a whole, as well as helping to tackle the climate emergency and traffic congestion.

The current £12.50 daily charge level for cars, vans and motorbikes that do not meet the standards would be retained. This would be supported by a revision of the Mayor's Transport Strategy (MTS), which is also part of this consultation. The consultation also asked Londoners to help shape the future of road user charging in the capital. This could include scrapping existing charges, such as the Congestion Charge, and replacing them with a single road user charging scheme that uses more sophisticated technology to make it as simple and fair as possible for Londoners.

Climate Emergency

Launch of Power Purchase Agreement tender

We marked London Climate Action Week (25 June to 3 July 2022) by launching the tender for our first Power Purchase Agreement (PPA), which aims to purchase more than 10 per cent of our required electricity from renewable energy sources and new build assets.

As one of the largest consumers of electricity in the UK, we will be playing a major part in meeting the Mayor of London's ambition for the capital to become a net zero-carbon city by 2030. The Mayor, through the London Environment Strategy, has also set us the goal of achieving a zero-carbon railway by 2030.

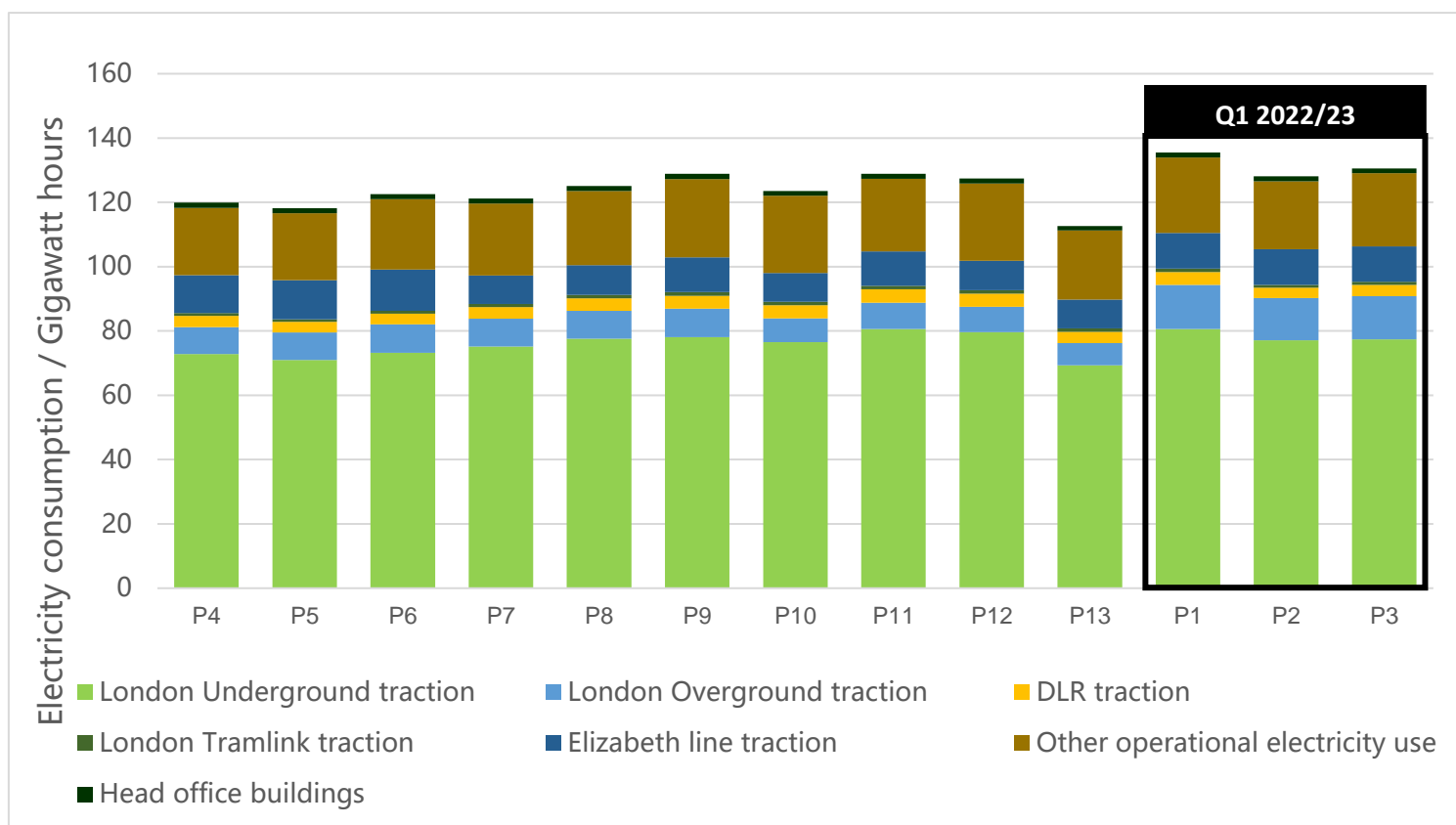
Renewable PPAs are long-term contracts with renewable generators for purchase of their electricity. These contracts can reduce our exposure to changes in the wholesale energy market, providing cost certainty and long-term cost savings, while also helping meet climate change targets through developing new renewable energy generation projects.

The launch of the tender on 27 June 2022 forms part of our long-term strategy to ensure that all the electricity we use is generated by 100 per cent renewable sources. By using a phased approach, we can also benefit through being able to learn and adapt as the renewable market evolves.

This tender will guarantee that the energy supplied is from renewable energy sources, comprising wind or solar power, rather than a mix of power generators that emit carbon into the atmosphere. By confirming the demand for renewable energy, the power purchase agreement will also lead to the creation of new build assets across the UK, such as solar or wind generation, by enabling the selected supplier to confidently invest in the delivery of new renewable energy projects.

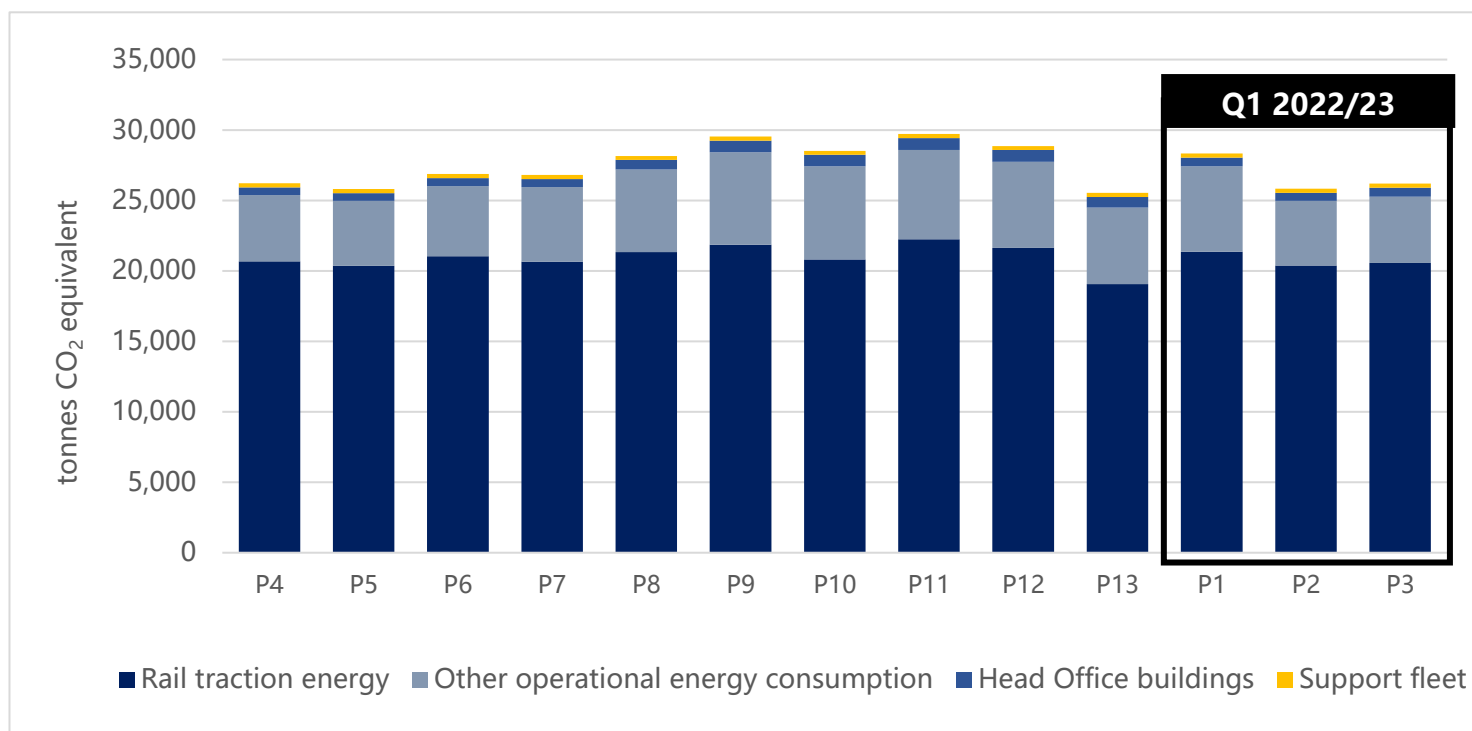
Energy consumption and carbon emissions from our operations

Electricity consumption – provisional – Quarter 1 2022/23 (Gigawatt hours)



Electricity consumption was three per cent higher in Quarter 1 than in the equivalent period in 2021/22. This has largely been driven by increased reporting of energy consumption on London Overground, resulting from changes by Network Rail to estimates for traction energy consumption. This is under review. While May 2022 saw the introduction of Elizabeth line services through the central section of the line, trial operations in the months running up to the opening meant that there has been no significant new increase in electricity consumption on the line.

CO₂ emissions (excluding buses) Quarter 1 2022/23 (tonnes CO₂ equivalent)



Greenhouse gas emissions from operations, excluding buses, track closely to electricity consumption. Emissions decreased by approximately five per cent in Quarter 1 compared to the equivalent period of last year, in part due to a reduction in emissions intensity of grid electricity.

Sustainability training, engagement and embedding

Sustainability Staff Network

Our Sustainability Staff Network Group continues to go from strength to strength, with over 400 active members and growing. It celebrated its second anniversary on the 16 June 2022. The consensus of the group is that we need to continue to share, learn and support each other, and encourage colleagues to be brave in creating space for conversations about the sometimes-difficult sustainability challenges we face.

In April 2022, Arcadis ran a free three-part bite-sized Zero-Carbon Academy, which was open to anyone at TfL. The sessions were run by Arcadis's UK Climate Change & Sustainability Director, Ben Harris. Session one presented an overview of where we are today internationally and nationally in tackling climate change, session two looked at operational carbon and session three looked at infrastructure carbon. The training talked about general principles as well as providing examples and describing TfL's strategy and actions in these areas. The sessions were recorded and are now available on the TfL staff intranet as a freely available internal resource. They acted

as a precursor to the more formal and detailed Carbon Literacy Training Programme described below.

Other events run by the TfL Sustainability Network have included presentations and discussions led by TfL experts on London's 2030 Electric Vehicle Infrastructure Strategy, ULEZ, how to be a 'Sustainability Champion', Circular Economy and Responsible Procurement. We also hosted external speakers, including from Regen, who are not-for-profit energy experts and have been working with [National Grid ESO](#) to examine the question of decarbonising UK's electricity grid by 2035.

For London Climate Action week (25 June to 3 July 2022), the Sustainability Network held daily events including presentations and discussions on:

- decarbonising the TfL Pension Fund, led by the TfL Pension Chief Investment Officer,
- cutting carbon from our buildings,
- our strategy to use Power Purchasing Agreement to reach 100 per cent renewable rail operations by 2030.

We were also joined by '[The JUMP](#)', who shared their 'Joyous, People-Led Movement', which is about coming together to make practical changes, support and inspire each other, celebrate success and drive a change in society's mindsets and cultures with a '6 Shifts approach'.

Sustainability video

At the start of London Climate Action week, we launched a 10-minute video on TfL's approach to sustainability. The video was shared internally and across TfL social media (LinkedIn and YouTube). The video describes our sustainability approach set out in TfL's first ever Sustainability Report published last September. It brings to life what we do across all three pillars (social, environment and economy) of sustainability. The video is available on the [sustainability page](#) of the TfL website.



TfL Sustainability

We are planning more video content to engage customers, stakeholders and potential job applicants on our sustainability agenda. As part of this we will be working with the TfL Youth Panel to generate engaging ideas and involve them in the development of video content. We are keen to promote TfL as a purpose-driven organisation that puts sustainability at the core of everything it does.

Green skills talent pipeline

We know that the green skills sector is rapidly growing and in the future all jobs will have an element of 'green' as we move toward sustainability. TfL needs to ensure it is getting the message out there that we are leading the way on many areas in relation to sustainability, and as well as being a great place to work with lots of opportunities for development, it also has huge scope and ability to deliver for the environment. To help with developing a talent pipeline of potential job applicants, we are in the process of building a micro-site to promote the potential for people joining TfL to work on many aspects of sustainability and to encourage potential future applicants to register their interest so we can proactively contact them as suitable roles are advertised.

We are in the process of retendering for suppliers across all our apprenticeships and we have included a requirement that they all include sustainability as part of the skills, knowledge and experience they provide. In addition, we included some sustainability and corporate social responsibility specific apprenticeships within the tender scope, such as ST0934 Corporate Responsibility and Sustainability Practitioner (Level 4) which will have the broadest appeal across TfL.

Taskforce on Climate-related Financial Disclosures and Climate Budgeting

We have strengthened this year's TfL Annual report with the inclusion of sustainability, to align with our new purpose to 'move London forward, safely, inclusively and sustainably' and our vision to be the 'strong green heartbeat for London', building on our TfL Sustainability Report published last September. We have already voluntarily begun reporting in line with the Taskforce on Climate-related Financial Disclosures (TCFD) this year, ahead of being legally required to from next year. The TfL Annual report also includes our first disclosures of physical and transition risks under TCFD requirements. In line with TCFD, TfL is in the process of creating a new Enterprise Risk on 'Climate Change, including Adaptation'.

The Mayor has set an ambitious target of making London net zero carbon by 2030. A key enabler of this ambition is the integration of a 'London Climate Budget' within the Greater London Authority (GLA) Group's annual consolidated budget process and documents. To inform this work the GLA is working with C40 Cities, which the Mayor has chaired since December 2021, in order to learn from cities like Oslo that have had a climate budget in place for several years. London is a C40 climate budget 'Pilot City', with the GLA Budget Guidance issued in July 2022 including a requirement for Climate Budgeting for the first time.

A climate budget is a governance system that mainstreams climate considerations into decision making via the budget allocation process and highlights a city's short-term actions (typically annually) to deliver the long-term climate targets (in line with the city's climate action plan or Net Zero Pathway).

As part of the financial budget process, climate measures are proposed, adopted, implemented, monitored and reported in line with the budget cycle. The climate budget should clearly state targets, actions and to the extent possible the estimated emissions reduction effects over time, costs and financing, as well as any relevant co-benefits.

London's first climate budget for the financial year 2023/24 will focus on scope one and two carbon emissions for the GLA Group, and therefore TfL. Ultimately, the ambition of the London Climate Budget is to cover all actions reducing Greenhouse Gas emissions in London (both within its boundaries and from the goods and services it consumes). London's Climate Budget will also be expanded in future years to include actions to mitigate the impact of climate change, to ensure functional bodies manage climate risks and implement measures to adapt.

London Climate Action Week 25 June to 3 July 2022

As well as internal events hosted by the TfL's Sustainability Network, releasing our Sustainability Video and the Mayor announcing the opening of TfL's Purchase Power Agreement tender, we also took part in several external activities during London Climate Action week. These included the Climate Innovation Forum, Climate

Investment Coalition, Surface Water Flooding Conference and the Business Climate Forum.

TfL Youth Panel Investigation

During the summer we supported the TfL Youth Panel to undertake an investigation into issues of diversity, inclusion and equality and how it interacts with environmental sustainability. The intention is to complete evidence gathering, hearings and research over the summer and present initial findings to the TfL Executive Committee in the autumn. Following this, a report will be finalised and published.

The objectives of the investigation are:

1. Development opportunity for the TfL Youth Panel and TfL staff.
2. Collation and synthesis of the latest evidence and research in relation to the investigation topic, which can then be used for communication, engagement and upskilling across TfL.
3. Identification of specific issues in relation to TfL activities, purpose and objectives.
4. Identification of specific policy recommendations for TfL.
5. Promotion of TfL as a forward thinking and attractive purpose-driven organisation.

Carbon Literacy Training Programme

We gained accreditation for our one-day carbon literacy training course from the Carbon Literacy Project in June 2022 and have trainers from across the business delivering one to two courses per week as part of a pilot phase.

Planning is underway for the next stage of the rollout, where we will increase the number of trainers and make courses more widely available. As well as embedding carbon reduction as a core part of TfL culture, this course will help to achieve cost savings due to an increased awareness of energy and resource consumption.

Buildings Decarbonisation

If we are to achieve our Corporate Environment Plan ambition to reach net zero carbon across our operations and Head Office estate by 2030, we need to decarbonise our built environment. TfL has a large and complex property estate with over 6,000 assets registered as buildings in our Asset Management systems. This includes a range of archetypes such as our head offices, stations, depots and garages, which are all integral to keeping London moving. Over the past nine months we have conducted a baseline assessment of the carbon emissions associated with our buildings and undertaken initial analysis for how we can simultaneously reduce carbon and operational cost. Our understanding will continue to be refined, but we estimate that

approximately 11-12 per cent of TfL's operational carbon emissions (approximately 105 kilotonnes of CO₂) are attributable to the activities that we undertake in our buildings.

Alongside this work we have developed a Buildings Decarbonisation plan, which includes recommendations and key action areas requiring further development. One of these actions is to conduct site specific feasibility to improve our understanding of how to decarbonise high priority sites, particularly at complex locations such as depots. In this regard, we have successfully secured grant funding through the Low Carbon Skills Fund (LCSF) to conduct feasibility work and generate Heat Decarbonisation Plans at eight of our operational buildings, with a further two LCSF applications awaiting a decision for our Commercial Development estate. This feasibility work will complete by March 2023 and will start to build a pipeline of projects that we will continue to develop.

Asset Climate Risk Assessment and Adaptation Reporting Power submission

In April 2022 we published our final submission under the third round of the Adaptation Reporting Power. The report sets out TfL's governance process, strategy for adapting to climate change, main climate risks now and in the future and proposed adaptation measures.

The climate risk assessment conducted for this report demonstrates that all of our assets, operations and services, staff and customers carry some degree of weather and future climate-related risk. The assessment identified 333 climate risks using the Met Office's latest climate projections and best professional judgement from a wide range of colleagues across the business.

We are now using the report and risk assessment to identify and prioritise actions for our forthcoming Adaptation Plan. This includes actions on governance, processes and decision-making, data and evidence, TfL's adaptive capacity, and collaboration and interdependencies. This is due to be published later in 2022.

We are also using the climate risk assessment to inform the development of our research programme, as well as in internal and external collaborative work, including with the Rail and Safety Standards Board's Climate Change Adaptation Working Group, Transport Adaptation Steering Group, and Infrastructure Operators Adaptation Forum.

Pan-London surface water flooding

The Transition Group, responsible for helping to transform the way that London plans for and responds to surface water flooding, held a stakeholder workshop in June 2022, ahead of the one-year anniversary of the July 2021 flood events. The workshop introduced the work done by the Task & Finish Group and the purpose of the Transition

Group. As well as the intention to establish a new, pan-London Strategic Forum for coordinated management of surface water flood risk, and the development of a pan-London surface water flood risk management strategy. It also began the process of creating a vision and scope for the strategy. Representatives from 27 boroughs attended, together with representatives from Thames Water, TfL, the Environment Agency, the GLA and other key stakeholders.

In July 2022, the London Councils Transport & Environment Committee discussed and approved a Transition Group paper on the governance of the Strategic Forum, including membership and roles and responsibilities. TfL will be represented by our Chief Safety, Health & Environment Officer. A detailed Terms of Reference will be produced as part of a funding bid to the Thames Regional Flood and Coastal Committee to support an independent Chair, secretariat and strategy officer.

July Heatwave

In July, the UK experienced a heatwave that was severe enough to warrant the Met Office issuing a Red Extreme Heat Warning for the first time. The 18 and 19 July 2022 were record-breaking days for both minimum and maximum temperatures. TfL staff, contractors and customers responded to the challenges of the event with great professionalism and resilience and TfL is incredibly proud and grateful for all they did to keep everyone safe.

Our operational response worked effectively, and there was extensive adverse weather planning and intensive and agile management of our response and coordination with other agencies prior, during and following the extreme weather. We experienced both planned and unplanned impacts on our operations and construction activities.

Planned measures (some of which were at short notice) included standing up a major incident command structure, implementing adverse weather plans (which include preparing for potential flash flooding that might follow the heatwave due to potential for thunderstorms). We also implemented speed restrictions, service suspensions (Cable Car due to cabin temperature, multiple line suspensions), traffic diversions, early closure of construction sites and reduced staff availability.

Our staff and customer communications were advising people:

- Not to travel unless necessary,
- That there would be widespread speed restrictions,
- To stay well hydrated by drinking plenty of water,
- To stay cool by adjusting their clothing to prevent overheating, where safe and practical to do so,

- To look out for those who may struggle to keep themselves cool and hydrated including young children and babies, older people, those with underlying conditions and those who live alone are particularly at risk,
- To try to stay in the shade and keep out of the sun between 11.00 and 15.00 when UV rays are strongest
- To always wear sun cream,
- To always travel with a bottle of water.

Tube travel reduced by 24 per cent on 18 July in comparison to the previous week, and by 34 per cent on 19 July. Bus travel reduced by 13 per cent on 18 July in comparison to the previous week, and by 19 per cent on 19 July.

There were also knock-on impacts on TfL services and operations due to issues for national rail services in the Southeast as a result of the heatwave. These included widespread impacts on London commuter services and National Rail services in London, including into Wednesday 20 July, resulting in reduced ridership and staff availability.

Unplanned incidents included asset failures (trains, ferries, signals, points, pumps, air conditioning, Electric Vehicle chargers and track circuit failures, fallen trees, track buckling, sagging overhead cables etc), police assisted customer evacuations of stuck trains, multiple fires (small and large, one of which – a trackside fire between Upney to Becontree 500 metres past footbridge - was declared as a CAT1 incident). There were also several cases of staff and customers becoming unwell due to heat.

We are working to understand and learn from these incidents so we can continue to improve and build insights and action into our forthcoming pan-TfL Adaptation Plan.

Green Infrastructure

Development of full Natural Capital Account

Natural capital accounting is the process of considering the value of the environment in business decision making and reporting.

This is the first time that we have assessed our whole estate and carried out a monetary valuation of our natural capital. The main objective was to develop a better understanding of how a natural capital approach can support TfL's strategies and operations. The Natural Capital Protocol was followed throughout, a four-stage assessment that provides a robust, credible and replicable assessment that is also in line with British Standards.

Our natural capital assets support significant value to Londoners and global society. They provide numerous, important benefits ranging from air quality, carbon sequestration, biodiversity, visual screening, shading and cooling to mental health and education that have been included in the assessment.

Due to the complex nature of our organisation, we have identified several data gaps that we intend to fill to improve future natural capital accounts and are working to embed the natural capital approach into business activities, including project delivery, asset strategy, and maintenance.

TfL is one of the first Transport and Infrastructure organisations to look at natural capital in this depth. This provides us with a great opportunity to show leadership and to share learning with other organisations in the sector.

The natural capital account will help inform the development of a pan-TfL Green Infrastructure and Biodiversity Plan.

Wildflower verges

Following the successful trial of six wildflower verge sites from 2019, we are currently identifying additional sites that will be suitable from a safety and visual amenity perspective. We are currently managing 108,000 square metres of roadside verge – 6.5 per cent of the road network – for biodiversity.

Verges have considerable potential for boosting biodiversity and can be cost-effective due to their management requirements, including reduced cutting frequency (allows wildflowers to grow and set seed) and collecting the clippings (reduces nutrient levels, allowing wildflowers to compete & reduces growth levels).

TfL's six pilot sites have been selected based on: vegetation suitability, proximity to residential areas and maintainability & safety considerations. We are continuing to assess the potential for further sites.

Safety, Sustainability and Human Resource Panel

Date: 16 November 2022

Item: Safety, Health and Environment Assurance Report

This paper will be considered in public

1 Summary

- 1.1 The purpose of this report is to give the Panel an overview of the effectiveness of the risk controls for Enterprise Risk 1 (ER1) – ‘Major safety, health or environmental incident or crisis’, based on second line of defence audit work by the Quality, Safety and Security Assurance (QSSA) team and third line of defence work by the Internal Audit team. Information is also provided on Enterprise Risk 12 (ER12) – ‘Asset condition unable to support TfL outcomes’ and Enterprise Risk 4 (ER4) – ‘Major Security Incident’ as they correlate to ER1 for Quarter 2 of 2022/23 (26 June to 17 September 2022) (Q2). For Q3 of 2022/23 (18 September to 10 December 2022) work will be mapped against the new Enterprise Risks (see Appendix 3).
- 1.2 Appendix 1 provides a list of audits undertaken in Q2. Audit reports issued are given a conclusion of ‘well controlled, adequately controlled, requires improvement or poorly controlled’. Individual findings within audit reports are rated as high, medium or low priority.
- 1.3 Performance data is provided on progress against the audit plan, audit ratings, rating trends by Enterprise Risk and business unit and progress against actions, with comparisons provided across the last two years.

2 Recommendation

- 2.1 The Panel is asked to note the paper.

3 Annual Quality, Safety and Security Assurance Audit Plan

- 3.1 The annual QSSA audit plan contains a series of second line of defence audits that address ER1, ER4 and ER12.
- 3.2 The 2022/23 annual audit plan was finalised in March 2022 in consultation with the Safety, Health and Environment (SHE), Operations, Maintenance, Engineering Directorates and Security teams to identify where assurance is required or where there are performance or compliance concerns. Each audit has an identified sponsor within TfL to whom assurance is provided, typically a management system or risk owner or an assurance function. In Q2 audit sponsors were consulted on the draft 2022/23 audit plan for Q3 and Q4 of 2022/23 (11 December 2022 to 31 March 2023) to ensure it reflects current risks and assurance needs. The audit plan is reviewed every six months for greater flexibility and an agile approach to changing business demands.

4 Work of Note this Quarter

- 4.1 ER1 along with all Level 0 Enterprise Risks has been revised and presented to the TfL Executive Committee, TfL Board and the Audit and Assurance Committee in Q1 of 2022/23 (1 April to 25 June 2022). The overall risk assessment ratings for ER1 remain the same. The environmental elements of ER1 will be captured in Enterprise Risk 3 'Environment including climate adaptation' as part of the review of all revised Level 0 risks.
- 4.2 As of Q3 all audits will be mapped to the applicable Level 0 risk from the list of revised Enterprise Risks (see Appendix 3). The previous Level 0 risk ER12 'Asset condition unable to support TfL outcomes' will become a Level 1 risk and these audits will be reassigned to the Level 0 Enterprise Risk 6 'Deterioration of operational performance'.
- 4.3 Internal Audit have two audits in progress on the reporting and procurement of a digital monitoring and assurance system. There were no ER1 Internal Audit reports issued in Q2.
- 4.4 A total of 29 second line QSSA audits were delivered in Q2, this is 44 per cent of the annual plan for 2022/23 and is therefore on track for the target of 85 per cent for year end (see Appendix 1 for the full detail of audits completed in Q2). Three audits were concluded as 'poorly controlled' in Q2, all have agreed and tracked action plans in place:
- (a) London Underground (LU) Pumps Competence Management: Key elements of the pumps competence management system were not in place.
 - (b) LU Civils Competence Management: Non-conformances identified in a previous audit remained in relation to the document and quality control processes. A contributor to this is the continued absence of Internal Verification activities and a key Competency Assurance and Quality Manager role being vacant; and
 - (c) LU Off Track Drainage Management: The location of all assets could not be verified and some surveys or inspections were not completed as required.
- 4.5 Three audits were concluded as 'Requires Improvement', all have agreed and tracked action plans in place:
- (a) LU Fire Safety Compliance: Significant progress has been made to improve the governance of fire safety; however further process improvements are required to ensure their effectiveness;
 - (b) London Overground Alstom Depot Competence Management: Gaps had been identified in the effective control and review of risks, and the assurance of training and competence of staff involved in the movement of rail vehicles within the depot. It could not be assured that actions raised from previous investigations and audits had been completed; and

- (c) LU Power Competence Management: Some requirements of R0623 A6 'LU Competence Management System', and PR0200 A2 'Power & Electrical – Competence and Licensing', have not been satisfied. This affects compliance with Office of Rail and Road guidance on competence management systems.

- 4.6 Fourteen audits were concluded as Adequately Controlled or Well Controlled, with nine Integrated system audits which are not rated.
- 4.7 A common issue was identified in the competence audits where the quality or absence of a risk-based training needs analysis (RBTNA) weakened the competence management system and assurance or verification arrangements. This was raised with the LU Skills and Development team who will provide the resource and methodology to work collaboratively with the technical specialist maintenance teams to ensure the RBTNA are correctly recorded and inform assurance activities.
- 4.8 In Q1 and Q2 the QSSA team have been working on an improved approach to audit planning for 2023/24 with key stakeholder colleagues in TfL. The new approach will structure the QSSA assurance planning and reporting around the management system content for Engineering, Maintenance, SHE and Security. Using this approach there will be a direct link between assurance activities, TfL's risk controls and key legal requirements.
- 4.9 Planning audit work around the management system provides a more proactive approach, ensuring the full range of subjects and requirements in the management system are considered and reducing the reactive influence of known problems or recent issues. Similarly, by reporting assurance against the management system it will show common trends and themes across different teams and highlight any subject areas that are not currently being assured. A fundamental requirement is that this model has the ability to incorporate risk and performance data from stakeholders and also reflect where assurance is provided by other teams or systems to ensure efficiency of resource. This will also provide a clearer picture of what key controls are assured and any gaps in assurance.
- 4.10 The breakdown of the Q2 audits by risk is as follows:
 - (a) 20 audits were completed against ER1 in Q2: nine Integrated Systems Audits of LU (not rated) and 11 topic audits;
 - (b) seven audits were completed against ER4 in Q2; and
 - (c) two audits were completed against ER12 in Q2.

5 Cancelled and Deferred Work

- 5.1 There were no audits cancelled or deferred in Q2.

6 Performance and Trends

- 6.1 The removal of Covid-19 operational restrictions, i.e. not able to do site visits, resulted in an increase in audits completed for Q3 of 2021/22 to Q2 of 2022/23 compared to the same quarters in 2021/22 (97 compared to 75). There were no identifiable trends when comparing the profile of audits carried out or audit conclusions across the relevant Chief Officer teams.
- 6.2 Comparing audit conclusions against the associated Enterprise Risks over the two years, the distribution of conclusions by risk is broadly consistent, indicating there has been no significant change in risk profile identified by our audits.
- 6.3 The graphs in Appendix 2 show there was an increase in the number of audits completed against ER1 in the last four quarters compared with the previous year. Conversely, there was a reduction in the number of audits completed against ER12 in the last four quarters compared with the year prior to that. There are differences in the number of audits undertaken against individual risks when comparing years. However, when looked at over a longer two to three year period fluctuations even out. This indicates no specific long term trends in control weaknesses across the risks.
- 6.4 There had been a steady increasing trend of actions been closed on time which is now starting to plateau: steadying from 68 to 41 per cent during Q1 and Q2. In response we have increased and escalated our reporting on overdue actions to senior management. There has been a small increase in the number of actions granted extensions (in compliance with our procedure and against a small criteria of reasons) from 13 to 17 per cent across Q1 and Q2.
- 6.5 There are currently 45 overdue actions which has decreased from a peak of 68 during Q1. It is noted that the actions from four audits in four different areas of TfL make up 60 per cent of the total number of significantly overdue actions. Actionees receive routine reminders from the Audit team and overdue actions are escalated to the applicable management teams to try and resolve. Chief Officers also receive reports that include overdue actions within their teams which the Director of Risk and Assurance discusses with them in quarterly meetings. Further reporting on them will now also be provided to the Audit and Assurance Committee.
- 6.6 The greatest number of overdue actions is in the Chief Operating Officer's (COO) team which is where most of our audits are conducted. The COO's team has been actively monitoring and reporting on overdue actions and this has had a positive impact on closing overdue actions.

7 Improving SHE Assurance Tools and Processes

- 7.1 SHE are launching iAuditor, a brand-new tool that will help people complete SHE inspections and assurance checks within their work areas. Most inspections and assurance processes are paper-based or held locally. This restricts wider visibility of findings, correlation of information and reporting. Over a number of phases we will be rolling-out iAuditor to different areas of the organisation, with phase one launched on 31 October 2022. This project is part of the wider SHE Management System (SHEMS) improvement programme and aligns with current SHE priorities to help mature SHE culture, simplify and enable people to do the right thing in relation to SHE.
- 7.2 As we migrate existing SHE assurance processes to iAuditor, legacy data from the Supplier Assessment Tool has been extracted to make it easier to perform some analysis. This provides us with six years' of assurance data related to construction suppliers. The data is currently being analysed to ensure any valuable insight can be shared.
- 7.3 Drafting of the SHE Assurance and Monitoring section of the new SHEMS has begun. This section of the SHEMS will include information on how to provide assurance that key SHE requirements for all SHEMS topics are being met.

List of appendices:

Appendix 1: QSSA Audits Completed in Q2 against ER1, ER4 and ER12

Appendix 2: QSSA Audit Data

Appendix 3: Revised TfL Enterprise Risks

List of Background Papers:

None

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Appendix 1 – Quality, Safety and Security Assurance Audits Completed in Quarter 2 of 2022/23 against ER1, ER4 and ER12

ER1 Major Safety, Health or Environmental incident or crisis

Directorate	Ref.	Audit Title	Objective	Conclusion	Summary of Findings
Asset Performance & Facilities	22 751 U	LU Jubilee Northern and Piccadilly: Compliance with Institution of Railway Signal Engineers (IRSE) Competence Requirements	To assess the LU signaller competence management system for compliance against the IRSE requirements	Well Controlled	Processes were in place and implemented in accordance with the IRSE requirements.
Asset Performance & Facilities	22 752 U	Supplier Audit - Morson Protection Services	To provide assurance that Morson are providing competent protection staff in accordance with contractual, Quality, Environmental, Safety and Health (QUENSH) and LU Standards	Well Controlled	Morson was found to be managing and providing competent protection staff/support activities in accordance with the contract QUENSH conditions and LU Standards.
Project & Programme Delivery	22 728	Projects and Programmes Directorate Client Duties (Construction Design and Management Compliance)	To seek assurance that management actions from the previous Poorly Controlled audit (20 721) have been effective regards Client Duties for construction work being undertaken in accordance with legislation and internal guidance	Adequately Controlled	An improved level of compliance with Pathway requirements was demonstrated, noting the complexity of some of the projects sampled. Two issues have been identified regarding communication and record keeping.
Rail and Sponsored Services	22 724	London Overground: Arriva Fatigue Management	To seek assurance that the Arriva fatigue risk management system is compliant with the Office of Rail and Road (ORR) Guidance. Assess the effectiveness of Arriva fatigue management arrangements and controls	Adequately Controlled	Arriva have developed a fatigue risk management system in line with ORR guidance but there are still some areas to improve. An internal gap analysis audit was conducted in 2021. This audit has raised four medium priority findings to address the gaps in the current fatigue risk management system.

Directorate	Ref.	Audit Title	Objective	Conclusion	Summary of Findings
Asset Performance & Facilities	22 725	LU Mechanical Compliance with Fluorinated Greenhouse Gases Regulations 2015	To seek assurance that LU is compliant with statutory requirements on control of Fluorinated Gas	Adequately Controlled	Extensive controls have been implemented to ensure the governance of Fluorinated Gas equipment meets the requirements of the Fluorinated Greenhouse Gases Regulations 2015.
Asset Performance & Facilities	22 740	REW Quality of Signalling Equipment Overhaul	To assess compliance with quality requirements for overhaul of legacy equipment critical to safe operation of the railway	Adequately Controlled	REW was found to be generally working in compliance with requirements. Issues raised related to audits not taking place and isolated technical issues
Rail and Sponsored Services	21 812	LO Alstom Competence Management - New Cross Gate Depot	To seek assurance that Alstom is managing competence of Train Operators on London Overground infrastructure at New Cross Depot	Requires Improvement	Gaps have been identified in the effective control and review of risks, and the assurance of training and competence of staff involved in the movement of rail vehicles within the depot. It could not be assured that actions raised from previous investigations and audits had been completed.
Asset Performance & Facilities	22 727	LU Power Competence Management	To assess the competence management system compliance with ORR Guidance and internal standards	Requires Improvement	Some requirements of R0623 A6 'LU Competence Management System', and PR0200 A2 'Power & Electrical – Competence and Licensing', have not been satisfied. This affects compliance with ORR guidance on competence management systems.
Chief Operating Officer	21 769	LU Fire Safety Compliance	To examine LU's approach to overall fire safety, including assessing effectiveness of the management system, legal compliance and effectiveness of assurance regimes	Requires Improvement	Significant progress has been made to improve the governance of fire safety; however, further process improvements are required to ensure their effectiveness.
Asset Performance & Facilities	22 713	LU Pumps Competence Management	To assess the competence management system compliance with ORR guidance and internal standards	Poorly Controlled	Key elements of the pumps competence management system were not in place

Directorate	Ref.	Audit Title	Objective	Conclusion	Summary of Findings
Asset Performance & Facilities	22 717	LU Civils Competence Management	To assess if actions have been effectively embedded following the previous Poorly Controlled audit of Earth Structures and look at the wider management of civils competence	Poorly Controlled	Non-conformances identified in the previous audit remain in relation to the document and quality control processes as per the Civil Engineering Competence Management System framework. A key contributor to this is the continued absence of Internal Verification activities and a key Competency Assurance and Quality Manager role being vacant.

Integrated Systems Audits

Directorate	Ref.	Audit Title	Objective	Conclusion	Summary of Findings
Asset Performance & Facilities	22 714	Ruislip Depot Integrated Systems Audit	To provide assurance that key requirements contained in the management system are being met	Not Rated	66% Conformance, 41 Green, 7 Amber, 14 Red (compliant, minor non-compliance, major non-compliance)
Asset Performance & Facilities	22 715	District Signals Integrated Systems Audit	To provide assurance that key requirements contained in the management system are being met	Not Rated	49% Conformance, 23 Green, 1 Amber, 23 Red (compliant, minor non-compliance, major non-compliance)
Customer Operations -LU	22 705	Paddington Area Integrated Systems Audit	To provide assurance that key requirements contained in the management system are being met	Not Rated	64% Conformance, 38 Green, 2 Amber, 19 Red (compliant, minor non-compliance, major non-compliance)
Customer Operations -LU	22 706	Walthamstow Central Area Integrated Systems Audit	To provide assurance that key requirements contained in the management system are being met	Not Rated	84% Conformance, 49 Green, 2 Amber, 7 Red (compliant, minor non-compliance, major non-compliance)
Customer Operations -LU	22 707	Waterloo Area Integrated Systems Audit	To provide assurance that key requirements contained in the management system are being met	Not Rated	76% Conformance, 44 Green, 0 Amber, 14 Red (compliant, minor non-compliance, major non-compliance)
Customer Operations -LU	22 708	Bank/Holborn Area Integrated Systems Audit	To provide assurance that key requirements contained in the management system are being met	Not Rated	66% Conformance, 38 Green, 2 Amber, 18 Red (compliant, minor non-compliance, major non-compliance)

Directorate	Ref.	Audit Title	Objective	Conclusion	Summary of Findings
Customer Operations -LU	22 709	Northern Service Control Integrated Systems Audit	To provide assurance that key requirements contained in the management system are being met	Not Rated	59% Conformance, 20 Green, 3 Amber, 11 Red (compliant, minor non-compliance, major non-compliance)
Customer Operations -LU	22 710	Queens Park Area Integrated Systems Audit	To provide assurance that key requirements contained in the management system are being met	Not Rated	81% Conformance, 43 Green, 1 Amber, 9 Red (compliant, minor non-compliance, major non-compliance)
Customer Operations -LU	22 711	Cockfosters Area Integrated Systems Audit	To provide assurance that key requirements contained in the management system are being met	Not Rated	85% Conformance, 45 Green, 1 Amber, 7 Red (compliant, minor non-compliance, major non-compliance)

ER4 Major security incident

Directorate	Ref.	Audit Title	Objective	Conclusion	Summary of Findings
Bus Operations	22 742	PCI DSS Compliance Audit: Victoria Coach Station (VCS)	To seek assurance that the VCS is operating in compliance with the Payment Card Industry Data Security Standards (PCI DSS) v.3.2.1 and additionally Tfl's contractual obligations to its Acquiring Banks	Adequately Controlled	The VCS was found to be compliant to the PCI DSS.
Bus Operations	22 744	PCI DSS Compliance Audit: Bus Stop Closures	To seek assurance that the Bus Stop Closure is operating in compliance with the PCI DSSv.3.2.1 and additionally Tfl's contractual obligations to its Acquiring Banks	Adequately Controlled	The Bus Stop Closures was found to be compliant to the PCI DSS.
London Transport Museum	22 747	PCI DSS Compliance Audit: Tfl and London Transport Museum Operations Centre	To seek assurance that the London Transport Museum (LTM) Operations Centre are operating in compliance with the PCI DSS v.3.2.1 and additionally Tfl's contractual obligations to its Acquiring Banks	Adequately Controlled	The LTM Operations Centre was found to be compliant to the PCI DSS.
London Transport Museum	22 748	PCI DSS Compliance Audit: Tfl & London Transport Museum Shop	To seek assurance that the LTM shops are operating in compliance with the PCI DSS v.3.2.1 and additionally Tfl's contractual obligations to its Acquiring Banks	Adequately Controlled	The LTM Shop was found to be compliant to the PCI DSS.
Strategy & Chief Technology Officer	22 743	PCI DSS Compliance Audit: Staff Travel	To seek assurance that the Staff Travel is operating in compliance with the PCI DSS v.3.2.1 and additionally Tfl's contractual obligations to its Acquiring Banks	Adequately Controlled	The Staff Travel was found to be compliant to the PCI DSS.
Chief Operating Officer	22 741	PCI DSS Compliance Audit: Compliance, Policing Operations and Security	To seek assurance that Compliance, Policing Operations and Security (CPOS) is operating in compliance with the PCI DSS v.3.2.1 and additionally Tfl's contractual obligations to its Acquiring Banks	Adequately Controlled	CPOS handle payment card data at times when processing data/evidence requests from the police and this could potentially require them to undergo a compliance assessment under PCI DSS rules. However, CPOS have demonstrated that the existing controls in place are sufficient to satisfy/exceed the PCI requirements so it is not considered necessary to carry out such an assessment. This is supported by both Tfl's PCI Internal

					Security Assessor and Acquiring Banks.
Chief Operating Officer	22 749	PCI DSS Compliance Audit: Art on the Underground (AoU)	To seek assurance that AoU is operating in compliance with the (PCI DSS v3.2.1 and additionally TfL's contractual obligations to its Acquiring Banks	Adequately Controlled	AOU was found to be compliant to the PCI DSS.

ER12 Asset condition unable to support TfL outcomes

Directorate	Ref.	Audit Title	Objective	Conclusion	Summary of Findings
Asset Performance & Facilities	22 720	LU Off Track Drainage Management	To seek assurance that off-track drainage assets are suitably recorded in the asset database with an appropriate inspection and maintenance in place	Poorly Controlled	The location of all assets is not known, and some surveys/ inspections are not completed as required.
Asset Performance & Facilities	22 722	Northern Line Wheelset and Safety Device Maintenance (supplier audit: Alstom)	To assess whether Alstom are operating to the Train Maintenance Regime (TMR) and applicable standard and to provide assurance that wheelsets, fire extinguishers, detonators and short-circuiting devices are managed according to standards	Adequately Controlled	Alstom follows the TMR to manage the Northern line fleet. Some minor weaknesses were found that are unlikely to severely impact on the management of risks or meeting objectives. Three medium and one low priority findings were raised relating to calibration and maintenance management.

Audit Progress against half year plan Q1-2 2022/23

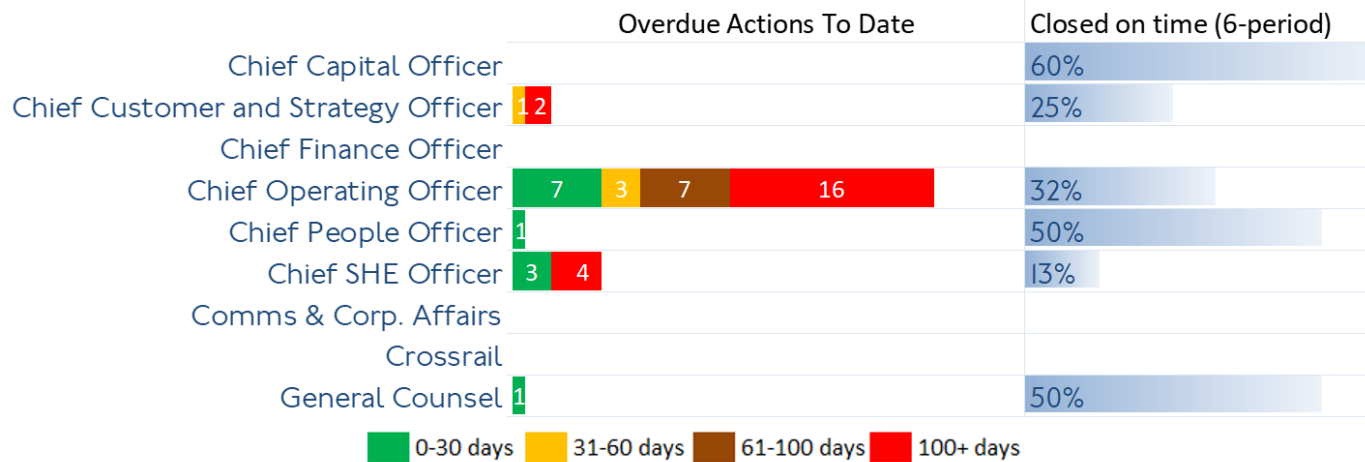


Open Audit Actions - Overall Tfl Performance (6-Period trend)

Measure	No.	%	6-period rolling trend
No. Actions Closed on time	25	41%	
No. Actions Extended	10	17%	

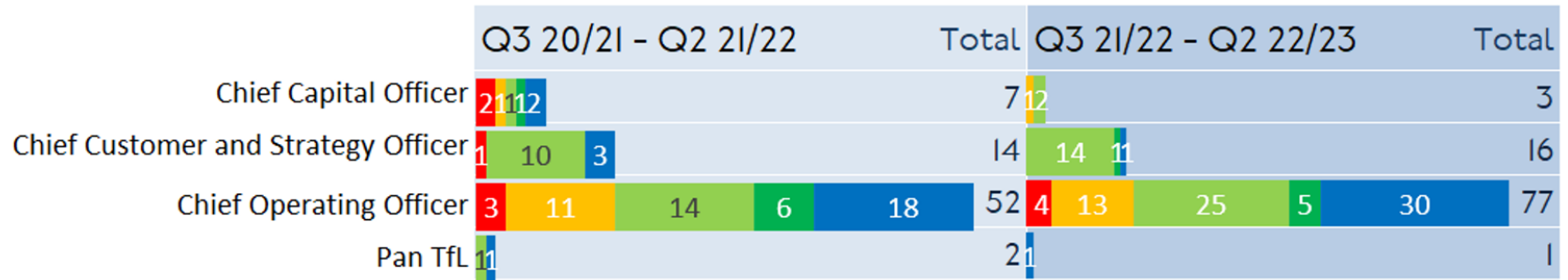
45 Overdue
Out Of
113 Open

Action Management - Overdue Action by Directorate by Overdue Days

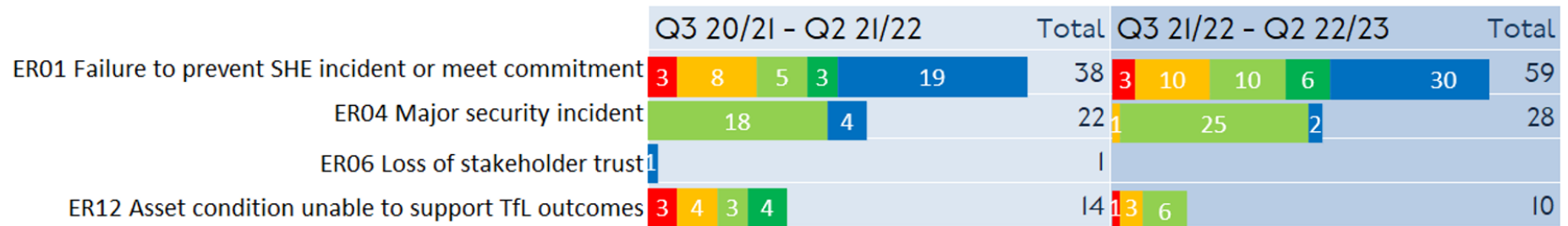


Action data status at 24/10/2022

Audit Conclusion Trends by Chief Officer Team (over 4 quarters)



Audit Conclusion Trends by Enterprise Risk (over 4 quarters)



■ Poorly Controlled
 ■ Requires Improvement
 ■ Adequately Controlled
 ■ Well Controlled
 ■ Not Rated

Appendix 3: Revised Level 0 Enterprise Risks

The new list of 10 Enterprise Risks are as follows:

1. Inability to deliver safety objectives and obligations (ER1);
2. Attraction, retention, wellbeing and health of our employees (ER2);
3. Environment including climate adaptation (ER3);
4. Significant security incident (ER4);
5. Procurement including supply chain (ER5);
6. Deterioration of operational performance (ER6);
7. Financial resilience (ER7);
8. Delivery of TfL key investment programmes and projects (ER8);
9. Changes in customer demand (ER9); and
10. Governance and controls suitability (ER10).

Safety, Sustainability and Human Resource Panel

Date: 16 November 2022

**Item: Safety, Health and Environment Assurance Report
Quarter 1 2022-23**

This paper will be considered in public

1 Summary

- 1.1 The purpose of this report is to give the Panel an overview of the effectiveness of the risk controls for Enterprise Risk 1 (ER1) – Major safety, health or environmental incident or crisis based on second line of defence audit work by the Quality, Safety and Security Assurance (QSSA) team. Information is also provided on Enterprise Risk 12 (ER12) – Asset condition unable to support TfL outcomes and Enterprise Risk 4 (ER4) – Major Security Incident as they correlate to ER1.
- 1.2 The appendices provide a list of audits undertaken in Quarter 1 of 2022/23 (1 April to 25 June 2022) (Q1). Audit reports issued are given a conclusion of ‘well controlled, adequately controlled, requires improvement or poorly controlled’. Individual findings within audit reports are rated as high, medium or low priority.
- 1.3 Performance data is provided on progress against the audit plan, audit ratings, rating trends by Enterprise Risk and business unit and progress against actions, with comparisons provided across the last two years.
- 1.4 This paper was prepared and published for the meeting scheduled for 14 September 2022, which was cancelled as it fell within the period of public mourning of the death of Queen Elizabeth II.

2 Recommendation

- 2.1 **The Panel is asked to note the report.**

3 Annual Quality, Safety and Security Assurance Audit Plan

- 3.1 The annual QSSA audit plan contains a series of second line of defence audits that address ER1, ER4 and ER12.
- 3.2 The 2022/23 annual audit plan was finalised in Quarter 4 of 2021/22 in consultation with the Safety, Health and Environment (SHE), Operations, Maintenance, Engineering Directorates and Security teams to identify where assurance is required or where there are performance or compliance concerns. Each audit has an identified sponsor within TfL to whom assurance is provided, typically a management system or risk owner or an assurance function. In Quarter 2 of 2022/23 (26 June to 17 September 2022) (Q2) the 2022/23 audit plan for Quarter 3 and Quarter 4 of 2022/23 will be checked with audit sponsors to ensure it reflects current risks and assurance needs.

4 Work of Note this Quarter

- 4.1 ER1 was reviewed by the TfL Executive Committee on 1 June 2022 and has been updated to reflect a post-coronavirus pandemic environment and includes new preventative actions. Feedback from the Executive Committee has been incorporated into ER1. The overall risk assessment ratings for ER1 remain the same.
- 4.2 Internal Audit have three ER1 audits in progress in Q1 concerning climate adaptation data management and two audits on the reporting and procurement of a digital monitoring and assurance system. There were no ER1 Internal Audit reports issued in Q1.
- 4.3 A total of 10 second line QSSA audits were delivered in Q1, this is 17 per cent of the six-month programme for Q1-2 and is therefore behind the target of 50 per cent for Q1. However, early data from the first few weeks of Q2 shows progress increased to 43 per cent and therefore recovery is underway. No audits were rated as 'Poorly Controlled' or 'Requires Improvement' in Q1. The breakdown of the Q1 audits by risk is below (see Appendix 1 for the full detail of audits completed in Q1):
- (a) ER1 – seven audits: six Integrated Systems Audits of London Underground (LU) (not rated) and one 'Adequately controlled';
 - (b) ER4 – one audit 'Adequately controlled'; and
 - (c) ER12 – two audits 'Adequately controlled'.
- 4.4 In Q1, six integrated systems audits of LU Operations and Maintenance teams were delivered, providing assurance of key management system requirements addressing local SHE, security, assets, competence and financial controls.

5 Cancelled and Deferred Work

- 5.1 There were no audits cancelled or deferred in Q1.

6 Performance and Trends

- 6.1 Comparing the last four quarters (Quarter 2 of 2021/22 to Q1) with the four prior quarters, the data shows a greater number of audits were completed in 2022/23 than 2021/22 (84 compared with 66). This difference is predominantly due to the Integrated Systems audits being put on hold due to social distancing rules in place at the time, whereas other audits were able to be completed using online meeting tools. The profile of audits undertaken within each Chief Officer team is generally consistent across the eight quarters, as is the ratio of audit conclusions.
- 6.2 When comparing the audit conclusions against the associated Enterprise Risks over the two years, the distribution of conclusions by risk is broadly consistent, indicating there has been no significant change in risk identified by our audits. However, it should be noted that the audit plan is different each year so there are limitations to direct comparisons.

- 6.3 The graphs in Appendix 2 show there was an increase in the number of audits completed against ER1 in the last four quarters compared with the previous year. Conversely, there was a reduction in the number of audits completed against ER12 in the last four quarters compared with the previous year. There are differences in the number of audits undertaken against individual risks when comparing years. However, when viewed over a two to three year period such annual fluctuations evens out.
- 6.4 There had been a steady increasing trend of actions been closed on time which is now starting to plateau: steadying from 68 to 40 per cent and in response we have increased and escalated our reporting on overdue actions to senior management. There has been a small increase in the number of actions granted extensions (in compliance with our procedure) from 13 to 15 per cent.
- 6.5 There are currently 56 overdue actions which has decreased from a peak of 68 during Q1. It is noted that the actions from three audits in three different areas of TfL make up 50 per cent of the total number of significantly overdue actions. Actionees receive routine reminders from the Audit team and overdue actions are escalated to the applicable management teams to try and resolve. Chief Officers also receive reports that include overdue actions within their teams which the Director of Risk and Assurance discusses with them in quarterly meetings.
- 6.6 The greatest number of overdue actions is in the Chief Operating Officer's (COO) team which is where the majority of our audits are conducted. The overdue actions table is slightly polarised with 22 significantly overdue actions (over 200 days) and the remainder of the actions following a more normal pattern of closure within 60 days of the deadline. COO has recently started an initiative to ensure these overdue actions receive additional focus and as many are closed out as soon as possible.

7 Improving SHE Assurance Tools and Processes

- 7.1 SHE has entered the planning phase of the iAuditor implementation project. This solution enables local management teams to confirm compliance with the SHE management system easily and systematically, highlighting areas for improvement. This self-assurance capability (first line assurance) will give senior officers in TfL greater visibility of how well the SHE management system is being implemented in their areas of accountability. It will also provide a valuable leading indicator (an indicator of potential SHE risk before it manifests as harm) that can inform decision making.
- 7.2 The SHE Insights and Direction team is currently in discussion with the QSSA and Internal Audit teams to develop a holistic approach to prioritising SHE audits. The intention is to develop an approach that draws not only from SHE assurance data but also from SHE risk management and identification processes, such as ER1, SHE Priorities and current strategic thinking in SHE. This aligns with the desire to move toward a more systematic, risk-based, evidence-driven approach to planning SHE related audits.

List of appendices:

Appendix 1: QSS Assurance, Audits Completed in Q1 against ER1, ER4 and ER12

Appendix 2: QSS Assurance, Audit Data

List of Background Papers:

None

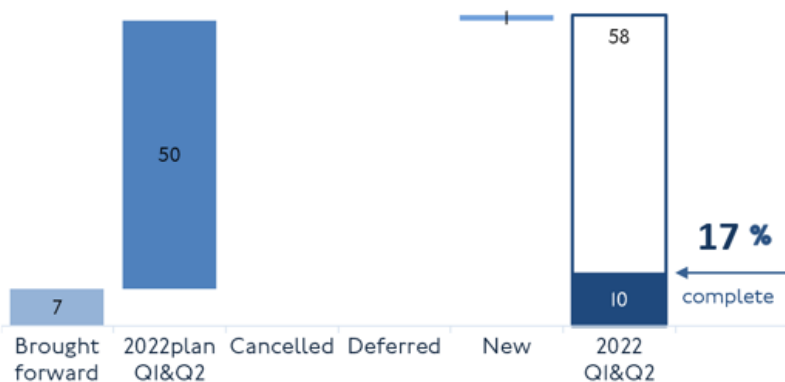
Contact: Mike Shirbon, Head of Quality, Safety and Security Assurance
Email: Mike.shirbon@tube.tfl.gov.uk

Appendix 1 – Quality, Safety and Security Assurance Audits Completed in Quarter 1 of 2022/23 against ER1, ER4 and ER12

Enterprise Risk	Directorate	Ref.	Audit Title	Objective	Conclusion	Summary of Findings
ER01 - Major safety, health or environmental incident or crisis	LU Customer Operations	21 723	Bakerloo Service Control Integrated Systems Audit	To provide assurance that key requirements contained in the management system are being met	Not Rated	68% Conformance, 23 Green, 1 Amber, 10 Red (compliant, minor non-compliance, major non-compliance)
	LU Asset Performance and Capital Delivery	21 729	Upminster Rolling Stock Depot Integrated Systems Audit	To provide assurance that key requirements contained in the management system are being met	Not Rated	68% Conformance, 41 Green, 3 Amber, 16 Red (compliant, minor non-compliance, major non-compliance)
	LU Customer Operations	22 701	Acton Town Area Integrated Systems Audit	To provide assurance that key requirements contained in the management system are being met	Not Rated	68% Conformance, 39 Green, 1 Amber, 17 Red (compliant, minor non-compliance, major non-compliance)
	LU Customer Operations	22 702	Baker Street Area Integrated Systems Audit	To provide assurance that key requirements contained in the management system are being met	Not Rated	71% Conformance, 39 Green, 3 Amber, 13 Red (compliant, minor non-compliance, major non-compliance)
	LU Customer Operations	22 703	Victoria Service Control Integrated Systems Audit	To provide assurance that key requirements contained in the management system are being met	Not Rated	79% Conformance
	LU Customer Operations	22 704	Kentish Town Area Integrated Systems Audit	To provide assurance that key requirements contained in the management system are being met	Not Rated	76% Conformance, 42 Green, 2 Amber, 11 Red (compliant, minor non-compliance, major non-compliance)

Enterprise Risk	Directorate	Ref.	Audit Title	Objective	Conclusion	Summary of Findings
	Rail and Sponsored Services	21772	DLR Rolling Stock Door System Maintenance	To seek assurance that DLR Rolling Stock door system maintenance is managed by Keolis Amey Docklands in accordance with the requirements in MR-100 Maintenance Management Standard and MR-700 Maintenance Standard for Rolling Stock.	Adequately Controlled	There are minor weaknesses that are unlikely to impact on the management of risks or meeting objectives. Three medium priority finding were raised to enhance documentation control and follow up on known issues.
ER04 Major Security Incident	Strategy & Chief Technology Officer	21797	Management of Network and Information System Regulations Compliance	To seek assurance that TfL is meeting its obligations under the Network Information Systems (NIS) Regulations regarding the management of a framework of assessments	Adequately Controlled	The Cyber Security team have established a clear governance and control structure and newly created policies. Work is required and underway to strengthen risk management and incident response management.
ER12 Asset condition unable to support TfL outcomes	LU Asset Performance and Capital Delivery	22719	Signals Authority to Work Certificates (AWC) Process	To provide assurance that the requirements of Pr0536 is being implemented which ensures that signals works are carried out safely and to quality requirements	Adequately Controlled	Requirements for Authority to Work Certificates were implemented by the Asset Control Centre and records well maintained.
	LU Asset Performance and Capital Delivery	22732	Hammersmith Service Control Centre Maintenance and Control of Software Configuration	To provide assurance that control centre equipment is maintained in accordance with G0199E	Adequately Controlled	Apart from two issues, the signalling at Hammersmith Service Control Centre was found to be effectively maintained, cleaned, and managed in compliance with an established standard and guidance.

Audit Progress against half year plan Q1-2 2022/23

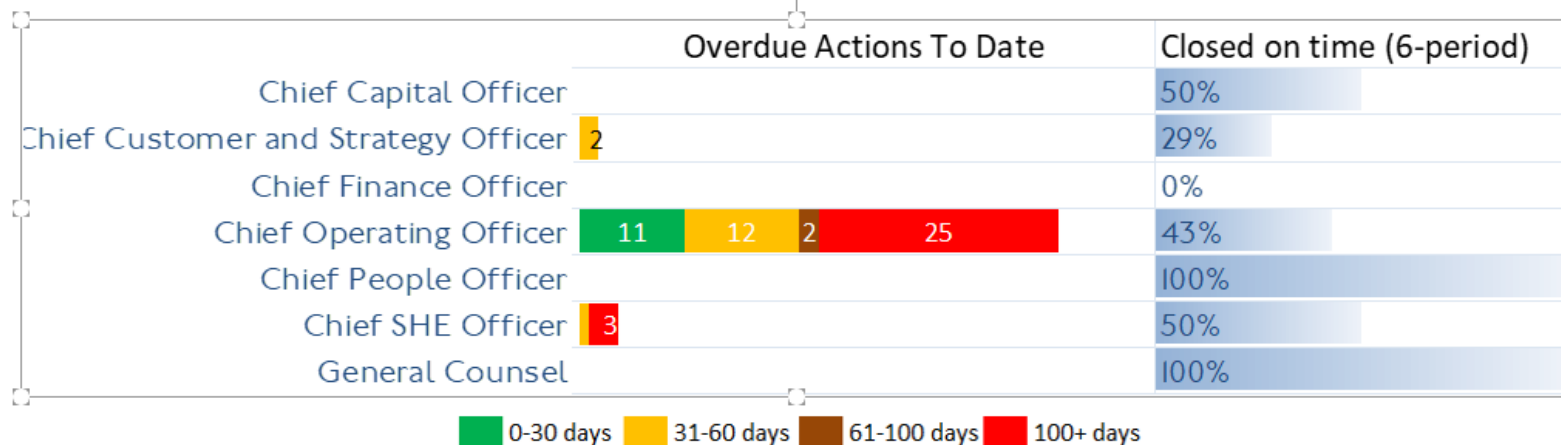


Open Audit Actions - Overall Tfl Performance (6-Period trend)

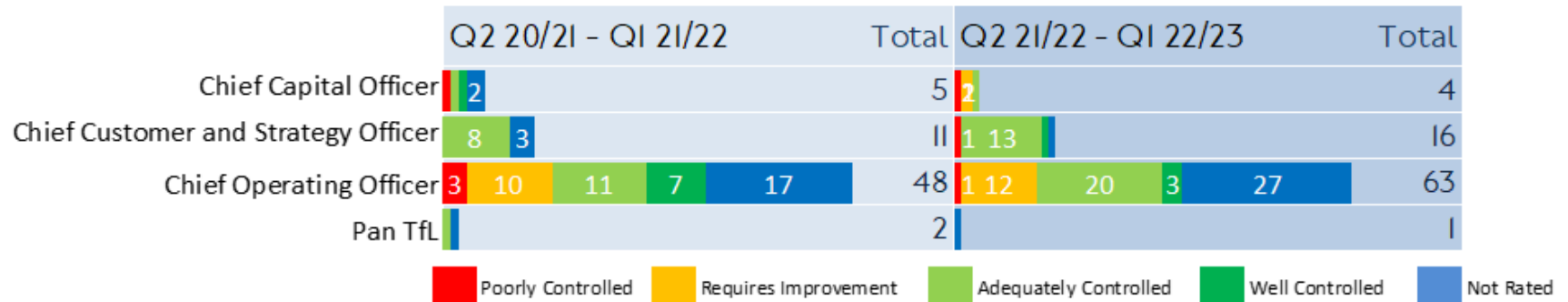
Measure	No.	%	6-period rolling trend
No. Actions Closed on time	41	40%	
No. Actions Extended	16	15%	

56 Overdue
Out Of
105 Open

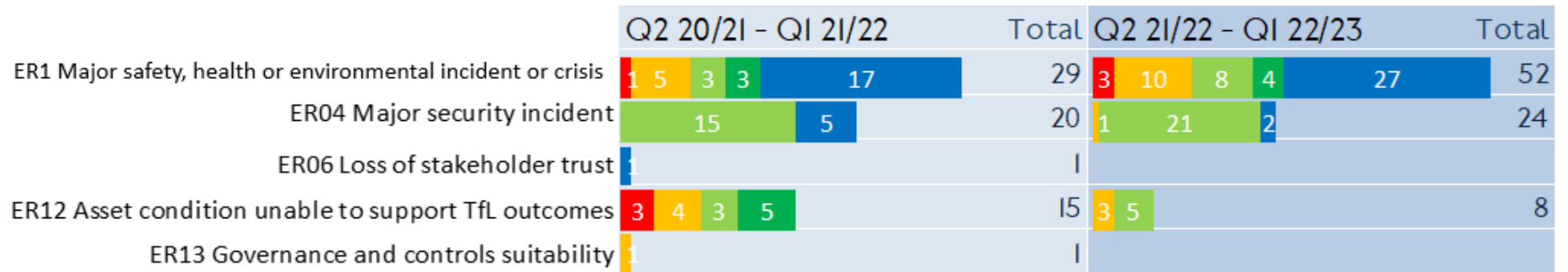
Action Management - Overdue Action by Directorate by Overdue Days



Audit Conclusion Trends by Chief Officer Team (over 4 quarters)



Audit Conclusion Trends by Enterprise Risk (over 4 quarters)



Date: 16 November 2022

Item: TfL Sustainability Report and Corporate Environment Plan Progress Report

This paper will be considered in public

1 Summary

- 1.1 In September 2021, we published our first ever Sustainability Report and Corporate Environment Plan (CEP), in order to outline our approach to sustainability and environment to our customers, staff and suppliers.
- 1.2 The Sustainability Report is structured around the three pillars of sustainability (society, environment, and economy) and the CEP provides more detail on our plans and ambitions for the environment pillar.
- 1.3 This paper provides an update on key metrics one year after publication and our ongoing progress against key sustainability themes and our CEP. Section 6 of the report highlights work to implement the CEP by TfL Operations Office and Section 7 highlights work to implement the CEP in our Capital Office. A summary of our efforts to embed and improve our approach sustainability within TfL is provided in Section 9.

Key points

- 1.4 Society
 - (a) **Safe:** We have published our Vision Zero Action Progress Report introducing new and updated measures to help ensure we continue to work towards our target of eliminating deaths and serious injuries from London's roads. We have progressed actions set out in our work-related violence and aggression strategy, including recruitment of Transport Support Enforcement Officers. We continue to make good progress with our programme of activities to end violence against women and girls, while also looking at what more we can do;
 - (b) **Inclusive:** In November 2021, we published our equalities objectives setting out our commitments on equality. It has 13 objectives which are underpinned by the way we treats our customers, supports our people and works with partners. Over half of all stations (>50 per cent) on our network are now step-free; and
 - (c) **Healthy:** We continue to roll out our Well@TfL programme to support our colleagues in improving their health. We have successfully rolled out Health Surveillance for exposure to skin and respiratory hazards within the workplace.

1.5 Environment

- (a) **Decarbonisation:** We have continued to introduce zero emission buses as we aim to reach a fully zero emission fleet. We launched our first tender for renewable energy Power Purchase Agreements. We have identified opportunities to improve energy efficiency and reduce carbon emissions from our building estate and we are working to develop an ongoing pipeline of funded projects to progress this. We continue to improve our understanding of infrastructure and wider supply chain carbon emissions and build the tools and capability needed for reduction;
- (b) **Adapting to climate change:** Extreme rainfall and heat events in 2021 and this year have highlighted the degree of risk climate change poses to London's transport network. Our asset climate risk assessment provides the most detailed picture to date on the potential impacts of the changing climate, but we have much to do to embed adaptation across our business processes. This will be set out in our forthcoming Adaptation Plan;
- (c) **Green infrastructure and Biodiversity:** We have continued to increase street tree numbers and have successfully delivered Sustainable Drainage Systems (SuDS) on the network. We have developed an initial pan-TfL Natural Capital Account for the organisation, detailing the value to TfL and Londoners of TfL's green estate. We are working to develop tools to embed and maintain the Natural Capital Account within our processes and decision making, which will be described in our forthcoming Green Infrastructure and Biodiversity Plan that will be published next year; and
- (d) **Air Quality:** Expansion of the Ultra Low Emission Zone (ULEZ) in October 2021 to cover the area within the North and South Circular roads has had a transformative effect on air quality. Levels of nitrogen dioxide in the zone are 20 per cent lower than they would have been without the expansion and this is in addition to the step change in better air quality delivered by the original central London ULEZ. In May 2022, TfL launched a consultation on proposals to further expand the Ultra Low Emission Zone (ULEZ), to cover almost the whole of the capital.

1.6 Economy

- (a) **Financial Stability:** Our 2022/23 Budget sets the trajectory to achieve financial sustainability from April 2023. This year will be the last year we require extraordinary Government revenue support due to the pandemic as we return to financial sustainability.
- (b) **Responsible Procurement:** We have approved the GLA Group Responsible Procurement Implementation Plan, committing TfL to further ambitions, targets and reporting metrics to demonstrate delivery of the Mayor's Responsible Procurement Policy; and
- (c) **Security Risk Management:** We are continuing to progress our Security Improvement Programmes across the organisation and are delivering

the Security Governance and Culture programme. We have a pan TfL security scorecard to measure our progress to achieving 'competent' security maturity. defined as a consistent approach to security.

- 1.7 Significant progress has been made across TfL's sustainability objectives in the last year, despite our current financial constraints. However, more action is still required across the organisation to meet our environmental and sustainability challenges, particularly around embedding decarbonisation and climate change adaptation requirements in TfL's activities.
- 1.8 This paper was prepared and published for the meeting scheduled for 14 September 2022, which was cancelled as it fell within the period of public mourning of the death of Queen Elizabeth II.

2 Recommendation

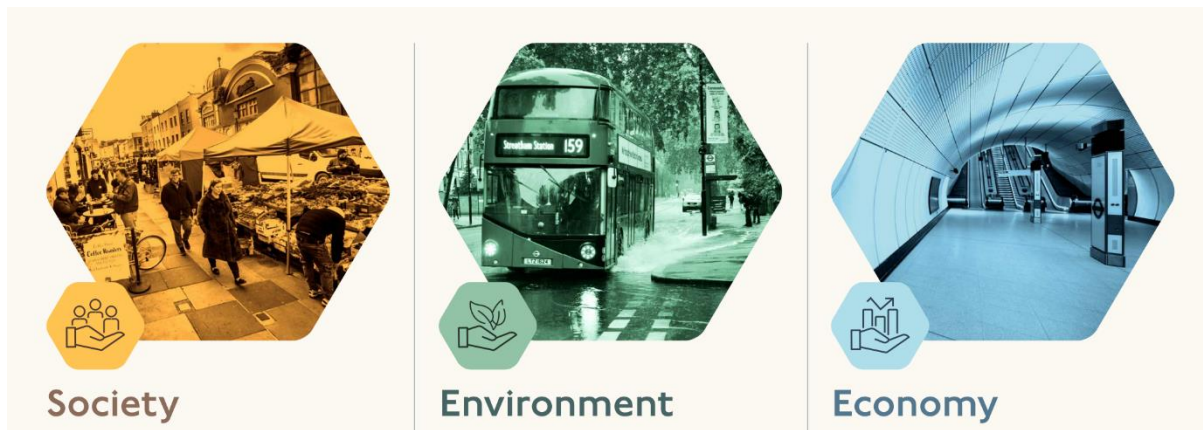
- 2.1 **The Panel is asked to note the paper.**

3 Background

- 3.1 The TfL Sustainability report published in 2021 reported the social, environmental and economic outcomes TfL delivers as an organisation. It provides an account of work to date, including key metrics to measure performance.
- 3.2 The Corporate Environment Plan (CEP) published in 2021 sets out TfL's future approach to improving its organisational performance. It is a forward-looking plan with a focus on the environment strand of sustainability, providing more detail on our ambition, targets and plans.

Sustainability Report

- 3.3 The 2021 report acted as a baseline to help us understand our progress against our strategy, commitments and priorities. We used the Global Reporting Initiative (GRI) Sustainability Reporting standards to guide the development of the report. The voluntary GRI standards help translate the UN Sustainable Development Goals down to an organisational level. We intend to strengthen future iterations of our Sustainability Report and ultimately work towards a GRI compliant report.
- 3.4 The 2021 Sustainability report and this 2022 update is structured around the three pillars of sustainability:
 - (a) **Society** - Caring about our colleagues, customers and communities through safe, healthy and accessible transport services;
 - (b) **Environment** – Operating in a sustainable way, to protect and regenerate the natural world; and
 - (c) **Economy** – Being financially sustainable to provide a resilient and good quality of life for all.



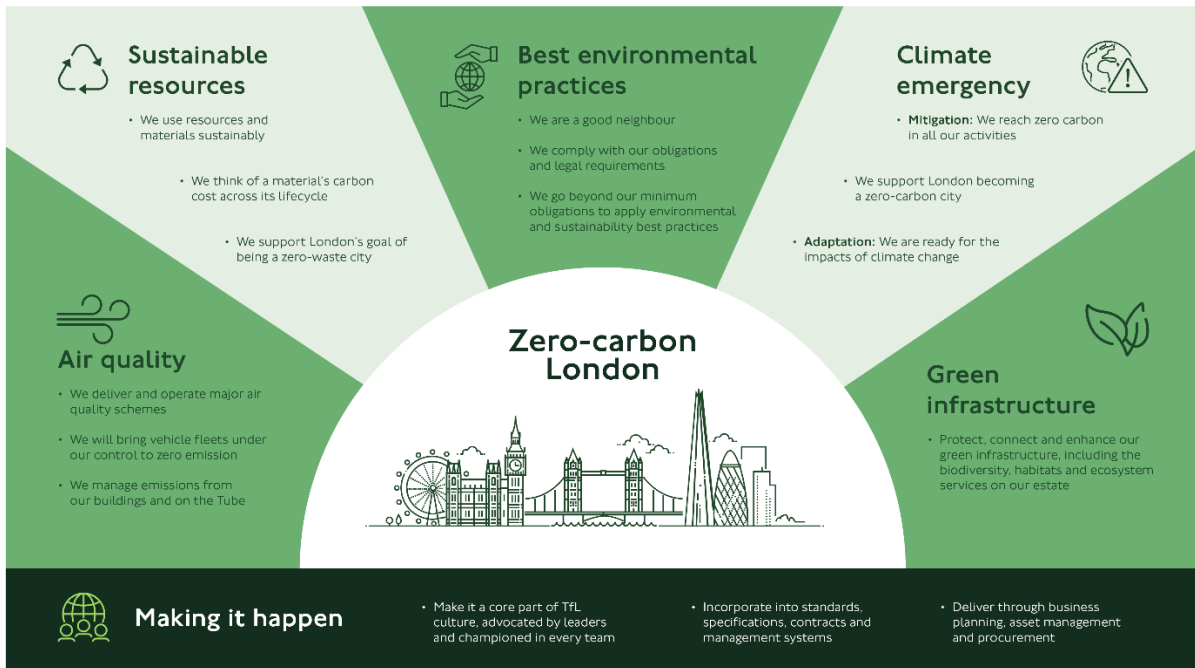
- 3.5 We have increased reporting on our sustainability performance through the TfL Annual Report. Our 2021/22 report includes our first reporting of climate-related risks and opportunities to the organisation under the Taskforce for Climate-Related Financial Disclosures (TCFD) framework.
- 3.6 The Mayor's Budget Guidance 2023-24¹, issued in July, included a requirement for 'Climate Budgeting' for the first time. London's first climate budget will focus on the Greater London Authority Group operational emissions (scope 1 and 2); however, this focus may broaden beyond the Group in the future. Ultimately, the ambition of the London Climate Budget is to cover all actions reducing Greenhouse Gas (GHG) emissions in London (both within its boundaries and from the goods and services it consumes) and the measures supporting London's adaptation to climate change.
- 3.7 We will report annually to the panel on our progress and performance against our Sustainability Report metrics and will publish new versions of the report itself on a regular, but not necessarily annual, basis.
- 3.8 The landscape of sustainability reporting standards and frameworks is complex and fast evolving. It is particularly noteworthy that the International Financial Reporting Standards (IFRS) Foundation has established the International Sustainability Standards Board (ISSB)² and are working to establish a comprehensive global baseline of sustainability disclosures. The new baseline is building upon existing sustainability disclosure standards, including those of the Task Force on Climate-related Financial Disclosures (TCFD), the Climate Disclosure Standards Board (CDSB), SASB Standards, Integrated Reporting, the World Economic Forum and the Global Reporting Initiative (GRI). We will keep the ISSB's work under review to inform our approach to future sustainability reporting and disclosures.

¹ https://www.london.gov.uk/sites/default/files/mayors_budget_guidance_2023-24.pdf

² IFRS Foundation merged with the Climate Disclosure Standards Board (CDSB) and the Value Reporting Foundation (VRF). The VRF was a global non-profit organisation, itself formed from the merger of the Sustainability Accounting Standards Board (SASB) Foundation and the International Integrated Reporting Council (IIRC).

Corporate Environment Plan (CEP)

- 3.9 Our CEP sets out our environmental ambition and how we will achieve this through our operations, maintenance and construction activities. It forms the detailed environmental pillar of our sustainable development approach.
- 3.10 CEP framework and ambitions are structured around five environmental themes: Climate Emergency, Air Quality, Green Infrastructure, Sustainable Resources and Best Environmental Practices.



- 3.11 Our CEP is underpinned by actions required to “Make it happen”. This includes the need to:
- make it a core part of TfL culture, advocated by leaders and championed in every team;
 - incorporate into standards, specifications, contracts and management systems; and
 - deliver through business planning, asset management and procurement.
- 3.12 A summary of our work to achieve the above is covered in section 9 of this paper on ‘Embedding sustainability at TfL’. The following sections of this paper provide an update on progress on ongoing work against each of the Sustainability Report and CEP themes.

4 Society

4.1 Themes under this pillar include:

- **Safe:** Safety is our top priority. Our Vision Zero ambition aims to eliminate deaths and serious injuries on our transport networks, construction and operational sites.
- **Inclusive:** We strive to have an accessible and inclusive workplace and transport network.
- **Healthy:** Enabling more cycling and walking will support a healthier, more inclusive London. We want a healthy and happy workforce.
- **Thriving:** We encourage the connectivity among people, trade and culture, celebrating London's unique identity.

Safe

- 4.2 **Vision Zero Action Plan:** In 2021, we published our Vision Zero action plan progress report. Vision Zero is our fundamental belief that no death or serious injury on London's transport network is acceptable or inevitable, firmly positioned at the heart of the Mayor's Transport Strategy.
- 4.3 The safety of London's streets has long been a focus for us, the boroughs and the police. In 2018, we published our first Vision Zero action plan, which set out how we will eliminate deaths and serious injuries from London's streets by 2041. Three years on, we refreshed the action plan. In doing so, we highlighted the significant achievements made to date, shared new insight and understanding, and outlined new priorities and challenges for Vision Zero over the new Mayoral term.
- 4.4 **Bus Safety:** TfL has committed to producing a Bus Safety Programme Strategy that will set out the approach to achieving Vision Zero for buses, the alignment with Vision Zero as a whole and the role played by the specific projects in TfL's investment programme. The development of this strategy is at an advanced stage and bus driver engagement sessions and stakeholder workshops have already been undertaken.
- 4.5 **Work-related Violence and Aggression:** The safety of our workforce is a priority, and we are committed to preventing violence and aggression on our network by tackling the causes and providing support to those who experience it. Our work-related violence and aggression strategy was approved by the Safety, Sustainability and HR Panel in June 2021. In it, we outline our actions around this work.
- 4.6 Our Transport Support Enforcement Officers, who work closely with the British Transport Police, are trained and equipped to deal with the triggers of work-related violence and aggression through engagement, enforcement and problem-solving. We recruited a total of 90 officers by the end of 2021/22 and we aim to increase this to 135 by the end of 2022/23.

- 4.7 Fare evasion remains the biggest trigger for this type of violence. We are recruiting 60 new Revenue Control Officers as part of our strategy to help tackle fare evasion on the London Underground network. There are 27 fully trained officers working across our network and we started training the additional officers in July 2022.
- 4.8 We have just approved plans to double the size of our work-related violence and aggression (WVA) team with new, dedicated staff working on WVA Prevention Activity to tackle the causes of WVA and one pan-TfL Support and Investigations Team who will support colleagues who experience WVA and provide assistance to the police forces investigating those crimes.
- 4.9 Ensuring our staff have up to date safety equipment is an essential part of our strategy. All our frontline customer services staff have access to body worn video cameras and we are now rolling these out to other groups of staff, and we plan to roll out additional body-worn cameras, following a successful initial roll out. Emergency communication devices are also being provided for staff where there is an operational need.
- 4.10 **Violence against women and girls:** We continue to make good progress with our programme of activities to end violence against women and girls, while also looking at what more we can do. On 15 June 2022, the Mayor published his strategy for tackling violence against women and girls. We are proud to have been involved in its development and will work with the Mayor's Office for Policing and Crime and other partners to deliver on it. Additionally, on 4 July 2022, the British Transport Police (BTP) released the first edition of their new mobile reporting app, 'Railway Guardian', making it easier for customers to report crime and access support. It also provides customers with information on what to do if they see sexual harassment on trains or at stations. We have collaborated with them on the design and continue to work closely on integrating this platform into other apps and tools.
- 4.11 The delivery of our 'zero tolerance to sexual harassment' training to frontline customer-facing transport staff continues. Our 500 enforcement officers have been trained, and training programmes have launched for staff that work in our bus and Tube stations. This training is supported by a comprehensive internal communications plan to raise awareness and provide guidance to staff. Sexual harassment will also be covered in the new diversity and inclusion training being rolled out to all our bus drivers starting later this year.
- 4.12 We continue to run our communications campaign across our networks that reinforces our zero tolerance of sexual harassment. The primary aim of the campaign is to send a strong message to offenders that sexual harassment behaviours are wrong, harmful and not tolerated on our network. We want to encourage those who experience any form of sexual harassment on our rail network to report it and to reassure that those reports will be believed and handled sensitively, and to that end, we have seen an increase of 74 per cent in the reporting of sexual harassment behaviours. There were 1,363 reports of sexual harassment made between October 2021, when the campaign launched, and the end of April 2022. This is up from 575 reported offences in the same period the year before.

Inclusive

- 4.13 **Equalities Objectives:** In November 2021, we published our equalities objectives setting out our commitments on equality. It has 13 objectives which are underpinned by the way TfL treats its customers, supports its people and works with partners. The customer focused objectives relate to affordability (fares and road charging), customer information, safety, customer service, inclusive infrastructure, stakeholder and community engagement, improving the health of all Londoners and embedding inclusion and equality into decision making. TfL's objectives for supporting its workforce relate to workforce representation, fairer internal opportunities, skills development and creating an inclusive culture. Its final objective is to work with partners, suppliers and the wider industry to have inclusion as a core value.
- 4.14 **Trans and Non-Binary Guidance:** We recently published our Trans and Non-Binary guidance 'Creating Inclusive workplaces for trans and non-binary colleagues' and a set of Conversation Cards. These resources help to support colleagues who identify as Trans or Non-Binary, along with their line managers and other colleagues, consider some of the challenges that may require support on their unique journey. The new guidance is supported by changes to our process and systems that will unlock barriers previously faced by colleagues. With this new resource, we aim to help colleagues navigate a clear path through some of the cultural, legal and technical steps to ensure that at least our working environments are truly inclusive. Every individual's journey and approach to their gender identity and expression will be unique, but by familiarising ourselves with this guidance we can each play our part in creating a shared understanding of what it means to be trans and non-binary inclusive at TfL.
- 4.15 **Pay Gap Reports:** Earlier this year we published our Gender, Ethnicity and Disability pay gap reports for 2021. It was the first year that we have published our Disability pay gap and this is as per a Mayoral commitment. We know that people with disabilities face many barriers towards, and within, employment. To successfully target barriers from within our organisation, we know that we need to be guided by what our data is telling us. Later this year we will publish our new four year pay gap action plan which sets out the steps we will take to help reduce our pay gaps for women, Black, Asian and minority ethnic and disabled colleagues as referenced in our three pay gap reports.
- 4.16 **Employee Network Groups:** Last Autumn, following a recruitment campaign, we announced the names of our new Chairs and Vice Chairs for our Staff Network Groups. Our Staff Network Groups (SNG) are part of the wider Employee Network Groups that also include Special Interest Groups. SNGs play a key role in creating a diverse and inclusive workplace where differences are celebrated and our colleagues can share, learn and be inspired. We're very excited to welcome the new Chairs and Vice Chairs onboard. They'll help us create an environment where a deep sense of pride and belonging is embedded into everything we do.
- 4.17 **Anti-Racism:** On 9 June 2022, we held a hybrid event on the topic of Anti-Racism. Colleagues from across the organisation came together for this event, that aimed to shine a spotlight on our Anti-Racism Leadership Charter

(ARLC) and hear more about its mission to erase workplace racism. It was a chance to drive the conversation forward, discuss the successes and challenges, and most importantly listen to the hurdles and issues people face at the hands of racism, and hear from a range of voices on what more needs to be done. External speakers [Afua Hirsch](#) and [Nova Reid](#), both respected authors and activists in this space, joined us to discuss what more we can all do to challenge behaviours and create safe spaces to discuss and tackle this important issue. We also heard from internal colleagues, who bravely shared their own moving and personal experiences of racism, as well as giving colleagues the opportunity to raise questions to members of our senior leadership team. As an organisation, we're committed to ensuring racism is a thing of the past for our colleagues here at TfL.

- 4.18 **An Accessible Network for all:** Over half of all stations (>50 per cent) on our network are now step-free. We currently have 92 London Underground stations, 62 London Overground stations and all stations across the Elizabeth line route fully step-free. DLR, Tram and Bus remain fully step-free.
- 4.19 The delivery of the Elizabeth line provides new step-free routes and interchange with other lines, level boarding and wider more spacious trains with plenty of provision for luggage, pushchairs and wheelchairs.
- 4.20 **Inclusive supply chain:** Through the Supply Chain Sustainability School, TfL is co-funding the Fairness Inclusion and Respect programme with other transport clients (HS2, National Highways and Network Rail) to drive Equality, Diversity and Inclusion best practice in the supply chain as well as within the transport client organisations. This includes requesting diversity data from suppliers and collaborating to tackle issues at an industry level. The programme offers free training, workshops and webinars to upskill our suppliers.

Healthy

- 4.21 **Phase two of Well@TfL Acton pilot project:** The Acton pilot project aimed to help our colleagues to learn more about their health and how they can improve it. The project started with wellbeing checks, including measurements like cholesterol, blood glucose and blood pressure. Participants were then invited for a three-month follow-up call and six-month follow-up appointment. For those that attended the six-month follow-up health checks there was a significant improvement including:
 - (a) an average reduction overall in waist circumference;
 - (b) an average reduction in the mean diastolic and systolic blood pressure recording; and
 - (c) an average reduction in relative risk (the risk of a cardiovascular event) and an increase in the number of individuals who had the recommended relative risk of 1.0 or below.
- 4.22 **Well@TfL Mobile Health Unit:** The Well@TfL health bus has been busy since May and is delivering onsite mobile health checks, health surveillance and periodic medicals. The mobile health bus will provide a convenient and

cost-effective way for employees to receive onsite support on their health and wellbeing, as well as to attend medicals. Since launching the Well@TfL project in August 2021, more than 900 employees have received a mobile health check.

- 4.23 **Health Surveillance:** Health Surveillance for exposure to skin and respiratory hazards within the workplace has been successfully rolled out across TfL with more than 300 people being trained so far to become local skin assessors. Health surveillance programmes help to identify any ill health that may be caused as a result of exposure to these workplace hazards and will continue to be implemented for other risks such as vibration and noise in the coming months.
- 4.24 **Staff absences:** At TfL mental health problems and musculoskeletal problems are the leading cause of long-term sickness absence. This is the same for organisations across the UK. We continue to provide support and treatment options for these conditions and are exploring evidence-based interventions to reduce risk of these conditions. We are now reporting into the Rail Safety and Standards Board (RSSB) pilot health dashboard. Their first report indicates that absence at TfL due to mental health and most musculoskeletal conditions is lower than other reporting organisations (train operating companies).
- 4.25 **Covid-19:** As of 31 March 2022, 105 members of our workforce have sadly lost their lives to Covid-19. Each loss is a personal tragedy to their friends, family and colleagues, and our thoughts are with everyone affected. We lost people from across all areas of the organisation and everyone within the organisation pays tribute to the vital role they played in our fight against the pandemic.
- 4.26 In October 2021, we announced plans to create a memorial in Braham Street Park in Aldgate to commemorate the London transport workers who died from Covid-19 and provide somewhere for their families and friends to visit and remember those they have lost. We are using this opportunity to bring significant improvements to the park while we create the memorial to the transport workers we have lost.
- 4.27 The initial designs were shared with the bereaved families for feedback and we have continued to involve them throughout the design process. Planning permission for the memorial was granted in April 2022 and the memorial is set to open later this year.

Thriving

- 4.28 **Everyone's Future Counts:** In March 2022 we published Everyone's Future Counts which for the first time brought together all of our employability and young people outreach work which aims to support those who face barriers in education and getting into or returning to work. Even before the pandemic, many groups of people in London faced much higher levels of underemployment and unemployment. Addressing this inequality and other challenges people in our city face is fundamental to who we are as an organisation and the contribution we make to helping London, and the UK, move ahead.

- 4.29 **Education to Work:** has supported 9567 students with 91 per cent of them from under-represented backgrounds. Eighty per cent experienced increased confidence in their employability.
- 4.30 **Ways into Work and Routes back to Work:** has supported 523 participants, with 58 per cent in paid employment within six months of leaving. Eighty-eight per cent experienced increased confidence in their employability.
- 4.31 **Commencing Work:** has seen progress in our representativeness across our intake. Our total intake for 2021-22 was 61 Graduates, 103 Apprentices and 5 Interns. Of that:
- (a) those declaring a disability, we saw an increase of two thirds****;
 - (b) 38 per cent were individuals from Black, Asian or Minority Ethnicity, compared to 34 per cent last year and surpassing our target of 36 per cent to reflect London’s population; and
 - (c) 33 per cent were women; while this was a decrease from 40 per cent last year, there was a positive trend of women making up 47 per cent of apprentices hired at higher levels 4-6.
- 4.32 Our focus remains to design person-centred interventions to remedy the barriers people face in education and into employment. As a result, two new 12-week programmes for Ways into Work and Routes Back to Work are currently in design and are scheduled to launch at the end of the year. We continue to focus our education to work outreach on those from lower social economic backgrounds and supporting young people impacted by the pandemic.

Performance metrics: Society

- 4.33 Table 1 shows an update on our ‘Society’ metrics compared to our first published report in 2021. We continue to evolve and improve on our Sustainability reporting and some of these measures have therefore been updated to align with our most current reporting approaches.

Table 1

Theme	Measure	2019/20	2020/21	2021/22
Safe	People killed or seriously injured on our roads (number of injuries)	3,624	2,968*	3,899*
	Customer and workforce injuries on public transport (number of people)	11,167	4,497	8,430

Inclusive	Percentage of TfL employees (based on declarations)			
	Women	23.7% as of 31st Mar 2019	24% as of 31st Mar 2020	24.2% as of 31st Mar 2021
	Black Asian Minority Ethnic	30.5% as of 31st Mar 2019	32.5% as of 31st Mar 2020	32.8% as of 31st Mar 2021
	Disability	Not available	Not available	2.8% as of 31st Mar 2021
	Relative additional journey time using the step-free network (minutes)	8.3	7.3	6.8
Healthy	Number of colleagues who feel there is adequate support in place to help them manage their health, safety and wellbeing	60%	65%	62%
	Number of employees completing the MIND Mental Health Awareness training	406	1,134	2,385
Thriving	Number of people progressing from pre-employment programmes to employment within 12 months	29%	44%	Not currently available
	Percentage of TfL graduate starts (based on declarations)			
	Women	22%	25%**	32%***
	Black Asian Minority Ethnic	53%	30%**	45%***
	Disability	Redacted* ***	Redacted* ***	Redacted* ***
	Percentage of TfL apprentice starts (based on declarations)			
	Women	37%	40%**	33%***
	Black Asian Minority Ethnic	36%	34%**	38%***
	Disability	Redacted* ***	Redacted* ***	Redacted* ***

* Numbers for 2020/21 and 2021/22 are provisional and subject to change

**starts delayed to Jan/April 2021

***started Sept 2021 and Jan/Feb 2022

**** Actual percentages have been redacted in instances of smaller numbers, to protect the identification of individuals in compliance with the General Data Protection Regulation (GDPR)

5 Environment

5.1 Themes under this pillar are summarised in our Sustainability Report, but more comprehensively set out in our CEP as follows:

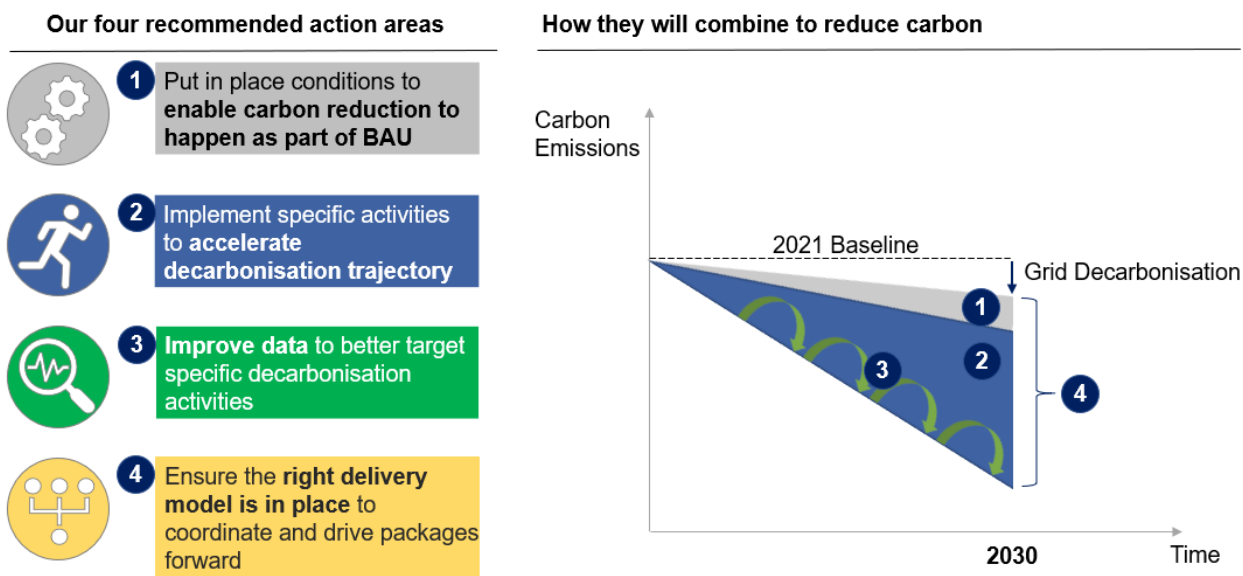
- **Climate Emergency:** We will reduce carbon emissions from our activities and ensure we are ready for the impacts of climate change.
- **Air quality:** We will transform our vehicle fleets to zero emission and support broader efforts to clean London's air.
- **Sustainable resources:** We will design for the circular life cycle of resources and materials, supporting London's goal of being a zero-waste city.
- **Green infrastructure:** We will increasingly protect, connect and enhance our green infrastructure, including the biodiversity, habitats and ecosystems services on our estate.
- **Best environmental practices:** We are a good neighbour. We comply with our obligations and legal requirements. We go beyond our minimum obligations to apply environmental and sustainability best practices.³

Climate Emergency: Decarbonisation

- 5.2 **Tender Launched for First Power Purchase Agreement:** In June we went out to procure our first Power Purchase Agreement, 'PPA Comet'. This tender aims to purchase more than 10 per cent of our required electricity from 'new build' renewable energy sources. The launch of the tender forms part of TfL's long-term strategy to ensure that all the electricity it uses is generated by 100 per cent renewable sources.
- 5.3 **Buildings Decarbonisation:** Over the past nine months we have conducted a baseline assessment of the carbon emissions associated with our buildings, using existing data, supplemented with 40 site visits. We have undertaken initial analysis for how we can simultaneously reduce carbon and operational cost. We estimate that approximately 11-12 per cent of TfL's operational carbon emissions (approximately 105 kilotonnes of CO₂) are attributable to the activities that we undertake across our estate of approximately 6,000 buildings.
- 5.4 The energy used by our buildings is estimated to currently cost TfL c£65m per year. However, this is set to increase with rising energy costs. London Underground, Tenanted Estate, Bus Operations and Head Office account for 93 per cent of all emissions. We have developed a Buildings Decarbonisation plan, which includes recommendations and key action areas requiring further development.

³ 'Best environmental practices' is not a theme of the Sustainability Report, but is included in the CEP, which is a more comprehensive description of our environment sustainability pillar.

Our buildings decarbonisation plan is structured around four action areas:



5.5 One important action is to conduct detailed site-specific feasibility to improve our understanding of how to decarbonise high priority sites, particularly at complex locations such as depots. In this regard, we have successfully secured grant funding through the Low Carbon Skills Fund (LCSF) to conduct feasibility work and generate Heat Decarbonisation Plans at eight of our operational buildings. This feasibility work will complete by March 2023 and will start to build a pipeline of projects that we will continue to develop and deliver.

5.6 **Carbon Literacy training:** We have developed a one-day carbon literacy course for employees, which is fully accredited by the Carbon Literacy Project. As part of this course, employees make two pledges to reduce carbon. The course is currently being piloted prior to full roll out later in the year. We aim to train 500 employees by April 2023, initially prioritising TfL's Capital Office.

5.7 **Understanding our scope 3 emissions:** Building on an initial GLA-wide scope 3 footprint undertaken in 2021, we are currently undertaking a more detailed emissions assessment of our upstream scope 3 emissions. Assessments of whole lifecycle emissions from our Major Projects (section 7.1) and Technology and Data activities have been undertaken. Our full upstream scope 3 footprint will be used to inform overall emissions reduction targets in this area.

Climate Emergency: Adapting to climate change

5.8 **Adaptation Reporting Power:** In April 2022 we published our final submission under the third round of the Adaptation Reporting Power. The report sets out TfL's governance process, strategy for adapting to climate change, main climate risks now and in the future and proposed adaptation measures.

- 5.9 The climate risk assessment conducted for this report demonstrates that all of our assets, operations and services, staff and passengers carry some degree of weather- and future climate-related risk. The assessment identified 333 climate risks using the Met Office's latest climate projections and best professional judgement from a wide range of colleagues across the entire business.
- 5.10 We are also using the climate risk assessment to inform the development of our research programme, as well as internal and external collaborative work, including with the Surface Water Transition Group (who are working to set up a new pan-London Surface Water Strategic Forum), Transport Adaptation Steering Group and Infrastructure Operators Adaptation Forum.
- 5.11 **TfL Adaptation Plan:** TfL's first corporate Adaptation Plan will use the climate risk assessment to set out actions needed to embed adaptation requirements and increase maturity across the business, expanding on the Corporate Environment Plan. The plan includes both business-wide actions to improve governance, improve our evidence base and upskill our people, as well as embedding adaptation requirements within key business processes. The agreed plan will be submitted to the Panel by the end of 2022/23.

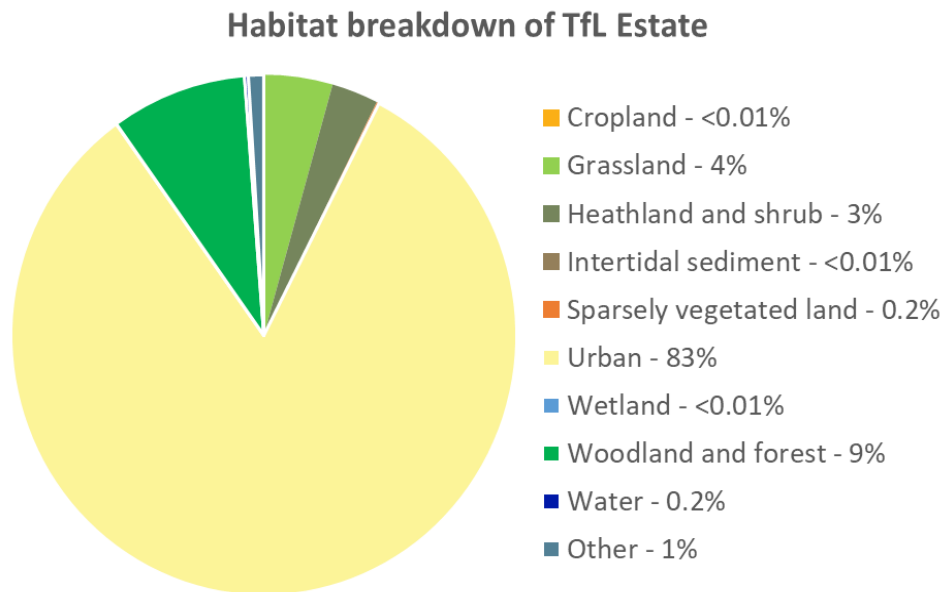
Air Quality

- 5.12 **Expansion of the Ultra Low Emission Zone (ULEZ):** We expanded the ULEZ in October 2021 to cover the area within the North and South Circular roads. The 'six-month on' report on the expanded ULEZ, published 19 July 2022, shows 94 per cent compliance rate inside the zone. Levels of nitrogen dioxide in the zone are 20 per cent lower than they would have been without the expansion. All monitoring sites along the North and South Circular Roads have seen reductions in NO₂.
- 5.13 In May 2022, TfL launched a consultation on proposals to further expand the Ultra Low Emission Zone (ULEZ), to cover almost the whole of the capital from 29 August 2023.
- 5.14 The Mayor considered a range of options when deciding the next steps to take in dealing with the 'triple emergency' facing the capital (air pollution, climate change and congestion). In the short-term, if ULEZ is expanded London-wide it will have the biggest effect on air pollution emissions relative to the cost to Londoners as a whole, as well as helping to tackle the climate emergency and traffic congestion.
- 5.15 **Non-Road Mobile Machinery:** We continue to work with the GLA to develop an online portal to monitor compliance with NRMM standards across the GLA group and pilot this on TfL's highways maintenance contracts.

Green Infrastructure

- 5.16 **Developing TfL's Natural Capital Account:** Natural capital accounting is the process of considering the value of the environment in business decision making and reporting. For the first time, we have assessed our whole estate and carried out a monetary valuation of our natural capital following the Natural Capital Protocol throughout.

- 5.17 Our natural capital assets support significant value to Londoners and global society. They provide numerous, important benefits ranging from air quality, carbon sequestration, biodiversity, visual screening, shading and cooling to mental health and education that have been included in the assessment.
- 5.18 Due to the complex nature of our organisation, we have identified several data gaps that we intend to fill to improve future natural capital accounts, and are working to embed the natural capital approach into business activities, including project delivery, asset strategy and maintenance.



- 5.19 TfL is one of the first transport infrastructure organisations to look at natural capital in this depth, therefore we have great opportunity to show leadership and to share learning with other organisations in the sector.

Sustainable Resources

- 5.20 **Increased and more efficient use of sustainable resources:** Overall recycling levels remain similar to previous years; however, TfL has increased the number of dedicated recycling services to stations and depots which allows for improved recycling and better staff visibility of recycling.
- 5.21 We will continue to monitor the improvements in station recycling performance and look to introduce more recycling facilities where possible.
- 5.22 For example, following a successful trial at Stratford station, we're starting food waste collections at a further two stations working closely with station tenants.
- 5.23 We also continue to collaborate with the ReLondon partnership engaging with Tier 1 suppliers and contractors and small and medium-sized enterprises (SMEs).
- 5.24 Working in partnership with the Transport Infrastructure Efficiency Strategy (TIES) project, we have identified a series of future Circular Economy

benchmarks and metrics that could be used across the industry and have rolled out improved reporting systems for collating information from projects.

Best environmental practices

- 5.25 **Managing our impact:** As part of the Safety Health and Environment Management System (SHEMS) Improvement Workstream, work is currently underway to review and update our existing Environmental Evaluation process which is used to assess project's environmental risks and opportunities.
- 5.26 TfL is also supporting Defra's efforts to update their noise modelling, which will result in interactive and accurate noise maps that can be used to better target interventions.

Performance Metrics: Environment

- 5.27 Table 2 shows an update on our 'Environment' metrics compared to our first published report in 2021.

Table 2

Theme	Measure	2019/20	2020/21	2021/22
Climate Emergency	Operational carbon emissions (thousand tonnes per annum)	1,040	862	832
	Percentage of bus fleet that are zero emission	3.5%	5.4%	9.2%
Air Quality	Percentage of support vehicles that are zero emission	2.6%	2.5%	2.3%
	Percentage of Commercial and Industrial waste recycled	42%	40%	47%
Sustainable Resources	Percentage of construction, demolition and excavation waste reused	98.2%	99.26%	89.11%*
	Number of trees on our road network	24,234	24,103	24,581
Green Infrastructure				

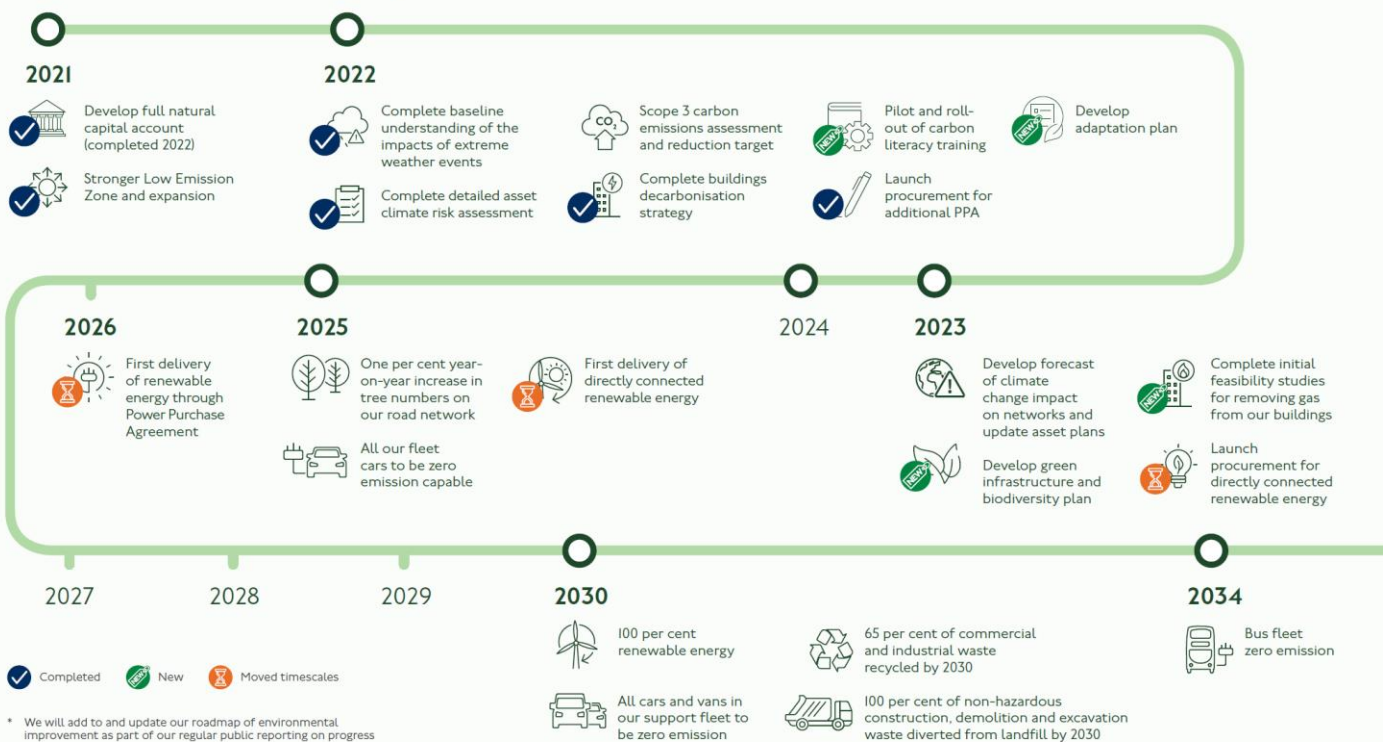
* Results for 2021/22 are provisional and subject to change

Update to our Roadmap of environmental improvements

- 5.28 The roadmap below shows an update on our 'Environment' milestones compared to our first published Corporate Environment Plan in 2021.
- 5.29 Some key updates on the roadmap include:
- (a) We have delivered our 2021 milestones with the exception of the launch of procurement of directly connected renewable energy which has been delayed to 2023;

- (b) We have added new 2022 milestones, including strengthening our approach to adapting to the changing climate through the development of a detailed Adaptation Plan, and piloting and rolling out carbon literacy training;
- (c) We have added new 2023 milestones to address our Green Infrastructure and Climate Emergency priorities; and
- (d) We will add to and update our roadmap of environmental improvement as part of our regular public reporting on progress

Our roadmap of environmental improvements*



6 Implementation of the CEP: Operations

6.1 Zero emission TfL buses: We are aiming for 10 per cent of our 9,000 buses to be zero-emission by the end of 2022. As of 31 March 2022, there are more than 800 zero emission buses in our fleet, helping us reduce our reliance on diesel, cut harmful emissions and reduce CO₂ in the capital. The fleet also includes 20 double-deck zero-emission hydrogen fuel-cell buses, launched in June 2021, with technology that helps us reduce emissions and ensures our buses emit nothing except water vapour from their propulsion systems.

6.2 **Piloting wildflower verges on the road network:** Verges have considerable potential for boosting biodiversity and can be cost-effective due to their management requirements. We are piloting wildflower verges at six pilot sites, selected based on vegetation suitability, proximity to residential areas and maintainability and safety considerations. Public perception of ‘untidy’ verges can be a challenge – signage, mowing at the edges close to the road, and better communications have been used and found to help.



A wildflower verge on the A40 in Hillingdon

6.3 **Tree planting:** We remain on track to meet the target of a one per cent year-on-year increase in street tree numbers between 2016 and 2025. In 2021/22 an additional 849 trees were planted, increasing the total number on the network to 24,581.

6.4 **Sustainable Drainage Systems (SuDS):** In November 2021, a raingarden capturing 500m² of surface water run-off was installed on the TLRN at Elspeth Road in Wandsworth, as part of our commitment to installing Sustainable Drainage Systems (SuDS) on London’s road network.

6.5 We have agreed £640k of Thames Water funding for the delivery of sustainable drainage (SuDS) projects on TfL’s road network, including outside Edgware Road station, at Tolworth roundabout, Nine Elms Lane and Old Street.

6.6 **Managing Noise from our activities:** Reducing noise on the Underground remains a priority for TfL. We continue to monitor noise levels on the Tube network closely.

6.7 Rail grinding is currently TfL’s principal means of addressing Tube noise. We also continue to carry out other targeted interventions to reduce noise (including removing redundant rail joints, maintaining points and crossings and re-ballasting track, where appropriate to the location) and detailed investigations to understand and address the root cause of noise issues such as rail corrugation.

6.8 We are also investigating alternative engineering solutions to manage Tube noise. For example, TfL has been trialling the replacement of Pandrol Vanguard (PV) track fastenings (which impact in-carriage noise) with alternative Delkor track fastenings between Baker Street and St John’s Wood on the Jubilee line. The next site for installing Delkor is Camden Town to Euston, where work commenced in July 2022.

6.9 **London Underground Air Quality:** The £4.2m tunnel and track cleaning programme continued in 2021/22, Additional training was provided to help improve targeting of the 10,000 metres of air-quality related track cleaning per month which is carried out using Bac-Vacs, shown to the right.

6.10 Financial restraints impacted air quality budgets that were in addition to the £4.2m track cleaning budget. However, funding was secured for research and monitoring, and new sources of funding are being explored for trials of new cleaning techniques.

6.11 We have commissioned two academic studies by independent researchers from Imperial College to look at whether Tube dust has an impact on health. The studies will examine:

- (a) Sickness absence in workers exposed to tunnel dust to evaluate whether staff exposed to LU tunnel dust have higher levels of sickness absence due to respiratory and cardiovascular conditions; and
- (b) Retrospective Cohort Epidemiological study on mortality/morbidity/cancer in LU workers (such as train operators and station staff) exposed to tunnel dust.

6.12 The short-term sickness absence study commenced in 2021. Data collection is in progress and records are being reviewed to determine whether there is any association between employment role, tube dust exposure and absence. The short-term study report is due to be published in 2023, while publication of the long-term report is expected in 2025.

7 Implementation of the CEP: Capital

7.1 **Major Projects Carbon Baseline:** In June 2022, we completed the Major Projects Carbon Baseline Report. This is the first time the whole life carbon baseline for all 10 current Major Projects have been modelled in detail, including the scope and carbon hot spots for each. We will be aiming to reduce whole life carbon impacts in the coming years, by management of carbon through the full Project lifecycle in collaboration with our supply chain. We are now working to expand the De-carbonisation Strategy and carbon baseline across our capital investment portfolio in conjunction with the stand-up of the new Capital Directorate.

7.2 **CEEQUAL:** Projects where the estimated total cost exceeds £5m or the contractor's costs exceed £25m must achieve CEEQUAL certification award level of at least 'Very Good', ideally 'Excellent', and BREEAM (Building Research Establishment Environmental Assessment Method) rating level of at least 'Very Good' and ideally 'Excellent'.



A colleague using a 'Bac-Vac' to clean a Tube tunnel

7.3 The Northern line Extension (NLE) project was awarded 'Excellent' Whole Team Award for Civil Engineering Environmental Quality Assessment & Award Scheme (CEEQUAL) in December 2021. This award was achieved by the hard work and commitment of the TfL and Ferrovial Laing O'Rourke teams, with the support from the many suppliers and sub-contractors involved.

8 Economy

8.1 Themes under this pillar include:

- **Economic impact:** We will deliver a transport system for London that supports economic development and create more sustainable buildings and homes.
- **Responsible procurement:** We deliver social value and support our supply chain to become greener, fairer and more inclusive.
- **Financial stability:** Reduction on operational expenditure funding support from central government.
- **Security risk management:** We manage existing and emerging security risks and adopt a zero-tolerance approach to any fraud, bribery or corruption committed against us.

Economic impact

8.2 The pandemic devastated our finances and meant we have had to rely on extraordinary Government funding to fill the gap as ridership significantly declined and our revenues diminished. In total, we have received around £5bn of Government funding over the last two years, on a declining trajectory each year, so that this year will be the last year we require extraordinary Government revenue support due to the pandemic as we return to financial sustainability.

8.3 Our Budget for 2022/23 set out the final step in that path. We had secured £300m from 1 April 2022 to 24 June 2022 with a remaining funding requirement of £900m for the remainder of the financial year to 31 March 2022. The 2022/23 Budget was based on a managed decline scenario which reduced levels of renewals whilst still ensuring safety standards on the network are maintained, and deep service reductions of 18 per cent on buses and 9 per cent on tube and rail services.

8.4 On 30 August we reached an agreement with Government to receive base funding of around £1.2bn until 31 March 2024 and ongoing revenue support should passenger numbers not recover at the rate budgeted, which is crucial at this time of ongoing economic uncertainty. It helps us avoid large-scale cuts to services, and means that we will commit £3.6bn to capital investment over the period, with around £200m of new capital funding from Government beyond previously budgeted sources like business rates, which were devolved to the Mayor in 2017. The agreement also allows us to increase our asset

renewal programme to help ensure our network remains reliable, and means we can restore our Healthy Streets programme, making our roads safer, and more attractive for those walking and cycling.

- 8.5 However, the support offered by Government left an unfunded gap in our budget, which we have been working hard to identify how we will fill. This work has made good progress and we are confident that we will achieve an outcome that allows us to balance our budget and maintain our minimum cash balance. We will need to progress with our plans to further modernise our organisation and make ourselves even more efficient, and we will still face a series of tough choices in the future, but London will move away from the managed decline of the transport network.
- 8.6 Projects like the Elizabeth line, Barking Riverside extension on London Overground and Northern line extension are examples of transformative projects making a big difference. These projects support the regeneration of the entire area with plans for 10,000 new homes, communities and business spaces and adds to the list of innovative projects that places TfL firmly as a strong, green heartbeat for London.

Responsible Procurement

- 8.7 TfL has approved the GLA Group Responsible Procurement Implementation Plan (RPIP), which includes various ambitions and reporting metrics, as well as five key targets. The GLA Group will:
- (a) apply a minimum weighting of 10 per cent of the total tender evaluation score allocated to responsible procurement and social value;
 - (b) create 500 supply-chain apprenticeship starts per annum, with progress towards apprentices reflecting London's diversity;
 - (c) work towards purchasing 20 per cent of goods and services from small and medium-sized enterprises (SMEs), directly or indirectly within the supply chain;
 - (d) double the number of GLA Group suppliers accredited to the Good Work Standard, from 26 to 52; and
 - (e) require every new contract over £5m in value to produce an organisational Carbon Reduction Plan; and we will include evaluation criteria in these tenders to encourage bidders to demonstrate their contribution towards London's ambition of being net-zero by 2030.
- 8.8 The RPIP also commits TfL to further ambitions, targets and reporting metrics to demonstrate delivery of the Mayor's Responsible Procurement Policy. These include, but are not limited to:
- (a) training all Procurement and Commercial staff in Carbon Literacy by the end of the Mayoral term;
 - (b) reporting the number of London Living Wage beneficiaries in the supply chain;

- (c) driving the creation of green skills and employment through procurement activity; and
 - (d) working with medium to high-risk suppliers of modern slavery to ensure they achieve a score of 70 per cent in the Government's Modern Slavery Assessment Tool
- 8.9 TfL is a signatory to the London Anchor Institutions' Charter addressing the five objectives of the London Recovery Board through procurement and recruitment activity. This includes opening contract and job opportunities to micro, small and diverse businesses. A trial to reserve specific contracts for Small & Medium Enterprises is currently underway as well as a review of indemnity insurance and other requirements that create barriers for small and diverse businesses.
- 8.10 The Supplier Skills team delivered its annual supply chain apprenticeship fair in February 2022, connecting suppliers with those looking to enter the transport industry. In person pre-employment programmes recommenced in June 2022, Women into Transport and Engineering is being delivered with Alstom, BAI Communications and ADComms. The team also reported 868 new supply chain apprenticeship starts in 2021/22 (53 per cent from a BAME background and 23 per cent were women).

Financial stability

Financial performance: year-to-date, 2022/23

- 8.11 Our 2022/23 Budget sets the trajectory to achieve financial sustainability from April 2023: Quarter 1 financial performance for 2022/23 is on track against Budget, with passenger income, other operating income and operating costs close to Budget. .
- 8.12 Our cash balances are expected to average £1.2bn over the remainder of the year, in line with the new funding agreement with government. Passenger journeys continue to recover: The most recent data shows total journeys were 81 per cent of pre-pandemic levels in Period 5 (period ending 20 August 2022), up from 68 per cent at the end of last year. Elizabeth line journeys are 14 million higher than budget following the earlier than expected opening in May 2022. We are still expecting passenger income to be broadly in line with Budget, with average demand of 80 per cent versus pre-pandemic level over the full year.

Security risk management

- 8.13 TfL is a key player in the safety and security of London with the maintenance and operation of a transport network, that employs thousands and transports millions of people. We take a holistic approach to the threats we face, and proactively strengthen our defences by optimising the inter-relationship between physical, personnel and cyber security measures to protect customers and colleagues from hostile and deliberate actions that cause harm. We actively measure our progress to continually improve our security maturity which monitors our critical pathway progress. We have regular

access to threat briefings which informs our planning and decision making to ensure our security defences are robust.

8.14 We are continuing to progress our Security Improvement Programmes across our organisation and are delivering the Security Governance and Culture programme, all of which will play a vital role in responding to Security threats across our business. We continue to refresh our understanding and risk management of corporate vulnerabilities, and take on board best practice learning where applicable. For example, we have fully embraced, reviewed and responded to the Lord Harris report. We have a security policy where we commit to all colleagues owning security within their roles, with a focus on requiring colleagues to update / refresh their security knowledge through training and comms plans for the year. We also continue to work towards achieving full compliance with regulatory programmes, and we are in constant engagement with our DfT regulators and rail operators to achieve this.

Performance Metrics: Economy

8.15 Table 3 shows an update on our ‘Economy’ metrics compared to our first published report in 2021.

Table 3

Theme	Measure	2019/20	2020/21	2021/22
Economic impact	Number of new homes started on site	1077	178	467
Responsible Procurement	Number of new supply chain apprenticeship starts each year: including BAME and Women	619 (62%, 18%*)	524 (62%, 22%*)	868 (69%, 22%*)
	Number of job starts: including previously workless	1,027 (46%*)	677 (42%*)	1,314 (43%*)
Security Risk Management	Number of colleagues undertaking fraud awareness training	1,828	6,181	4,108

* Of those who disclosed

9 Embedding Sustainability across TfL

9.1 Sustainable development is core to our purpose. Our strategies, plans and regular reporting on sustainability performance are centred around the principles of:

- (a) social development;
- (b) improvement of the environment; and
- (c) economic development

9.2 We are working to improve the understanding of our colleagues with regards to sustainability and how to apply its principals and contribute toward progress

against our sustainability performance metrics through training, communication, discussion and system improvements.

- 9.3 **Vision and Values:** Our new Vision and Values was created from the ground up with input from thousands of colleagues from every part of TfL. The roadmaps contained in our Vision and Values plan map perfectly with the pillars of sustainability: Colleague and Customer (society pillar), Green (environment pillar) and finance (economy pillar).
- 9.4 This was not by design; this is what emerged from the collaborative and collective process we used to produce the Vision and Values. This suggests that our colleagues, when asked, what their vision for the organisation is, it is a vision of sustainability. Therefore, implementing and strengthening our Vision and Values is key to improving our performance on sustainability.
- 9.5 We are working to embed our Vision and Values, and therefore sustainability, throughout our governance and processes. This includes applying it to the development of our next business plan and the prioritisation of our investment.
- 9.6 To ensure we maintain a particular focus on sustainability, and we are able to drive this agenda with sufficient detail, we have established a Sustainability Sub-Group of the Executive Committee, which is chaired by our Chief Safety, Health and Environment Office and our Chief Capital Officer as the deputy chair. The group, which will meet regularly and include senior representation from across TfL, will be responsible for tracking and driving progress against our environmental ambitions and targets.
- 9.7 **Executive Sustainability Training and Sustainability Summit:** In November 2022, we will be running sustainability training for the TfL Executive Committee. The training will be hosted at a local social enterprise (to be confirmed) with a briefing and workshops sessions run by Will Day, Sustainability Advisor to PricewaterhouseCoopers UK. Will is also a fellow of the University of Cambridge Institute for Sustainability Leadership and previously sat on the UK's Sustainable Development Commission.
- 9.8 Following this, we will explore how to best roll out this training to all of TfL's senior leaders as well as making the key messages, information and tools available to everyone in TfL. This will complement our Carbon Literacy training programme discussed at paragraph 5.6.
- 9.9 To support this, we are also planning a TfL Sustainability Summit in 2023. It will be internally focused, similar to TfL's Anti-Racism Journey event held on 9 June 2022. It will help us to continue to build momentum and strengthen our engagement and understanding amongst TfL colleagues in relation to the issues of sustainability. Importantly, it will encourage our people to have brave conversations about some of the more challenging aspects of sustainability and bring their whole selves to work.
- 9.10 **TfL Youth Panel Exploration:** Over the summer we are supporting the TfL Youth Panel to undertake an 'exploration' into issues of diversity, inclusion and equality and how it interacts with environmental sustainability. The intention is to complete evidence gathering, hearings and research over the

summer and present initial findings to the TfL Executive Committee in the autumn. Following this, a report will be finalised and published.

9.11 The objectives of the exploration are:

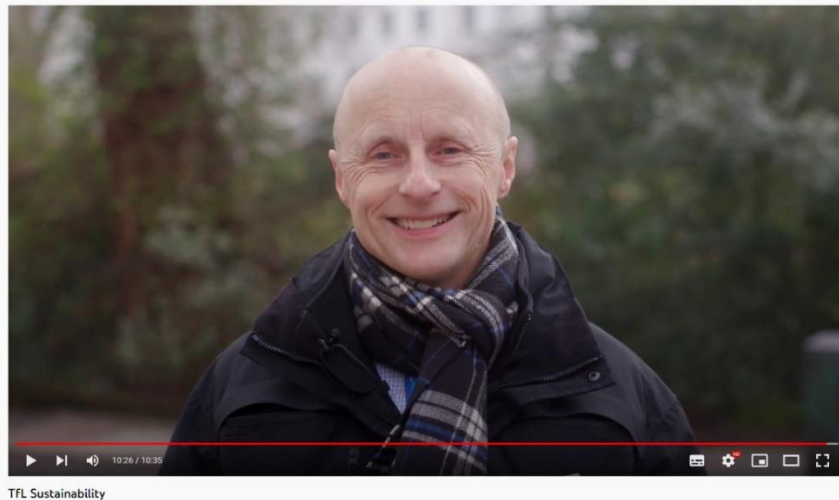
- (a) development opportunity for the TfL Youth Panel and TfL staff;
- (b) collation and synthesis of the latest evidence and research in relation to the exploration topic, which can then be used for communication, engagement and upskilling across TfL;
- (c) identification of specific issues in relation to TfL activities, purpose and objectives;
- (d) identification of specific policy recommendations for TfL; and
- (e) promotion of TfL as a forward thinking and attractive purpose-driven organisation.

9.12 **Sustainability Staff Network:** Our Sustainability Staff Network Group continues to go from strength to strength, with over 400 active members and growing. It celebrated its second anniversary on the 16 June 2022. The consensus of the group is that we need to continue to share, learn and support each other, and encourage colleagues to be brave in creating space for conversations about the sometimes-difficult sustainability challenges we face.

9.13 Events run by the TfL Sustainability Network have included presentations and discussions led by TfL experts on London's 2030 Electric Vehicle Infrastructure Strategy, ULEZ, how to be a 'Sustainability Champion', Circular Economy and Responsible Procurement. We also hosted external speakers, including from Regen, who are not-for-profit energy experts and have been working with National Grid ESO to examine the question of decarbonising UK's electricity grid by 2035.

9.14 **Sustainability video:** At the start of London Climate Action week, we launched a 10-minute video on TfL's approach to sustainability. The video was shared internally and across TfL social media (LinkedIn and YouTube). The video describes our sustainability approach set out in TfL's first ever Sustainability Report published last September. It brings to life what we do across all three pillars (social, environment and economy) of sustainability. The video is available on the sustainability page of the TfL website⁴.

⁴ <https://tfl.gov.uk/sustainability>



- 9.15 We are planning more video content to engage customers, stakeholders and potential job applicants on our sustainability agenda. As part of this we will be working with the TfL Youth Panel to generate engaging ideas and involve them in the development of video content. We are keen to promote TfL as a purpose-driven organisation that puts sustainability at the core of everything it does.
- 9.16 **Green skills talent pipeline:** We know that the green skills sector is rapidly growing and in the future all jobs will have an element of 'green' as we move toward sustainability. TfL needs to ensure it is getting the message out there that we are leading the way on many areas in relation to sustainability, and as well as being a great place to work with lots of opportunities for development, it also has huge scope and ability to deliver for the environment. To help with developing a talent pipeline of potential job applicants, we are in the process of building a micro-site to promote the potential for people joining TfL to work on many aspects of sustainability and to encourage potential future applicants to register their interest so we can proactively contact them as suitable roles are advertised.
- 9.17 We are in the process of retendering for suppliers across all our apprenticeships and we have included a requirement that they all include sustainability as part of the skills, knowledge and experience they provide. In addition, we included some sustainability and corporate social responsibility specific apprenticeships within the tender scope, such as ST0934 Corporate Responsibility and Sustainability Practitioner (Level 4) which will have the broadest appeal across TfL. We are working to set up a new sustainability focused graduate and apprenticeship scheme with new intake starting in September 2023.

List of Appendices:

None

List of Background Papers:

TfL Sustainability Report & Corporate Environment Plan:

<https://tfl.gov.uk/sustainability>

Safety, Health and Environment Annual Report: <https://content.tfl.gov.uk/safety-health-and-environment-annual-report-2021-22.pdf>

Expanded Ultra Low Emission Zone: Six Month Report:

https://www.london.gov.uk/sites/default/files/expanded_ultra_low_emission_zone_six_month_report.pdf

Vision Zero Action Plan: <https://tfl.gov.uk/corporate/safety-and-security/road-safety/vision-zero-for-london>

Workplace Violence and Aggression Plan: <https://content.tfl.gov.uk/sshrp-20210630-agenda-and-papers-public-website.pdf>

Mayor's Violence Against Women and Girls Strategy:

<https://www.london.gov.uk/mopac-publications-0/mayors-violence-against-women-and-girls-strategy>

TfL Adaptation Report Power Submission 2021: <https://tfl.gov.uk/sustainability>

TfL's Equality Objectives: <https://content.tfl.gov.uk/our-equality-objectives-november-2021.pdf>

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Safety, Sustainability and Human Resources Panel



Date: 16 November 2022

Item: Direct Vision Standard and Safety Permit Scheme for Heavy Goods Vehicles

This paper will be considered in public

1 Summary

- 1.1 In September 2016, the Mayor announced plans to introduce the world's first Direct Vision Standard (DVS) for Heavy Goods Vehicles (HGVs) designed to reduce the danger posed by HGVs to cyclists and pedestrians.
- 1.2 TfL's Freight and Servicing Action Plan and Vision Zero Action Plan include a commitment to introduce DVS and the HGV Safety Standard Permit Scheme by 2020, and to further tighten safety standards from 2024.
- 1.3 The purpose of this paper is to inform the Panel on the outcomes of the introduction of the first phase of the DVS scheme which was launched in October 2019 and to update on progress being made to develop and implement Phase 2 of the DVS and HGV safety permit scheme.

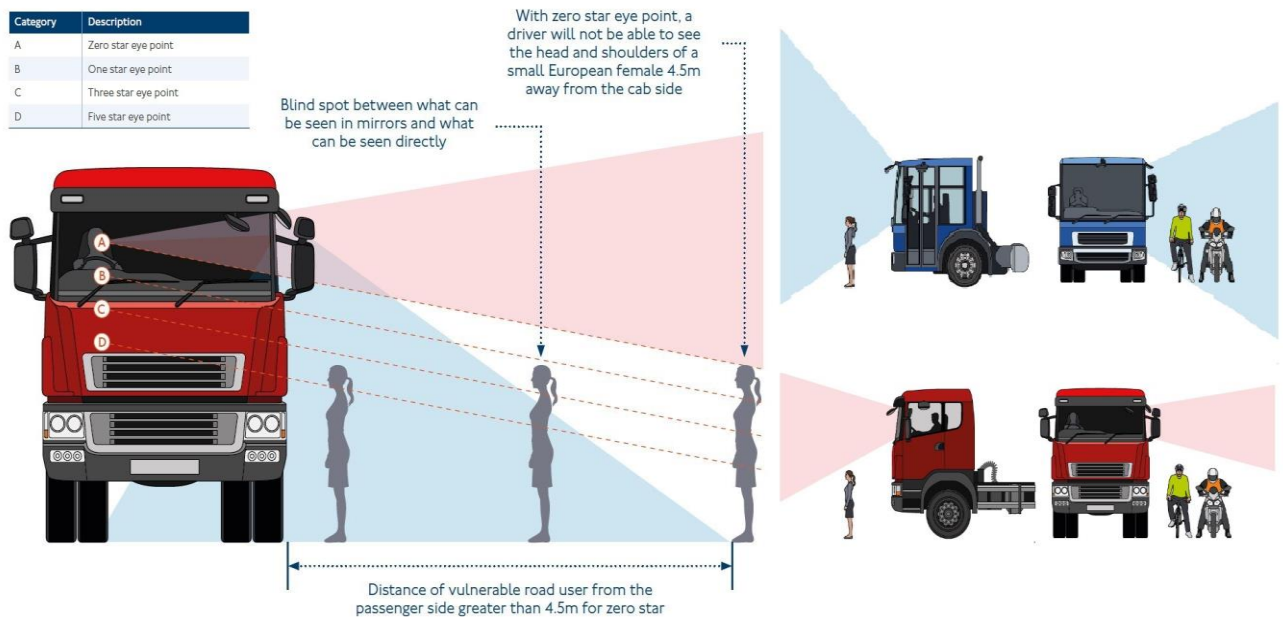
2 Recommendation

- 2.1 **The Panel is asked to note the paper.**

3 Background

- 3.1 HGVs are involved in a disproportionate number of fatal collisions involving people walking and cycling. Between 2015 and 2017, HGVs were involved in 63 per cent of cyclist deaths and 25 per cent of pedestrian deaths, yet they made up just five per cent of traffic on London's roads network.
- 3.2 To tackle this issue, the Mayor committed to launch the world's first DVS for HGVs over 12 tonnes operating in Greater London.
- 3.3 Restrictions in the HGV driver's field of vision, or 'blind spots', are a significant contributory factor in collisions between HGVs and vulnerable road users (VRUs). DVS seeks to improve drivers' direct vision through the cab windows of HGVs and prevent collisions caused by limited visibility. The amount of vision which can be seen from the cab is associated with a star rating from zero to five, with 'zero star' being the lowest and 'five stars' the highest. Figure 1 shows a picture of a zero star rated vehicle and a five star rated vehicle.

Figure 1: Sight lines from a zero star rated HGV cab and a five star HGV cab



- 3.4 To operate HGVs over 12 tonnes in Greater London, operators must apply and obtain a Safety Permit by demonstrating the star rating of the vehicle, which can be obtained from the manufacturer.
- 3.5 Those HGVs which do not meet the minimum DVS rating (currently one star) must provide evidence that they have met the Safe System requirements, which is a condition of the Safety Permit.
- 3.6 Current Safe Systems requirements include fitting safety interventions such as side cameras, audible warning systems and side-underrun protection to improve indirect vision, warn other road users and minimise the impact of a hazard.
- 3.7 The DVS and HGV safety permit scheme was launched in October 2019 and the scheme's enforcement began on 1 March 2021. Operating an HGV without a valid Safety Permit or in breach of its conditions may result in a penalty charge notice of up to £550 (reduced to £275 if paid within 14 days). Enforcement of the scheme was delayed to allow the freight industry sufficient time to overcome supply chain issues and additional demands placed on the industry, caused by the coronavirus pandemic.
- 3.8 The 2019 Freight and Servicing Action Plan commits TfL to raise the minimum direct vision threshold from one-star to three-stars from October 2024 to ensure any developments in technology are considered. A consultation on any changes to the Safe System will be held in advance of any changes.
- 3.9 In January 2022 TfL commissioned Loughborough University to undertake a review of the existing Safe System and make recommendations for further safety improvements. The updated Safe System, referred to as 'Progressive Safe System' will apply to all HGVs more than 12 tonnes that are rated zero, one or two-stars.

- 3.10 This review has recently been completed by Loughborough University and has highlighted the need for further safety improvements as a result of advancements in technology. A consultation with industry on the Progressive Safe System is planned between February and March 2023.
- 3.11 The details of the Progressive Safe System will be published in Summer 2023 and applied to zero, one and two-stars rated vehicles from October 2024.

4 Outcome of the first year of DVS enforcement and its wider impacts

- 4.1 During the first year of enforcement of the DVS and HGV safety permit scheme enforcement from 1 March 2021 to 28 February 2022 we saw the following:
- (a) a total of 191,769 Safety Permits were issued – the majority of these, 112,259, were to 'zero star' vehicles and 4,768 to 'five star' vehicles;
 - (b) average daily compliance with the scheme was very high, with more than 94 per cent of HGVs in London operating with a Safety Permit and hauliers reporting that they are building DVS requirements into future purchasing decisions;
 - (c) the number of fatal collisions involving an HGV where vision was cited as a contributory factor has fallen compared to previous years (six in 2021, compared to eight in 2020 and nine in 2019), although this needs to be considered in the context of the pandemic. The overall number of serious injuries involving HGVs has also fell from 48 in 2017 to 17 in 2021; and
 - (d) 'zero star' rated vehicles accounted for four of the six fatal collisions in 2021 where vision was cited as a contributory factor. This indicates that direct vision offers benefits over other Safe System equipment, which further points to the need to further raise the minimum direct vision threshold to 'three-stars'.
- 4.2 Early indications are that the DVS and HGV Safety Permit scheme is having an impact on collisions where sight is a causation factor.
- 4.3 The scheme has been recognised by the EU as best practice and EU regulation 2019/2144, which came into effect on 6th July 2022 following TfL's and others lobbying on regulatory change, requires all 27 member states to consider direct vision from HGV cab windows as a tool to reduce fatalities.
- 4.4 The United Nations Economic Commission for Europe has also cited DVS as a best practice example for how countries across Europe can reduce road deaths.

5 Progress being made to implement the Progressive Safe System and raise DVS standards from October 2024

- 5.1 As technology has evolved since 2019, we commissioned a review of the Safe System requirements, undertaken by Loughborough University between January and September 2022.

- 5.2 The findings of this review, which included a series of industry workshops, are informing our current proposals for the PSS requirements for October 2024.
- 5.3 PSS proposals are currently being finalised and will be subject to an Integrated Impact Assessment, followed by a stakeholder consultation in early 2023. We will report on that consultation in the spring with final details of the PSS expected to be published by summer 2023. Subject to consultation, the new PSS, along with raising the minimum rating requirement from 'one star' to 'three stars', will take effect from October 2024.
- 5.4 As mentioned below TfL operates and enforces the DVS Scheme under a delegation from London Councils Transport and Environment Committee (TEC). We will submit a request to the TEC at its meeting on 8 December 2022 for permission to undertake a consultation on the proposed PSS measures. TfL will report back to the TEC on the outcome of the consultation and what measures are recommended by it should form the PSS, which the TEC will have to approve.
- 5.5 We are currently in the process of discussing operational and technical requirements to ensure our ability to deliver Phase 2 of the scheme, which until September 2022 did not have confirmed funding.

6 Legal Implications

- 6.1 The DVS is operated by TfL under a delegation from the and is established under a traffic regulation order (TRO) that applies across Greater London for which the TEC is the traffic authority. That TRO establishes the legal requirement for HGVs over 12 tonnes (subject to certain exceptions) to obtain a Safety Permit to operate in London. A policy statement approved by the TEC under the TRO imposes a requirement that all HGVs that are rated as zero star under the DVS system must fit Safe System additional safety measures (subject to certain exceptions and relaxations), and that from October 2024 all HGVs that are rated between zero and two stars (inclusive) must fit the PSS measures. The requirement to fit these additional safety measures is a requirement of conditions attached to the Safety Permit. TEC's approval must be sought for TfL to consult stakeholders on proposed PSS measures. TfL will report back to it to obtain approval to the necessary changes to the Policy Statement and Safety Permit conditions to implement the PSS.

List of appendices to this report:

None

List of Background Papers:

June 2021, TfL: [DVS one year on report](#)

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This paper will be considered in public

1 Summary

- 1.1 In 2021, we published an update to the 2018 Vision Zero Action Plan. The progress report was intended to update the 2018 Action Plan with the latest evidence and reaffirm actions to 2023/24. The Action Plan is part-way through delivery and continues to guide our road danger reduction activity.
- 1.2 This paper outlines progress against these actions and puts them into context against road safety trends that have emerged since the pandemic.
- 1.3 This paper also includes a spotlight on an action delivered since publication of the refreshed document: Action 27, the impact of installing Intelligent Speed Assistance within our own fleet.

2 Recommendation

- 2.1 **The Panel is asked to note the paper.**

3 Background

- 3.1 London has a long history of tackling road danger, and in 2018 took a bold step forward with its commitment to Vision Zero, pledging to eliminate deaths and serious injuries from London's streets by 2041. This ambition now applies to all our safety activity in the organisation, including customer and workforce safety.

4 Our stakeholders

- 4.1 Our primary audience for this work was our partners in the boroughs and the police, and external stakeholders we work closely with in shaping our approach to road danger reduction. The progress report included case studies from our partners in the boroughs, businesses, schools and others, showing how they were delivering measures to reduce road danger and celebrating their achievements.
- 4.2 We launched the Vision Zero document with the Transport & Environment Committee (TEC) of London Councils. The TEC Chair, the Commissioners of TfL and the Metropolitan Police Service (MPS) contributed a joint foreword in addition to the foreword from the Mayor.

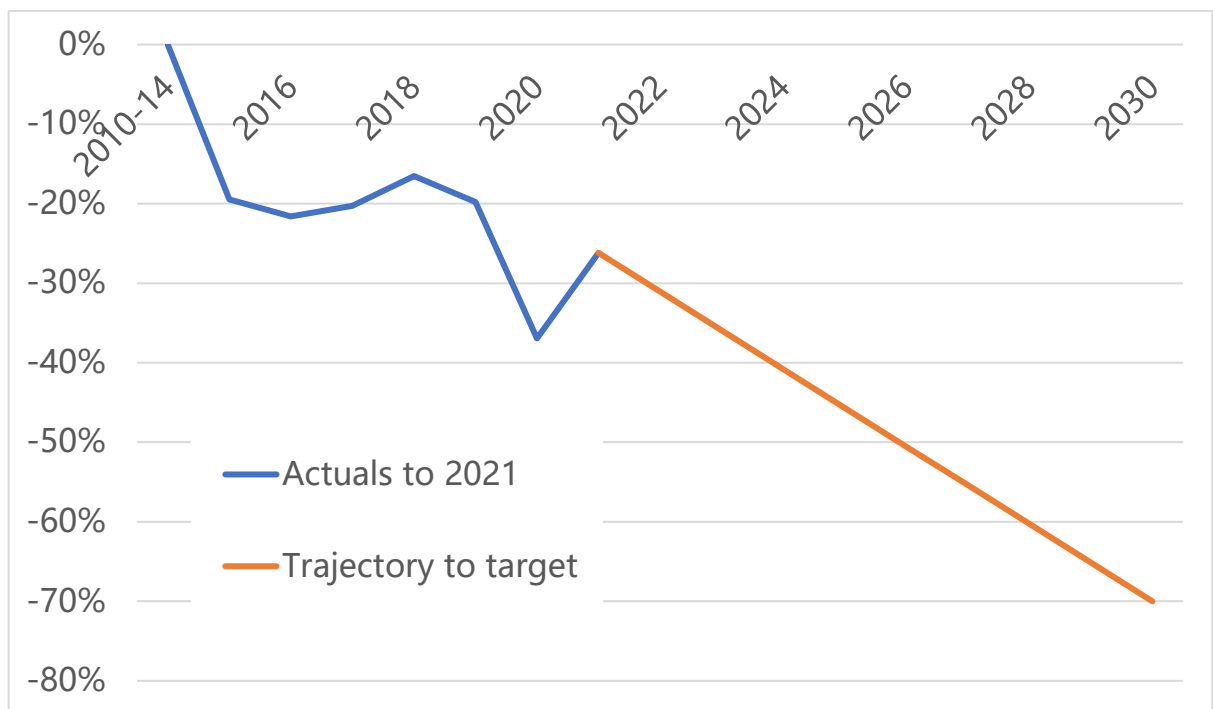
- 4.3 The joint foreword included ‘five asks’ for all London boroughs: lower speeds to 20mph, reduce traffic, redesign streets with safety in mind, promote active travel and introduce safe vehicle standards through suppliers and fleets. These five asks have provided us with a clear framework to engage with boroughs and campaigners as we work towards delivering Vision Zero in London.

5 Road safety trends emerging since publication

Long term trends

- 5.1 Our objective for roads is to reduce deaths and serious injuries by 65 per cent by 2022, 70 per cent by 2030 and for all deaths and serious injuries from road collisions to be eliminated from London’s streets by 2041. Our target for buses is for a 70 per cent reduction in people killed or seriously injured in 2022, and for nobody to be killed or seriously injured on or by a bus by 2030. The 2018 Action Plan outlines the Safe Systems framework we have adopted to work towards those goals.
- 5.2 We have seen good progress in road safety improvements but there is further to go. In 2021, the number of people killed on London’s roads fell substantially to the lowest level on record. There was a 22 per cent reduction in fatalities between 2020 and 2021, and a 44 per cent reduction in Killed and Seriously Injured (KSI) casualties from the 2005-09 baseline towards the MTS (Mayor’s Transport Strategy) target of a 65 per cent reduction by 2022. For children (0-15) we have seen a 68 per cent reduction. We met our target to reducing KSI casualties involving a bus 70 per cent for two years running (in 2020 and 2021), earlier than our interim date of 2022.
- 5.3 Since the pandemic, there has been a change in the type of road users experiencing collisions and injury on the road network. We have seen a reduction in KSI casualties while walking or using a motorbike, and a reduction in the number of people killed while cycling, but a rise in the number of people seriously injured while cycling. This is all in the context of large changes of who uses the road network, when and where. We are continuing to monitor these trends and to further understand them, while continuing to focus on reducing the harm to people walking, cycling, and motorcycling, who remain the most vulnerable on our roads.
- 5.4 Despite this change, the underlying headline trends in road danger remain the same: around 80 per cent of people killed or seriously injured were walking, cycling or motorcycling; cars are the biggest source of harm, followed by HGVs and motorcycles which pose a disproportionate risk to other road users. Buses remain the safest way to travel on the roads.
- 5.5 Figure 1 highlights the trajectory needed to meet our strategic 2030 and 2041 targets.

5.6 Figure 1 – Trajectory to our 2030 interim Vision Zero target



6 Progress on actions

Overview

- 6.1 There were 36 actions set out in the Action Plan, grouped under the five pillars of the Safe System. By delivering these actions, we would expect progress towards delivering our 2030 interim target and 2041 Vision Zero goal.
- 6.2 We have made notable progress since our original Vision Zero action plan was published and we continue to work through our actions, while adding new targets and initiatives. We are proud of what we have delivered together so far. London's world-first Direct Vision Standard, which we introduced to reduce lethal blind spots on lorries, is now being enforced on all roads in London, and TfL's ground-breaking bus safety standard is mandating the latest safety technologies and designs on all new buses. Working in partnership with the boroughs, we have delivered 260km of safer, high-quality cycle routes, improved 43 dangerous junctions, delivered more than 100 Low Traffic Neighbourhoods and introduced 372 School Streets, where roads are closed at certain times to traffic to encourage more children to walk, cycle or scoot to school.
- 6.3 We continue to engage with Government on changes requiring Governmental approval or legislation such as vehicle standards (national adoption of EU General Safety Regulation), a lower default urban speed limit, motorcycle training standards and changes to who can enforce road offences and how.
- 6.4 The following provides a high level overview of progress on actions as set out in the Action Plan.

Safe Speeds

- 6.5 Lowering speeds remains one of the most important things we can do to reduce road danger. It also makes our streets less dominated by motor vehicles, more attractive for walking and cycling and reduces noise, pollution and carbon emissions, which is why we are on track to deliver 140km of lower speeds to the TLRN by 2024. We have engaged with the Government on lowering the default urban speed limit on residential roads and are encouraging boroughs to adopt a default 20mph limit.
- 6.6 To improve compliance with speed limits, we have optimised where speed cameras are deployed and have enhanced enforcement activity, so that we will meet the commitment to have the ability to enforce increased numbers of contraventions if needed by up to one million offences by 2024. The delegation of enforcement powers to Police Community Support Officers will be granted soon when the new Met Commissioner signals his intent, which we hope will be received shortly. The Command's PCSOs play a significant role in reducing road danger. There is more they, and other PCSOs, could do to tackle speeding if they had the powers to stop and deal with speeding drivers at the roadside.

Safe Streets

- 6.7 Our recent funding deal with the Government has given us more certainty to deliver enhancements to our road network. We have reduced danger at junctions with 43 Safer Junctions and plan to deliver an additional three Junctions by 2024, and undertake feasibility and engagement on a further 10 Safer Junctions schemes by 2024, to address our most dangerous junctions.
- 6.8 Further pedestrian crossings and safety improvements will be delivered, as well as the continued roll out of the cycle network. We have continued to fund the boroughs to deliver schemes that contribute to Vision Zero.

Safe Vehicles

- 6.9 In 2021, we launched the Direct Vision Standard for heavy goods vehicles (HGVs). It is a world-first, industry leading lorry safety permit scheme, applicable to freight operators in London. It measures the driver's direct field of vision from their cab and rates it from zero to five stars, with those rated zero having to retrofit additional safety features to enhance the drivers view of hazards in an urban setting. We plan to further tighten the standard by 2024. We have engaged with the European Union and manufacturers to adopt these standards as part of the General Safety Regulation for all new vehicles sold in Europe. We have also committed to make all vehicles in the GLA supply chain FORS (Fleet Operator Recognition Scheme) Gold standard accredited by 2024, updated planning guidance to recommend CLOCS (Construction Logistics and Community Safety) silver standard.
- 6.10 We continue to call on the Government to support full adoption of the EU General Safety Regulation (GSR) making the latest safety technologies mandatory in all new vehicles in the UK from 2024.

- 6.11 We are also leading the Bus industry in our efforts to make buses the safest in the world. A number of enhancements that improve safety are being installed as standard on new vehicles. These include intelligent speed assistance, acoustic vehicle alerting systems for quiet running vehicles; non-slip flooring to reduce passenger slips, trips and falls; pedal indicator lights to reduce instances of pedal confusion; and blind spot mirrors to increase visibility of vulnerable road users are being installed as standard on new vehicles. However, the pace of installing technology has been constrained by global supply chain issues and our funding envelope. Nevertheless, we have also taken tough measures to improve safety by combatting bus driver fatigue, including ensuring that all managers in bus garages have undertaken fatigue training. All ten London bus operators now have a Fatigue Risk Management System, and in partnership with our Operators we have introduced programmes to improve Health and Wellbeing of drivers.
- 6.12 We recently wrote to London borough councillors and shared with them a video with our five Vision Zero asks of boroughs. One of the asks in the video is for boroughs to manage work related road risk through adoption of the FORS & CLOCS Standard into their contracts and operations. Boroughs can manage work related road risk through FORS & CLOCS as part of their Local Implementation Plans. The most recent LIPS guidance (2022) includes provision for this.

Safe Behaviours

- 6.13 Collectively, we need to work towards a culture of safer driving, which must be addressed to help us achieve Vision Zero. More than 90 per cent of collisions on London's roads are linked to unsafe driving behaviours. We have continued to improve behaviours on the roads with the MPS focusing on the most dangerous drivers, using highly visible patrols deployed based on casualty data and local intelligence. We are working with the Government to improve education and training, particularly motorcycle training, and have launched targeted publicity and campaigns to continuously reinforce messages on Vision Zero.
- 6.14 Enforcement has a critical role in challenging the culture of those drivers who think speeding is a victimless crime. Speed enforcement in London currently uses a combination of on-street officers, fixed-site digital cameras and mobile speed enforcement vans. The new three-tiered approach to enforcement is now in place and provides the framework for how officers are deployed. This is supported by a new risk-based analytical approach to help prioritise deployments and inform the tactics used, with an intensified focus on the most dangerous drivers and riders. The MPS have expanded their enforcement capacity, which means that up to one million speeding offences will be able to be enforced by 2024. This is being supported by 50 new redeployable cameras for civil enforcement of road traffic rules to tackle danger hotspots.
- 6.15 We are continuing to raise standards for professional drivers through education and training. For example, we have expanded FORS to include a standard for the motorcycle courier sector and are rolling out a programme of safety training for existing and new bus drivers. To improve the safety of

motorcycle riders and people walking and cycling, we have called on the Government to make road safety education part of the national curriculum and are working directly with the new motorcycle delivery companies to better understand how we can safeguard people who ride for work.

- 6.16 We have continued, in partnership with the MPS, to promote and engage the public on reducing road danger.

Post collision response

- 6.17 It is vital that we work with our partners to ensure anybody affected by a collision on our roads receives the support they need and deserve. In October 2022 we held a Victim Summit, attended by the Mayor of London, the Commissioner, and senior TfL leaders to hear first-hand the effects that road danger has on survivors and their families.

- 6.18 To provide justice to victims of traffic collisions we have become better at pushing through media channels the criminal justice outcomes of fatal and life-changing or life-threatening collisions that proceed to prosecution and have pushed for driving bans by magistrates for repeat offenders and those accumulating 12 penalty points on their license. We have also better signposted the most appropriate restorative justice and post-collision support service, such as the Sarah Hope Line to the victims of collisions.

- 6.19 Continual learning from collisions is essential to avoid similar incidents in future. We have enhanced evidence gathering training through new equipment and training at the MPS and have worked with bus operators on better information sharing. We are trialling new technology which allows the collection of data from vehicles and collision learning and are also bringing together Original Equipment Manufacturers, innovators and key stakeholders to focus on how innovation through emerging technologies could be applied in vehicles to support our road safety objectives. We have also responded to the Government consultation on creating a road accident investigation board and we welcome their decision to progress with this.

- 6.20 People from more deprived backgrounds are less likely to own a car and more likely to live in areas with high exposure to traffic and road risk, air pollution, noise and community severance caused by traffic. These Londoners are also more likely to walk for longer, and if they do own a motorised vehicle, are more likely to drive or ride for work, putting them at greater risk. We are working to highlight the link between deprivation and poor road safety outcomes, and using that data to prioritise road safety interventions, including by sharing that information with the boroughs. We intend to publish this data by the end of 2022.

Our Performance

- 6.21 It is vital that TfL leads by example, using the safest vehicles and ensuring that staff using its vehicles always demonstrate exemplary driving behaviours.

- 6.22 TfL started retrofitting Sturdy speed limiting technology to our commercial vehicle fleet in 2021 as a key part of our fleet safety programme and with the aim of reducing speeding across the fleet. We completed the fitment of active ISA units to 360 vehicles in our fleet in March 2022.
- 6.23 The ISA system limits uses GPS positioning to limit the speed of the vehicle to the prevailing local speed limit. It is fitted with a time-limited override capability which enables drivers to override the system in case of errors or loss of signal.
- 6.24 An evaluation of the effectiveness of the retrofit programme has been carried out by Apollo, an independent consultancy. Apollo examined approximately two years' worth of trip and safety incident data from June 2020 to July 2022 to determine how effective the technology has been in reducing speeding in our fleet. The results have been extremely encouraging. Some of the key findings included:
- (a) a 62 per cent reduction in speeding incidents amongst vehicles fitted with ISA;
 - (b) a reduction in speeding incidents observed across all speed limits;
 - (c) no increase in the number of harsh braking, harsh cornering, or harsh acceleration incidents, alleviating concerns that the ISA fitment may have unintended consequences in terms of driving style;
 - (d) no significant change to the number of trips taken by vehicles after ISA was fitted, suggesting that ISA vehicles are not being avoided; and
 - (e) the average distance travelled and average journey time taken for each trip was largely unaffected by the fitment of ISA, helping to refute the misconception held by many that speeding will get you to your destination significantly sooner.
- 6.25 These positive results will help make the strategic case for the inclusion of ISA technology in our fleet and more widely in London, and in other fleets and vehicle standards, helping us to achieve our Vision Zero ambition. We will be looking at including ISA technology as part of our specification for new TfL vehicles alongside our move to a zero emission fleet.

List of appendices to this report:

None

List of Background Papers:

None

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Date: 16 November 2022

Item: SHE Vision Zero Plan for TfL's River-Based Operations

This paper will be considered in public

1 Summary

1.1 As part of the Mayor's Transport Strategy, our Vision Zero ambition is to eliminate death and serious injury on the public transport and road networks by 2041. Our vision is to be London's Strong Green Heartbeat, delivering a sustainable, healthy and safe City where our operations are free from harm. TfL's river-based operations have grown with the addition of the Woolwich Ferry as a TfL-run service. We are proposing a Safety, Health and Environment (SHE) Vision Zero Plan for TfL's River-Based Operations.

2 Recommendation

2.1 The Panel is asked to note the paper.

3 Background

3.1 At the start of 2019/20, London River Services (LRS), TfL's only river-based operation at the time, launched its own internal Safety, Health and Environment plan which included 15 actions to support the continued growth of safe and sustainable travel on the river. All actions were delivered on time.

3.2 The proposed SHE Vision Zero Plan for TfL's River-Based Operations builds on the Mayor's River Action Plan from 2013, and TfL's SHE plan from 2019/20, with the inclusion of the Woolwich Ferry service which was brought in-house from January 2021 as part of our continued journey in line with the Mayor's Transport Strategy.

4 SHE Vision Zero Plan for TfL's River Based Operations

4.1 The SHE Vision Zero Plan for TfL's River-Based operations (the Plan) sets out Woolwich Ferry and LRS's path to Zero Harm in their respective operations through three areas of focus (pillars): Health and safe behaviours; Safe and sustainable assets; and Safe and sustainable operations. TfL has many strengths, including external partnerships and internal control, to help its river-based operations to contribute to delivering its vision. This plan sets out:

- (a) The current performance of the respective areas and how they are measured
- (b) Our priority risks, which have been evaluated both externally and internally and categorised by those we can control and those we can influence

- (c) Our approach to achieving the vision by assessing our priority risks against the three pillars and prioritising our top actions
- (d) How and when we intend to deliver on our actions in line with this prioritisation
- (e) How we will govern ourselves internally and also externally in collaboration with our partners across the Thames

5 Next steps

Governance: The Plan will be will be overseen by the TfL Operations SHE quarterly meeting and report into the sub-Exco Safety Group.

- 5.1 We will track actions and look to be flexible in our plan to ensure we continually improve and adopt to the ever-changing environment in which we operate.
- 5.2 Engagement: We have engaged and formulated this plan with involvement from internal stakeholders with and shared this with both the PLA and the Deputy Mayor's office.

List of Appendices:

Appendix 1: SHE Vision Zero Plan for TfL's River Based Operations

List of Background Papers:

None.

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SHE Vision Zero Plan for TfL's River Based Operations

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Purpose and Scope

Understanding the need for a SHE Vision Zero Plan for TfL's River Based Operations

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THE PURPOSE:

The success of London's future transport system relies upon reducing Londoners' dependency on cars in favour of increased walking, cycling and public transport use.

This plan brings together a focus on ensuring that through these operations TfL will work in line with the Mayor's Transport Strategy to provide a sustainable, healthy and safe city where its operations are free from harm.

THE SCOPE:

This plan looks to address the risks across our London River Services and Woolwich Ferry Service operations that TfL both have direct control over and can influence through external stakeholders and partners such as the Thames and London Waterways Forum.

Contents

Outline of the contents for the SHE Vision Zero Plan for TfL's River Based Operations which include:

London River Services (LRS)
Woolwich Ferry

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SHE Vision Zero Plan for TfL's River Based Operations

The plan sets out TfL's river-based operations' journey to Zero Harm.
The plan contains:

- The Vision
- Introduction to TfL's river-based operations
- Current performance based on our Safety Performance Indexes (SPIs)
- Evidencing & Understanding our Priority Risk Areas
- The Framework to achieve our Vision
- Continuous Improvement Action towards our Vision
- Governance
- Appendices

The TfL Vision for River Based Operations



The Vision

To meet MTS and LES ambitions of making London a sustainable, healthy, and safe city, where all our operations must be free from harm (Zero Harm).

For our River Based Services and Operations, our Vision is underpinned by our pillars:

- a) Healthy and Safe Behaviours
- b) Safe and Sustainable Assets
- c) Safe and Sustainable Operations

THE VISION: As part of The Mayor’s Transport Strategy, our Vision Zero ambition is to eliminate death and serious injury on the public transport and road networks by 2041. Our vision is to be London's Strong Green Heartbeat, delivering a sustainable, healthy and safe city where our operations are free from harm – ZERO HARM

- **MTS Policy 11:** All parts of the public transport network will play an important role in achieving Vision Zero, eliminating deaths and serious injuries from London’s transport system by 2041.
- **The London Environment Strategy (LES),** also published in 2018, brings together an action plan for every aspect of London’s environment. It recognises that the environment has a big influence on the quality of Londoners’ lives and challenges everyone, especially those that provide services in London, to be cleaner, greener and ready for the future. The ambition is for London to be a net zero carbon city by 2030.
- **TfL’s Safety Health and Environment policy** commitment states that “Our customers, employees and suppliers have an expectation that when using or delivering our services or assets they will remain harm free”.



Introduction to TfL's river-based operations:



Background

- a) TfL's internal SHE River-based operations plan launched in 2019/20 for LRS
- Size and scope of TfL's river-based operations grew in January 2021 which included Woolwich Ferries, hence the new proposed SHE Vision Zero Plan for River Based Operations

At the start of 2019/20, London River Services (LRS), TfL's only river-based operation at the time, launched its own internal Safety, Health and Environment plan which included 15 actions to support the continued growth of safe and sustainable travel on the river. All actions were delivered on time and by the end of 2019/20, annual passenger journeys were just over 10 million and have continued to grow despite the pandemic.

The current proposed plan takes this into account.

Changes to TfL's river-based operations since the 2019/20 SHE plan was delivered:

- Size- TfL now has 2 river-based operations. They are LRS and Woolwich Ferry, which became an in-house operation in January 2021
- Scope- TfL now operates a full passenger ferry service (motorised vehicles, including HGVs, cyclists and pedestrians); and safe, sustainable and well-connected piers

Introduction to TfL's river-based operations

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Activities across TfL's river-based operations are wide-ranging. Zero Harm in operations means being best-in-class across our accountabilities underpinned by our pillars:

- a) Healthy and Safe Behaviours
- b) Safe and Sustainable Assets
- c) Safe and Sustainable Operations

London River Services (LRS) has an important role to play in TfL's river-based operations as the team that manages contractual relations with other parties related to TfL's piers. This included managing the contract for operating Woolwich Ferry until January 2021 when it came in-house and ceased to be a contracted service. This change has meant that TfL now carries out all aspects of delivering a passenger service on the Thames. To manage the new risks that Woolwich Ferry operations bring, TfL has introduced competent marine personnel with extensive industry expertise to lead the operation, but there is work to do to address these new risks

The introduction of additional marine expertise strengthens TfL's ability to improve safety across its river-based operations and deliver Zero Harm by being best-in-class across specific accountabilities:

- **Woolwich Ferry:** maintaining a healthy and competent workforce (**Behaviours**); maintaining and operating safe infrastructure, including linkspans and vessels (**Assets**); operating safe passenger vessels (**Operations**)
- **LRS:** maintaining a healthy and competent workforce (**Behaviours**); maintaining and operating safe piers and external relationships (**Assets**)

Our strengths

Our river-based operations sit within the context of the wider Thames river. We work closely with important stakeholders on the Thames to continually reduce SHE risks on the river.

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Strengths within TfL's river-based operations

External partnership

- Represented on the Board of Thames Skills Academy
- Strong industry expertise in-house
- Collaborating with PLA to develop a river-wide view of SHE
- Valued member of Thames and Waterways Partnership Groups

Internal control

- TfL has control of its own operations on the river and has carried out a lot of work to improve SHE in both LRS and Woolwich Ferry.
- TfL promotes safety by discussing incidents and sharing lessons they have learned with licensed operators of River Tours, River Buses and Chartered vessels
- TfL has an in-house SHE team that provide objective, independent challenge and support to operational areas

How TfL's river-based operations Currently Measure Performance



Current performance

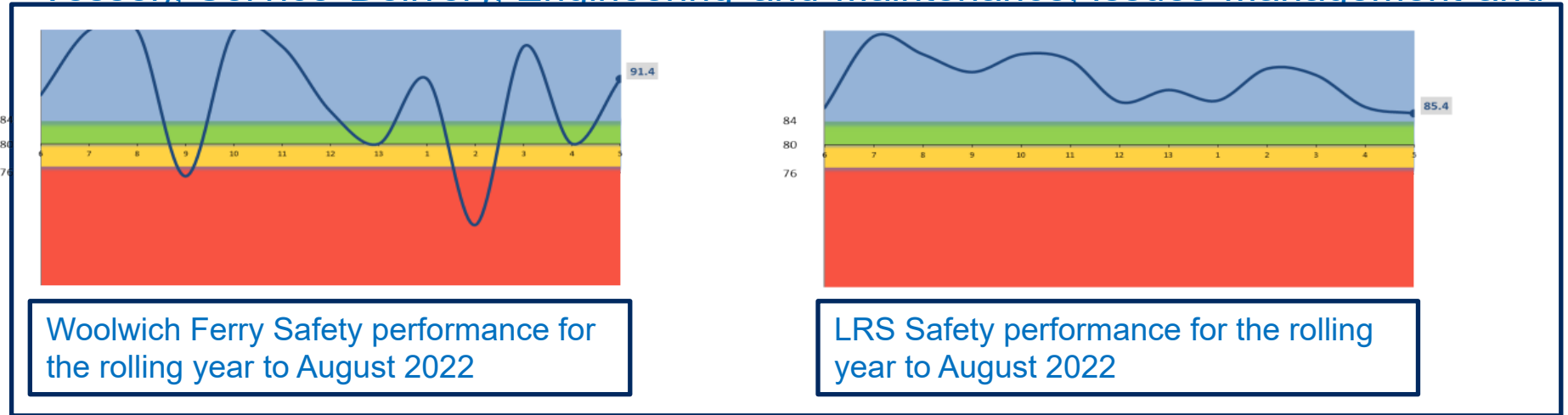
For the rolling year to August 2022, SHE performance across our river-based operations has been inconsistent. Engineering failures and the effects of the global pandemic have affected scores.

Local interventions and collaborative working have led to a decrease in incidents and improved SPI scores, which have been above the benchmark consistently since June 2022

SHE performance across our river-based operations

Safety performance is managed through Safety Performance Indexes (SPIs), which consist of leading and lagging indicators (examples shown below), continuously working to improve performance. The SPIs are currently under review with the intention to include Health and Environment. The current key drivers for the SPIs are:

Customer Safety, Staff Safety, Pier Safety, Asset Safety (Infrastructure and Vessel), Service Delivery, Engineering and Maintenance, Issues Management and



In the rolling year (to August 2022), there have been a number of incidents reported across TfL's river-based operations. This has been mainly linked to colleague safety in Woolwich Ferry, and customer safety in LRS. This has caused the SPI scores to vary and sometimes fall below the benchmark of 80. Active collaboration with the Engineering and SHE teams have led to interventions being put in place following each incident, resulting in improved safety performance and SPI scores consistently above the benchmark since June

Evidencing and Understanding our Priority Risk Areas of Control and Influence



Evidencing Key Risks on the River

Based on the operations we have had to date, we have extended our knowledge of Key Risks for River Operations through their partners in the Thames and London Waterways Forum.

Our areas of focus through the Thames and London Waterways Forum

The Thames and London Waterways Forum is a partnership group that coordinates strategy and activities on the Thames and London's waterways. It was set up by the Mayor to promote the river Thames and London's canals and other waterways.

Forum members including TfL work together to develop and implement relevant policies as set out in the Mayor's Transport Strategy, London Environment Strategy, London Plan and the Culture Strategy. The Forum also supports aspects of the Port of London Authority's 'Thames Vision 2050' which outlines long-term priorities for the Thames.

Through the Thames and London Waterways Forum, the Thames Partners Passenger Vessel Risk Register identifies **11 risks** on the Thames through independent reviews, industry knowledge and incident reports. These were:

- Fatigue
- Antisocial Behaviour (Charter)
- Infrastructure Projects
- Infrastructure Safety
- Security
- Historic vessels
- Congestion / timetables
- Drugs & Alcohol
- Wash / Draw Off
- Boarding & Alighting (customer safety)
- Cultural Professionalism

Deriving Our Risks on the River

Through commissioned work by TfL, and the previously mentioned Passenger Vessel Risk Register, the focus areas for our River-Based Operations were derived.

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Our Areas of Focus through ARC

In January 2020, Abbott Risk Consulting (ARC) delivered a report commissioned by TfL. The task was to undertake a review of incident reporting and data collated by the various river users (for passenger vessels only) in order to:

1. Analyse the existing safety related river incidents verses number of passenger journeys
2. Identify shortfalls in incident source data including in the precursor information
3. Provide initial conclusions based on 1 and 2 to identify areas of weakness

Using this commissioned report, internal expertise and incident data, and the **11 risks** identified from the Thames Partners Passenger Vessel Risk Register, we identified overall **14 key risks**, of which 10 key areas of focus were within our direct control, and 4 further areas of focus where we have the opportunity to be influential.

These are shown on the next slide.

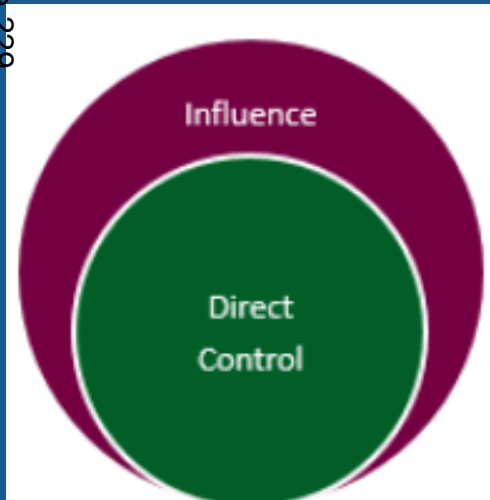
Priority risks

Understanding the risks in the wider environment in which we operate; and where we have Direct control and where we have Influence

Our Risks – Direct Control & Influence

We understand our risks specific to our operations, as well as the wider river environment and therefore have a holistic approach across the Thames. Based on significance and frequency of occurrence, we have prioritised risks in relation to our operations. These are under constant review. In addition to the 10 risks we directly control, there are a further 4 we can influence through our external partners.

Risk we Influence (4)	Risk we Directly Control (10)	
Historic vessels (lower survivability)	Cultural professionalism (poor safety culture, Competence)	Drugs & Alcohol
Wash issues (from speeding vessels)	Security incidents	Fatigue
Major infrastructure projects	Charter boat anti-social behaviours	Medical fitness for work
Congestion/Timetables	Infrastructure safety (lack of maintenance)	Customer safety
	Environment Impact (pollution, discharge, air quality)	Workforce safety, health & wellbeing



The Framework for Achieving our Vision



The Approach

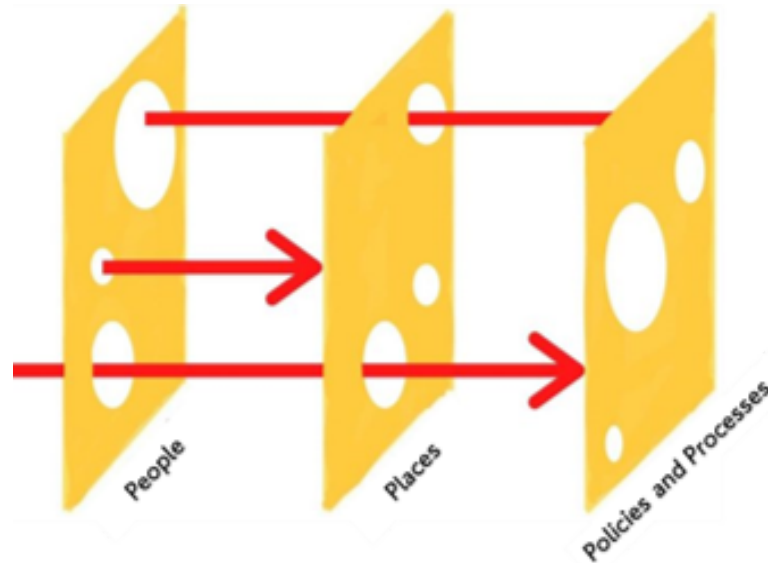
Plan in relation to our 3 key pillars of our Vision:

- a) Healthy and Safe Behaviours
- b) Safe and Sustainable Assets
- c) Safe and Sustainable Operations

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Our plan to achieve the Vision

- To deliver Zero Harm, we are taking a safe systems approach to avoid single points of failure and encourage the right collaborative SHE culture.
- All parts of the system must be strengthened in combination to multiply effects



This means: -

- **Healthy & Safe Behaviours:** we want to foster a mature safety culture across our operations.
- **Safe & Sustainable Assets:** ensuring that we have high maintenance standards, reduction in carbon emissions, and appropriate investment in infrastructure.
- **Safe & Sustainable Operations:** Our customers, suppliers, and employees expect ZERO SHE HARM from our operations.

All those with a role in designing, building, operating, managing, leading and using our transport services have a responsibility and desire to constantly reduce harm

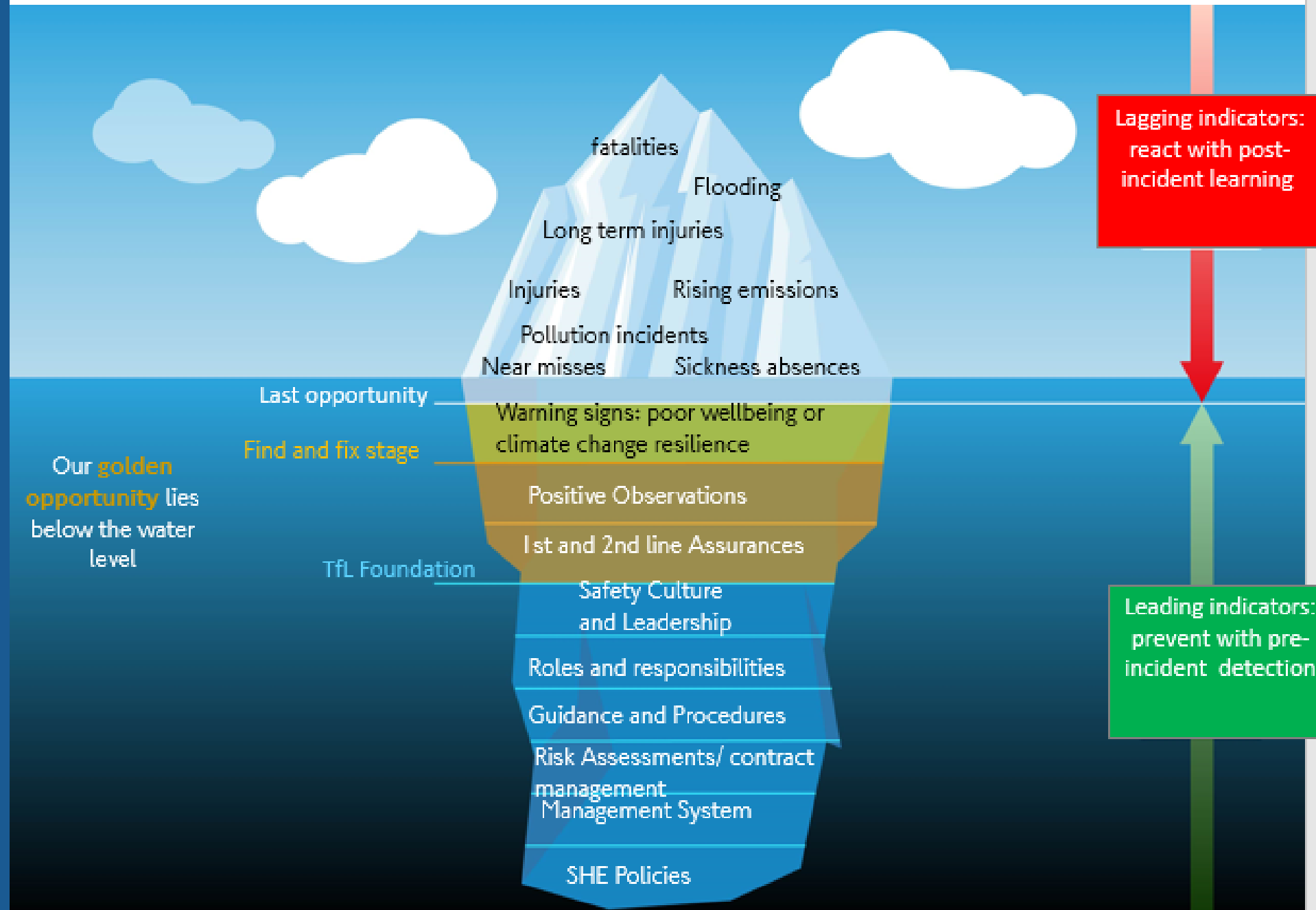
We need to have confidence in the controls

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Past incidents show us that taking this approach highlights warning signs.

b) We have the opportunity to test and improve its controls to ensure that they are effective

Strengthening the gaps in our system



The Approach

plan in relation to our Vision (3 key pillars) against our 10 priority risks

Steps to Zero Harm

Assessing the frequency (and thereby likelihood) of these 10 key risk areas against the potential impacts of them occurring in the future, we have found that the highest risks of Direct Control within our river-based operations are related to:

Risk	Healthy and Safe Behaviours	Safe and Sustainable Assets	Safe and Sustainable Operations
Cultural professionalism	✓	✓	✓
Fatigue.	✓	✓	✓
Alcohol and drug misuse	✓		✓
Medical fitness for work on the river	✓		✓
Customer safety.	✓	✓	✓
Workforce health, safety & wellbeing	✓		
Infrastructure management		✓	✓
Environmental Impact		✓	✓
Security incidents	✓	✓	✓
Charter boat anti-social behaviours	✓		

To reduce the impacts of these risks, we need to align these to 6 priority workstreams and determine short, medium and long term actions accordingly to bridge the gap towards Zero Harm

The Approach

Introducing the 6 priority workstreams which will address our 10 priority risks in conjunction with our Vision (3 key pillars)

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Our plan to achieve the Vision

We will address risks across all areas within our control through **six priority workstreams**:

- Meaningful Data & Analysis;
- Communication, Engagement & Learning;
- Empowerment, Leadership & Capability;
- World leading Standards & Practice;
- Innovation & Futures;
- Contracts, Procurement & Supply Chain

We will differentiate the risk by what we Directly Control against those we Influence. We will prioritise our efforts accordingly.

For risks outside our control, we will support our partners on the river by helping them to put the tools they require in place to understand and reduce risks

Continuous Improvement Action towards our Vision



Taking Action

We have mapped the 10 risks that affect our SHE performance across our river-based operations most against the 6 workstreams to generate a range of focused actions.

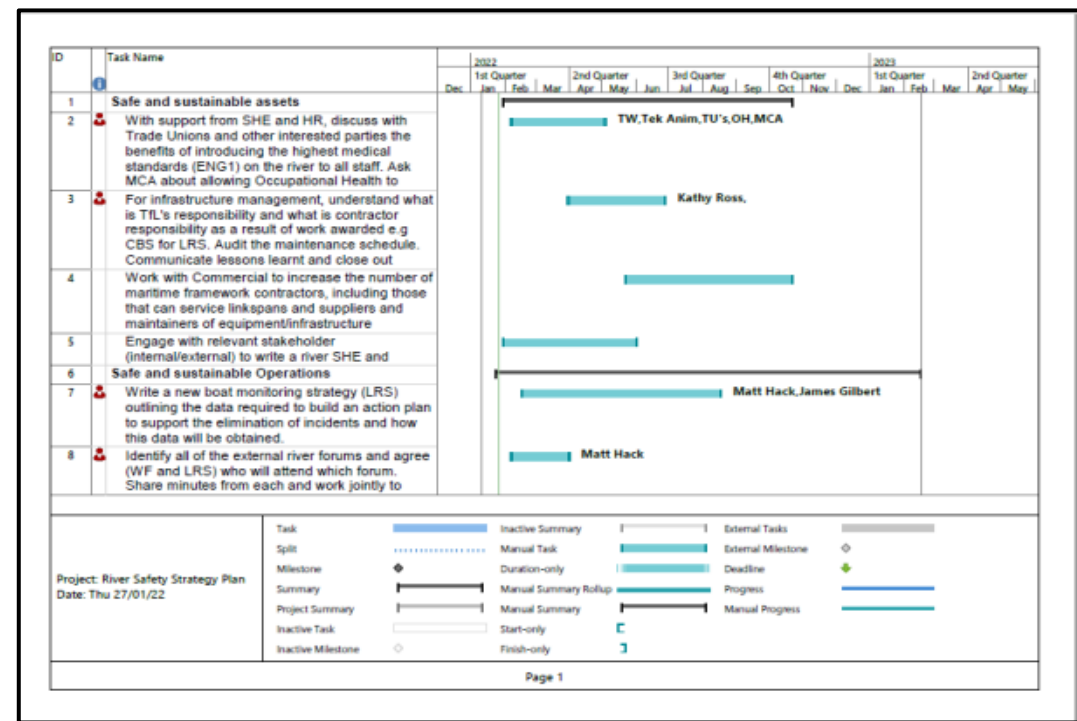
Actions have been arranged into short, medium and long term to enable us to develop a defined plan that will get us to Zero Harm

Mapping our Workstreams against our Priority Risks

- 6 Strategic workstreams:**
- Meaningful Data & Analysis;
 - Communication, Engagement & Learning;
 - Empowerment, Leadership & Capability;
 - World leading Standards & Practice;
 - Innovation & Futures;
 - Contracts, Procurement & Supply Chain

- 10 priority risks:**
- cultural professionalism.
 - Fatigue.
 - alcohol and drug misuse.
 - medical fitness for work on the river.
 - Customer safety.
 - Workforce health, safety & wellbeing
 - infrastructure management
 - Environmental Impact
 - Security incidents
 - Charter boat anti-social behaviours

Example Output



Horizon scanning and continuous improvement

Design out, mitigate and eliminate harm by continuous learning, horizon scanning, benchmarking and working with external partners to share knowledge, information and experience. continually encourage and support our partners to reduce incidents on the Thames to Zero.

Continuous Improvement through Short, Medium and Long-Term Actions

This SHE plan for our river-based operations focuses on actions required in the short term, taking us to April 2023, when we expect to see SPI scores consistently above 80 across all areas. The plan will be refreshed every 3 years after that to account for emerging risks that may not exist at present; lessons learned from delivery of the short-term actions; and actions required to improve our controls and maintain our trajectory. Both LRS and Woolwich Ferry assess how well they control their risks through the Enterprise Risk Management (ERM) framework.

Short term (up to April 2023):

Improve our understanding and management of SHE risks that most affect our performance

Medium term (April 2023 – April 2026):

Ensure our improvements are embedded and work with our stakeholders to continually improve our control of risks we both directly control and influence

Long term (April 2026 onwards):

Design out, mitigate and eliminate harm across our river-based operations by continuous learning, horizon scanning, benchmarking in conjunction with external partners.

Action Tracking

Actions are grouped primarily by the three key pillars of the Vision:

- a) Healthy & Safe Behaviours
- b) Safe & Sustainable Assets
- c) Safe & Sustainable Operations

Then split into short medium and long term actions through a live tracker

Action Tracking Example & Live Tracker

Short- medium- and long-term actions will be held in a live tracker and monitored through the governance structure.

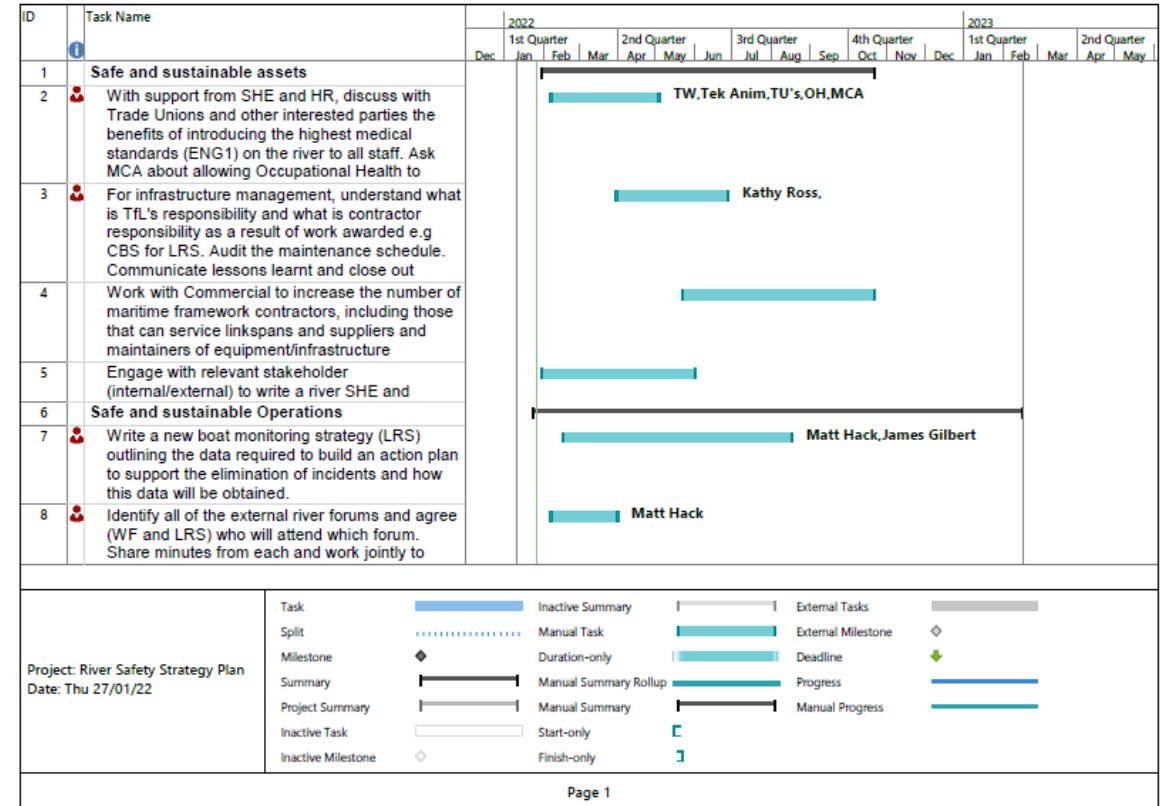
The actions will be predominantly grouped by the three key pillars of the Vision:

- a) **Healthy and Safe Behaviours**
- b) **Safe & Sustainable Assets**
- c) **Safe & Sustainable Operations**

Please note. This is an example where we have the option to map the actions based on 2 of the 3 groups to achieve our action tracker output. These include:

- i) The Three Key Pillars
- ii) The 6 Workstreams
- iii) The 10 Priority risks

For this example, we are focusing on the Three Key Pillars and the 10 Priority Risks against the timeline of short, medium, and long term actions. However this can be manipulated to suit the end user.



Top 3 Actions for each Pillar – Safe and Sustainable Assets

Scope- top 3 actions for Safe and Sustainable Assets

Action item	Priority Risk	End date
<p>Infrastructure management: *Complete a review of the audit and maintenance schedules and communicate outcomes to staff</p>	Infrastructure Safety	Mar-23
<p>Commercial: Develop a TfL framework for maritime contractors, including those that can service linkspans; and maintainers of equipment and infrastructure.</p>	<p>Infrastructure Safety</p> <p>Cultural Professionalism</p>	Mar-23
<p>Environmental: For project work, including upgrades, refurbishments, new equipment and renewals, introduce systematic consideration of sustainable alternatives, including suppliers and materials</p>	Environmental Impact	Mar-23

Top 3 Actions for each Pillar – Safe and Sustainable Operations

Scope- top 3 actions for Safe and Sustainable Operations

Action item	Priority Risk	End date
<p>Improve the quality of local investigations by:</p> <ul style="list-style-type: none"> *Ensuring that all Duty Operations Managers are trained in the latest investigation techniques and are all competent in carrying out investigations; * Develop a Separate auditable investigation Log which is visible to all staff and share lessons learned via summaries following investigations; and *Habitually undertake Fatigue Risk Screening as part of the investigation process. Where relevant, feed back to the Fatigue team. 	<p>Cultural Professionalism</p> <p>Fatigue</p>	<p>Dec-22</p>
<p>Develop a dedicated area for maritime operations in the Tfl management system</p>	<p>All priority risks under Tfl control</p>	<p>Mar -23</p>
<p>Encourage increased reporting of SHE concerns by: Introducing a maritime-based confidential reporting system via a 3rd party</p>	<p>Cultural Professionalism</p>	<p>Sep-22</p>

Top 3 Actions for each Pillar – Healthy and Safe Behaviours

Scope- top 3 actions for Healthy and Safe Behaviours

Action item	Priority Risk	End date
<p>Review the health surveillance arrangements in place by:</p> <ul style="list-style-type: none"> *Refreshing management and staff knowledge of COSHH via online training *Skin Health Checkers - identify and give training. *Referrals to OH – develop an action log showing steps taken to action recommendations, including dates and responsible people. 	Workforce Safety, Health and Wellbeing	Dec-22
Introduce mandatory ENG1 medicals for all staff working in river-based operations	Medical Fitness for Work	Mar -23
Seek to increase the percentage of D&A testing carried out above our current statutory obligation.	Drugs & Alcohol	Sep-22

Governance



Internal Governance

The Rail and Sponsored Services Board will be the accountable owner on behalf of the COO for this strategy and will be supported by SHE

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Internal Governance

- **SHE** will continue to provide support and constructive challenge TfL Operations SHE quarterly meeting and report into the sub-Exco Safety Group
 - Progress and issues will be cascaded and escalated accordingly to the TfL SHE Policy holder (Chief SHE Officer), and the TfL Accountable Person (Chief Operating Officer), and discussed at the **SHE ExCo** forum
 - **Chief SHE Officer** is accountable for delivery of excellence in safety, health and environment. She will support, advise and hold to account, other areas and directorates, specifying targets.
 - **Chief Operating Officer** is accountable for the health and safety of the users of their service, employees and others.

External forums

We will support and influence our partners across the Thames to constantly reduce harm through our membership of 3 key forums. TfL will help to set priorities and provide tools to help manage and track progress

External

The Thames and London Waterways Forum is an effective group for steering river related actions and priorities. With a rotating chair, a member of the TfL operational leadership attends this forum alongside leaders from the PLA, GLA and others. The group meets quarterly.

The Thames Partnership Group is a monthly 30 min call between river stakeholders such as TfL, the PLA, police, RNLI, etc to give updates on key points from the respective businesses and to share, amongst other things, any issues relating to river safety.

The Tidal Thames Water Safety Forum (TTWSF) is committed to reducing the number of people who drown in the tidal Thames, either accidentally or deliberately. Members include RNLI, London Fire Brigade, HM Coastguard, Metropolitan Police, London Ambulance Service and the Port of London Authority, TfL, City of London Police and the City of London Corporation. The group meets quarterly

Thames Skills Academy is committed to improving training and safety standards on the Thames. As a Board member, TfL contributes to the strategic objectives and as an employer also has a role to play in driving better standards with partners

LRS safety forum is a TfL initiated forum led by LRS which brings together licensed stakeholders to discuss best practice in river operations. It is a safe space for operators to raise and discuss concerns, share learning and agree norms and principles for safety on the river.

London CONTEST Board

The aim of the London CONTEST Board is to provide a strategic lead in addressing London's threat, risks and vulnerabilities in relation to counter-terrorism. The board looks across the CONTEST strategy, encompassing Protect, Prepare, Pursue and Prevent

Safety, Sustainability and Human Resources Panel



Date: 16 November 2022

Item: Bus Safety Programme Update

This paper will be considered in public

1 Summary

- 1.1 This paper provides an update on the progress of the delivery of the Bus Safety Programme.
- 1.2 This paper was prepared and published for the meeting scheduled for 14 September 2022, which was cancelled as it fell within the period of public mourning of the death of Queen Elizabeth II.

2 Recommendation

- 2.1 The Panel is asked to note the paper.

3 Background

- 3.1 The Mayor and TfL have adopted Vision Zero for London, with a target of zero deaths and serious injuries from road collisions by 2041.
 - 3.2 Within Bus Operations, we have even more ambitious targets:
 - (a) 70 per cent reduction in the number of people killed or seriously injured in, or by, buses by 2022 (against 2005-09 baseline); and
 - (b) No one killed in, or by, a bus by 2030.
 - 3.3 The Bus Safety Programme was launched in February 2016, with the aim of reducing the number of people killed or seriously injured (KSI) on the bus network.
 - 3.4 The Bus Safety Programme is aligned with the Vision Zero 'safe systems' approach which aims to ensure safe speeds, safe streets, safe behaviours and safe vehicles alongside post-collision learning and justice. Funding pressures have impacted on the progress of implementation of the Bus Safety Programme since our last update in February 2022. This paper sets out the financial impact on the programme and provides key updates on our progress.
- #### 4 Safety Performance
- 4.1 The number of people killed or seriously injured in or by a bus (bus involved KSIs) rose by 24 per cent to 174 people between 2020 and 2021. This increase was a result of the increasing number of people travelling again who continue to be concerned about Covid-19 while travelling on public transport, but still represents

a 70 per cent reduction against the 2005-09 baseline. Figure 1 illustrates the continual downward trend in people being killed or seriously injured in or by a bus. We have now met our 2022 target of a 70 per cent reduction in KSIs two years early and for two years in a row. It is encouraging that we have maintained this target achievement for a second year, despite the continued return to pre-pandemic collision rates, travel patterns, bus journeys and bus patronage. However, we continue to closely monitor this as our return to pre-pandemic levels is not yet complete. We also continue to monitor the emerging issues and risks that have developed during the pandemic and how these may continue to influence bus safety.

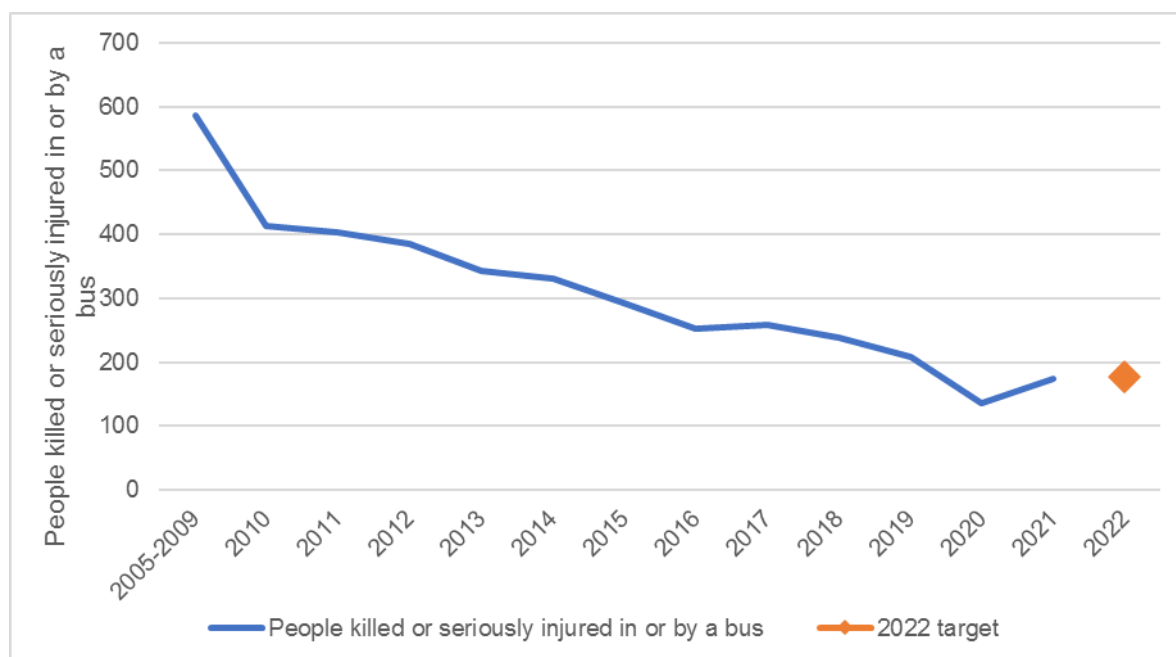


Figure 1: People killed or seriously injured in or by a bus: progress against baseline

- 4.2 Separating bus involved casualties into those injured on, and those injured by, the bus gives a slightly different perspective on who is being injured, that means we can target our safety interventions where they are most needed. It is important to note that whether a person was injured as a passenger, while walking or other road user, this does not mean that the bus driver was at fault, for example where someone may be injured ‘by a bus’, it could mean that a bus was involved in the collision simply as a stationary or third party. During 2021, one person died after falling down the stairs on a bus, and 66 people were seriously injured (passengers or bus drivers) on the bus, while four¹ people died and 103 people were seriously injured by the bus as a result of a collision involving the bus. Of those people who were killed or seriously injured ‘by a bus’, 49 were people walking, 30 were cycling and 16 were riding motorcycles.
- 4.3 Critical to our further progress in bus safety is the safety culture within TfL and London’s bus operators. Ensuring that there is consistent safety performance is a key responsibility of our Safety, Health and Environment (SHE) team. Analysis

¹ This excludes a fatality in Victoria Bus Station in 2021 as deaths occurring on private land are excluded from STATS19

can be complex when trying to normalise the data and taking into account safety risk exposure. However, when scrutinising passenger injuries, normalising the rate of injury occurring by annual mileage operated, gives an indication of safety performance across the London bus operators. Figure 2 shows that the passenger injury rate follows a broadly similar downward trend of improvement until after the pandemic. The range of risk rate values between operators has reduced over time too which may suggest that the focus on safety, greater collaboration and transparency since the launch of the Bus Safety Programme has helped to improve the consistency of performance amongst operators. Monitoring safety performance will continue to be a priority for us.

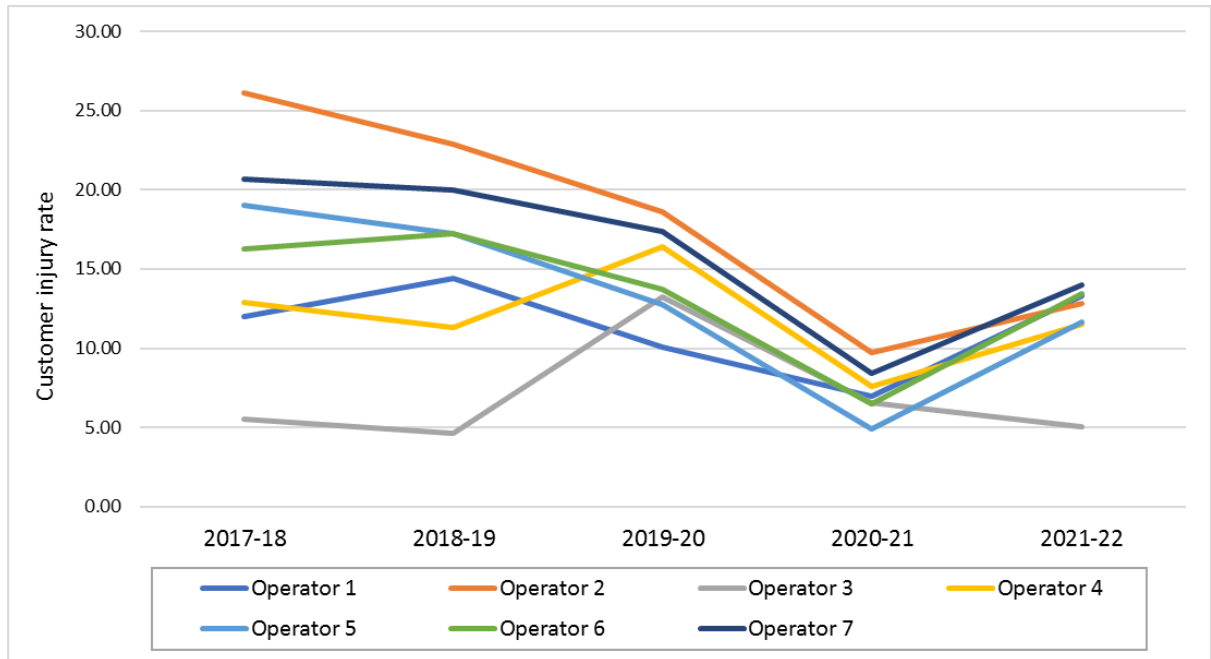


Figure 2: Customer Injury Risk Rate by annual Operated Mileage

Note: Three operators were excluded as their injury rate and/or mileage operated was low

- 4.4 In addition to statistical performance analysis, we also consider how well bus operators engage with our various safety initiatives. Examples include the fatigue management training rolled out to operators during 2021, where training was given to all bus operator managers and operational supervisors, engagement was high across all operators to deliver and receive this training; our most recent bus safety innovation challenge had bids submitted by nearly all the bus operators; engagement at our various safety working groups for pedal confusion, fatigue, and, health and wellbeing is well established and attendance is consistent across most operators.

5 Roll out of Bus Safety Standard into London’s bus fleet

- 5.1 The Bus Safety Standard is being rolled out against the published Roadmap. At the end of July 2022, 827 new buses met the standard, which is approximately nine per cent of London’s bus fleet. Based on the current 14-year lifecycle of buses within our fleet, it is estimated that it will take until 2033 for complete roll out of the 2019 Bus Safety Standard to be achieved. For safety features required

from 2021, complete roll out is estimated by 2035, and for safety features required from 2024, complete roll out is estimated by 2038.

- 5.2 Intelligent Speed Assistance (ISA) technology has been a requirement for new buses since the launch of the Bus Safety Standard, but we have also worked to enable some existing Volvo buses in the fleet which have a similar version of ISA capability to be activated, and there is an active ISA retrofit programme. This means that the rate of ISA fitment in London's bus fleet is much higher than the rest of the Bus Safety Standard measures, as at the end of July 2022 it was around 25 per cent of the fleet.
- 5.3 Acoustic Vehicle Alerting Systems (AVAS) have also been a requirement on new buses since the launch of the Bus Safety Standard but are only required on quiet-running buses so there are slightly fewer buses (672 as at end July 2022) with this technology, representing around seven and a half per cent of our fleet.
- 5.4 Camera Monitoring Systems (CMS) were only required in the Bus Safety Standard from 2021, however several operators were keen to introduce these earlier, which has resulted in 718 buses as at the end July 2022 being fitted with CMS, representing around eight per cent of the London fleet.
- 5.5 The next milestone for the Bus Safety Standard is 2024, when a range of further safety measures will be required. We have also included two additional new safety measures for implementation in 2024 within our latest New Bus Vehicle Specification and will publish a revised Roadmap later this year to reflect these changes. These additional safety measures help to further align the Bus Safety Standard with the new European General Safety Regulations updated in early summer 2022, they are:
 - (a) **Tyre Pressure Monitoring System:** a system that provides a warning to the driver if an unsafe change in air pressure in one or more tyres is identified; and
 - (b) **Alcohol Interlock Installation Facilitation:** requires bus manufacturers to make available a document with clear instructions for installation of alcohol interlocks without interfering with the performance or maintenance of the bus. This is a pre-cursor to any potential inclusion of Alcohol Interlocks within a future phase of the Bus Safety Standard.

6 Impacts of Funding Uncertainty

- 6.1 The funding uncertainties we face have impacted the Bus Safety Programme. With each short-term funding deal expected to lead to a longer-term settlement, deferring activity for 3-6 months has been an appropriate decision. The impact of the new Government funding deal on bus safety projects is not yet known, the following information is provided in the meantime and we will provide an update at a later meeting on any further changes. The aggregated effect of the pandemic and lack of clarity over future funding is now significant, and the following projects and activities were paused in March/April 2022 as a result of lack of funding availability:

- (a) **ISA Retrofit:** Funding for 1,800 buses to be retrofitted with ISA was paused. The total number of buses in scope for retrofit is 3,000, the 1,200 buses with funding had hardware fitment completed during August 2022. It was estimated that if all 3,000 buses were retrofitted with ISA as originally planned, together with the new build buses, this would equate to around 50 per cent of the bus fleet.
- (b) **AVAS Retrofit:** Funding to retrofit AVAS onto all quiet-running buses in the fleet was paused. The number of buses that could be retrofitted was flexible, from just fitting the buses that always run quietly (the electric and hydrogen buses) to a full roll out onto all diesel-hybrid buses that have shorter periods of silent running.
- (c) **CMS Retrofit:** Funding to retrofit buses in the fleet with CMS was paused. In particular, fitting CMS to all New Bus for London buses was planned.
- (d) **Fatigue Detection Technology project:** Funding to fit a further 450 buses with Fatigue Detection Technology was paused. This funding would have enabled us to achieve our target in the Bus Action Plan for 500 buses fitted with Fatigue Detection Technology. Furthermore, this funding would allow us to collect a more diverse and robust set of quantitative data to ensure the effective development of the bus driver fatigue programme, and to enable us to introduce a performance specification for this technology for new buses through the Bus Safety Standard.
- (e) **Bus Safety Standard Phase 2:** Funding for further development of the Bus Safety Standard beyond 2024 was paused. The Bus Safety Standard is a live document intended to evolve to take account of new technological advances and to respond to changes in risk to achieving TfL's bus safety Vision Zero targets. New safety initiatives such as reducing distraction and simplifying the driver's cabin, measures to further improve customer safety, and integrating the safety of e-scooter riders into the specification, are all now on hold.
- (f) **Advanced Emergency Braking (AEB) implementation support:** Funding to realise the recommendations of recent work into supporting the implementation of AEB into the fleet by 2024 has been paused. AEB for an urban environment is the most challenging safety measure being introduced because of the complexity of the fixed and moving vehicles and vulnerable road users alongside the multiple passengers that are seated and unbelted, or who might be standing when an AEB system brakes. However, if implemented correctly AEB has the potential for significant safety benefits and forms a critical part of our ability to meet our Vision Zero targets for buses. Owing to the complexity of the technology it requires a high level of investment from our suppliers to meet our requirements. TfL had a strategy in place to help reduce the barriers while ensuring AEB systems realise the forecasted benefits, however a strong pipeline of orders for new vehicles is necessary to support that investment by our supply chains (see 6.2 (a) below).

6.2 The effects of the funding uncertainties were not limited to the direct impact on current project funding. There are further effects on the delivery of the Bus Safety Standard:

- (a) The roll out of the Bus Safety Standard is directly linked to the rate of fleet renewal. Fleet renewal has been lower than average due to the natural fleet renewal cycle over the last few years; however, it has also been affected by the pandemic through both supply chain delays and TfL's funding issues with a pause in letting new contracts implemented for a few months in late 2021. While this has now resumed, the effect on fleet renewal will remain. The proposed reduction in fleet size of around four per cent set out in our Financial Sustainability Plan (half of which is subject to a live public consultation) has had a direct impact on new vehicle orders for this year and next too.
- (b) If further funding does become available for ISA retrofit, there will be a 9–12-month delay before any further buses can be retrofitted as there is now a minimum 26-week lead in time for parts with suppliers and fitting takes time. Orders were being placed on a rolling basis, but these were stopped when no further funding was approved. The ISA retrofit project will end in September 2022 at which point the project resourcing and approvals will expire.
- (c) There are around 200 electric buses within our bus fleet which are going to be prioritised for AVAS retrofit alongside the ISA retrofit programme, in order for them to be fitted with our enhanced Responsive AVAS system which optimises safety and reduces extraneous noise nuisance. However, this is impacted by the lack of funding for ISA and compounded by the lack of funding for AVAS retrofit. These buses are the only electric buses without any form of AVAS currently in the fleet. Furthermore, lack of funding has meant that the successful outcome of the Responsive AVAS project has not been rolled out to the existing buses with AVAS.
- (d) Funding for future year retrofit programmes was also paused including those for vulnerable road user alerting systems (a requirement on new buses from 2024) and further fatigue detection technology.

7 Bus Driver Fatigue, Health and Wellbeing Innovation Challenge

7.1 Ten projects selected from around 50 bids are being rolled out across eight bus operators as part of the Bus Driver Fatigue, Health and Wellbeing Innovation Challenge. Most of these projects were awarded funding in late February 2022 with work commencing at the end of March 2022. The last project had funding approved in July 2022. To manage the delivery of these ten projects which are of differing scope, value and timescale, we have put in place appropriate project controls and are actively engaging with bus operators.

8 Pedal Confusion

8.1 The recent research we commissioned AECOM to undertake has now been completed and this study is published on TfL's website at:
<https://content.tfl.gov.uk/bus-safety-standard-pedal-confusion.pdf>

- 8.2 The report (appended to this update) sets out several recommendations which are being incorporated into the work overseen by the joint TfL and bus operator Working Group for pedal confusion. The report states that its main recommendation is the need to gather evidence to validate the reports' recommendations and the impact they will each have to the reduction of pedal confusion incidents. Evidence is now being collected through the use of pedal/footwell cameras on new buses, however owing to funding restrictions it is not currently possible to retrofit these cameras which would rapidly improve our evidence base.

9 Emerging Issues

Bus Safety Programme Strategy

- 9.1 An independent programme assurance group recommended that an overarching strategy for achieving Bus Vision Zero is established. We have committed to producing a strategy document that will set out the approach to achieving Vision Zero for buses, the alignment with Vision Zero as a whole and the role played by the specific projects in TfL's investment programme.
- 9.2 The development of this strategy is at an advanced stage and will be shared with the Panel when it is available. Activity undertaken for the strategy to date includes:
- (a) holding five stakeholder engagement workshops to discuss and explore issues related to bus safety. Attendees included representatives from different transport modes, bus operators and manufacturers, lobby and safety campaign groups, the Independent Disability Advisory Group (IDAG), the London Fire Brigade, and internal TfL staff from a range of teams;
 - (b) holding several informal engagement sessions with bus drivers from different London bus operators at bus garages across London;
 - (c) developing a tool to carry out sensitivity testing of the Bus Safety Standard safety measures to understand how the estimated benefits of the Standard may be affected by changes in our business case assumptions such as fleet renewal, and to understand the potential safety impacts of new safety measures that we may wish to include in future phases of the Bus Safety Standard; and
 - (d) developing a new Power BI tool to better analyse the bus involved risk rates based on mode (e.g., person walking, cycling or travelling by bus) and known characteristics such as gender, age or ethnicity, to ensure that risk is being reduced for all people who may be killed or seriously injured in or by a bus.

Bus Fires

- 9.3 On average there have been 17 bus fires per year over the last five years in London. This is significantly below the average rate for the rest of the UK. The roll out of more zero emission buses introduces different risks than those arising from diesel and diesel-hybrid buses..

9.4 We have therefore decided to incorporate a Bus Fires workstream into the Bus Safety Programme to ensure a systematic approach is taken to address the actual and potential risks of fire within our changing bus fleet as with the rest of the Bus Safety Programme. The new workstream has been developed to address key risks and prioritise activities within TfL and amongst our key stakeholders, such as working with bus manufacturers, operators and the London Fire Brigade to provide education on the different types of buses in our fleet.

10 Summary

10.1 We have a good grasp of the safety issues facing the bus network, we have built robust relationships with the bus industry and work very closely with bus operators who are also strongly committed to improving safety.

10.2 We are committed to continual improvement of the safety of London's buses and bus network; however, the funding uncertainties are impacting upon our ability to deliver planned and future safety improvements, it can be seen that this is being compounded the longer these uncertainties persist. The impact of this is an increasing risk that we will be unable to achieve its Vision Zero targets for the bus network in the current timeframe.

10.3 However, we are ready to restart all the paused activity as soon as funding is available and subject to supply chain limitations, we will seek to catch up on lost time. The impact of the new Government funding deal on bus safety projects is not yet known, we will provide an update at a later meeting once the details have been confirmed.

10.4 We will continue to focus on improving and advocating for bus safety as a key outcome of both the Bus Action Plan and the Vision Zero Action Plan.

List of appendices to this report:

Bus Safety Standard Pedal Confusion Report (AECOM, 2022)

List of Background Papers:

Bus Safety Programme, Safety Sustainability and Human Resources Panel, 24 February 2022

Measuring and Improving Employee Health, Safety, Sustainability and Human Resources Panel, 14 September 2021

Bus Safety Programme and Driver Health and Well Being, Safety, Sustainability and Human Resources Panel, 10 February 2021

Bus Safety Programme, Safety, Sustainability and Human Resources Panel, 12 February 2020

Bus Safety Programme, Safety, Sustainability and Human Resources Panel, 4 September 2019

Bus Safety Programme, Safety, Sustainability and Human Resources Panel, 27
September 2018

Bus Safety Programme, Safety, Sustainability and Human Resources Panel, 23 January
2017

Bus Safety Programme, Safety, Accessibility and Sustainability Panel, 30 June 2016

Bus Safety Programme, Safety, Accessibility and Sustainability Panel, 10 March 2016

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Bus Safety Standard:
Report - Pedal Confusion

Transport for London

August 2022

Quality information

<u>Prepared by</u>	<u>Checked by</u>	<u>Verified by</u>	<u>Approved by</u>
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Revision History

<u>Revision</u>	<u>Revision date</u>	<u>Details</u>	<u>Authorized</u>	<u>Name</u>	<u>Position</u>
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Executive summary

Introduction

AECOM were commissioned to research the frequency that pedal confusion occurs and the number of incidents of pedal confusion that go unreported by drivers, if any, such as occasions when they recover before there is an incident. Additionally, AECOM held workshops and discussions with stakeholders from TfL, bus operators, Unions and drivers to evaluate opinion of six proposed solutions put forward following previous work in 2018 by TfL and the Transport Research Laboratory which were based on the recommendations from a 2011 report.

Research was completed using various methodologies

- Secondary data analysis: A literature review of published studies about pedal confusion and use of the Incident Reporting & Investigation System (IRIS) data with support from the Notification and Investigation of Major Incidents (NIMI) data.
- Primary research in three stages:
 1. An online survey for drivers and other bus operator employees to complete, with 593 drivers self-selecting to complete the survey;
 2. Group discussions with 45 drivers for additional detail about their views; and
 3. Ten workshops with a total of 86 key stakeholders and union representatives with various roles (engineering, operations, health and safety) and responsibilities (manufacturers, operators and TfL stakeholders).

Number of incidents and locations of pedal confusion

Secondary data findings using IRIS data

- 143 pedal confusion incidents reported between 2015 and 2019 an average number of 29 incidents per year. 19 of these were flagged as NIMI

Between 2015 and 2019:

- There was an average of 2.4 incidents per month;
- Tuesday saw the highest number of incidents (35) and Sunday the lowest (9); and
- The times when the highest number of incidents took place was between 15:00 and 16:00 and between 10:00 and 11:00.

Findings from the drivers online survey

- Approximately 1 in 5 drivers (22%) were unaware of pedal confusion (78% aware);
- 44% had awareness of incidents (56% unaware);
- 16% of drivers have experienced unintended acceleration at any time;
- 9% of drivers experienced unintended acceleration in the past year; and
- 1.3% of drivers experienced a collision due to unintended acceleration.

Of the 53 drivers* who experienced unintended acceleration in the past year, 85% of these experiences did not result in a collision.

***Note:** the low base of 53 drivers means statistically significant conclusions cannot be made and data should be treated with caution and considered indicative.

Locations of the 143 incidents identified in the IRIS data

- Most incidents occurred on a two-way major road, the second most on a two-way minor road. IRIS data reports often refer to the start-stop nature of the traffic;
- A third of all incidents took place as a bus is approaching either a stand, a stop or moving traffic; and
- Half the incidents did not involve a third-party vehicle

Possible causes of pedal confusion

All views provided in the survey were based on driver opinion, similarly, all views in the workshops were from the attendees own opinion and experience. A main recommendation of this report is to build the evidence to confirm whether these opinions are validated.

The main themes expressed by those who attended the workshop were:

Pedal configuration

- Pedal sizes and spacing between the pedals were referenced as possible causes. Pedal configuration on electric and hybrid vehicles and the New Routemaster bus were an example where pedal configuration may lead to pedal confusion.

Hybrid and electric buses driving style

- Drivers and workshop attendees stated a belief that the regeneration feature on hybrid and electric vehicles may confuse the driver as it provides the option for “one pedal driving” and drivers may become confused about which pedal their foot is covering, particularly as the vehicle slows down even though they are covering the accelerator pedal.

Possible driver related causes of pedal confusion

- Driver concentration;
- Passenger interaction; and
- Driver pressure to meet stand times or finish their shift (including home pressure)

Drivers’ opinions of the factors causing pedal confusion from the online survey

- The top two factors according to drivers who responded to the survey were fatigue and human error with just over half the drivers mentioning at least one of these;
- A fifth of drivers believed that driving in heavy, stop/start traffic was a contributory factor;
- Drivers who had experienced pedal confusion previously were more likely to say that pedal confusion is most likely to occur at any point in the shift compared to those who had not experienced pedal confusion (50% compared to 29%); and
- More drivers with under 5 years’ experience agree with the statement “**I have been trained to recognise when unintended acceleration is occurring and how to respond to it**” than those who have over 5 years’ experience (55% compared to 43%). There is no significant difference in the views between those who have and have not experienced pedal confusion.

Potential solutions to pedal confusion

In the same manner as the possible causes of pedal confusion, all views expressed in the survey and workshops were opinion based and not evidence led. The six solutions¹ shown during the workshops, using previous work from TfL Human Factors and Transport Research Laboratory were:

Brake Toggling:

- Believed this would be effective during setting off manoeuvres, but as most pedal confusion incidents occur at slow speeds, this needs to be complemented by another solution(s); and
- Drivers believed that while there would be a benefit when setting off, it would add to journey time.

Improve direct / indirect vision

- The link between improving vision around the whole of the bus and pedal confusion was not obvious to workshop attendees and once explained, nearly all disagreed with the link. There was an expectation that drivers would move in their cab anyway, such as turning around to speak to passengers; and
- Drivers were as concerned with the practicalities of driving as much as the benefit as a solution, believing this would add on time.

Pedal acoustic feedback (audible cue) and Pedal light indicator (visual cue)

- The main observations for pedal acoustic feedback and pedal light indicators were very similar, it was believed that these two solutions had merit but relied on the driver to react and interpret the sound they heard or light they saw, with some feeling that in a stressful, panic situation this may not happen, or happen in time;
- There was a view that both lights and noises would be ignored based on current experience of introducing other warning lights; and
- The majority of workshop attendees believed the light was preferable to an audible cue (sound), however some attendees provided the counter argument that drivers should be encouraged to keep their eyes on the road rather than the dashboard.

Advanced Emergency Braking (AEB)

- Those attending workshops agreed this would be a long-term consideration, adding that technology would need substantial testing, particularly around sensitivity of the AEB and when it is applied, before it could be put on the buses and for drivers to be comfortable with the technology being used;
- Bus manufacturers believed there were risks, providing scenarios where drivers would need to accelerate at times, this was echoed by workshop attendees who were equally concerned about stopping distances and reaction times; and
- Many caveated that AEB was a positive part of the solution but would be a contribution rather than a solution on its own.

Pedal Standardisation

- Most attendees believed this would be the most effective solution of the six solutions shown, seeing the benefit as reducing unfamiliarity as drivers change buses during a shift, 'spare' drivers who regularly change buses were used as an example; and

¹ Three solutions: Brake toggling, direct/indirect vision and the pedal light indicator have been introduced into the 2021 Bus Safety Standard therefore some workshop attendees were already familiar.

- Engineers and Health and Safety workshops attendees both brought up the concern that if pedals are standardised the importance of right first time design, and building knowledge based on evidence that standardising pedals will have a positive impact on reducing pedal confusion is critical.

Other potential solutions

A number of other solutions were discussed, in the main there were two themes.

Interim solution similar to AEB

- Use current technology to measure the pressure applied to the accelerator by a driver at all times, should this ever be full pressure (similar to the action of stamping on the brake), override the response.
- Operations teams, Engineers and Health and Safety workshop attendees were amongst those who, independently from one another, believed this type of interim solution was worth investigating and could be implemented in the short term. Attendees in other workshops used the term “dead man’s switch” such as a cut-off switch a train has or electric milk floats.

Reducing driver pressure and fatigue

- TfL, Operator, Unions and Drivers expressed their view that drivers work under pressure or have other distractions from passengers and other road users. There was a belief that reducing pressure on drivers including time between shifts (fatigue) would reduce incidents in general, including pedal confusion.

Recommendations

There are a number of recommendations which can be grouped under the safe system pillars that TfL has adopted in their Vision Zero approach to road safety.

This report acknowledges that some of the solutions presented in the workshop have been introduced on new buses in the fleet, as per the BSS roadmap and recommends that all future incident investigations linked to possible pedal confusion to report which if any solutions were a feature on the bus and if they were not a feature for the incident investigator to provide an opinion about whether any of the solutions could have prevented the incident.

Safe behaviours

Monitor any evidence that driver movement has been a contributory factor to pedal confusion. If monitoring shows a link to pedal confusion, update driver training and education.

Review the iBus controllers’ communication procedures with drivers, and ensure drivers are receiving training for correct use of iBus foot switch.

Investigate if any solutions to driver fatigue, as provided in the fatigue report, will reduce pedal confusion incidents or has reduced incidents once implemented.

Review whether footwear has a link to pedal confusion incidents. If a link is found, consider additional testing and trials to resolve this.

Investigate if ‘spare’ drivers, who regularly change buses are more likely to be involved in pedal confusion incidents or near misses.

Safe vehicles

Explore differentials across bus make and model for pedal type, height, and spacing by conducting an audit of the current fleet.

Build a library of lessons learnt from current technology such as early warning systems.

Use learnings from AVAS to develop a sound for pedal acoustic feedback; aim to produce a multi-beneficial sound such as improving driving style.

Conduct further analysis to understand whether travelling at slow speed and/or in heavy traffic is a contributory factor and if so add further workstreams such as driver training.

Conduct further analysis to measure brake regeneration in hybrid and electric buses as a possible cause using current data and/or track tests with drivers.

Measure if the assumed difference in acceleration between electric, hybrid and diesel buses is shown in driver data and if so, whether this could have an impact for pedal confusion.

Consider building a team of experts to design, validate and test the AEB parameters and to cover training and implementation once approved.

Engage with bus manufacturers for a possible review of the International Standards Organisation (ISO) standard for pedal layout.

Build an expert working group with the remit to assess what pedal standardisation could look like with pros and cons. Use findings from the analysis of the 143 incidents suggested for further evidence.

Post collision response

Review and improve the IRIS database with more fields including one specifically for suspected pedal confusion.

Explore measuring traffic flow prior to an incident. Record the road layout, traffic flow procedures (e.g., traffic lights); number of lanes, any joining or additional lanes, bus lane available.

Introduce footwell cameras on buses supporting driver education, incident prevention and incident investigation.

Analyse pedal configuration for each of the 143 incidents for similarities and differences.

Measure if buses with brake toggling are involved in fewer incidents; include near-miss data.

Contact the International Bus Benchmarking Group (IBBG) for learnings from the international industry and if there is appetite for a forum for best practice and solutions.

Work with bus operators to build a national view of pedal confusion for the UK.

Contact other UK industries, starting with waste disposal, investigate if pedal confusion incidents occur in their industry.

1. Introduction

1.1 Background

Pedal confusion has been defined as the manoeuvre where a driver confuses the acceleration pedal with the brake pedal resulting in either sudden unintended acceleration or harsh braking.

At present the scale or nature of the problem among London bus drivers is unknown and there are concerns of under-reporting of incidents by bus drivers, particularly if the driver is able to recover in time resulting in no collision occurring.

A better understanding of the nature and extent of pedal confusion incidents occurring amongst London bus drivers is required to support the decision on the most appropriate solution(s) to mitigate the issue of pedal confusion. TfL accepts that, while mistakes must be minimised, there will always be the chance of human error and one of the priorities for TfL is to make the whole system as safe as possible so that when a road user does make a mistake this does not result in serious or fatal injury.

The information provided in this report is intended to act as part of the supporting evidence for TfL to deliver Vision Zero for London which has a goal, as set out in the Mayor's Transport Strategy, that by 2041, all deaths and serious injuries will be eliminated from London's transport network.

1.2 Objectives

The primary objective of the research was to better understand pedal confusion, specifically:

- The nature and extent of pedal confusion incidents occurring amongst London bus drivers;
- Learn of any key causes and patterns which may increase the possibility of pedal confusion, and specifically if they are related to the driver, vehicle and / or environmental circumstance;
- Whether pedal confusion is attributed to unintended acceleration only or if harsh braking should be considered as well;
- Whether there are any environmental characteristics which contribute to pedal confusion incidents;
- To assess driver and stakeholder views of six proposed solutions* and their ability to reduce the number of any pedal confusion incidents; and
- To learn of any other suggestions of solutions for future thinking.

*The six proposed solutions were established following initial research and recommendations completed by TfL Human Factors in 2011 and an additional report with recommended safety measures evaluated by the Transport Research Laboratory (TRL) in 2018 ².

One of the challenges to overcome is any fear of reprisal drivers are likely to have or the human trait to avoid admitting they have done something "wrong". AECOM reassured drivers about treating their data in confidence through the UK GDPR and further by reassuring anonymity in the reporting through the Market Research Society Code of Conduct, of which AECOM are Company Partners.

² Identifying solutions to pedal confusion in buses 2011: <https://content.tfl.gov.uk/solutions-to-pedal-confusion.pdf>
Pedal Application Error Prevention and Recovery 2018: <https://content.tfl.gov.uk/pedal-application-error.pdf>

1.3 Methodology

There were various types of data already available about the topic of pedal confusion, and due to a diverse nature of the respondents the following three different methodologies were used.

1.3.1 Method 1: Secondary data review

An analysis of the Incident Reporting & Investigation System (IRIS) and the Notification and Investigation of Major Incidents (NIMI) databases was undertaken to determine the number of incidents and the patterns in the occurrences of pedal confusion incidents, if any.

The Incident Reporting & Investigation System (IRIS) (2015-2019)

This database covers a range of parameters for road safety data relating to information recorded by bus operators and contains a detailed account of the incident, including a record of the primary and secondary types of incident and a description of the incident. The incident description is a key determinant of whether an incident was due to pedal confusion.

The Notification and Investigation of Major Incidents (NIMI) database (2018-2021)

A record of major incidents resulting from pedal confusion was provided by TfL. This database is separate to the NIMI cases identified within the IRIS database. The database covers the period from 2018 to 2021 and includes 18 records (two of which are ongoing investigations). NIMI data has recently been supported in some cases by the provision of footwell cameras, although reviewing this data was not part of this research as incidents had already been investigated.

Literature review

AECOM sourced data sets and reports and conducted a literature review, a list of the titles reviewed is shown in Appendix A.

STATS19 data

STATS19 data is published annually by the Department for Transport and this holds a data set of factors contributing to accidents recorded by police officers. STAT19 data was analysed as part of our data review. We found that while there are multiple factors that could potentially relate to pedal confusion incidents as there are no contributory factors that specifically reference it directly. The nearest contributory factors recorded are:

- 401 – Junction overshoot;
- 402 – Junction restart (moving off at junction);
- 509 – Distraction in vehicle;
- 605 – Learner or inexperienced driver / rider; and
- 607 – Unfamiliar with model of vehicle

In discussion with TfL, it was agreed that STATS19 data would not be included in the report.

1.3.2 Method 2: Driver survey (Online questionnaire)

Drivers were invited to take part in an online survey which took approximately 10 minutes to complete. The drivers who participated in the survey work for various operators, namely:

- Abellio;
- Arriva;
- HCT;

- Metroliner;
- Stagecoach; and
- Tower Transit;

All drivers were eligible to take part and the survey was operated online, therefore drivers could select whether they wanted to complete the survey and could participate at any time, 24 hours a day, 7 days a week.

There were 593 completed surveys and while this number of responses is suitable for analysis with a level of confidence at the 95% level of +/- 4%, the responses should not be considered representative of drivers as the survey was self-select and the profile of drivers may skew to those with more experience, as described in section 2.

To inform and encourage participation:

- Each operator communicated details of the survey and how to provide feedback using a prepared information sheet, an example of this is in Appendix B;
- Drivers were informed of the survey using the operators' internal communication system and a survey link provided. A QR code was also included as an easy to use, alternative method for drivers to access the survey; and
- Drivers were incentivised to participate with a prize draw for each operator with one winner (£100 voucher) and two runners-up (£50 voucher each).

It was explained to all potential respondents that:

1. Data was being collected under the UK GDPR; and
2. AECOM are accredited as a Market Research Society (MRS) Company Partner and collected data under the MRS Code of Conduct, with a summary of the key points about anonymity and confidentiality explained to drivers.

AECOM interviewers attended 32 of the busiest garages, split by operator, to further communicate the importance to AECOM, TfL and bus operators about confidentiality, anonymity and a chance to respond freely without fear of retribution.

While at the garages, AECOM interviewers carried a tablet and invited anybody who was available to complete the survey at that time to do so. The survey on the tablet was identical to the online survey and the driver was handed the tablet to ensure this continued to be a self-complete survey, i.e. the interviewer did not read out the questions and importantly the driver did not need to vocalise their response on a sensitive subject.

1.3.2.1 Questionnaire

A copy of the questionnaire can be found in Appendix C, questions included:

- Experience as a driver;
- Opinions on frequency of pedal confusion including:
 - Personal experience
 - Knowledge of other drivers' experience
- Potential causes of pedal confusion; and
- Potential solutions to pedal confusion.

1.3.3 Method 3: Workshops

1.3.3.1 Driver only workshops

At the end of the online survey, drivers were offered an opportunity to provide their details if they wanted to participate in workshops. Those who were undecided at the time, or only wanted to participate in the workshops and not the survey, were offered the chance to leave their details using a separate link specifically for the discussions.

Drivers were invited to attend workshops at various times of the day to support the flexibility needed due to their shifts. To ensure shift patterns were not disrupted, AECOM arranged for workshops to take place outside of the drivers’ working hours.

Workshops were held at either 4pm, 5pm, 6pm or 7pm with between two and four drivers attending each one. Drivers working later shifts were offered a chance to hold discussions at either 11am, 12pm or 1pm, to suit their shift pattern.

Each workshop lasted between 60 and 90 minutes, depending on the number of attendees. Each attendee received a £50 voucher to reflect time spent outside of working hours.

1.3.3.2 Stakeholder workshops

Stakeholders with a specific subject interest were invited to participate in one of ten workshops, each one lasting between 90 minutes and two hours. Those attending were from various bus operators, TfL and bus manufacturers. The workshop types based on roles and responsibilities are shown in Table 1.1. A total of 45 drivers and 86 stakeholders participated in the workshops.

Table 1.1 Stakeholder workshops and roles of attendees

Workshop	Representing	Roles and responsibilities of attendees
1	Bus manufacturers	Bus manufacturers
2	TfL	Health and safety experts
3	TfL	Operations experts
4	Bus operators	Health and safety experts
5	Bus operators	Operations experts
6	Bus operators	Incident investigators
7	Bus operators	Driver trainers
8	Union representatives	Bus operator staff nominated representatives
9	Union officials	Union officials
10	TfL and bus operators (combined group)	Engineers

The discussion guide for both driver and stakeholder workshops can be found in Appendix D.

1.4 Project timings

The project ran from July to October 2021.

The start date for the online survey varied by bus operator, with three weeks allowed for employees of the final operator to participate. Operators who started participating earlier, sent

reminder communications to drivers as well as confirmation of the final date they could respond. The timings by methodology are shown in Table 1.2.

Table 1.2 Project timings by methodology

Methodology	Start date	End date
Secondary data analysis	12 July 2021	22 October 2021
Online survey	12 July 2021	13 September 2021
Workshops	7 September 2021	19 October 2021

1.5 Data analysis and reporting

This report highlights the key findings from each data source, namely:

1. Secondary data;
2. Online quantitative survey; and
3. Workshops.

Where appropriate any statistically significant difference in response to the online survey have been highlighted although in general there were very few statistically significant differences. The significant differences were either based on the years’ experience of a driver or whether a driver had experienced pedal confusion themselves.

To enable the report to be easily read and understood, all reported figures have been rounded to the nearest number or percentage. The rounding effect may cause some charts to sum 99 or 101 percent. If respondents could give more than one answer to a question, then the chart will sum to over 100%.

NOTE OF CAUTION: The online survey was using self-selection by drivers, therefore while the number of responses is suitable for analysis it should not be considered representative of bus drivers.

1.6 Definition of pedal confusion

As a point of clarity, all respondents, whether via the online survey or in the workshops were provided with definitions of pedal confusion.

Online survey definition of pedal confusion

Pedal confusion is defined as an occurrence of a driver accidentally selecting the brake pedal instead of the accelerator pedal or the other way around. This causes either sudden unintended acceleration or harsh braking. This may lead to incidents such as a collision outside the vehicle, passengers being jolted inside the vehicle or may have no impact at all such as a near miss as the driver successfully recovered the situation.

The definition for the online survey was more detailed than the workshop definition. The detail in the online survey was included to ensure drivers considered all aspects of incidents as those responding did not have an opportunity to clarify, and the definition included softer words such as “accidentally”.

Workshop definition of pedal confusion

Pedal confusion can be defined as the manoeuvre of a driver confusing the brake pedal and the accelerator pedal thus causing an incident of sudden unintended acceleration or harsh braking of their vehicle

Those who attended the workshops were asked for feedback about the definition and while there was agreement about the definition there was also a view that:

1. The word manoeuvre should be replaced by action; and
2. Pedal confusion was associated with unintended acceleration and not harsh braking and many attendees did not agree that harsh braking should be part of the definition.

Confirmed definition of pedal confusion

The agreed definition amongst workshop attendees is shown below, with the change of the word “manoeuvre” to “action” and the removal of the reference to harsh braking.

This report will report on incidents recorded as pedal confusion or, where defined as such, unintended acceleration only and not harsh braking.

Pedal confusion can be defined as the action of a driver confusing the brake pedal and the accelerator pedal thus causing an incident of sudden unintended acceleration of their vehicle

1.7 Format of the report

Following this introduction, the report shows:

Section 2: The literature view of published reports specifically to buses.

Section 3: Profile of those who responded to the online survey.

Section 4: Occurrences of pedal confusion with findings from both the secondary data which includes data by year, by month, day of week, time of day and findings from the online survey.

Section 5: Suggested causes of pedal confusion.

Section 6: Opinions on suggested solutions to pedal confusion and other potential solutions, combining the findings from the secondary data, online survey and workshops.

NOTE: In the survey and during the workshops, some drivers and attendees expressed their belief that fatigue was a potential cause of pedal confusion and as a consequence a reduction in fatigue would reduce the number of emergency situations where pedal confusion may occur. TfL has previously commissioned Loughborough University to complete a study in to bus driver fatigue, therefore this report does not focus on the reasons for, and solutions to, bus driver fatigue.

2. Literature Review

There are very few published reports on pedal application errors specifically related to buses. Those which have been reported have been commissioned mainly by TfL. Other studies into pedal misapplication errors tend to focus on passenger vehicles in general, with research in Japan and the USA exploring age or gender correlations.

There are a number of terms used for 'pedal confusion' including 'pedal confusion', 'pedal application error', 'pedal misapplication' and in some cases, 'unintended acceleration'. For the purposes of this review, these terms may be considered interchangeable.

An approach was made to the International Bus Benchmarking Group (IBBG) of which TfL are members, who kindly provided the Clearinghouse Study from Dublin in 2007, this provided useful guidance, however as this report is not published it is not referenced any further.

The IBBG is a group of bus operators and authorities from around 15 member cities around the world who share best practice on operations. The group undertakes benchmarking on a range of metrics including safety, finance, efficiency and operational practices. All information shared is confidential.

See appendix A for references to each piece of literature reviewed.

2.1 Human Factors – 2011 (TfL)

This report explored possible measures to counter pedal application error. Solutions were assessed by experts to explore the feasibility and potential benefits of each.

- a. Standardise pedal layouts – ensure all models of bus use the same standardised pedal layout, so that drivers have a consistent mental model;
- b. Seat adjustment controls – improved driving seat controls would allow quicker seat adjustment, particularly for smaller drivers, which would help to ensure a correct driving position, which could reduce the number of pedal errors;
- c. Engine cut off when driver door is open – drivers must restart the bus and reposition their foot on the brake pedal to switch from neutral to drive mode, each time the driver's door is opened; and
- d) Pedal application error training – provide pedal application error training to help bus drivers to recognise and react to a pedal application error which should help them to recover more reliably.

2.2 Transport Research Laboratory – 2018 (TRL)

A study was commissioned to research a range of safety measures to be included in the Bus Safety Standard (BSS). The safety measures evaluated by TRL were based on the recommendations from the Human factors – 2011 research (section 2.1).

Environmental and safety tests were conducted for feasibility and the development of assessment protocols for an individual vehicle's adherence to the BSS. In terms of pedal application error, recommendations included:

- a. Toggling – Drivers should press the brake twice to update the driver's recent memory of the brake pedal position, for example, whilst waiting at a bus stand. If the brain has more frequent updates, drivers are less likely to place their foot incorrectly. This was introduced into the 2021 BSS.

- b. Bus Vision Standard – Driver’s feet might become misaligned to the pedals if they move to see a blind spot. Additional measures to reduce blind spots will help to reduce unintended acceleration.
- c. Standardised pedal placement – Although pedal design is regulated and many manufacturers build to ISO standards, there is still variation between models. TRL suggested that identical layouts could eliminate potential driver confusion.
- d. Driver feedback system – In the event of an error, a feedback system may help a driver realise that they have made a mistake. This could be a visual indication (the Pedal Indicator Light was introduced into the 2019 BSS), or engine noise simulation for electric/hybrid vehicles.
- e. Future Advanced Emergency Braking (AEB) – If the current AEB system was adapted to recognise the difference between normal acceleration and brake confusion, it could engage emergency braking if the accelerator was depressed fully.

This research takes these recommendations to learn how stakeholders, including drivers perceive each of these as a potential solution.

2.3 Footright – 2015 (TTN Technologies)

Footright is an intelligent safety device designed for buses and coaches. It is specifically designed to eliminate the effects of unintended acceleration incidents. It is designed to be retrofitted to commercial vehicles, demanding a series of inputs before allowing the throttle to be enabled. Other features include variable speed limitation, reverse gear selection warnings and reduced acceleration after the operation of entry/exit doors.

2.4 Pedal Application Errors – 2012 (NHTSA)

The US Department of Transportation’s National Highway Traffic Safety Administration (NHTSA) examined the prevalence of pedal application errors and the driver, vehicle, roadway and environmental characteristics associated with them. This was via a literature review, media analysis, crash database analysis, case studies and a panel of subject matter experts. Whilst this study was not limited to buses, it appears to be one of the largest scale examinations into the phenomenon.

Main findings include:

- a. There are approximately 15 pedal misapplication crashes* in the USA per month;
- b. Two thirds of the drivers of vehicles involved in those crashes* are female;
- c. Driver age distribution is concentrated in the youngest (16-20) and oldest (76+) age groups, representing 35-50% of drivers, depending on the data set used; and
- d. Passenger cars are the most common vehicle type to experience crashes* due to pedal application errors, correlating with their exposure in the vehicle fleet.

Recommendations include educating medical professionals about conditions associated with pedal application errors so that these can be flagged at routine physical examinations, public education on measures to counteract an unintended acceleration incident and providing law enforcement with a means to record driver details in such incidents.

*NOTE: The NHTSA refers to crashes, not incidents, this terminology has been matched here.

2.5 Additional Studies

In addition to the above studies there are several areas of focus in the wider academic field. There appears to be a particular focus on age, which correlates with the NHTSA age

distribution curve. Several studies have been conducted into the effects of age on pedal application errors, with a focus on older drivers. References are shown in Appendix A.

- a) Kinematic and Electrophysical Characteristics of Pedal Operation by Elderly drivers during Emergency Braking;
- b) Understanding the Automotive Pedal Usage and Foot Movement Characteristics of Older Drivers; and
- c) Pedal Misapplication: Interruption Effects and Age-Related Differences.

3. Profile of respondents to the online survey

3.1 Respondent Profile

In total, 593 respondents participated in the online survey which delivers data. This number of responses provides data with a level of confidence at the 95% level of +/- 4%. However, the responses should not be considered representative of drivers as the survey was self-select and the profile of drivers may skew to those with more experience as shown later in Figure 3.2.

Table 3.1 shows the number of interviews achieved through the online invitation with the link or QR code and those who completed the interview while the interviewer was in attendance using a tablet available for an immediate response.

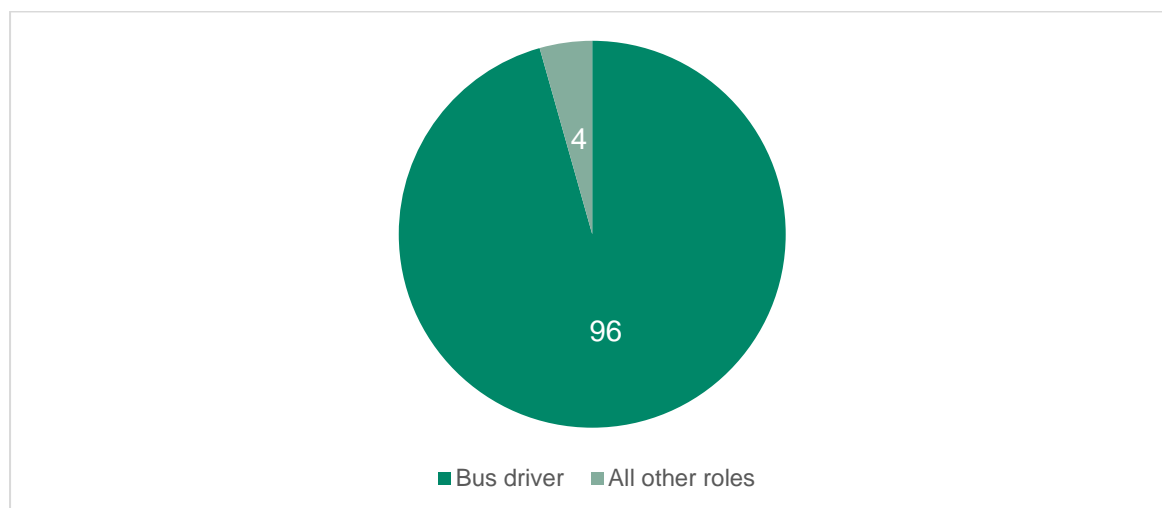
Table 3.1 Number of interviews by time

Time of interview	Number (n)	Percentage (%)
Completed during interviewer visit using a tablet with an online link	402	68
Completed at any other time using a personal device and accessing the online link	191	32
Total	593	100

Base: all respondents (n=593)

The majority of responses to the survey were from drivers as shown in Figure 3.1.

Figure 3.1 Profile of respondents: drivers and other roles (%)

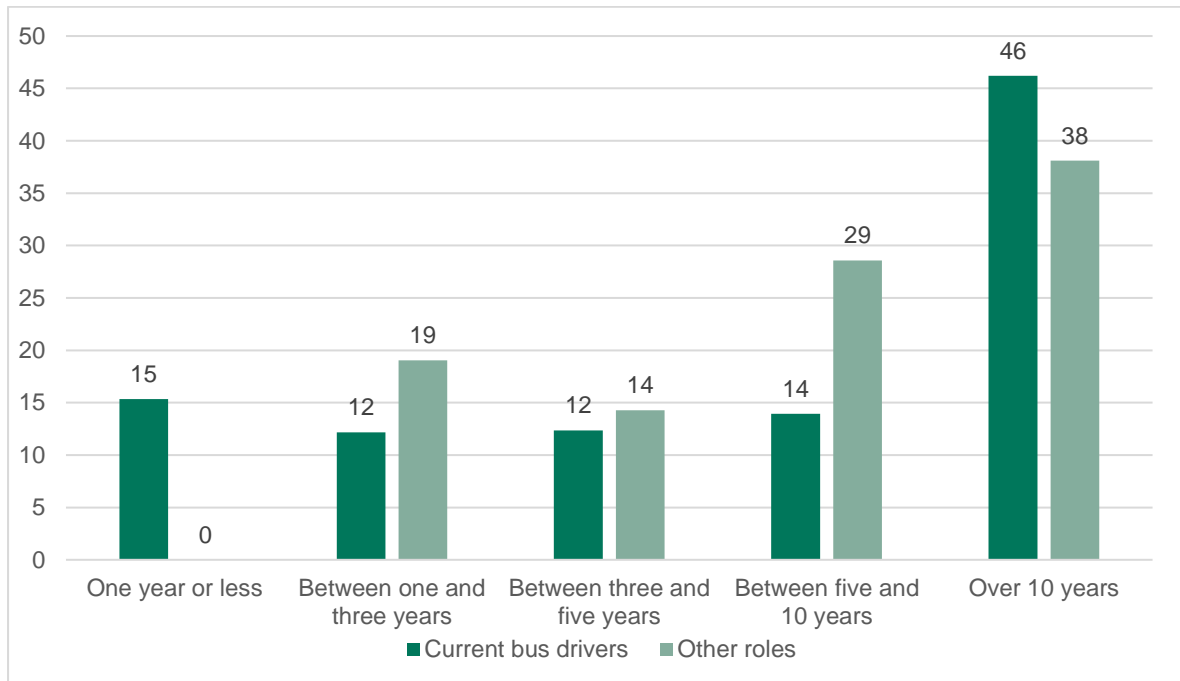


Base: all respondents (n=593)

Of the 593 responses to the survey, 567 (96%) were current drivers. Of the remaining 26 respondents (4%), 21 had previously worked as a bus driver before changing roles, with 5 respondents who worked in the bus garages but had not had a role as a bus driver. In total, 99% of all respondents work or had worked as a bus driver.

Figure 3.2 shows the amount of driving experience of those currently driving and those who had previously been a bus driver but were now in another role.

Figure 3.2 Driving experience (%)

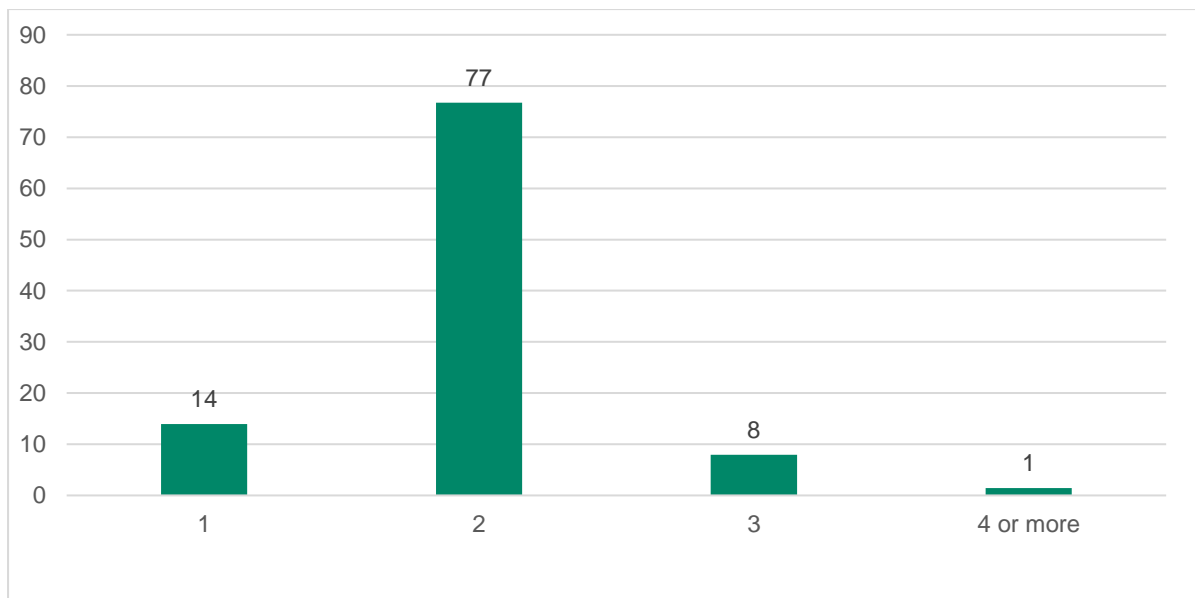


Base: all current bus drivers (n=567); other roles, previously bus drivers (n=21)

Of those who currently drive a bus, 39% have under five years' driving experience and 60% have over 5 years' experience with most of these (46%) having over 10 years' experience.

Figure 3.3 shows the proportion of drivers who stated that typically they drive more than one bus per shift, even if it is the same make and model, with 86% of all drivers stating this.

Figure 3.3 Typically, number of different buses driven per shift per driver (%)



Base: all current bus drivers (n=567)

4. Occurrences of pedal confusion

This section looks at the number of times that pedal confusion is reported to occur, firstly using the IRIS database and secondly the online survey.

4.1 IRIS data

The IRIS database also includes a description of the incident and this account was used to identify cases of pedal confusion incidents.

The IRIS data provided had a total of 363,329 incidents in the five-year period from 2015 to 2019 and includes 64,203 incidents where a bus driver was noted as the primary cause of the incident. In the absence of contributory factors, and without a categorical indication of whether incidents were related to pedal confusion, the analysis of this data focussed on interpreting the incident descriptions. Owing to the vast number of data points held, the methodology focussed on searching for key words in the incident description field to highlight incidents of pedal confusion. Key words searched included 'pedal confusion', 'accelerator', 'accelerated', 'brake' and 'gas'.

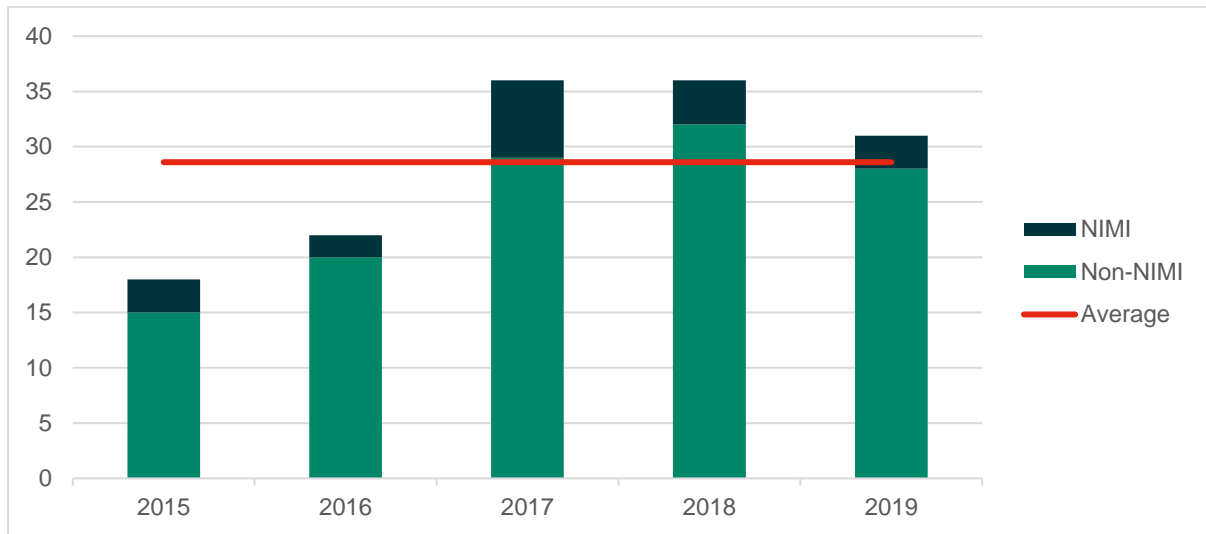
In total, 143 incidents were identified as pedal confusion incidents and of these 19 had been flagged as NIMI (major) incidents.

In addition to the 143 pedal confusion incidents, there were multiple incidents caused by drivers' failure to apply the handbrake when the vehicle was stationary. These incidents were also highlighted by searching for key words in the incident description field including "handbrake", "hand brake" and "rolled". There were 93 of these incidents identified, with two of these incidents then leading to instances of pedal confusion. The incidents which did not lead to pedal confusion were considered outside the scope of the study and were not analysed further.

It is worth noting that the narrative provided in the descriptions varied case-by-case (in particular, the level of description and whether the description was written by the driver or other staff). There was therefore an element of subjectivity involved in the study of this information.

Figure 4.1 shows the number of incidents related to pedal confusion in the IRIS data set recorded over the five-year period from 2015 to 2019. The incidents that had been flagged as NIMI (major) incidents within the IRIS database have been highlighted in the figure below.

Figure 4.1 Number of pedal confusion related incidents by year (n)



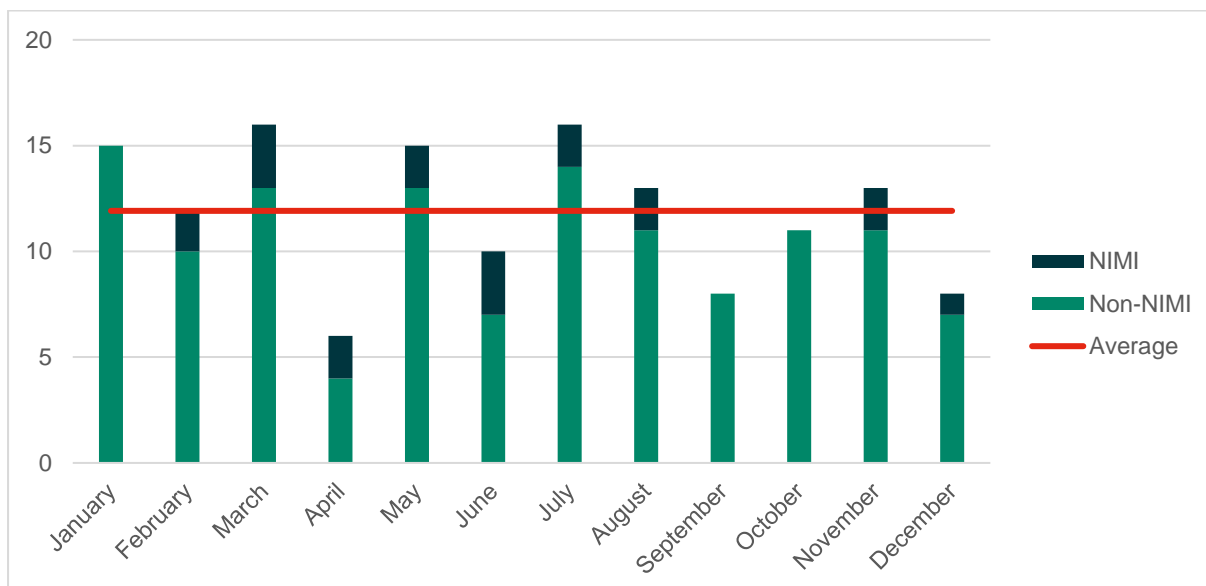
The number of recorded incidents grew considerably from 2016 to 2017 and fell slightly from 2018 to 2019. Given that the period of study was only five years in length, it was difficult to determine whether these changes were significant or whether they were just a natural variation in the number of incidents reported year-on-year. If there is a significant increase, the reasons for this cannot be determined, but may include:

1. Driver willingness to report due to a more open reporting culture;
2. Improved investigation techniques, such as footwell cameras;
3. Changes in bus types being driven, such as more hybrid and electric buses; or
4. More incidents of pedal confusion from any bus type.

Month of year

Figure 4.2 presents the incidents related to pedal confusion in the IRIS database by month for the period 2015 to 2019. The major (NIMI) incidents in the IRIS data set have been highlighted in Figure 4.2 and the average number has been added for comparison.

Figure 4.2 Number of pedal confusion related incidents by month (n)



As can be seen in Figure 4.2, the number of instances of pedal confusion varied considerably by month. For example, there were six reported incidents occurring in April but as many as 16 in March and July. The number of incidents that had NIMI flags in the IRIS database (representing the more serious incidents) also varied by month. There were no NIMI incidents recorded in January, September or October but the majority of the remaining months had at least two NIMI incidents recorded.

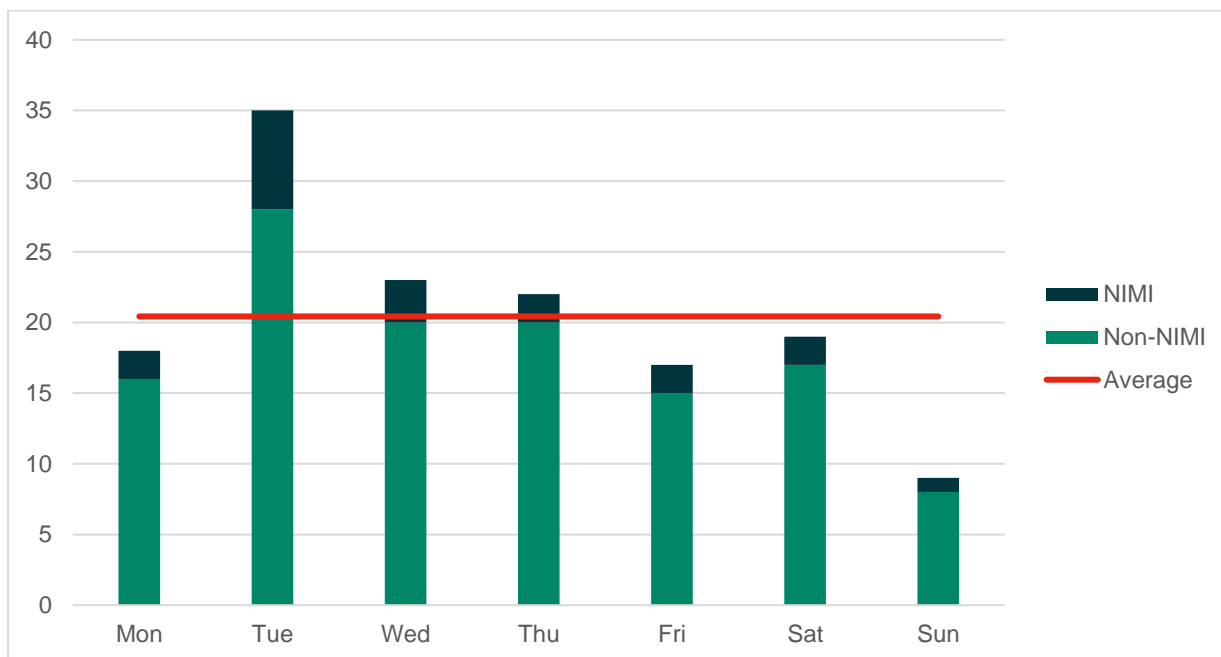
In the IRIS data set, March and July had the highest number of reported pedal confusion incidents (16) and these months were closely followed by January and May which both had 15 reported incidents. The highest number of NIMI incidents was recorded in March (3) however the months with the highest frequency of serious incidents as a proportion of the total incidents that occurred during the month was April (33%) and June (30%).

Whilst the data showed that pedal confusion incidents occurred with a higher frequency in some months than others, the trends were fairly weak and more detailed data would therefore be needed to identify whether there is a relationship between the number of collisions and the month of the year. The limited quantity of NIMI incidents available for study in the IRIS database also meant that it was not possible to determine whether there was a relationship between the month and the incident severity. Further data would also be required to explore this relationship further.

Day of week

Figure 4.3 presents the incidents related to pedal confusion by day of the week and includes the NIMI and non-NIMI data in the IRIS database for the period 2015 to 2019.

Figure 4.3 Number of pedal confusion related incidents by day of the week (n)



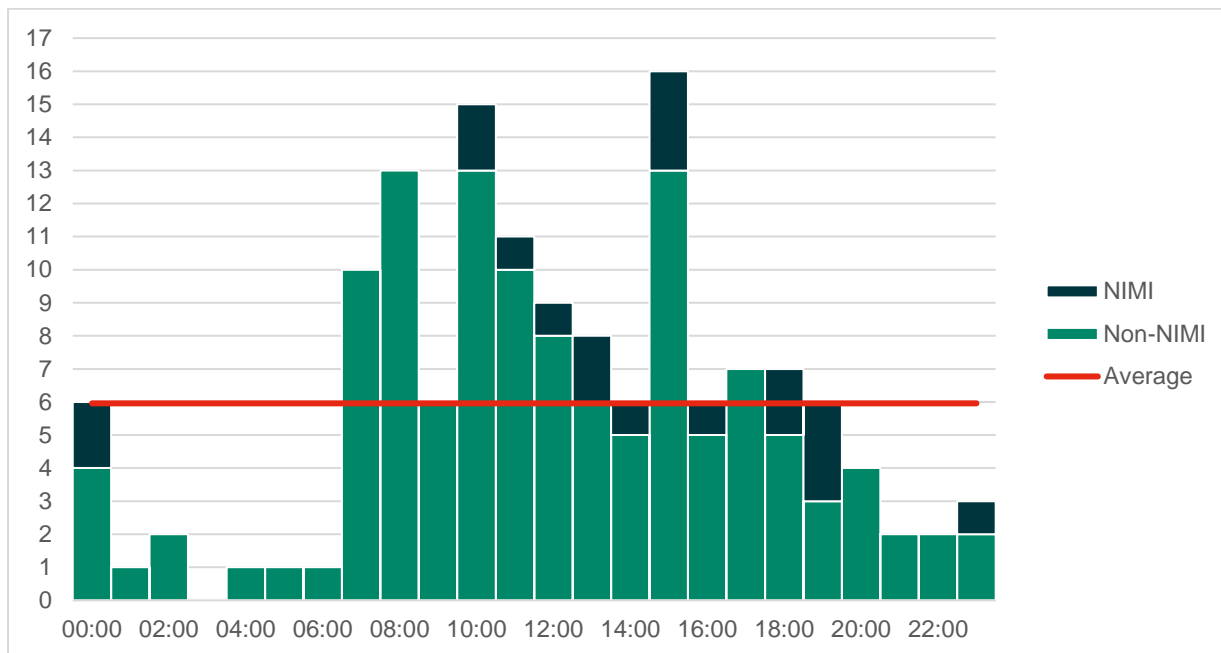
Tuesday clearly had the highest number of reported pedal confusion incidents both in terms of overall number and the number of NIMI incidents. The proportion of the overall pedal confusion related incidents that were classed as NIMI incidents was also highest on a Tuesday (20%). The remaining days of the week, excluding Sunday, all appeared to have a similar level of reported incidents in the IRIS data set (in the range from 17 to 23). There were very few incidents recorded on a Sunday, although this may be because there is a reduced service on a Sunday.

Over the period of study, pedal confusion incidents occurred considerably more frequently on a Tuesday than any other day. Of the relationships studied relating to time of day, day of the week and month of the year, this was the clearest indication that there might be an underlying pattern in the data. It is worth stressing however that data would need to be studied over a longer period to confirm whether this represents a trend or if this was purely coincidental.

Time of day

Figure 4.4 shows how the number of pedal confusion incidents varied by hour of the day and is again separated into NIMI and non-NIMI incidents.

Figure 4.4: Number of pedal confusion related incidents by hour of the day.



There were very few incidents recorded during the early hours of the morning when the traffic on the network was likely at its lowest. The number of incidents recorded increased significantly from 07:00 onwards, which could be linked to a potential increase in traffic volumes during morning rush hours. The hour with the highest number of incidents was 15:00 – 16:00 and this was closely followed by 10:00 – 11:00. Whilst there were a few hours which had higher numbers of incidents recorded, there does not appear to be a significant variation.

The number of incidents recorded was lower for the hours from 20:00 onwards however there was a slight increase in the number of incidents recorded for the hour 00:00 – 01:00. When compared to the hours in the middle of the day, which generally saw higher levels of incidents than the hours during the evening and early hours of the morning, the hour 00:00 – 01:00 does not have a significantly high level of incidents. However, when comparing the six incidents recorded in this hour to the number of incidents recorded in the other hours from 20:00 to 07:00, there is a marked increase in incident levels for this hour.

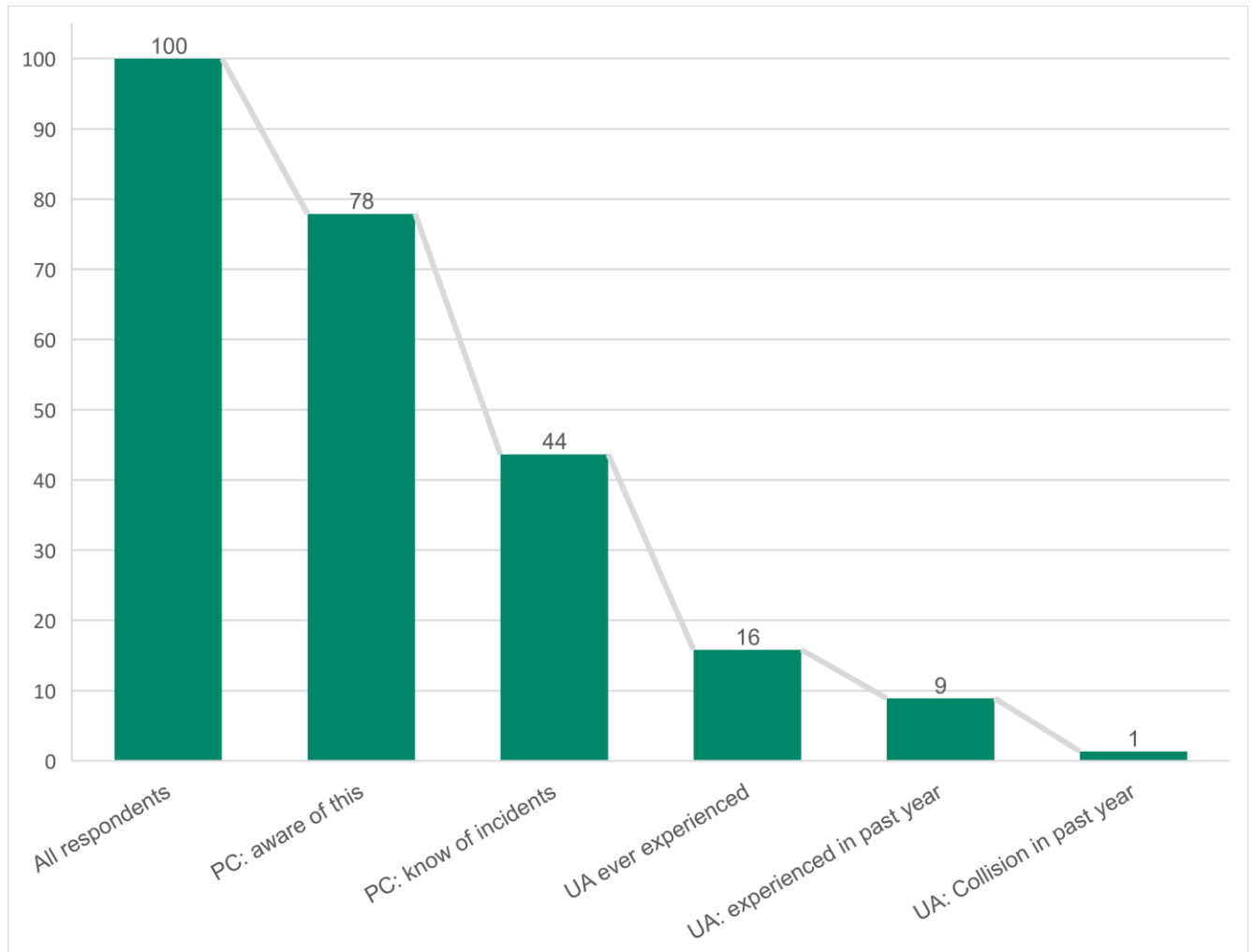
Like many of the findings in this study, more detailed data would be needed to clarify whether the peak in incidents in the hour 00:00 – 01:00 was significant or whether this was purely coincidental. Furthermore, more detailed data would be required to determine if there are hours of the day that have a higher rate of incident occurrence.

4.2 Drivers reporting of pedal confusion

When asked about their awareness and experience of pedal confusion, approximately 1 in 5 drivers were unaware of pedal confusion (22%), 44% had awareness of pedal confusion incidents and 56% were not aware of any pedal confusion incidents.

Figure 4.5 shows the awareness of pedal confusion (PC), which may include harsh braking due to the definition provided to drivers in the survey and those who have experienced unintended acceleration (UA).

Figure 4.5 Awareness of pedal confusion; experience of unintended acceleration (%)



Base: all respondents (n=593)

Occurrences of unintended acceleration

Drivers in the survey confirmed the following, specifically about unintended acceleration:

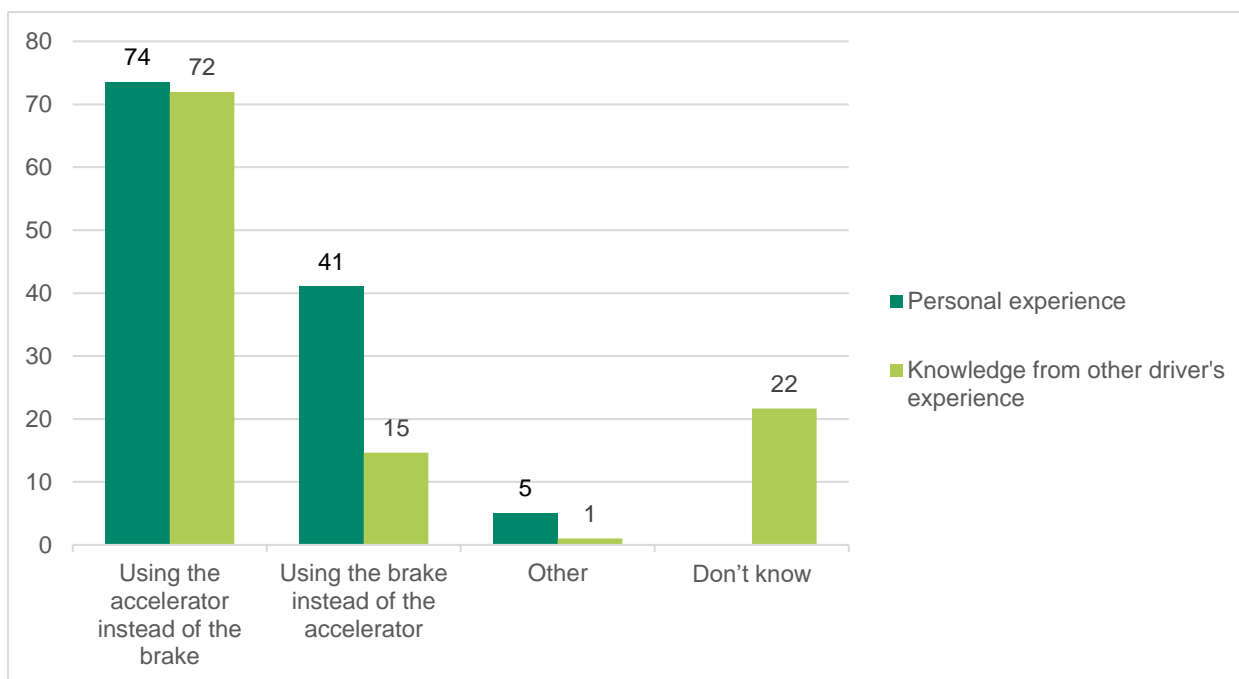
- 16% of drivers have experienced unintended acceleration;
- 9% of drivers experienced unintended acceleration in the past year; and
- 1.3% of drivers experienced a collision due to unintended acceleration

Of the 53 drivers who experienced unintended acceleration in the past year, 85% of these experiences DID NOT result in a collision, these are assumed to be near misses.

Additionally, drivers with less than 5 years' experience are less likely to know of any other drivers' experience of pedal confusion compared with those who have more than 5 years' experience (46% compared to 33%), while the proportion who do not have any knowledge of pedal confusion is similar irrespective of experience.

Figure 4.6 shows whether driver's knowledge and experience about actual incidents were unintended acceleration or harsh braking.

Figure 4.6 Experience of pedal confusion (%)



Base: Personal experience (n=127); Knowledge from other driver's experience (n=157)

This report continues to look at the higher proportion of driver's experience and workshop attendees knowledge, which is unintended acceleration, however, 41% of drivers stated they have used the brake instead of the accelerator, although the outcomes of these types of pedal confusion are unknown.

Of those who experienced pedal confusion, about three-quarters (74%) said they had used the accelerator instead of the brake, while 72% of those who were using their knowledge of other driver's experience understood it was unintended acceleration.

When asked about the anticipated frequency of a pedal confusion incident occurring, many drivers were unsure.

4.3 Summary of pedal confusion occurrences

Findings from IRIS data:

143 pedal confusion incidents reported between 2015 and 2019.

- An average of 29 incidents per year. 19 were flagged as NIMI;
- An average of 2.4 incidents per month;
- Tuesday saw the highest number of incidents (35) and Sunday the lowest (9); and

- The times when the highest number of incidents took place was between 15:00 and 16:00 and between 10:00 and 11:00.

Findings from the online survey

- Approximately 1 in 5 drivers (22%) were unaware of pedal confusion (78% aware);
- 44% had awareness of incidents (56% unaware);
- 16% of drivers reported having experienced unintended acceleration at any time;
- 9% of drivers reported having experienced unintended acceleration in the past year; and
- 1.3% of drivers reported having experienced a collision due to unintended acceleration.

Of the 53 drivers who experienced unintended acceleration in the past year, 85% of these experiences did not result in a collision. This low number means significant conclusions cannot be made and data should be treated with caution and considered indicative.

5. Causes of pedal confusion

5.1 Secondary data

The following section describes the possible causes, other than time of day (see section 4).

5.1.1 NIMI data

Records for each incident included the date of incident, route, operator, and vehicle information; and a brief description of the event and the key findings resulting from the investigation. In addition to the information provided in the database, further information about the 16 cases with completed investigations was obtained, including details of driver shift patterns leading up to the incident and drivers' experience in operating the model of bus involved in the incidents.

As the NIMI data didn't cover the same reporting period as the IRIS data therefore it was not possible to treat the NIMI data as a sub-set of the IRIS data. Additionally, whilst the NIMI records included useful information that was not contained in the IRIS databases (namely shift pattern information, vehicle type and drivers' experience of operating the vehicle involved in the collision), the small number of records available for study meant that it was not possible to draw statistically significant conclusions from the information.

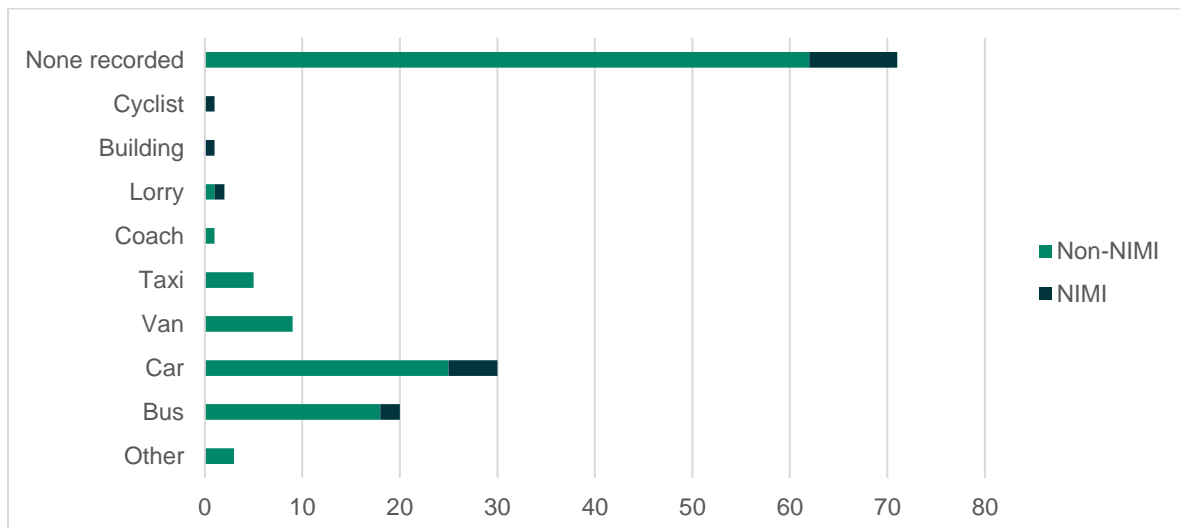
For this reason, the remainder of the analysis focuses on the data in the IRIS databases.

5.1.2 IRIS data

Third party involved

Figure 5.1 splits the pedal confusion incidents with respect to the third party involved in the collision.

Figure 1.1 Number of pedal confusion related incidents by third party involved (n)



Base: 143 pedal confusion incidents

Of the 143 incidents identified in the IRIS database, 71 had no third party recorded despite many of the incident descriptions suggesting that a third party was involved. Most of the

remaining incidents involved cars or buses which were often the nearest object at the point of pedal confusion occurring.

The incident descriptions suggest that many of these incidents occurred while the bus was in stop-start traffic.

Recommendations

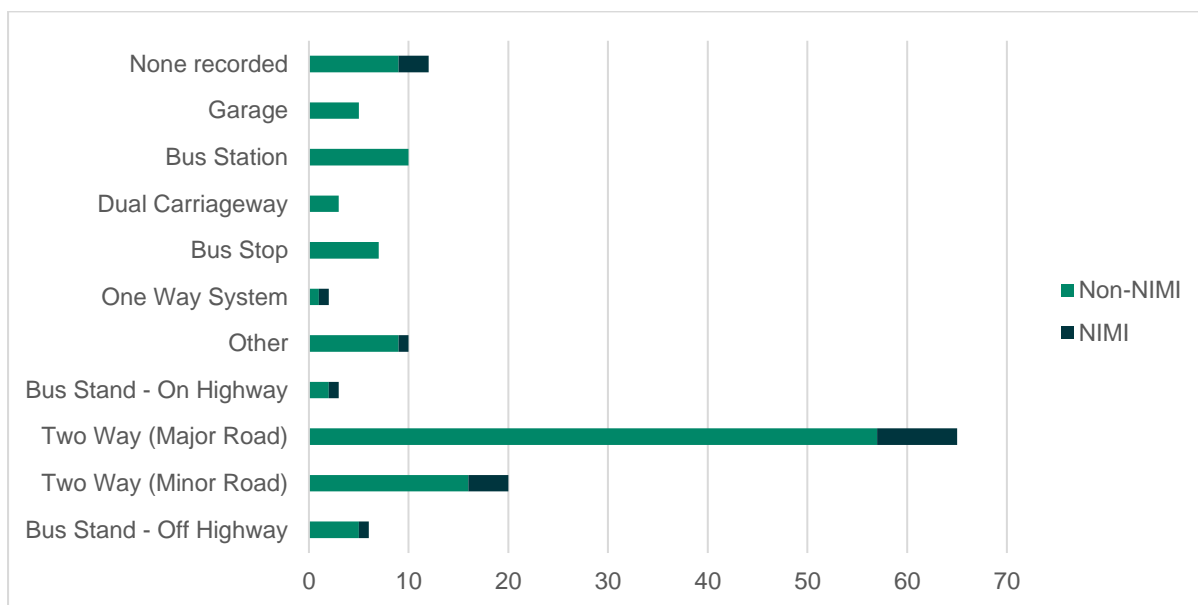
To aid future analysis it is recommended that a comprehensive review of the IRIS and NIMI database fields is carried out, with fields expanded as follows:

- Manoeuvre being performed at the point of the incident;
- Whether the incident is specifically related to pedal confusion;
- Clear details of the vehicle model;
- Drivers’ experience in operating the vehicle involved in the incident; and
- Shift patterns or length of time on shift at the point of the incident occurring.

Location Type

Figure 5.2 shows the location of the incidents related to pedal confusion and includes the 143 identified instances in the IRIS database.

Figure 5.2 Number of pedal confusion related incidents by location (n)



Base: 143 pedal confusion incidents

Most of the records had location information included, though there were 12 incidents that were missing this information. Almost half of all incidents occurred on two-way major roads and the next most common location was two-way minor roads. Many of the incident descriptions that had these two locations recorded referred to stop-start periods in traffic or where buses were on approach to bus stops.

Though it appears that incidents are more likely to occur on major and minor roads with two-way traffic, it is important to consider the proportion of each journey spent in these locations. Traffic flow information would need to be considered in further research to allow a better understanding of whether pedal confusion incidents are more likely to occur in these locations

or whether incidents occur more frequently due to the relatively greater time spent in these locations.

Recommendations

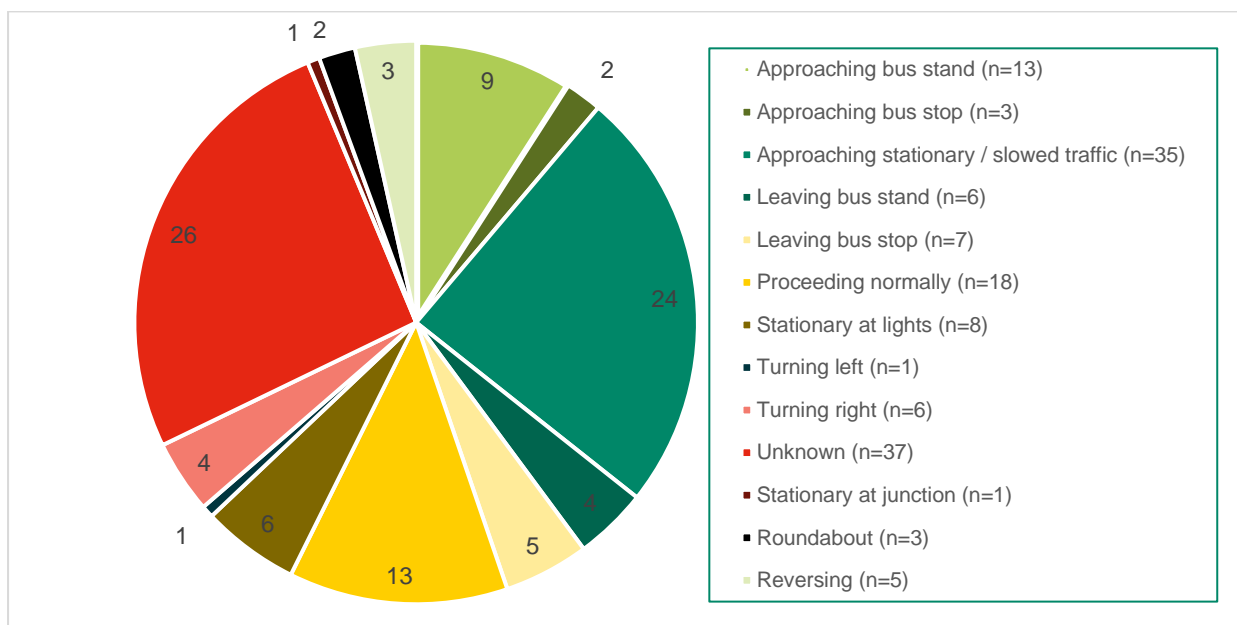
Make sure key fields, such as location, if not all fields, in the database have a forced response when data is inputted.

Measure traffic congestion levels or traffic flow at the incident location at the time of the incident and validate with previous days/weeks at the same time of day to validate if this was usual or unusual.

Manoeuvre Involved

Figure 5.3 categorises the 143 pedal confusion incidents identified in the IRIS database by the manoeuvre that was being performed at the point that the incident occurred.

Figure 5.3 Manoeuvre performed at point of pedal confusion (%)



Base: 143 pedal confusion incidents

The manoeuvre for each incident was determined using the incident descriptions which, for over a quarter of cases, was not clear enough to categorise the incident. Based on the analysis, the most common manoeuvre that led to pedal confusion incidents was ‘approaching stationary / slowed traffic’. Almost a quarter of all incidents occurred under these circumstances. Further evidence would be needed to confirm whether there was an increased frequency of pedal changes in slowed or stationary traffic which may be a contributing factor. Other manoeuvres with a significant share of the total incidents included ‘proceeding normally’ (13%) and ‘approaching bus stand’ (9%).

Given that it was not possible to determine the manoeuvre for such a high proportion of the incidents, it was difficult to identify patterns in the data. A clearer, more consistent method for recording this data would be required to delve into this.

Recommendations

Add a data field or fields which clearly state the type of manoeuvre being completed to reduce the proportion of unknown manoeuvres. The list in this report could be used as a starting point, with a comments box for additional detail.

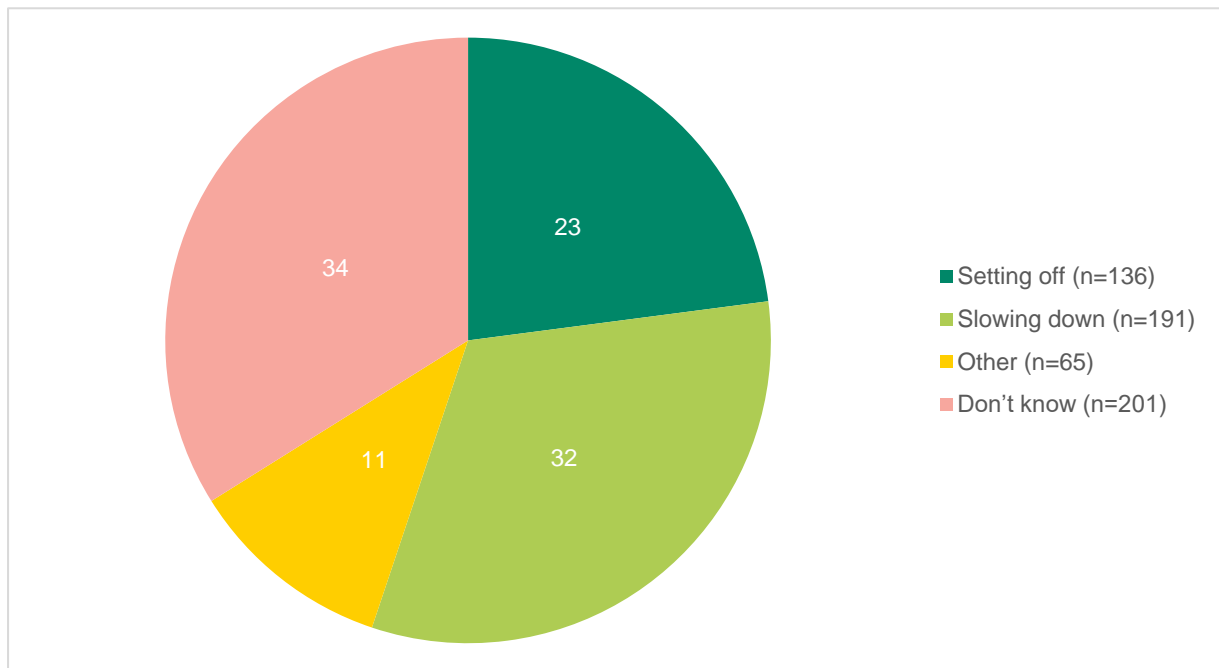
Consider using technology such as footwell cameras to measure and record whether the number of pedal changes were high, regular or low. The definition of high, regular, low and the number in the scale would be better determined by TfL and other experts.

5.2 Online survey

5.2.1 When might pedal confusion occur

Drivers were asked when they believed pedal confusion was most likely to occur and the point in a shift it is most likely to occur. Figure 5.5 shows the outcomes, where setting off and slowing down includes from a garage (depot), from a bus stop or at a junction. Figure 5.6 shows the outcomes by shift.

Figure 5.5 Driver opinion: When is pedal confusion most likely to occur (%)

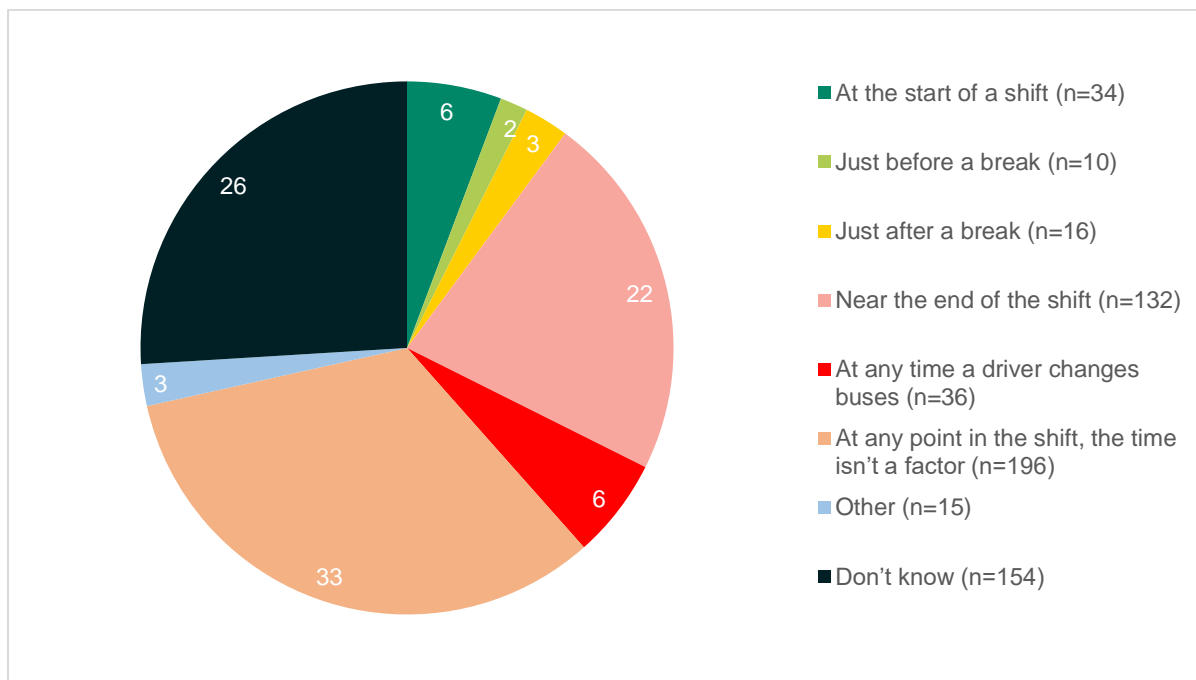


Base: all respondents (n=593)

Similar to the manoeuvre data, the breadth of response varied, including 34% who felt they didn't know enough to answer. The other responses were mainly:

- At any time (n=16);
- Slowing down and sitting in slow moving traffic (n=14); and
- Others such as along a straight road, when tired and that it does not happen.

Figure 5.6 Driver opinion: When in a shift is pedal confusion most likely to occur (%)



Base: all respondents (n=593)

In total, 33% of drivers felt that pedal confusion could occur at any time, and when those who stated they don't know are removed, this increases to just over half the drivers (52%). In addition, drivers who had experienced pedal confusion previously were more likely to say that pedal confusion is most likely to occur at any point in the shift compared to those who had not experienced pedal confusion (50% compared to 29%).

When drivers were asked for reasons, they felt these specific timings were most likely to be when pedal confusion might occur, the main reasons provided were consistent, irrespective of the time selected, and mainly:

- Long shifts, not enough rest time and time between shifts;
- Hurrying, rushing or panicking, or feeling under pressure; and
- That pedal confusion can happen at any time, therefore it's not possible to give a most likely time.

As referenced in section 1.7 of this report, a separate report TfL has previously commissioned Loughborough University to complete a study into bus driver fatigue³.

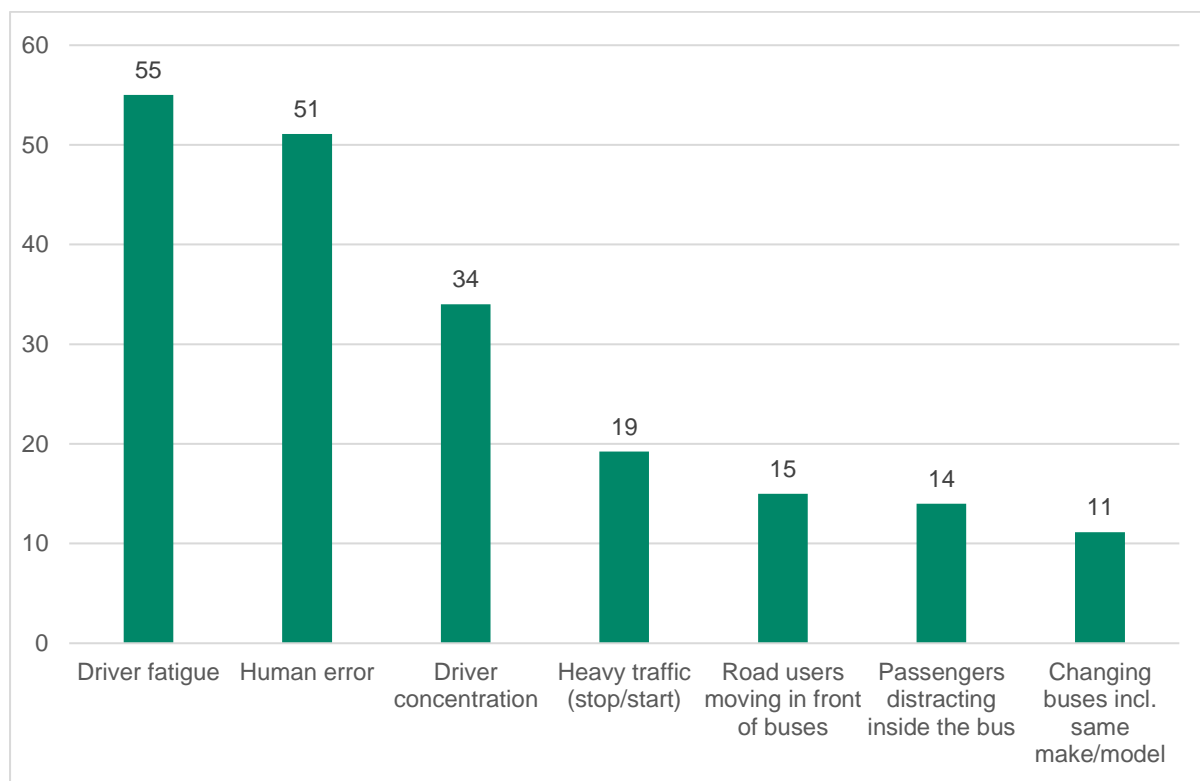
5.2.2 Main factors that cause pedal confusion to occur

Respondents were asked to give their opinion of the top three reasons they believed may cause pedal confusion and given an opportunity to offer any other reason not provided on the list of 14 potential reasons they had been asked to consider. The findings are based on their opinion and does not assume it is evidence based.

Figure 5.7 shows all the possible causes of pedal confusion that drivers gave an opinion on, those selected by at least 10% of respondents are included.

³ <https://content.tfl.gov.uk/bus-driver-fatigue-report.pdf>

Figure 5.7 Driver opinion: Factors most likely to cause pedal confusion (%)



Base: all respondents (n=593)

The three main causes in drivers opinion are: driver fatigue, human error, lack of driver concentration. In total, 49% of drivers mentioned at least one type of driver distraction (driver concentration, passenger distraction or pedestrian distraction).

The other options, in order of selection by respondents were:

The other options, in order of selection by respondents were:

- Other road users (7%);
- At blind spots (6%);
- Distraction by pedestrians outside the bus (6%);
- At bus stops (5%);
- Drivers unable to hear the acceleration (4%);
- Pedal shape, placement or layout (4%);
- Rushing or panicking, feeling under pressure (4%);
- Stress (3%);
- Driving when dark (2%); and
- Driving a night bus (2%).

Drivers with over 5 years' experience were more likely to feel that fatigue was one of the three main causes compared to drivers with under 5 years' experience (60% compared to 48%), although both levels of experience ranked this highest as a possible cause.

Drivers who had experienced pedal confusion previously (n=127) listed human error (54%), driver fatigue (51%), driver losing concentration (31%) and driving in heavy traffic (27%) as the most likely causes of pedal confusion.

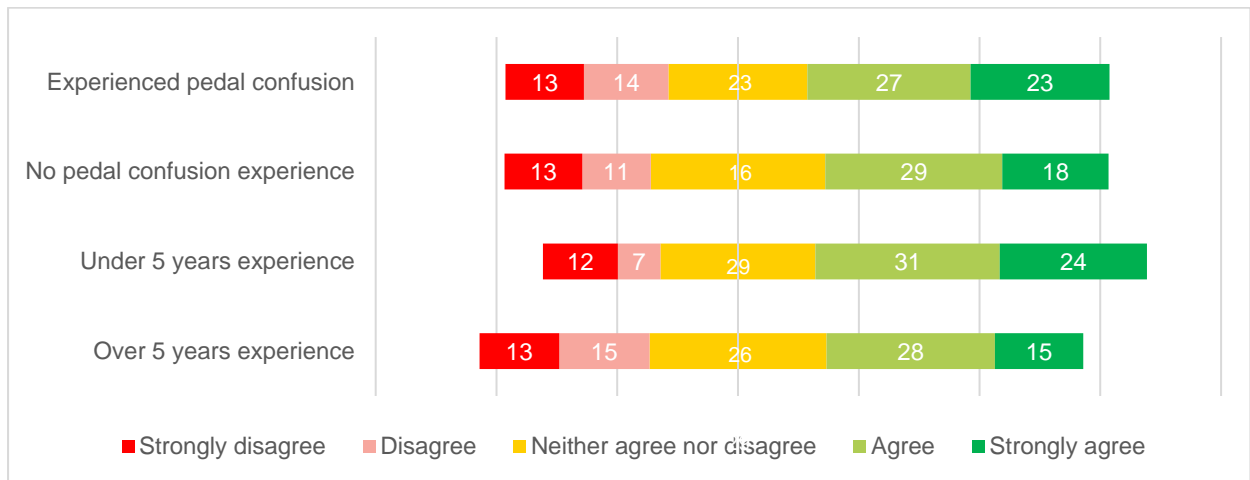
5.2.3 Driver training

Drivers were asked about how much they agreed with the following statement:

“I have been trained to recognise when unintended acceleration is occurring and how to respond to it”

Figure 5.8 shows the responses from drivers based on their driving experience and personal experience of pedal confusion.

Figure 5.8 Driver opinion: Training on unintended acceleration (%)



Base: all current bus drivers (n=567)

More drivers with under 5 years’ experience agree with the statement than those who have over 5 years’ experience (55% compared to 43%). However, there is no significant difference in the views between those who have and have not experienced pedal confusion.

5.3 Workshops

The causes and occasions when drivers thought that pedal confusion might occur were discussed in all workshops. Table 5.1 outlines the workshop and day-to-day roles of attendees in each workshop. A total 86 stakeholders participated in the workshops. In addition, of 45 drivers participated in separate workshops with 2 to 4 drivers attending each session.

Table 5.1 Stakeholder workshops and roles of attendees

Workshop	Representing	Roles and responsibilities of attendees
1	Bus manufacturers	Bus manufacturers
2	TfL	Health and safety experts
3	TfL	Operations experts
4	Bus operators	Health and safety experts
5	Bus operators	Operations experts
6	Bus operators	Incident investigators
7	Bus operators	Driver trainers
8	Union representatives	Bus operator staff nominated representatives
9	Union officials	Union officials
10	TfL and bus operators (combined group)	Engineers

The outcomes of these workshop discussions have been divided into possible causes related to the vehicle and driving conditions and possible causes that related to a driver.

Everything stated in the workshops was the attendees own opinion based on their experience and was not evidence based. Quotes from the workshop about each topic are shown in Appendix F.

5.3.1 Possible Causes: Vehicle and driving conditions

Many of the workshop respondents thought that similar aspects of the vehicle might contribute towards pedal confusion including:

Different pedal configurations or cab design

Attendees pointed out that pedals differ from bus to bus, both make and model, which means this is something drivers have to get used to, 86% of drivers state they drive more than one bus per shift (see Figure 3.3). Bus drivers thought that electric buses and the New Routemaster bus had pedals that were particularly close together.

The gap between the accelerator and brake pedals, the type of pedals and the height of pedals were all areas of discussion in many of the stakeholder workshops. These features are regulated by national and international regulations. The view was that generally drivers were able to use both pedals by swivelling their foot at the heel (which is a poor driving technique), rather than lifting their foot (which is the driving technique taught to new drivers).

There was a very small piece of analysis completed by one bus operator health and safety expert with a very small sample of six to seven incidents, which is insufficient to draw conclusions. In the small sample, the pedal layout wasn't found to be a consistent reason for the incident, however pedal layout could not be ruled out as a factor either

It is noted that Pedal Standardisation is on the roadmap for the Bus Safety Standard.

Traffic

While it was agreed by most respondents that pedal confusion could occur at any time, it was noted throughout the groups that pedal confusion tends to happen at slow speed and in heavy traffic building upon the evidence from the IRIS data. Further analysis may be required to understand what the contributory factors are that lead to pedal confusion in these instances.

Hybrid and electric buses

There was a view that the acceleration in electric buses, as well as being quieter, was quicker compared to diesel buses.

Some stakeholders thought that regenerative braking on hybrid and electric buses contributed to pedal confusion. The view held by some stakeholders is that during regeneration as the bus slows down the driver may falsely believe their foot is on the brake pedal and this may not be the case. In an emergency situation, those who thought this may be happening also thought that when the driver intends to press the brake the driver is likely to press the pedal as hard as possible but does not realise their foot is on the accelerator.

Footwear choice / lack of feeling of the pedals underfoot

Stakeholders thought that that footwear could make a difference to what the drivers can feel underfoot. Union representatives had a view that drivers do not always wear appropriate footwear. Some drivers in other workshops added similar points.

Driving different models of bus on the same shift / general unfamiliarity with the bus design

Some drivers are required to drive more than one bus per shift, as referenced in section 5.2 of this report. Some drivers we spoke to felt this could potentially contribute towards pedal confusion.

It is noted that Pedal Standardisation is on the roadmap for the Bus Safety Standard.

Recommendations

Explore pedal differentials such as height of pedals and spacing between pedals further. Analyse pedal layouts on all 143 previous incidents, where data is available.

Ensure pedal layout, pedal types, height and spacing are recorded on future incident investigations and included in the IRIS database.

Review current bus operator driver training for correct use of pedals.

Conduct further analysis to understand whether travel at slow speed and/or heavy traffic is a contributory factor and if so, further work such as driver training to be determined.

Conduct further analysis to measure brake regeneration in hybrid and electric buses as a possible cause using current data and/or track tests with drivers.

Review whether footwear has a link to pedal confusion incidents or near misses by reviewing current evidence. If a link is found, further work on footwear requirements should follow and footwear type and condition to be considered to be added to the IRIS database.

Confirm whether bus operators have a footwear regulation or guidance for drivers and where this is the case, review the regulation or guidance.

5.3.2 Causes: Driver related

Driver distraction and driver pressure were mentioned as possibly contributing to pedal confusion by stakeholders across all workshops. In some cases, it might be that these are causes of an emergency situation rather than a direct cause of unintended acceleration. Where a workshop participant thought there may be a direct link these are discussed below.

General driver distraction

Drivers may become distracted for many reasons such as:

Radio controllers contacting drivers

A small number of drivers mentioned that bus operator radio controllers contacting them whilst driving and the pressure they feel to answer the radio before they have managed to stop the bus might contribute towards pedal confusion occurring.

The operator health and safety discussion built on this point further by identifying that the radio button to speak to controllers is on the floor and while drivers should not be in contact with controllers while driving this may not always be complied with.

Passengers / passenger behaviour

Respondents pointed out that drivers may be distracted by passengers' behaviour on the bus behind the driver or when passengers talk directly to them.

Other road users' actions / road conditions

Bus drivers in the workshops described feeling that they have to concentrate hard as they need to read the road ahead, be aware of pedestrians, cyclists and other drivers as well as reading the traffic and safely stopping the bus. Some actions of others around them may cause them to perform an emergency stop or cause panic braking.

Respondents also discussed other possible causes of pressure that could cause driver distraction which have the potential to contribute towards a pedal confusion incident. These included:

Home life pressures (need to pick the children up, family commitments)

A number of respondents provided their view that external timing pressures with family commitments will sometimes cause a driver to rush or to be thinking about that rather than the driving of the bus. Their belief is that rushing to a finish can potentially contribute to an incident of pedal confusion occurring.

Drivers rushing: To achieve their stand time or to finish a shift

Some respondents thought that traffic or incidents on the road may result in buses falling behind schedule and that in these incidences drivers may feel under pressure to make up the time to get back to the depot and not have a route running late.

No toilet facilities in rest areas

One driver felt that in some cases, no facilities at one end of a route may lead to a loss in concentration later during the shift.

Tiredness / fatigue

Some respondents thought that on some days drivers will just be tired or fatigued and therefore their attention to detail and to their driving may not be as accurate or as focused than other days when they are not feeling as tired.

As referenced in section 1.7 of this report, a separate report TfL has previously commissioned Loughborough University to complete a study in to bus driver fatigue⁴.

Recommendations

Review current technology that uses sound to alert drivers to a potential incident to assess if a similar method and any learnings can be applied as an effective intervention for pedal confusion.

Identify whether there is a link between driver fatigue and pedal confusion*

Explore how driver stress can be managed for each possible circumstance*

- Communication with radio controllers; type of communication such as late running and driver response and impact on driver**.
- Personal pressure: Drivers want or need to meet timings
- Personal pressure: Home life problems impact on driver concentration

Explore how passenger distraction can be minimalised, for example through driver training, improving passenger information to answer common questions and improved customer education on not speaking to the bus driver whilst the vehicle is in motion.

*Outcomes may be linked to the Loughborough study about driver fatigue.

**Review bus operator policy about communication with drivers whilst driving including:

- Bus operator policy;
- Guidance in the Big Red Book and whether this can be improved; and
- Whether best practice from both the bus operator policy and the Big Red Book can be integrated.

⁴ <https://content.tfl.gov.uk/bus-driver-fatigue-report.pdf>

6. Solutions

6.1 Introduction

Those who responded to the survey and attended the workshops were asked for their views about possible solutions to pedal confusion, using a defined list based on previous research in 2018 and further investigation by TfL since.

This section uses the opinions of those who participated in the survey and the workshops. In the workshops, attendees often clarified there was no data evidence for their views, only their opinion, and often stated more data was needed to validate their opinion.

Recommendation:

Opinions reported in this section should be reviewed by gathering and analysing data which either proves or disproves the view and provides a sense of scale to the value of the solution.

As described in section 3, 96% of those who responded to the online survey were current drivers. In the online survey, respondents were asked for their level of agreement about various solutions and whether they would reduce pedal confusion.

These responses have been ranked based on the difference between those agreeing and disagreeing, as shown in Table 6.1

Table 6.1 Possible solutions to reduce pedal confusion in rank order

Possible solution	Ranking	Net Percentage
Improved driver training about pedal confusion	1	75
Giving drivers time to prepare when changing buses	2	69
*Having the same types of pedals and pedal layout for all makes/models of bus	3	68
*Making sure drivers can see all around the exterior of the bus before setting off, i.e. no more blind spots	4	59
Using the same bus for the whole shift	5	44
*Having a visible cue, such as a light, to inform the driver when the accelerator and brake pedal are being pressed	6	42
Drivers being provided with approved footwear to be used when driving buses	7	42
* Forcing a driver to apply the brake pedal before engaging a gear to drive away ¹	8	41
*A detector to automatically brake, based on sensors which deem when a bus is likely to be unintentionally accelerating	9	41
*Having an audible cue to inform the driver when the bus is accelerating from a low speed or stationary position	10	29

Base: all respondents (n=593)

¹ Description provided to drivers in the survey as some drivers may be unfamiliar with the term brake toggling.

*These are the six possible solutions already included in the BSS roadmap for new build buses and were the ones discussed in more detail in the workshops.

The remainder of section 6 will look at the benefits and limits of each of the six solutions discussed in the workshops as well as other solutions suggested that were not listed.

Everything stated in the workshops was the attendee’s own opinion and was not evidence based. Quotes from the workshop to demonstrate each topic is shown in Appendix G.

6.2 Suggested solutions

6.2.1 Brake toggling

Brake toggling was introduced during the discussions using the text below. All workshop attendees were advised this was introduced into the 2021 BSS and required on all new buses being delivered that meet the 2021 BSS specification.

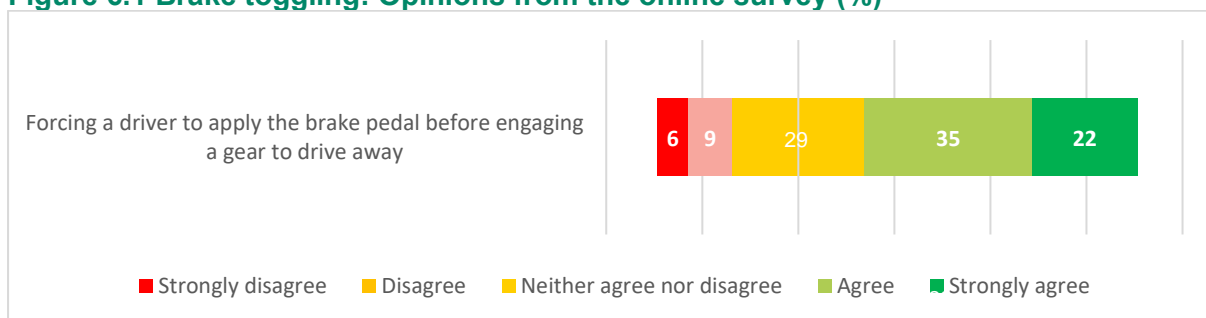
This solution would enable the driver to re-initialise their right foot/driving position and update recent memories of the brake position before leaving a bus stand/stop. This is achieved by the driver needing to double tap the brake before the bus will move forwards (accelerate).

This solution would also avoid errors linked to drivers not following expected driving operations when stopped at a bus stop/stand.

The addition of such a solution could be fitted on an operated bus as long as (light) training is provided to the drivers.

The drivers who answered the online survey saw this described in a more succinct way as shown in Figure 6.1.

Figure 6.1 Brake toggling: Opinions from the online survey (%)



Base: all respondents (n=593)

Over half (57%) of respondents (drivers) either strongly agreed or agreed that brake toggling would be a possible solution with an overall ranking of eight out of the ten suggested solutions.

Opinions of workshop attendees about benefits and limitations of brake toggling

Main Benefit: Expected to be more useful when the bus sets off

Main Limitation: Not expected to be as useful when the vehicle is in motion

Context: 59% of incidents occur when the vehicle is moving;
16% as the vehicle is setting off;

Context (cont.) 26% unknown.

Reference: Figure 5.3 of this report

Topic: Brake toggling as a benefit

Many of the workshop attendees recognised that a clear benefit of having brake toggling was the idea of making drivers find the two pedals sequentially and therefore promoting muscle memory.

A possible additional benefit is for times when buses are in stop-start, heavy traffic.

Topic: Brake toggling as a limitation

The main limitation is the requirement for brake toggling when the vehicle sets off, when more incidents occur when the vehicle is approaching a stop or stand.

Recommendations for brake toggling

Monitor any future pedal confusion incidents and any near misses, with a record of whether the vehicle involved had brake toggling.

In cases where a bus involved in an incident had brake toggling, record the time and/or distance the bus was last stationary to validate whether a driver had driven for a sufficient time or distance to mis-align their foot placement.

6.2.2 Pedal Acoustic Feedback (audible cue)

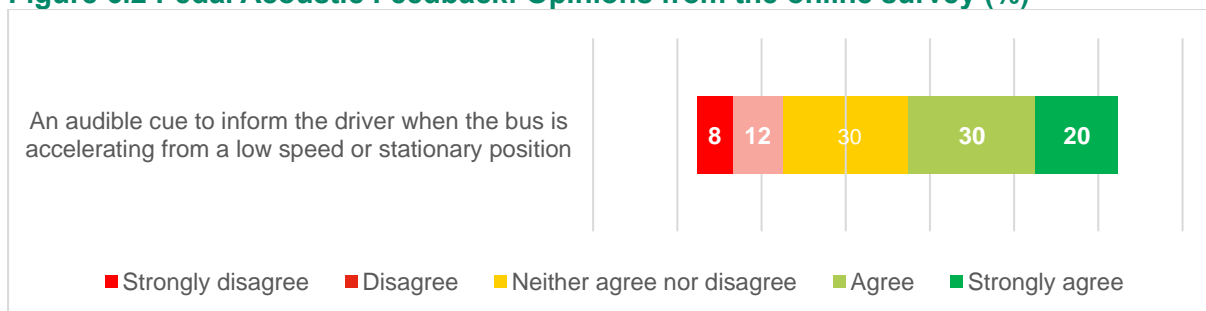
Pedal Acoustic Feedback was introduced during the discussions using the text below. All workshop attendees were advised that Pedal Acoustic Feedback had been a requirement of the 2021 BSS. To note, implementation has been paused until the completion of this research.

Add / Amplify an accelerator engine sound when the bus is in electric mode and at low speed (below 20mph).

The selected sounds to be tested will be fitted in the cab using a speaker/sounder at a predetermined noise level.

The drivers who answered the online survey saw this described in a more succinct way as shown in Figure 6.2.

Figure 6.2 Pedal Acoustic Feedback: Opinions from the online survey (%)



Base: all respondents (n=593)

50% of respondents (drivers) either strongly agreed or agreed that accelerator sound would be a possible solution with an overall ranking of ten out of the ten suggested solutions, with 20% of respondents either strongly disagreeing or disagreeing, the most for any of the ten possible solutions.

Opinions of workshop attendees about benefits and limitations of Pedal Acoustic Feedback

- Main Benefits:** It may help drivers who don't realise their bus is still moving.
It may alert the driver's attention through the action
- Main Limitation:** Expectation / reliance remains with the driver to respond
- Context:** It may alert the driver's attention but the action and response remains with the driver
- Pre-conception:** Drivers who have driven with AVAS on electric buses hold a concern about any sound used being continuous and therefore irritating, and this pre-conception needs to be considered and overcome.

Topic: Accelerator sound as a limitation

The views widely expressed by workshop attendees was that the audible cue would create the need for a response or reaction from a driver, which means the reaction time of the driver between the audible cue being heard, the brake being applied and the stopping distance for the bus would all be factor.

Over time, with all other sounds in the cab this would become white noise to a driver.

There was still some reliance on the driver to realise there was unintended acceleration and to respond correctly. The opinion of workshop attendees was there are too many sounds already for a driver to distinguish.

Topic: Past experience

Health and safety teams commented they had tried something similar before and they did not see it as successful, and therefore their opinion is the sound does not get past the limitation of human nature and reaction time.

Recommendations for Pedal Acoustic Feedback (audible cue)

Use learnings from Acoustic Vehicle Alerting System (AVAS) project to support development of a suitable Pedal Acoustic Feedback sound including gaining buy-in from drivers.

Explore the possibility and "need" for a consistent sound on all bus makes and models as described by the TfL Operations team.

Consider using the accelerator sound as a multi-beneficial addition to improve driving style as suggested by bus manufacturers.

Monitor any future pedal confusion incidents and any near misses, with a record of whether the vehicle involved had an accelerator sound.

6.2.3 Accelerator/Brake light indicators (visual cue)

Accelerator / Brake light indicators was introduced during the discussions using the text below.

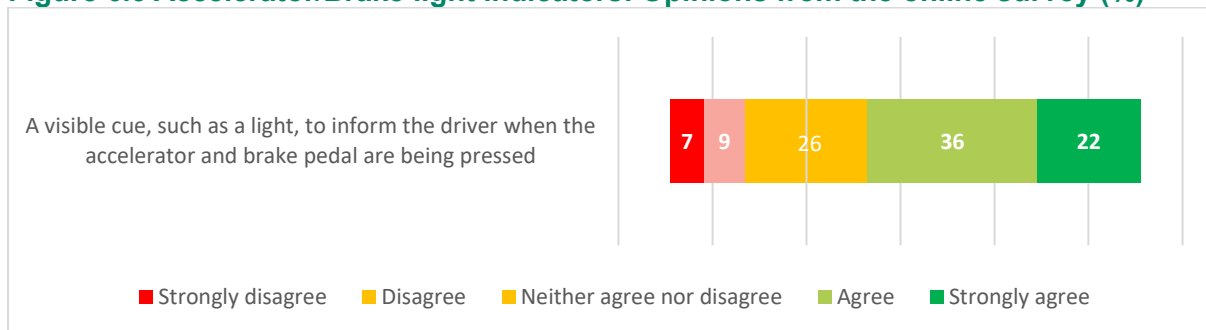
Add two LEDs/lights (one light for the brake pedal activation, one light for the accelerator pedal activation) to a bus dashboard.

The LEDs/lights should be dimmed between day/night conditions.

NOTE: Pedal indicator lights were a requirement of BSS buses from 2019

The drivers who answered the online survey saw this described in a more succinct way as shown in Figure 6.3.

Figure 6.3 Accelerator/Brake light indicators: Opinions from the online survey (%)



Base: all respondents (n=593)

58% of respondents (drivers) either strongly agreed or agreed that accelerator/brake light indicators would be a suitable solution with an overall ranking of six out of the ten suggested solutions.

Opinions of workshop attendees about benefits and limitations of **accelerator /brake light indicator**

Main Benefits: The light shows both accelerator and brake pedal use
Probably quick and cheap to implement compared to others

Main Limitation: Expectation / reliance remains with the driver to respond

Context: There are a number of light displays on the dashboard for various notifications such as engine warnings; stop request; economical driving, a widely held view is this would become another light, drivers would not pay attention to and its value will become redundant

Topic: Accelerator / brake light indicator as a benefit

Drivers saw the benefits of a visual cue compared to an audio cue as it would act as confirmation of the current action for the driver.

A number of respondents liked the simplicity of lights showing up when they press on the brake or accelerator, thought this could be simple to implement and offer some benefit to help reduce pedal confusion as it could easily identify the pedals for the driver.

Topic: Accelerator / brake light indicator as a limitation

Workshop attendees held the opinion that drivers ignore LEDS, partly because drivers might not know what all the different lights do, and there are too many lights on the dashboard already.

In the same manner as the accelerator sound, the opinions of workshop attendees held is this is still reliant on a driver's reaction and understanding. Over and above an accelerator sound, they felt having such lights could have a negative impact, if drivers are checking the light and not the road ahead.

The potential for the driver to remove their eyes from the road, led one Union Official to state their belief that there would be more benefits to an audio cue rather than visual cue and a manufacturer agreed.

Recommendations for accelerator / brake light indicators (visual cue)

Undertake a review of the benefits and limitations of accelerator / brake light indicators on existing BSS vehicles in the fleet, including but not limited to the positioning of the lights in relation to the driver's line of sight and colours used.

Monitor any future pedal confusion incidents and any near misses, with a record of whether the vehicle involved had an accelerator and brake light indicator.

6.2.4 Improved Direct/Indirect vision for a driver inside the cab

Improved direct/indirect vision was introduced during the discussions using the text below. All workshop attendees were advised this was introduced into the 2021 BSS.

Use of additional visual aids to drivers to check all areas and reduce the need for body movement (including foot movement leading to misplacement) in the driver cab when making manoeuvres.

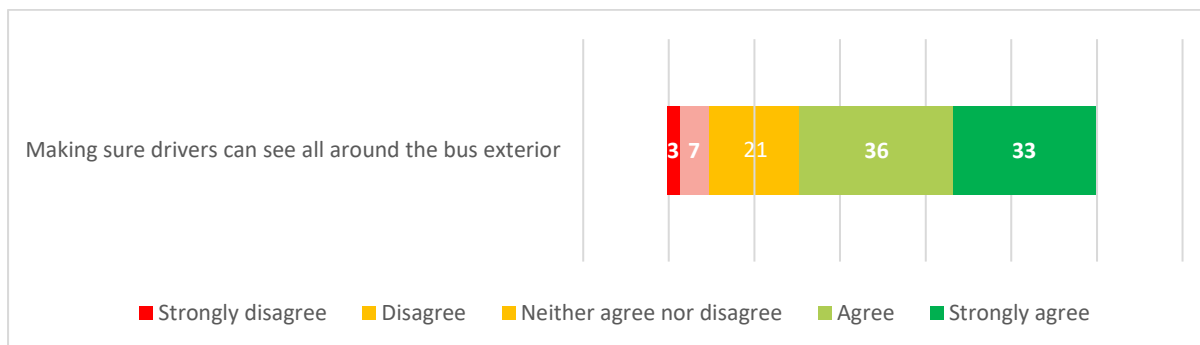
Visual driver aids such as:

- Blind spot mirrors (already fitted)
- Cameras providing external views back to driver replacing the usual wing mirrors with monitors which display view in drivers cabin

NOTE: some operators introduced Camera Monitoring Systems early; they are now a requirement of the BSS 2021 for all new buses.

The drivers who answered the online survey saw this described in a more succinct way using the wording "making sure drivers can see all around the bus exterior", as shown in Figure 6.4.

Figure 6.4 Improved direct/indirect vision: Opinions from the online survey (%)



Base: all respondents (n=593)

69% of respondents (drivers) either strongly agreed or agreed that improved direct/indirect vision would be a suitable solution with an overall ranking of 4 out of the ten suggested solutions.

Opinions of workshop attendees about benefits and limitations of improved direct/indirect vision

Workshop feedback: Most workshop attendees did not agree with a link between improved direct/indirect vision and pedal confusion

Context: Improved direct/indirect vision is designed to avoid driver movement in their cab, maintaining foot position

Topic: Improved direct/indirect vision as a benefit

Some drivers felt it might be a support for more concentration and possibly less distraction. One incident investigator had the opinion that on one occasion driver movement may have been linked to a pedal confusion incident.

Topic: Improved direct/indirect vision as a limitation

Many stakeholders required more clarity around why and how improving direct and indirect vision for a driver would be a suitable solution to reducing pedal confusion and once clarified they remained unconvinced about the link.

A union official held an opinion that if seat position was a key factor, then driver training on this topic would help.

Recommendations for improved direct/indirect vision

Monitor any future pedal confusion incidents and any near misses, with a record of whether the vehicle involved had improved direct/indirect vision and whether there is evidence of driver movement in the cab ahead of the incident or near miss.

Review the importance of correct seat positioning and if required, update as part of the driver training.

Develop driver communications and provide education around the link between driver foot mis-alignment and improved direct/indirect vision

6.2.5 Advanced Emergency Braking (AEB)

Advanced Emergency Braking (AEB) was introduced during the discussions using the text below.

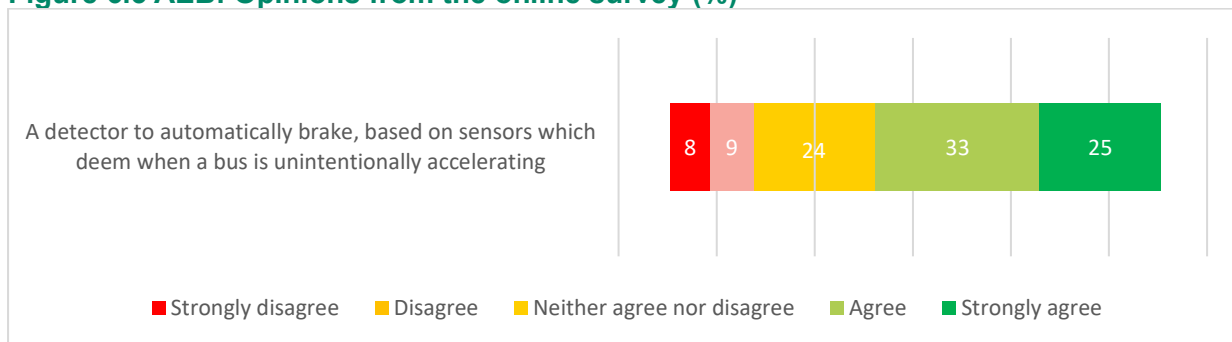
Technology capable of detecting unintended acceleration errors and intervene (e.g. automatic emergency braking interpreting the acceleration signal as a brake signal when a pedal error is detected)

AEB system activation for unintended acceleration scenarios is currently not available on the market but is under development.

NOTE: AEB solutions would be unable to be retrofitted to the current fleet of buses.

The drivers who answered the online survey saw this described in a more succinct way, using the wording “a detector to automatically brake, based on sensors....” as shown in section 6.5.

Figure 6.5 AEB: Opinions from the online survey (%)



Base: all respondents (n=593)

58% of respondents (drivers) either strongly agreed or agreed that AEB would be a suitable solution with an overall ranking of nine out of the ten suggested solutions. However, 58% agreed with the solution, the third highest of the BSS solutions presented in the workshops and the sixth highest overall.

Opinions of workshop attendees about benefits and limitations of advanced emergency braking (AEB)

Main Benefits: Provides additional support to the driver to reduce or mitigate the chances of human error.
 Reduces the expectation for the driver to react and prevents the pedal application error

Main Limitations: The parameters the AEB system will need to prevent false activations
 Trust in the technology, especially for drivers
 Time to implement

Context: Some workshop attendees believed an interim solution would be possible by overriding the driver if too much pressure is put on an accelerator, such as the force used on a brake for an emergency stop.

Topic: Advanced emergency braking as a benefit

While the online survey had a mixed response as a solution to reducing pedal confusion, most of those in the workshops felt Advanced Emergency Braking (AEB) would be beneficial as a solution to reducing pedal confusion.

There were a number of stakeholders holding a view that AEB would reduce the impact of some incidents rather than delivering the solution to avoiding pedal confusion.

Topic: Advanced emergency braking as a limitation

Bus manufacturers had concerns with AEB and felt the solution was high risk and had doubts over the benefit as a solution to reducing pedal confusion. This type of concern was also expressed in the TfL Health and Safety workshop, the Engineers workshop and by union officials

Observation: There's a need to consider instances where a bus driver will need the bus to pick up speed at a junction or as the best course of action to avoid an incident, and the design would need to factor this into the logic.

Observation: The system needs to be able to differentiate between a possible incident and a busy area, with Oxford Street used as an example where this could prove challenging.

Additional discussions in workshops recognised and stated this would be a long term consideration, as technology would need substantial testing before it could be put on the buses and for drivers to be comfortable with the technology being used.

Some drivers felt they'd need reassurance the technology would work before believing it would be a suitable solution to reducing pedal confusion and many stakeholders agreed, caveating their response until they had clarity of the parameters for AEB and how it would work in practice.

Topic: driver reliance on technology

There was a view expressed about the solution encouraging an over-reliance on technology, and reduced driver concentration.

Topic: Interim solution suggested by Engineers, Health and Safety and Operations

There was a belief that a shorter term and more cost-effective solution to pedal confusion similar to AEB was possible by overriding the driver when they apply "too much" pressure to the accelerator, where too much is comparable to the force used when emergency braking, and they believed these solutions would have a similar benefit to AEB as a solution.

Recommendations for advanced emergency braking (AEB)

Build a team of experts to design, validate and test the AEB parameters.

In the interim, assess whether the accelerator pressure solution is viable including a review of when the accelerator is currently pressed e.g., to 100% by drivers.

Establish a clear communication and training guide for buses to build confidence in the final system.

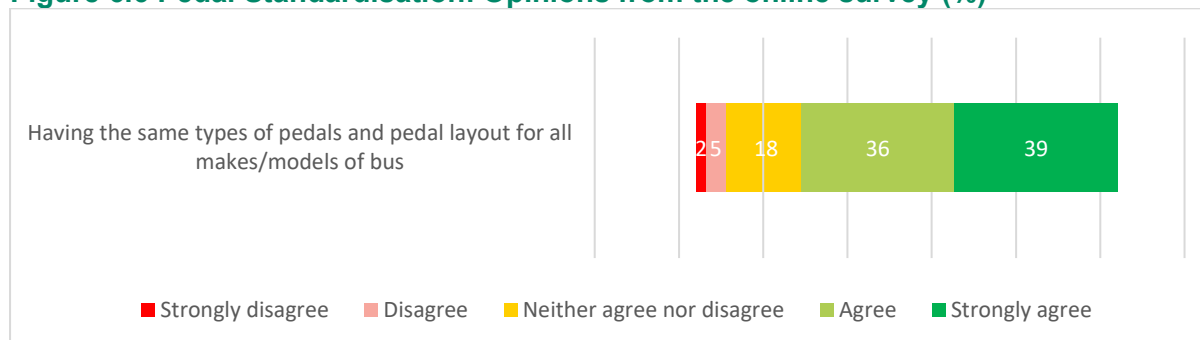
6.2.6 Pedal Standardisation

Pedal Standardisation was introduced during the discussions using the text below.

Propose a standard pedal configuration (pedal location, size, angle, pedal resistance, hanging or floor mounted) for all London buses.

The drivers who answered the online survey saw this described in a more direct way about the same type of pedals and pedal layout for all buses as shown in section 6.6.

Figure 6.6 Pedal Standardisation: Opinions from the online survey (%)



Base: all respondents (n=593)

75% of respondents (drivers) either strongly agreed or agreed that Pedal Standardisation would be a suitable solution with an overall ranking of 3 out of the ten suggested solutions and the highest ranked of the BSS solutions presented in the workshops.

Opinions of workshop attendees about benefits and limitations of [Pedal Standardisation](#)

Main Benefits: Considered to be the most effective
 Driver familiarity as they change bus make and models

Main Limitations: Design is critical to the success
 Time to implement

Context: If Pedal Standardisation is included, this needs to be right first time, as stated by Engineers and Health and Safety teams.

Topic: Pedal Standardisation as a benefit

During the workshops, the majority liked this solution, and many described this as the best solution out of the six to help reduce pedal confusion.

Many of the workshop attendees saw the benefits to having a standard pedal arrangement across all London buses, reducing unfamiliarity with pedal setup as drivers move between different models or types of buses during a shift.

Drivers identified as ‘spares’ were one group who other drivers felt would benefit from Pedal Standardisation.

Drivers felt that there was little time to familiarise themselves with the pedals but if they were all standard this would be beneficial and possibly reduce pedal confusion.

Topic: Considerations for Pedal Standardisation

The type, shape and layout of the pedals was a topic that provided different opinions. Workshop attendees agreed there needs to be differences between the pedals in order for drivers to feel the difference in terms of shape, size and feel on the foot. A definitive space between pedals, height of pedals and type of pedals was not agreed upon, although engineers, health and safety and operations experts all concurred that further data and evidence was required before any opinion could be actioned

To summarise, there was general agreement that more work was required to determine what Pedal Standardisation looks like, however there was general agreement that drivers needed to move their feet rather than have the ability to swivel their foot when switching pedals.

It was suggested to look at pedal configurations on bus makes and models which have, and have never, had a pedal confusion incident for any learnings.

Topic: Pedal pressure

One engineer noted there needs to be a change in the amount of pressure that a driver needs to apply for each pedal and suggested it should require more force to press the accelerator and comparatively less force for the brake pedal.

Topic: Limitations of Pedal Standardisation as a solution

While some drivers and stakeholders agreed that this solution could help to reduce pedal confusion, there are still some limitations as respondents also pointed out that this would not solve everything. By standardising the pedal shape, location or size, this does not account for the variability between drivers such as leg length, feet size, shoe grip/resistance and chosen comfortable seating position. These all differ between drivers and therefore will always provide variability in how the drivers position themselves around the pedals.

Whilst overall this solution was preferred by most attendees, there were concerns with the implementation time of this solution with the expectation that this would be implemented as new buses are added to fleets.

Topic: International Organisation for Standards (ISO)

Manufacturers added that all buses are produced in line with the standards set out by the International Organisation for Standards (ISO) and therefore to move Pedal Standardisation forward the ISO standard may need to be reviewed.

Manufacturers agreed that differences in a driver's physique are not a specific consideration and referenced the ISO standards they work to.

Topic: Pedal Standardisation is a contributor to the solution, not a stand-alone solution

Operators also pointed out that a limitation to this is that you can standardise the pedal configuration but on its own, it is not enough. It is also about educating the drivers to drive correctly e.g. keeping their foot over a pedal and not resting it on the floor, regardless of what the vehicle is doing and that education and training needs to be as important as the pedal configuration standardisation.

Topic: Cab design

Manufacturers felt that it wasn't only Pedal Standardisation but also features need to be considered such as seat and steering column position for driver alignment to the steering wheel.

Drivers were keen to explain that to move forward with this solution they felt they should be involved in the design discussion as they have the day-to-day experience and knowledge of the practicalities and would be the end users. Union officials and representatives suggested the same.

Topic: Training

Driver trainers expressed the need for driver training once standardised pedal configuration has been agreed, tested and implemented.

Recommendations for Pedal Standardisation

Conduct an audit of the pedal configuration of each make and model of bus, including but not limited to pedal type, spacing between pedals, pedal height and difference in height between pedals and tread wear.

Carry out analysis of the pedal configuration of each of the 143 buses involved in pedal confusion incident. Identify if there are any similarities or any specific parts to the pedal configuration which never appear; and from this form a view whether it is possible to conclude a link.

Form a working group to consider what Pedal Standardisation would look like, assessing the pros and cons of each and formulating a plan to deliver from concept to implementation.

As part of the working group, identify where drivers and driver trainers can be included.

As part of the working group, identify if the design should go further than pedal, to include other parts of the cab.

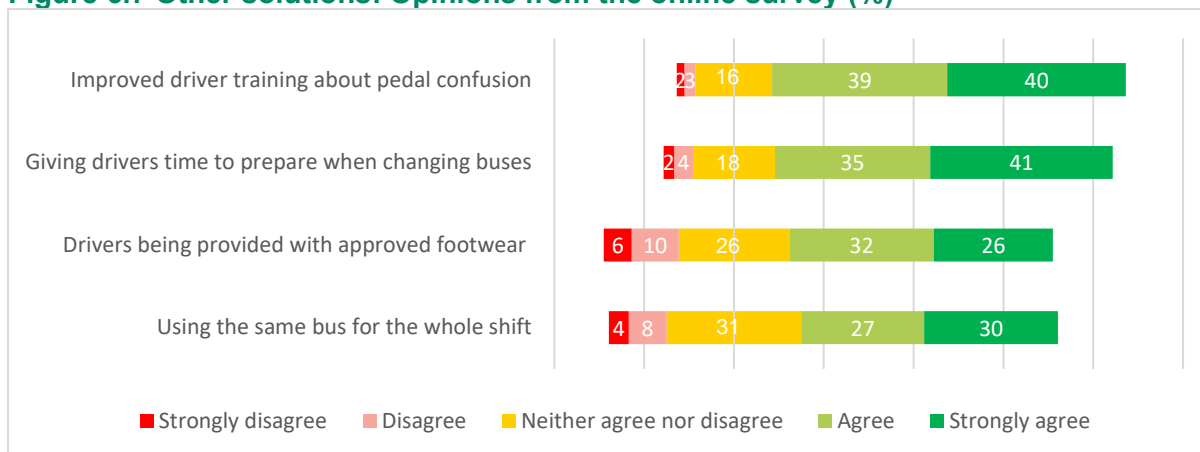
Engage with bus manufacturers to review the ISO standard.

Investigate whether the “spare” drivers have been involved in pedal confusion incidents, near misses (may include other incidents) and whether this is due to driving many makes and models with different pedal layouts

6.3 Other suggested solutions: Online survey

Prior to introducing the BSS solutions, drivers and stakeholders in the workshops were asked for their unprompted opinions on suggested solutions, while drivers who participated in the survey gave their opinions about four other solutions as shown in Figure 6.7.

Figure 6.7 Other solutions: Opinions from the online survey (%)



Base: all respondents (n=593)

Using the same bus for the whole shift

As shown in Figure 3.3 earlier in the report, 86% of those who currently drive a bus stated they typically drive more than one bus per shift, even if it's the same make and model.

Time to change a bus

In the survey, 71% of those who currently drive a bus (n=567) stated they have 5 minutes or less when changing buses.

Those who strongly agreed that giving drivers time to prepare when changing buses was a suitable solution were asked for their view of the length of time to change buses, with the outcomes shown in Table 6.2.

Table 6.2 Suggested mean, median and mode times to change buses by drivers

Average calculated	Time in minutes
Mean	8.8
Median	7
Mode*	5

Base: all respondents (n=241)

*While most drivers (n=80) stated 5 minutes, the second highest (n=62) stated 10 minutes.

Driver training

In the survey, 86% of those who currently drive a bus (n=567) stated they typically drive more than one bus per shift, even if it's the same make and model.

Footwear

Drivers who have experienced pedal confusion are more likely to strongly agree that using approved footwear is a possible solution to pedal confusion compared with those who have not experienced pedal confusion (29% and 19% respectively).

Recommendations

*Drivers trained for correct use of pedals and not swivelling the foot, using the current new driver training as a base for this.

*Review whether footwear has a link to pedal confusion incidents or near misses by reviewing current evidence. If a link is found, further work on footwear requirements should follow.

Validate drivers' opinions from the survey that 86% drive more than one bus per shift, monitor if there is any link between pedal confusion incidents and drivers changing buses and create an action plan if there is data evidence of a link.

*These recommendations are already included in the report and shown again for clarity.

6.4 Other suggested solutions: Workshops

Cut-off switch

Several workshop attendees referenced other modes of transport such as trains and trams who have an engine cut off switch often referred to as a "dead man's switch" which could mitigate the impact of pedal confusion incidents. It was recognised this may not be a solution to prevent pedal confusion but, they felt it would support in incidents where a driver is convinced, they are pressing the brake, but the bus isn't stopping.

Learning from other industries

A number of attendees to workshops asked whether pedal confusion occurs in similar types of vehicles, such as HGVs and coaches. It was acknowledged by attendees that the driving requirements and style were different, such as HGVs do not have passengers and coaches do not have the same number of start/stop procedures that a bus has.

The waste industry was referenced as having a similar start/stop in London streets and may warrant further investigation, with the only major difference being the absence of passengers.

Reducing driver pressure and fatigue

In the majority of the workshops, TfL, Operator, Unions and Drivers expressed their view that drivers working under pressure or having other distractions from passengers and other road users, are potential contributory factors in pedal confusion incidents. There was a belief that reducing pressure on drivers including time between shifts (fatigue) would reduce pedal confusion.

As referenced in section 1.7 of this report, a separate report TfL has previously commissioned Loughborough University to complete a study in to bus driver fatigue⁵.

⁵ <https://content.tfl.gov.uk/bus-driver-fatigue-report.pdf>

Recommendations

Use a working group to verify if the opinions of engineers, health and safety and operations teams are correct and a cut-off switch when too much pressure is placed on the accelerator will have an impact, can be implemented and will be safe.

Investigate if there are any learnings from other industries, specifically:

- Contact the International Bus Benchmarking Group (IBBG) and members for learnings about pedal confusion incidents (if any) from the international industry and if there is appetite for holding a discussion group to build cross-industry best practice to avoid pedal confusion incidents (see chapter 2)
- Similar to the IBBG, contact bus operators, for example, incident investigators, for a national view, starting in busy UK cities to understand whether these types of incidents occur, how they categorise the incidents and take learnings from any successful solutions.
- Contact other UK industries who drive regularly in London, as a minimum, contact the waste industry.

As recommended in Chapter 5, identify whether there is a link between driver fatigue and pedal confusion with links to the Loughborough University report.

7. Recommendations

This chapter sets out our recommendations arising from this research study. We have not been able to evaluate the potential effectiveness of the recommendations, therefore these actions are not a prioritised list.

All recommendations are based on the opinions provided in the survey and workshops, as explained in earlier chapters, these opinions are not evidence led, therefore, the recommendations are formed from the analysis of these opinions and not evidence.

7.1 Summary of recommendations

Throughout the report, recommendations have been made and the following tables summarise these recommendations. Each recommendation has received a score from 1 to 3 for each of cost, time and value, where 1 is low and 3 is high.

Cost indicator:

Cost assumption compared with other recommendations

£	May be achieved with little or no additional employee time or outlay for technology
£ £	Requires some investment in technology and/or additional employee time
£ £ £	Requires highest investment in technology, and/or additional employee time or additional employees

Time indicator:

Time assumption compared with other recommendations

🕒	Short term: Less than one year
🕒🕒	Medium term: 1 to 3 years
🕒🕒🕒	Long term: 3+ years

Value indicator:

Possible contribution as a solution to pedal confusion (guidance only)

★	Marginal impact, more indirect and less direct impact
★ ★	Medium impact: possibly offer some direct impact
★ ★ ★	Largest impact: possibly offer most directly impact

The ratings in each table should only be used as a guide and AECOM do not accept any responsibility for how this guidance is used.

Each recommendation includes a suggested “owner” of the task, again, this is for guidance and it is anticipated that TfL and bus operators would need to work collaboratively on all tasks.

Main recommendation

The main recommendation of this report is the need to gather evidence to validate each recommendation in the table below and the impact it will have to the reduction of pedal confusion incidents.

Table 7.1 shows recommendations to improve the type of data collected and analysis of all data. Using the TfL Safe Systems model, these recommendations fall under the **Post Collision Response** pillar.

Table 7.1 Post Collision Response: Understanding causes through data collection and analysis

Recommendation	Owner	Cost	Time	Value
<p>Comprehensive review of the IRIS database: Expand the number of data fields, including adding an incident category for suspected pedal confusion, vehicle make and model, engine type (electric/hybrid/diesel) and which BSS solutions were installed.</p>	TfL / Bus operators	£	🕒	★ ★
<p>IRIS database accuracy improvement: Force all fields for data entry to be comprehensive and provide guidance on how to complete entries to ensure all key data is captured.</p>	TfL	£	🕒	★
<p>Traffic flow: Explore measuring traffic flow prior to the incident to establish any abnormalities on the day of the incident.</p>	TfL / Bus operators	£	🕒	★
<p>Road layout and other external factors: Record of the road layout, traffic flow procedures (e.g. traffic lights); number of lanes, any joining or additional lanes, bus lane available. A full list to be defined by TfL and bus operator experts.</p>	TfL / Bus operators	£	🕒	★
<p>Introduce footwell cameras on all buses: Use for driver training and improvement for prevention as well as incident investigation.</p>	Bus operators	£	🕒 🕒	★ ★
<p>Pedal configuration: Carry out analysis of the pedal configuration such as but not limited to, pedal spacing, height differential, pedal type (organ or hanging) for each of the 143 incidents that have been reported from 2015 to 2019 and any incidents since 2019 and report prior to any Pedal Standardisation proposal is implemented.</p>	TfL / Bus operators	£	🕒 🕒	★ ★
<p>Improve driver reporting culture: Build an open culture with drivers to report near-misses to their operators and operators to TfL.</p>	TfL / Bus operators	£	🕒	★

Tables 7.21 and 7.22 show recommendations to understand the main possible causes of pedal confusion. Using the TfL Safe Systems model, Table 7.21 shows recommendations that fall under the **Safe Behaviours** pillar and Table 7.22 shows those that fall under the **Safe Vehicles** pillar.

Table 7.21 Safe Behaviours: Understanding the main possible causes of pedal confusion

Recommendation	Owner	Cost	Time	Value
Driver communication: Review the iBus controllers communication procedures with drivers, compare these with the Big Red Book to build best practice.	TfL / Bus operators	£	⌚	★
Driver training: Ensure drivers are receiving training for correct use of pedals (not swivelling foot) and consider if refresher or targeted training on pedal confusion can be provided.	Bus operators	£	⌚	★
Possible cause review: Driver fatigue Consider whether driver fatigue and different pressure points drivers' experience has an impact on stress and possible loss of concentration.	TfL / Bus operators	£	⌚ ⌚	★★
Possible cause follow-up: Driver fatigue Investigate if any solutions to driver fatigue, as provided in the fatigue report, will reduce pedal confusion incidents or has reduced incidents once implemented	TfL / Bus operators	£ £	⌚ ⌚	★★
Possible cause review: 'Spare' drivers Investigate if 'spare' drivers, who regularly change buses are more likely to be involved in pedal confusion incidents or near misses.	Bus operators	£ £	⌚	★
Possible cause review: Footwear Review whether footwear has a link to pedal confusion incidents or near misses by reviewing current evidence. If a link is found, further work on footwear requirements should follow, and any testing and trials would potentially add time and cost	TfL / Bus operators	£	⌚	★

Table 7.22 Safe Vehicles: Understanding the main possible causes of pedal confusion

Recommendation	Owner	Cost	Time	Value
Pedal differential analysis: Explore differentials across bus make and model for pedal type, height, and spacing by conducting an audit of the current fleet.	TfL / Bus operators	£	🕒	★
Possible cause review: Traffic and speed Conduct further analysis to understand whether travel at slow speed and/or heavy traffic is a contributory factor and if so, add further workstreams such as driver training	TfL	£ £	🕒	★★
Possible cause review: Brake regeneration Conduct further analysis to measure brake regeneration in hybrid and electric buses as a possible cause using current data and/or track tests with drivers.	TfL	£ £	🕒🕒	★★
Possible cause review: Acceleration rates Measure if the assumed difference in acceleration between electric, hybrid and diesel buses is shown in driver data and if so, further investigate how this could be mitigated for when considering pedal confusion	TfL / Bus operators	£	🕒	★★

Tables 7.31, 7.32 and 7.33 shows recommendations to understand the potential of possible solutions to pedal confusion. Using the TfL Safe Systems model, Table 7.31 shows recommendations that fall under the **Post Collision Response** pillar, Table 7.32 shows those that fall under the **Safe Behaviours** pillar and Table 7.33 shows those that fall under the **Safe Vehicles** pillar.

Table 7.31 Post Collision Response: Understanding the main possible solutions to pedal confusion

Recommendation	Owner	Cost	Time	Value
BSS introduction of brake toggling: Measure if buses with brake toggling are involved in less incidents; include near-miss data.	TfL	£	🕒🕒🕒	★★

Table 7.32 Safe Behaviours: Understanding the main possible solutions to pedal confusion

Recommendation	Owner	Cost	Time	Value
Improved direct/indirect vision: Monitor any evidence that driver movement has been a contributory factor to pedal confusion. If confirmed, share evidence with relevant TfL and Operators teams.	TfL / Bus Operators	£	🕒🕒	★
Improved direct/indirect vision: If monitoring shows a link to pedal confusion, update driver training and education	Bus Operators	£	🕒🕒	★★

Table 7.33 Safe Vehicles: Understanding the main possible solutions to pedal confusion

Recommendation	Owner	Cost	Time	Value
Technology review: Build a library of lessons learnt from current technology such as early warning systems.	TfL	£ £	🕒 🕒	★ ★
Pedal Acoustic Feedback: Use learnings from AVAS to develop a sound, engage with bus drivers for buy-in; Produce a multi-beneficial sound such as improving driving style.	TfL / Bus Operators	£ £	🕒 🕒	★ ★
Advance Emergency Braking (AEB): Consider building a team of experts to design, validate and test the AEB parameters and to cover training and implementation once approved.	TfL / Bus Operators	£ £ £	🕒 🕒 🕒	★ ★ ★
Accelerator pressure interim solution: Consider building an expert development team to assess whether an accelerator pressure solution is viable including a review of when the accelerator is currently pressed hard by drivers e.g. to 100% and possible safety implications of applying an interim solution.	TfL / Bus Operators	£	🕒 🕒	★ ★
Pedal Standardisation: Engage with bus manufacturers for a possible review of the ISO standard for pedal layout, for example pedal types, height, width and spacing.	TfL	£	🕒 🕒	★ ★
Pedal Standardisation: Build an expert working group to assess what standardisation could look like with pros and cons. Use findings from the analysis of the 143 incidents suggested for further evidence.	TfL / Bus Operators	£	🕒 🕒	★ ★
Pedal Standardisation: Consider whether Pedal Standardisation should expand to cab standardisation.	TfL	£ £	🕒 🕒	★
Introducing a throttle kill switch: A similar to the system used by the railway. Investigate whether adding a throttle kill switch to shut off power to the engine will achieve either or both of, preventing a more serious incident during pedal confusion or improving safety when recovering a vehicle following an incident.	TfL	£	🕒	★ ★

Table 7.4 shows recommendations to gain any learnings from peer groups. Using the TfL Safe Systems model, these recommendations fall under the **Post Collision Response** pillar.

Table 7.4 Post Collision Response: Learnings from peer groups and other industries

Recommendation	Owner	Cost	Time	Value
International peer groups: Contact the IBBG for learnings from the international industry and if there is appetite for a forum for best practice and solutions	TfL	£	🕒🕒	★ ★
National peer groups: Work with bus operators to build a national view of pedal confusion for the UK and if similar incidents happen elsewhere and how these are recorded	TfL / Bus Operators	£	🕒	★ ★
Other industries: Contact other UK industries, starting with waste disposal, investigate if pedal confusion incidents occur in their industry. Either way, analyse similarities and differences between the industries, assess if conclusions can be reached.	TfL	£	🕒🕒	★ ★

Additional Recommendation: For solutions already introduced as part of the Bus Safety Standard (BSS)

This report acknowledges that some of the solutions presented in the workshop have been introduced on new buses in the fleet, as per the BSS roadmap. A final recommendation is for all future incident investigations linked to possible pedal confusion to report:

1. Which of the solutions, if any, were a feature of the bus;
2. If the solution has been introduced, record any mitigating circumstances to explain why the solution was unable to prevent the incident from occurring; and
3. If the solution had not been introduced but was a requirement of BSS, ascertain why the solution is not in situ and whether, in the opinion of the incident investigator, if the solution would have been introduced as required could it have prevented the incident or reduced its impact.

Appendix A Literature review titles

1. **Human Engineering Limited.** *Identifying Solutions to Pedal Confusion in Buses.* London : Transport for London, 2011. HEL/TfL/102561/RT01.

2. **Transport Research Laboratory Limited.** *The Transport for London Bus Safety Standard: Pedal Application Error Prevention & Recovery.* London : Transport for London, 2018. PPR984.

3. **TTN Technologies Ltd.** About Footright. *Footright Safe Pedal Management.* [Online] 2015. [Cited: 13 10 2021.] <https://ttntechnologies.wordpress.com/>

4. **United States Department of Transportation.** Pedal Application Errors. *National Highway Traffic Safety Administration.* [Online] 03 2012. [Cited: 04 10 2021.] <https://www.nhtsa.gov/staticfiles/nti/pdf/811597.pdf>

5. **Department for Transport.** Road Safety Data. *Find Open Data.* [Online] 24 September 2021. <https://data.gov.uk/dataset/cb7ae6f0-4be6-4935-9277-47e5ce24a11f/road-safety-data>.

6. **Hasegawa, Kunihiro, Kimura, Motohiro and Takeda, Yuji.** Pedal Misapplication: Interruption Effects and Age-Related Differences. *Human Factors: The Journal of the Human Factors and Ergonomics Society.* [Online] 02 07 2020. [Cited: 01 10 2021.] <https://journals.sagepub.com/doi/10.1177/0018720820936122>.

7. **Department for Transport.** Road Safety Data. *Find Open Data.* [Online] 24 September 2021. <https://data.gov.uk/dataset/cb7ae6f0-4be6-4935-9277-47e5ce24a11f/road-safety-data>

In addition, the International Bus Benchmarking Group provided a members report in confidence:

Clearinghouse Study: Fatal Injuries. Dublin Bus. London, 2007.

Appendix B Example communications poster

The poster shown below is an example sent to Abellio drivers, each operator received their own branded communication, supported by TfL and the relevant bus Operator communications teams.

July 2021



Sharing your views - Pedal confusion

busdriversurvey.com

Through **London's Vision Zero**, TfL aim to have a 70% reduction in the number of people seriously injured or killed by buses by 2022. To help, AECOM have been asked to learn about pedal confusion from drivers and their colleagues.

A survey has been produced to collect your views to share anonymously with TfL. This will be open until Monday 9 August and takes about 10 minutes to complete.




- Take this survey on mobile, tablet or PC
- Type in the link busdriversurvey.com
- Scan the QR code

What's in it for you?

An opportunity to share your views to avoid more incidents.

Win **£100** in Amazon vouchers; plus **two £50** runner-up prizes



Confidentiality Assured:

Only anonymous results are provided to TfL and Abellio. AECOM is an independent consultant who will receive your answers directly and produce a summary report of the overall findings. AECOM are bound by UK Data Protection Law (was GDPR) and are members of the Market Research Society.

Have more to say on this? busdrivergroup.com

Would you like to share your experience to help us find solutions? We would like to hear more from you and be one of five drivers taking part in a 90-minute group discussion. Sessions will take place between Monday 2 August - Friday 20 August.

A **£50** amazon voucher will be offered to cover your time (email address required).

Location: Face-to-face in your garage or online discussion groups, at home.

If you are interested in taking part, please enter your contact details, using the link: busdrivergroup.com or call 0800 652 8646. AECOM will be in contact with you.

2 July 2021




Transport for London



Appendix C Online Questionnaire

Introduction

On behalf of Transport for London (TfL), AECOM; an independent research consultancy, is carrying out research about the occurrence of pedal confusion when buses are being driven.

The survey will take around 10 minutes.

We're aware of the sensitivity of this subject and we are keen that when you answer this survey you feel able to do so while being assured and confident that your responses are kept confidential.

Pedal confusion can lead to serious incidents and even fatalities which is why it is so important to get your honest views in this survey, to help TfL, bus operators and bus drivers in their bid to prevent it occurring in the future.

Your anonymity and using the answers you provide

We have taken steps to maintain the anonymity of your answers by:

1. Not sharing individual responses with TfL; and
2. Only providing a combined set of answers to TfL in a report format.

Your rights and our reassurance to you

The survey is being carried out under the Market Research Society's Code of Conduct. A copy of this is available here: mrs.org.uk/standards/code-of-conduct. The principles of this code of conduct include:

- Be transparent as to the subject and purpose of data collection.
- Respect the confidentiality of information collected in their professional activities.
- Respect the rights and well-being of all individuals.

You can access the AECOM's privacy policy using this website: aecom.com/privacy-policy/. To exercise all relevant rights or if you wish to make a query or file a complaint, in the first instance please contact AECOM's Data Protection Officer at privacyquestions@aecom.com. You can also contact the Information Commissioner's Office on 0303 123 1113 or via email ico.org.uk/global/contact-us/email/ or at the Information Commissioner's Office, Wycliffe House, Water Lane, Wilmslow, Cheshire. SK9 5AF.

**ASK ALL
SINGLE CODE**

1. Which bus operator do you work for?

- Abellio
- Arriva
- HCT Group
- Go-Ahead
- Metroline
- RATP Dev
- Stagecoach London
- Sullivan Buses
- Tower Transit
- Uno

**ASK ALL
SINGLE CODE**

2. Which of the following best describes your job role?

- i. Bus driver
- ii. Bus driver trainer
- iii. Bus depot manager
- iv. Health and Safety manager
- v. Engineer
- vi. Engineering Manager
- vii. Work in an office role at the bus depot not directly with buses
- viii. Other (please specify)

ASK ALL BUS DRIVERS (Q2=1)

SINGLE CODE

3. How long have you worked in total as a bus driver?

- One year or less
- Between one and three years
- Between three and five years
- Between five and 10 years
- Over 10 years

ASK Q2=CODE 2,3,4,5,6,7,8

SINGLE CODE

4. Before your current role had you ever worked as a bus driver?

- Yes
- No

ASK Q4=CODE 1 (YES), previously worked as a bus driver

SINGLE CODE

5. How long did you work as a bus driver?

- One year or less
- Between one and three years
- Between three and five years
- Between five and 10 years
- Over 10 years

**ASK ALL
SINGLE CODE**

ASK IF ALREADY KNOW TIME AS BUS DRIVER (AT Q3 OR Q5)

6. How long have you worked in the bus industry?

- One year or less
- Between one and three years
- Between three and five years
- Between five and 10 years
- Over 10 years

**ASK ALL DRIVERS (Q2=1)
SINGLE CODE**

7. Typically, how many different buses do you drive in one shift, even if it's the same make/model of bus?

- 1
- 2
- 3
- Over 4 (please specify)

**ASK DRIVERS WHO DRIVE MORE THAN ONE BUS PER SHIFT (Q7=2,3 OR OVER 4)
SINGLE CODE**

8. Typically, how many different makes/models of bus do you drive in one shift?

- 1
- 2
- 3
- Over 4 (please specify)

**ASK ALL DRIVERS AND THOSE WHO USED TO DRIVE (Q2=1 or Q4=1)
MULTICODE**

8a Which of these makes of bus do you drive or have you driven in the past?

Please select all that apply

- ADL
- BYD
- Caetano
- MCV
- Mercedes Citaro
- Optare
- Scania
- Wrightbus
- Other (please specify)

**ASK IF Q7=MORE THAN ONE BUS IN ONE SHIFT (Q7=2,3 OR OVER 4)
SINGLE CODE**

9. When changing buses, typically how much time do you take from your bus arriving until you drive it away?

- 5 minutes or less
- More than 5, up to 10 minutes
- More than 10, up to 15 minutes
- Over 15 minutes

ASK ALL

INTRO TEXT:

We would like to ask some questions about the potential for pedal confusion to occur when a bus is being driven. We'd like to reiterate that your responses are anonymous and the answers to this questionnaire will only be reported as a combined set of responses.

The definition of pedal confusion we are using is:

Pedal confusion is defined as an occurrence of a driver accidentally selecting the brake pedal instead of the accelerator pedal or the other way around. This causes either sudden unintended acceleration or harsh braking. This may lead to incidents such as a collision outside the vehicle, passengers being jolted inside the vehicle or may have no impact at all such as a near miss as the driver successfully recovered the situation.

ASK ALL

SINGLE CODE

10. How frequently do you believe pedal confusion occurs amongst London bus drivers even if there isn't a collision?

Select one only

- i. At least once a week
- ii. Less than weekly but at least once a month
- iii. Less than once a month but at least once every 3 months
- iv. Less than once every 3 months but at least once every 6 months
- v. Less than once every 6 months but at least once a year
- vi. Less than once a year but it does happen
- vii. I'm not aware of this ever happening
- viii. Prefer not to say
- ix. Don't know

SHOW TO ALL

Bus operator incident data shows there have been **at least** 43 incidents where pedal confusion contributed to an incident between 2002 and 2018. Two of these had a fatality.

ASK ALL DRIVERS OR FORMER DRIVERS (Q2=1) or (Q4=1)

SINGLE CODE

11. Have you ever received training about pedal confusion, either when you joined the company or since?

- Yes
- No
- Don't know / Can't remember

ASK ALL

SINGLE CODE

12. At what point in a journey do you think pedal confusion is most likely to occur?

- Setting off from a depot
- Setting off from a bus stop
- At a junction, setting off
- At a junction, slowing down
- Slowing down for a bus stop
- Driving back into a depot
- Other (please specify)
- Don't know

**ASK ALL
SINGLE CODE**

13. At what point in a shift do you think pedal confusion is most likely to occur?

- At the start of a shift
- Just before a break
- Just after a break
- Near the end of the shift
- At any time a driver changes buses
- At any point in the shift, the time isn't a factor
- Other (please specify)
- Don't know

ASK ALL EXCEPT DON'T KNOW AT Q12 AND Q13

OPEN END: 9999 CHARACTERS

14. When asked about when pedal confusion is most likely to occur, why did you say (PIPE FROM Q12) during a journey and; Why did you say (PIPE FROM Q13) for the part of the shift?

ASK ALL

TOP 3

ROTATE LIST

15. Which of the list below do you believe are the main factors that lead to pedal confusion?

Please select the top three factors.

- Switching from one bus to another, even if it's the same make/model
- Passengers distracting the driver inside the bus
- Pedestrians distracting the driver outside the bus
- Other road users distracting the driver
- A driver's mind wandering and losing concentration
- At blind spots where a driver may concentrate on making sure they don't hit anything or anyone
- At traffic lights / road junctions where other road users move in front of buses
- At bus stops when other road vehicles do not let buses out
- Driving in heavy traffic (stop/start)
- Driving when dark
- Driving a night bus
- Driver fatigue
- Human error
- Drivers not being able to hear when the bus is accelerating

ASK ALL

OPEN END

16. Do you think there are any other reasons which are not listed which may lead to pedal confusion?

ASK ALL

MULTI CODE

17. What experience do you have of pedal confusion? Please select all that apply

- I've experienced pedal confusion myself
- I'm aware of pedal confusion happening to other drivers
- I know what it is but do not know of any experiences
- I do not have any knowledge of pedal confusion **EXCLUSIVE**

**ASK IF Q17=CODE 1
MULTI CODE**

18. What is your personal experience of pedal confusion?

Using the accelerator instead of the brake

Using the brake instead of the accelerator

I've used both the accelerator instead of the brake and brake instead of the accelerator

Other (please specify)

**ASK IF Q17=CODE 1
SINGLE CODE**

19. What type of vehicle were you driving?

Petrol

Diesel

Hybrid

Electric

Don't know / Can't remember

**ASK IF Q17=CODE 1
MULTI CODE**

20. Can you recall the make and / or model of the vehicle you were driving?

Yes

No

**ASK IF Q20=CODE 1
OPEN BOXES X 2**

21. Please provide the make and model

MAKE:

MODEL:

**ASK IF Q17=CODE 1
OPEN BOX NUMBER MAX 2 DIGITS**

22. How many times have you experienced pedal confusion in the past year?

**ASK IF Q17=CODE 1
OPEN BOX NUMBER MAX 2 DIGITS**

23. How many times has the pedal confusion led to a collision in the past year?

**ASK IF Q17=CODE 2
MULTI CODE**

24. What is your knowledge of the occasions when another driver described pedal confusion?

Please select all that apply

The driver used the accelerator instead of the brake

The driver used the brake instead of the accelerator

Other (please specify)

Don't know the details **EXCLUSIVE**

ASK IF Q17=CODE 2 (NUM BOX, MAX 3 NUMBERS)

25. How many different drivers have mentioned they've experienced pedal confusion in the past year?

ASK IF Q17=CODE 2

MULTI CODE

26. What was the outcome of the incident(s)?

Please select all that apply

There has been a collision which involved another person (including cyclists/car drivers)

There has been a collision which involved an object (e.g. a tree or lamp post) but not a person

Passengers were jolted, but no outside collision

There was a near miss as driver successfully recovered the situation, no collision and passengers unaffected

Other (please specify)

ASK IF Q17=CODE 2

OPEN BOX NUMBER MAX 2 DIGITS

27. How many times have you heard of drivers experiencing pedal confusion in the past year?

OPEN BOX times

ASK IF Q17=CODE 2

OPEN BOX NUMBER MAX 2 DIGITS

28. How many times have these pedal confusion incidents led to a collision in the past year?

OPEN BOX times

ASK ALL BUS DRIVERS

SINGLE CODE

29. To what extent do you agree with the statement:

I have been trained to recognise when unintended acceleration is occurring and how to respond to it

Strongly agree

Agree

Neither agree nor disagree

Disagree

Strongly disagree

ASK ALL BUS DRIVERS

SINGLE CODE

30. How frequently do you choose to “coast” while in control of the bus?

Very frequently (multiple times on a route)

Frequently (at least once on a route)

Occasionally

Rarely

Never

ASK IF COAST FREQUENTLY (Q30=1 OR 2 OR 3)

MULTI CODE

31. Which of these places are you most likely to “coast”?

Please select all that apply

Sitting in slow moving traffic

Once I'm up to speed and I see traffic stopped ahead

Arriving at a bus stop

Arriving at the depot

Other (please specify)

**ASK ALL
SINGLE CODE PER ROW
ROTATE OR RANDOMISE LIST**

32. To what extent do you agree or disagree that the following possible solutions would reduce pedal confusion amongst bus drivers?

	Strongly Agree	Agree	Neither agree nor disagree	Disagree	Strongly Disagree	Don't Know
Forcing a driver to apply the brake pedal before engaging a gear to drive away (e.g. when leaving the depot or bus stop)	1	2	3	4	5	6
Having the same types of pedals and pedal layout for all makes/models of bus	1	2	3	4	5	6
Making sure drivers can see all around the exterior of the bus before setting off, i.e. no more blind spots	1	2	3	4	5	6
Having an audible cue to inform the driver when the bus is accelerating from a low speed or stationary position	1	2	3	4	5	6
Having a visible cue, such as a light, to inform the driver when the accelerator and brake pedal are being pressed	1	2	3	4	5	6
A detector to automatically brake, based on sensors which deem when a bus is likely to be unintentionally accelerating	1	2	3	4	5	6
Drivers being provided with approved footwear to be used when driving buses	1	2	3	4	5	6
Giving drivers time to prepare when changing buses	1	2	3	4	5	6
Using the same bus for the whole shift	1	2	3	4	5	6
Improved driver training about pedal confusion	1	2	3	4	5	6

**ASK IF GIVING DRIVER TIME TO PREPARE IS STRONGLY AGREE OR AGREE
OPEN MAX 2 NUMBERS**

33. You agreed that giving drivers time would be a possible solution to reduce pedal confusion. How long, in minutes, do you think should be given to a driver to prepare before driving away safely?

OPEN BOX Minutes

**ASK ALL
DO NOT FORCE
QPRIZE**

Thank you for taking the time to complete this survey.

To enter you in to the prize draw we need you to provide contact details to reach you should you win a prize, you can include either a phone number or email address or both.

If you do not want to provide these details please select next to move on to the next page however we will not be able to include you in the prize draw.

Your contact details are only used for the prize draw and they are separated from your answers straight away. Neither TfL or your bus operator will receive these details.

Q34 – Q36

Name

Phone number **NUMERIC AND VALIDATE**

Email address **VALIDATE**

ASK ALL BUS DRIVERS (Q2=1)

SINGLE CODE

QGROUP

We are keen to hear more about your views on pedal confusion and specifically about solutions which are being proposed.

AECOM are running some group discussions with bus drivers which would last 90 minutes each. These will occur outside your working hours and for that reason we would include an Amazon voucher of £50 to all those who attend in return for their time.

These discussions will be with up to 4 other drivers (expect 5 in a group) and other than these drivers nobody else from TfL or your bus operator will be present.

The groups discussions will be recorded on the day, again, these are for AECOM's analysis reasons only and the recordings will not be shared with TfL or your operator and everything you say will be kept anonymous.

Q37 If you wish to attend a group discussion please confirm below. We will contact you at a later date to make specific arrangements:

- Yes: I would like to be involved in the group discussions and you can use the contact details that I have provided for the prize draw to contact me
- Yes: I would like to be involved in the group discussions but I did not leave my contact details or I would like to give you different details
- No: I do not wish to attend a group discussion
- Don't Know: I need to decide later.

ASK IF QGROUP=YES BUT NEEDS TO GIVE CONTACT DETAILS (CODE 2)

TEXT

QCONTACT

Please provide a phone number or email address or both to enable us to contact you. If you do not want to provide these details please select next to move on to the next page however we will not be able to include you in the group discussions.

The contact details you give are for AECOM to make arrangements with you for attending the groups and for this reason only, these details are stored separately from your answers.

Q38 – Q40 Neither TfL or your bus operator will receive these details.

Name

Phone number **NUMERIC AND VALIDATE**

Email address **VALIDATE**

ASK ALL WHO SAID YES TO A GROUP (QGROUP=1 OR 2)

SINGLE CODE

QLOCATION

There are two options for holding the groups,

ONLINE (INTERNET): If most drivers prefer to complete these from home using the internet, we will arrange for these to be completed online. To use the internet you need to have a tablet, laptop or PC with a webcam (i.e. in the same way you use for Zoom calls, Facetime etc).

OFFLINE (FACE-TO-FACE) We can arrange for a face-to-face discussion to take place in a depot close to you (it may not be your main depot) with somebody from AECOM in attendance.

Q41 Please give your preferred method for the group discussions

If you have no preference and have a webcam at home please select the bottom option

Online (using the internet and I confirm I have a webcam at home

Face-to-face in a meeting room

I don't mind and I confirm I have a webcam at home.

ASK IF QGROUP=DON'T KNOW (CODE 4)

TEXT

QDON'T KNOW

If, at a later date, you decide you would like to attend a group, please type [Busdrivergroup.com](https://busdrivergroup.com) in your internet browser and there will be a short survey asking for your contact details and we will then be in touch. You can find this web address on the communication from your operator.

Please select next to continue

ASK ALL

TEXT

Thank you again.

Please click on the submit button below to upload your answers and close your survey.

Appendix D Workshop Discussion Guide

The same discussion guide was used for all, with the exception of the introductions where workshop attendees included the name of the operator they were representing (or TfL) and driver discussion attendees included their years of experience and make(s) of bus they frequently drive.

Introduction session

Format of the session (adapt if online)

- H&S – Fire exits, toilets, refreshments, no mobile phones
- Introduce moderator / note taker and on behalf of TfL
- Recording the groups – Only for internal use etc. Comments and findings are anonymised
- No right or wrong answers.
- Collating view from a wide range of stakeholders.
- Objectives for today (reviewing solutions to reduce/remove pedal confusion)
- Don't have to reach a consensus

Introduction AECOM

- Self/ AECOM/independent consultancy
- Conducting research on behalf of Transport for London
- Purpose of research to talk about Pedal Confusion and the solutions to it
- Emphasise there are no right or wrong answers
- Emphasise confidentiality – recording interview for accuracy of reporting. Recording will not be passed on to anyone outside the research team or the client team. Findings are aggregated for reporting. Stress anonymity in reporting of findings

Introduction Respondents

- Introduce themselves
- First name
- Role / Operator
- How long have they been in the bus industry?

5 mins

If the incident at London Victoria is raised where a pedestrian lost their life. The incident is under investigation and the cause is unknown. This should be mentioned before the discussion gets too deep and then continue with the discussion.

Context

TfL Vision Zero **show on Powerpoint for all to read.**

- 70 per cent reduction in the number of people killed or seriously injured in, or by, buses by 2022 against 2005-09 baseline
- No one killed in, or by, a London bus by 2030

TfL's aim is to make the whole system as safe as possible so that when a road user, i.e. a cyclist, pedestrian or another driver does make a mistake, this mistake does not result in serious or fatal injury

Pedal confusion

- What is the definition of pedal confusion?
- Not why it happens but what is it?
- After driver discussion agree a definition and share:

Definition of Pedal Confusion

show on Powerpoint for all to read.

Pedal confusion can be defined as the manoeuvre of a driver confusing the brake pedal and the accelerator pedal thus causing an incident of sudden unintended acceleration or harsh braking of their vehicle.

- Is this the right definition of pedal confusion?
- Should we include both unintended acceleration and harsh braking?
- Anything to add.....aim for all to settle on a definition although overall consensus is not required

READ OUT BELOW IF THERE HAS BEEN DOUBT ABOUT WHETHER PEDAL CONFUSION EXISTS:

Bus operator incident data shows there have been **at least** 43 incidents where pedal confusion contributed to an incident between 2002 and 2018. Two of these had a fatality.

Footwell CCTV has shown pedal confusion to be a cause of incidents.

Reference: if asked: Transport Research Laboratory report on the TfL bus safety standard using bus operator incident data

Twitter video or similar

PLAY and put in full screen, short video so repeat 2 to 3 times:

<https://twitter.com/howzmeluck/status/1240405171118772227?s=20>

- Views on the video:
 - Is this an example of a driver experiencing pedal confusion?
 - How do we know (either way)?
 - What else, other than pedal confusion could have happened?

10 mins

Causes of pedal confusion

What are the potential causes of pedal confusion?

- PROBE: Bus specific
 - How do physical driving features on a bus vary? E.g. seating position, vision, pedals
 - Any makes/models considered better/worse?
 - What physical features of a bus could cause pedal confusion?
 - pedal layout (whether pedals are close together, how visible they are to the driver or how they differentiate between the two pedals; familiarity / unfamiliarity with personal car or other vehicles they drive;
 - bus size / visibility
 - Does engine type make a difference? i.e. diesel, hybrid, electric
 - Different makes/models of bus: any makes better than others in terms of visibility, pedal layout.
 - Changing from one make/model of vehicle to another and changing to another vehicle of the same make/model. How is this different?

PROBE: is changing vehicles more to do with the physical features of a driver (height, shoe size) than changing make/model and the vehicle layout?

- Driver specific factors to PROBE:
 - What factors could be down to human error?
 - Driver error
 - What leads to driver error (e.g. fatigue, concentration disturbed by passengers)
 - Any manoeuvres which could cause unintended acceleration/harsh braking
- External factors to PROBE:
 - Driver footwear
 - Gears/pedals on a personal car vs on a bus; different types of buses
 - Emergency action avoiding a collision

IMPORTANT TO CHECK,, ESPECIALLY DRIVERS:

Impact of changing to hybrid or electric buses, i.e.

- Any noticeable change in pedal alignment
- Any noticeable change in acceleration / brake pedal i.e. harder or easier to press

If impact of changing buses is mentioned, confirm

MAKE of bus and

TYPE of bus, i.e. hybrid, electric, hydrogen, diesel

10 mins

Timing of incidents

When do you feel these incidents are most likely to happen? PROBE:

- Time of day
- Time of shift (i.e. beginning, middle, end)
- After multiple shifts
- Night bus / driving in the dark / driving in the day
- Peak periods vs off-peak
- Can relaxation after a “difficult” route lead to relaxation and oversight?

5 mins

Pedal configuration and footwear

What do you think of the current pedal configuration in relation to pedal confusion?

PROBE:

- Organ (flat) or hanging type pedals
- Type of tread on the pedals
- Distance between pedals
- Different levels of pedal resistance for different vehicles
- How does variation of pedal alignment for different makes of bus affect drivers? Including changing buses mid-shift

Does the type of footwear drivers wear impact recognition of the pedals?

- Can drivers feel the pedals

5 mins

Solutions to pedal confusion

Spontaneous or first thoughts on best solutions

- Can think as far reaching as they feel necessary, assume no limit on budget and anything is possible!
- PROBE: Vehicle related / External (see examples)
 - How can buses be adapted;
 - Anything to allow for external distractions such as vehicles/cyclists/pedestrians completing unexpected manoeuvres
 - Are there any examples of make/model of bus which deliver already? What do they deliver and why?
 - Use of cameras / blind spot mirrors
- PROBE: Driver related (see examples):
 - One vehicle per shift;
 - Time to adjust when changing buses;
 - Driver checklist before setting off, such as confirm correct vision and controls (seat position check, mirror check); i.e. ensuring settled before leaving (depends if leaving a depot is highlighted as a higher risk for pedal confusion)
 - Shorter shifts; breaks;
 - Less consecutive days working;
 - Type footwear (what would this look like / how standardise?);
 - Specific training and what would this training be

10 mins

Suggested solutions.

READ OUT: I am now going to show you six solutions that TfL are considering as potential solutions. For each, I would like to hear your thoughts including pros and cons and the speed to which the solution could be implemented and deliver TfL Vision Zero.

- Use showcards to present each of the proposed solutions. Show in different order for different workshops, especially drivers.

Evaluate each solution

- Pros/cons for each
- Benefits and limitations of each
- How practical they believe the solution is
- How timely to implement
- How quickly can they see the solution being implemented and reference back to TfL Vision Zero
 - 70 per cent reduction in the number of people killed or seriously injured in, or by, buses by 2022 against 2005-09 baseline
 - No one killed in, or by, a London bus by 2030

Solutions shown in this document are for ease of reference using the PowerPoint slides to run through each one. Additional information provided on benefits/limits for moderator use only.

5 mins per solution (30 in total)

Solution 1:

Brake Toggling:

This solution would enable the driver to re-initialise their right foot/driving position and update recent memories of the brake position before leaving a bus stand/stop. **This is achieved by the driver needing to double tap the brake before the bus will move forwards (accelerate)**

This solution would also avoid errors linked with a misuse of the system (especially when the driver is not following expected protocol and does not switch gear back to neutral when stopped at a bus stop/stand).

The addition of such a solution could be fitted on an operated bus as long as (light) training is provided to the drivers.

- **Evaluate each solution**
 - Pros/cons for each
 - Benefits and limitations of each
 - How practical they believe the solution is
 - How timely to implement
 - How quickly can they see the solution being implemented and reference back to TfL Vision Zero
 - 70 per cent reduction in the number of people killed or seriously injured in, or by, buses by 2022 against 2005-09 baseline
 - No one killed in, or by, a London bus by 2030

Notes for moderator if need to probe:

Already a requirement on new vehicles

Table 16. Brake toggling benefits and limitations

Benefits	Limitations
<ul style="list-style-type: none"> • Improves right foot proprioception • Reduces foot misplacements • Quick retrofit on buses • This solution could be tested this year as a proof of concept • Short driver training time 	<ul style="list-style-type: none"> • Retrofit limitations depending on bus models • Limited effectiveness (effectiveness expected at bus stop, bus stand only) –

Solution 2:

Accelerator noise:

Add/Amplify the accelerator engine sounds when the bus is in electric mode and at low speed (below 20mph) using the noise counter measures of the Bus Safety Standard project (AVAS).

The selected sounds to be tested will be fitted in the cab using a loudspeaker at a predetermined noise level.

- **Evaluate each solution**
 - Pros/cons for each
 - Benefits and limitations of each
 - How practical they believe the solution is
 - How timely to implement
 - How quickly can they see the solution being implemented and reference back to TfL Vision Zero
 - 70 per cent reduction in the number of people killed or seriously injured in, or by, buses by 2022 against 2005-09 baseline
 - No one killed in, or by, a London bus by 2030

Notes for moderator if need to probe:

Table 19. Accelerator noise conspicuity benefits and limitations

Benefits	Limitations
<ul style="list-style-type: none"> • Helps the driver recover from a pedal error at any location/time • Reduces pedal error consequences and occurrence • No additional driver training • Easy to implement in a bus (loudspeakers) 	<ul style="list-style-type: none"> • Additional time to design the solution on a bus (depends on manufacturers' possibility to prototype) • Additional/specific testing required

Solution 3:

Accelerator/Brake light indicators:

Add two LEDs/lights (one light for the brake pedal activation, one light for the accelerator pedal activation) to a bus dashboard.

The LEDs/lights should be dimmed between day/night conditions. The addition of such a solution could be fitted on an operated bus as long as adequate training is provided to the drivers.

NOTE: Pedal indicator lights were a requirement of BSS buses from 2019 implementation

Evaluate each solution

- Pros/cons for each
- Benefits and limitations of each
- How practical they believe the solution is
- How timely to implement
- How quickly can they see the solution being implemented and reference back to TfL Vision Zero
 - 70 per cent reduction in the number of people killed or seriously injured in, or by, buses by 2022 against 2005-09 baseline
 - No one killed in, or by, a London bus by 2030

Notes for moderator if need to probe

Already a requirement on new vehicles

Table 20. Accelerator/brake lights benefits and limitations

Benefits	Limitations
<ul style="list-style-type: none"> • Helps the driver recover from a pedal error at any location/time • Reduces pedal error consequences and occurrence • Short additional driver training • Easy to implement in a bus (LEDs) 	<ul style="list-style-type: none"> • Effectiveness when used alone (expected to be more effective when coupled with accelerator noise conspicuity) • Additional equipment to be fitted in a bus (could not necessarily be fitted in the main field of view on current buses)

Solution 4:

Improved Direct/indirect vision:

Use of additional visual aids to drivers to check all areas and reduce the need for body movement (including foot movement leading to misplacement) in the driver cab when making manoeuvres.

Visual driver aids such as:

- Blind spot mirrors (already fitted)
- Cameras providing external views back to driver replacing the usual wing mirrors with cameras which display view on screens in drivers cabin

NOTE: some operators introduced Camera Monitoring Systems early; they are now a requirement of the BSS 2021 for all new buses.

- **Evaluate each solution**
 - Pros/cons for each
 - Benefits and limitations of each
 - How practical they believe the solution is
 - How timely to implement
 - How quickly can they see the solution being implemented and reference back to TfL Vision Zero
 - 70 per cent reduction in the number of people killed or seriously injured in, or by, buses by 2022 against 2005-09 baseline
 - No one killed in, or by, a London bus by 2030

Notes for moderator if need to probe:

Table 18. Improved direct/indirect vision benefits and limitations

Benefits	Limitations
<ul style="list-style-type: none"> • Improves drivers visibility and driving comfort • Reduces foot and body misplacements • Reduces pedal error in left-right turn locations (e.g. includes bus stop) 	<ul style="list-style-type: none"> • Additional equipment to be fitted to a bus (additional cost) • Less applicable in a “straight road” pedal error scenario

NOTE FOR MODERATOR:

Pedal layout standardisation and AEB solutions are unable to be retrofitted to the current fleet of buses. Introduce later unless referenced by a member of the group
PROBE: These last two cannot be retrofitted on current buses. Does this mean they should be excluded from the solutions.

Solution 5:

Advanced Emergency Braking (AEB):

Technology capable of detecting unintended acceleration errors and intervene (e.g. automatic emergency braking interpreting the acceleration signal as a brake signal when a pedal error is detected)

AEB system activation for unintended acceleration scenarios is currently not available on the market but is under development.

NOTE: AEB solutions would be unable to be retrofitted to the current fleet of buses.

Evaluate each solution

- Pros/cons for each
- Benefits and limitations of each
- How practical they believe the solution is
- How timely to implement
- How quickly can they see the solution being implemented and reference back to TfL Vision Zero
 - 70 per cent reduction in the number of people killed or seriously injured in, or by, buses by 2022 against 2005-09 baseline
 - No one killed in, or by, a London bus by 2030

Notes for moderator if need to probe:

Table 21. Automated Emergency Braking benefits and limitations

Benefits	Limitations
<ul style="list-style-type: none"> • Potential to mitigate most pedal error events depending on the level of performance of the algorithm • Corrects driver's cognitive errors by applying the brakes instead of the accelerator throttle 	<ul style="list-style-type: none"> • Additional equipment to be fitted to a bus (additional cost) • Specific algorithm will need to be developed in a safe way to impede unexpected emergency braking

Solution 6:

Pedal position standardisation:

Propose a standard pedal configuration (pedal location, size, angle, pedal resistance, hanging or floor mounted) for all London buses.

NOTE: Pedal layout standardisation would be unable to be retrofitted to the current fleet of buses.

- **Evaluate each solution**
 - Pros/cons for each
 - Benefits and limitations of each
 - How practical they believe the solution is
 - How timely to implement
 - How quickly can they see the solution being implemented and reference back to TfL Vision Zero
 - 70 per cent reduction in the number of people killed or seriously injured in, or by, buses by 2022 against 2005-09 baseline
 - No one killed in, or by, a London bus by 2030

Notes for moderator if need to probe:

Table 17. Pedal standardisation benefits and limitations

Benefits	Limitations
<ul style="list-style-type: none"> • Improves bus standardisation • Reduces foot misplacements and adaptation time to a new bus model • No driver training time • Could be fitted on new buses 	<ul style="list-style-type: none"> • Heavy retrofit for existing buses that could include driver's seat retrofit • Limited effectiveness (e.g. does not address cognitive errors) • International standard currently under review (updated version expected in 2018) • Requires advanced mock-ups

Conclusions about solutions

- What are the best solutions in terms of:
 - Time (short term/long term)
 - Safety
 - Practicality (ease of implementation)
- Is there a mix of solutions required, if yes, what is the mix?
- Assume cost and practicality are not a barrier and rank each solution for short term (2022) and long term (2030)
- Any additional solutions that should be included (based on their initial thoughts) which would add to their preferences / improve final outcome and goal

10 mins

Thank and Close

Appendix E Data Tables

		Count	%
Which bus operator do you work for?	Abellio	90	15
	Arriva	167	28
	HCT Group	42	7
	Go-Ahead	1	0
	Metroline	116	20
	RATP Dev	17	3
	Stagecoach London	131	22
	Sullivan Buses	0	0
	Tower Transit	28	5
	Uno	0	0
	Other	1	0
	Base	593	100

		Count	%
Which of the following best describes your job role?	Bus driver	567	96
	Bus driver trainer	7	1
	Bus depot manager	4	1
	Health and Safety manager	4	1
	Engineer	1	0
	Engineering Manager	0	0
	Work in an admin role at the bus depot not directly with buses	1	0
	Other	9	2
	Base	593	100

		Count	%
How long have you worked in Base as a bus driver?	One year or less	87	15
	Between one and three years	69	12
	Between three and five years	70	12
	Between five and 10 years	79	14
	Over 10 years	262	46
	Base	567	100

		Count	%
Before your current role had you ever worked as a bus driver?	Yes	21	81
	No	5	19
	Base	26	100

		Count	%
How long did you work as a bus driver?	One year or less	0	0
	Between one and three years	4	19
	Between three and five years	3	14
	Between five and 10 years	6	29
	Over 10 years	8	38
	Base	21	100

		Count	%
How long have you worked in the bus industry?	One year or less	85	14
	Between one and three years	66	11
	Between three and five years	69	12
	Between five and 10 years	80	13
	Over 10 years	293	49
	Base	593	100

		Count	%
Typically, how many different buses do you drive in one shift, even if it's the same make/model of bus?	1	79	14
	2	435	77
	3	45	8
	4 or more	8	1
	Base	567	100

		Count	%
Typically, how many different makes/models of bus do you drive in one shift?	1	146	30
	2	304	62
	3	33	7
	4 or more	5	1
	Base	488	100

		Count	%
Which of these makes of bus do you drive or have you driven	ADL	205	35
	BYD	76	13
	Caetano	39	7
	MCV	69	12
	Mercedes Citaro	61	10
	Optare	132	22
	Scania	201	34
	Wrightbus	236	40
	Other	218	37
	Base	588	100

		Count	%
When changing buses, typically how much time do you take from your bus arriving until you drive it away?	5 minutes or less	346	71
	More than 5, up to 10 minutes	115	24
	More than 10, up to 15 minutes	17	3
	Over 15 minutes	10	2
	Base	488	100

		Count	%
How frequently do you believe pedal confusion occurs amongst London bus drivers even if there isn't a collision?	At least once a week	142	24
	Less than weekly but at least once a month	50	8
	Less than once a month but at least once every 3 months	26	4
	Less than once every 3 months but at least once every 6 months	13	2
	Less than once every 6 months but at least once a year	24	4
	Less than once a year but it does happen	59	10
	I'm not aware of this ever happening	87	15
	Prefer not to say	5	1
	Don't know	187	32
Base	593	100	

		Count	%
Have you ever received training about pedal confusion, either when you joined the company or since?	Yes	188	32
	No	299	51
	Don't know / Can't remember	101	17
	Base	588	100

		Count	%
At what point in a journey do you think pedal confusion is most likely to occur?	Setting off from a depot	30	5
	Setting off from a bus stop	52	9
	At a junction, setting off	54	9
	At a junction, slowing down	126	21
	Slowing down for a bus stop	52	9
	Driving back into a depot	13	2
	Other	65	11
	Don't know	201	34
	Base	593	100

		Count	%
At what point in a shift do you think pedal confusion is most likely to occur?	At the start of a shift	34	6
	Just before a break	10	2
	Just after a break	16	3
	Near the end of the shift	132	22
	At any time a driver changes buses	36	6
	At any point in the shift, the time isn't a factor	196	33
	Other	15	3
	Don't know	154	26
	Base	593	100

		Count	%
Which of the list below do you believe are the main factors that lead to pedal confusion?	Switching from one bus to another, even if it's the same make/model	68	11
Please select the top three factors	Passengers distracting the driver inside the bus	81	14
Please note any other factors not listed that may lead to pedal confusion?	Pedestrians distracting the driver outside the bus	34	6
	Other road users distracting the driver	44	7
	A driver's mind wandering and losing concentration	200	34
	At blind spots where a driver may concentrate on making sure they don't hit anything or anyone	38	6
	At traffic lights / road junctions where other road users move in front of buses	89	15
	At bus stops when other road vehicles do not let buses out	30	5
	Driving in heavy traffic (stop/start)	115	19
	Driving when dark	12	2
	Driving a night bus	9	2
	Driver fatigue	329	55
	Human error	304	51
	Drivers not being able to hear when the bus is accelerating	26	4
	Lack of experience / new drivers	7	1
	Stress	17	3
	Over confidence	3	1
	Weather	2	0
	Seats incorrectly installed / uncomfortable	4	1
	Training is inadequate / non existent	6	1
	Pedal shape / placement / layout	26	4
	Low skilled drivers	3	1
	Bad cab layout / driver conditions	6	1
	Hurry / rushing / panic; including pressure from operator iBus controllers	21	4
	Footwear	6	1
	Not using handbrake	2	0
	Alcohol / drug taking	3	1
	Other	18	3
	Base	593	100

		Count	%
What experience do you have of pedal confusion?	I've experienced pedal confusion myself	127	21
	I'm aware of pedal confusion happening to other drivers	157	26
	I know what it is but do not know of any experiences	219	37
	I do not have any knowledge of pedal confusion	131	22
	Base	593	100

		Count	%
What is your personal experience of pedal confusion?	Using the accelerator instead of the brake	73	57
	Using the brake instead of the accelerator	31	24
	I've used both the accelerator instead of the brake and brake instead of the accelerator	21	17
	Other	6	5
	Base	127	100

		Count	%
What type of vehicle were you driving?	Petrol	7	6
	Diesel	58	46
	Hybrid	52	41
	Don't know / Can't remember	10	8
	Base	127	100

		Count	%
Can you recall the make and / or model of the vehicle you were driving?	Yes	44	35
	No	83	65
	Base	127	100

		Count	%
How many times have you experienced pedal confusion in the past year?	0	55	43
	1	46	36
	2	14	11
	3	5	4
	4	2	2
	5	5	4
	Base	127	100

		Count	%
How many times has the pedal confusion led to a collision in the past year?	0	118	93
	1	7	6
	2	1	1
	5	1	1
	Base	127	100

		Count	%
What is your knowledge of the occasions when another driver had pedal confusion?	The driver used the accelerator instead of the brake	113	72
	The driver used the brake instead of the accelerator	23	15
	Other	1	1
	Don't know the details	34	22
	Base	157	100

		Count	%
How many different drivers have mentioned they've experienced pedal confusion in the past year?	0	47	30
	1	27	17
	2	29	18
	3	24	15
	4	6	4
	5	12	8
	6	3	2
	7	2	1
	10	5	3
	12	2	1
	Base	157	100

		Count	%
What was the outcome of the incident(s)?	There has been a collision which involved another person (including cyclists/car drivers)	51	32
	There has been a collision which involved an object (e.g. a tree or lamppost) but not a person	58	37
	Passengers were jolted, but no outside collision	29	18
	There was a near miss as driver successfully recovered the situation, no collision and passengers unaffected	48	31
	Other	15	10
	Base	157	100

		Count	%
How many times have you heard of drivers experiencing pedal confusion in the past year?	0	45	29
	1	40	25
	2	22	14
	3	19	12
	4	11	7
	5	9	6
	6 or more	11	8
	Base	157	100

		Count	%
How many times has the pedal confusion led to a collision in the past year?	0	96	61
	1	30	19
	2	11	7
	3	11	7
	4 or more	9	6
	Base	157	100

		Count	%
I have been trained to recognise when unintended acceleration is occurring and how to respond to it	Strongly agree	105	19
	Agree	164	29
	Neither agree nor disagree	158	28
	Disagree	67	12
	Strongly disagree	73	13
	Base	567	100

		Count	%
How frequently do you choose to "coast"?	Very frequently (multiple times on a route)	46	8
	Frequently (at least once on a route)	33	6
	Occasionally	105	19
	Rarely	139	25
	Never	244	43
	Base	567	100

		Count	%
Which of these places are you most likely to "coast"?	Sitting in slow moving traffic	100	54
	Once I'm up to speed and I see traffic ahead	85	46
	Arriving at a bus stop	45	24
	Arriving at the depot	18	10
	Other	6	3
	Base	184	100

		Count	%
Forcing a driver to apply the brake pedal before engaging a gear to drive away (e.g. when leaving the depot or bus stop)	Strongly agree	131	22
	Agree	206	35
	Neither agree nor disagree	164	28
	Disagree	54	9
	Strongly disagree	38	6
	Base	593	100

		Count	%
Having the same types of pedals and pedal layout for all makes/models of bus	Strongly agree	230	39
	Agree	216	36
	Neither agree nor disagree	106	18
	Disagree	28	5
	Strongly disagree	13	2
	Base	593	100

		Count	%
Making sure drivers can see all around the exterior of the bus before setting off, i.e. no more blind spots	Strongly agree	197	33
	Agree	212	36
	Neither agree nor disagree	126	21
	Disagree	41	7
	Strongly disagree	17	3
	Base	593	100

		Count	%
Having an audible cue to inform the driver when the bus is accelerating from a low speed or stationary position	Strongly agree	116	20
	Agree	179	30
	Neither agree nor disagree	177	30
	Disagree	71	12
	Strongly disagree	50	8
	Base	593	100

		Count	%
Having a visible cue, such as a light, to inform the driver when the accelerator and brake pedal are being pressed	Strongly agree	131	22
	Agree	213	36
	Neither agree nor disagree	155	26
	Disagree	52	9
	Strongly disagree	42	7
	Base	593	100

		Count	%
A detector to automatically brake, based on sensors which deem when a bus is likely to be unintentionally accelerating	Strongly agree	147	25
	Agree	198	33
	Neither agree nor disagree	147	25
	Disagree	54	9
	Strongly disagree	47	8
	Base	593	100

		Count	%
Drivers being provided with approved footwear to be used when driving buses	Strongly agree	157	26
	Agree	191	32
	Neither agree nor disagree	146	25
	Disagree	62	10
	Strongly disagree	37	6
	Base	593	100

		Count	%
Giving drivers time to prepare when changing buses	Strongly agree	241	41
	Agree	205	35
	Neither agree nor disagree	108	18
	Disagree	25	4
	Strongly disagree	14	2
	Base	593	100

		Count	%
Using the same bus for the whole shift	Strongly agree	177	30
	Agree	162	27
	Neither agree nor disagree	178	30
	Disagree	50	8
	Strongly disagree	26	4
	Base	593	100

		Count	%
	Agree	231	39
	Neither agree nor disagree	101	17
	Disagree	15	3
	Strongly disagree	10	2
	Base	593	100

Appendix F Possible causes of pedal confusion: Quotes from workshops

Topic	Quote by	Quote
Different pedal configurations or cab design	Bus Driver	“On the electric buses, on the hybrids that I drive the pedals are much closer together and the cab is much smaller and also when you take off in one of those buses as well, when you take off in electric mode, it can be quite confusing, it can be quiet, because you think oh crumbs! But definitely an electric bus, the cab seating area is much smaller, because you’ve got the batteries behind you.”
Different pedal configurations or cab design	Union Officials	“The actual layout of the pedals is a massive, massive concern and we do believe that it’s probably second, only second to fatigue”
Different pedal configurations or cab design	TfL Operations	“Sometimes they’re too close to each other, the pedals. Obviously, your orientation, you push down, and if the pedals are too close to each other, so obviously you don’t know which one you’re pressing.”
Different pedal configurations or cab design	Operator Health and Safety	<p>“The pedals are both floor mounted, push down, they’re very close at the base and they spread out slightly. So, it encourages you...[to]...leave your heel where it is and it’s across both pedals, which then gives you the potential issue of covering the pedals.</p> <p>The other issue is there’s less than 5mm difference between the height of the pedals, the accelerator and the brake pedal, so if you are twisting your foot it’s very easy to slide between the pedals, so we’ve also had instances where we’re covering both pedals, whereas if you look at it on some of the other bus designs, they’re square on, so you need to move your heel slightly, but there’s also a lot bigger difference between [the pedals] 25 and 30 mm difference”</p>
Different pedal configurations or cab design	Operator Health and Safety	“We photographed every pedal on every bus type, we’ve measured them, we’ve seen the issues, you know, with particular incidents we’ve had, does that reflect the pedal box? After a lot of work on doing that, we came to the conclusion well, no, there wasn’t, not significantly or not sufficient that there’s a real cause there, but that’s me and six or seven pedal confusion incidents”
Traffic	Incident Investigators	“Or when slow moving traffic, they’re on and off from one pedal to the other, therefore sometimes that can work that they actually think they’re pressing the brake, when they’re actually pressing the accelerator.”

Topic	Quote by	Quote
Hybrid and electric buses	TfL Health and Safety	"I think sort of the quiet running buses, again in terms of those sort of where electric buses generally are able to get a little bit more torque and acceleration quicker, so we do sort of see those where they can go from stationary to moving and again the situation getting out of control probably a little bit quicker than maybe we sort of do with conventional diesel based engine"
Hybrid and electric buses	Engineers	"Just taking on what you're saying, regeneration on a hybrid and electric vehicle, you take your foot off, the bus is slowing down, you've got more chances of pedal confusion [at a slower speed] than where you're driving at a higher speed"
Hybrid and electric buses	Union Representatives	"There's one more other thing really with the electric buses is the regeneration of power. So, the batteries are not sufficient, so they have to regenerate and that's what causes that problem with the accelerator. It's always braking."
Footwear choice / lack of feeling of the pedals underfoot	Bus Driver	"When I first started on the buses I found that the shoes that you would wear were quite clumpy compared to what you'd say you'd use in your car and I did find a lot of the time that when you were pressing the accelerator [or] vice versa, your shoe would be sort of clipping the pedal next door."
Footwear choice / lack of feeling of the pedals underfoot	Union representatives	"A lot of them wear trainers and nobody controls them."
Footwear choice / lack of feeling of the pedals underfoot	<i>Bus Driver</i>	"Signing on in the morning, the difference in trainers, shoes that are falling apart, all kinds of different footwear, if you're not wearing the proper footwear, your shoe, which is the sole's coming apart or whatever can easily, you know, your foot can slip, maybe, so maybe the footwear should be examined by management"
Driving different models of bus on the same shift / general unfamiliarity with the bus design	Bus Driver	"It's the types of buses, because there are so many different types of buses, left indicators, right indicators, opening doors, closing doors is also different. It's not ergonomically designed for the seat adjustment, take our buses changeover and all [that] applies and the response time of each vehicle, even if it's made from the same model won't respond exactly the same, the steering will be different, the acceleration and the brake response will be different for each bus, individually you have to get used to it."

Topic	Quote by	Quote
General driver distraction	Operator Operations	“You know, when you do a root cause analysis, all the incidents that I’ve dealt with it tends to be something like fatigue, not concentrating, chatting to their buddies, potentially on the bus with them and many other factors that potentially lead to that I think we probably need to focus more on them and then obviously pedal confusion can’t potentially get rid of it, because you never plan to do it, but it’s then what do you do with that, but I’d definitely look at it as a wider aspect than simply that they’re just confusing it.”
Radio controllers contacting drivers	Bus Driver	“If they’re feeling under pressure to reach a certain place by a certain time, because the drivers usually always want to make sure that they’ve got their stand time. If the running time is so short, no matter what they do they’re going to miss that stand time, that will play on their heads as well or if they’ve left a few minutes late for whatever reason.”
Radio controllers contacting drivers	Operator Health and Safety discussion	<p>“Why do they radio buttons have to be on the floor.... I know drivers shouldn’t answer their radios when they’re driving, we tell them, but most of us all know that they probably do. Why can it not be on the steering wheel”.</p> <p>“You’re right and it probably is an element, because if you use it and you’re in a rush to put your foot back to the brake or whatever else, so it’s not ideal. You almost want it to be deactivated when it’s in motion.”</p>
Passengers / passenger behaviour	Bus Driver	“Passengers talk with the driver when they are driving which is distracting.”
Passengers / passenger behaviour	Incident Investigators	“So we’ve had a case recently where you clearly see the driver, if he leans out of the cab to talk to a passenger and as he recedes, just because his body isn’t aligned with the pedals, I mean it happens almost instantaneously, that’s just probably the way he hasn’t checked where his feet are.”
Topic	Quote by	Quote
Home life pressures need to pick the children up, family commitments	Bus Driver	“A lot of people think you just make a journey and it’s not just like that, you have got to deal with time, you’ve got a time restriction to get from A to B and if you don’t make it in time they sort of spin you around in the middle and send you back on yourself, so you get passengers that get a bit irate, you get the school rush, you’ve got quite a lot of things to deal with, so I think that you tend to get fatigued quite easily as a driver and I think that that’s where you can make mistakes.”

<p>Drivers rushing: To achieve their stand time or to finish a shift</p>	<p>Operator Operations</p>	<p>“The bus started to move forward in slow moving traffic, it was behind schedule, so he wants to push, push, push, he can see the way off, starts to move away, the traffic stops, he puts his foot on what he believes is the brake, it’s not, it’s the accelerator”</p>
<p>No toilet facilities in rest areas</p>	<p>Bus Driver</p>	<p>“I was reading an article in the United States, where it stated that in their bus driver system, sometimes people get involved in an accident because when they’re too desperate to go to the toilet and your body system is really kind of like all over the place, you’re like holding on, you’re trying to right, you know, I’ve got ten minutes to get to the stand, so I can go to the toilet, that can give you, your body reaction, without even you realising it mentally.... physically your body cannot react, you don’t get the right signals of what pedal to press”</p>
<p>Tiredness / fatigue</p>	<p>Bus Driver</p>	<p>“Also driver fatigue, I think driver fatigue is the main thing in there and just basically driver error, unfortunately.”</p>

Appendix G Possible solutions to pedal confusion: Quotes from workshops

Brake Toggling

Topic	Quote by	Quote
Brake Toggling	Operator Operations	"[Pedal confusion] tends to happen in slow moving traffic, when we're going quite slowly and something happens, that might not necessarily have come in"
Brake Toggling	Bus Driver	"Then that doesn't solve the solution, because pedal confusion comes when you're, say like you're on the road and the bus is actually moving."
Brake toggling as a benefit	Manufacturers	"So making the driver find the two pedals sequentially every now and again when he starts his shift or near a bus stop or something, it feels like that's probably a positive thing, but it's just a judgement, I don't have any data behind that."
Brake toggling as a limitation	Operators Health and Safety	"You also run into unintended consequences with this toggling, which we found, because we've got it on our new electric buses and they've recently changed, but what we've found was drivers weren't using the handbrake."

Accelerator Sound (audible cue)

Topic	Quote by	Quote
Accelerator sound as a benefit	TfL Health and Safety	"I think there have been occasions where pedal confusion has occurred because the driver psychologically perhaps isn't aware that the bus is moving, because there isn't a noise, if that makes sense, but I'll temper that with there is a lot going on in a bus driver's cab"
Accelerator sound as a benefit	Operator Health and Safety	"The noise just drags their attention back to the front windscreen. So that's an improvement, but that doesn't fix this [pedal confusion], so I'm not throwing out noise completely, but what I'm saying is it has a very limited benefit"
Accelerator sound as a benefit	Bus Driver	"With the electrical buses, we are missing the sound of the engine. So, I think it would be such an idea, when you press the accelerator to make a noise that make it shows that, we enjoy the sound of the engine, but now we need to enjoy something about the electrical engine, like a buzzer or I don't know, whatever they decide. At least you are in control by listening to it"
Accelerator sound as a limitation	Union Official	"By the time they're hearing the noise the incident's happening, this doesn't prevent it.....It all happens in a split second and this does nothing except tell the person you're making a mistake....even it was saying accelerating,

		accelerating, accelerating, accelerating, if we're talking about the focus issue here, I don't think it does enough"
Accelerator sound as a limitation	Union representatives	"You're getting beeping sounds from the controllers, where you get signals are coming and then you've got things that come on for the passengers as well, so you've got all these different things happening, when really you just need to concentrate on that road and what's ahead of you."
Accelerator sound as a limitation	TfL Health and Safety	"Sometimes we talk about distractions in cab now and we're actually putting more and more distractions into the cab for the driver just to sit there and shrug his shoulders and go, really, I haven't got a clue what alarm's going off now, because that one sounds like that, that one sounds like that"
Accelerator sound as a limitation	Driver Trainers	"It'll be okay for the first few times but then the drivers will switch off, it's just another annoyance that they'll just ignore."
Past experience	Operator Health and Safety	"We've had this on diesel buses..... they still don't take their foot off the pedal. It doesn't get through, the nature, human nature part of it."
Recommendations	TfL Operations	"I would like to see is a universal buzzer, so the bus you drive, by what manufacturer, if it's that noise you know it's that, if it's that noise you know it's that, whereas currently each manufacturer has its own buzzer or bells or whistles" TfL Operations
Recommendations	Manufacturers	"So if you progressively and smoothly press the accelerator in a controlled way, you either get perhaps no feedback sound or a very low level sound. If you stamp on it you get the same sound, but a lot louder or shriller or something. So, the driver gets used to the sound, but it's at very low level, so it's not an annoyance and it actually encourages the driver to use the accelerator pedal gently and smoothly, because that's nicest in terms of avoiding noises"

Accelerator / Brake light indicators (visual cue)

Topic	Quote by	Quote
Accelerator / brake light indicator as a benefit	Bus Driver	"Because it's telling you, the lights are telling you what you've got your foot on."
Accelerator / brake light indicator as a benefit	Operator Operations	"I also see the benefits of it, it probably can be quite simply done, it's in a lot of modern cars now for gear changes and it does help sometimes. That might potentially benefit to an extent, but I don't think it will be the solution."
Accelerator / brake light indicator as a benefit	Operator Operations	"Yes, whether it would make a difference, I guess, but it's probably one of the more cost effective and sort of straightforward ones that could be added."
Accelerator / brake light indicator as a limitation	Operator Operations	"I think it's that reaction and whatever it is that can help with that, but I still can't get away from this is unintended, it's over reaction, we're adding something else into it, are they genuinely going to react how we'd like them to which is press [the] brake."
Accelerator / brake light indicator as a limitation	Union representatives	"If you're talking about pedal confusion and you're [adding a light] , it's taking away the guy's concentration from the pedal and he's now looking at the light".
Accelerator / brake light indicator as a limitation	Union Official.	"You see my view is I'm not looking at the dashboard, I'm looking out the window. Where I'm going I'm looking at my surroundings. So, actually if we had a light on the dash, it'd probably be the last thing, you know, between the noise and that, I would hear a noise, but I wouldn't see that light"
Accelerator / brake light indicator as a limitation	Manufacturers	"My feeling is that the visual warnings are much lower value than an audible warning, because you have to be looking at a warning or you have a huge warning light that's going to be a massive distraction a lot of the time, in order to not require the driver to look at the instrument panel. The likelihood of the driver looking at the instrument panel to analyse what's gone wrong is, I would say, pretty low."

Improved Direct / Indirect vision for a driver inside the cab

Topic	Quote by	Quote
Improved direct/indirect vision as a benefit	Incident Investigators	"We've had a case [incident] recently where you clearly see the driver, he leans out of the cab to talk to a passenger and as he recedes, just because his body isn't aligned with the pedals, it happens almost instantaneously, that's just probably the way he hasn't checked where his feet are."

Improved direct/indirect vision as a benefit	Bus Driver	"Yes, you are less distracted, you are concentrating more, so somehow, part of what we said earlier is distraction actually leads to pedal confusion.... So I'm all for it."
Improved direct/indirect vision as a limitation	Operator Health and Safety	"I don't see how that's going to improve pedal confusion. It can help with other things."
Improved direct/indirect vision as a limitation	Operator Health and Safety	"I mean a lot of drivers when the weather's hot, there's a bit of a window, putting their arm out the window like they was driving a sports car, so again that's a change in position. I don't think it's [pedal confusion] got anything to do with it"
Improved direct/indirect vision as a limitation	Operator Operations	"I think it's basically trying to say that if you didn't have these things, you'd be therefore moving your foot position, but I don't necessarily agree with that."
Improved direct/indirect vision as a limitation	Union Officials	"I think teaching people how to use their seats, teaching people how to position themselves for the pedal would be more beneficial than something we've already got."

Advanced Emergency Braking (AEB)

Topic	Quote by	Quote
AEB as a benefit	Operator Operations	“To me it’s certainly the one that makes the most sense, because that is the problem and it tackles it directly, it’s interesting”
AEB as a benefit	TfL Health and Safety	“This is one that sort of seems to definitely be an intervention that could prevent these incidents from sort of ending in tears.”
AEB as a benefit	Bus Driver	“Yeah, I think it would be a good thing. Anything that would actually help us I think is a good thing. I used to have, on the car that I used to drive, it used to have the technology where it used to keep you in the lane, whereas if you used to start to drift slightly out of your lane it would automatically correct the steering wheel and sort of bring you back in, but yeah, obviously if you’re going to accidentally hit the accelerator and the bus can sense that there’s something in front and then it’s going to correct that, that can only be a good thing.”
AEB as a part benefit	Operator Health and Safety	“So it’s not going to change the fact we’ll have pedal confusion incidents, it’s just mitigating the effect. Because I think the velocity of the vehicles still means that there might be some immediate damage.”
AEB as a part benefit	Operator Health and Safety	“Yorkshire that had that case where they hit ten different vehicles on the road, it would certainly reduce that, because at some point after the first collision hopefully, but of course, that first collision could be a bus queue of people, it could be someone crossing the road.”
AEB technology	Bus Driver	“Yes, definitely, I think that would be something to explore. I don’t know how, if the technology would work on such a vehicle as a bus and I guess ..., but it’s definitely worth looking at, 100%.”
AEB technology	Operator Health and Safety	“It depends how the system works, because potentially certainly some of the [incidents] I can think of, you’re so close when it happens, is the system actually going to work for that?”
AEB in busy areas	Union Officials	“I think it’s a good idea. I think it’s okay if you’ve got something that works from a distance, that will reduce the speed down to say anything up to a metre, they would apply the brakes, but it’s how it would apply the brakes. What we can’t do is get into a situation where if it gets down to a metre that the bus will just stop, because we don’t know what speed that bus will be doing when it gets down to a metre.”

AEB in busy areas	TfL Health and Safety	“I think in busy areas, like Oxford Street, I think depending on how the technology work it might prove a challenge trying to drive a bus through a street with crowded pedestrians with the system not, malfunctioning or being oversensitive. So that’s the only thing that kind of comes to mind in terms of being a limitation.”
AEB technology	Manufacturers discussion	<p>“It’s a very high risk that the system will intervene at the wrong time, you know, the full scenario is you’re overtaking a cyclist and a van comes round the bend on the other side of the road, faster than you’re expecting, you have to either abort the manoeuvre or continue it. You take the judgement to continue it, so you stamp on the accelerator and then the bus comes to a halt in the middle of the road in front of the van.” “How would this have bearing on the pedal confusion itself. I know that there’s a different working on ABS and the amount of accidents that that might cause or create, but for the topic of pedal confusion how does it connect?”</p> <p>“It’s very tricky, to pinpoint the unintended accelerations out of all the intended ones, because I mean regardless of the surroundings outside, sometimes the intended acceleration maybe is trying to avert another danger that the system for emergency braking doesn’t see, like it doesn’t take the complete picture, like the driver has to do.”</p>
AEB technology	Bus Driver	“From what I understand from this, it’s meant to detect when you’re accelerating or braking and basically cut it out when it thinks that you’re doing it as a mistake. So, how does it know, because imagine I’m not doing it as a mistake?”
AEB technology	Bus Driver	“For me it looks like so advanced, so far away from the solution that we shouldn’t even be part of it. Like this would be, I would see, you know, those self-driving cars. So the car itself predicts when it’s going to accelerate or when it’s going to brake. And it controls its prediction to the driver’s reaction and that’s what it does, but it’s still science fiction to me, you know, where we are now.”
AEB technology	Bus Driver	“Can you imagine that emergency brake with sixty people on board? Maybe on a small car it works, but on the bus, I think you have to be in control of it. I don’t know how harsh the braking is and emergency stop on the bus is.”
AEB technology	Bus Driver	“Yes, but how’s it going to stop the bus, is it going to stop the bus suddenly, like how close do we have to be for it to detect that, oh my gosh, it’s something, is it going to do a big shunt, is it going

		to be dangerous for passengers maybe standing up?”
AEB technology	Engineers	“If you think about the principal of what AEB does, you can’t accelerate if something’s in the way. It’s just how good those sensors are. So, like some of you guys in here, we’ve all trialled all these bike and person monitoring devices and you have things going off, you go down Oxford Street and you might not get anywhere, so it’s got to be right.”
Other observations from the workshops	Bus Driver	“Any technology that can help is never going to be a bad thing, but I think the issue is so small that spending this sort of money on it doesn’t make a lot of sense to me. I think there’s bigger issues than pedal confusion.”
Other observations from the workshops	Bus Driver	“I don’t know if I’d be too happy with something braking for me. You know, there’s been so much with these cars now with lane changes where they don’t do it right and automatic braking systems that don’t work. I think it would be a wrong way to go by virtue of the fact that people may back off of braking, because they know that, something’s going to stop. I think laziness would start to creep in, personally.”

Advanced Emergency Braking (AEB) discussions about interim solutions

Topic	Quote by	Quote
Interim solution suggested in the workshops	Operator Operations discussion	<p>“I’m really surprised, to be honest, that it’s only under development. I would have thought that there’d be something……, there’s going to be stock data in terms of how much pressure you’d ergonomically, right, to apply to the brake pedal and the accelerator, they do have different weights.”</p> <p>“so all you need is some software that tells you that pressure over a certain amount.”</p> <p>“Yes, you have like a pressure sensor on the accelerator and it’ll signal”.</p>
Interim solution suggested in the workshops	Engineers discussion	<p>“You’ve got two differences, acceleration, which is minutes per second squared and then you’ve got minutes per second cubed and it’s based with the time to go from zero to one minute per second squared, so it’s like that, if you ramp up to one minute per second squared in ten seconds, that feels gradual, like it gets thrown, that’s when it goes from 0-1 instantly. So, it might only cover half a metre, but it scares the driver, so it might actually, they might not actually travel very far, but like to them ...</p> <p>“Could we not have something on the vehicle that cut out the signal but took away speed, took away acceleration? You press the throttle and it’ll kick down, to try and get away quickly, you know, there’ll be like a little kick down switch just behind the throttle, 95% feeling under foot. I wonder whether in kick down, whether you just instead, because like you were saying, when they panic, the driver panics. Foot goes down.</p> <p>Stamp and I just wonder whether you just if it goes 100% or 95%. Take away the throttle. They’ve still got time to react.”</p> <p>“Something on your steering wheel where you have to click it to get acceleration, maybe that’s where, if you want full acceleration you do that. So if you’re pulling away into fast traffic. You click back to give yourself that boost. And then if someone hits the pedal.</p> <p>And obviously, it’s not obviously, pedal confusion, but if they put their foot down and it doesn’t react, you’ve got the ability for that boost, but if they put their foot down in the scenarios we’ve been talking about, because they think they’re going to the brake and their foot doesn’t come off of it, it should cut out.”</p>

Pedal Standardisation

Topic	Quote by	Quote
Benefits of Pedal Standardisation as a solution	Bus Driver	“This is the best one, this is the best one, yeah. Because each bus or each maker, they’ve got slightly difference. Like the 18s, they are different from the ADHs, you know, the pedals, the distance, how you sit as well, you know.”
Benefits of Pedal Standardisation as a solution	Bus Driver	“Yeah, that would work. If every single bus you got on was all the same and the brake pedal is like a normal car brake pedal, where it’s a lot squarer, where it’s a lot squarer, where it accelerates. On our buses the accelerator pedal and the brake pedal are almost exactly the same.”
Findings from the workshops	Operator Health and Safety	“It wouldn’t solve everything, but I think it would have the biggest impact, as a single item”
Benefits of Pedal Standardisation as a solution	Bus Driver	“I think if you were to get to a position where every bus had the pedals in the same position with the same gap, it would help the drivers, because obviously we’ve all said that sometimes we’re driving one bus and one half or one bus today and a different bus tomorrow. So, yeah, that’s a positive, definitely.”
Benefits of Pedal Standardisation as a solution	TfL Health and Safety	“For me, I think it would benefit a lot of people, because you familiarise yourself and you just take away another way out, for want of a better term, for the driver and it’s standardised for all vehicles, yeah, definitely.”
Considerations for Pedal Standardisation	Bus Driver	“It must be a little bit higher than the accelerator, a bit closer to the driver, ..., I mean the position should be central when it normally is, but with a different size of pedal, different from the accelerator.”
Considerations for Pedal Standardisation	Bus Driver	“To have them more separated, more apart from each other. That’s one of the, I think that could be a good solution”
Considerations for Pedal Standardisation	Driver Trainer	“I see something for actual hanging pedals, as in if you have flat type pedals then the foot could slide up on the pedal, whereas if you put them down like a conventional car, then perhaps that might take away or having two pedals, as was said before, the old mushroom type, so if you have one pedal that does ..., another pedal and therefore, you know, you’re going to have a completely different feel.”
Considerations for Pedal Standardisation	Union Officials	“If you physically have to move your feet to hit the brake or the accelerator, that means you have to register it with your brain and I think it’s a big thing to do that and we’ve got away from that, which I think is quite a big concern.”

Considerations for Pedal Standardisation	Union Officials	“[On electric buses] the pedals are identical side by side and I think that there’s something that we can do there, even if it means just, look, I’m no engineering expert, but I’m pretty sure that without changing the linkage we could easily move the pedal over on the right hand side and move the left hand pedal towards the left and that would create the gap”
Considerations for Pedal Standardisation	Engineers	“It’s naturally easy in a driver’s cab to press the throttle at 100% than it is to press the brake at 100%. It needs to be the other way round, it needs to be harder to press the throttle and easier to press the brake.”
Caveats to Pedal Standardisation	Operator Health and Safety	“I think from our point of view the best pedal box design is the accelerator is floor mounted, so it’s push down. The brake pedal is a swing pedal, more likely to have in a car, so it’s a very different action between them.....and you physically need to move your foot across”
Caveats to Pedal Standardisation	Engineers	“You slip off the top of the pedal if you’ve got wet shoes as well.....but if it was mounted at an angle and you push into it and that felt more different from a high pitch compared to throttle.”
Caveats to Pedal Standardisation	Engineers	“Just bear in mind that if you get Pedal Standardisation wrong, it causes problems for the lot.”
Caveats to Pedal Standardisation	TfL Health and Safety	“The limitations would be if you do it to 9,000 plus vehicles and then we start to have pedal confusion on them, then we are screwed, yes, the NRMs, we’ve got a thousand of them, so again obviously there is a debate as to kind of, is it sort of volumes in the fleet that kind of make them more likely to. It’s that being absolutely certain that kind of the design you’ve chosen is the right one, because otherwise, yeah, it presents quite a large issue.”
Limitations of Pedal Standardisation as a solution	Bus Driver	“Yeah, I drove a bus with the pedals hanging and it felt like so strange. When I try to hold the brake, I can’t hold the brake properly, because my foot is resting down too hard and the brake is going now, so I try to accelerate, the accelerator is going too hard, because it just feels different, when the pedals are in the ... inaudible and that time, that’s the first time I actually drive that bus.”
Limitations of Pedal Standardisation as a solution	Operator Health and Safety.	“I think there’s some element to the design of the pedal configuration which you would think could be designed out and improved on, but I think even if we had complete standardisation of pedals across the bus industry, that may make a difference and remove pedal confusion, but I think we’d still have pedal confusion.....it’s just an element of it, rather than a real solution”

Limitations of Pedal Standardisation as a solution	Manufacturers	“The only thing about the standards, they tend to have a fairly big range in which you can comply with the standard. From memory there’s a sort of recommended area and there’s a required area and I think there’s quite a big tolerance on it, in terms of pedal positions and seat position and steering column position relative to accelerator heel point and that type of thing…… the tolerances of these recommendations aren’t usually to accommodate for different heights for drivers etc, because many times we have come across the problem that some of the drivers are inside the tolerances and some of the drivers are not, because these tolerances are for a population,”
Limitations of Pedal Standardisation as a solution	Manufacturers	“From our point of view we design all our cabs to meet the ISO ergonomic standard… I don’t know if anyone’s done any more work to see whether the standard is valid and the pedal positions relative to each other are good and accurate…it might be that maybe a bit more investigation needs to be done.”
Limitations of Pedal Standardisation as a solution	Operator Health and Safety	“But also, it’s drumming into the drivers that your foot should always be over one, the pedal, regardless of what your vehicle’s doing, don’t rest it on the floor.”
Limitations of Pedal Standardisation as a solution Limitations of Pedal Standardisation as a solution	Operator Health and Safety	“I think that’s just poor practice, because rather than placing your foot properly on the pedals, you’re using it in a lazy fashion, so I think that’s just poor placement.”
Other observations from the workshops	Driver Trainer	“I still, me personally I still think there needs to be, even for each vehicle to be the same there’s got to be that retraining, hasn’t there, people have got to be retrained for that.”
Other observations from the workshops	Operator Health and Safety	“There are some bus types that you don’t have pedal confusions, they’re the ones we should be looking at to see what is it about those pedals and the configuration that has contributed and we have had incidents with those buses, but again I don’t think Pedal Standardisation would stop all this.”
Other observations from the workshops	Manufacturers	“I think it needs more of a study as to how the driver is sat and interacts, rather than potentially the pedals themselves.”

Other observations from the workshops	Bus Driver	“They need to talk to us. We are the ones driving. We know what works and what doesn’t. Not people sat in an office.”
Other observations from the workshops	Union Officials	“We don’t get involved in cab designs anymore....and that’s the biggest problem, no-one consults the bus driver anymore. It’s about what the manufacturer wants, yeah and what they may think is okay in a lorry or whatever, maybe not ideal for any bus, whether it be a London bus or whatever.”
Other observations from the workshops	Union Representatives	“I think the best solution is to get those who are concerned, which is the drivers and the union in the process of design and that’s the only time this problem can be solved.”

Report 6.4 Quotes Other suggested solutions: Workshops

Topic	Quote By	Quote
Cut-off switch	Operator Operations.	“The idea of like a dead man’s switch is not new at all. I think most mechanical equipment they’ve got, safety devices and things like that and there are plenty of, so if you look at other things, technically it’s just a couple of pedals”
Cut-off switch	Union representatives.	“In milk floats.....you put your foot down hard on the accelerator there was a cut-off, like a little button underneath, like a dead man’s switch. So, the vehicle wouldn’t go nowhere. It would stop you from, you’d put your foot down, because you’d believe you were on the brake and you’d put it down harder. So, as soon as you put it down harder it would cut out”
Regeneration	Engineers	“You can change the pedal, you can tweak the regen, it’s not going to solve everything, but it might make it a little bit better, because [a manufacturer] at the time, there was a lot of pedal confusion and that’s because they had it, the lift off the accelerator was almost like a braking effect, it was very strong regeneration and [the manufacturer] said they reprogrammed it to be more like a diesel bus”
Learning from other industries	TfL Health and Safety	“You know, waste vehicles, picking up rubbish, they’re stopping, they’re starting, they are moving through London, they are a similar style of driving, but they don’t appear to be getting this”

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This paper will be considered in public

1 Summary

- 1.1 At the meeting of the panel in June 2022, the Panel requested a further briefing on TfL's Responsible Procurement programme, which will now be repeated annually. This paper provides that further briefing.

2 Recommendation

- 2.1 **The Panel is asked to note the paper.**

3 GLA Group Responsible Procurement Implementation Plan

- 3.1 The GLA Group Central Responsible Procurement Team (CRPT) published the revised GLA Group Responsible Procurement Implementation Plan 2022-2024 (RPIP) in September 2022. The RPIP sets out how TfL and the GLA Group functional bodies will deliver the goals of the GLA Group Responsible Procurement Policy, revised in March 2021, between 2022-24.

- 3.2 Key ambitions within the plan include:

- (a) all bidders for contracts over £5m must provide organisational carbon reduction plans at the Selection Questionnaire stage. We will also include evaluation criteria in these tenders to encourage bidders to demonstrate their contribution towards London's ambition of being net-zero carbon by 2030;
- (b) new contracts from 2025 will require zero-emission deliveries to GLA Group sites;
- (c) the GLA Group, including TfL, will work towards purchasing 20 per cent of goods and services from small and medium-sized enterprises (SMEs) either directly or indirectly, in line with the London Anchor Institutions Charter. This ambition will involve further work to understand the constraints, deliver on the 20 per cent target and effectively measure both direct and indirect spend with SMEs.

- (d) a minimum of 10 per cent of the total tender evaluation score will be allocated to responsible procurement and social value for all GLA Group above-threshold contracts, which recognises bidders who will deliver community, environmental and local economic benefits where relevant and proportionate to the subject matter of the contract. Through this approach, the GLA Group, although not directly in scope, is electing to align to the government's Procurement Policy Note 06/20 which outlines how social value should be explicitly evaluated in central government procurement;
- (e) create 500 supply chain apprenticeship starts per annum across the GLA Group and progress towards apprentices reflecting London's diversity;
- (f) across the GLA Group, double the number of signatories to the Mayor's Good Work Standard, from 26 to 52;
- (g) work across the GLA Group supply chain to support the delivery of the interim target for Non-Road Mobile Machinery (NRMM) to meet stage IV requirements by 1 January 2025. NRMM is a broad category covering mobile machines and transportable industrial equipment or vehicles which are fitted with an internal combustion engine and not intended for transporting good or passenger on roads; and
- (h) one hundred per cent of commercial staff to complete carbon literacy training by 2024.

3.3 The CRPT are working closely with the TfL Procurement and Commercial Improvement Programme (PCIP) to make the necessary process changes to support TfL's delivery of the RPIP. In particular, a significant programme of work is ongoing to ensure consistent and effective delivery of the ambition to require a minimum of 10 per cent of the total tender evaluation weighting to be assigned to social value where relevant and proportionate to the subject matter of the contract. PCIP are aiming to implement this from April 2023.

3.4 The recently formed Chief Officers' Sustainability Sub Group's Terms of Reference includes oversight and scrutiny of TfL's delivery against the RPIP and regular updates will be made at this group to communicate delivery and highlight areas of risk.

4 2022 Activity

Skills and Apprenticeships

- 4.1 TfL's Supplier Skills Team (SST) supports delivery of the skills, training, and employment opportunities theme of the GLA Group Responsible Procurement Policy, by embedding contractual requirements in relevant tenders and managing the delivery of supply chain commitments.
- 4.2 The team currently manages requirements in approximately 50 contracts to support delivery of supply chain commitments following contract award, and reports quarterly supply chain apprenticeship starts to the Department for Transport.
- 4.3 In the financial year 2021-22, there were 868 new apprenticeship starts in our supply chain, an increase of 344 from the previous year. 52.9 per cent of these are from a Black, Asian or minority ethnic background and 21.8 per cent identify as being female.
- 4.4 The team has continued to deliver in-person pre-employment programmes following restrictions imposed by the coronavirus pandemic which put these on hold. This collaborative approach with suppliers encourages Londoners with employment barriers into our supply chain.
- 4.5 In February 2022 the team hosted a virtual apprenticeship fair as part of National Apprenticeship Week. In total, 20 sessions were hosted throughout the week giving our suppliers a chance to advertise their vacancies to interested candidates. The sessions were varied and included employability skills with the London Transport Museum as well as the Metropolitan Police Service, London Fire Brigade and the GLA. . Attendance across the sessions totalled 547.
- 4.6 In June 2022, the fourth iteration of Women into Transport and Engineering (WiTnE) took place with key suppliers Alstom, ADComms and BAI Communications. This five-week programme gave 17 candidates two weeks of pre-employment training at college before completing two weeks of work experience with one of the suppliers. The women were also offered an appointment with Smart Works, a charity offering work-ready clothing chosen by a stylist, and interview techniques to boost confidence before the work placements and interviews. So far, nine of the candidates have gained employment.

- 4.7 Five candidates started the Women with Drive programme with Abellio on Monday 10 October 2022 aimed at attracting and recruiting more women into bus driving. The programme creates a supportive environment for the women to understand more about the bus industry and the role while building their confidence. Candidates undertake Customer Service training at college and have the unique opportunity to spend time at the bus depot to gain some useful driving practice. Each candidate also has an appointment with Smart Works.
- 4.8 The fifth iteration of the WiTnE programme began on 20 October 2022 with employers Riverlinx, FM Conway, MTR Elizabeth Line and Tarmac Kier Joint Venture offering over 20 work placements between them.
- 4.9 Historically, the programmes have put around 33 per cent of candidates into employment, but more recently this has increased to 50 - 70 per cent moving into sustainable jobs. Further benefits such as increased confidence and work-readiness are evident in those who do not immediately find work.
- 4.10 The SST has begun planning activity for National Apprenticeship Week 2023. Following the last year's event being held online, the team is investigating options for an in-person event in 2023.

Ethical Sourcing and Modern Slavery

- 4.11 As referenced at the meeting of the Panel in June, TfL's Modern Slavery Statement 2021/22 is now published on the TfL website.
- 4.12 Within Commercial Development, property managers have undertaken awareness training on spotting the signs of modern slavery on site and how to report concerns or whistle blow. Standardised tender questions and contractual requirements have been included across the property portfolio to ensure potential developers are evaluated against their risk management processes, including how they will manage construction sites.
- 4.13 A specific focus for 2022/23 is the Cabinet Office Modern Slavery Assessment Tool (MSAT). The RPIP includes an ambition for all medium to high-risk suppliers to complete the MSAT and score 70 per cent or above by 2024.
- 4.14 A modern slavery risk assessment was conducted in January 2022 and those suppliers considered medium to high risk according to the services or works they are delivering were invited to complete the tool. To date, 30 out of 54 (56 per cent) of suppliers have completed. The RP team is working to improve the response rate as well as hosting two due diligence workshops through the Supply Chain Sustainability School to upskill our suppliers and improve their scores.
- 4.15 We continue to progress with internal and external capacity building to raise awareness of the risk of Modern Slavery in our supply chains, including promoting the Home Office Modern Slavery training as part of the RPIP.

- 4.16 TfL is actively participating in the Electronics Watch Low-Emission Vehicle Programme to address human and labour rights risks and issues in the supply chain of electric vehicle batteries. This includes the sourcing of raw materials - namely nickel, lithium, cobalt and graphite - where there is a high risk of labour exploitation. The CRPT are working closely with TfL's Bus Development team and are due to present at the TfL's quarterly Bus Operator Forum in November 2022. This is with a view to gaining future commitment from operators to work with bus manufacturers to improve transparency of their battery supply chains and collaborate with Electronics Watch to monitor and improve working conditions. This aligns with the proposals of London's 2030 Electric Vehicle Infrastructure Strategy.

Environmental Sustainability

- 4.17 The CRPT liaises with Safety, Health and Environment (SHE) colleagues to ensure the environmental commitments within the RPIP 2022-24 closely align with TfL's Corporate Environment Plan.
- 4.18 This engagement includes with the SHE Management System (SHEMS) programme, specifically on managing SHE with suppliers. The standard Selection Questionnaire pack has been updated and includes a requirement for bidders on all contracts over £5m in value to provide an organisational carbon reduction plan, in line with the requirements of Procurement Policy Note 06/21 which outlines how to take account of Carbon Reduction Plans in the procurement of major government contracts and the RPIP commitment. This question has been included in the relet for Mobile Services and the requirement has been communicated to Procurement and Commercial through the RP classroom training delivered by the PCIP team.
- 4.19 The CRPT ensured relevant Responsible Procurement references were included in TfL's inaugural Sustainability Report and the One-Year On report currently in draft.
- 4.20 The CRPT and the SHE Corporate Environment Team are working closely with industry and the Supply Chain Sustainability School to ensure consistency in our approach and best practice sharing. This includes reviewing the School's Carbon Calculator to assist with collecting primary supply chain (scope 3) emissions data.
- 4.21 The CRPT are assisting with supplier spend data to support the development of TfL's scope 3 emissions baseline and further the report completed by Mott MacDonald in 2020. This is with a view to setting reduction targets and monitoring reductions which ties into RPIP ambitions.
- 4.22 The CRPT has worked with ReLondon's Circular Construction in Regenerative Cities project, an EU-funded and Mayor of London collaborative project aiming to reduce the yearly consumption of virgin raw material by 20 per cent in new construction and show cost savings of 15 per cent. The TfL Environment team was involved in an initial workshop so the project could understand current practices, which was followed up with a supplier-focussed

workshop in March 2022. The project is currently drafting circularity criteria for public bodies to apply a consistent approach.

- 4.23 The CRPT has supported the SHE team in the Surface Technology Contracts Retender (STCR) which requires the successful supplier to submit their carbon baseline in year one of the contract along with reduction targets for the following years. The contract is due for award in 2023.
- 4.24 To support London's NRMM Low Emission Zone, the CRPT have engaged with GLA policy leads to ensure reference to the standards and the NRMM Register in relevant contracts. Contractors will be required to upload their NRMM to the Register to demonstrate adherence to the requirements.

Fair and inclusive employment practices

- 4.25 Approximately 50 per cent of TfL key suppliers disclosed their workforce diversity data through the Diversity Data Benchmarking Initiative, in which National Highways, Network Rail and HS2 are also participating. Fifty-nine TfL suppliers responded in total including a higher number of SMEs. This is an increase from 43 suppliers responding last year. In total, the survey represents nearly 350,000 employees working in the sector and the CRPT work closely with the other transport clients and suppliers to act on the results and improve Equality, Diversity and Inclusion in the industry.

Supplier Diversity

- 4.26 TfL has been progressing priority actions within the GLA Group Small and Diverse Business Action Plan, which is aligned with the commitment of the London Anchor Institution Charter to provide greater access to opportunities to small and diverse businesses affected by the pandemic.
- 4.27 TfL has undertaken two trials to implement the guidance in the Procurement Policy Note 11/20 which allows below-threshold contracts to be reserved for SMEs. Following use of this provision, Pest Control for Trams was awarded to an SME in September 2022, a contract was previously held by a large multi-national. The relet delivered a significant cost saving in the process.
- 4.28 In March 2022, the CRPT commissioned Go4Growth to complete research into scale-based insurance and financial requirements to better understand and reduce barriers for small and diverse businesses entering the supply chain.
- 4.29 In April 2022, the CRPT commissioned Go4Growth to complete a report into the barriers faced by small and diverse businesses. The team has analysed the recommendations for ease of implementation which, along with the Small and Diverse Business Action Plan, help TfL work towards the RPIP ambitions and targets.

- 4.30 In September 2022, TfL took part in a supplier readiness webinar with other members of the London Anchor Institute Network, which more than 80 SMEs attended. TfL provided an overview of what we buy and how to do business with us.
- 4.31 TfL is implementing an approach to capture indirect spend with SMEs, initially engaging with around 63 key suppliers. This exercise will provide a more accurate baseline on the totality of spend with SMEs throughout our supply chain beyond Tier One contractors.

Contracts and Tenders

- 4.32 The CRPT supports TfL's Procurement and Commercial function on implementing Responsible Procurement requirements from early market engagement through tender evaluation to contract management. Key contracts receiving support in 2022 include Surface Technology Contracts Retender, Uniforms, Bollo Lane property development, iBus2 and the retender of the revenue collection contract, Project Proteus.

List of Appendices:

None

List of Background Papers:

GLA Group Implementation Plan 2022-2024

https://www.london.gov.uk/sites/default/files/gla_group_rpip_2022-24.pdf

Procurement Policy Note 06/20:

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/921437/PPN-06_20-Taking-Account-of-Socia

London Anchor Institutions Charter:

https://www.london.gov.uk/sites/default/files/anchor_institutions_charter_1.pdf

Procurement Policy Note 06/21:

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1054374/PPN-0621-Taking-account-of-Carbon-Reduction-Plans-Jan22_1.pdf

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Safety, Sustainability and Human Resources Panel



Date: 16 November 2022

Item: Human Resources Quarterly Report

This paper will be considered in public

1 Summary

1.1 The Quarterly Report is a standing item on the agenda for this Panel. It provides an update on key Human Resources (HR) led activities and performance for the period June – October 2022.

2 Recommendation

2.1 **The Panel is asked to note the report.**

List of appendices to this report:

Appendix 1 – HR Quarterly Report

List of Background Papers:

None

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HR Quarterly Report June to October 2022

16 November 2022



HR Quarterly Report June – October 2022

Introduction

This Human Resources (HR) Quarterly Report provides an update on the activity that has taken place to support our colleagues from June – October 2022, to make Transport for London (TfL) a great place to work, for everyone.

The first section provides an update on our People Scorecard measures and targets for the 2022/23 performance year.

The second section updates on activity delivered across the HR function aligning to our top People Priorities:

1. Our TfL Programme
2. A More Inclusive and Diverse Organisation
3. An Engaged, Motivated and Healthy Workforce
4. The Right People, Skills and Capacity to Deliver the Business Plan



Our TfL Programme

Our TfL Programme

The Our TfL Programme has been established to ensure that we are set up to deliver on our vision to be a strong, green heartbeat for London, whilst also supporting our TfL values to be caring, open and adaptable.

The programme has a dual purpose; to enable the delivery of an Our TfL Operating Model and bring costs down on our journey towards financial sustainability. The programme is led by Fiona Brunskill, Chief People Officer, and has five core workstreams, these are:

Pan-TfL Operating Model – This is the fundamental way in which TfL operate as an organisation.

Customer & Strategy - Setting direction, support, and deliver for our customers, colleagues and city.

Capital - Supplying sustainable and efficient outcomes for all our customers, working to build and drive whole life asset outcomes.

Operations - To plan, operate, and maintain a safe, integrated and sustainable transport network which delivers great value for London.

Corporate Services- Providing expert and consistent support and expert advice to our colleagues across TfL whilst holding the

organisation to account on safety, financial, compliance, people and legal matters.

An in depth update on Our TfL Programme is scheduled for the TfL Board meeting on the 7 December 2022.

We will report on the progress of this programme and key deliverables within this paper at subsequent Panels.

The Executive Team

Following on from Andy Byford's departure in October, Andy Lord has been appointed as Interim Commissioner with effect from the 25th October 2022. Andy Lord was previously the Chief Operating Officer at TfL.

There has been a number of other moves across the Executive in October. Following a competitive recruitment process, Rachel McLean was appointed Chief Finance Officer (CFO) from the 31 October 2022. Rachel was previously the CFO for Crossrail and Finance Director for Operations.

Glynn Barton was appointed as the Interim Chief Operating Officer with effect from the 25 October 2022.

Tricia Wright has been seconded to lead on the Pension Review workstream, as Chief Officer – Pensions Review from the 10th October 2022.

Fiona Brunskill was appointed Interim Chief People Officer from the 10 October 2022.



People Scorecard Measures and Performance 2022/23

Our Scorecard performance for our Engagement, Inclusion and Wellbeing measures will be calculated through our Viewpoint employee survey which took place between the 26 September and the 21 October 2022. As in previous years, we will reach out to Board and Panel members to schedule an informal briefing on these results ahead of the full update to the TfL Board on the 1 February 2023.

Total Engagement

Last year's score – 61 per cent
This year's target – 62 per cent

We are committed to making TfL a great place to work for everyone, caring for our people, and supporting them to be the best they can be. This is the only way we can truly deliver for London. The best indicator of how well we are doing at this is our Viewpoint engagement scores, which tell us how our

people feel about working for us and what needs to be better.

Our overarching measure of employee engagement at TfL is called Total Engagement. This is the average of positive responses across 20 questions about different parts of the working experience. These include engagement with change & leadership, customers, wider team and the TfL brand.

Wellbeing at Work Index

Last year's score – 57 per cent
This year's target – 58 per cent

Wellbeing is linked to engagement, so we introduced and continue to track our Wellbeing at Work Index from our Viewpoint results. This allows us check if colleagues within different areas of the business are at risk of work-related stress.

The six factors that can affect employees' wellbeing at work are: Control, Support, Role, Demands, Relationships and Change. These areas, if not managed well, are linked with stress and could lead to poor health and wellbeing, lower productivity and increased sickness absence.

Inclusion Index

Last year's score – 51 per cent
This year's target – 52 per cent

It is of the utmost importance to us that our workforce remains engaged and happy and feels included.

Our inclusion index is calculated from six questions on our Viewpoint Survey, measuring our colleagues views on their involvement in decisions, openness of senior managers, challenging the way things are done, on bullying and harassment and if the survey will result in change.

Diversity Declaration Rates

Last year's score – 54 per cent

This year's target – 56 per cent

Improving our data and improving our colleagues' trust in us with their data is key to building an inclusive workplace and ultimately improving diversity. We have seen a steady decline in declarations on all demographics over the last two years – so driving this change represents a significant improvement from where we are now.

The top drivers of this measure are centred around issues of trust and inclusivity and colleagues feeling that it is safe to share their data with us and that it will have no bearing on their career. In previous years, declaration drive campaigns have encouraged people to declare and can have up to a 10 per cent impact, but we can't force people to declare, which is why creating the right environment is so important.

A More Inclusive and Diverse Organisation

Black History Month

Throughout October, our RACE Staff Network Group will be hosting a series of events to celebrate Black History Month (BHM). Throughout BHM we recognise the achievements and contributions that Black people make to the United Kingdom every day, both past and present.

Events included lunch and learn sessions, guest speakers, music events, book clubs and more. We also reflected on the past, including learning about the historical legacy of colonialism and slavery, along with a visit to the Windrush Generation national monument at Waterloo station - dedicated to 'Windrushers' – which marks the 75th Anniversary of the arrival of the Windrush generation to the UK.

South Asian Heritage Month

South Asian Heritage Month which takes place between 18 July - 17 August each year

seeks to celebrate, commemorate, and educate on all things South Asian with a particular lens on the historical, social and cultural ties to the UK. This includes looking at the role of trade and the British Empire, migration and wide-ranging contributions, influences, fusions and changes in modern society.

To celebrate this, we created a virtual exhibition space on our online Platform, where colleagues from across the organisation can share what South Asian Heritage Month means to them and the experiences they have had. This online exhibition enabled more of our colleagues join in and access the sketches, artwork and recipes shared by our colleagues.



In addition to this, throughout the month there were online and in person events, ranging from South Asian literature, to a museum visit, ending with a summer fair on the 16 August.

Pride at 50

This year at TfL we are celebrating the huge diversity of our LGBT+ identities, [and?] intersectionality with other protected characteristics. Throughout June there were multiple events happening across the organisation to highlight our LGBT+ colleagues and allies, leading to our presence at Pride events across London.

We were proudly represented at the Pride in London Parade on the 2 July 2022, at Croydon Pridefest on the 16 July 2022, and at UK Black Pride on the 14 August 2022, giving our colleagues a chance to get involved in the 50th Anniversary celebrations.

Following the success of the LGBT Roundel campaign held in 2021, we launched a competition for colleagues to submit artwork associated with Pride that was displayed across the TfL estate during Pride month.



Defence Employer Recognition Scheme – Gold Award

We have been successful in the revalidation of our Gold Employer Recognition Scheme (ERS) award by the National Employer Recognition Board on behalf of the Ministry of Defence. This award will run for a further five years and is in recognition of our commitment to support colleagues involved in the Armed Forces.

This is down to the work of the Reservist and Ex Forces Special Interest Group, placements for ex Forces, our annual Industry Day, including CV writing, interview skills, skills matching and engaging with our supply chain to attend along with key note speakers. Attendance at The Mayors Remembrance Service and attending the cenotaph on Remembrance Day and

engagements with outside agencies such as Career Transition Partnership, The Poppy Factory, Veterans Adi and SSAFA.

Count me In

Our main drive to increase the number of our colleagues declaring their protected characteristics, Count me In, is due to launch in the next month.

Good data enables us to deliver schemes that demonstrate our commitment to our colleagues and potential applicants, that we are committed to equality and supporting our diverse workforce. This importance of sharing personal information will be cascaded from senior managers down to individual teams. There will be articles published on our Platform intranet pages, along with our On the move publication. Complementing this will be a poster campaign across our estate.

We are also building an App which will allow operational colleagues to enter their details directly, without the need to go via their line manager or call the HR Services phonenumber. All operational colleagues will be sent a link directly asking them to share their details, removing barriers to them sharing their details with us whilst also explaining the importance of doing so.

Our Pay Gap Action Plan

We are shortly due to publish our Pay Gap report Action Plan. This action plan sets out how we plan to increase the representation of women, Black, Asian and minority ethnic, and disabled colleagues across the

organisation, particularly in more senior roles.

We will provide an update to the Remuneration Committee at the February meeting and go into the interventions that will run up to 2025 as we look to reduce our pay gaps.

World Menopause Day

World Menopause Day is held every year on the 18 October. The day was designated by the International Menopause Society to raise awareness of the menopause and to support options to improve health and wellbeing for women in midlife and beyond.

To celebrate this day, the Women's Staff Network Group (WSNG) is hosting a series of events hosted by the Menopause Hub. This operates with a 15-minute presentation on a specific aspect of Menopause. After this, the Hub will become a space for attendees to engage in conversation, share personal experiences and solutions used on their menopause journey.

There are open invitations to all our colleagues to participate or just observe and learn from any of our events whether you're menopausal or want to better support family, friends or colleagues.

An Engaged, Motivated and Healthy Workforce



Viewpoint 2022

On the 26 September we launched our annual employee engagement survey, Viewpoint. This ran for four weeks and will allow us to measure our employee engagement, inclusion and wellbeing.

The response rate to the survey was over 57 per cent, an increase from 54 per cent last year, with over 15,000 colleagues telling us their views on what it is like to work here.

This increase was again helped by carrying out a paperless survey to help increase the response rate in operational areas.

Ahead of the survey, we hosted confidentiality sessions for our colleagues to sign up to. These aimed to provide reassurance that information provided will remain anonymous and that colleagues can not be identified. This is to provide confidence so that colleagues can provide accurate information for us to act upon. These sessions will be held virtually and take place at different times to allow for operational colleagues working shifts to take part.

As in previous years, we will reach out to Board and Panel members around December

to share these results with you in detail and talk through any key changes from previous years.

Employee Engagement – You Said We did

Ahead of the 2022 survey, across the business we highlighted to our colleagues action which has been taken from last year's survey results via our 'You said, we did' process. This sought to demonstrate to our colleagues that their input into this survey does generate real change, which set out to drive a higher response rate for the 2022 survey.

An example of this includes one of the main themes to come out of Viewpoint around communication and engagement. Open and honest communication were highlighted in London Underground customer operations, in response to this we established a new monthly Customer Service Manager call, line engagement sessions, listening sessions and regular calls with the Area Managers.

Our City Planning function have actively promoted diversity & inclusion through a series of departmental listening sessions which have focused on issues around race, inclusion and more recently on specific topics such as mental health, neurodiversity and domestic abuse. This has been accompanied by including "diversity moments" at the start of key meetings and forums, where we reflect on issues that might be significant for our colleagues (e.g. faith festivals, celebrations of key moments, reflections on how we have handled or supported a particular issue in the workplace) and promote the work of SNGs.

Across Network Management, two key themes were identified from last year's survey results and acted upon, communication and development. The team have developed a new SharePoint site providing information for colleagues on health, safety and wellbeing, personal and career development, inclusion, job opportunities and a calendar of events of interest for our people. They have also established regular development seminars to improve awareness and competence in subjects including unconscious bias, time management and interview guidance.

Update on mydiscounts

mydiscounts was launched at the end of March 2022 and so far nearly c16,000 employees are using the new discounts platform, hosted by Reward Gateway, with more joining each day. Employee feedback was key to establishing the requirements for the procurement of the new mydiscounts, and this has really paid off in the success of the scheme. In little more than four months after launch, employees have spent over £4.7 million, with total saving of c£330k, (average of c8% on each purchase). The next stage of the campaign is promoting the app, particularly in operational areas, ensuring that everyone can make the most of mydiscounts.

Further embedding our Hybrid Working

Whilst our transition to hybrid working concluded on the 31 March, we continue to ensure that we make this as effective as

possible for our colleague and the organisation.

Starting on the 14 July, we introduced further Hybrid Working training sessions our colleagues can enrol on. These sessions involved guidance on setting up meeting room technology so that other attendees can log on virtually, hybrid meeting etiquette and how to co author documents live. These sessions are being held both virtually and in person across our estate.

Cycle to Work Day

On the 5 August, we took part in the nationwide Cycle to Work Day initiative, providing colleagues who are able to do so the perfect opportunity to start exploring the benefits and possibilities of cycling in London.

Regular exercise such as cycling, can boost mental health, reduce stress, improve your mood, productivity and sleep quality. It also has the benefit making a cleaner choice for London's air quality - so it's a good choice for our colleagues and a more sustainable choice for London.

Online cycle safety schemes were available to our colleagues to help mitigate any safety concerns. We also continue to offer our colleagues the Cycle to Work scheme, allowing colleagues to hire cycles and cycling equipment to further encourage this active mode of travel.

The Right People, Skills and Capacity to Deliver the Business Plan

Our Graduate & Apprentice schemes update

On the 19 September we welcomed our latest cohort of Graduates, Apprentices, and Interns. This comprised of 60 apprentices across 16 different schemes, 51 graduates across nine schemes and 11 year in industry interns across four schemes. A further five interns joined the Stuart Ross Communications Internship Scheme, a diversity initiative, aimed at addressing the underrepresentation of Black, Asian and minority ethnic communities in public relations, communications and marketing.

On the 31 October we were also welcomed 45 new Apprentices joining London Underground, Rail for London and TfL Engineering as part of our 2022/23 cohort. In January we will welcome our final tranche of additional level 3 apprentices as part of this cohort.

For our graduate scheme, we have a record 54 per cent joining from a BAME background, with Women starters falling slightly from 32 per cent to 29 per cent. Whilst these trends are positive news we are

not complacent and continue to seek further applications from under-represented groups.

Graduate starts	2018	2019	2020	2021	2022
Women	18%	22%	25%	32%	29%
BAME	27%	53%	30%	45%	54%

We will share the trends for our apprenticeship scheme when the final new starters for 2022/23 join in January.

We have also concluded the re-tender for 17 apprenticeships commencing in September. The retender aimed to increase the quality of apprentice training provision by placing a greater emphasis on diversity and inclusion, embedding of sustainability into apprentice training, awarding longer contracts to improve supplier relationship, innovation and continuous improvement.

Steps into Work

On 5 September we also welcomed our latest Steps into Work (SiW) cohort into the organisation. SiW is a 12-month programme offering neurodivergent participants the chance to gain skills and work experience.

Participants complete three unpaid work placements within Transport for London's offices, stations and across the GLA. They will have the opportunity to gain accredited and practical qualifications such as 'Work Skills', so they'll feel more confident and prepared to find work post programme.

Our previous Cohort of nine students have now rolled off the scheme after completing their 12-month programme. Three students have already secured permanent roles,

including two with MTR Crossrail who operate the Elizabeth Line. The remaining students continue to be supported into either paid employment or further training. A graduate event for the students will take place on the 8 December 2022.

Employability Outreach and Green Skills

Our Skills and Employment team have attended 12 Green and future skills focused events promoting our Graduate, Apprenticeship, Internship and Employability opportunities.

On the 13 October, we attended the London Wildlife Trust Green Jobs Fair 2022 at Walthamstow Wetlands attended by more than 100 young people aged 16-25, particularly from backgrounds under-represented in the environmental sector.

On the 17 October we hosted a Green Skills Hackathon event at the London Transport Museum, which saw students from Uxbridge College propose solutions to tackle air quality in the capital.

Mentoring in TfL – Celebrating National Mentoring Day

The 27 October was National Mentoring day and TfL marked the day by highlighting to our colleagues the different ways we support mentoring across the organisation, along with the opportunities available and benefits of mentoring.

We also used it as an opportunity to promote the TfL mentoring hub which hosts lots of support and resources for individuals wanting to find or be a mentor as well as departments setting up their own schemes.

We also launched a new Introduction to Mentoring e-learning.

feedback, develop talent and enable career development.

Embedding our new approach to Talent

Following on from our colleagues' end of year conversations with their line managers, we have conducted a review of our first year using our employee-led Readiness talent model, new Performance Ratings and my Journey (the underpinning Performance & Development portal). This lessons learnt exercise will drive further improvements, helping us embed the employee led, inclusive and integrated approach to talent and performance.

The myJourney tool is where our end of year performance ratings are captured following discussions with line managers. Through the lessons learnt, we have reviewed the engagement of employees and managers in capturing new ratings on myJourney, alongside qualitative feedback on how well the new ratings have been understood and used by the business. myJourney also captures if colleagues are looking to strengthen in role, stretch or move, and we are already looking at how this data will be used to inform career agility & development initiatives.

The next steps are to further embed the MyJourney tool and the new talent approach throughout the year, helping our colleagues have better quality performance conversations, capture achievements and

Date: 16 November 2022

Item: Leadership Development at Transport for London

This paper will be considered in public

1 Summary

- 1.1 To update Panel members on the approach being taken to develop leaders at all levels in TfL and how this supports our mitigation of our strategic risk (ER2) on the attraction, retention and wellbeing of our people.

2 Recommendation

- 2.1 **The Panel is asked to note the paper.**

3 Background

- 3.1 We know that having good calibre leaders is essential for the challenges we face in retaining our talented employees, and building our brand and employee value proposition (EVP).
- 3.2 Over the last decade TfL has supported an executive education partnership with Cass Business School (2012 – 2016), an in-house Leader Led approach (2017 – 2019) and various departmental programmes aligned to local business plans, for example Fit for the Future Stations (2013 – 2018). The pandemic, combined with severely restricted funding, meant we focussed on curating a mainly online offering called [Stay Learning](#), which was supplemented with a bespoke 360 tool, mentoring, group coaching and membership of organisations including [Whitehall Industry Group](#) and [Women in Transport](#).
- 3.3 We have also supported programmes for emerging leaders including a GLA sponsorship programme [Our Time](#) and our work with Graduates and Apprentices.
- 3.4 Evaluation of our approach to date shows that our leaders most value coaching, the opportunity to network to build opportunities to collaborate and learn from other leaders and the time to think and reflect. We are also cognisant of how leadership development is changing, moving away from top-down programmes to more self-directed and experiential. There is more emphasis on authenticity and emotional intelligence for building trust and communication skills. Also, recognition of the complex context our leaders need to thrive in including financial crisis, pandemic recovery, and the threat of climate change.

4 Leadership Development Approach 2022 -2025

- 4.1 Our primary purpose is to build values led leaders who embody being caring, open and adaptable and create strong followership from others. All our actions and programmes to develop leaders are informed by these values.
- 4.2 We have two frameworks to provide clarity and consistency. These are:
- (a) **Senior TfL Leadership Strengths**– these describe the key attributes needed to successfully meet our objectives and challenges. They are used to identify strengths and development areas and are embedded into senior recruitment and job design. They cover areas such as Commercial Thinking and Building our Future to reflect the strategic responsibilities of our most senior leaders.
 - (b) **People Leadership Framework** – due to be launched in December 2022. This is aimed at all levels of people leaders, from front line supervisors through to our most senior roles. This framework describes how we expect all of our people leaders to deliver Our Vision and Values in leading their teams’ performance to deliver on TfL priorities.
- 4.3 These frameworks shape our development offering which has five levels:
- (a) **Entry level** – this describes both our Graduate and Level 6 Apprenticeship programmes for General Managers. Also, our internal upskilling at Levels 3 and 5, which was piloted in Asset Management. We are ambitious to grow internal apprenticeship upskilling further through use of our Apprenticeship Levy and the full suite of management apprenticeship standards. We have recently re-tendered for providers to work with us on delivery for Level 3, 5, 6, and 7 programmes which will be aligned to either the Institute of Leadership and Management or the Chartered Management Institute depending on Apprenticeship Level.
 - (b) **People Leader Foundation** – this covers a suite of self-directed training resources including manager induction, mentoring and workshops aligned to our People Leader Expectations. It is aimed at all levels of people leaders and aspiring leaders. This includes building confidence and skills to have the conversations necessary to drive performance.
 - (c) **Emerging Leaders** – currently open to General and Project Manager final year Graduate and Apprentices. Includes two placements providing team leadership plus networking and a speaker programme from senior leaders. We want to grow this programme to include other high potential employees identified through our approach to talent and succession planning and building on the successful model we have for our Graduate and Apprentices of providing placements with dedicated feedback.
 - (d) **Getting Ready for Senior Leadership** – shortly to be launched to senior managers at Band 4 and 5 level to help them move towards Director roles. This is a sponsorship programme with additional leadership experiences based around our Leadership Strengths. This will align to our work on building diverse succession pipelines.

- (e) **Director Support** – covers induction for new Directors and group coaching to support collaboration, shared problem solving and support for Directors who act as sponsors and mentors for emerging leaders. Individual coaching is also available to support Director resilience and wellbeing.

4.4 Local programmes, for example the LU Leading Customer Service programme, are funded and managed locally. A business case is made for each programme, and it is aligned to local People Plans. Our HR Business Partners act as programme advisers to ensure local programmes are not duplicating learning available from central programmes.

List of Appendices:

None

List of Background Papers:

None

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Date: 16 November 2022

Item: Plan for managing our Safety, Health and Environment (SHE) Enterprise Risks

This paper will be considered in public.

1 Summary

- 1.1 In June 2022 we provided our annual update on the Safety, Health and Environment (SHE) Enterprise Risk 1 (ER1). This was assessed as ‘above tolerance’ and ‘requires improvement’. We outlined how we would:
- (a) use the opportunity presented by the new TfL operating model to effectively focus efforts on topics presenting the greatest risk to ER1 and meeting SHE outcomes;
 - (b) ensure our priority SHE risks were more clearly defined and communicated in the Level 1, Level 2 and wider risk cascade through the business; and
 - (c) encourage development and ongoing review of business SHE improvement plans and activities in line with this approach to proactively manage SHE risk.
- 1.2 Our approach was noted, and we agreed to bring the Panel a more detailed plan for working towards bringing our SHE Enterprise Risks ‘within tolerance’.
- 1.3 This paper outlines progress in developing our SHE Enterprise Risks and our Strategy and Plan for effective management, including:
- (a) ensuring our Enterprise Risks focus on each of the SHE outcomes, with appropriate governance in place for each risk;
 - (b) our Strategy for improving our maturity in managing SHE risk, through building confidence we are focussing on controls and activities to prevent SHE harm before it happens; and
 - (c) detailing the actions we are taking to work collaboratively in managing SHE risk across our business areas in line with roles, accountabilities and influence.

2 Recommendation

- 2.1 The Panel is asked to note the paper.**

3 Vision for our SHE Enterprise Risk Management Plan

- 3.1 Our required SHE outcomes and Vision and Values are clear; maintain legal and standards compliance, prevent SHE incidents and achieve our Vision Zero and Vision and Value aspirations.
- 3.2 When it comes to risk 'appetite' and 'tolerance' with regards to SHE we are 'risk averse'. Our tolerance is 'low' because we do not want to accept even minor SHE incidents or injuries affecting our tolerance rating.
- 3.3 Our Strategy is to mature our risk management approach. We are shifting to leading indicators, measuring strength and building confidence in our risk controls and activity to prevent SHE harm, reduce incidents and likelihood of missing our Vision Zero targets.
- 3.4 This is being supported by a programme of supporting identification and management of issues through effectively diagnosing risks and use of leading indicators, simplifying our controls, such as through the delivery of a new, more accessible SHE Management System (SHEMS), and promoting a stronger SHE Culture at all levels of the organisation.
- 3.5 Our Plan for delivering our Strategy can be summarised as
 - (a) ensuring adequate focus on each of our SHE risks and establishing effective governance to deliver the SHE Enterprise Risk Management Plan;
 - (b) increasing visibility of leading indicators focussed on flagging areas of concern, such as confidence in our controls early and before incidents or harm occurs;
 - (c) assessing confidence, we are controlling SHE risks, diagnosing what action is required and where to effectively target improvements;
 - (d) detailing specific actions to be delivered by each business area in line with their roles, accountability and influence and our wider operating model; and
 - (e) ensuring our actions and risk management activities are represented in our risk cascades at all levels, and we hold ourselves to account through our governance.

4 SHE Enterprise Risks and Governance

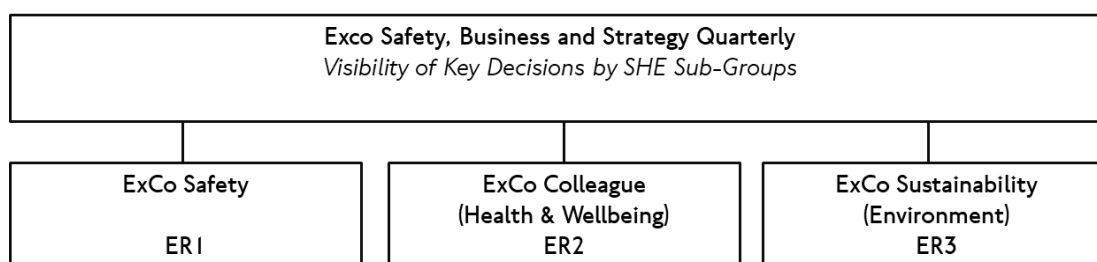
- 4.1 Since our last update in June 2022, the TfL Executive Committee has approved a set of 10 new Enterprise risks. The first three outlined in Table 1 below relate to SHE.
- 4.2 Each of the SHE three components used to be included within a single Enterprise Risk, ER1, but are now split into out into separate risk areas. This enables more targeted focus on action to control these risks.

Table 1: Our SHE Enterprise Risks

No	Level 0 Enterprise Risk Title	Owner
1	Ability to Deliver Safety Objectives & Obligations	Chief SHE Officer
2	Attraction, Retention, Health & Wellbeing of our Employees	Chief People Officer
3	Environment , including Climate Adaptation	Chief SHE Officer

4.3 A key part of our plan is to ensure our Executive governance structure is optimised to best manage these risks. This is detailed in Figure 1 below, with there being an Executive Committee thematic sub-group overseeing each of the SHE risks. In October 2022, the Executive Committee endorsed that all ERs should go to the relevant sub-group before going to the Executive Committee, panels and committees.

Figure 1: Executive Committee SHE Sub-Group Structure



4.4 While each risk has an Executive Committee level owner, the reality is every part of the business is responsible for managing and able to influence SHE.

4.5 We have a lot of SHE activity in place already and our new operating and governance structure presents an opportunity to join it up and work more collaboratively across the business.

4.6 The thematic sub-groups have representation from across the TfL Value Chain and business areas. This enables us to manage risk through the whole lifecycle of our work from planning to maintaining. We are also pooling our expertise and influence, enabling a joined-up view and coordination of SHE risks, actions and direction of resources.

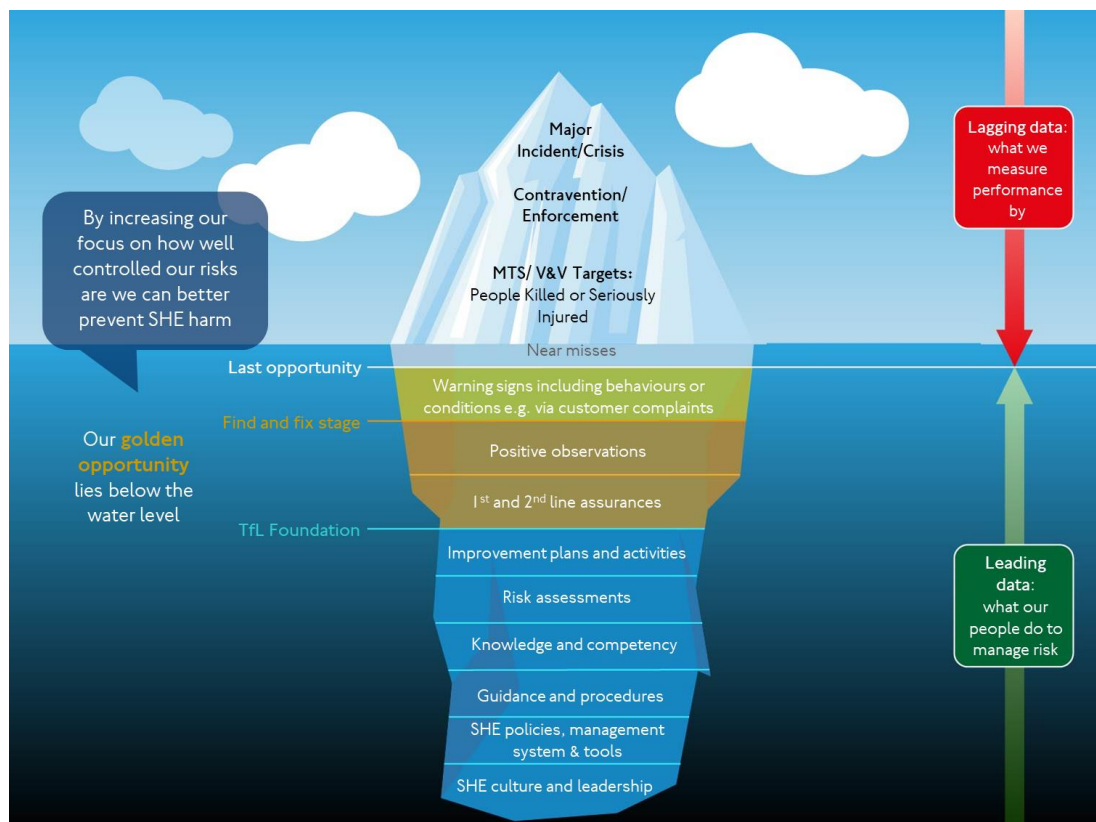
4.7 Work is in progress to develop Level 1 risks assigned to the new SHE Enterprise Risks.

5 Improving our Indicators

5.1 Effective governance and meaningful review require appropriate performance information. We are widening the types of leading indicators we use to assess our risks and increasing visibility and use of indicators at each level.

- 5.2 Alongside ‘lagging’ indicators (things that have already happened, such as injuries or incidents) we are working towards using and giving greater visibility to more ‘leading’ indicators (things that indicate something may happen or needs attention such as near misses or controls not being in place).
- 5.3 Leading indicators tell us more about the confidence we have in our controls and activity to prevent harm so as to work in a more proactive and preventative way. This is illustrated in our SHE Insights and Prevention Framework, or ‘Iceberg’ where we are building focus on what happens ‘below the Waterline’ (see Figure 2 below).
- 5.4 Examples include measuring incident close out rates and outstanding actions from investigations to focus on ensuring timely action is taken and we are continually learning. We also measure completion of SHE training courses. As we roll out our new digitised SHEMS we will be able to provide a variety of indicators about how often it is being accessed, tools are being used and by who. All of this helps us consider not just whether we have controls and processes in place but whether they are being used, and ultimately whether they are effective.
- 5.5 We have also developed a Cultural Maturity Model which brings much of this together; measuring elements such as leadership and how well we communicate with and develop our people to provide a score of our SHE maturity.

Figure 2: SHE Insights and Prevention Framework ‘Iceberg’



6 Diagnosing areas of focus to identify and prioritise action

- 6.1 As detailed in June 2022, we know our priority topics of pan-TfL concern, posing the greatest risks to meeting our SHE outcomes. We also know the controls we need in place for good risk management, providing us greater confidence that they are managed (see Appendix 1).
- 6.2 From these we have developed a diagnostic tool, using recognised risk management maturity definitions where we assess confidence in each of the controls and activities in place for each of our SHE concerns.
- 6.3 The approach not only highlights where improvements are required (lower levels of confidence controls are standardised) but also where we are performing well (high level of confidence controls are standardised). We can then learn lessons from effective approaches to apply elsewhere in the business, continually maturing our approach.
- 6.4 This helps us better manage both the SHE priority topics and the controls.
- 6.5 We look at how topics are managed in one area and can expand or adapt that approach for other areas. This is how we approached our Pan-TfL Fatigue Management programme. Some areas had their own fatigue training, others were trialling detection technology or new fatigue reporting processes. By looking across the business we were able to bring all the good practice together into a single Pan-TfL Fatigue Management Plan for all areas to utilise.
- 6.6 We are also working on common challenges and required solutions for controls. For example, we carry out assurance checks across the business but use different ways of collecting and storing that information making it harder to view and analyse. Understanding the issues at this level, we can develop improvements meeting business needs. We are now rolling out a digital assurance linked to our new SHEMS, to more systematically capture and report on information.
- 6.7 We are carrying out diagnostic assessments across business areas and at different levels. This means we can 'zoom in' on those topics requiring focus and specifically on the area of control, prevention or management that needs improvement.
- 6.8 It is therefore much easier and more effective in terms of translating into specific actions, and who or where this action needs to take place. Business areas can then ensure these are included within SHE improvement plans and tracking they are completed. It gives confidence each area is focussing on the right areas.
- 6.9 Our Strategy and SHE Enterprise Risk Management Plan actions, summarised in Table 2 below, are structured around the controls we know need to be in place for good risk management, aligned to internationally recognised steps in risk management and 'Plan, Do, Check, Act'.

Table 2: Summary of Actions within SHE Enterprise Risk Management Plan

Activity Group	Actions	Timescale									
Enabling Conditions	Creating Enabling SHE Culture SHE Cultural Maturity Model <table border="0" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 60%;"></td> <td style="width: 20%; text-align: center;">Pilot</td> <td style="width: 20%;"></td> </tr> <tr> <td></td> <td style="text-align: center;">Full rollout</td> <td></td> </tr> </table>		Pilot			Full rollout		Ongoing Complete 2024			
		Pilot									
		Full rollout									
	SHE Leadership engagement programme Leadership tours <table border="0" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 60%;"></td> <td style="width: 20%; text-align: center;">Full rollout</td> <td style="width: 20%;"></td> </tr> </table>		Full rollout		Ongoing Jan-2023 2022 2023 - onwards						
		Full rollout									
Focus Weeks & Stand Downs <table border="0" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 60%;"></td> <td style="width: 20%; text-align: center;">2 x per year</td> <td style="width: 20%;"></td> </tr> </table>		2 x per year		2022							
	2 x per year										
SHE Governance and Reporting Align Level 0 SHE ERs and Governance Align risk cascades to business area roles, accountabilities & influence <table border="0" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 60%;"></td> <td style="width: 20%; text-align: center;">L1</td> <td style="width: 20%;"></td> </tr> <tr> <td></td> <td style="text-align: center;">L2</td> <td></td> </tr> </table>		L1			L2		Complete Ongoing - 2023				
	L1										
	L2										
Understanding Risk (Plan)	Risk Identification & Assessment Risk Diagnostics across operational areas New Risk Assessment System Pan - TfL Fatigue Risk Management Plan Slips Trips Falls - Buses - Wider Public Transport Modes	2023 May-2023 Nov-2022 Complete Mar-2023									
	Evidence and Indicators Leading Indicators development New single incident reporting system Self-Service Reporting & Visualisation	Ongoing 2024 Ongoing									
	Effective Management of Risk (Do, Act)	SHE Management System & Tools New, simplified SHE Management System <table border="0" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 60%;"></td> <td style="width: 20%; text-align: center;">Tranche 1</td> <td style="width: 20%;"></td> </tr> <tr> <td></td> <td style="text-align: center;">Tranche 2</td> <td></td> </tr> <tr> <td></td> <td style="text-align: center;">Full rollout</td> <td></td> </tr> </table>		Tranche 1			Tranche 2			Full rollout	
		Tranche 1									
	Tranche 2										
	Full rollout										
SHE Competency Basic SHE training Requirements <table border="0" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 60%;"></td> <td style="width: 20%; text-align: center;">Agreed</td> <td style="width: 20%;"></td> </tr> </table>		Agreed		Complete							
	Agreed										

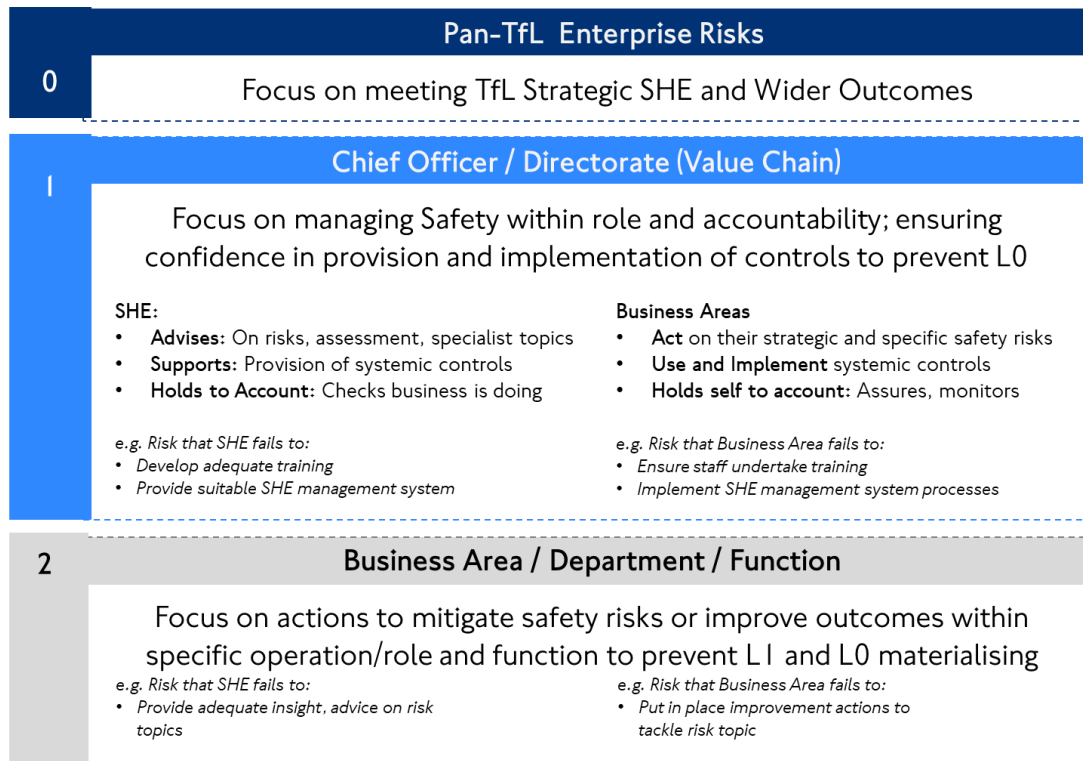
Activity Group	Actions	Timescale
	Enhanced SHE competency training	suite Roll out Agreed suite Roll out Dec-2023
	Carbon Literacy Training Delivered	Mar-2023
	Strategies & Information	
	Vision Zero Action Plan & Progress Reports (Road Risk)	In delivery
	Capital Delivery & Maintenance Strategy	In delivery
	Public Transport Safety Strategies	In delivery
	Corporate Environment Plan	In delivery
	Climate Change Adaptation plan	Feb-2023
Taking Action (Act, Check)	SHE Improvement Plans & Actions	Annualised
	Update to include Risk Diagnostics	Ongoing Jun-2023
	Assurance & Review	
	Digitised Assurance System	Phase 1 Full rollout Nov-2022 Q1 2023/24

7 Reflecting our Strategy and SHE Enterprise Risk Management Plan actions in our operating model, accountabilities and roles

- 7.1 We have both clearly identified roles and accountabilities across business areas, as well as an understanding of where we can have a wider influence.
- 7.2 We also have the SHE improvement programmes and actions as detailed in Table 2 above. We can use our established Enterprise Risk Management and Framework to bring together our roles and accountabilities and the actions we are already taking and those from our diagnostics to manage SHE.
- 7.3 We can articulate and cascade the actions at Level 1 and Level 2 in a way that enables each business area to monitor its progress and show how we are all working together to mitigate our Enterprise Risks and meet SHE outcomes.
- 7.4 Using the actions identified from the diagnostics and already in train above and our roles and accountabilities we could articulate risks and actions at Level 1 and Level 2.
- 7.5 For example, Level 1 risks and actions for SHE focus on provision of a new SHEMS and SHE competence and training. The business Level 1 risks and actions focus on implementation of the SHEMS and ensuring staff undertake training.

7.6 Specific risk topics can also be included with SHE supporting identification of topics of concern and deep diving into potential solutions, and business areas ensuring solutions and actions to tackle risk topics included within their improvement plans.

Figure 3: Illustrative Approach to SHE Enterprise Risk Cascade



7.7 Setting the Level 1 and 2 risks and actions in this way helps all parts of the business understand their roles, accountabilities and actions not just in their own area, but as part of the bigger effort to manage SHE risk.

7.8 The status of each risk and preventative or mitigating action can be monitored and tracked at each level of governance, overseen by the Executive Committee thematic sub-groups.

8 Summary and Next Steps

8.1 The dedicated focus on SHE in separate Enterprise Risks and alignment of our governance structure create the conditions for developing and implementing our SHE Enterprise Risk Management Plan. Our diagnostic approach enables us to identify and prioritise areas for action.

8.2 We have developed several actions already that are in train, which will be further targeted as we complete our diagnostics. Over time, we believe this approach will help us to improve our maturity in terms of confidence we are controlling our SHE risks and improving our performance to achieve our SHE outcomes.

8.3 We will provide a further update on as part of our annual SHE Level 0 Enterprise Risk reviews as per Table 23.

Table 3: Summary of Actions within SHE Enterprise Risk Management Plan

Date for review	Level 0 Enterprise Risk
February 2023	ER2: Attraction, Retention, Health & Wellbeing of our Employees ER3: Environment , including Climate Adaptation
September 2023	ER1: Ability to Deliver Safety Objectives & Obligations

List of appendices to this report:

Appendix 1: Top SHE Concern Topics and Key Risk Management Controls

List of Background Papers:

None

Contact Officer: Lilli Matson, Chief Safety, Health and Environment Officer
Email: lillimatson@tfl.gov.uk

Appendix 1: Top SHE Concern Topics and Key Risk Management Controls

Pan-TfL SHE Concern Topics, presenting greatest risk to SHE Outcomes and Vision

Top Priority SHE Risks	Primarily Affects (outcomes)	Summary Rationale for Inclusion (see Diagnostic Table for further detail)
Asset Deterioration	S,H,E Law, MTS, V&V	This is a known risk under most future funding scenarios. ORR identified risk requiring particular management.
Road Risk (VRU)	S, E MTS, V&V	This is the single greatest form of harm that befalls Londoners whilst travelling
Slips Trips Falls	S MTS, V&V	Most common source of customer injury across a range of our services and workforce injury. Has many underlying factors
Passenger Transport Interface Boarding / Alighting	S MTS, V&V	Higher risk point in passenger journeys across a range of our services.
Track Access	S Law, V&V	Is an acknowledged risk area in TfL and the wider industry.
Fire	S Law	Is a low frequency but high consequence risk.
Fatigue	S,H Law, V&V	A known risk across capital, operations and non-operational roles.
Staff Mental Health	S,H V&V	The single greatest cause of absence with potential to be exacerbated by economic, social and organisational responses to Covid.
Health Surveillance	S,H Law, V&V	Requirement not currently undertaken, enforcement notice. Aim to expand ambition beyond compliance.
Workplace Violence & Aggression	S,H MTS, V&V	A known risk to the health and wellbeing of frontline staff.
Hazardous Materials & Hazardous Waste	S,H,E Law, MTS	A low frequency, high risk issue with significant regulatory scrutiny.
Climate Change / Extreme Weather / Adaptation	E,H, S MTS, V&V	A known issue with incompletely understood implications, increasing scrutiny from regulators due to potential impacts
Air Pollution	E,H Law, MTS, V&V	Continued illegal levels of air pollution in parts of London combined with air quality issues on some of our services.
Operational Communication	S Law, V&V	Known issue across operations; within TfL and with third party operators and organisations
<i>Further SHE Risks kept under review within Business as Usual</i>		

Key Risk Management Controls to be in place and effective for each Concern Topic

An Enabling SHE Culture
Understanding our Risk (Plan) <ul style="list-style-type: none"> - Governance, Reporting, Tracking - Risk Identification & Assessment - Evidence & Indicators
Enabling effective management of risk (Do, Act) <ul style="list-style-type: none"> - Management Systems & Tools - Competency & Knowledge - Strategies, Information & Communication
Taking Action (Act, Check) <ul style="list-style-type: none"> - Improvement Plans & Actions - Assurance & Review

Date: 16 November 2022

Item: Members' Suggestions for Future Agenda Discussions

This paper will be considered in public

1 Summary

- 1.1 This paper presents the current forward programme for the Panel and explains how this is put together. Members are invited to suggest additional future discussion items.

2 Recommendation

- 2.1 **The Panel is asked to note the forward programme and invited to raise any suggestions for future discussion items.**

3 Forward Plan Development

- 3.1 The Board and its Committees and Panels have forward plans. The content of the plans arise from a number of sources:
- (a) Standing items for each meeting: Minutes; Matters Arising and Actions List; and any regular quarterly reports. For this Panel these are the Health, Safety and Environment Quarterly Report and the Human Resources Quarterly Report.
 - (b) Regular items which are for review and approval or noting such as the Health, Safety and Environment Annual Report.
 - (c) Items requested by Members: The Deputy Chair of TfL and the Chair of this Panel will regularly review the forward plan and may suggest items. Other items will arise out of actions from previous meetings (including meetings of the Board or other Committees and Panels) and any issues suggested under this agenda item.

4 Current Plan

- 4.1 The current plan is attached as Appendix 1. Like all plans, it is a snapshot in time and items may be added, removed or deferred to a later date.

List of appendices to this report:

Appendix 1: Safety, Sustainability and Human Resources Panel Plan.

List of Background Papers:

None

Contact Officer: Howard Carter, General Counsel

Email: HowardCarter@tfl.gov.uk

Safety, Sustainability and Human Resources Panel Forward Planner 2022/23**Appendix 1**

Membership: Dr Lynn Sloman MBE (Chair), Dr Nina Skorupska CBE (Vice Chair), Kay Carberry CBE, Bronwen Handyside, Dr Mee Ling Ng OBE, Mark Phillips and Marie Pye.

Abbreviations: CCSO (Chief Customer and Strategy Officer), CFO (Chief Finance Officer), COO (Chief Operating Officer), CPO (Chief People Officer), CSHEO (Chief Safety, Health and Environment Officer), D (Director), DCP (Director, City Planning), Director of Risk and Assurance (DRA)

22 February 2023		
Safety, Health and Environment Quarterly Report (to include resilience, assurance and compliance issues)	CSHEO	Standing item
Safety, Health and Environment Assurance Report	DRA	Standing Item
CIRAS Presentation	CSHEO	To note
Bus Driver Facility Improvements	COO	To note (6 monthly standing item)
Pan-TfL Fatigue Management Programme	CSHEO	To note
Air Quality Update	DCP	To note
Climate Change Adaptation Update	CSHEO	To note
Building Decarbonisation Update	CSHEO	To note
Responsible Procurement	CFO	To note
Human Resources Quarterly Report	CPO	Standing item
Pay Gap Action Plan	CPO	To note
Our Colleague Strategy	CPO	To note

To be scheduled

- Action on Inclusion
- Rail Accident Investigation Branch Update
- Safety Risk Prioritisation
- Vision Zero Inequality Dashboard and Analysis
- Safety at Junctions Update
- Review of the Programme to Improve Safety for Women and Girls Travelling on the TfL Network
- Update on Tram Collision at Oaks Road, Croydon
- Report on Graduate and Apprentice Diversity

Regular items

- SHE Quarterly Report – standing item
- HR Quarterly Report – standing item
- SHE Assurance Report – standing item
- Bus Driver Facility Improvements (every 6 months)
- People Plan Update
- Review of CIRAS Report and Themes – annual
- Vision Zero
- Enterprise Risk Updates