

Health, Safety and Environment report

2017/18

MAYOR OF LONDON



**TRANSPORT
FOR LONDON**
EVERY JOURNEY MATTERS

About Transport for London (TfL)

Part of the Greater London Authority family led by Mayor of London Sadiq Khan, we are the integrated transport authority responsible for delivering the Mayor's aims for transport.

We have a key role in shaping what life is like in London, helping to realise the Mayor's vision for a 'City for All Londoners'. We are committed to creating a fairer, greener, healthier and more prosperous city. The Mayor's Transport Strategy sets a target for 80 per cent of all journeys to be made on foot, by cycle or using public transport by 2041. To make this a reality, we prioritise health and the quality of people's experience in everything we do.

We manage the city's red route strategic roads and, through collaboration with the London boroughs, can help shape the character of all London's streets. These are the places where Londoners travel, work, shop and socialise. Making them places for people to walk, cycle and spend time will reduce car dependency and improve air quality, revitalise town centres, boost businesses and connect communities.

We run most of London's public transport services, including the London Underground, London Buses, the DLR, London Overground, TfL Rail, London Trams, London River Services, London Dial-a-Ride, Victoria Coach Station, Santander Cycles and the Emirates Air Line. The quality and accessibility of these services is fundamental to Londoners' quality of life. By improving and expanding public transport, we can make people's lives easier and increase the appeal of sustainable travel over private car use.

We are moving ahead with many of London's most significant infrastructure projects, using transport to unlock growth. We are working with partners on major projects like Crossrail 2 and the Bakerloo line extension that will deliver the new homes and jobs London and the UK need. We are in the final phases of completing the Elizabeth line which, when it opens, will add 10 per cent to London's rail capacity.

Supporting the delivery of high-density, mixed-use developments that are planned around active and sustainable travel will ensure that London's growth is good growth. We also use our own land to provide thousands of new affordable homes and our own supply chain creates tens of thousands of jobs and apprenticeships across the country.

We are committed to being an employer that is fully representative of the community we serve, where everyone can realise their potential. Our aim is to be a fully inclusive employer, valuing and celebrating the diversity of our workforce to improve services for all Londoners.

We are constantly working to improve the city for everyone. This means freezing TfL fares so everyone can afford to use public transport, using data and technology to make services intuitive and easy to use, and doing all we can to make streets and transport services accessible to all. We reinvest every penny of our income to continually improve transport networks for the people who use them every day.

None of this would be possible without the support of boroughs, communities and other partners who we work with to improve our services. We all need to pull together to deliver the Mayor's Transport Strategy; by doing so we can create a better city as London grows.

Contents

4 Commissioner's foreword

6 Our business

8 Our approach

10 Underground

14 Buses

20 Rail

26 Streets

34 Other operations

38 TfL workforce safety and wellbeing

44 Environment

About this report

This report covers the financial year from 1 April 2017 to 31 March 2018. However, the road safety data for Greater London and the Transport for London Road Network (TLRN) covers the calendar year from January to December 2017, in line with national standards. The safety data includes customer, employee and supplier details. Health data relates to employee wellbeing and includes employee sickness absences but does not cover contractor or customer health issues.

Environment data covers London's public transport operations, including taxis and private hire vehicles, plus the activities we and our suppliers carry out. Our continuous effort to provide more accurate data means that, following further checks, there are some changes to the figures we reported last year. Where possible, data is compared over five years and, where appropriate, comparisons have been made with previous years.

Commissioner's foreword

On 9 November 2016, seven people tragically lost their lives and 54 others needed hospital treatment after a tram overturned near Sandilands junction in Croydon. Our thoughts remain with those who lost their lives or were injured in the tragedy, and we continue to do all we can to support everyone affected. In 2017/18, both the Rail Accident Investigation Branch (RAIB) and SNC-Lavalin, the company we commissioned to carry out an independent investigation, published their reports. We are now implementing their recommendations and publicly report on our progress against each action through our quarterly TfL Health, Safety and Environment Reports.

Since the incident, we have introduced a wide range of additional safety measures to make sure such a tragedy can never happen again. These include improvements to signage, warning systems, speed monitoring and CCTV; as well as additional speed restrictions and the first UK use of an in-cab device to detect fatigue and alert the driver.

This year, 49* people lost their lives following incidents on the Tube and 11 died in incidents involving London Buses. The number of fatalities on London's roads rose during 2017 to 131, up from



116 in 2016, which was the lowest number on record. In particular, there were concerning increases in the number of pedestrian fatalities, especially those involving heavy goods vehicles (HGVs), as well as the number of cyclist and car occupant fatalities. At TfL, safety is our core value; it is ingrained in everything we do – we are committed to make sure that everyone who travels and works on our network returns home safe and healthy every day.

* This number includes suicides

The Mayor of London published his Transport Strategy in March 2018. At the heart of this document is the Mayor's commitment to Vision Zero. We are determined to work with the boroughs, police and enforcement authorities to help him meet this target and to make sure no one is killed in, or by, a London bus by 2030, and for all deaths and serious injuries from road collisions to be eliminated from our streets by 2041. Our plans to achieve this will be outlined in our Vision Zero action plan. This year we have made good progress with our Bus Safety Programme, which addresses some of our most significant risks and aims to help us achieve Vision Zero. We have also launched a number of initiatives to make escalators safer and improve safety at the platform edge or while boarding or alighting trains.

We have played an important role in helping the Mayor to achieve his ambitious environmental goals, especially when it comes to addressing London's poor air quality. The T-Charge is beginning to tackle air pollution ahead of the start of the central London Ultra Low Emission Zone in 2019. We launched the first two Low Emission Bus Zones in Putney and Brixton and continued to retrofit our bus fleet with cleaner engines. We supported

low emission taxis, launched rapid electric vehicle charging programmes and created Low Emission Neighbourhoods. We are closely tracking our performance on issues that help to deliver the new London Environment Strategy, including carbon dioxide emissions and energy use, waste reduction and green infrastructure.



Mike Brown MVO
Commissioner
Transport for London

Our business

Keeping London moving, working and growing to make life in our city better

How we report on our business*



Facts and figures**

940 Trains on the TfL network



580km

TfL-operated highways



680km

TfL-operated Rail and Underground routes

9,550

Buses on the TfL network



6,350

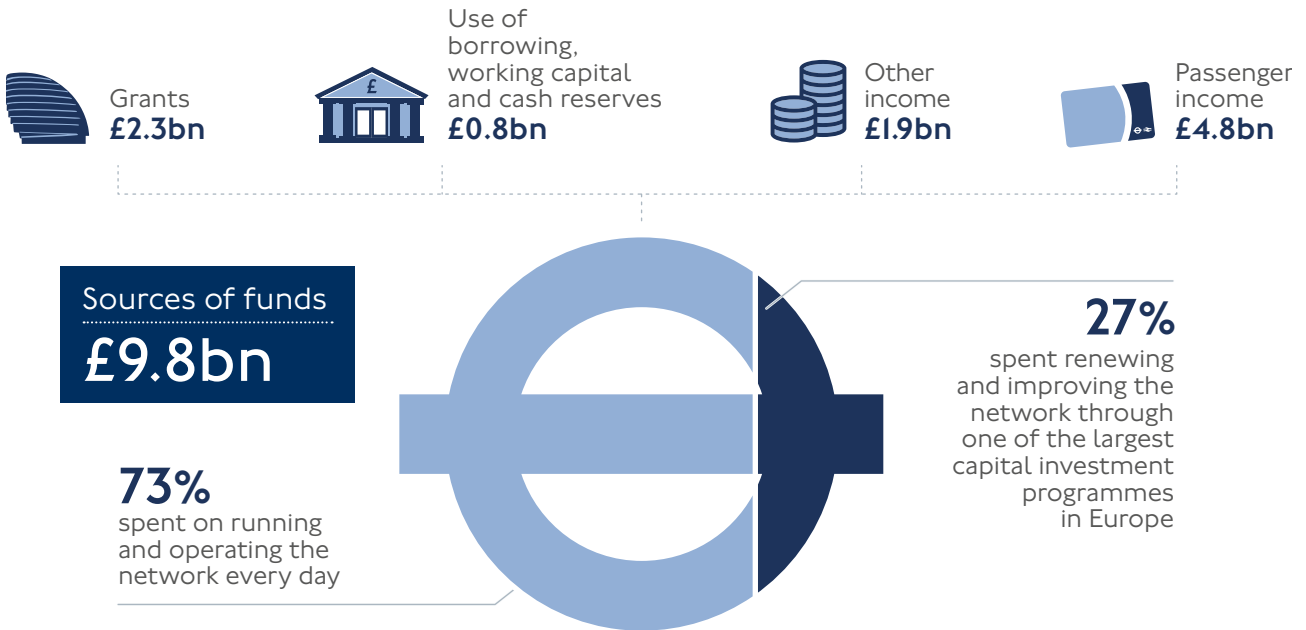
Traffic signals operated by TfL



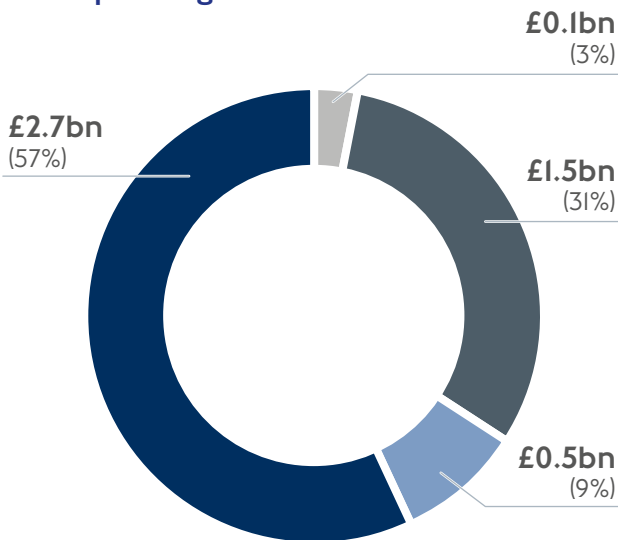
* In this report, TfL Rail is reported as part of Rail

** Based on full year 2017/18

Business at a glance



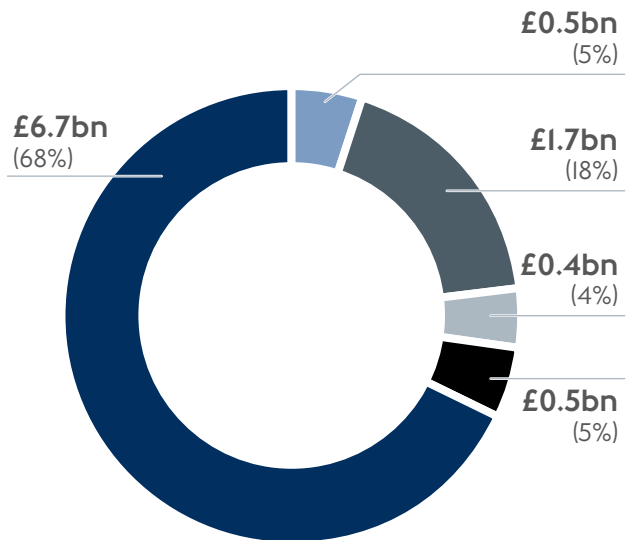
Total passenger income



Total: **£4.8bn**

- Underground
- Buses
- Rail
- TfL Rail

Total costs



Total: **£9.8bn**

- Operating costs
- Capital renewals
- New capital investment
- Crossrail
- Net financing



Pedestrians on Oxford Street

Our approach

Our vision for health, safety and environment is to get everyone home safe and healthy every day.

We want to make sure that:

- Every journey is safe for our customers, employees, agency staff and contractors, and that everyone goes home safe each day
- We maintain our assets and deliver projects safely
- We fulfil our commitments to prevent pollution and nuisance, protect biodiversity, improve air quality and reduce waste and carbon emissions

An important part of our Health, Safety and Environment (HSE) management strategy is measuring and benchmarking our performance internally and against international standards. Across TfL, we use the Office of Rail and Road (ORR) Railway Maturity Model to assess, benchmark and improve our approach to HSE management. The model looks at the five areas of our safety management system:

- Policy
- Organising for safety
- Cooperation and competence
- Planning and implementing
- Monitoring, audit and review

This allows us to identify long-term targets and address barriers to safety improvement.

Our businesses also set HSE targets against a number of indicators to enhance our day-to-day performance. These indicators focus on customer and workforce injuries, include historical incidents and preventative measures and reflect our continually improving understanding of risks. Based on this, we have improved our trend analysis, which helps us to identify measures to reduce risk, injury and harm to the environment. To deliver our performance targets, each business area develops HSE improvement plans that address the risks, injuries and sources of environmental harm that are relevant to their activities. Each area regularly monitors and reviews their plans and evaluates the effectiveness of their control measures.

HSE performance is reported at business unit level and discussed in management meetings across the organisation. Audits are carried out to monitor our strategic risks and ensure they are adequately controlled. Where shortfalls or non-compliance with the law or our internal requirements are identified, a corrective action plan is put in place to make sure appropriate improvements are made. This process of planning, implementing, monitoring and reviewing risks is vital to achieving our vision of getting everyone home safe and healthy every day and creating a safer, greener transport network for London.



Escalators at Tottenham Court Road station: 40 per cent of customer injuries across the LU were sustained on escalators

Underground

London Underground

In 2017/18, a total of 3,742 customers sustained accidental injuries on London Underground (LU), the equivalent of 2.76 injuries per million passenger journeys. The vast majority (84 per cent) were caused by slips, trips or falls. Consistent with 2016/17, approximately 40 per cent occurred on escalators, while another 22 per cent happened on stairs. The platform train interface (PTI) accounted for 15 per cent of customer injuries.

There were 49 incidents that resulted in a fatal injury on the LU network. These have been recorded by the coroner as: suicide (25), open* (six), narrative** (three) and accidental (five) and rail collision (one). A further nine fatalities are awaiting the outcome of coroner inquest.

To address this, we launched a suicide prevention programme with dedicated resources helping our staff understand what they can do to try to prevent someone from attempting suicide. We gave our operational staff additional training on how to identify someone in need and how to approach and assist them.

We used a number of different approaches to improve customer safety: some focused on changing behaviours (through direct and 'nudge' messaging), while others involved changes to our infrastructure to eliminate or reduce risk. These approaches resulted in a decline of almost seven per cent in customer injuries.

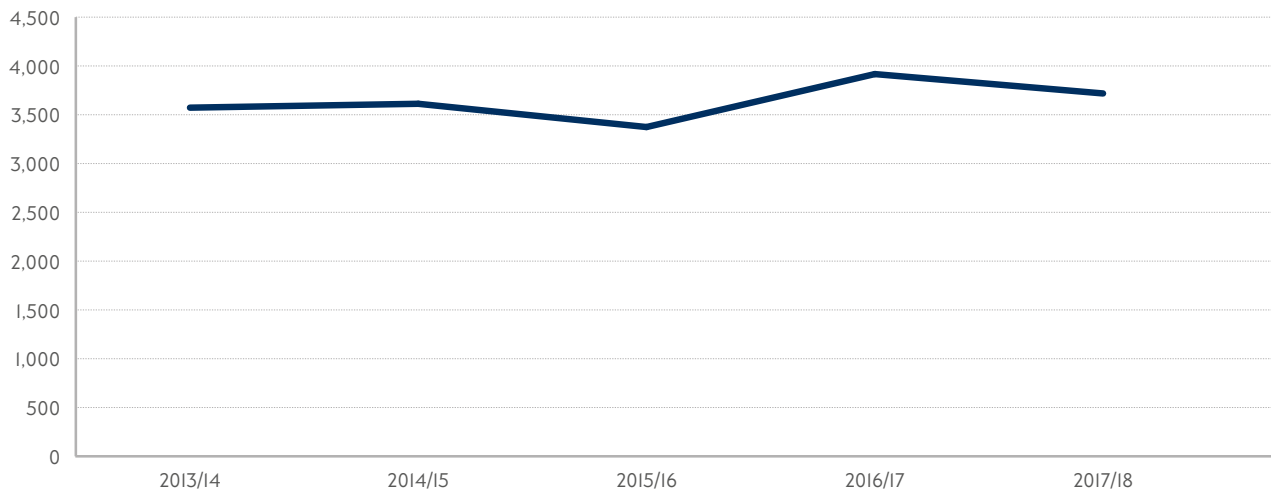
Trend analysis has shown that a quarter of all customer accidents happen at 10 stations on the LU network. Employees at these 'hotspot' stations developed local customer safety plans to address the specific issues that are causing most of the customer injuries.

We also changed our messaging to 'nudge' customers towards safer behaviour at these stations. For example, we installed red lines at the bottom and top of escalators (which resulted in people stepping onto the escalator more carefully), and handprints on escalator handrails (to encourage them to hold onto the handrail). As a result of the programme, called Escalator Excellence, we saw a 29 per cent reduction in customer accidental injuries on escalators at the 10 hotspot stations in the final three months of 2017/18. In 2018/19, the programme will be extended to all Underground stations with escalators.

* An 'open' conclusion arises in the absence of sufficient evidence to prove cause of death to the necessary standard

** A 'narrative' conclusion records the coroner's conclusions on the important issues arising in the circumstances by which the deceased came by his or her death

Number of customers injured on LU



We trialled deploying Travel Ambassadors at the top four hotspot stations to help customers during the summer holiday season. From this trial, we identified the locations on our stations where staff can help customers, for example where they can direct them towards lifts, encourage them to hold the handrail.

To reduce the number of injuries that took place on stairs and at the PTI last year, we developed targeted safety communications, including a poster campaign and Mind the Gap Oyster wallets.

Analysis showed that alcohol was often a contributory factor in incidents, especially over the festive period. During December, we displayed awareness posters at stations and in pubs around Zone 1, encouraging customers to take care when travelling after drinking. We also increased PA announcements and posted social media reminders. The number of accidents where alcohol was a factor was significantly lower in December 2017 compared with the previous year.

The Managing my Platform initiative, which was introduced at stations where employees carry out platform management duties, gave staff guidance (such as PA scripts) to help them better manage safety at the PTI. We received positive feedback from customers and there was a five per cent reduction in PTI-related injuries across the network.



Customers safely boarding a bus, which has stopped close to the kerb

Buses

London Buses

There were 11 fatalities on London Buses in 2017/18. Seven of these happened after buses collided with pedestrians (six) or motorcyclists (one). A further three people died from injuries sustained during falls while on board. One fatality occurred after an assault.

In 2017/18, a total of 5,348 injuries were reported, which is equivalent to 2.38 injuries per million passenger journeys. Almost 56 per cent were the result of slips, trips or falls. A further 19 per cent were caused by passengers being struck by an object (for example, another passenger's shopping) or striking an object (for example, a handrail). Seven per cent occurred when a bus collided with a person, vehicle or infrastructure.

The Bus Safety Programme and response to Driven to Distraction

The Bus Safety Programme was launched in February 2016. It contributes to the Mayor's Vision Zero approach to road safety, which includes a commitment to eliminate death and serious injury from the bus network. The programme was refreshed in 2017/18 and its scope was widened to include further risk management elements, such as fatigue management.

The London Assembly Transport Committee conducted a review of bus safety and published its findings in July 2017 in its report, Driven to Distraction. In October 2017, we responded to each of the report's recommendations and added further actions to the Bus Safety Programme where necessary.

Below are some of the significant improvements we delivered this year.

A new approach to measuring bus safety performance

We have developed two new measures to enhance our safety performance monitoring. The first measure, which was introduced at the end of 2017, is a leading indicator that assesses the maturity of an individual operator's safety arrangements. The criteria promote HSE systems and behaviours, and measure the extent to which an operator meets them. It helps to encourage a positive HSE culture and highlights good practice that can be shared with other operators to make the bus network safer. For example, by assessing how different operators work together to improve safety, it encouraged RATP, Metroline, Abellio and Go-Ahead to join forces on a campaign to encourage the safer use of Hammersmith bus station.

The second measure, the Safety Performance Index, uses a range of metrics to identify areas requiring improvement, by individual operators, or across the network. It was trialled in late 2017/18 and came into effect in April 2018.

Bus Safety Standard

As part of our Bus Safety Programme, we are developing a new safety standard, for launch in autumn 2018. This involves identifying innovative technologies that:

- Prevent collisions, such as autonomous emergency braking
- Mitigate the impact of collisions, such as a redesign of the front of buses

These measures were developed and tested throughout 2017 and the roadmap details the bus safety requirements all bus operators will need to adopt up to 2024. The introduction of Intelligent Speed Assistance technology is considerably more advanced thanks to extensive trials carried out in 2015/16. The technical checks that took place on 30 buses between January and March 2018 were positive and a phased roll-out across the fleet begins in 2018/19.

Bus Safety Innovation Fund

In November 2017, we announced the winners of our Bus Safety Innovation Fund. Operators were invited to bid for up to £500,000 to develop and trial new initiatives to improve safety across London's bus network. Successful bids included:

- A fatigue management system that uses in-cab sensors to detect eye and face movements for signs of fatigue, and alert the driver. The system can also provide invaluable data to better understand the issue of fatigue

- An interactive mobile safety app that enables the bus driver workforce to easily view a series of safety videos
- A collision prevention device that uses a forward-facing sensor to provide the driver with advance collision warnings and a speed limit indicator
- Development of a psychometric test for driver recruitment to quickly identify those candidates who are risk averse and those who exhibit high levels of risk-taking behaviour
- Investigation into the effects of different acceleration rates to identify the optimum rate of acceleration to reduce the number of slips, trips and falls

If trials are successful, the above will be considered for introduction across the bus network.

Alongside the TfL-funded trials, operators have introduced their own safety measures. These include:

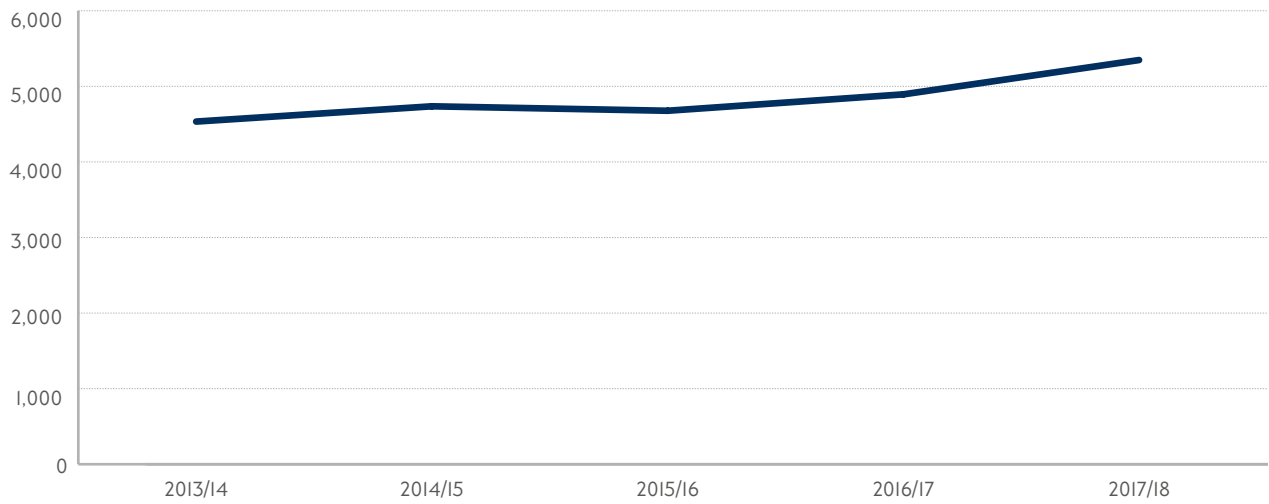
- Training assessments to increase bus drivers' awareness of vulnerable road users
- Applying lessons learned from the Sandilands overturning
- A new voluntary scheme that encourages drivers to sign up to a pledge comprising a series of safety statements. The aim is to ensure safety is at the forefront of their minds

Onboard announcements

Slips, trips and falls are among the main causes of injuries on buses so, over the past year, we have introduced a number of measures to mitigate this risk. Between December 2017 and January 2018, we tested a new onboard announcement that advises customers to hold on to handrails. The trial attracted a lot of media attention, which helped raise awareness of the risk. We evaluated the results of the trial and have established a plan for a more localised trial during 2018/19.

The smoothness of a bus ride is an important factor in controlling falls. We worked with operators to monitor driving standards and have introduced corrective measures where required.

Number of customers injured on buses





The London Bus Safety programme, launched in February 2016, contributes to the Mayor's Vision Zero approach to road safety



Platform marking helps to prevent incidents at the platform train interface at Canary Wharf station on the DLR

Rail

DLR, London Overground, London Trams and TfL Rail



A total of 425 customers were injured on TfL's rail networks in 2017/18, which equates to 0.58 injuries per million passenger journeys. Of these, 72 per cent were caused by slips, trips or falls (down from 79 per cent in the previous year). Twenty-seven per cent of all injuries occurred on platforms, while 21 per cent happened on stairs.

Three people lost their lives on the rail network in 2017/18 (awaiting outcome of coroner inquest).

DLR

In 2016/17, 79 per cent of injuries on the DLR were caused by slips, trips or falls. To reduce this, in 2017/18 we adopted best practice improvements from LU's escalator safety study. This included installing red comb plates, which highlight the start of moving steps on an escalator, at locations where most incidents happened.

We organised a series of passenger engagement roadshows to help us understand why customers make decisions that lead to injuries on the network. Feedback from the roadshows has helped to identify further improvements and their priority.

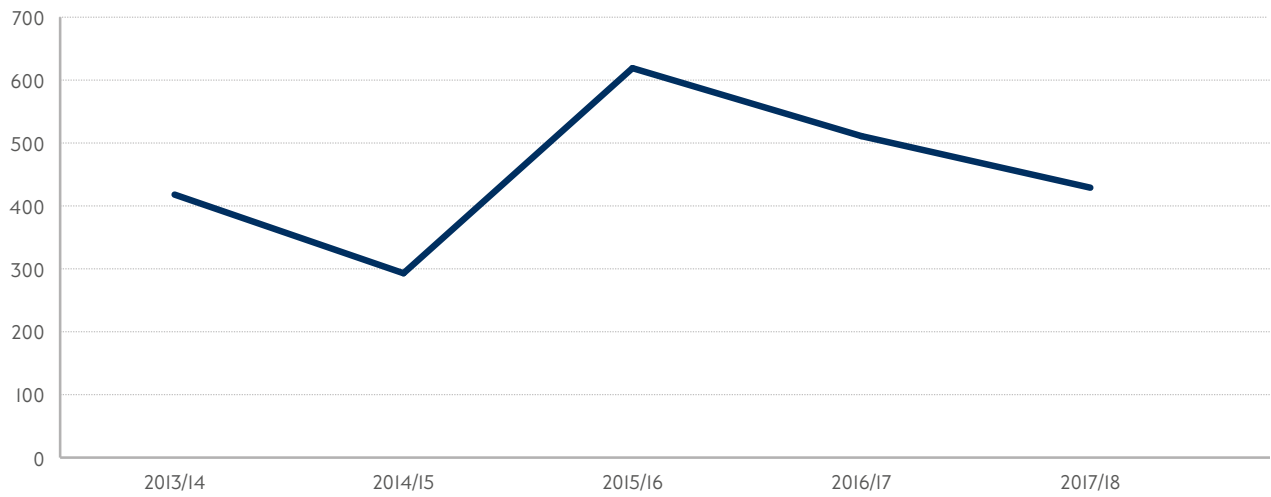
Over the past year, we have made significant progress in delivering our PTI incident reduction strategy. This includes:

- Keolis Amey Dockland (KAD), which operates and maintains the DLR on our behalf, launching a revised train dispatch procedure that focuses on safe door-closing operations. Passenger Service Assistants (PSAs) also received refresher training and this was supported by reminder posters in station rest areas
- Improving visibility by adjusting the platform mirrors that PSAs use to dispatch trains
- Exploring the use of platform edge lighting systems to illuminate the gap between the train and platform

To stop people trespassing on our tracks, we carried out targeted activities at hotspot stations. This included installing 'do not trespass' signs and painting red hashed boxes to discourage passengers from passing through the platform end gates on to the track.

As part of the DLR Back on Track programme, KAD and DLR staff worked with the East London NHS Foundation Trust to help people with mental health, social or psychological difficulties to travel on the network as part of their rehabilitation and recovery programme.

Number of customers injured on TfL Rail



London Overground

In December 2017, we launched the Night Overground on the East London line. This was extended to Highbury & Islington in February 2018. The service benefits local businesses and the night-time economy, providing a safe, frequent and reliable service for the thousands of people who enjoy nights out in vibrant east London, as well as local shift workers. To deter antisocial behaviour on the service, additional British Transport Police (BTP) and Travel Safe Officers patrolled trains and stations. Incident and crime statistics are being regularly monitored to make sure these extra patrols remain effective.

We also introduced a protection system on the West Anglia and Gospel Oak to Barking lines that provides a visual and audible warning for drivers if doors are opened on the wrong side of the train. The technology is now in place across the London Overground network.

Arriva Rail London (ARL), which operates the Overground on our behalf, developed a three-year plan to address the underlying cause of operational incidents on London Overground. It covers Signals Passed At Danger, incorrect door operations, station overruns and people being transported past the train's destination. It also addresses human factors and issues arising from the interaction drivers have with infrastructure and train equipment. The issue of fatigue management has also been considered via related workshops and staff engagement. ARL continues to operate one of the safest railways in the world when compared with its international peers.

ARL has also run its collaborative workforce training programme, which equips staff with the skills and knowledge they need to help vulnerable people on railway premises. The training is coordinated by Network Rail and Samaritans.

London Trams

Since the overturning of a tram at Sandilands in November 2016, we have introduced a wide range of additional safety measures to make sure such a tragedy can never happen again.

These include new signage and warning systems for drivers, additional speed restrictions, enhanced speed monitoring and an upgrade of the CCTV recording system. An in-cab driver protection device is now fitted to every tram, meaning that any sign of driver distraction or fatigue results in the driver being alerted immediately. This is the first time such a device has been used in the rail industry in the UK.

The RAIB published its recommendations in December 2017 and in January 2018, SNC-Lavalin, the company we commissioned to carry out an independent investigation, shared its report. We have identified the actions to be taken in respect of the recommendations from both reports. We have also formally responded to the ORR, the industry's regulator, outlining our intention to implement the RAIB's recommendations and we continue to provide quarterly updates on our progress against each action through the TfL HSE Report.

While our primary focus has remained on implementing the recommendations from both reports, we also continued to work with the rest of the tram industry

to make sure lessons have been learned from this tragic incident. Together, we are introducing measures to improve the safety of trams across the UK. For example, we played an important role in establishing a new tram industry body, which was set up under the guidance of the ORR to develop common standards and work on risk review and identification.

Additionally, customer education campaigns specifically tailored to trams were rolled out across the fleet this year. The messages encourage customers to look out for moving trams and to take care if they're standing while on board.

TfL Rail

On TfL Rail, there was a focus on managing the PTI. This included partnership working with Network Rail to improve congestion management during periods of disruption, and work to enhance the management of busy platforms during winter conditions. CCTV installation was completed to support Driver-Only Operation across the network.

In common with other modes, campaigns raising awareness of the risks of travelling under the influence of alcohol ran across the network.

Throughout the year, Rail for London Infrastructure developed the safety case supporting our application to the ORR to become an Infrastructure Manager during 2018/19.



Tram at the George Street stop in Croydon town centre



One-to-one motorcycle training

Streets

Transport for London Road Network



From 1 January to 31 December 2017, a total of 3,885 people were killed or seriously injured (KSI) on London's roads. There were 131 fatalities – a notable rise compared with 116 in 2016. There were also particularly concerning increases in the number of pedestrian fatalities, especially those involving HGVs, and the number of cyclists and car occupants killed. Despite a reduction in motorcyclist fatalities, motorcyclists continued to make up a disproportionate number of deaths and serious injuries, given their traffic share. Child fatalities fell to the equal lowest level on record. For a detailed breakdown of the data, visit <http://content.tfl.gov.uk/casualties-in-greater-london-2017.pdf>

The Mayor's Transport Strategy (MTS) was published in March 2018. An integral part of this document is his commitment to Vision Zero, which is his aim for no one to be killed in or by a London bus by 2030, and for all deaths and serious injuries from road collisions to be eliminated from London's streets by 2041. We are committed to ensuring that we work with the boroughs, the police and enforcement authorities to meet this ambitious target through the delivery of a detailed Vision Zero action plan focused on safe speeds, safe streets, safe vehicles and safe behaviours.

We have made a number of improvements to the Capital's roads that have helped them become more reliable, safer and greener. A full list of these works can be found at tfl.gov.uk/campaign/our-plan-for-londons-roads

Safer Junctions

In April 2017, the Safer Junctions list highlighted the 73 most dangerous junctions on the TfL road network (defined as those with the highest vulnerable road user collision rates between 2013 and 2015). We have now completed work at 26 of these junctions and all have had mitigation measures to reduce road danger. We are currently undertaking a review of the completed projects to ensure that they have been successful in reducing collisions. We are taking the remaining 47 through design, with 15 of these scheduled for construction by spring 2020.

At the end of March 2018, detailed design was under way for Charlie Brown's roundabout, a Safer Junctions location where proposed improvements will make the area safer for people walking and cycling. New signal-controlled toucan crossings will be installed on all arms of the roundabout, as well as measures including widened footways and central islands to encourage slower speeds at the roundabout and make the area feel less intimidating.

The extension to Cycle Superhighway 6 was under way at the end of March 2018, delivering safety improvements at two Safer Junctions locations. In addition to segregated cycle lanes replacing sections of traffic and bus lane on Farringdon Road/Farringdon Street, new traffic restrictions were introduced at the junction with Clerkenwell Road to help create better conditions for cyclists.

Road improvements

Examples of road improvements include:

- Highbury Corner: traffic modelling and design was carried out before the roundabout could be replaced with two-way roads. Work began in summer 2018 and will take around 12 months to complete
- Tooting Broadway: proposals to transform the junction outside Tooting Broadway station are currently in design and will be subject to public consultation later in 2018. Widened straight-across crossings are planned to replace the existing staggered crossings that encourage poor pedestrian behaviour at this busy junction
- Lambeth Bridge roundabouts: during spring 2017, we made interim changes to improve safety for vulnerable road users at the northern roundabout. We consulted on long-term plans to further transform both the northern and southern roundabouts. Our intention is to start construction in mid to late 2020

Enhancing town centres

Two pedestrian town centres, Peckham and Tooting, were identified as locations for trials for a package of innovative changes to reduce collisions, encourage walking, improve the urban realm, and change behaviour.

Public consultation on Tooting town centre is due to begin in October 2018 following the completion of feasibility design. We propose to introduce a 20mph speed limit with new raised pedestrian crossings and a transformation of the junction outside Tooting Broadway station. We also propose an innovative feature to provide extensive pedestrian priority across side roads through 'continuous crossings' where traffic is required to give way to pedestrians. Subject to consultation, implementation is planned to start in summer 2019.

We have completed feasibility designs and modelling for improvements to Peckham town centre on the A202 between Southampton Way and Asylum Road. This will include integrated measures to enhance safety for pedestrians and cyclists, such as the provision of new signalised crossing points, the creation of new turning facilities for cyclists, and the implementation of a safer road layout. This also includes continuous crossings to give priority to pedestrians across side roads. Concept design will now progress ahead of public consultation in spring 2019.

Improving cycling

Cycling Quietways

These are continuous, convenient and less busy cycling routes. At the end of 2017/18, construction was complete or taking place on 110km of a potential 250km network. Wayfinding was implemented across 17km of this network, with signage to be introduced on a further 45km in 2018/19.

Central London Grid

These are continuous, convenient and less busy cycling routes branded as Quietways, delivered in Central London. At the end of 2017/18, construction was complete or taking place on more than 50km of a potential 150km network. Wayfinding was implemented across more than 35km of this network, with signage to be introduced on a further 4km in 2018/19.

Cycle Superhighways

These routes provide protected space for cyclists on some of London's busiest roads. They connect stations, town centres and important destinations, making them more accessible and easier for people to cycle to.

We opened the full eastern section of the East-West Cycle Superhighway in mid-December and have continued work on the rest of the route. We are progressing delivery of Cycle Superhighway 6 North-South and in early 2018 we published the public consultation factual reports for Cycle Superhighways 9 and 4 (the full consultation reports for both routes will be published later in 2018).

Mini-Hollands

This programme is part of the Mayor's Healthy Streets agenda and is designed to help Londoners reduce their reliance on cars, and walk, cycle or use public transport instead. It specifically addresses the demands of growth in outer London. At the end of 2017/18, 26 of the 103 Mini-Hollands schemes (98 infrastructure and five supporting measures) were complete. Six started on-site in early 2018, comprising four Quieter Neighbourhood (a programme looking to make streets quieter and safer) initiatives in Enfield and two schemes connecting Kingston town centre. In total, 25 projects were under way, including the Kingston station scheme, the Lea Bridge Road scheme in Waltham Forest and the A1010 South scheme in Enfield.



Cyclist and HGV on York Way: FORS- compliant HGVs and drivers help to protect cyclists

Safe vehicles

Direct Vision Standard

We began developing a Direct Vision Standard to ensure HGV drivers have direct vision of vulnerable road users around them. In September 2017, we published the interim star ratings for the Direct Vision Standard for Euro VI HGVs and made the case for an HGV permit scheme that combines our standard with other, already established and recognised safety measures. This followed intensive consultation with the freight industry, vehicle manufacturers and vulnerable road user groups. We have since obtained approval from the European Commission to proceed with the scheme, produced permit scheme guidance for operators, shared the Euro IV and V vehicle ratings with operators and finalised the rating protocol. The final consultation phase is due to start in early 2019.

Construction Logistics and Community Safety (CLOCS)

CLOCS brings the construction logistics industry together to manage work-related road risk and embed a road safety culture. A revised version of the CLOCS standard was published at the end of 2017/18. In addition, the 2017/18 target of 500 CLOCS champion organisations and/or individual construction projects actively implementing the standard's requirements for construction logistics was achieved. To find out more about CLOCS, go to www.clocs.org.uk

Fleet Operator Recognition Scheme (FORS)

FORS is a commercial vehicle accreditation scheme that covers trucks, vans and coaches. Initiated by TfL, it now consists of more than 135,000 vehicles across 14 countries. The scheme standards are set above the legal minimum, with additional requirements in place for drivers, management, operation and vehicles.

Safe behaviour

In partnership with police resources funded by us, we undertake intelligence-led activities and enforcement to reduce road danger, with a specific focus on repeat and high-risk offenders. During the year, our activities also supported the National Police Chiefs Council's Mobile Phone Week in January and the Europe-wide Seatbelt Week in March, as well as providing ongoing support to Community Roadwatch. On 21 July, the MPS Cycle Safety Team launched a new programme called Give Space to Cyclists. Officers have been holding events across London, based on intelligence and complaints, to make sure drivers obey the rules of the road. The officers worked in plain clothes, wearing video cameras and riding unmarked bicycles donated by BMW, to identify and manage offences that deter people from cycling. These include tailgating and unsafe overtaking and turning.

Throughout the summer, we ran campaigns to encourage drivers and riders of powered two-wheelers to reduce their speed and to educate motorists and cyclists on the common causes of collisions. The campaigns, which covered radio, on-street posters and online advertising, led to a significant improvement in attitudes and understanding.

In October 2017, we launched a package of motorcycle safety initiatives. This involved developing a new FORS standard for motorcycle delivery companies and offering a range of rider training schemes aimed at different audiences.

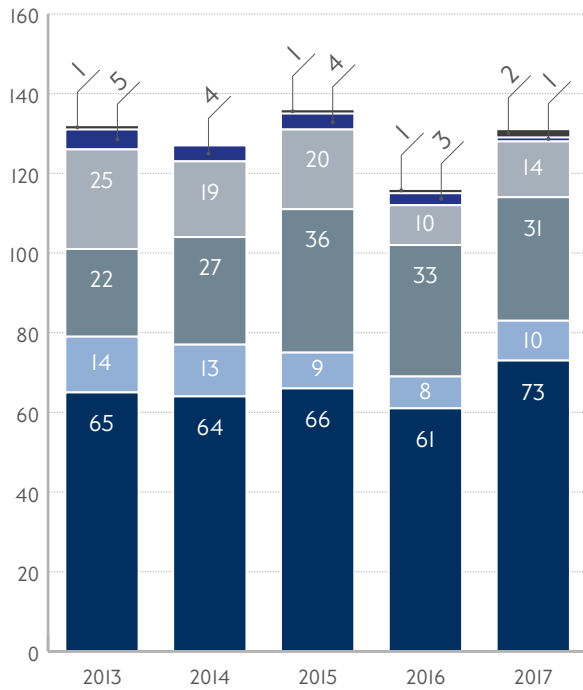
Safe Urban Driving

Our Safe Urban Driving course focuses on the risks and hazards associated with driving HGVs in UK cities. It gives drivers the knowledge and skills necessary to safely share the road with more vulnerable users, particularly pedestrians, cyclists and motorcyclists. Safe Urban Driving is the first accredited course in the UK to include an on-road cycling hazard awareness module. This gives drivers first-hand experience of feeling vulnerable on busy urban roads and helps them to understand how other road users may act in certain situations. This year we exceeded our target and provided training for 6,330 people. Since the launch of the course in September 2011, we have delivered vulnerable road user courses to 67,653 commercial drivers who operate in London – this includes 5,800 who took part in our Van Smart training.

Youth Travel Ambassador end-of-year expo

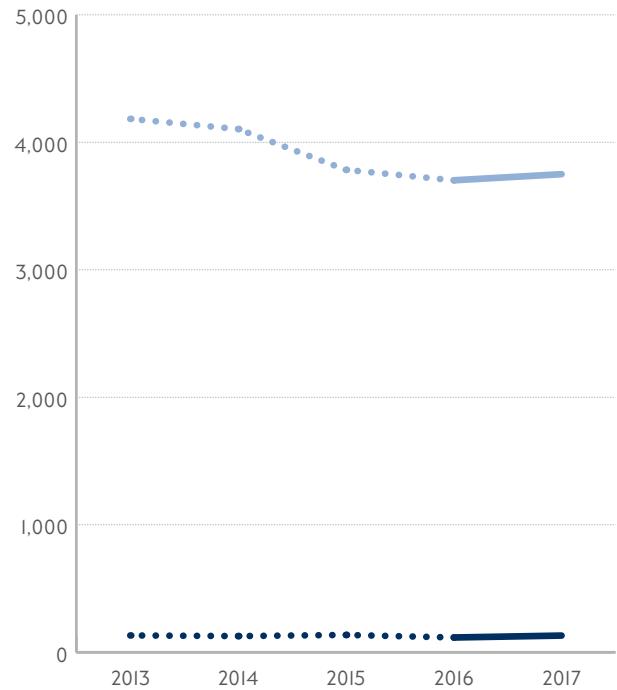
This end-of-year event for the Youth Travel Ambassador (YTA) scheme took place in June 2017 at the London Transport Museum. Attended by more than 600 YTAs from 53 of the Capital's secondary schools, the expo showcased the results of their campaigns and gave them the opportunity to share their experiences with other YTA teams. During the 2016/17 academic year, 43 campaigns were run by YTAs to improve cyclist and driver safety.

Fatalities by vulnerable road user group Annually



- Pedestrians
- Pedal cyclists
- Powered two-wheeler
- Car occupants
- Other vehicle occupants
- Bus or coach occupants

Killed or seriously injured Annually*



- Seriously injured
- Fatal

* Figures from the end of 2016 have been reported using a new system (COPA). The dotted lines in the graph for calendar years 2013-2016 denote back-estimated figures following analysis undertaken with the Transport Research Laboratory to indicate how KSIs would have been reported under this system in previous years



Santander Cycles users in Shoreditch: The main causes of injuries to cycle hire users were slips, trips or falls, and collisions with vehicles or other cyclists.

Other operations

London Dial-a-Ride, London River Services,
Taxi & Private Hire, Santander Cycles,
Victoria Coach Station and Emirates Air Line



In 2017/18, a total of 114 customers were injured on other TfL operations, which encompass Dial-a-Ride, London River Services, Santander Cycles, Victoria Coach Station and the Emirates Air Line.

Dial-a-Ride and Cycle Hire customers were most affected. The main causes of injuries on Dial-a-Ride were slips, trips and falls. This was also true for cycle hire customers, along with collisions involving either vehicles or other cyclists, though the number of incidents is low. Tackling road-based collision injuries is part of our Vision Zero ambition for London.

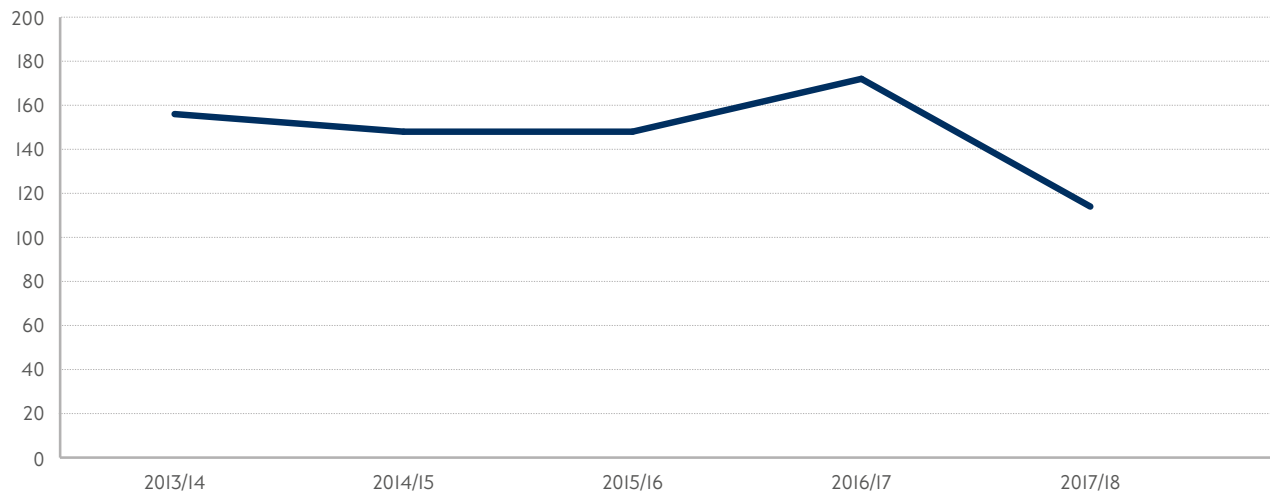
Although we do not operate taxi and private hire services, through our licensing and monitoring activities we play an important role in making sure they are run in a safe and environmentally friendly way. The private hire industry has seen considerable change over the past few years, with many new services now being offered. To retain our status as the world leader in regulating taxi and private hire services and to ensure the safety of passengers, we responded to these changes by publishing a new policy statement in February 2018. This sets out how private hire and ride-sharing services will operate in the Capital in the future. Also, in February, we presented a paper to the Department for Transport's Taxi

and Private Hire Task and Finish Working Group on Cross-Border Hiring, with recommendations on how to tackle some common issues and problems, especially around licensing.

Following the recruitment of 250 new compliance officers between November 2016 and September 2017, we managed to check more than five times as many taxi and private hire drivers and vehicles in 2017/18 as the previous year. This led to improved compliance rates over the year. Our compliance officers were also given additional powers by the Metropolitan Police Service (MPS) under the Community Safety and Accreditation Scheme, which will enhance the effectiveness of our on-street enforcement and compliance activities.

Operation Safer Travel at Night (STAN) saw officers from TfL and the MPS Roads and Transport Policing Command out in force at the beginning of the academic year and over the festive period. The operation involved high-visibility and plain-clothed patrols in priority areas to deter illegal activity. Officers also carried out roadside checks of vehicles and drivers, visited private hire operators and shared crime prevention advice. In addition, they followed up on intelligence regarding sexual offences linked to taxi and private hire journeys.

Number of customers injured on other operations





Passenger boarding a Dial-a-Ride service



Go-Ahead London, Waterloo Garage: an engineer working on an electric bus

TfL workforce safety and wellbeing

We aim to eliminate occupational illness and create workplaces that protect employees' health and safety, and promote wellbeing.

Workforce safety

There were 1,151 reported accidental injuries among TfL employees during the 2017/18 financial year, with no fatalities. Common causes of employee accidents include contact with machinery and moving parts, and slips, trips and falls.

We are committed to creating the safest possible working environment for our people. Safety risks are regularly reviewed and control measures put in place. We have developed strategies and Workforce Safety Plans, with a focus on encouraging a positive HSE culture.

Two vital messages have been adopted within LU and our capital programmes to help build this culture: 'Showing We Care' and 'Make Safety Personal'. They are supported by initiatives including:

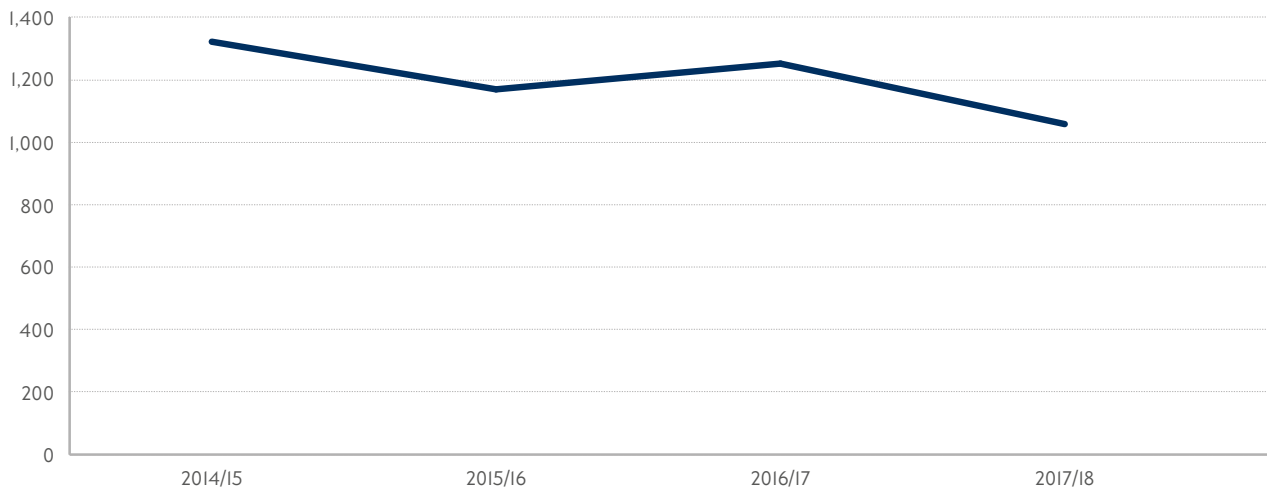
- Senior LU managers and directors launching personal safety charters. These set out an individual's commitment to safety, their reasons for this commitment and the actions they will take to improve safety performance
- Trialling a new, more efficient approach to incident investigation and conducting Back to Work briefings to refocus teams on the importance of good safety practices

- Senior managers carrying out safety tours, talking to staff and sharing their observations from these tours via our internal social media channel

Within our Surface Transport businesses, we use the ORR's Risk Management Maturity Model as our framework for identifying and addressing areas for improvement, and to strengthen our HSE systems and culture. This includes building measures into local performance scorecards to gauge progress. Feedback from our network of safety and health and wellbeing champions confirmed that, as a result, there has been an increased focus on HSE improvement across the business.

We have addressed some of the most common and significant causes of workforce injuries. Data from 2016/17 showed that manual handling accounted for approximately 20 per cent of injuries among LU maintenance staff. So, we introduced manual handling training that provided practical techniques, relevant to our working environment. Similarly, manual handling was the main cause of injury to Dial-a-Ride employees. To help address this, we implemented a new physical capability testing procedure as part of our fitness standard. This procedure tests whether

Number of TfL employee injuries



staff are capable of pushing a wheelchair containing a 100kg dummy up a ramp using manual handling techniques. We also launched online manual handling refresher training for drivers.

Over the past few years there has been a number of significant electric shock incidents on the LU network. To mitigate against these infrequent but potentially high-impact risks, we have installed new and safer equipment in a range of locations. Fewer staff now work on, or near, equipment when the power is switched on.

We have also adapted working practices to reduce risks. These include:

- Reducing working at height on LU
- A new safe system of work for coach departures to protect those working close to vehicles at Victoria Coach Station
- Safety observation cards for London Trams. These are a quick, easy way for employees to report low-level incidents and hazards in the workplace

Construction supplier safety

Our work to safely deliver one of Europe's largest investment programmes continued through the year. With our construction suppliers, we enable the healthy, safe and environmentally-positive delivery of our capital investment and upgrade programme. At a strategic level, this is achieved by building partnerships with senior leadership teams in our supply organisations so we can find practical solutions to shared issues.

We organise 'Zero Harm' forums and Safety Improvement Groups that bring our construction supplier representatives together and promote collaboration on important HSE issues. In March 2018, we successfully held our first TfL-wide HSE Zero Harm forum. This allowed us to capture improvement opportunities and cascade them to programme owners across TfL, so they can be implemented. Safety Improvement Groups were established to encourage consistent progress throughout our organisation. In addition, this year we trialled sessions at supplier premises so we can engage directly with their workforce, share important information and demonstrate unity on HSE.

We keep our contracts under review and set clear health and safety requirements within them. We monitor performance against these objectives to make sure our suppliers continue to achieve high standards of HSE management.

During 2017/18, we enhanced our assurance processes. These help us monitor TfL and supplier activities to make sure we are on track for safe

delivery, and our requirements and HSE standards are being met. We also launched an improved supplier assessment tool across our major construction programmes. This encourages risk-based monitoring of supplier HSE performance and allows us to focus on areas of highest risk.

We are encouraging positive behaviour in our supply chain through our TfL Supplier Awards. In November 2017, we organised our first awards event to recognise the contribution that our suppliers make to running and improving London's transport systems. The winner of the safety category was FM Conway, nominated for its continued approach to mitigating Work Related Road Risk, including making available spare capacity on its training programme to other organisations. Alongside this, our Beacon Awards scheme recognises exemplary HSE practice on TfL sites and among our delivery teams. We awarded 16 Beacon team awards and 15 site awards.

Our injury and near-miss trend analysis helps us to identify compliance issues with planned working arrangements. As a result, we liaised with our suppliers to share best practice in the production of safe systems of work and have been encouraging them to involve their staff in the systems' development. Our suppliers have been running a range of campaigns and initiatives to reinforce the importance of following the agreed way to carry out the work. They have been supported by our own Making HSE Personal campaign and by role modelling behaviours when our representatives visit suppliers' sites.

These initiatives led to a one per cent reduction in minor injuries, a 52 per cent drop in major injuries and a 30 per cent improvement in the number of injuries that required people to take time off work. Overall, there was a 20 per cent reduction in total injuries within our major projects.

Workforce violence

In 2017/18, there were a total of 5,260 acts of violence towards our direct workforce and suppliers. This is an increase of more than 100 compared to the previous year (5,121). Of these, 27 per cent were physical assaults.

Dedicated teams in our operational businesses support our workforce to take formal action, through the police, against those who commit acts of violence. The workplace violence support teams worked closely with the police to assist their investigations.

Almost half (47 per cent) of acts of violence were directed to our direct workforce, 25 per cent of which were physical. LU station staff were particularly affected, with the majority of incidents taking place in ticket halls. We have put in place action plans to combat these incidents. For instance, we have worked on improving our data and aligning it with the BTP's to allow more sophisticated analysis, worked with the BTP to establish a more integrated 'one team' approach and worked on improving customer awareness of the consequences of being abusive to staff.

Just over 50 per cent of these acts of violence were directed towards our suppliers – particularly towards bus operators, with 28 per cent being physical. We are actively involved in taking witness statements on behalf of the police, promoting spit kits for bus drivers to capture DNA evidence and working with stakeholders on a joint approach to tackle violence towards staff and suppliers working for or on behalf of us.

Workforce wellbeing

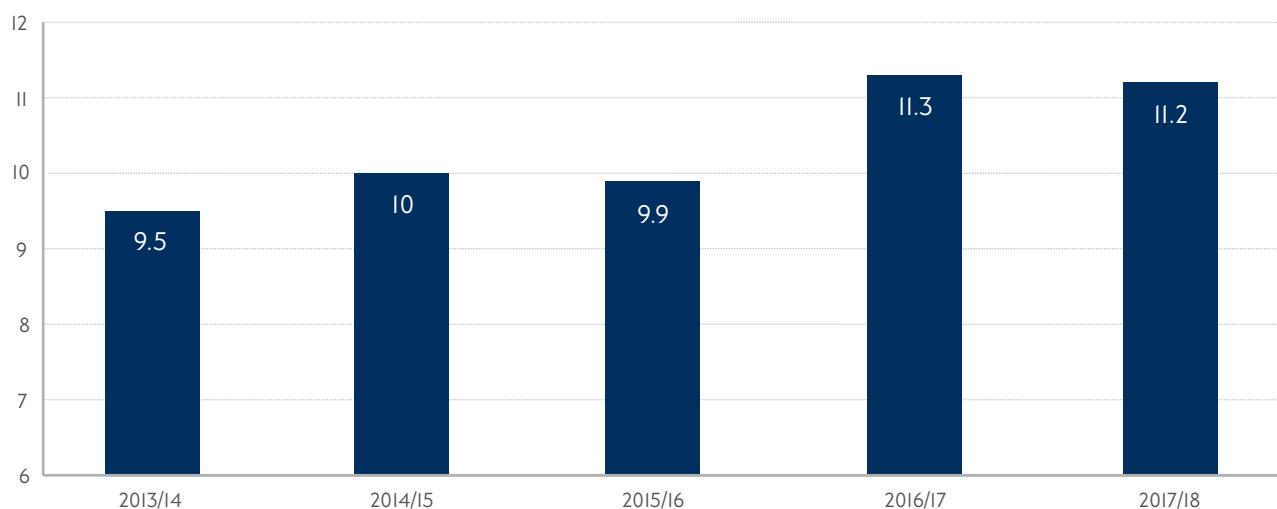
We want to end occupational illness and create workplaces that protect employees' health and promote wellbeing.

We identify occupational health risks and introduce practices to control exposure. We are now two years into our five-year Health and Wellbeing Improvement Programme, which focuses on lifestyle health factors and engages with employees to improve musculoskeletal, mental and general health. Achievements in 2017/18 include:

- A diabetes awareness campaign and associated workshops
- Events such as Walk the Line and Park Run, which encouraged employees to increase their physical activity levels
- Launching an online tool to raise awareness of sleep hygiene
- A series of lunchtime mental health awareness talks

Annual sickness absence

Average number of days sick per TfL employee



- Training 149 mental health first aiders and 40 'Time to Change' agents to provide peer-to-peer workplace support for those experiencing mental health issues. 'Time to Change' is a campaign run by Mind and Rethink Mental to end the stigma and discrimination that people with mental health problems face in England
- A series of presentations on skin awareness

Workforce attendance

We use sickness absence data to identify health risks. Musculoskeletal conditions, mental health issues and colds and flu continue to be the main causes of sickness absence. In response, we introduced health and wellbeing initiatives along with the continuing

support provided to employees by our Physiotherapy, Counselling and Medical Services teams within our Occupational Health department. The average annual sickness absence is 11.2 days per employee across TfL. This is slightly lower than the 11.3 days in 2016/17, with both years being periods of significant change within our business.

Drug and alcohol testing

We take a zero-tolerance approach to drug and alcohol misuse by operational staff and this is enforced through random unannounced testing. Disciplinary action, up to and including dismissal, is taken against anyone who breaches our drugs and alcohol policy. During the year, we conducted 706 unannounced screenings, exceeding our target to test five per cent of our safety-critical workforce by 0.15 per cent. There were nine failures.

Environment

This section provides an update on our progress against the Mayor's environmental goals. It also details the environmental impacts of our directly managed activities and operations, such as transport services, construction, maintenance and support functions.

The Mayor's vision – to make London the world's greenest global city – was published in the London Environment Strategy (LES) in June 2018. Both the LES and MTS set out the actions required to achieve this vision. We are committed to supporting these measures through the operation of our transport services.

Progress against Mayoral priorities **Operating a cleaner and greener bus network**

We have retrofitted conventional diesel buses to help achieve the Mayor's wider target of raising the entire fleet to at least the ultra-clean Euro VI engine emission standard by 2020. This programme passed the 1,000-vehicle milestone during 2017/18 and the number of retrofitted buses continues to rise. We also secured £3m from the Government's Clean Bus Technology Fund to help cover the cost. In addition, our pure electric bus fleet increased to 96 vehicles with the introduction of 12 single-deck vehicles.

We launched the first two Low Emission Bus Zones in Putney High Street and between Brixton and Streatham. As part of our wider plans to improve air quality

in areas most affected, we are planning our third and fourth Low Emission Bus Zones and will upgrade or replace vehicles that do not meet the highest diesel emission standards.

We trialled oxides of nitrogen (NO_x) abatement equipment on a New Routemaster that entered service in January 2018. A further five trial vehicles were upgraded and, following good performance, the other 300 buses are being upgraded during 2018/19.

The T-Charge

The Mayor launched the world's toughest emissions standard – the T-Charge – in October 2017. The most polluting petrol and diesel vehicles must now pay the charge plus the Congestion Charge, a total of £21.50, every weekday when they drive in the zone between 07:00 and 18:00. Since its introduction, the number of polluting vehicles driven in the zone has dropped by almost 1,000 a day when compared with the previous month. At the end of the reporting year, there were 2,000 vehicles per day paying the T-Charge.

Rapid charging infrastructure

We are installing rapid charging infrastructure to support the uptake of new zero-emission capable taxis. This will also encourage vehicle owners to switch to electric vehicles. The first sites were opened in October. Individual operators are responsible for operating the points, servicing and accepting payment. Some may offer membership schemes too and most provide pay as you go options.

We continued to make progress on the delivery of rapid charging points. A total of 103 rapid charge sites were installed by the end of March 2018, exceeding our target of 100 sites. This included a number of sites dedicated for use by London licensed taxis. Over the next two years, 300 new rapid charging points will be installed on TfL, borough and private land.

Go Ultra Low City Scheme

The Go Ultra Low City Scheme (GULCS) started during the year. A joint project between TfL, local authorities and the Greater London Authority, the aim is to provide more on-street electric vehicle charging infrastructure across the Capital.

We also supported a GULCS initiative, Neighbourhoods of the Future, with innovative electric vehicle charging technologies, policies and programmes that support the growth of clean vehicles in London. In November, the GULCS project team advertised up to £1.5m of funding for boroughs to implement additional projects.



Crossrail engineers laying a track crossing point

Environmental accreditations

During the year, we recorded good performance in the civil engineering sustainability rating system, CEEQUAL. The Bakerloo line link achieved an 'excellent' score for construction at Paddington. The Barking Riverside Extension was given 'very good' for its interim design stage.

Carbon dioxide emissions and energy use

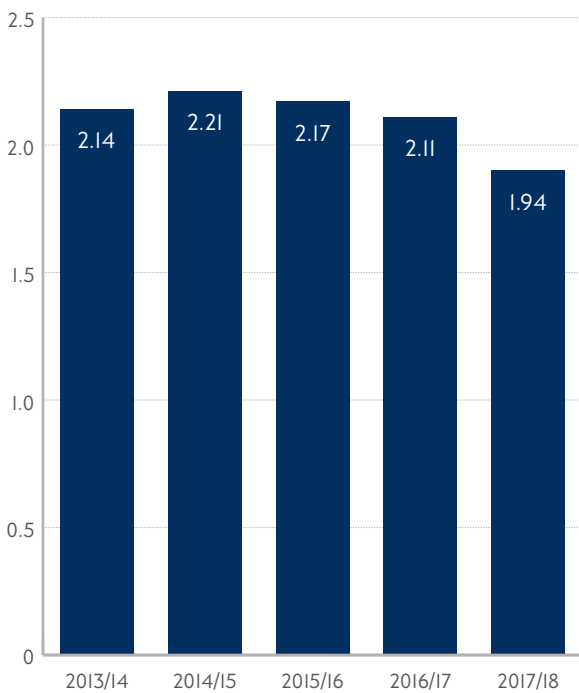
Our carbon dioxide (CO₂) emissions come from the fuel used to run buses and other vehicles, electricity to power trains and trams, and the energy supplied to our buildings and equipment. Last year's published figure of 2.69 terawatt hours (TWh) has been amended to 1.75 TWh as a result of us reviewing data collected during the year.

In 2017/18, our electricity use was 1.73 TWh, which includes reductions across LU and our offices. There was an increase from our Rail operations as we ran more services.

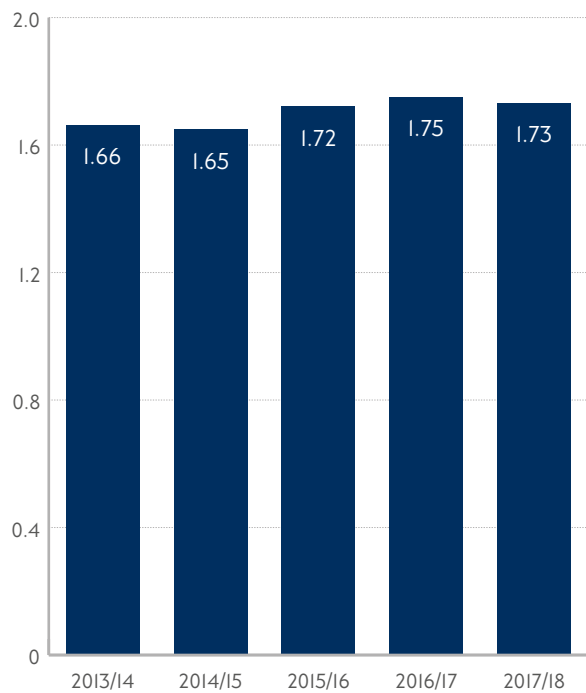
Total CO₂ emissions associated with our activities was 1.9 million tonnes compared with 2.11 million tonnes in 2016/17 – a 4.3 per cent decrease. The main factor has been the reduction in carbon intensity of our electricity supply from National Grid. Our normalised figures for grams of carbon emissions per passenger kilometre remain below our target trajectory.

Continued improvements in the energy efficiency of transport infrastructure and the carbon intensity of the grid are vital to achieving the Mayor's long-term goal of a zero-carbon city.

Total carbon emissions (million tonnes of CO₂e)*
Annually



Grid electricity usage (TWh)
Annually



Air quality

Nitric oxide (NO) and nitrogen dioxide (NO₂) are together referred to as oxides of nitrogen (NO_x). Total NO_x emissions fell 15 per cent from last year to 4.300 tonnes, meaning we have met our target to reduce NO_x emissions from our operations by 40 per cent by 2017/18, against a 2005/06 baseline.

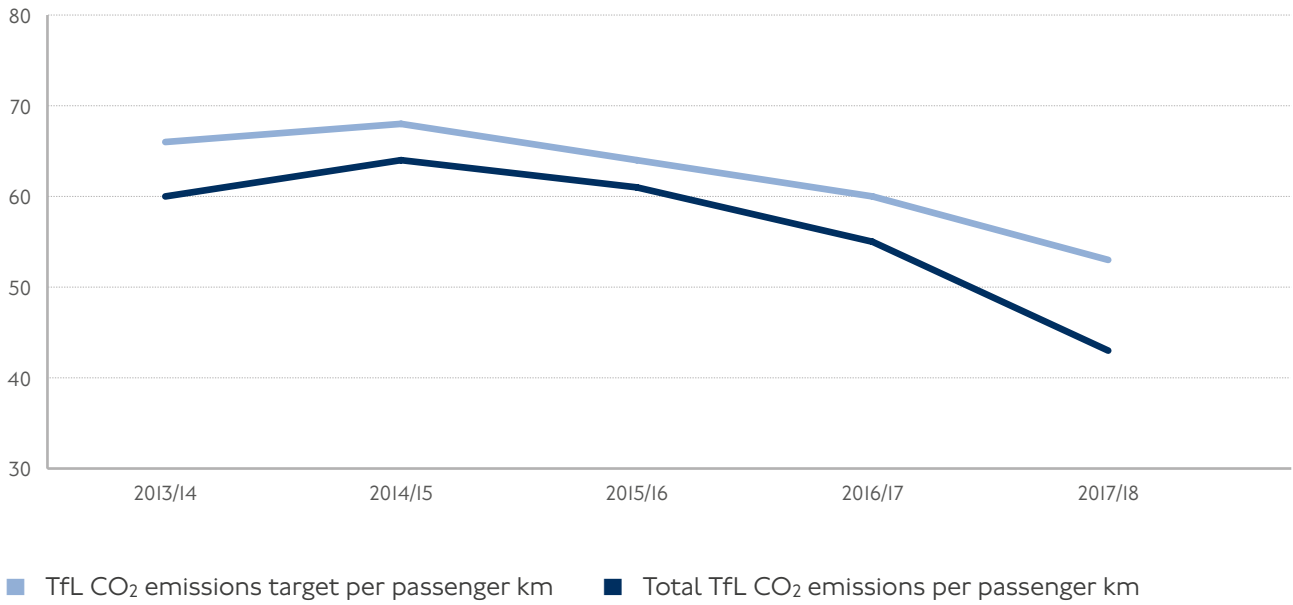
We have also achieved our target to halve PM₁₀ emissions from our operations by 2017/18, against 2005/06 levels. This applies to our public transport services

and the taxi and private hire fleet. Emissions fell from 75 tonnes last year to 68 tonnes.

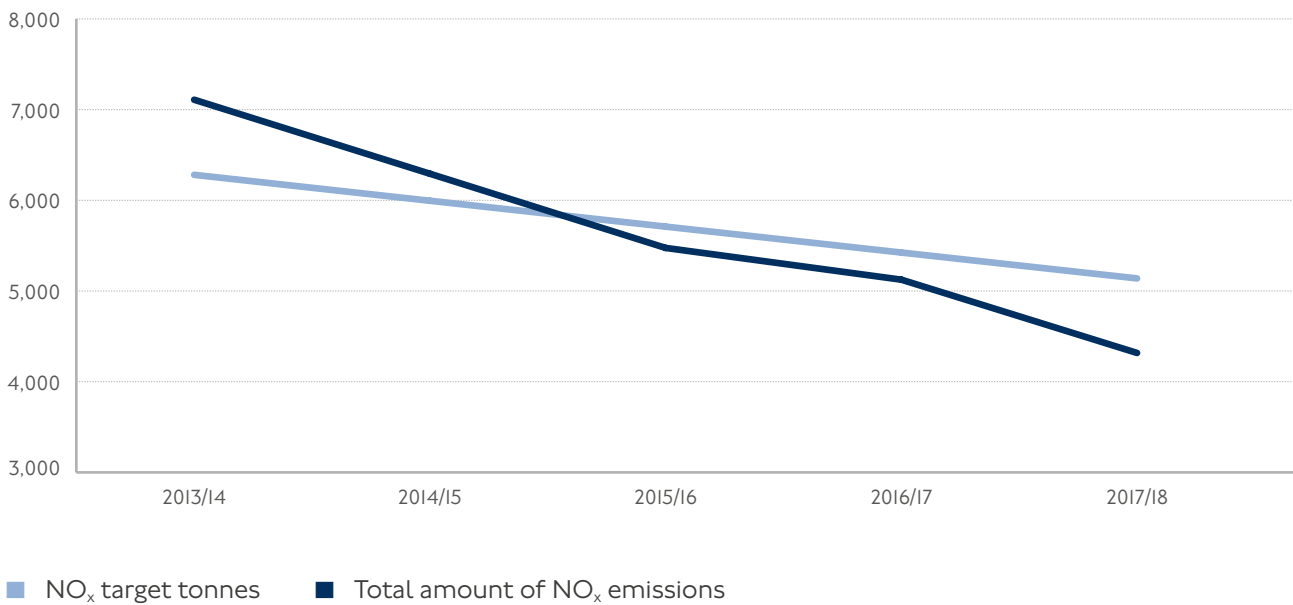
These air quality improvements are the result of our bus retrofit programmes, which as at March 2018, had delivered more than 1,500 ULEZ-compliant vehicles into service as part of a retrofit of conventional diesel buses to ensure they meet Euro VI emission standards. We have done the same with newer vehicles in the taxi and private hire fleets.

* CO₂e is carbon dioxide equivalent – the standard unit for measuring carbon footprints. It expresses the impact of each different greenhouse gas compared with the amount of carbon dioxide that would cause the same warming effect

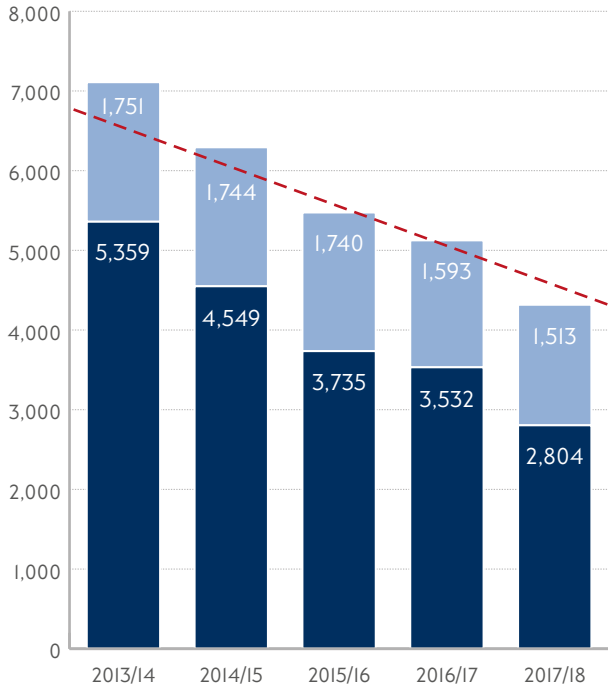
Total carbon emissions grams (g) of CO₂e per passenger km



TfL NO_x emissions (tonnes) vs targets



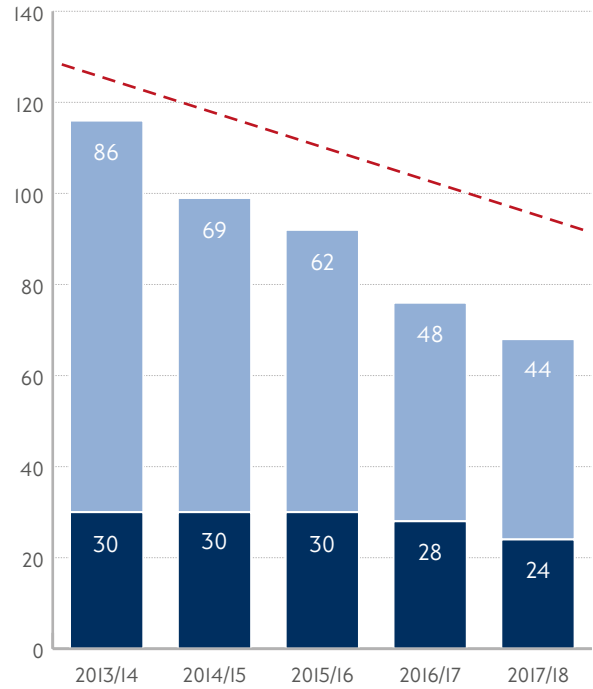
NO_x emissions (tonnes)



- Public transport services – total amount of NO_x emissions
- Taxi and Private Hire vehicles – total amount of NO_x emissions
- - - Target

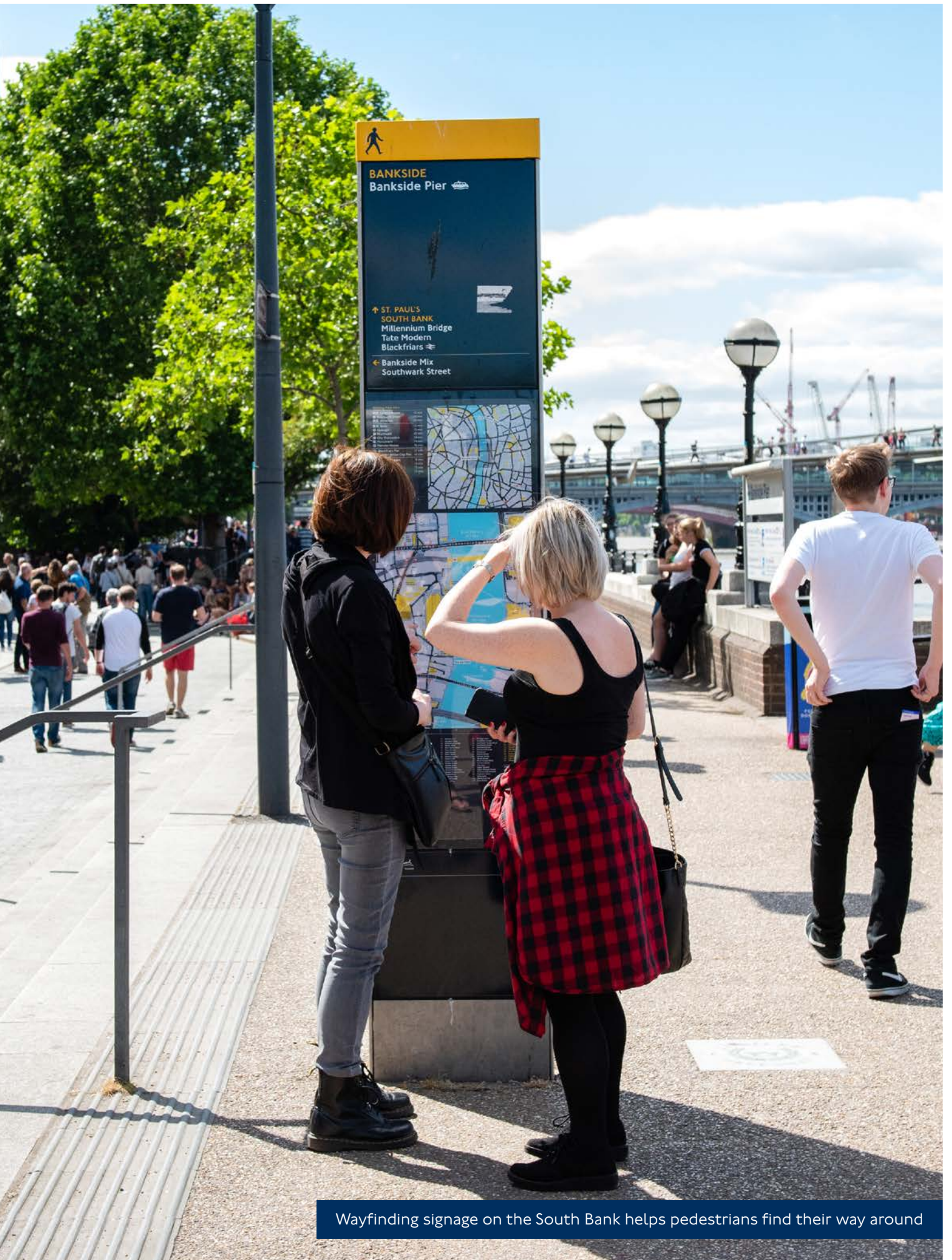
We remain on course to achieve the Mayor’s air quality objectives by making the bus fleet cleaner, with zero-tailpipe emission technologies. Our hydrogen-fuelled bus fleet increased, with two

Particulate matter (PM₁₀) emissions (tonnes)



- Public transport services – total amount of PM₁₀ emissions
- Taxi and Private Hire vehicles – total amount of PM₁₀ emissions
- - - Target

additional vehicles entering service during the year. We now have 10 fuel-cell buses, and our pure electric fleet increased to 120 vehicles in 2018.



Wayfinding signage on the South Bank helps pedestrians find their way around

Waste management

We produced 0.48 million tonnes of construction, demolition and excavation waste this year, compared with 0.64 million tonnes in 2016/17. The amount fluctuates in line with our investment programme works, but we aim to keep the proportion high and consistent for waste that is reused in sustainable locations and recycled. For example, with our construction of the Northern Line Extension, we have exceeded the planning requirement to remove 68 per cent of excavated tunnel spoil by river barge from Battersea. We achieved 74 per cent, which brings environmental and social benefits as well as a £3.7m saving on the project.

In 2017/18, we collected 61 tonnes of waste from our stations, maintenance depots and buildings, of which 52 per cent was recycled or recovered.

Sustainable buildings

Energy efficiency upgrades completed in 2017, including the Mayor's RE-FIT scheme, which delivers the retrofitting of older buildings with more modern heating and lighting, are expected to help reduce energy consumption at some of our locations by approximately 20 per cent.

November 2017 saw the completion of a nine-site RE:FIT contract with E.ON that has already led to £130,000 of savings and a 13 per cent energy and carbon efficiency improvement at our Southwark office. This was achieved by recommissioning our combined heat and power plant and associated hot water pipework systems.

Further works next year will enable even greater savings from improved domestic hot water supplies and a high efficiency chiller replacement. Our forthcoming first full-year Measurement and Verification Report will detail how much the RE:FIT works have improved performance at two other major offices, two bus garages and four LU sites, when considered alongside the £2.5m investment (in improvements to heating, lighting and water systems, delivering a reduction in energy bills) at these locations. We expect to see savings in energy bills repay the original investment cost in less than eight years.

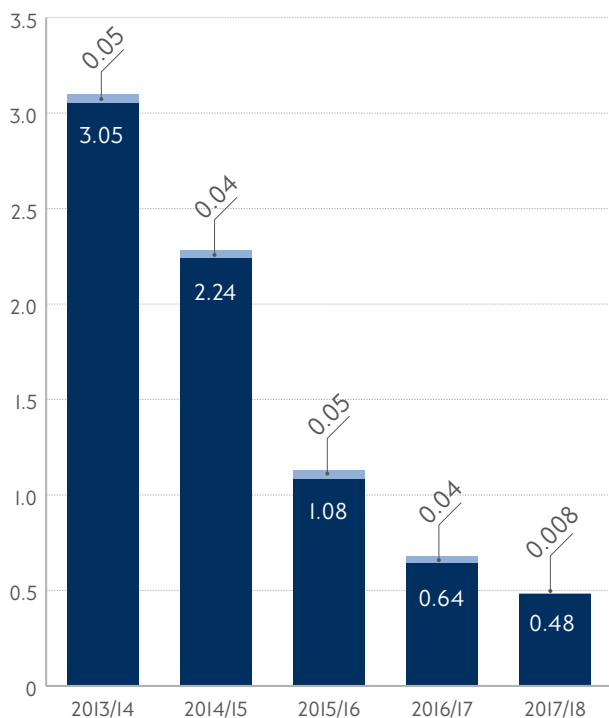
Airborne dust monitoring on the Tube

In 2017, the Mayor commissioned a review of air pollution on the Tube with the aim of introducing measures to minimise dust levels and ensure employees and customers breathe the cleanest air possible.

Dust can be generated from a variety of sources on the Tube, for instance the movement of train wheels on tracks, brake pad wear, construction works, customers' shoes and emissions from nearby traffic. We operate a comprehensive and regular cleaning programme to minimise any associated health risks. This involves litter picking, sweeping dust and fluff from cables and track, wet mopping walls and floors, and vacuum cleaning.

Our dust monitoring programme, conducted over the last 13 years, has confirmed we are well within regulatory limits set by the Health and Safety

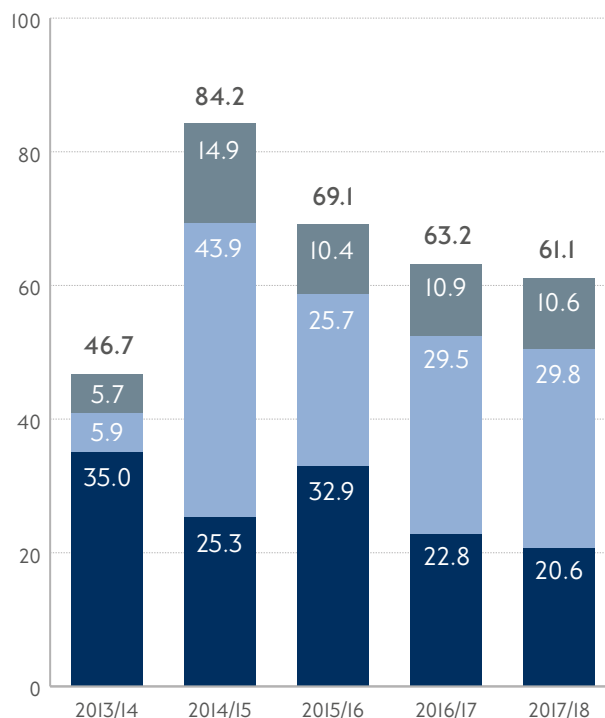
Construction, demolition and excavation (CDE) waste produced (million tonnes)



- Amount of CDE waste reused
- Amount of CDE waste sent to landfill

Executive. In May 2017, we carried out additional monitoring to determine whether more frequent cleaning would be beneficial in areas where our previous results have shown higher dust concentrations, even though these were still within regulatory limits. All airborne concentrations of inhalable and respirable dusts, measured at the sampling points, were well within the regulatory limits sets by the Health and Safety Executive. We observe higher standards – all our post-cleaning samples met the recommended guidelines

Commercial and industrial (CI) waste produced (tonnes)



- Amount of CI waste recycled
- Amount of CI waste sent to landfill
- Amount of CI waste recovered via energy from waste

for inhalable and respirable dust concentrations set by the Institute of Occupational Medicine.

More recently, we have been investigating how quickly dust accumulates after cleaning has taken place. This will allow us to further evaluate the effectiveness of our cleaning regimes.

In February 2018, we conducted sampling activity, followed by a clean of the entire Bakerloo line.

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January 2019

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PUB18_072