



Investment programme report

Quarter 1 2023/24
(1 April to 24 June 2023)

Contents

3 Introduction

- 4 Purpose and scope
 - 5 Investment programme delivery structure
-

7 Our performance

- 8 Safety performance
 - 10 Strategic milestones
 - 12 Schedule performance
-

13 Major projects

- 14 Elizabeth line – Rolling stock
 - 15 Crossrail
 - 16 Four Lines Modernisation
 - 18 DLR rolling stock and systems integration
 - 20 Piccadilly line upgrade
 - 22 Silvertown Tunnel
 - 24 Barking Riverside extension
 - 25 Bank station capacity upgrade
-

27 Rail and station enhancements

- 29 High Speed 2
 - 30 Elephant & Castle
 - 31 East London line
 - 32 Tram replacement rolling stock
 - 33 DLR
 - 34 London Underground
-

36 Safe and healthy streets

- 38 Old Street station and roundabout
 - 39 Cycling infrastructure
 - 40 Vision Zero
 - 41 Bus priority
 - 42 Bus safety
-

43 Environment

- 45 Road user charging
 - 46 Direct Vision Standard phase 2
 - 47 Electric vehicle infrastructure
-

49 Technology

- 51 Surface technology
 - 53 London Underground technology
 - 54 Technology and data
-

57 Streets, Bus and rail-sponsored services renewals

- 59 Streets
 - 60 Bus
 - 61 River services
 - 62 London Overground
 - 63 DLR
 - 64 London Trams
-

65 London Underground renewals

73 Professional services

74 Appendix: Our safety performance data

Introduction

Our investment programme comprises projects to maintain the reliability of the network and support growth in the capital



Purpose and scope

Purpose

Transport for London (TfL) is part of the Greater London Authority (GLA) family led by Mayor Sadiq Khan. We are the integrated transport authority responsible for delivering the Mayor's aims for transport.

We run most of London's public transport services, including 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 IFS Cloud Cable Car. The quality and accessibility of these services is fundamental to Londoners' quality of life. By improving and expanding transport, we can make people's lives easier and increase the appeal of sustainable travel.

We are moving ahead with many of London's most significant infrastructure projects, using transport to unlock growth. 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 supply chain creates tens of thousands of jobs and apprenticeships across the country.

Scope

The report gives a progress update on the programmes and major projects that seek authority each year from the Programmes and Investment Committee. It includes programmes of renewals and enhancements to maintain reliability and support growth. Renewing and replacing our assets is our required baseline to maintain our current performance in terms of safety, reliability, capacity and asset

condition. Additional enhancements can unlock new capacity and enable us to use our existing network more intensively.

This report covers Quarter I, which runs from 1 April to 24 June 2023. For each key project or programme, the financial and milestone data represent the position at the end of Quarter I, with commentary on key achievements, progress and challenges. It also updates on notable progress since the last report.

The data displayed differs depending on whether the programme or portfolio has a finite scope to deliver:

- For projects with a finite scope, financial records of spend to date, authority and estimated final cost (EFC) are provided, which represent the entire duration of the programme or portfolio except where stated. For these projects, a completion date is also provided, indicating the year and which quarter the specified event will occur
- For ongoing portfolios that aggregate a number of projects, financial records of spend to date and forecast cost are provided for a discrete period of time

Numbers in brackets represent a deficit in the figure or a decrease since the last report; numbers without brackets represent a surplus in the figure or an increase since the last report. Where financial information is commercially sensitive, it has been redacted. The performance over time graphs illustrate financial performance over the last four quarters. The commentary alongside the graph explains any specific trends or changes to trends over a snapshot in time.



London's transport network supports quality of life for all



The Elizabeth line is now running 24 trains per hour at peak times

Investment programme delivery structure

Our investment programme is delivered by the areas of business set out below. This is reflected in the structure of the report

During Quarter 2 2022/23, on 1 September 2022, we created a new director structure. The changes saw the majority of capital works fall under Capital, the area overseen by the Chief Capital Officer. From this Quarter 1 report onwards, the new structure is now in place. However, there may be further small changes to refine specific parts of the structure.

In May 2023, the Programmes and Investment Committee endorsed the creation of a number of new programmes, which are set out below.

Major projects

This area is responsible for our largest and most complex projects. It comprises line upgrades such as the Piccadilly line upgrade and the Four Lines Modernisation programme, as well as network extensions, major station upgrades and the Elizabeth line.

Rail and station enhancements

This brings together the London Underground enhancements programme and surface-related enhancements from the Public Transport programme such as the East London line Housing Infrastructure Fund and DLR Royal Docks, in particular where there are links to third-party developments and funding, recognising the similarities in the activities involved and the outcomes that they deliver.

Safe and healthy streets

This is largely unchanged from the previous Healthy Streets programme. The addition of the Bus customer action plan from the existing Public Transport programme alongside bus priority brings together interconnected activities to deliver the Bus action plan.

It recognises the importance of holistic investment in the bus network, alongside cycling and walking, to reduce car use and increase travel by sustainable modes. Similarly, the addition of bus safety schemes such as intelligent speed assistance alongside the Safer Junctions and Lowering speed limits programmes would align activities to improve safety on London's road network.

Environment

This mainly retains the structure of the Environment programme while reflecting the new green project pipeline that is being developed.

Technology

This merges the three technology-focused programmes – London Underground technology, Surface technology, and Technology and data – with a small number of rail and sponsored-services technology projects currently in the Public Transport programme. These currently have separate governance despite common resources, stakeholders and delivery of strategic outcomes.

Streets, Bus and rail-sponsored services renewals

This groups together renewals that are currently split across the Surface assets and Public Transport programmes. These programmes share a common approach to work-bank management and through joining together associated activities such as bus-focused renewals, improved investment prioritisation and efficiencies can be applied.

London Underground renewals

This merges the two existing London Underground renewals programmes – Train systems and Infrastructure. Grouping these projects together will enable more holistic oversight and prioritisation in managing renewals across programmes. In addition, this programme will incorporate Railway systems enhancement (formerly World class capacity).



Encouraging more cycling is key to safe and healthy streets for all

Our performance

We measure the safety and milestones progress of our investment programmes schemes



Safety performance

Capital

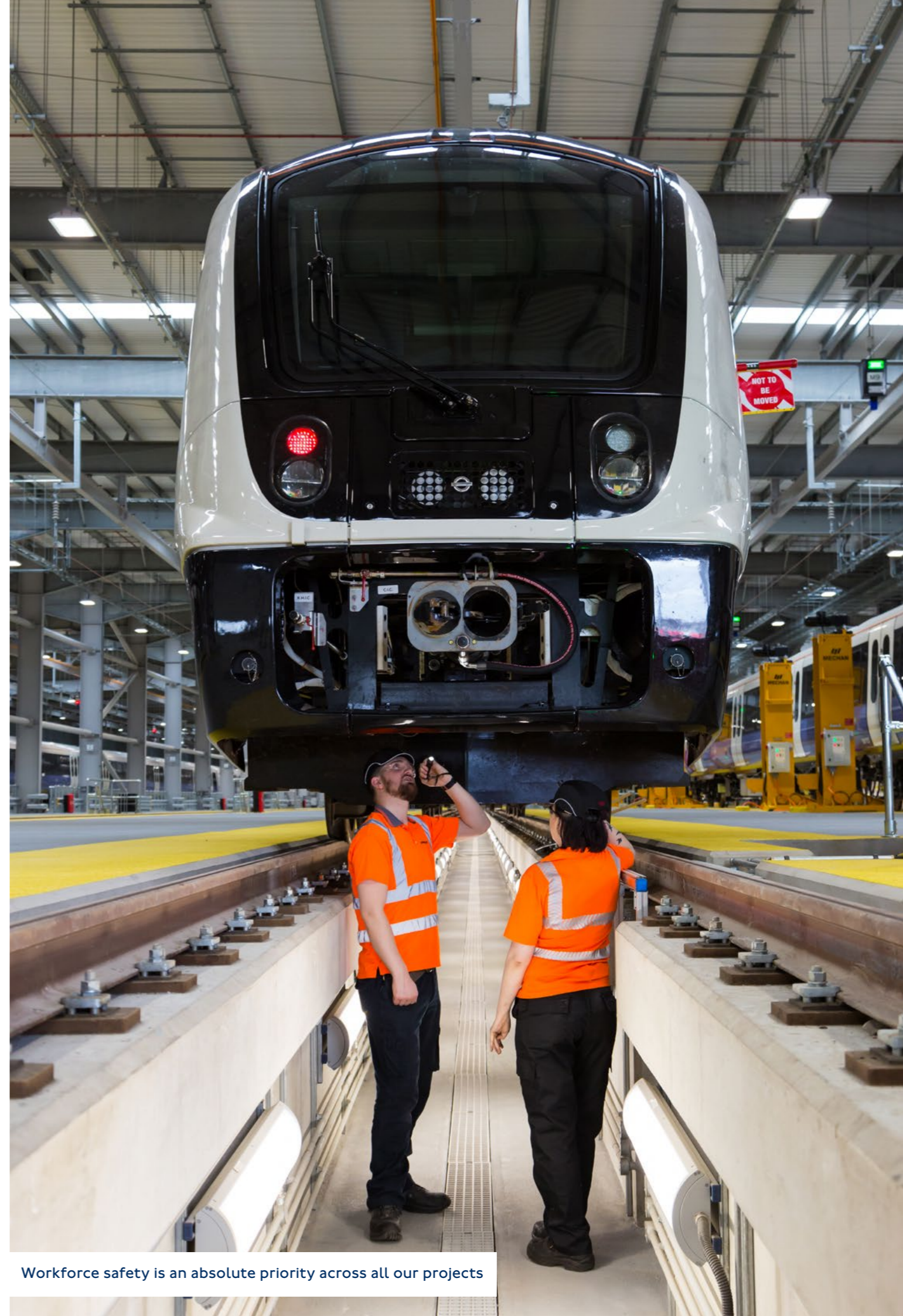
Capital includes activity under the Chief Capital Officer as well as maintenance activity for which the Chief Operating Officer is responsible. In Quarter I, our Capital teams worked a combined total of 1.9 million hours, a decrease of 0.7 million hours from the previous quarter.

Quarterly performance

In Quarter I, there were two incidents which reached the threshold for more than seven days absence and as such were reported under the Reporting of Injuries Diseases and Dangerous Occurrences Regulations 2013 (RIDDOR). As a result, the RIDDOR accident frequency rate for the Capital area has risen from 0.07 to 0.1 at the end of Quarter I.

During the same period there were three lost-time injuries (LTIs) reported, which are injuries that cause an employee to be absent for one or more shifts. Although this represents a reduction on Quarter 4 2022/23, the frequency rate remains stable due to the relative increase in the number of LTIs reported during the second half of 2022/23.

In total, there were 10 injuries reported during Quarter I, eight fewer than reported during the previous quarter. As such, the long-term trend of workforce injuries in Capital continues to decline as we work towards our zero-harm ambitions.



Workforce safety is an absolute priority across all our projects



We monitor safety incidents across the whole transport network

Significant incidents and near misses

In addition to recorded injuries, we also capture and review incidents that could have resulted in harm. This quarter, they included:

Piccadilly line upgrade

A person operating a drill struck a high-voltage cable in a duct within a tunnel wall. Fortunately, there was no injury, as the cable was not live at the time. This incident is the subject of an ongoing investigation so that lessons are learned and shared in our organisation and with our suppliers.

Four Lines Modernisation

The new communications-based train control system continues to have a very good level of reliability in service. The software defects previously reported continue to be managed. Mitigations have been put in place to support service controllers, and plans have progressed for revisions in the software to rectify the problems. The Office of Rail and Road continues to be informed of progress on this.

Capital safety, health and environment improvement plan

The Capital safety, health and environment improvement plan has delivered two significant projects this quarter.

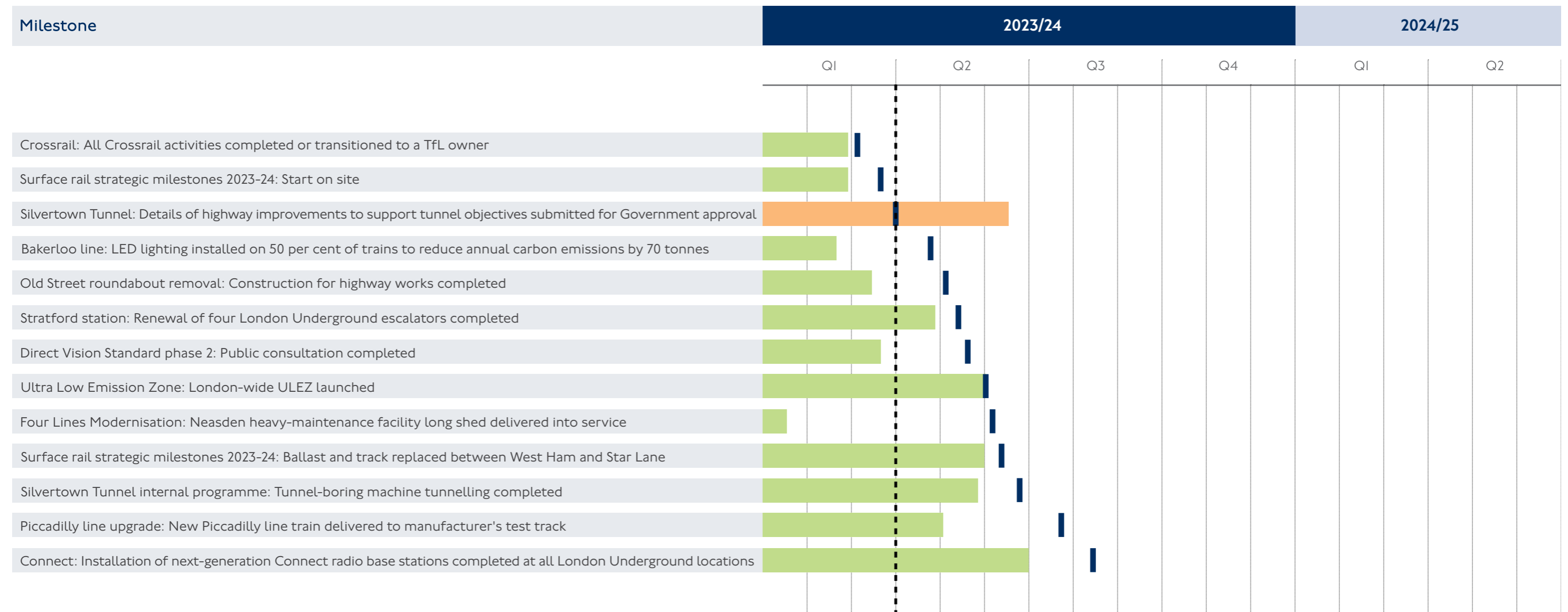
Firstly, our engineering and asset strategy teams have focused on educating TfL teams on environmental impacts and how to effectively reduce these. A specific outcome of this improvement is for us to have a consistent approach to carbon baselining, meaning the amount of carbon dioxide we emit before any activity to reduce this, and the reduction of emissions across new projects. Topics covered so far include carbon management and reduction, green infrastructure, biodiversity and insights into climate adaptation and flooding.

Secondly, we have launched the LEGO campaign (Learn, Engage, Get Out), an interactive focus to bring safety, health and environment issues to life on site. Following educational and practical sessions in May, our Get Out months have been June and July, where we have encouraged as many of our capital and engineering people as possible to get out to site, particularly where their roles are normally more office-based. Our aim is to improve engagement with the people who are delivering our capital projects, show them we are supporting them and for us all to take the opportunity to learn and improve.

Strategic milestones

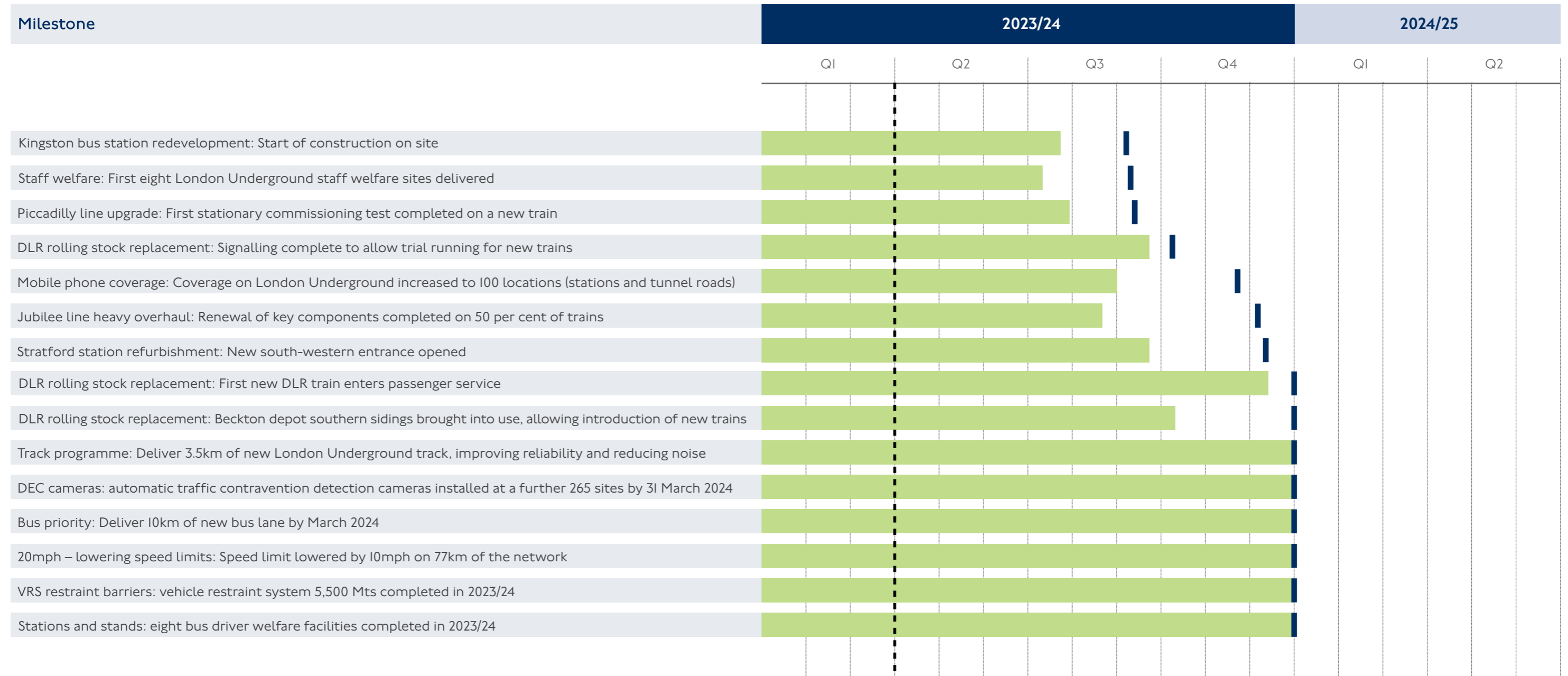
We have delivered five out of 28 strategic milestones either on time or early this year

These are our strategic milestones for 2023/24. The solid blue bar shows when the milestone was due to be met, while the green, amber and red blocks show when it was achieved, or is forecast to be achieved.



■ Delivered on time or earlier than planned
 ■ Delivered less than 90 days later than planned
 ■ Delivered more than 90 days later than planned
 ■ Planned delivery date
 ⋮ Reporting period cut off by 24 June 2023

Strategic milestones 2023/24 (continued)



■ Delivered on time or earlier than planned
 ■ Delivered less than 90 days later than planned
 ■ Delivered more than 90 days later than planned
 ■ Planned delivery date
 ⋮ Reporting period cut off by 24 June 2023

Schedule performance

We have achieved a number of scheduled milestones during the quarter

Crossrail

In May 2023, all Crossrail activities were completed or transferred to a TfL owner.

Surrey Quays station

In May we started on site at Surrey Quays station.

Bakerloo line fleet

By May, we installed energy-saving LED customer lighting on 50 per cent of Bakerloo line trains to reduce annual carbon emissions by 70 tonnes.

Direct Vision Standard

In June, we completed the Direct Vision Standard phase 2 public consultation.

Four Lines Modernisation

The Neasden heavy-maintenance long-shed facility was brought into service in April.

Milestones forecast to be late

Silvertown Tunnel programme

Details of highway improvements to support tunnel objectives submitted for Government approval

Submission to the Secretary of State was deferred until after August 2023 to ensure effective engagement with the boroughs on the planned highway improvements.



Our teams have met a number of key milestones during the quarter

Major projects

This portfolio contains our largest and most complex projects. It comprises line upgrades such as the Piccadilly line upgrade and Four Lines Modernisation programme, network extensions, major station upgrades, the Elizabeth line and Crossrail



Elizabeth line

Rolling stock

Forecast completion	Gross cost to date (£m)	Gross cost to go (£m)	Gross EFC (£m)	Programme and project authority (£m)	Variance: EFC versus authority (£m)
Q4 2024/25	1,002	5	1,007	1,149	142
Change since last Investment programme report					
No change	2	(2)	No change	No change	

Financial commentary

The movement of £2m since the last report in the cost to date relates to ongoing rolling stock work that will be completed in December 2024.

Performance over time commentary

The forecast end date represents the delivery of the rolling stock and depot, including all additional changes. Since authority was awarded in 2013/14, the EFC dropped from £1,090m to £1,007m because the trains have since been part of a sale and leaseback arrangement. They are now being leased from 345 Rail Leasing Limited and the costs charged as operational costs.

Programme update

Class 345 trains

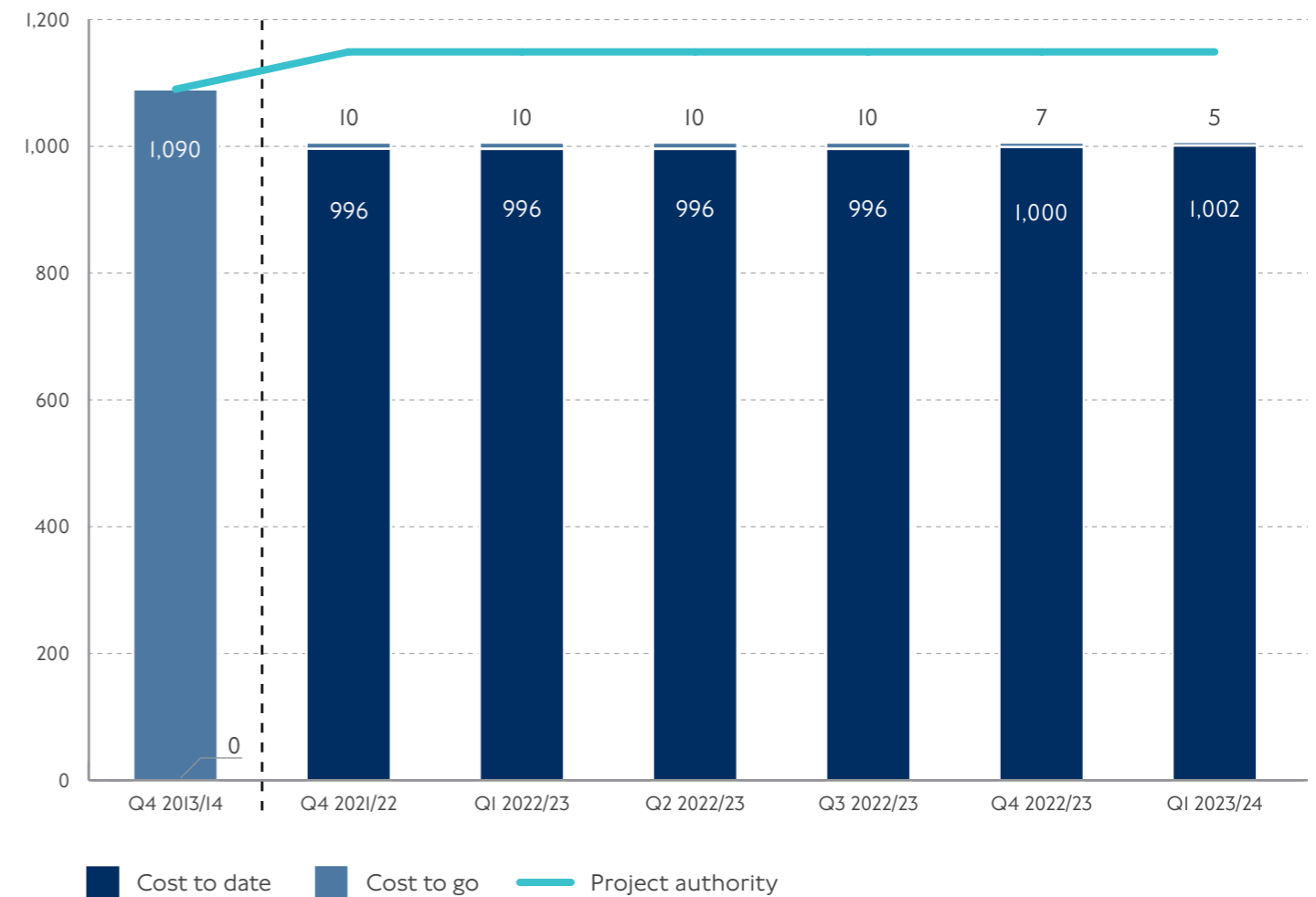
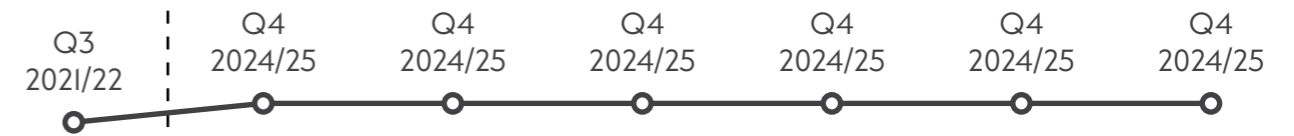
On 21 May 2023, a new Elizabeth line timetable was introduced which increased the peak service to 24 trains per hour, using 65 class 345 trains.

The manufacturers continue to apply incremental updates to the train and signalling system software. This has been accounted for in the rolling stock project forecast through to 2025.

Alstom, the train manufacturer, has a continuing modification programme to attain further fleet reliability increases.

Estimated final cost performance over time (£m)

Forecast completion date



Crossrail

Forecast completion	Gross cost to date (£m)	Gross cost to go (£m)	Gross EFC (£m)	Programme and project authority (£m)	Variance: EFC versus authority (£m)
Q1 2023/24	15,815	88	15,903	15,888	(15)
Change since last Investment programme report					
No change	18	(18)	No change	No change	

Financial commentary

In Quarter I, the EFC remained stable at £15,903m. The programme achieved end-to-end integration with Stage 5c, increasing peak service to 24 trains per hour on 21 May 2023 and final timetable status. The Crossrail programme formally closed out on 26 May 2023.

The focus is now on the remaining residual works. The £88m cost-to-go represents all other residual work items required due to safety, reliability or performance improvements.

Crossrail continues to focus on managing the risks associated with implementing the additional functionality required to achieve the required level of operational resilience.

Performance over time commentary

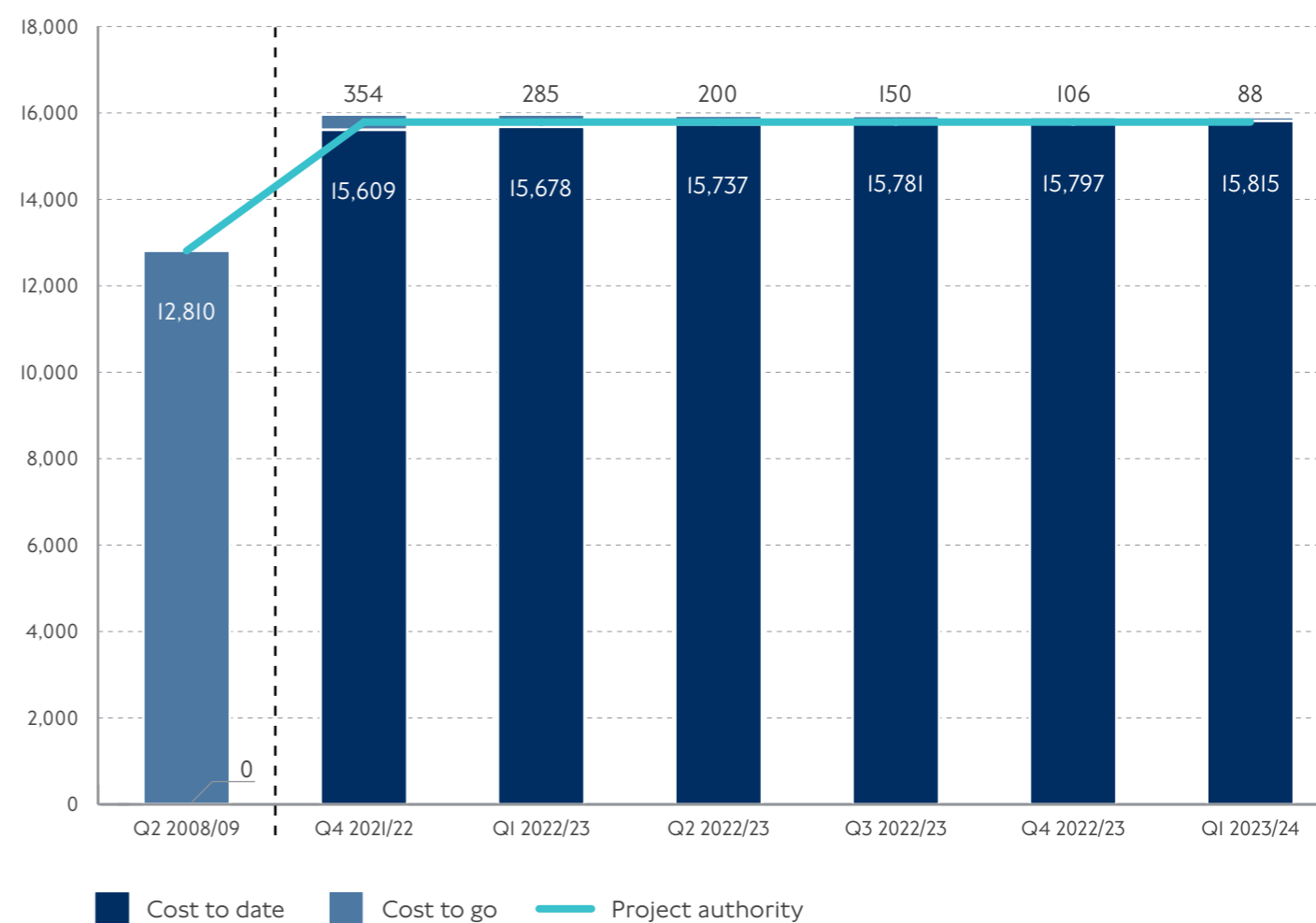
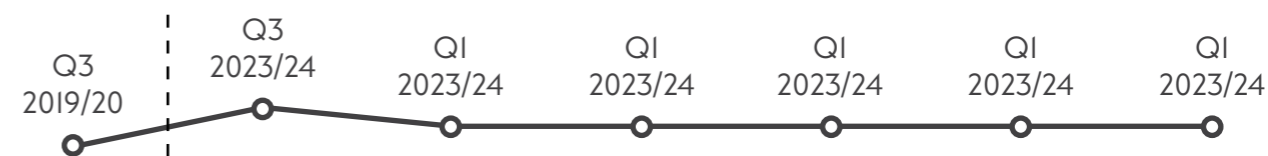
Crossrail formally closed out on 26 May 2023, having achieved final timetable status in May 2023. At this point peak-time frequency increased from 22 to 24 trains per hour between Paddington and Whitechapel, with 16 trains per hour off-peak. Direct services from Shenfield to Heathrow Airport also began. Opportunities and risks continue to be monitored with the aim of reducing the programme EFC of £15,903m to within the approved funding level.

Programme update

The latest Elizabeth line timetable was introduced on Sunday 21 May 2023. This timetable change sees the railway move to a peak service of 24 trains per hour in the central section (an increase from 22 trains per hour) and also increases connectivity and reduces journey times. The introduction of this timetable marked the end of the Crossrail project.

Estimated final cost performance over time (£m)

Forecast completion date



Line upgrades

Four Lines Modernisation

Forecast completion	Gross cost to date (£m)	Gross cost to go (£m)	Gross EFC (£m)	Programme and project authority (£m)	Variance: EFC versus authority (£m)
Q4 2024/25	5,284	202	5,486	5,520	34
Change since last Investment programme report					
No change	26	(9)	(17)	No change	

Financial commentary

Following an in-depth review of the schedule and costs, the annual review submission to the Programmes and Investment Committee in July 2023 reported an EFC increase in Quarter 1 of £17m compared to Quarter 4.

This is principally due to schedule delay owing to the challenges of complex signalling software development, cost increases relating to complexities in asset installation and the radio communication system, and inflationary pressures. These have been partially offset by cost reductions from efficiencies and de-scoping planned works (Ealing radio island) from the 4LM programme.

Delivery of the 4LM programme continues to be challenging due to its scale and complexity and it continues to face both schedule and cost pressures. The current programme and project authority does contain provision for further programme slippage, should it occur, but is currently under review.

Performance over time commentary

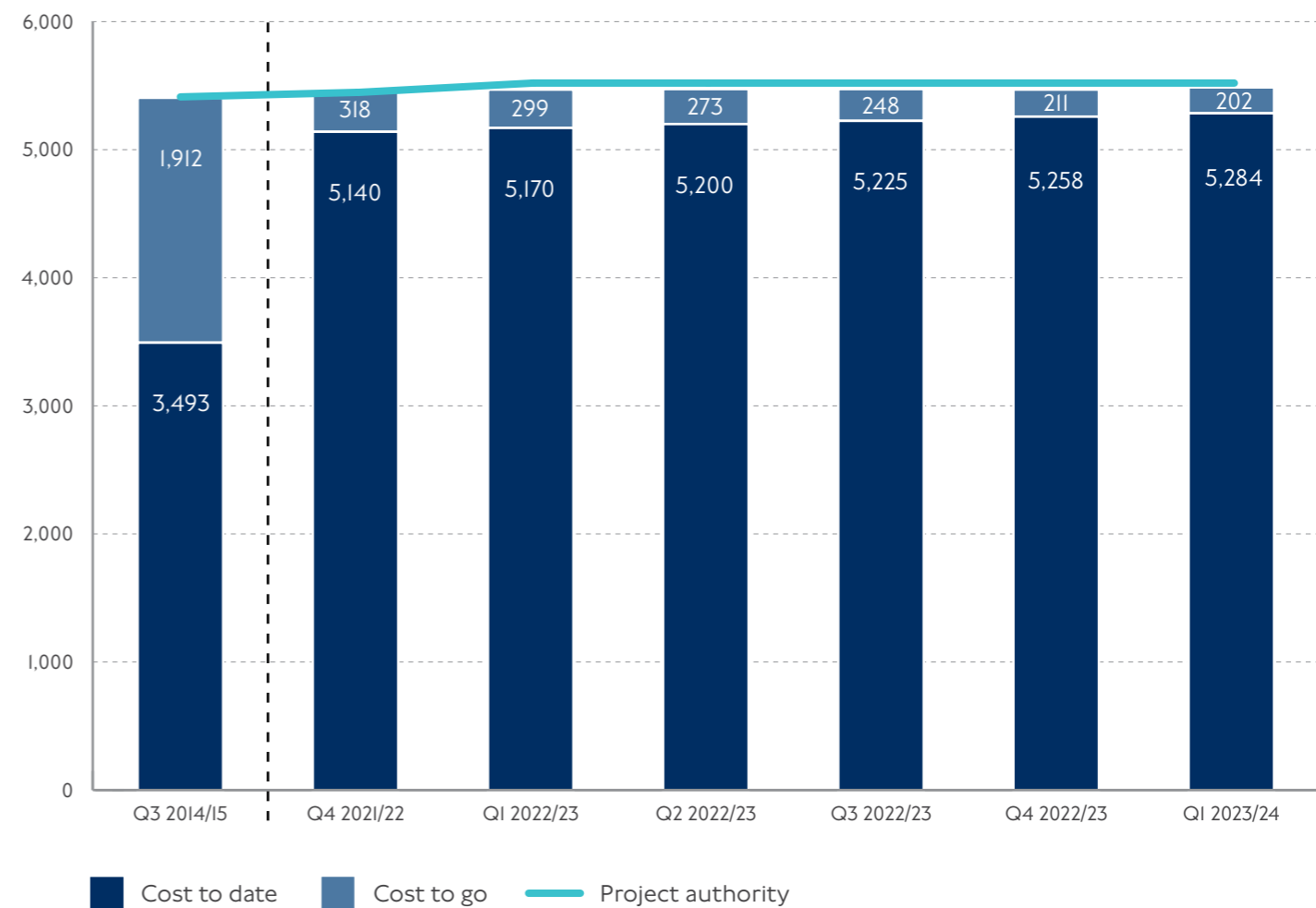
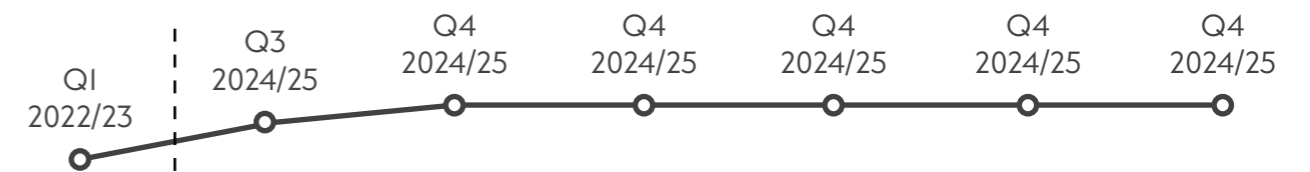
The forecast completion date shows when the final signal migration area I4 between Rayners Lane and Uxbridge will be brought into service. The date has been delayed from the forecast at the time the signalling contract was awarded in 2015.

Since the last report, the forecast completion date has been delayed by two periods, although it remains within Quarter 4 2024/25. This is principally owing to challenges with complex software development, testing and commissioning, and closure availability.

This represents a stretching target date and there remain significant challenges to achieving this. The delay has come principally from a revised assessment as part of our in-depth review of the most likely timescales to develop, test and commission the software. There is also limited availability of the closures required to complete the remaining areas of signalling upgrade.

Estimated final cost performance over time (£m)

Forecast completion date





The District and Metropolitan lines are due new signalling systems

Programme update

We continue to make progress on the programme, which is delivered by progressively installing new signalling on sections of the railway known as signal migration areas (SMAs).

Following successful commissioning of SMA6 between Stepney Green and Becontree on 15 January 2023 and SMA7 between Becontree and Upminster depot on 19 March 2023, the area now operating under the new signalling contains 62 stations and four complex junctions, including the full Circle and Hammersmith & City lines and the majority of the District line. For comparison, the Jubilee line has 27 stations. This means two of the four sub-surface lines (and around 57 per cent of the total Tube network) are now operated by an automatic signalling system.

The remaining areas still to go live with the new signalling system include the Metropolitan line north of Finchley Road (SMAs 8, 9, 13 and 14) and sections of the District line from Barons Court to Stamford Brook (SMAI0) and Fulham Broadway to East Putney (SMAI2).

Software development continues for the next SMA to be commissioned, covering the Metropolitan line between Finchley Road and Preston Road (SMA8), which is due to go live in 2024. SMA8 is considered one of the most complex areas of the programme, with significant new challenges associated with the integration of the new signalling system on the Metropolitan line with the Jubilee line and Neasden depot train control software.

Unrelated to the commissioning of SMA7, we have identified two significant software issues which are currently being mitigated through additional operational restrictions. The impact of resolving these issues has been assessed and a plan is now in place to address these prior to implementation of the Finchley Road to Preston Road signalling section (SMA8).

Design and installation of trackside signalling assets continues in the areas which are yet to go live. We are aiming to complete all installation by March 2024.

Procurement is in progress for planned upgrades to the heavy-lifting shed at Neasden depot and the new staff accommodation block. When complete, this facility will enable the planned overhaul of Metropolitan line trains.

Line upgrades

DLR rolling stock and systems integration

(includes Housing Infrastructure Fund)

Forecast completion	Gross cost to date (£m)	Gross cost to go (£m)	Gross EFC (£m)	Programme and project authority (£m)	Variance: EFC versus authority (£m)
Q2 2026/27	367	485	852	881	29
Change since last Investment programme report					
No change	52	(52)	0	No change	

Financial commentary

Since the last report, the EFC has remained stable. It remains below authority due to savings achieved by using existing facilities in the depot to assemble the early trains. This contributed to reducing the scope of both the temporary fit-out shed and the Housing Infrastructure Fund from I4 to II trains. We continue to review options to mitigate and offset inflationary pressures where possible.

Performance over time commentary

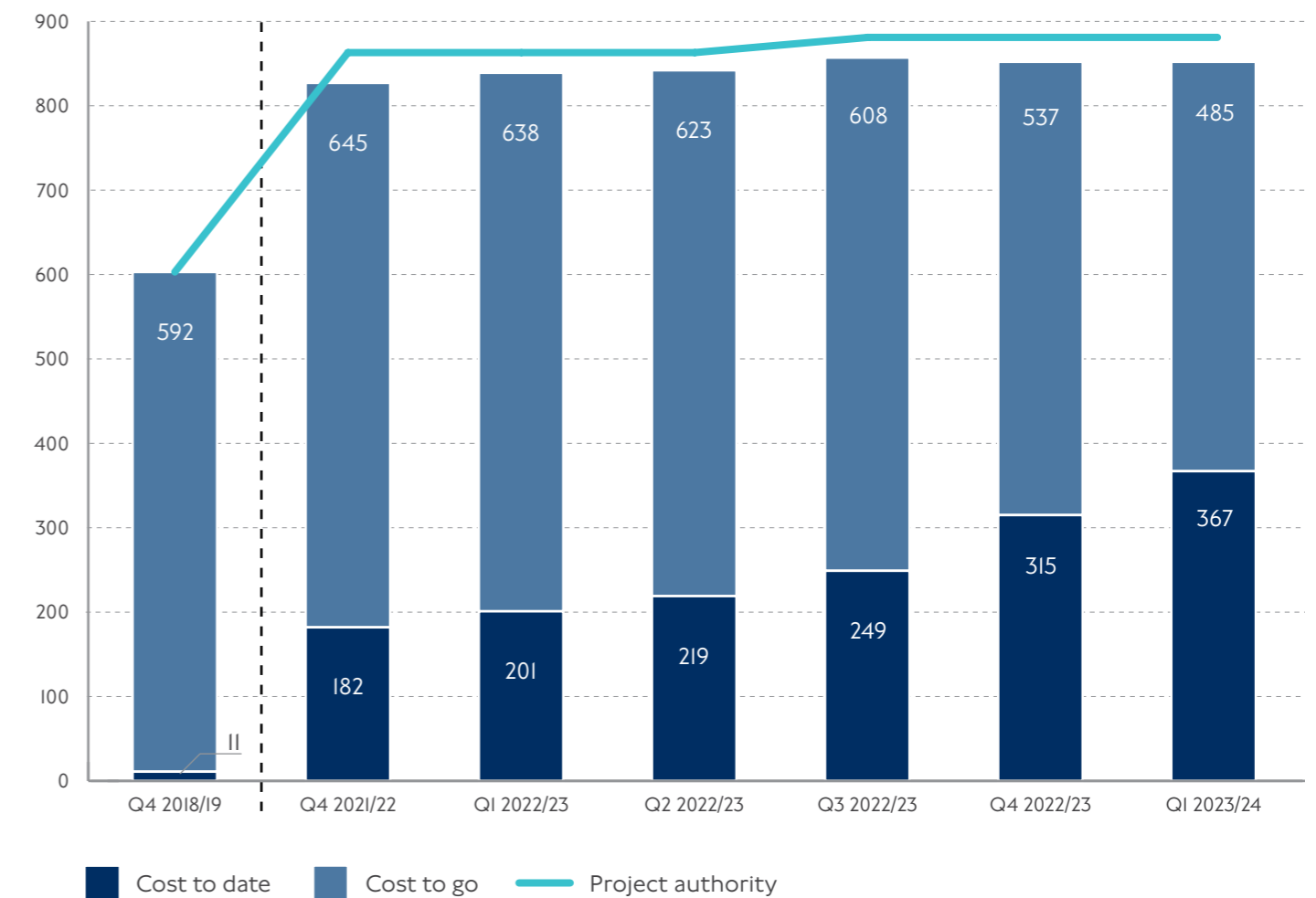
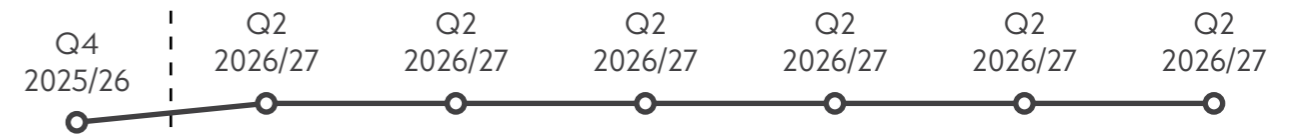
Since the original grant of authority in 2019, we have received approval from the Government to activate an option to purchase II additional trains funded through the Housing Infrastructure Fund.

The increase in EFC from Quarter 4 2018/2019 reflects the addition of £261m of grant funding from the Government to deliver the Housing Infrastructure Fund scope of works.

We reduced our EFC to reflect procurement savings and by taking a proactive stance on the remaining risk exposure as the rolling stock design approached completion. However, this is offset by countervailing inflationary pressures.

Estimated final cost performance over time (£m)

Forecast completion date



Programme update

Rolling stock delivery

The manufacture of the new rolling stock in Spain is continuing to plan, with 19 trains completed. Main line testing is underway with a number of successful elements already complete. Modifications and snagging were completed for two trains within the depot. Eleven HIF option trains have been ordered.

Testing of new signalling software is in progress with the existing fleet on the DLR network, in preparation for the new trains to enter into service in early 2024.

Beckton depot and network infrastructure

On Thursday 17 August 2023, the northern sidings contractor, Buckingham Group Contracting Ltd (BGCL) filed a notice of intention to appoint administrators. BGCL suspended works on site and stood down its subcontractors. The TfL team enacted a safe stop to ensure the site was left in a safe and secure condition. BGCL have now entered into administration. Parts of the BGCL rail business have been sold to Kier Group, but the northern sidings contract does not form part of that sale. Work is ongoing to develop and consider options for how we complete these works.

Following the award of the contract for the maintenance-facility building and southern sidings, our contractor has now fully mobilised and key sub-contracts have begun for significant enabling works. The new site-office accommodation has also now been delivered and lifted into place.

Following the award of the design and build contract for the second entrance at Blackwall, intrusive surveys have been undertaken and detailed design is underway.

The first power resilience contract has been awarded and design is underway.

Housing infrastructure funding

Following confirmation from the Government, we have confirmed the order with the train manufacturer to purchase 11 additional trains through the Housing Infrastructure Fund. This will provide additional capacity and unlock further housing benefits in the Royal Docks and Isle of Dogs.

Green agenda

Our maintenance factory building contractor, Morgan Sindall, is participating in the IOT Carbon Challenge. This empowers project teams to work for a focused week with their consultants and supply chain to find intelligent solutions that reduce carbon from buildings and their delivery by a minimum of ten tonnes. As part of this challenge, they will be:

- Re-using aggregates produced from breaking out and crushing concrete from the existing slab on site
- Using a warm asphalt mix rather than a hot one for tarmacking new car park and haul roads
- Using Cemfree or concrete with the highest-possible cement replacement for any temporary concreting works associated with the site set-up



Our new DLR trains are on test to enter service early next year

Line upgrades

Piccadilly line upgrade

Forecast completion	Gross cost to date (£m)	Gross cost to go (£m)	Gross EFC (£m)	Programme and project authority (£m)	Variance: EFC versus authority (£m)
Q4 2026/27	719	2,206	2,925	2,994	69
Change since last Investment programme report					
No change	63	(50)	13	No change	

Financial commentary

Since our last report, the EFC has increased by approximately £13m, primarily due to updated pricing information as contracts are awarded.

The EFC at Quarter I does not reflect the outcome of ongoing reviews of the PLU Stage I programme schedule. An update of the progress and findings of these reviews will be included in the annual review to the Programmes and Investment Committee (PIC) in October.

Performance over time commentary

The forecast end date reflects when the last new Piccadilly line train is currently planned to be delivered into use. Since authority was originally awarded in May 2018, this forecast end date has been delayed from 2026 to 2027.

Since July 2021, industry price increases have led to updated inflation indices within our business, adding around £75m to the overall EFC. This is also being updated as part of a review of the programme schedule and should be available for the October PIC meeting.

Programme update

Rolling stock

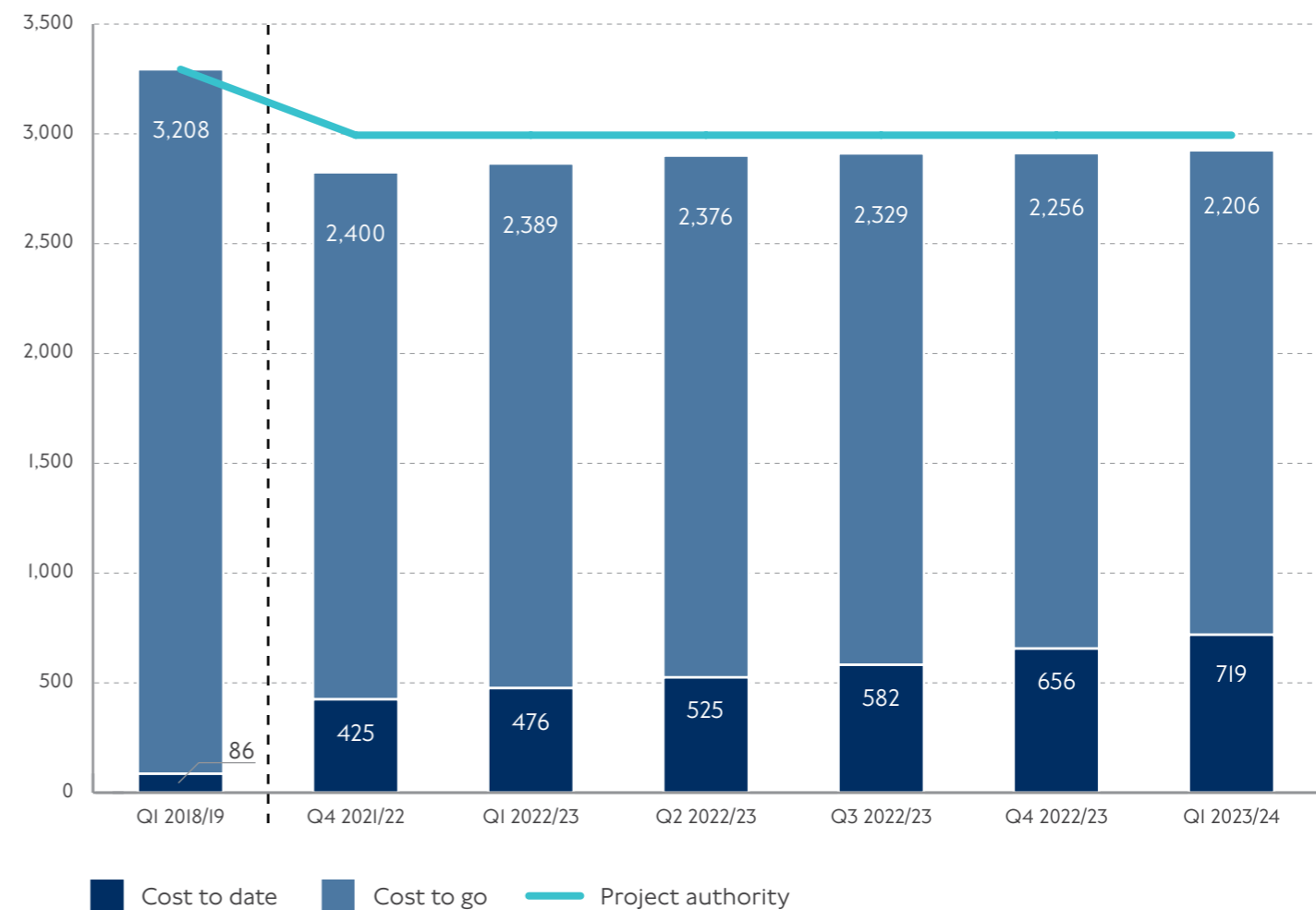
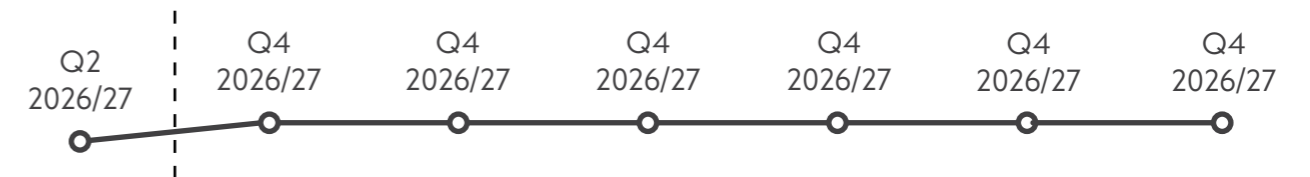
The manufacturing contract with Siemens Mobility Limited is progressing well, and we remain on schedule for the first train to be delivered to London in July 2024.

In July 2023 the first fully assembled train was successfully transferred from Vienna, Austria to Siemens' test and validation centre in Wildenrath, Germany. This first train will now undergo an extensive programme of pre-delivery performance and reliability proving, prior to mass production.

In July 2023 we completed an external expert review of Siemens' manufacturing schedule. This concluded that there is a high level of confidence in Siemens' capability to deliver in accordance with their schedule. It validated the known interface challenges that we have between the new train and the existing Piccadilly line infrastructure and systems, and it praised the collaborative relationship in place between the TfL project team and Siemens.

Estimated final cost performance over time (£m)

Forecast completion date



Enabling works for high voltage (HV) power

Good progress continues to be made with respect to the upgrade of HV power. Our initial focus is on the provision of additional capacity at Sudbury Hill, Northfields and Cockfosters sub-stations to support upgrades to the train maintenance depots and stabling facilities. Upgrades are also being progressed at Hyde Park Corner and Leicester Square sub-stations to enable new train operation.

Complex upgrade work is also underway at Manor House where an existing TfL telephone exchange is being relocated to enable the installation of a new HV power coupling transformer. Enabling works are also underway at Cobourg Street in readiness for new HV equipment installation.

Railway control systems

Modifications to the existing signalling system are underway to ensure compatibility with the new trains. These works include the re-positioning of lineside signals and installation of additional signal indicators to ensure visibility from the new, longer trains at all locations.

Additionally, 76 legacy delta-type track circuits are being replaced with a new design of train position detector. This is necessary to ensure the existing safety signalling system is not affected by electro-magnetic interference generated by the new trains.

One-person operation closed-circuit TV (OPO CCTV)

Following design development, implementation has also begun for the new OPO CCTV system with the first installation at Caledonian Road station. This system will improve safety through transmission of high-quality digital images of the platform-train interface to both the train operator and the line control centre to ensure the safe departure of the train from the platform.

Depots

In May 2023, we brought into use an expanded train stabling facility at South Harrow. This upgrade has expanded the site from its original six-train capacity to 12 longer sidings to accommodate the new rolling stock and increase overall stabling capacity on the line. This is a key enabler to introduction of the new Piccadilly line trains on our network for testing in 2024 and for passenger service from 2025.

Good progress continues to be made with respect to enabling work activities at Northfields and Cockfosters, with the construction of three new sidings to the west of Northfields station. This will augment stabling capacity on the line and facilitate the extensive upgrade works to train maintenance facilities at Northfields depot.

As previously reported, we have identified significant challenges with the overall schedule, including slippage of some critical path activities required for the commencement of testing with the new trains.

Delivery schedules for key sub-programmes are not fully integrated and this is reflected in a misalignment between the availability of upgraded depot maintenance facilities and the delivery of the new trains.

These challenges are being addressed and actions are being taken to recover schedule delays and enable new train introduction. A detailed update will be submitted to the Programmes and Investment Committee in October.

Green agenda

The project team has set key performance indicators across the programme focusing on how they will reduce carbon, the values of which are reported. Top carbon risks and opportunities are reported in our internal programme performance report.

Objectives have been set for all staff to attend carbon literacy training courses to support the delivery of carbon savings within the programme. Work continues on revising the baseline to reflect a developing understanding of the programme.

Network extensions

Silvertown Tunnel

Forecast completion	Net cost to date (£m)	Net cost to go (£m)	Net EFC (£m)	Programme and project authority (£m)	Variance: EFC versus authority (£m)
Q1 2025/26	117	62	179	173	(6)
Change since last Investment programme report					
1 Quarter later	4	(2)	2	No change	

Financial commentary

The EFC is currently £6m over the approved authority of £173m, owing to inflation increases and the agreed safe stop undertaken because of the coronavirus pandemic. The EFC has increased by around £2m since the last report due to a reassessment of some of the key risks, which are being managed and mitigations developed. We continue to seek opportunities to reduce cost and risk exposure, which should be achievable to bring us back in line with the authority. The completion date has slipped 18 days since the last report, which is detailed in the performance over time commentary below.

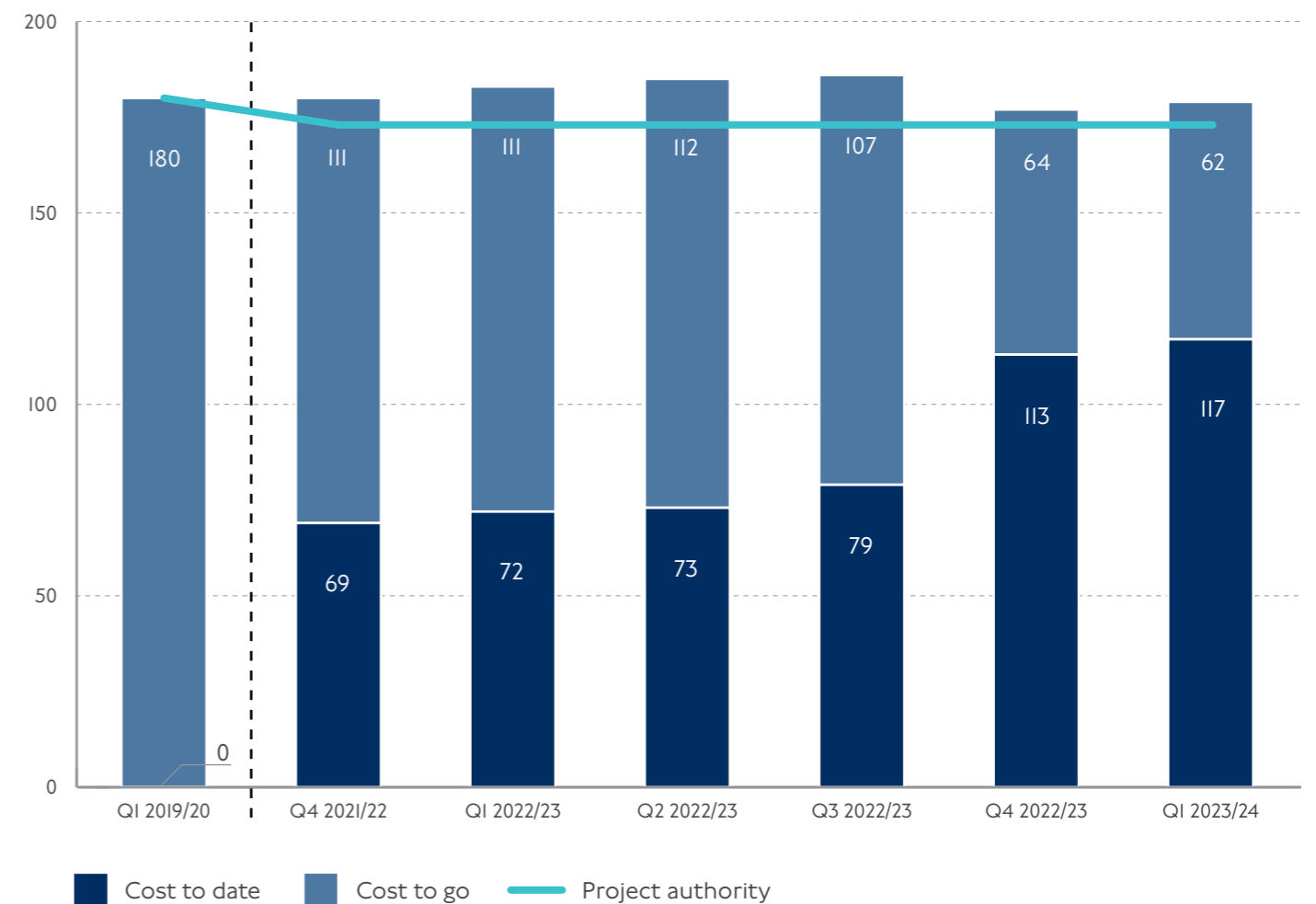
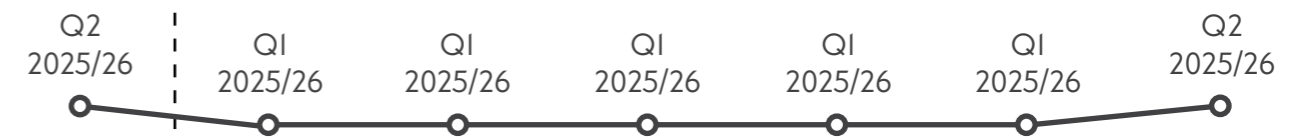
Performance over time commentary

The forecast end date is when the permit from an independent assessor to use the new Silvertown Tunnel is obtained. Planned permit to use remains in 2025 but has slipped just into Quarter 2 2025/26 in the last quarter following a change in programme sequencing to allow for equipment installation to take place after the removal of the tunnel-boring machine (TBM). Both TfL and Riverlinx are working hard to bring the permit to use back into Quarter 1 25/26 as per previous reports. Mitigations are underway to allow for some parts of the TBM to be removed back through Greenwich rather than Silvertown. These have already reduced the potential impact of the equipment installation from 49 to 18 days.

The EFC reduced in Quarter 1 2021/22 after the scope and budget were transferred to the road user charging programme to achieve synergies with our other road user charging schemes. However, it rose again through 2022 due to inflationary pressures.

Estimated final cost performance over time (£m)

Forecast completion date



All numbers are shown as net of income and third-party contributions

Programme update

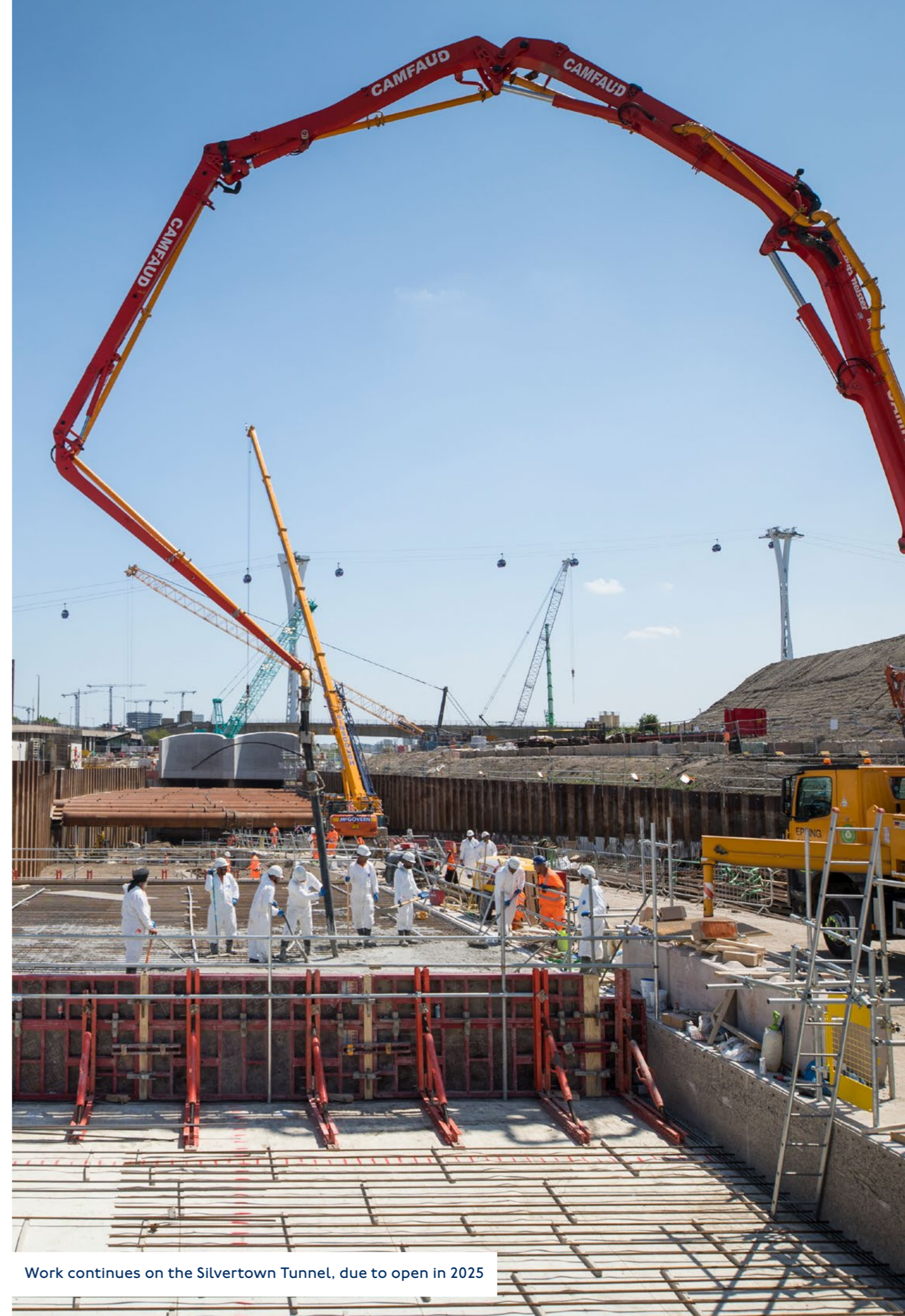
The tunnel-boring machine (TBM) reached the rotation chamber in Greenwich on 15 February 2023, completing the tunnelling of the first bore. Following a complex but successful rotation, it started the final leg of its journey on 23 May and completed its drive on 23 July, 62 days ahead of plan. This is a significant achievement for the programme as it represents successful completion of a complex TBM manoeuvre and is the first time this technique has been used in the UK.

The new Boord Street walking and cycling bridge across the A102 was opened to the public on 20 June with a temporary ramp on the northside, which will be in place until the bridge is completed in early 2024. This replaces the existing 1960s footbridge with a new, fully accessible bridge built to modern design standards with improved lighting. The new bridge will provide a safe and easily accessible crossing for those walking and cycling, including those using cargo bikes, on the Greenwich Peninsula and will accommodate future neighbouring development proposals. The demolition and removal of the old bridge will be completed in early August 2023.

Green agenda

The introductory cross-river bus network for Silvertown Tunnel was finalised in March 2023 and issued for tender in May 2023. The network includes routes I08 (existing service using Blackwall Tunnel), I29 and SL4, which forms part of the wider Superloop network. They will begin operating when the Silvertown Tunnel opens in 2025. We will be working to deliver a zero-emission bus fleet across all three routes.

The consultation for the cross-river cycle provision closed on 10 September. We received around 750 responses and are now analysing these before deciding on next steps.



Work continues on the Silvertown Tunnel, due to open in 2025

Network extensions

Barking Riverside extension

Forecast completion	Gross cost to date (£m)	Gross cost to go (£m)	Gross EFC (£m)	Programme and project authority (£m)	Variance: EFC versus authority (£m)
Q2 2022/23	333	(5)	328	329	1
Change since last Investment programme report					
No change	1	No change	1	No change	

Financial commentary

There have been minor changes to the EFC, which remains stable since the last report. The negative cost-to-go values are driven by future opportunities that are expected to materialise throughout 2023.

Performance over time commentary

The end date for when services will run between Gospel Oak and Barking Riverside was delayed after authority was approved in 2018, following the discovery of uncharted utilities and the safe stop because of the coronavirus pandemic.

The safe stop resulted in rail systems works being re-planned and Network Rail possessions re-booked, with the EFC increasing because there are only two opportunities a year for a four-day possession.

Additional works were required to resolve concerns over signal sighting, which affected the completion of the scope and main contract.

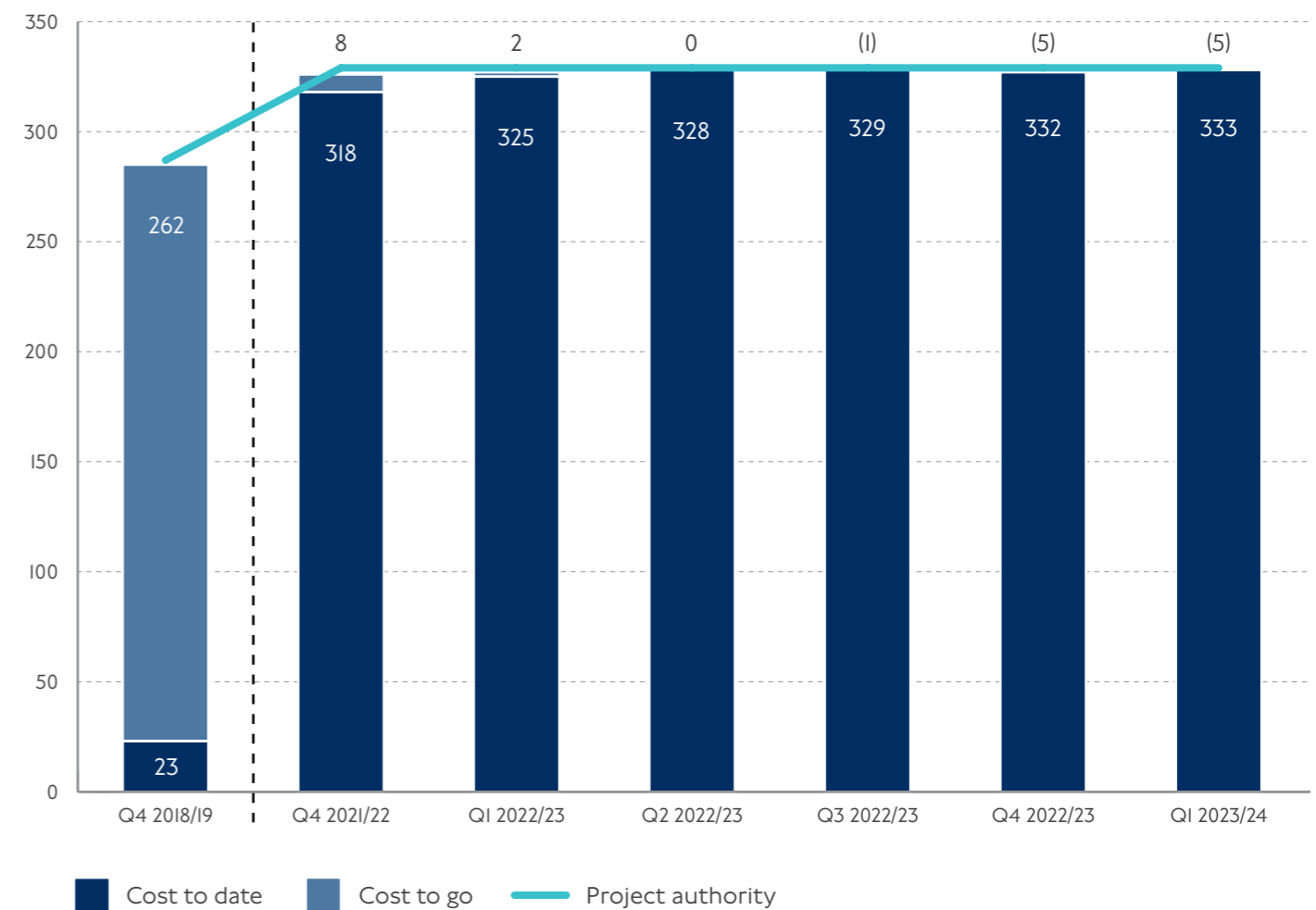
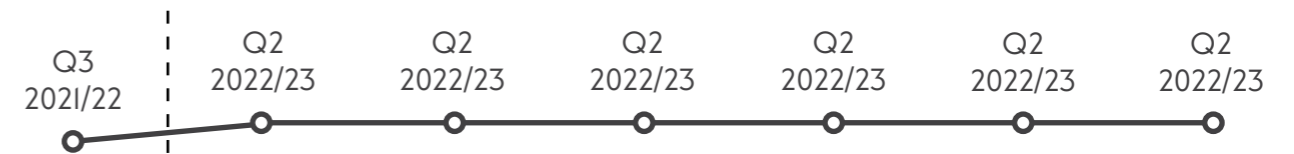
Programme update

The new extension between Gospel Oak and Barking Riverside opened on 18 July 2022 and has been running a good service.

We successfully transferred the civil assets to Network Rail in June 2023.

Estimated final cost performance over time (£m)

Forecast completion date



Major station upgrades

Bank station capacity upgrade

Forecast completion	Gross cost to date (£m)	Gross cost to go (£m)	Gross EFC (£m)	Programme and project authority (£m)	Variance: EFC versus authority (£m)
Q4 2022/23	687	13	700	702	2
Change since last Investment programme report					
No change	(3)	1	(2)	No change	

Financial commentary

The EFC has remained stable since the last report and spend is in line with current forecasts.

Performance over time commentary

The forecast end date represents the opening of the new Cannon Street ticket hall entrance at Bank station, which was achieved on 27 February 2023. Our estimated final cost has increased since the authority award in 2016, owing to site works being disrupted by the impact of the terrorist attack at London Bridge, the need for additional scope following the discovery of asbestos, and the impact of the coronavirus pandemic.

In addition, the final phase of the programme was delayed by around three months due to issues relating to the manufacture and installation of cladding panels and commissioning of safety-critical systems.

Programme update

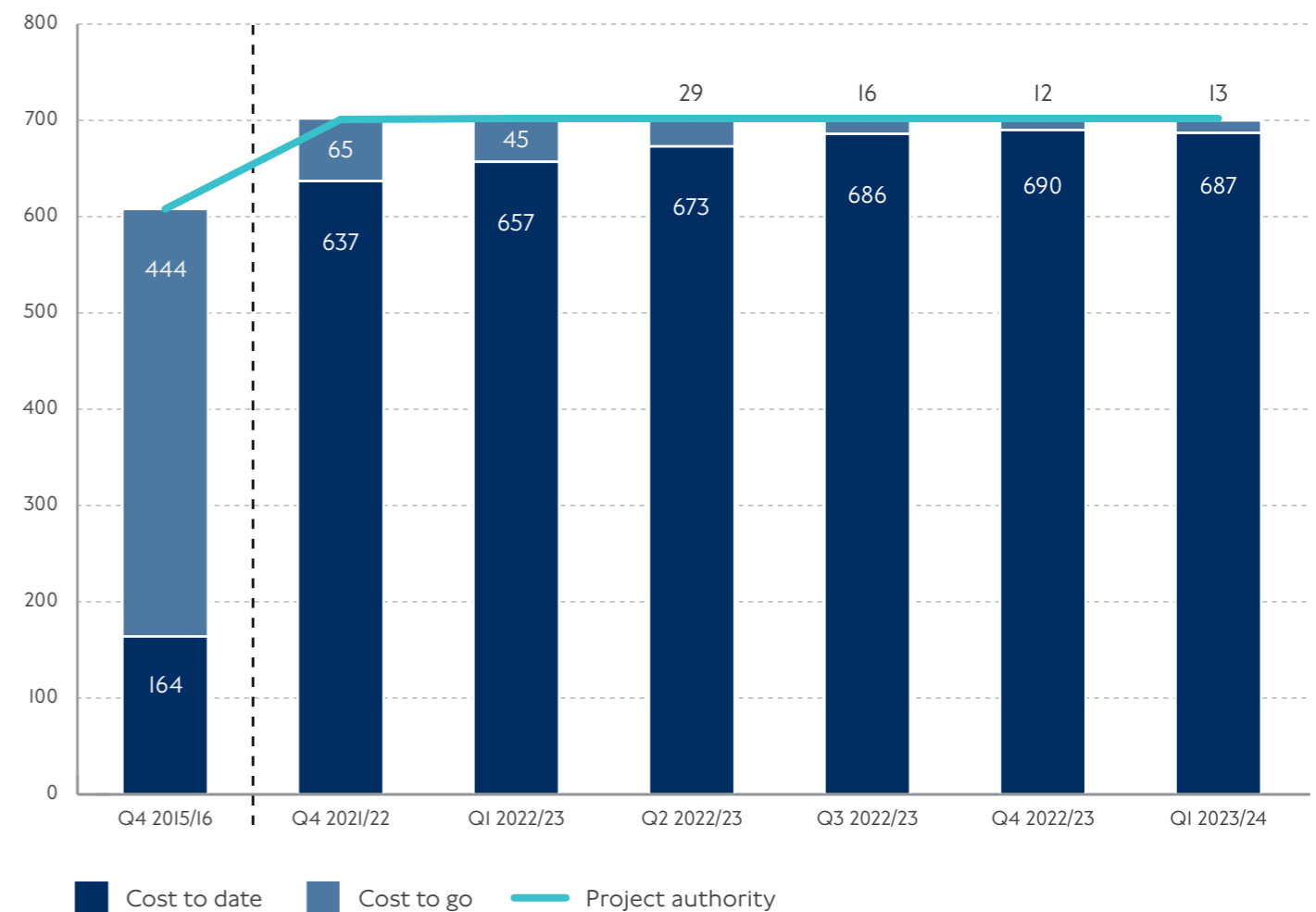
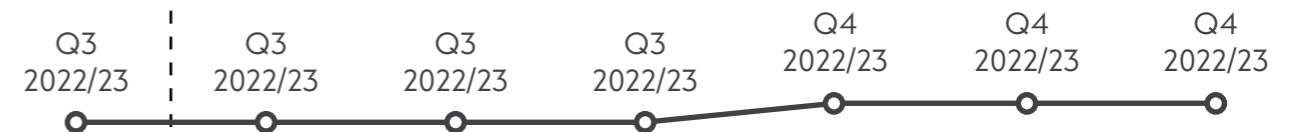
This project has increased the station's capacity by approximately 40 per cent. It has also resulted in improved passenger flows and reduced journey times, enhancing the overall customer experience. Improvements include step-free access to and from the Northern line, improved access to and from DLR platforms, two new moving walkways, 12 new escalators and two new lifts to serve the Northern line and DLR. There are more direct routes within the station and a new station entrance on Cannon Street.

Since opening the new entrance on Cannon Street in February 2023, the project continues to progress through snagging, close-out works and finalising the assurance and handover process. The works to reinstate Arthur Street await further negotiations with the City of London Corporation on the terms of a lease agreement to allow the backfill of the Arthur Street shaft to begin.

Further works associated with the junction modifications between Arthur Street and both King William Street and Upper Thames Street continue to progress through design.

Estimated final cost performance over time (£m)

Forecast completion date



Green agenda

The project is nearing completion of the works, and will assist in sharing initiatives and output data to support in developing and refining strategies and requirements of our green agenda. Strategies undertaken by the project in relation to environmental requirements and carbon-reduction targets will also be reviewed and shared.



The Bank station upgrade has increased its capacity by 40 per cent

Rail and station enhancements

This new programme includes enhancement delivery from across Surface and London Underground. This consolidation of projects will provide a single focus for an improved transport network



Rail and station enhancements

Forecast period	Gross cost to date (£m)	Gross cost to go (£m)	Gross EFC (£m)	Programme and project authority (£m)	Variance: Forecast cost v. authority (£m)
2022/23	72	257	329	1,002	673
Change since last Investment programme report					
No change	15	(25)	(9)	35	

Financial commentary

London Underground enhancements delivered £6m this quarter, which is in line with the forecast for 2023/24.

The Royal Docks programme shows continued delay in mobilisation, due to a pause in the programme funding from the Greater London Authority. The delays have resulted in £22m of activity moving into future years for Royal Victoria station upgrades, due to ongoing discussions.

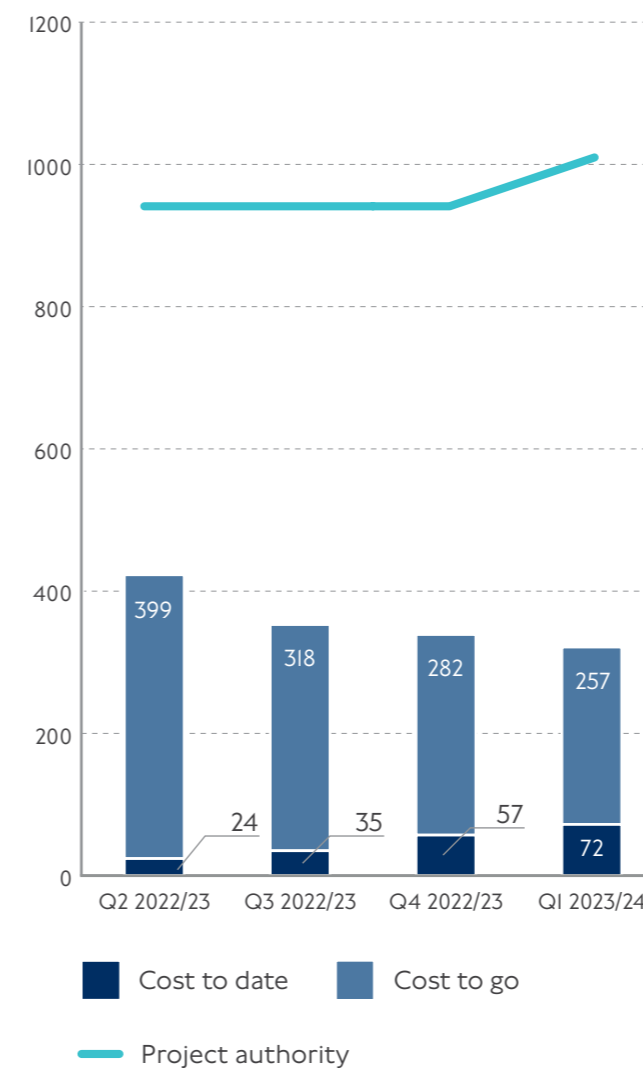
The East London line Housing Infrastructure Fund programme reflects savings of £2m following a successful procurement in the Surrey Quays signalling workstream.

In other areas there has not been any change in the spend or completion dates.

Performance over time commentary

The total cost shows little movement from the previous quarter but there has been good progress in conversion of the £15m of cost to go into spend to date. Some delays have occurred and this has resulted in spend moving into later years. Increased authority recognises the longer-term forecast for the portfolio.

Rail and station enhancements performance over time (£m)



Rail and station enhancements

High Speed 2

On 9 March, the Secretary of State announced a pause and rephasing of some elements of the HS2 programme. This means that HS2 will be delivered differently than planned over the next few years, so that the programme stays within allocated budgets.

We have engaged collaboratively with HS2 to explore a number of scenarios for the HS2 station and TfL assets, both in scope and phasing. This has included a meeting between the Commissioner and the chief executives of HS2 and Network Rail.

HS2 Ltd have now delivered a high-level feasibility report to the Department for Transport (DfT) with several options for further investigation. The DfT and HS2 Ltd have started to set out the option-sifting process and criteria for Euston and how the partners, including TfL, will be involved. We are aiming to work within their capped budget and are aligning our annual financial authority accordingly.

The new Northern line traction sub-station and ventilation building is not affected by the pause and HS2 construction continues at Euston with the four-storey superstructure completed above ground, and initial mechanical and electrical fit-out below ground progressing.

We are taking the opportunity presented by the design pause at Euston to re-engage with the DfT on the question of the transport of materials by rail. Along with the Chief Executive of the London Borough of Camden, our Commissioner had

previously written to the Chief Executive of HS2 to express our concerns about road safety, air quality and congestion associated with transport of spoil by road.

Despite the affordability challenges for the HS2 project, we continue to work with The Euston Partnership to ensure our requirements are met for the future bus station, taxi rank, cycle parking and Tube station at Euston, alongside the wider place-making and regeneration ambitions we share with partners to support the integration of the new development and public realm into the local community and deliver a significantly enhanced gateway into London.

The works at Old Oak Common are not affected by the Euston design pause and we continue to work with HS2 on the design development of the new surface intermodal area. In particular we have reinforced the need for our requirements to be met for buses, cycling and the new Elizabeth line station.

Given the likelihood of a prolonged period with Old Oak Common being a temporary terminus for HS2 services, TfL colleagues and DfT officers are working closely together on this issue and have endorsed the strategic case to procure additional class 345 Elizabeth line trains.

In addition, we want to ensure that all journeys are catered for by offering level boarding at Old Oak Common Elizabeth line station, which is not currently part of the station design. The matter of level boarding

has been raised with the DfT and will be progressed through a newly constituted DfT-chaired, cross-industry director-level Old Oak Common steering group.

Green agenda

TfL environmental requirements and carbon-reduction targets for new or altered assets are already incorporated into the functional requirements in the programme and project authority and are being cascaded to the supply chain.



Rail and station enhancements

Elephant & Castle

A new station entrance and Northern line ticket hall will support the creation of 5,000 new homes and 10,000 new jobs in the area. This new entrance will significantly increase the station's capacity to meet both existing and new demand for Tube services.

Procurement for the new tunnels linking the new station box to the existing Northern line platforms is underway. Four organisations have been invited to tender for the works. Tenders are due to be returned in October this year. A contract for essential pre-tunnelling ancillary works has been awarded and works are currently being mobilised. Other enabling works have been undertaken by in-house teams and have proved cost-effective.

To further support procurement of the tunnelling works contract, a package of works has recently been undertaken to provide additional ground investigation analysis in the area around Newington Butts. Due to our close co-operation, the developer has shared their ground investigation results and this work will add to that. The results of this work are currently being analysed prior to feeding into the main civils tender.

All these works, plus the station box, are known as Stage I works and are fully third-party funded. Construction of the station box by the developer continues apace, with station box piling completed and works on the slab begun. The developer has recently completed the construction to basement level 3. Relations with the developer are positive and station box handover remains as planned in early 2025.

Additionally, we continue to progress the package of work to determine the best option for the eventual fit-out of the station box and tunnels and bringing the new station entrance into use (these works are known as Stage 2 and are, as yet unfunded). It is anticipated the report providing costed options will be available during October.

Green agenda

Environmental requirements have been incorporated into tunnelling package contract documents, supported by the Environmental team.

Rail and station enhancements

East London line

Morgan Sindall Infrastructure continues to progress the detailed design of the Surrey Quays station upgrade. Enabling works including diversion of utilities both inside and outside the rail corridor have begun. The focus is on the safe delivery of essential closure works in November and December 2023.

Balfour Beatty have been procured to deliver the signalling enhancement to the East London line, with works commencing in June 2023. Procurement of the necessary power infrastructure reinforcement has also concluded, with works scheduled to begin in late 2023. The programme team continues to collaborate with Network Rail on reinforcing their power infrastructure to provide further resilience to the East London line.



Site work on the Surrey Quays station upgrade started in May



Plans to replace our trams rolling stock are under development

Rail and station enhancements

Tram replacement rolling stock

Our rolling stock replacement programme will replace the life-expired Bombardier CR4000 trams, which are experiencing declining reliability and have one of the lowest states of good repair categorisations across our fleets.

Early market engagement is complete, which has informed the procurement strategy. It was confirmed at our internal investment group meeting that replacement of the CR4000 trams is the preferred option. However, full funding for replacement of the trams alongside our other rolling stock has not yet been confirmed.

Initial assessments of infrastructure requirements to facilitate a new fleet have also been completed, which have informed the overall programme update.

Rail and station enhancements

DLR

DLR Thames Wharf

Feasibility and value engineering have now concluded for a new station at Thames Wharf, in line with the revised masterplan for the Thameside West development. The next phase of work on the scheme would be to tender for and complete concept design. This is dependent on further discussions with the GLA, as the project is currently third-party funded by the Royal Docks Enterprise Zone. We will return to the Programmes and Investment Committee for further programme and project authority when further third-party funding is secured.

DLR Royal Docks

The GLA-funded Royal Docks station programme is aligned with the emerging aspirations of the Royal Docks and Beckton Riverside Opportunity Area Planning Framework, aimed at improving accessibility and reducing congestion to enable the delivery of an additional 3,000 homes.

The programme has completed concept design for capacity enhancements at Pontoon Dock. We are undertaking a value-engineering study to mitigate increasing costs during Quarter I.



Improvements at the Royal Docks station aim to reduce congestion

Rail and station enhancements

London Underground

The London Underground enhancements and station developments project covers a range of improvements, mainly to stations and depots. We continue to improve stations by carrying out capacity upgrades and delivering projects that increase and improve accessibility and relieve congestion.

Throughout Quarter I, we made good progress, achieving notable milestones such as completing the demolition and sterilisation of a derelict warehouse at Acton depot.

Step-free access

A prioritised list of stations to undertake feasibility and design for step-free access has been developed and was formally announced on 11 July 2023. The stations are Alperton, Arnos Grove, Burnt Oak, Eastcote, Finchley Road, Northolt, North Acton, Rayners Lane, West Hampstead and White City.

These are in addition to the schemes at Colindale and Leyton already in progress. Both Burnt Oak and Northolt had previously had design and construction work paused during the pandemic. The team is also undertaking a preliminary study into provision of step-free access on the southern end of the Northern line.

The delivery team has been mobilised and is starting to engage with the supply chain for the delivery of the feasibility and design work for the stations during 2023/24.

Waterloo – Elizabeth House

We are finalising discussions with the developer on legal agreements to ensure step-free access to the Northern line platforms is secured before the re-development of Elizabeth House is completed. This would involve constructing lift-shaft structures and connections to the northbound platforms during the development works. The work would enable the future fit-out of the lift shafts after development, subject to future affordability.

Paddington – Bakerloo line

Installation of cabling, services and finishes for the new ticket hall and step-free access areas continue. The scheme is being delivered by a third party and challenges in integrating works with the existing station infrastructure continue to be addressed in delivery.

Colindale

Following the announcement in January 2023 that the GLA was successful in provisionally securing funding from the Government's Levelling Up Fund, we are updating the business case to meet the central government requirements. Programme and access requirements, and the associated pre-construction and governance processes, are being updated ahead of getting project authority to proceed with letting the construction contract. Work is programmed to begin on site in early 2024.

Hounslow West

We are working with our Property Development colleagues, who are seeking a new partner for development on the site of the station car parks. In the meantime, work is continuing to finalise a funding agreement with the borough to allow the further development of the work to improve step-free access at the station.

King's Cross St Pancras

We have secured third-party funding to deliver additional step-free access at Kings Cross St Pancras station on the south side of Euston Road. A developer-led concept design has been largely completed. The developer's main contractor Mace has been finalising detailed plans for the closure of the London Underground subway entrance on the south side of Euston Road from the last quarter of 2023/24. This will allow work to begin on construction of step-free access from the south side of Euston Road.

Knightsbridge

The project is targeting to deliver step-free access from the new Hoopers Court entrance by Quarter I 2024/25. This is later than previously forecast due to technical complications related to the re-use of older tunnel sections that required the inclusion of modern station systems. We are actively working to accelerate the remaining delivery sequencing, which includes undertaking critical works that interfaces with the existing station during the upcoming track closures.

Leyton

Following the announcement in January that the GLA was successful in provisionally securing funding from the Government's Levelling Up Fund, we are updating the business case to meet the central government requirements. The project will begin the detailed design stage in Quarter 2 of 2023/24 as planned with construction due to start in 2024/25.

London Bridge

We are still awaiting the outcome of a planning inquiry related to the developer's planning application for a new entrance at Borough High Street, expected in August 2023. In the meantime, negotiations are ongoing with the developer regarding the preparation of a development agreement.

West Ham

We are working with a third-party developer, Berkeley Homes, to deliver a new ticket hall to serve the Twelve Trees Park housing development, comprising 3,847 units delivered in four phases. The main construction works associated with the new entrance are progressing well, with the construction of the bridge deck completed and the erection of the superstructure begun.

Stratford

Mobilisation of the construction contractor has taken place and works are underway on delivering the urban realm and new station entrance. Worksite hoardings have been erected to separate the operational station from the works. We remain in close communication with scheme funders, the London Legacy Development Corporation and the London Borough of Newham as the works proceed.

We continue to coordinate with Network Rail, which will be delivering, owning and maintaining a new customer lift connecting the Jubilee line concourse to the western subway, providing step-free access to other platforms in the station. This will allow the removal of the existing platform lift from the stairs leading to the subway, which will reduce congestion in the station and improve reliability. This work is scheduled for completion in 2023/24.

Acton warehouse

Demolition and site sterilisation works were completed in June 2023 and the contractor has been demobilised. The sterilisation delivered critical enabling works associated with services and utility diversions which support the redevelopment of Acton Works at a future point.



Design of step-free access is in hand for 10 priority stations

JAY
by VISCO

Safe and healthy streets

This programme includes Bus enhancement projects that were previously part of the Public Transport and Healthy Streets programmes. This consolidation will provide a single focus for investment in healthy streets and complementary enhancements for bus users



Safe and healthy streets

Forecast period	Cost to date (£m)	Cost to go (£m)	Forecast cost (£m)	Programme and project authority (£m)	Variance: Forecast cost v. authority (£m)
2022/23 to 2025/26	163	535	698	773	75
Change since last Investment programme report					
No change	36	(36)	No change	No change	

Financial commentary

Our Safe and healthy streets capital programme continues to be in line with the funding settlement conditions agreed with Government over the two-year period for 2022/23 and 2023/24. We will continue to provide funding to London boroughs for investment in their streets, although this is accounted for as operating expenditure. The total investment in active travel, across both operating and capital expenditure, is an average of £150m per year net of income across our Business Plan 2022/23 to 2025/26.

Performance over time commentary

Following the Government funding settlement and TfL board agreement of the 2022/23 to 2025/26 Business Plan, investment in safe and healthy streets has increased over the last three quarters. This includes continued investment in and commitment to deliver the walking and cycling, bus and Vision Zero action plans.

Investment in Quarter I was £36m, which was below budget due to slower- than- expected re-mobilisation of resources and our supply chain following the coronavirus

pandemic. We are closely monitoring our delivery and fully expect to meet our commitments.

Programme update

The Safe and healthy streets programme continues to reduce road danger in line with the Mayor's Vision Zero goal, as well as making it easier to walk, cycle and travel by bus across London. It will also accelerate progress towards mode shift, decarbonisation, economic recovery and tackling health inequalities.

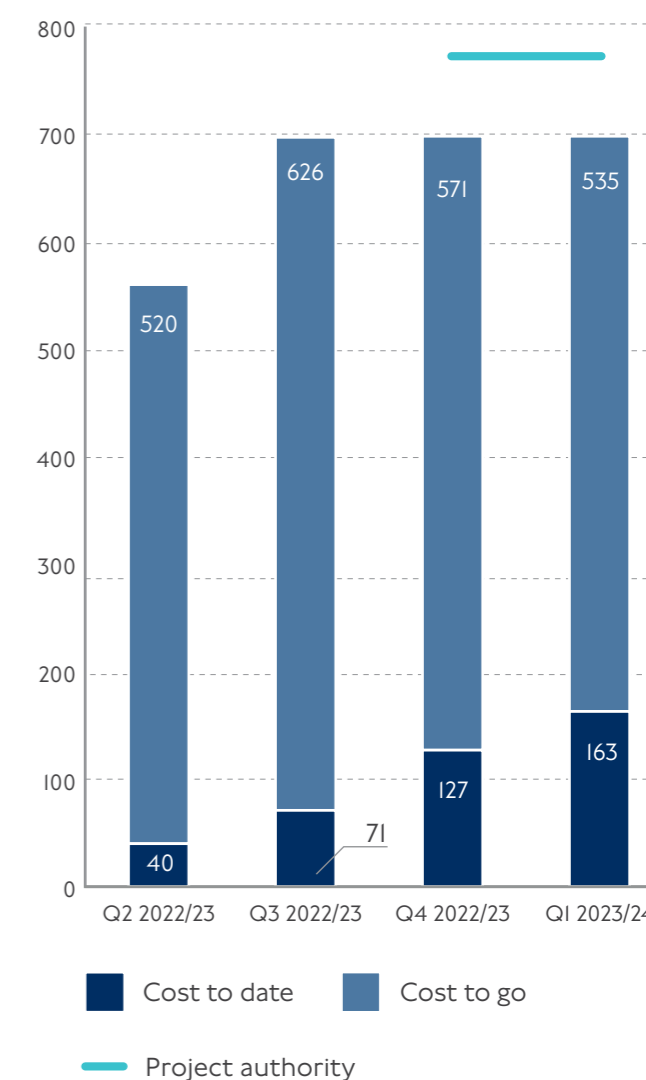
Recent highlights across the programme include completion of works to upgrade the temporary schemes installed as part of London's response to the coronavirus pandemic. These include the replacement of the temporary blue barriers with a trial of semi-permanent materials on Borough High Street and A21, and improvements along the route of Cycleway 9 on King Street and Chiswick High Road. We also decided to retain the trial upgrades to Cycleway 8 permanently.

Work continues on a transformational scheme at Tolworth, where improvements will make better provision for cyclists, pedestrians and bus passengers, while also supporting the growth in travel associated with a new housing development and Lidl's new European headquarters.

Construction carries on with an experimental cycling scheme (Cycleway 50) on the A503 Nags Head gyratory, to connect cyclists to a route in Camden. We also continue to construct cycle lanes around Lea Bridge roundabout as part of Cycleway 23 and the final section of Cycleway 4 in Southwark, with these schemes completing over the winter.

Construction has also started on the next section of C9 linking Kew Bridge to Watermans Park, as well as a project to deliver critical safety improvements on the A4 Bath Road, and along Holloway Road.

Safe and healthy streets performance over time (£m)



Safe and healthy streets

Old Street station and roundabout

A significant milestone has been achieved with the highway works construction now being completed. All the cycle lanes are in operation and being well used, and the wider pedestrian footways around the outer edge of the junction is complete. The new rain garden on the south-west of the junction has been completed, providing much-needed improvements to the environment and public space.

Construction of the superstructure for the new London Underground main station entrance has continued, with the remaining glass panels now installed. Works are now focused on the finished ceiling alongside removal of the temporary scaffolding. Works are also progressing in the surrounding peninsula area with installation of new sustainable drainage systems and hostile vehicle mitigation bollards. Cladding of the existing clerestory building structure and replacement of the roof skylights continues.

Construction of the new passenger and goods lifts have been completed ahead of standalone testing in September.

Refurbishment of the sub-surface concourse area continues, with installation of new mechanical, electrical and communications equipment. Installation of new shop fronts for the retail units and fire doors is planned for October.

As well as the green roof for the main station entrance, the project promotes other environmental initiatives. Sustainable drainage systems are to be installed in the disused subways, for which there is a £155,000 funding contribution from Thames Water. Last year the site became diesel-free, so all plant and machinery is now battery- or mains-electricity-powered.

Construction completion remains on schedule for Christmas 2023.



The superstructure for the new Old Street station is in place



Segregated Cycleways are being constructed in several locations

Safe and healthy streets

Cycling infrastructure

Cycleway 4 London Bridge to Greenwich

The London Borough of Southwark is continuing to construct the temporary scheme for Lower Road between Rotherhithe roundabout and Surrey Quays Road, which will complete the final section of a protected cycling route between London Bridge and New Charlton.

Cycleway 9 East Kensington Olympia to Brentford

The construction works for a new segregated cycleway between Kew Bridge and Waterman's Park are progressing well since they started on 27 March.

Cycleway 23 Lea Bridge to Dalston

Construction of segregated cycleways around Lea Bridge roundabout began on 13 March and works are progressing well with all islands and significant utility diversions completed. Construction of Lea Bridge Road started as planned on 24 July and is being delivered by the London Borough of Hackney.

Cycleway 37 Mile End to Westferry Lane

Work to deliver the permanent scheme at Mile End Road junction was due to begin in February but the London Borough of Tower Hamlets does not agree with elements of the proposals and consequently has not signed a section 8 agreement permitting the works. Until this is resolved, construction is delayed. The deliverability of the remaining sections including the temporary-to-permanent scheme on Burdett Road is being reviewed.

Cycleway 50 Finsbury Park to Tottenham Hale

Construction of the section on our roads from Caledonian Road to Finsbury Park started on 20 February and is progressing well with works on Isledon Road completed and underway on Tollington Road and Seven Sisters Road.

Safe and healthy streets

Vision Zero

Lowering speed limits

Lowering the speed of vehicles in London is key to reducing both the likelihood of a collision occurring and the severity of the outcome. The second phase of the programme is underway. The 2021 Vision Zero progress report aims to provide a 20mph speed limit on 220km of TfL's roads by May 2024. To date we have constructed 150km. The A205 in Greenwich and A20 in Lewisham and Greenwich, as well as roads in the Royal Borough of Kensington and Chelsea, will be completed by October 2023, with the remaining schemes due on site between October and December.

Safer junctions

In April 2017, the Safer Junctions programme highlighted 73 of the most dangerous junctions on our roads, defined as those with some of the highest rates of collisions involving vulnerable road users. We have made improvements at 44 of these junctions.

Construction work continues on the Holloway Road/Drayton Park safer junction scheme – which is part of wider corridor improvements for pedestrians – with the first phase at the junction of Holloway Road/Hornsey Street running to schedule.

On 13 June 2023, we published the Battersea Bridge consultation report for phase 2 safety improvements. We received 983 responses to the consultation, and following consideration of the responses, we have decided to proceed with the scheme subject to final approvals by the Royal Borough of Kensington and Chelsea.

Development work continues on the remaining schemes, with the aim of starting public engagement on potential changes to 10 further junctions by the end of 2024.

Pedestrian safety

The Road safety programme continues with approximately 40 live schemes across London at locations where there is an identified road safety concern. Most of these schemes are at early design stages. We have recently started delivering improvements to a pedestrian crossing on the A4 Bath Road in Hillingdon and on the A10 at Edmonton County School. These are two sites where tragic fatal collisions have occurred.

Construction work is due to start in August on a new pedestrian crossing on Grosvenor Place in Westminster. This will improve accessibility and provide a safe crossing point at a busy pedestrian location which is currently served by an intimidating and convoluted subway. The project will also support TfL's ongoing efforts to improve the personal security of women and girls.



Safety upgrades at Battersea Bridge are awaiting approval

Safe and healthy streets

Bus priority

We continue delivery of new bus lanes, contributing to a target of 10km by March 2024. To date, more than 4km has been delivered on borough and TfL roads, with further schemes moving to construction in autumn 2023. Signal timing reviews have been completed at 712 sites to provide additional priority for buses, against a target of 700 for the year – with the trajectory well ahead of schedule.

More than £10m of funding has been allocated to London boroughs to deliver enhanced bus priority on their local road networks. As well as new bus lanes, this investment will deliver other bus priority features such as new bus gates, the removal of pinch-points and changes to the operating hours of bus lanes. The London Borough of Newham is now on site constructing a scheme that will provide 700m of new bus infrastructure.

We have identified a suite of activities to improve bus priority across the 10 Superloop routes. Improvements include traffic signal upgrades, new and improved bus lanes and pinch-point removal. In some locations a holistic corridor-based investigation is being progressed to focus on end-to-end bus priority. Signal timing reviews have already been reprioritised to capture Superloop sites.

Transformational schemes

We have been working in partnership with Lewisham Council to support their ambition to transform Catford Town Centre and improve transport in the area. We want to help the council create a greener town centre and ensure Catford is a pleasant place for people to live, work and visit.

To achieve this vision, we are proposing changes to the South Circular Road – part of the TfL Road Network – to make it easier and safer to walk, cycle and use the bus. The main change would involve moving Catford Road (part of the South Circular) to a new position on the site of the Canadian Avenue car park. We would also make the road system around Plassy Island two-way. These changes would provide improvements for all road users, including cyclists and pedestrians. To fund this scheme, we are applying for finance through the Department for Transport (DfT) Major Road Network fund. A business case was submitted at the end of last financial year, and we await the outcome of the DfT and HM Treasury's assessment of our proposals and case for change. We undertook public consultation on the proposals between 24 April and 5 June 2023.

Borough funding

TfL supports boroughs to deliver a range of healthy streets improvements on local roads, including bus priority. We have allocated £63m funding for delivery in 2023/24. Recent achievements include:

- Westminster City Council has launched 11 school streets
- Lambeth has completed 30 rain gardens in Low Traffic Neighbourhoods to provide floodwater drainage and support biodiversity
- Three cycleways through low-traffic streets in Ealing, Lambeth and Islington were introduced in April, with 10 being launched as part of the Summer of Cycling marketing campaign
- Cycle parking hubs at Highams Park, Chingford and Blackhorse Road stations have been installed by the London Borough of Waltham Forest
- A suite of bus stop accessibility improvements has been implemented in Brent, Ealing and Richmond
- Over 30km of new bus lanes have been identified for delivery on borough roads in 2023 and beyond

Safe and healthy streets

Bus safety

The Bus safety strategy was published on 7 September and sets out our vision for a safe and attractive bus network.

We have reached the milestone of more than 1,000 buses in London's fleet meeting the Bus safety standard. We are making good progress with retrofitting technology onto the fleet, despite funding constraints due to the pandemic impacting on timescales. The project has now re-mobilised and retrofitted safety initiatives onto vehicles that still have a substantial number of years of London service ahead, allowing them to deliver safety benefits which were not available at the point of manufacture.

Bus customer action plan

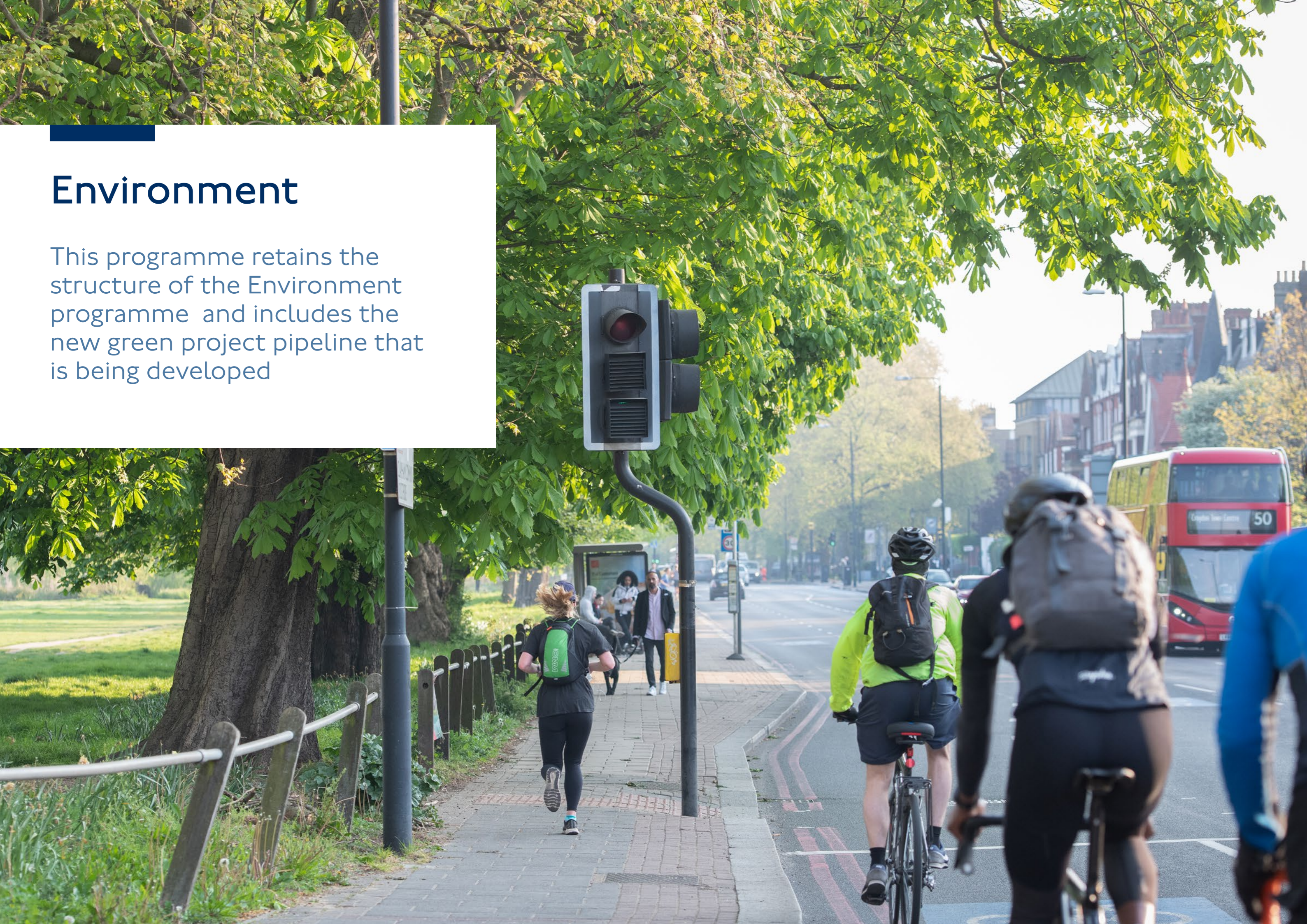
TfL has published the Bus action plan, which aims to build and broaden the appeal of the bus service. Within the plan, there is a supporting Bus customer action plan, which is focused on delivering a step-change in customers' perceptions and experiences of bus travel. This can be achieved through offering better information, and meeting customer expectations of having a modern and comfortable experience at bus stops and on buses.



We aim to deliver a comfortable customer experience on our buses

Environment

This programme retains the structure of the Environment programme and includes the new green project pipeline that is being developed



Environment

Forecast period	Cost to date (£m)	Cost to go (£m)	Forecast cost (£m)	Programme and project authority (£m)	Variance: Forecast cost v. authority (£m)
2022/23 to 2025/26	139	583	722	954	232
Change since last Investment programme report					
No change	50	(50)	No change	No change	

Financial commentary

The forecast cost has reduced by £8m since the last quarter, driven by a reduction in Direct Vision Standard 2 that followed a review to ensure that our scope reflected core requirements only. In conjunction with these changes, cost reductions have been identified within the delivery of the business operations in-house as well as further re-profiling across the portfolio.

The £232m variance to forecast versus authority is due to authority for all existing commitments and future known commitments for road-user charging schemes, whereas the forecast cost is for the period 2022-23 to 2025-26.

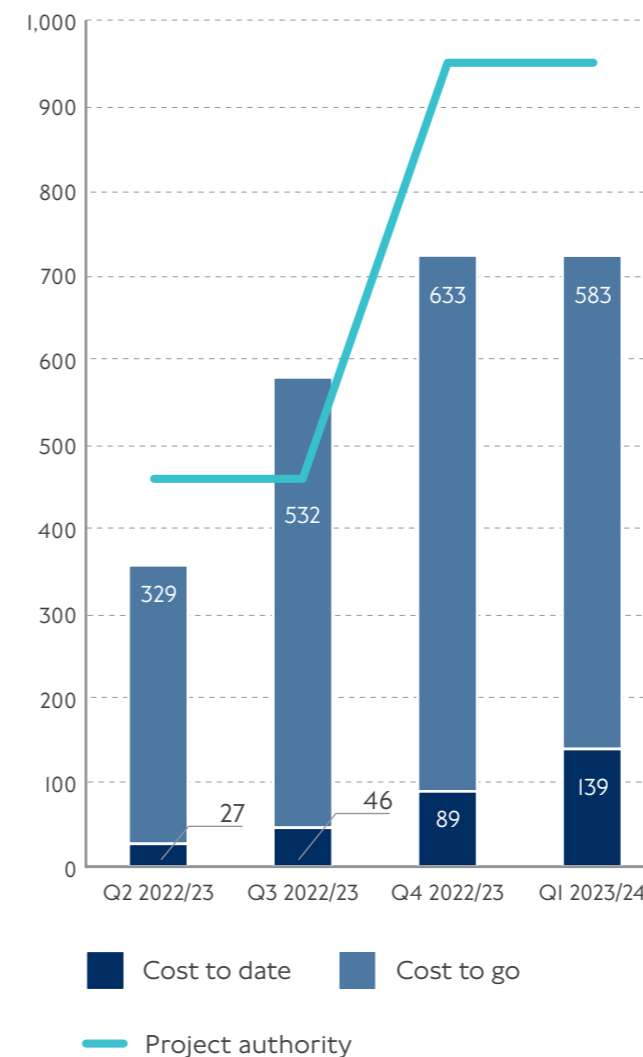
Performance over time commentary

Over the last six financial quarters, our forecast cost has fluctuated, driven by funding challenges brought about by the pandemic, which meant several projects had to be put on hold. However, since Quarter 1 2022/23 and the funding agreement confirmed in August 2022, the position has improved. The costs associated with the London-wide ULEZ expansion in 2023, as well as the costs of the associated scrappage scheme, are now part of the portfolio forecast.

Since mid-August, the full allocation of renewals and road user charging schemes such as re-let of contracts and delivery of business operations systems in-house has been included. A paper was approved by the Programmes and Investment Committee in December 2022 for £170m and March 2023 for £77m to increase the project and programme authority to address the above matters.

Since Quarter 4 the forecast and authority has remained stable. The £954m authority continues to 2026/27 for future known commitments.

Environment performance over time (£m)



Road user charging

To help address London's polluted air and improve the health of people across the capital, the Ultra Low Emission Zone (ULEZ) was expanded London-wide to cover all London boroughs from 29 August 2023. The Mayor's decision to expand ULEZ with an associated scrappage scheme was the subject of a legal challenge by way of judicial review by four London boroughs and one county council. The claim was heard in the High Court on 4 and 5 July 2023. On 28 July, the judgement was handed down, which dismissed all three grounds that formed the basis of the claimants' legal challenge.

Nine out of 10 cars on an average day seen in outer London meet ULEZ emission standards. Modelling suggests the ULEZ expansion will reduce the number of non-compliant cars each day from 160,000 to 46,000, and the number of non-compliant vans from 42,000 to 26,000. Overall, the scheme is forecast to lead to 146,000 fewer car trips (a reduction of nearly two per cent). It should also reduce London-wide road transport emissions of nitric oxide and nitrogen dioxide by an estimated 5.4 per cent. This is equivalent to a 6.9 per cent reduction in outer London.

To assist with ULEZ expansion, on 30 January 2023, a new vehicle scrappage and support scheme was launched, the largest of its kind in the UK. Since then, it has provided support for Londoners on lower incomes, disabled Londoners, charities, sole traders and businesses with 10 or fewer employees to replace or retrofit their old, polluting vehicles and make sustainable travel choices.

Successful scrappage applicants receive a grant to scrap or retrofit their vans and minibuses. Successful car and motorcycle scrappage applicants can opt to receive a smaller grant accompanied by up to two free annual bus and tram passes, which would give them a higher-value package.

At the beginning of June, the Mayor announced the expansion of the scrappage scheme to tens of thousands more Londoners. These people included those receiving child benefit and all small businesses registered in the capital with fewer than 50 employees, which were made eligible for financial support to replace polluting vehicles from the end of July. Previously only businesses with up to 10 staff could apply.

On 4 August, the Mayor announced further changes to the scrappage scheme, which extended support to all Londoners with a non-compliant vehicle, increased grant payments for scrapping a wheelchair accessible vehicle, van or minibus, and allowed businesses to scrap up to three vehicles.

The changes were successfully delivered on 21 August in advance of the launch of London-wide ULEZ on 29 August. As well as these changes, a further £50m provided by the Mayor of London was announced for the scrappage scheme, making the total funds available £160m.

The announcement on 4 August also extended the ULEZ grace periods for sole traders, microbusinesses, small businesses and registered charities with non-compliant vehicles that have ordered new compliant ones which won't arrive in time.

In addition, to further help disabled Londoners, there are two new grace periods under the ULEZ scheme that will allow the use of non-compliant vehicles, which will apply until October 2027. One is for recipients of certain disability benefits (or their nominated driver). The other is for all wheelchair accessible vehicles and some vehicles with other adaptations. People must register for these grace periods, and applications opened on 30 January.

The London-wide information campaign, launched in January to raise awareness of the ULEZ expansion on 29 August, has continued past the launch date into September, encouraging Londoners to check their vehicle and emphasising the health benefits of the scheme.

We are also working with stakeholders including London borough and home counties, MPs and London Assembly members, businesses, community groups and organisations representing disabled people, as well as a wide range of other Londoners, to raise awareness of ULEZ expansion and the scrappage scheme. Letters to non-compliant vehicle drivers and door-drop leafleting started in early May following local elections.

TfL has an extensive camera network which is sufficient to support the effective operation of the scheme. Installation has initially focused on TfL assets such as traffic signals and the TfL Road Network, where we are the highway authority. Up to 4 August, we have installed 1,900 new cameras, with more than 3,500 cameras enforcing road user charging schemes in London.

Unfortunately, there have been incidences of vandalism on some ULEZ cameras. All incidents are reported to the police and some arrests have been made. We are working closely with suppliers and the police to reduce the risk of further incidents. Where necessary, cameras are being repaired by TfL and contractors continually.

The London-wide ULEZ back-office system is now live and performing well. It is successfully processing the anticipated increase in data volumes from the additional vehicles in the expanded zone and the higher volume of associated transactions and enquiries. Training and recruitment of the additional contact centre agents who were needed to manage this was completed on 30 June.

Environment

Direct Vision Standard phase 2

Since March 2021 all heavy goods vehicles (HGVs) over 12 tonnes have been required to obtain a safety permit to operate in London as part of the London HGV safety permit scheme. This scheme is safety-focused and contributes to the Mayor's Vision Zero strategy by improving HGV drivers' visibility, thereby reducing the risks HGVs present to vulnerable road users and is run in partnership with the boroughs through London Councils. Vehicles that do not meet the minimum one-star on the Direct Vision Standard (DVS) rating are required to fit additional 'safe system' safety measures to the vehicle, originally developed in 2017/18. Since March 2021, the scheme has been enforced by a penalty charge notice.

From 29 October 2024, the minimum rating to operate without fitting additional safety measures rises to three stars, marking the beginning of phase two of the scheme. A consultation ran between 14 February and 3 April 2023 seeking views on the proposed progressive safe system (PSS). The PSS enhances the current safe system to reflect technological development since it was originally designed. London Councils approved the PSS and other scheme changes in June 2023.

The PSS and other changes will build on safety improvements from the current scheme, including the following outcomes and benefits published in the One Year On report (June 2022):

- The number of fatal collisions involving an HGV where visibility was cited as a contributory factor has halved (from 12 in 2018, the year before the scheme was introduced to six in 2021)
- The number of serious injuries fell from 48 in 2017 to 17 in 2021
- Average daily compliance rates are very high, with more than 94 per cent of HGVs in London now operating with a safety permit and hauliers reporting that they are building DVS requirements into future purchasing decisions



HGV safety permits help to reduce the risks to other road users

Environment

Electric vehicle infrastructure

It is expected that London will need between 40,000 and 60,000 electric vehicle charging points by 2030, including up to 4,000 rapid chargers. Estimates show a quarter of these could be accommodated on public sector land. This infrastructure could help support a reduction of carbon dioxide emissions of between 1.5 and 2.6 million tonnes per year. The Mayor has committed to supporting the continued roll-out of charging points alongside the private sector, to help meet exponential growth in demand and contribute towards achieving a net zero carbon London by 2030.

The first tranche of our electric vehicle infrastructure delivery (EVID) programme will deliver rapid and ultra-rapid charging points across 100 parking bays on our roads. Following the release of the first batch of sites to the market in November 2022, we have now completed the evaluation of bids from prospective suppliers. We signed our first contract with charge point operator Zest in early May, to deliver an initial batch of 39 charging bays across 24 sites. This infrastructure will be delivered using a full 'turnkey' solution from Zest. Two further batches of 25 sites were released to the market in June. Bids will close at the beginning of August when tenders will be evaluated. It is expected that contracts for these two batches will be awarded in November.

We have completed a preliminary assessment of more than 2,000 sites across the GLA estate which has allowed us to accelerate the release of further batches to the market. In addition, we have reviewed current assessment criteria, to bring forward new sites across TfL and wider GLA land.

In addition to the roll-out of rapid EV charging points through EVID, the Office of Zero Emission Vehicles has recently announced that London will receive £35.7m capital funding through the Department for Transport's local electric vehicle infrastructure (LEVI) fund. This will primarily be used to accelerate the delivery of low-powered charging infrastructure on borough highways, including for residents without access to off-street parking, and builds on the 400 fast-charging points that will be delivered by London boroughs by March 2024 using £9.7m of LEVI pilot funding and additional borough delivery funded by the government's on-street residential charge point scheme.

Zero-emission bus fleet

Our bus fleet now has more than 1,000 zero-emission buses in service. This means that one in nine of our iconic red buses have now gone green, and we continue to add zero-emission buses to the fleet, with around another 700 on order. Our zero-emission buses include battery electric buses, 'opportunity charged' electric buses and hydrogen buses. Such newer and cleaner technology is helping improve air quality across London and reduce carbon emissions, supporting our work to tackle the climate change emergency and further contributing to the Mayor's ambition of London being a net zero carbon city by 2030.

Works are progressing on the route 358 electric opportunity charging trial, where buses are charged multiple times throughout the day for a power boost. This will use overhead pantograph charging infrastructure at either end of route 358 in Bromley for the 20 new single-deck electric buses. These new buses also feature

enhanced customer and safety features. The trial is expected to launch in 2024.

We continue our engagement with bus operators and bus manufacturers to ensure we develop and build a competitive zero-emission market. This will help us build on our current fleet success and achieve our target of a zero-emission bus fleet by no later than 2034. With financial support from Government, we could transition to a fully zero-emission bus fleet by 2030, but the window of opportunity to make this a reality is closing, given our bus contracts generally run for seven years. If we progress on this now, we can demonstrate leadership on tackling the climate and ecological emergency and make a significant difference to those living in, working in and visiting the capital.

Waste heat

Waste heat from London Underground ventilation shafts is a constant and reliable source of energy. Much of it is simply released into London's air. This project will capture thermal energy of the ventilated air to feed to local users, powering heating and hot water in nearby buildings. Feasibility studies have been conducted for six ventilation shafts, to explore the scale of opportunity. This project could contribute to serving thousands of residential premises, plus commercial and public buildings such as schools. The proposed supply of waste heat would reduce a requirement for gas combustion and could therefore be associated with improved air quality through a decrease in carbon emissions.

Current activity is focused on accelerating the delivery of an initial ventilation shaft site, and to identify an appropriate energy supplier. Following their appointment and a need to progress contracts and design work at this first location, work will continue in parallel to identify future waste heat opportunities across the TfL estate. Other sites may not be limited to ventilation shafts, and options for harnessing heat from alternative sources, including pumped water systems, are being explored across the London Underground network. We also continue to receive significant interest from the market at a variety of locations.

The market engagement relating to the initial site is currently being used to finalise the procurement strategy and compile a delivery schedule.

Solar private wire

As London's single largest consumer of electricity, it is TfL's responsibility to identify and utilise renewable energy sources.

The Solar private wire project presents an opportunity to directly receive zero-carbon (solar-generated) electricity from decentralised sources, bypassing the national grid and distribution network operators and associated charges. This has twin benefits of guaranteeing renewable energy, while also offering financial savings.



More than 10 per cent of our bus fleet now has zero emissions

The intention is for a solar collaborator to carry out detailed project identification and development. TfL would ultimately purchase the energy to assist with powering the Underground network. Following an extensive market engagement exercise, a procurement strategy has been developed, to be presented for internal endorsement.

Initial investigations suggest the TfL's power network can accommodate 64 megawatts of renewable energy, equivalent to five per cent of the annual load.

Buildings decarbonisation

TfL is one of London's largest landowners, with roughly 6,000 registered structures of a wide variety of building types in our estate that we own and operate. These include stations, depots, river piers, head offices, approximately 3,000 rental properties and housing developments. TfL is also the single largest energy consumer in London with a total aggregate electricity consumption of 1.6TWh across traction and non-traction power and bus demand per annum (equivalent to roughly 457,000 domestic consumers).

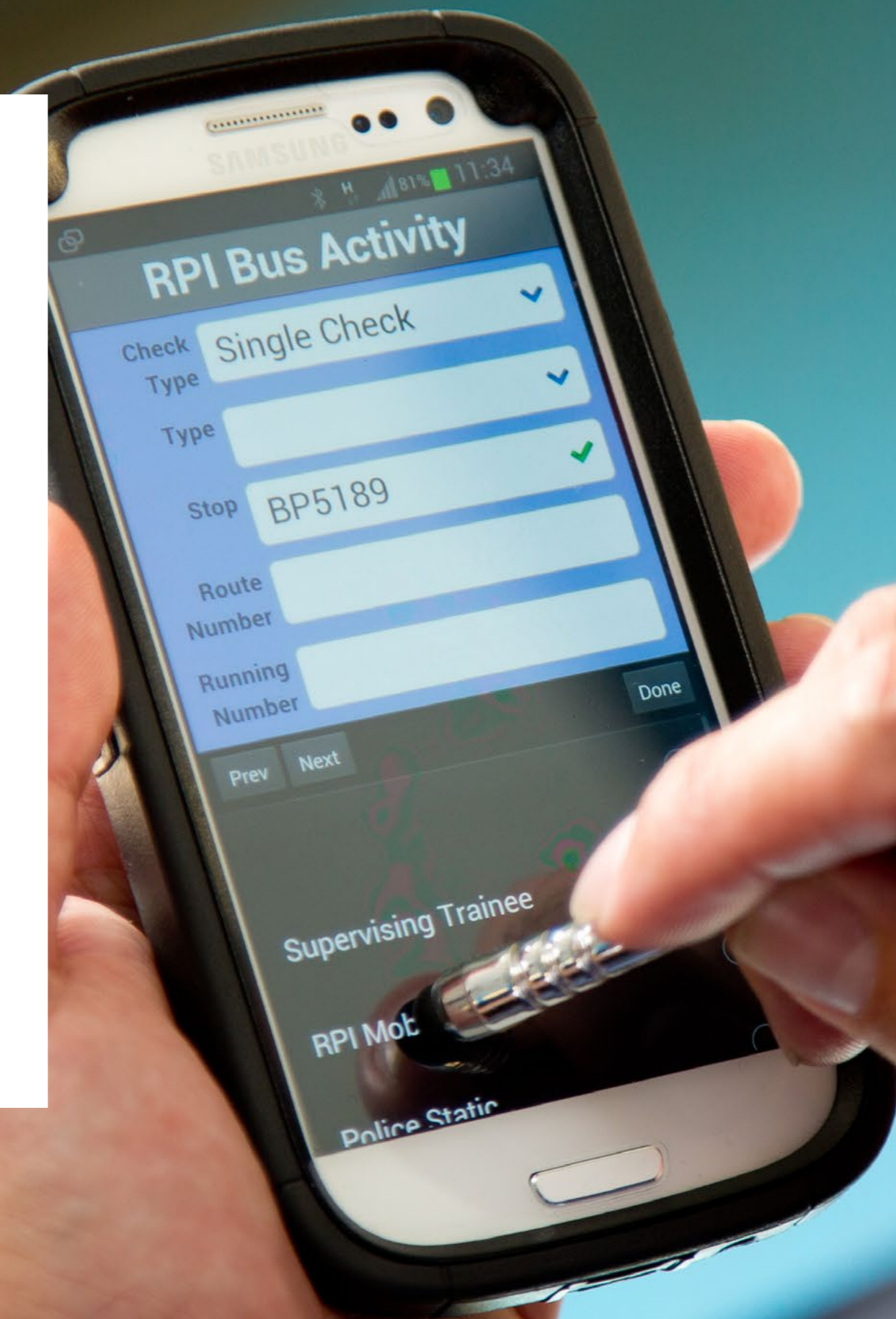
Some of this energy consumption in TfL's buildings comes from burning natural gas, which results in emission of air pollutants such as nitrogen oxide and particulate matter. Considering TfL's contribution to London's emissions, we must take significant steps to address and reduce all sources of our emissions and accelerate a switch to ultra-low and zero-emission technologies.

The strategic objective of the Buildings decarbonisation programme is set out in TfL's Corporate environment plan, published in 2021. This states TfL's ambition to achieve net zero carbon across all operations, including head office buildings, by 2030.

Desktop modelling of decarbonisation initiatives was produced as part of a deep-dive report completed in 2022. This study focused on TfL's buildings estate to create a carbon baseline for our entire property portfolio and assessed the potential costs, benefits and business case for a package of decarbonisation interventions rolled out at a large number of sites across the network. Following the report, further studies were completed at eight priority sites that were considered to have an opportunity to achieve significant savings in carbon emissions. Work is currently underway to develop plans at these eight sites and coordinate a delivery schedule that maximises value for money, while delivering on decarbonisation goals.

Technology

This programme merges the three technology-focused programmes – London Underground technology, Surface technology and Technology and data – with a small number of rail and sponsored services technology projects currently in the Public transport programme. These currently have separate governance despite common resources, stakeholders and delivery of strategic outcomes



Technology

Forecast period	Cost to date (£m)	Cost to go (£m)	Forecast cost (£m)	Programme and project authority (£m)	Variance: Forecast cost v. authority (£m)
2022/23 to 2025/26	221	687	908	915	7
Change since last Investment programme report					
No change	170	(83)	(48)	(52)	

Financial commentary

There has been a £48m reduction in forecast to 2025/26, predominately driven by Project Oval (£38m). Since Quarter 4 this project has received grant funding for part of the scope. Future forecasts will be revised as the Department for Transport makes further funding available.

There has been a further reduction of £6m since Quarter 4 in London Underground technology. The portfolio has delivered to plan with the exception of Connect MTS access issues, cyber-security supplier onboarding delays and resourcing issues in the station security technology improvement programme (SSTIP).

Connect MTS is the Motorola transceiver system which transmits a continuous radio signal to enable the transmission and reception of calls from Connect handsets. Connect MTS and SSTIP will recover the delivery delays before the end of the financial year. Cyber security has reforecast the spend into the next year.

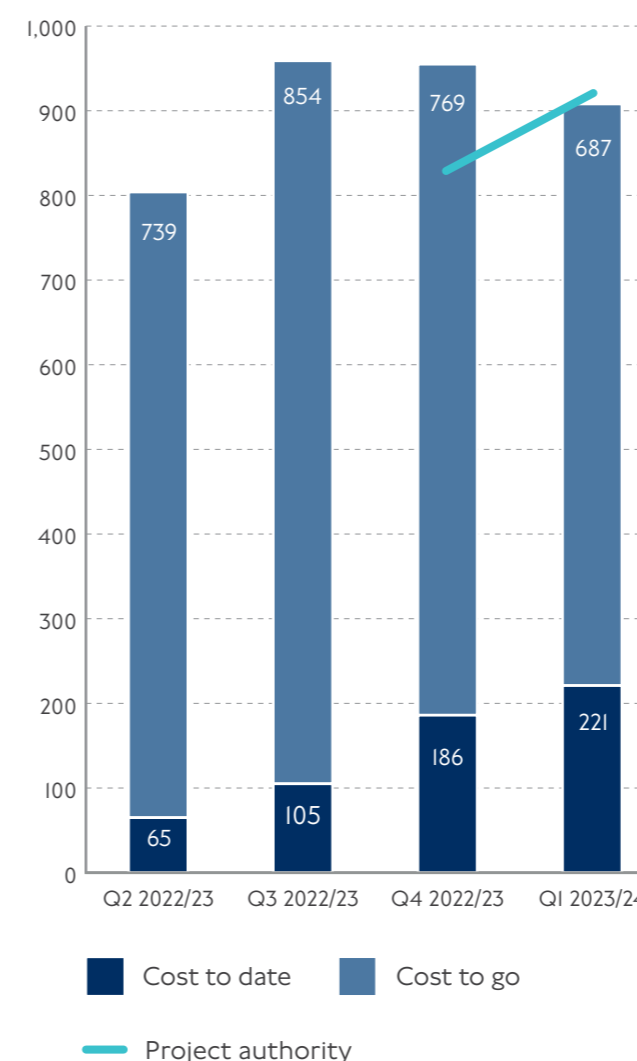
The difference between the programme and project authority and the forecast shown is due to a difference in the period of time covered by each. This will be reconciled and reflected next period as a result of the recent Programmes and Investment Committee paper in July.

Performance over time commentary

The overall reduction in Quarter I from the previous quarter is reflected in the narrative above.

Over the last four quarters, forecast spend for technology was significantly reduced to reflect our ongoing funding constraints. This meant that only projects required to secure legal compliance or future financial sustainability could be progressed. However, since Quarter 2 2022/23 and finalisation of the Business Plan 2022/23 to 2025/26, and the overall renewals funding of £725m approved in January 2023, many projects have re-mobilised allowing the portfolio to be able to continue to meet contractual, safety and legal obligations.

Technology performance over time (£m)



Technology

Surface technology

Programme update

Compliance, enforcement and safety technology

We are continuing to progress the roll-out of deployable enforcement cameras on our road network. These cameras enable us to target specific safety and non-compliance hotspots and are expected to make a significant contribution to helping us meet our Vision Zero goal. They are currently operational at 43 high-priority locations, selected on the basis of their recent safety and compliance records and have already resulted in more than 50,000 penalty charge notices being issued. We are now closely monitoring changes in driver behaviour and road safety, with early indications suggesting that the cameras have already delivered significant benefits, with improved compliance at multiple sites.

To build on this early success we have begun a second phase of camera installations, aiming to further expand their use across London. We have already identified sites for a number of cameras to be installed in 2023/24 and have started site enablement work and installations. We expect this to result in the delivery of at least an additional 265 sites by December 2023, but are working towards more.

Any money recovered from penalty charge notices will be reinvested in maintaining a safe and efficient road network for everyone travelling in the capital. The cameras are used for enforcement of civil traffic rules only and are fully compliant with data protection legislation.

As part of delivering the work-related violence and aggression strategy, the operational staff safety programme has rolled out an additional 200 body-worn video cameras to staff across TfL and significant progress has been made to distribute 300 emergency communication devices by the end of 2023.

Road technology

We are leading the way in delivering innovative new road management systems. These are delivered within the Surface intelligent transport systems programme and will enable a multi-modal approach to managing the road network. The programme continues to deliver the two core replacement systems, including the real-time optimiser to manage traffic lights more effectively, and the common operating view incident management system to enable more effective management of incidents. These systems will reduce delay and improve journey times. Both projects are prioritised as operationally critical renewals.

In February 2023, we completed all the code required for the final release of phase I (R6) of the common operating view incident management system, achieving the tier 2 milestone. We continue to receive positive feedback on the system from users.

We will complete core development of the real-time optimiser system in 2023 and will begin migration to live operation of the system in Quarter 4 2023/24. Further enhancements to the system are planned for 2024.

Significant progress has been made on defining the requirements for video analytics, which will provide improved real-time modal data on road use across London.

Public transport technology

We are maintaining and developing technology to operate our public transport networks and improve the customer experience. This includes upgrading the critical technology systems that underpin the bus network, such as the iBus system, which provides live information on bus locations. The tender process to select suppliers for the iBus2 software replacement project is progressing.

The past few months have concluded the competitive dialogue for iBus2, with the invitation to submit final tenders issued in February. Our focus has been on responding to requests for clarification from bidders following their review of the documentation. The clarification period is now closed, and we have begun evaluation of supplier bids.

Procurement has progressed for the new Countdown 3 system. Recent changes to the strategy have meant that suppliers are able to respond with an option to replace the entire asset if this proves to be better value for money. The selection questionnaire was released to market on 14 April with all responses received by 30 May. The evaluation period has now begun, alongside business case development to appraise the best option ahead of contract award in January 2024.

Feedback on new sign types was sought from the Independent Disability Advisory Group (IDAG) on 20 April. The IDAG feedback was positive as we had engaged ahead of contract award and they provided various considerations to make the displays more accessible. A visually impaired member of IDAG will be assigned to work closely with us on the project, to review the Equality Impact Assessment and the alternative screen types to help inform the contract award recommendation.

The contract was signed with Via in November 2022 to deliver the replacement of the booking and scheduling system for Dial-a-Ride, which will give passengers the option to book online and enable us to deliver more trips with the same number of vehicles. Delivery began in March 2023. Works are progressing well and delivery is anticipated to complete in late 2023.

Micromobility

The London e-scooter rental trial has been operating for more than two years, with 10 participating London boroughs making up a continuous trial area. In the period ending 2 July 2023, 135,000 trips were made with a total fleet size of 5,010 vehicles. This brings the total to 2.7 million trips for the trial to date.

In response to updated Department for Transport guidance that allows e-scooter trials across the UK to run until 31 May 2024, we have awarded contracts to Dott, Lime and Voi to operate the next phase of the London trial, following a competitive procurement process.

The next trial phase will build on learning from the current trial, as well as providing operators with opportunities to test new onboard technologies, including pavement-riding detection, tandem-riding detection and acoustic vehicle alerts. This will ensure that London continues to learn about e-scooters and the role that they can play in London's transport network.

In the 2022 Queen's speech, the Government proposed legislation to legalise e-scooters and grant powers to strategic authorities to manage rental operations for micromobility. Although the timing of this regulation is uncertain, we continue to advocate for this legislation to enable us, working closely with London councils and boroughs, to apply the same approach we have taken with e-scooter rental to all micromobility rental services in London, specifying standards and how operations should work in London, including parking.

Santander Cycles

Preparation is under way to procure a new operating contract for the Santander Cycles scheme, as the existing contracts expire from 2025. A contract notice was issued on 14 July 2023, ahead of schedule.

Santander Cycles e-bikes continue to be popular with our customers, with more than 59,000 hires in July 2023, taking the total number of e-bike hires since the October 2022 launch to more than 456,000.



Santander Cycles e-bikes continue to be popular with customers



We will operate all our assets through a single programme

Technology

London Underground technology

Programme update

Our technology assets include a network-wide radio system and data network, as well as all the software to manage our assets and operate the network. London Underground technology is a rolling, annualised programme consisting predominantly of renewals works, with projects added each year based on prioritisation of business needs.

To improve the planning and delivery of our technology investment, we are combining the London Underground technology programme with other technology-related investment programmes across TfL, meaning we will have a single consolidated programme for all our organisation's investment in this area.

Networks and connectivity

We have now completed works to upgrade key components of our Connect radio system, including the replacement of radio hardware base stations at all 293 locations, enabling the Connect system to continue to function into the 2030s. We are now in the process of closing this project and are focusing efforts on the next stage of works to ensure the long-term future of our operational networks by renewing our core data networks across London Underground.

We have delivered critical incident management (CIM) systems at 101 stations (of a total of 272) and have now commissioned works to undertake the next phase of CIM installations at 40 additional stations, which we expect to be completed by August 2024. This range of improvements enables us to effectively manage these stations during a critical incident and other key events. We are continuing to roll out this important safety functionality alongside other improvements to our CCTV estate and plan to complete the full scope of works by early 2025.

Digital, data and assets

We are continuing works to consolidate our asset management systems onto a single platform. This will enable us to better manage the performance of our key operational assets across London Underground and improve how we plan and deliver critical maintenance works. We are now in the latter stages of delivery and are migrating the final packages of asset information onto the new system. We plan to complete works in February 2024.

At the same time, we are embarking on a programme of works to fully digitise our asset management capabilities across the TfL estate, enabling us to continue to improve how we manage our assets, ensuring our data is fully accurate and up to date and allowing us to introduce next-generation tools to support our investment decision-making.

Technology

Technology and data

Programme update

Payments

On 15 May we introduced multi-factor authentication for our Oyster and contactless customer account websites. This provides additional security, to minimise the risk of customer accounts being hacked, by requiring customers to enter a unique code sent by text message in addition to using their username and password to log into their account. Following this, we were able to restore customers' ability to request a refund through their online accounts on 6 July. This facility was temporarily suspended after the credential-stuffing cyber-attack on Oyster online in 2019 which saw a number of customer accounts compromised.

Digital workplace

After a comprehensive commercial process, we have successfully awarded a contract to Daisy Corporate Trading Services for telephony maintenance and support services. The scope of this contract is all fixed telephony services and components across TfL, including both operational and non-operational locations.

The contract has a start date of 1 May 2024, an initial term of five years, and an optional two-year extension period. This will ensure service stability and continuity for TfL's fixed telephony services, which are critical to the day-to-day operation of the organisation.

The contract also includes an option to undertake modernisation works across the operational telephony estate (used predominantly by London Underground) which will be used to both mitigate against potential obsolescence issues and future-proof the operational telephony service.

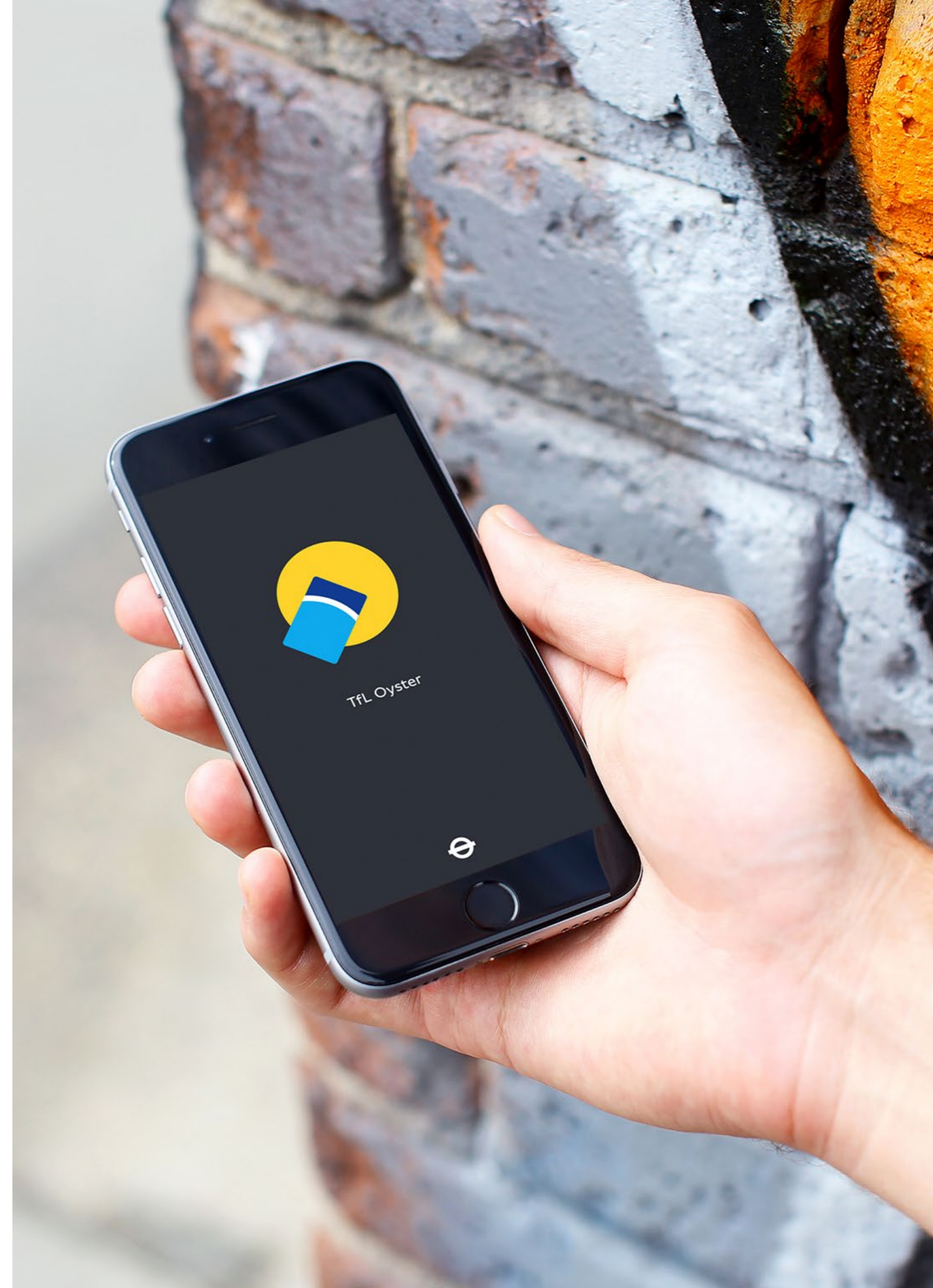
Networks

Work to expand mobile coverage on the London Underground is continuing, with a total of 16 stations (12 per cent) and 12 tunnel sections (24 tunnel roads - 6 per cent) now live at the end of Quarter 1.

BAI Communications have rebranded as Boldyn Networks and continue to invest according to their business plan, deploying 500 engineers six nights a week to build the infrastructure needed to support the network.

We have agreed a new plan that accelerates delivery of the very popular 5G services. It also accelerates Elizabeth line coverage, and adds new coverage for the London Overground and the DLR where these services run below ground. This significant change has resulted in us agreeing a new baseline plan with Boldyn Networks, which has also been agreed with the Home Office.

Elizabeth line coverage will now start to be delivered, with the first stations getting coverage by the end of December 2023 and tunnelled sections aiming to be completed in spring 2024. Exact dates are being finalised based on Elizabeth line closures over Christmas and in early 2024.



Multi-factor authentication offers greater security for customers

Oxford Circus and Tottenham Court Road Underground stations went live on 8 September, with Euston due to go live later in September. These large stations and the connecting tunnels are a major part of the delivery and open up line-testing opportunities on the Victoria and Bakerloo lines.

The Connect programme continues to replace London Underground's operational radio base-stations. This two-year project has now replaced 293 of 295 (99 per cent) of our base-stations, with all surveys and enabling works fully complete. All asset replacements are planned to be completed by the end of July 2023.

Our project to replace the end-of-life data network services that underpin virtually all surface services continues to progress. To date, we have migrated 4,191 of 4,608 (91 per cent) sites to the new network delivered by Capita. Of the 4,191 sites, 140 are currently operating on an interim 4G-based solution.

Technology services operations (TSO)

A key service provided by the TSO team is internal IT service management. Following the decision to stay with the current system in the short term, the project to assess and procure a long-term solution has begun and will continue through this year and next. Other projects to maintain our network and data centres also continue with support from Capita.

The project to agree the IT operating model with TfL's commercial property team, TTLP, is also progressing and scheduled to complete this year.

In our role as a central part of the GLA family, we are also continuing through 2023/24 with the strategic initiative for the GLA IT shared-service programme, which will see us assume responsibility for agreed IT systems and services for the GLA, the Mayor's Office for Policing and Crime, and the Old Oak and Park Royal Development Corporation. The phased roll-out of our IT services to their staff starts this year. We have also been asked to undertake a similar initiative for the London Legacy Development Corporation, for which we have started the feasibility study that is due to complete this year.

Enterprise resource planning

We successfully implemented the new general ledger function to our SAP Finance system on 14 July. This was a big project and delivers improved financial management capabilities including a divisional profit-and-loss and balance sheet to support the Making cash count programme. This is a key element of the ERP programme and supports our finance strategy to grow our income and control our costs.

The replacement of the expiring SAP HR system continues with the implementation of MyJourney, enabled by SAP Success Factors Employee Central. We have had to defer the payroll module due to a dependency with the Operations workforce management project. Before we can replace the legacy SAP payroll module we must first replace the SAP shift planner module which rosters and schedules frontline colleagues and therefore provides accurate payroll data.

Linked to that however, great progress has been made scoping and planning the implementation of the Operations workforce management project. We will contract the software vendor UKG over the summer and launch the project in early September.

Contact centre operations (CCO)

Following the successful introduction of the new CCO outsourcing framework, we have held positive sessions with our new suppliers in the interest of fostering a partnership approach and exploring innovations to drive reductions in our demand and therefore our cost to serve.

We have published the first tender under the new framework, which will re-tender the contact handling for contactless payment cards, including both correspondence and telephony. We are building resilience and responding to historic pain-points by splitting the service across two suppliers while retaining a small portion of the correspondence with an in-house team to improve internal knowledge of the services. The tender is currently with the five suppliers on our contact handling lot and a contract award is expected in September once evaluations and relevant governance processes have concluded.

Additionally, in March we began re-tender processes for both the street faults reporting tool and our interactive voice response services, which expire in September 2023 and June 2024 respectively.

Working closely with colleagues in Payments, we are in the process of defining the scope for the re-tender of our concessions services contract. We will be seeking separate suppliers for the contract handling and technology/fulfilment elements of the service and both contracts will be tendered under the CCO outsourcing framework.

Data analytics

We are mid-way through a series of data maturity assessments across TfL, using the government model as a framework. Some common themes are emerging in terms of areas of strength and areas that we will need to prioritise when developing the data strategy delivery roadmap. We have established two pan-TfL working groups to help set our direction for data, our corresponding capabilities and our ways of working and will be using these groups to test design options and emerging priorities.

We launched our Taps Power BI reporting suite in April 2023 giving organisation-wide access to tap insights across rail, bus, tram, river and cable car travel modes. This replaced the data and analytics Covid 19 reports and emails and provides significant enhancements such as gateline-level data, and easy filtering by rail line or line section, including paper tickets, Oyster customer-type breakdowns, bus route-type filtering and use of inferred entries and exits will help to provide a more accurate picture of network demand.



**Teddington
Broad Street**

Development work has been completed for the delivery of a new train operating companies management information file. This will give the train operating companies a richer view of passenger movements across the integrated transport network, ultimately improving customer experience through greater awareness of how passengers are using the network.

The re-platforming of the data and analytics (D&A) data warehouse is underway, with the successful delivery of the new strategic cloud environment which went live in May 2023. The second part of the project has also begun, in the preparation and migration of historic data. This is in readiness for the full migration of D&A products and existing reports to the new platform by the end of the year. This will result in a strategic and performant D&A data warehouse, which can be built upon for future projects.

Digital

The TfL Go app has now been downloaded more than 4.2 million times and was used by just over 719,000 customers in June 2023. Given the app's success, the business is seeking to accelerate the delivery of new features. To achieve this we are planning to augment our backend delivery capability via the Crown Commercial Services framework.

We have continued to release regular app updates over the quarter, including fares information in Journey Planner, support for Superloop and enhancements to the live Tube map (helping customers visualise closed and disrupted lines). We have also upgraded the Journey Planner engine so that it factors in live Tracknet data rather than relying on static Tube timetable information. This follows work to integrate live bus data earlier in the year. We continue to prepare for the launch of integrated payments functionality, although launch is dependent on resolving testing environments and subsequent end-to-end testing.

Outside the app we launched step-free access information on the ESUB screens in stations. This now uses the same data as TfL Go from our TfL Pathfinder graph database.

Global semi-conductor supply issues have distorted our delivery, due to long lead times and pricing that increases at short notice. This has impacted our ability to procure and implement new IT infrastructure and resulted in increased project costs. We have put mitigations in place for our known pipeline and live projects in the network's transformation programme. However, we are still exposed to risk on ad hoc small or emergency works.

Street, Bus and rail-sponsored services renewals

This programme groups together renewals from the Surface assets and Public Transport programmes. These programmes share a common approach to work-bank management and through joining together associated activities such as bus-focused renewals, improved investment prioritisation and efficiencies can be applied



Street, Bus and rail-sponsored services renewals

Forecast period	Cost to date (£m)	Cost to go (£m)	Forecast cost (£m)	Programme and project authority (£m)	Variance: Forecast cost v. authority (£m)
2022/23 to 2025/26	210	538	748	936	188
Change since last Investment programme report					
No change	34	(33)	1	No change	

Financial commentary

In May 2023 the Programmes and Investment Committee endorsed the creation of the Streets, Bus, and rail-sponsored services (RSS) programme. This new portfolio includes renewal projects previously reported in the legacy Assets and public transport portfolio. This consolidation of projects will provide a single focus to maintain a good state of repair on the surface transport network.

The forecast does not reflect any material change since last quarter.

Performance over time commentary

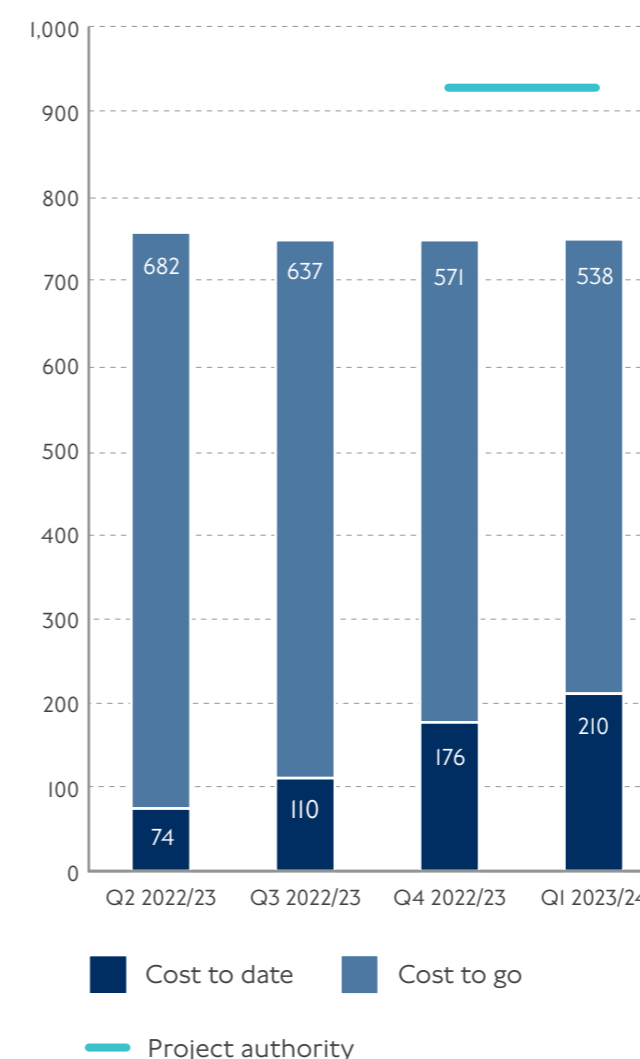
Over the last six financial quarters, our forecast cost has seen a generally decreasing trend, driven by funding challenges following the coronavirus pandemic. This has resulted in several projects being deferred. An increase in programme and project authority to cover spend up to the end of 2025/26 was approved at the Programmes and Investment Committee meetings on 17 May 2023 and 19 July 2023.

Programme update

The programme groups together renewals that were split across our Surface assets and Public Transport programmes. These programmes share a common approach to work-bank management and through joining together associated activities such as bus-focused renewals, improved investment prioritisation and efficiencies can be applied.

The Surface assets programme consists of a capital programme, surface operations assets, surface major assets and local implementation plans for bridges and roads. The remainder of the portfolio consists of renewals such as Bus and RSS renewals, and supports investment needed to maintain the safety, performance and reliability of the DLR, London Trams, London Overground, cable car, cycle hire, New Routemaster buses and Woolwich Ferry.

Street, Bus and rail-sponsored services performance over time (£m)



EFC reflects forecast starting 2022/23 vs authority which includes legacy Public Transport portfolio starting 2017/18

Renewals

Streets

Blackwall Tunnel southbound

This project aims to renew critical systems that support tunnel operation, including lighting, concrete repairs and CCTV. Following detailed modelling assessments, we have selected a preferred construction option: a series of weekend and night closures to minimise impacts on people and goods needing to cross the river. We appointed Tarmac Kier JV as design and build contractor in April and have now begun the design and build stage of the project. Subject to budgets and value for money, we plan to start the works from May 2024.

Gallows Corner

The Gallows Corner flyover in Romford is one of our highest-priority assets for renewal due to its age, condition and the current restrictions in place. Following the completion of feasibility work, we have selected a preferred option to fully refurbish and strengthen the flyover. We have briefed external stakeholders who are supportive of the selected option. The option selected has 30 per cent of the scheme carbon compared to the alternative of a full replacement.

The concept design using the existing foundations to support the new deck structure is complete. A draft concept design report was submitted by our contractor in late July and a signed final version is expected in early October. A final version of the outline business case was submitted to the Department for Transport (DfT) in May for approval. We have begun a tender for the design and build of the structure and aim to award the contract in late December or early January 2024, subject to DfT approval of the funding.

A40 Westway

Following successful completion of work package I (WPI), which consisted of the major joint replacement, the project is now focused on delivering the remaining scope and work packages. This includes further joint replacements, parapet renewals and repairs to concrete deterioration. The remaining scope has been prioritised and divided into further sub-packages based on asset risk to ensure it is affordable within current budget constraints.

Concept design work for the remaining elements has been completed and accepted by TfL. We are now in the process of awarding the first tranche of WP2 (seven expansion joints) to the same contractors as WPI. We have accepted the price and programme, and notice to proceed has now been issued. We will also be progressing with the design of WP2B (three expansion joints) to establish the earliest opportunity to replace these remaining vital components. We will continue to progress WP2C (concrete repairs and other works) and plan delivery, subject to budget availability.

Rotherhithe Tunnel

We have completed the design work and preparation of tender documents for the detailed design and build procurement stages of the refurbishment project. However, due to the need to retain sufficient cross-river travel opportunities while the works take place at the Blackwall Tunnel, the next-nearest road crossing in the east, we now expect that the full refurbishment of the Rotherhithe Tunnel will not take place until after the Silvertown Tunnel opens in 2025.

We are putting in place a series of short-term capital interventions to ensure the tunnel remains safe and operable until the main refurbishment project is progressed. We have completed procurement activity for some of the short-term capital interventions, including the fire main and tunnel lighting, and have awarded a contract to progress feasibility work. Investigation works are progressing. Options for delivery will be developed by September 2023 to inform decisions on the best value for money. Work on the main refurbishment is still on hold until the works at Silvertown Tunnel are completed. Feasibility and options reports on short-term capital interventions are still on target to be delivered in September 2023.

Hammersmith Bridge

We released our third of the share of the costs for the stabilisation works, which meant the London Borough of Hammersmith & Fulham started works earlier in 2022. The majority of stabilisation works are now complete and we expect to complete remaining works by the end of 2023. Alongside the Department for Transport, we continue to support the borough in developing a business case for the longer-term strengthening works.

Carriageway renewal

Plans are currently in place to deliver 208,000sqm of resurfacing against a target of 127,900sqm. The overprogramming allows for any slippage on the programme but will also enable acceleration if required. So far this year we have delivered significant schemes at York Road, A232 Fairfield Road and A21 Sevenoaks Road with an overall output of 61,906sqm. In the next quarter we plan to deliver 25,300sqm with significant schemes on A312 Parkway and A24 London Road.

Renewals

Bus

Kingston Cromwell Road bus station

The major redevelopment of Kingston Cromwell Road bus station will significantly improve the bus experience for our customers. The works will deliver a bus station that is in good condition, is safe to use, offers a better customer experience, is easier to navigate for all customers and is greener and more energy efficient.

The new bus station includes the introduction of energy-efficient lighting, energy-efficient buildings with a low environmental impact, a new sustainable urban drainage system, new vegetation including a green bus station canopy edge, and the introduction of solar panels.

We have completed detailed design for the project and instructed the build, which began in August 2023 with completion planned by summer 2024. The bus station closed on 28 August, with temporary stops and a full communication plan implemented.

New Routemaster refurbishment

This programme is the mid-life refurbishment of 998 TfL-owned New Routemaster bus fleet. During Quarter I 2023/24, 51 New Routemaster buses were refurbished across four operators. This takes the total of completed refurbishments to 329 at the end of this quarter. The target for this financial year is to complete 616 refurbishments.



Our refurbishment of New Routemaster buses is on track



Ferry maintenance work was completed in August

Renewals

River services

The Woolwich Ferry resilience and renewals programme is made up of schemes spread across several disciplines, which are all currently at various stages of the project delivery lifecycle.

We have appointed UK Docks to undertake our five-year maintenance cycle on both vessels. In line with our regulatory obligation, we need to carry out critical infrastructure works and perform a statutory overhaul of the vessels before October 2023, when the licence for both vessels is due to end. Not completing this necessary maintenance would make both vessels non-compliant.

Dry-docking works were completed on 25 August. Both vessels have now returned from the dry-docking facility to Woolwich Ferry. They are undergoing testing in preparation for return to service in September as planned.

South layby berth options continue to be reviewed with the opportunity to utilise existing assets instead of building new. Auto-mooring option studies have also begun, with the review started on project requirements.

Technical scopes are being compiled for Help Points and live information schemes, allowing us to go to market soon.

Works have also started on the linkspan. Our contractor has undertaken surveys and is producing designs.

Renewals

London Overground

Renewals delivery accelerated during the last quarter, with contractual commitments of around £800,000 agreed. Works delivery has included successful implementation of the telephone switching upgrade and the lineside and station supervisory control and data acquisitions renewals, both of which were carried out during an extended closure of the East London line during the weekend of 18 to 19 March. Lift renewals have also been completed, with the final one finished on 6 April. Stabilisation works and new mess room facilities at Stamford Hill station have been completed, enabling the station to return to full operational use.

Notable updates on the complex renewal schemes include:

- Reconfiguration of operational building complex accommodation was completed on site as planned in March
- Renewal of the East London line signalling control system received authority to award the contract for its design and build
- Authority was granted to award the supply of materials to replace 3,000 insulated track baseplates in the Thames Tunnel. Possessions over the 2023 Christmas period have been confirmed and secured to undertake this vital renewal work
- Software build for the class 378 train cab simulator renewal continues to progress to plan, with implementation forecast for November 2023



Work to renew London Overground facilities has increased



Track fixing included replacing more than 1,000 track base plates

Renewals

DLR

Procurement activities for the renewal programme continue, with priority given to critical and safety-related projects. The team are looking into combining workstreams to achieve efficiency where possible. This has meant early engagement with our contractors to understand where value can be achieved. Retaining key staff is a concern, with several engineers having left the business this quarter.

The replacement bogie frame project for the B92 train type is progressing well. Wheel slip protection trials have been completed. Software installation has begun for the plan to upgrade all I10 train units.

Long-line public address system installation is continuing at five stations. This system is used for station announcements, which are essential for evacuations as the majority of DLR stations are unstaffed.

Automatic people counters have been commissioned into service across the network.

High-voltage projects

High-voltage projects were impacted by the UK Power Networks (UKPN) sub-station fire at Poplar in March 2022. As a result, UKPN completion of power supply has been delayed until December 2023, requiring some key projects to be re-programmed so as not to impact services. The Poplar DC switchgear has been commissioned into service. Works have begun on shore supply at Beckton and Poplar depots. Six of eight sub-station battery chargers have been replaced.

Low-voltage renewals

Canary Wharf and Heron Quays low-voltage renewals works are going well with all the

distribution boards changed at Herons Quay and new LED lights installed. Building of the new station equipment room at Canary Wharf has started. An opportunity has arisen to change the ceiling tiles at Canary Wharf which the contractor has started to scope and price. We have fully installed new high-mast lighting at Poplar depot with new LED lighting, refabricated steel work and the introduction of dimming controls. Surveys and designs have also started on the LV distribution upgrade which will see 50 boards upgraded in and around the Poplar depot.

Platform resurfacing

The second phase of platform resurfacing has started to make sure the following stations are compliant with slip-resistance standards: All Saints, Royal Albert and Prince Regent.

Track fixing

Track-fixing works continue, and we completed more than 1,000 baseplates in Quarter 1. Switch and crossings renewal of three-point ends outside Beckton depot on the mainline, and two-point ends at Canary Wharf, have been fully renewed during two weekend possession. New methods of delivery have been developed with our contractor, which has meant the usual three-day closures have been reduced to two days. We also installed eight structural expansion joints at various locations around the network.

Lift upgrades

The lift system upgrade project has completed on all three lifts. Works have started on the next phase of 46 lifts. Escalators at Cutty Sark and South Quays stations return to service following refurbishment this period.

Renewals

London Trams

Installation work for both the wayside and on-tram upgrades to communications equipment are now complete, and we have begun deployment of a correct-side door-enabling system on the Bombardier CR4000 trams, with completion currently forecast for January 2024.

Our renewals programme continues across five asset groups: rolling stock, power, civils, systems and permanent way infrastructure.

Track renewals

The first phase of the Mitcham to Mitcham Junction ballasted track renewal was completed as planned during a 10-day part closure of the tramway from 4 to 12 April 2022. The second phase was delivered during another 10-day part-closure of the tramway from 22 August to 1 September 2022. The final phase was delivered during a planned 12-day closure from 8 to 20 February 2023. We are currently planning to complete Mitcham to Mitcham Junction follow-up tamping and drainage works and Wimbledon re-railing during a 10-day closure from 4 August 2023.

The tender process for a new framework contract for embedded track renewals was concluded in June 2022, and the contract awarded in August 2022. The original plan was to deliver Church Street track renewal as the first package under this contract in October 2022. However, this was completed in April 2023 owing to delays for materials, with a longer procurement lead time to delivery. The next package under this contract is the renewal of Shirley Hill road crossing which is currently planned for October 2023.

Detailed surveys and design have also begun for replacement of life-expired track and points at East Croydon and George Street, with works currently planned to be completed in spring 2024.

Birkbeck tram stop

We completed site investigations to replace the retaining wall and step-free access ramp at Birkbeck tram stop, as a result of which an updated design is required. The delivery contract is in place but on hold until design is complete. Works are due to start on site in Quarter 2 2023/24. This is to allow for an additional utilities survey to take place to facilitate lowering of shallow services by the utility companies, and for the contractor to adequately protect mature trees within the worksite.

Tram renewals

Following detailed investigations and assessment of asset condition, we accepted the recommendation to proceed with replacing the underframe of Tram 2547 (Bombardier type tram) and instructed Alstom to proceed with the works to return the tram to service in August 2023. Factory inspection of the centre casting at prototype stage was approved on 22 February, which will enable Alstom to progress the manufacture process.

In June 2022, we concluded the tender process to refurbish key components of the CR4000 Bombardier tram fleet (flooring, doors and rooftop), and awarded the contract in August 2022.

The passenger information display units on the Stadler Variobahn Trams fleet were replaced in December 2022 and are now in use.

London Trams depot

In May 2022, we awarded a contract to start planned works to replace fire doors at the London Trams depot and ensure compliance with current fire safety standards. However, due to supplier delays, works only started in February 2023.

London Underground renewals

This programme delivers critical renewals across multiple asset groups that form an integrated transport system, including whole-life asset interventions on our train systems (track, passenger fleet, engineering fleet and signalling assets) and our wider infrastructure (built environment, civils and structures, and station/depot systems assets). It also encompasses renewals for the Elizabeth line and our colleague welfare projects



London Underground renewals

Forecast period	Cost to date (£m)	Cost to go (£m)	Forecast cost (£m)	Programme and project authority (£m)	Variance: Forecast cost v. authority (£m)
2022/23 to 2027/28	410	2,744	3,154	3,158	4
Change since last Investment programme report					
No change	89	(61)	28	No change	

Financial commentary

Quarter I delivered a strong start to the financial year including establishing and delivering the Elizabeth line renewals programme, expansion of the colleague welfare programme, identification and embedding of 30 per cent of our annual efficiency target and development of metrics to further improve forecasting accuracy across the capital spend programme.

Key movements since the last report include a cost-to-date increase of £90m, reflecting strong performance in the quarter by fleet overhauls accounting for £26m and track accounting for £24m, with the balance delivered by power and electrical and signalling upgrades. Reduction of £66m in cost to go and a £24m increase in forecast are predominantly due to rephasing within the Central London improvement programme and adoption of a new procurement strategy in Siemens' signalling contract.

Looking ahead we are preparing for business planning and the prioritisation of renewals funding across our programme. This will enable us to provide an updated forecast for the programme across a new control period.

Performance over time commentary

In Quarter I London Underground renewals are delivering ahead of budgeted expectations, with cost-to-date spend of £417m and £6m of cost savings and efficiencies.

The accelerated performance in the quarter was assisted by a strong start and delivery confidence in the current year budget remains high. There are planned increases in volumes of fleet overhauls and track. Furthermore, we are moving to the main delivery phases on projects such as the Central line improvement programme and incremental signalling renewal projects.

Programme update

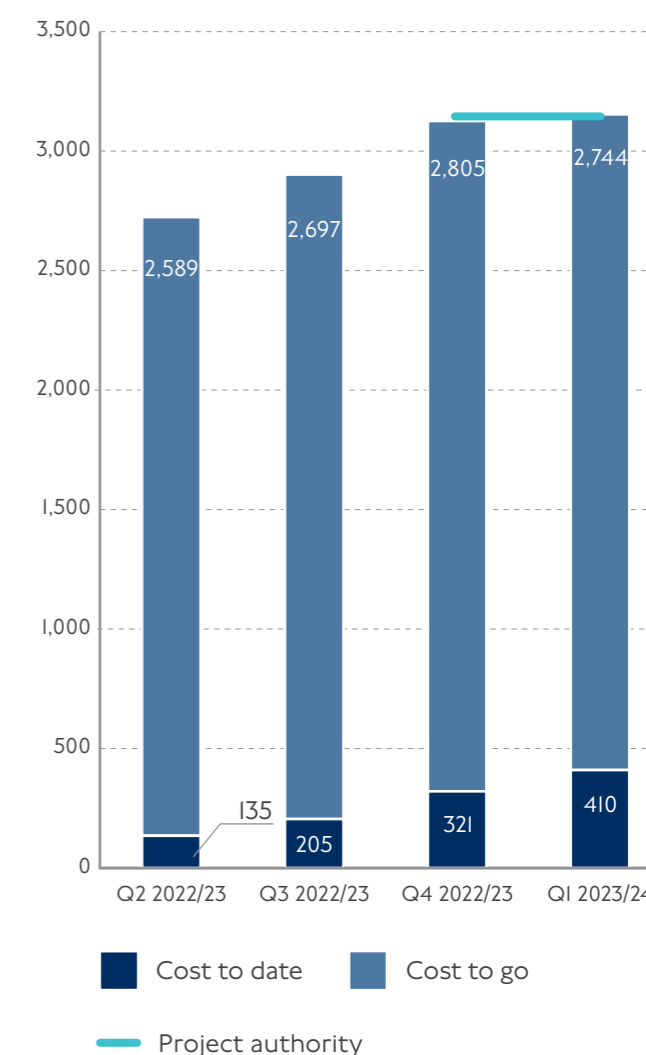
On London Underground we have more than 600 Tube trains operating across 11 lines, with the oldest trains having entered service in the 1970s. These trains run over 2,000km of track which requires continual rolling renewals to remain in operation and is controlled by five different signalling systems.

We have 30,000 building and civil assets across the network, providing railway access, structural support, stability and protection. The asset base includes more than 16,000 bridges and structures and 235km of embankments and cuttings, as well as tunnels, lighting masts and flood-protection assets.

The Elizabeth line operates a similar integrated rail system, where our responsibilities include infrastructure management for the central operating section and designated sections of the national rail network.

To ensure train fleets remain safe and reliable for an increasing in-service life, we conduct a range of planned interventions consisting of heavy overhauls and renewals (mid-life refurbishments and life-extension projects). In addition, we deliver specific work to improve accessibility and customer satisfaction, such as better lighting and CCTV. These works address changes in regulations arising from safety issues, poor reliability and performance, unacceptable costs or system obsolescence.

London Underground performance over time (£m)



Our heavy overhauls work delivers large-scale activities on our existing fleet of passenger rolling stock and engineering trains to ensure all core systems meet the required standards. The work requires each train to be removed from service for several days or weeks, and includes overhauling suspension, wheelsets, motors, brake systems and auxiliary equipment.

Signalling and control upgrades continue to keep our systems up to date and in serviceable condition. This avoids higher costs at a later stage, while also ensuring safety, continued reliability and that the overall cost is spread across a closely monitored timeline.

The engineering vehicle fleet supports the track renewals programme and comprises battery locomotives, wagons for different activities and plant equipment such as cranes and tampers. We aim to improve the reliability of this non-passenger fleet, responding to component obsolescence problems and supporting our overarching aim of mechanising track-based activities where possible. Our intention is to facilitate enhanced productivity and an improved safety culture.

Our complex building systems assets (mechanical, fire, communications, power and electrical) ensure that stations, depots and other sites operate safely and effectively. Work is prioritised according to the state of good repair of the assets and to address specific asset-condition concerns.

London Underground is the largest consumer of power in London. We operate our own high-voltage distribution network and back-up power generation. Based on

the state of assets and their expected lifespan, we deliver a rolling programme of renewals to maintain the integrity of power delivery to the railway.

We have 526 escalators, 327 lifts and six passenger conveyors on the London Underground network. These are essential to ensuring customers have safe, reliable and quick access to our services. We deliver a rolling asset renewal programme aiming to deliver renewals and replacement to escalators every 40 years and lifts every 20 to 40 years, depending on the type. This means replacing around 2.5 per cent of escalators and four per cent of our lift assets each year to maintain the current level of good repair.

Key successes this quarter

Quarter I delivered a strong start to the financial year including:

- Delivery of 40 per cent of our planned annual ballasted track renewal in key possession windows
- The establishment of the Elizabeth line renewals programme
- Start on site for Kentish Town escalators under a planned closure
- Completion of overhaul for a rail adhesion train and the key milestone for Central line improvement programme of the first train movement from Acton to Ruislip depot

Our rolling programme of fleet overhauls continues to deliver strongly to plan with further information on progress shown on the following page.



Our rolling renewals programme keeps services running safely

Network wide track renewals

Our track assets are an essential component of a safe and reliable railway. Track is continually degrading and needs rolling maintenance and renewals to maintain performance. Each section of track may have a residual life of 40 to 60 years, meaning we must renew two to three per cent of our track every year, as well as targeted component replacements. Where possible, we also aim to progressively install high-integrity, low-maintenance, flat-bottomed rail on concrete sleepers, replacing bullhead rail on timber sleepers, some of which has been in service since the early 1900s.

This modern track is more stable and reliable. Between April and June 2023, we converted 1,700 metres of bullhead rail with the more modern flat-bottom form. In addition, we completed 375 metres of deep tube reconditioning works, improving reliability and reducing noise.

Three weekend possessions, on the Central line (weeks 5 and 7) and the Hammersmith & City line (week 11) delivered 693 metres of ballasted track renewal, on target within the scorecard total year milestone of 1,750 metres.

Victoria line (fleet overhaul and depot control system renewals)

Door overhauls continued to plan, with 44 of 47 trains with phase I works complete. Work on upgrading the pressurised ventilation fan system and coupler overhauls is nearly complete, with the final train being worked on. Planned overhaul works have begun and are progressing to plan with trailer wheel replacement

complete on 18 trains, cab door overhaul on 15 trains, carriage end door overhauls on 14 trains, battery cell replacement on 10 trains and air filter overhaul on five trains.

The depot control system project has been paused to allow a strategic depot control strategy to be implemented. This will be based on the solution which is being developed for the Piccadilly line upgrade. Documentation is being finalised to progress opportunity works within the depot and complete the point lock and detection equipment replacement.

Metropolitan line (fleet overhaul)

Our programme of bogie overhauls continues to plan with train 40 of 60 now complete. We are on-track to complete all the bogie overhauls of the Metropolitan line fleet in Quarter 2 2024/25. Catch-back works are continuing in parallel. A number of technical issues identified have been resolved through our engineers working collaboratively with suppliers.

Metropolitan line (Liverpool Street escalators)

Twelve sets of fire doors have been commissioned. Two operational trials have been completed to enable passenger planning, with the new Elizabeth line entrance live. Planned replacement works to escalators seven through to nine are forecast to begin in September 2023.

District line (fleet overhaul)

Work has continued to prepare for the overhaul of the S7 fleet (District, Circle and Hammersmith & City lines) which is planned to follow on directly after the completion of the S8 programme lift (Metropolitan line) project in Quarter 2 2024/25.

Jubilee line (fleet overhaul and component renewal)

Bogie overhauls are continuing at the rate of two trains per period, with the tenth train now complete. Actions are in hand to increase to four trains per period by the end of August 2023, as are preparations to begin further overhaul scope.

Commercial tenders for the underframe modification project to address the cracking issue have been returned by potential suppliers and reviews are expected to complete by Quarter 2 2023/24.

Jubilee line (station communication and ventilation systems)

Station communication systems renewals are progressing to plan with works on site at London Bridge and North Greenwich completed. We are now progressing with the handover into maintenance. Installation works continue to plan at the remaining six sites on the Jubilee line extension. Communications installation work at all sites is scheduled for completion in Quarter 4 2023/24.

We are progressing with works to upgrade the obsolete tunnel ventilation control panels and refurbish the fans of the staircase pressurisation system at Jubilee line extension stations (Southwark to Canning Town) and intermediate shafts. Replacement of the ventilation management system is progressing to programme and approaching completion. The replacement of the local control panel is scheduled to begin in Quarter 2 this financial year. The replacement of the pressurisation systems is also progressing to programme.

The overall ventilation programme is scheduled for completion in Quarter 2 2026/27.

Jubilee line (escalators)

This rolling programme of escalator refurbishments has delivered three further refurbishments in this quarter at Waterloo, Bank and Stratford stations. Works are continuing on the next three refurbishments at the same stations to complete in Quarters 2 and 3 2023/24. We have re-prioritised the programme for the remainder of 2023/24 based on the latest asset performance data and have taken the opportunity to replace obsolete fire detection systems on future escalator refurbishments.

Jubilee and Northern lines (incremental signalling upgrade)

The design stage of replacement of central computers for the Northern line is progressing well, with key enabling works and the concept design now completed. The contract to replace the train operator displays on both lines was awarded in July 2023 and mobilisation for the design stage is underway, with an estimated completion date of July 2024.

Northern line (Kentish Town escalators)

Works have started on schedule for the replacement of both escalators, as well as station improvement works, under a station closure. This closure will run for 12 months from June 2023. Initial works included stripping out the redundant ticket office, ticket hall tile removal and removing escalator 1 cladding, steps and chain.



Renewals to lifts and lighting keep stations running smoothly

Piccadilly line (fleet overhaul and signalling renewals)

Work continues on the second fleet lift cycle to overhaul 59 units' bogies with 71 per cent now completed as planned. Overhaul of wheels and motors continue in line with maintenance requirements.

Progress on the interlocking machine room rewiring is progressing, however we are experiencing delays due to restricted hours. This has been caused by additional engineering hours/late train movements in the Acton area. Work is still forecast to be complete by the original date of November 2024.

Piccadilly line (Holloway Road lifts)

The removal of the old lift and installation of the new lift shaft lighting have been completed. Installation of the new lift has begun. Due to the late submission of the detailed design documents, the date for bringing into use has now moved to December 2023 from the original date of November 2023.

Central line (fleet and signalling renewals and incremental signalling)

This quarter saw the first Central line improvement plan train successfully run under its own power from Acton works to Ruislip depot. This represents the achievement of a key programme milestone and a significant step towards preparing the train for a return to operational service. While in Ruislip depot, further maintenance works will be undertaken to enable the final phase of dynamic testing to take place. Live testing on the Central line route has begun to ensure all systems work at each station and through tunnels.

The team has engaged with CCTV suppliers to address a change in London Underground standards and initiated work with the security team on operational readiness. The next key milestone in relation to CCTV improvement is the closing out of the production readiness review. This is due to take place in August 2023, ahead of the original target date of January 2024.

Feasibility and planning for the first tranche of the incremental upgrade to the signalling interlocking computers on the east end of the line has started. We plan to enter the early contractor involvement phase, which will complete in October 2024, and then award full contract in the last quarter of 2025.

A site visit with Siemens to Leytonstone signalling equipment room took place in June 2023 to consider the scope, possible workable solutions and limitations to support the pre-request for tender activities and to further understand enabling works requirements.

Bakerloo line (fleet overhaul, LED lighting conversion and signalling upgrade)

Seven programme lifts, one heavy overhaul and two mini-overhauls have been delivered since the start of the year, which has enabled us to maintain fleet availability. A concession has been drafted to assist with smoothing out the delivery of these works, which we expect to be signed off in August 2023.

We completed LED fitment on 20 trains to schedule by the end of June 2023, achieving 55 per cent of the targeted 160,000 kg of carbon emission reductions in 2023/24. The fitment of the remaining LEDs on board the Bakerloo line is due to be completed by March 2024.

The procurement of signalling equipment and design work is continuing for the Bakerloo line control room fit-out and the control system upgrade. We continue to install the key signalling and control interface equipment in lineside rooms on the Bakerloo line. Nine sites have been completed, with Lambeth North nearing completion as planned.

Bakerloo line (Marylebone escalators)

Work is continuing on the final escalator replacement and is due to be finished in September 2023. The completion of the wider station gateline and an additional escalator will provide increased station capacity to support future customer demand. This is planned to complete in December 2023.

Bakerloo, Central and Waterloo & City lines (accessibility)

The first Bakerloo line train with a newly fitted prototype passenger information system with audio and visual announcements has started live testing. Testing is expected to run until December 2023 to ensure the system works at every station. Four trains with new wheelchair bays have also been returned to service with the fifth expected by July 2023. A Department for Transport (DfT) site visit to Acton works was planned for 6 September 2023 to preview progress on the Central

line rail vehicle accessibility regulations. However, due to some DfT colleagues being unavailable, the visit has been postponed. We hope to arrange a visit in October, subject to availability from the DfT.

Rail adhesion train

Overhaul of the first Central line rail adhesion train (RAT), which is used to manage rail adhesion levels on the network during leaf fall season, is complete and handed over for testing with the second (final), substantially complete. Preparations have started for the Metropolitan line RATs.

Mechanised track renewal vehicle

The series of trials for prototype mechanised renewal vehicles was completed in February 2023 as planned. There are modifications to improve safety and in-vehicle access prior to further prototype trials in August 2023. Completion of this work will continue, to build confidence in advance of the vehicles being used to support track works in 2023/24.

Modular points and crossings

The team successfully obtained single crane operation (open section) assurance approval for Kirow cranes and began work on the next stage of approvals. In July 2023 the team obtained partial single crane tunnel section approval and used it to support the Gloucester Road works blockade successfully. Further works will now restart on obtaining the additional approvals for tandem lifting with two cranes. Remaining open and tunnel sections tandem lift approvals are due to be delivered in 2024.



We aim to give customers reliable and safe access to our services

Track recording vehicle

Maintenance works have been carried out on the track recording vehicle (TRV) to meet the conditions set out in the concessions. The vehicle, more than 55 years old, requires significant maintenance and monitoring to remain in operational use until the remote track monitoring vehicles are commissioned.

Remote track monitoring

The project is delivering new equipment which will be installed on two wagons to allow track recording. This will replace TRV once commissioned. A feasibility study will be undertaken in Quarter 3 2023/24 to assist the detailed design production. Two new vehicles will increase service reliability and provide critical data to keep the network safe.

Engineering vehicle overhauls

We successfully completed the overhaul of the first Matisa tamper, which returned to Ruislip in July 2023. The second tamper overhaul is due to start later this year alongside a strategy for in-house overhaul of the three Plasser tampers. Engineering teams are working on the battery locomotive bogie frame repair process after successfully completing the trials. This will be integrated into the overhaul programme of traction and other works.

Network-wide water ingress remediation

The concept design for remedial works at Mayor Sworder's Arches sub-station in London Bridge was completed in June 2023. Contract award for delivery of the selected option is scheduled for February 2024. Work to complete the options for remedial works at St Paul's and Chancery Lane stations has been extended to allow for further

technical verification. The options will be agreed in preparation for final approval in August 2023. Concept designs at Liverpool Street and Charing Cross were finalised in April and will be agreed in July 2023.

Network-wide cutting and embankments

Works are continuing to stabilise the cutting between Grange Hill and Chigwell stations on the Central line to ensure the continued safe running of the railway. Currently sheet piles are being installed to add extra stability to the slope during the final stages of the project, which includes strengthening works to two adjacent bridges and the final re-grading. Full project completion is due in March 2024.

Elsewhere, detailed design has begun for the Queensbury to Canons Park embankment, including the design for an enabling works package to divert drainage and power assets.

Additionally, three further embankment/cutting stabilisation projects were initiated in March 2023, progressing from outcome definition to feasibility.

Plaistow power sub-station roof replacement

Further to successful completion of the life-expired asbestos roof replacement, additional works to deliver scope for colleague welfare improvements and the possibility of addressing roof leaks at the station began on site in June and will be completed in October 2023.

Station platform remediation works

Feasibility work for platform remedial works has been completed for 94 platforms at 41 stations, with the selected options

for delivery agreed in May 2023. 'Quick win' remedial works will start in January 2024 and are scheduled to be completed in Quarter 4 2024/25. Design of the remaining selected remediation options began in July 2023, and site works are scheduled for Quarter 1 2025/26.

Platform tactile replacement works at Osterley station were completed in April 2023. Contract award for platform remedial works at Plaistow station was achieved in June 2023.

Welfare facility renewals

Colleague welfare facility improvements include mess rooms, kitchens, locker rooms, changing rooms, and shower and toilet facilities.

Works to improve the condition of welfare facilities and environment for our colleagues across London Underground are continuing, with four sites completed in the last quarter and a further two sites due to begin by end of September 2023. We aim to complete eight sites by the end March 2024. Due to unexpected site conditions during intrusive survey, such as the discovery of hazardous materials, progress was slower than expected in 2022/23. However, these lessons have been applied to the new tranches of work and more thorough investigative surveys are planned for future sites.

Smoke and heat exhaust ventilation systems

We are replacing and refurbishing life-expired components that form part of the smoke and heat exhaust ventilation systems located in the roofs of Bermondsey station and Stratford Market

depot. The procurement of material is progressing while we have completed the installation on the new main safe system on the roof of Stratford Market depot to allow access to the roof. The refurbishment of both systems is scheduled for completion in Quarter 3 2024/25.

Secondary lifts (supporting step-free access)

Detailed design is progressing on five lifts, and we will be sending instruction to manufacture for the next three lifts before the end of July. The start on site for the first lift (Hounslow East lift 1) has now moved to November 2023, with the second starting in December. Hounslow East has experienced delays due to extra design work required to resolve issues with space constraints within the existing lift shaft. Works for a 'place of safety' began in August with the demolition of a redundant building. A 'place of safety' is an area covered by CCTV and communication equipment where a person of restricted mobility can wait safely in the event of a fire or emergency until the emergency is over and where they can be assisted by a member of station staff or London Fire Brigade (LFB). The Bermondsey design was delayed due to firefighting requirements and additional consultation with LFB.

Uninterruptable power supply

We awarded a new contract in December 2022 to continue the replacement of life-expired UPS units (31) to ensure a continuous power supply to critical signalling assets on the railway. The works are going to plan, with detailed design nearing completion for the first batch to be installed on the Victoria line from September 2023.

Offline battery power inverters

An offline battery power inverter is a battery system present on all sub-surface stations to power emergency lighting in the event of a power loss. There are around 260 located across the network and they are a critical asset as failure could result in station closures as emergency evacuation is compromised.

During Quarter I 2023/24 we have successfully commissioned 12 of the 20 units planned in tranche I of the replacement programme. The procurement is nearing completion for a second tranche of 40 to be awarded in Quarter 2 2023/24. This has taken longer than planned to incorporate manufacturing product development changes which will help mitigate the obsolescence risk of the remaining units. Internal scoping and market engagement is in progress for further units as part of the strategy work on the longer-term solution.

Traction power

Initial design work has begun for the replacement of traction isolation switches located in sidings on Central and Bakerloo lines, continuing the programme to address equipment non-compliance and removal of operational restrictions. The works are planned to begin in 2024/25.

The construction of a new room to house a replacement switchboard at Holborn was completed to plan in April 2023. These complex works are being implemented under special access arrangements which have progressed well. New equipment was delivered to site under this arrangement and is being installed in readiness for site testing in Quarter 2 and commissioning by December 2023.

LED lighting

The LED programme works have now been fully remobilised following the temporary pause during 2022/23 due to funding constraints. Good progress has been made across the delivery programme, with works in progress at Hainault, Ruislip and Upminster depots that are being phased during 2023/24 to optimise access and operational opportunities. Re-lamping was undertaken in the wheel lathe shed at Upminster during a planned closure, leading to an efficiency of £200,000.

The conversion of lighting at Oxford Circus started in April 2023 and is on plan for completion in early 2024. We have also completed scoping surveys at King's Cross St Pancras station in readiness for a contract award in Quarter 3 2023/24 with delivery to start on site in early 2024. Conversion of lighting at smaller stations is being delivered internally, with a new team mobilised to deliver 22 priority stations during 2023/24 at a rate of 5.5 stations per quarter.

East Ham wall rebuild

Negotiations are continuing with property holders regarding access to the wall through local gardens. This is required as the running railway is adjacent on the opposite side with cables and other services occupying the safe area next to the track. The access agreements are an enabler to allow us to carry out the temporary works, including propping up of the remaining wall in advance of a permanent solution being installed.

A significant amount of upfront design and optioneering has been undertaken to identify challenging interfaces such as the location of welfare facilities within a very constrained site.

The tendering process has been delayed due to resource shortages, which was resolved in April 2023. As a result, the procurement strategy and a draft of the full detailed scope and interface identification documents have been completed, which will feed into the tendering process, targeting contract award in September 2023 for temporary works. We expect to begin the permanent re-building of the wall in Quarter 4 2023/24.

Elizabeth line renewals

The Elizabeth line asset renewal programme began in November 2022, covering a range of renewals to assets owned by TfL (which excludes the leased trains). It is an early stage of establishing detailed scope for this and future years.

During Quarter I progress has been made on initiating a pipeline of schemes for delivery later in 2023/24 and the future. In July 2023 there were 18 projects to be procured. Key site possessions for work in 2023/24 are targeted for October, November and February. In July, a lighting upgrade was completed at Romford Control Centre.

Railway systems enhancements

Delivery of the scheduled Northern line signalling software updates continues, with the first release targeted for commissioning on the railway at the end of July 2023 and the final in Quarter 2 2024/25. This later release has been rephased to accommodate other priorities in TfL Capital that are

dependent on the same supplier key resources. These priorities include the Four Lines Modernisation and DLR rolling stock replacement programmes. The Northern line software updates address residual issues and requirements following completion of the Northern line extension and the Bank station closure works.

Delivery of the Jubilee line signalling software updates also continues, with the updates addressing residual issues. The first software release was commissioned in Quarter 3 2022/23, and the final release is currently scheduled for Quarter I 2025/26. This is heavily dependent on the Four Lines Modernisation programme and when SMA8, which touches the Jubilee line within the programme, is delivered (currently scheduled for Quarter I 2024/25).

Enhancement work for the Northern line power supply was completed in Quarter 4 2022/23, with some minor closeout activities continuing. This has provided system capacity and resilience for reliable services during planned or unplanned outages.

The rolling stock works to enable an increase in entry and exit speeds at Neasden depot were completed successfully in July 2023. These support Metropolitan line service uplifts being delivered as part of the Four Lines Modernisation programme. The rolling stock works to enable an increase in entry and exit speeds at Neasden depot are on target for completion in Quarter 3 2023/24. These will support Metropolitan line service uplifts being delivered as part of the Four Lines Modernisation programme.

Professional services

Growth Fund

Reporting period	Forecast £m
2020/21 to 2029/30	37
Change since last IPR report at P3 22/23	
No change	No change

Financial commentary

In Quarter I, the forecast for the Growth Fund is unchanged. During last year's Business Plan process, funding was identified and prioritised for the Growth Fund once again after a temporary pause during the pandemic and this is reflected in the forecast. This money is profiled between 2024/25 and 2026/27 and will be allocated to specific Growth Fund projects over the coming months.

Programme update

Following the funding deal with Government, the 2022/23 Business Plan recognised the need for us to continue to seek third-party income and to support growth and step-free access projects in London. The Tolworth scheme remains in the Growth Fund budget as a commitment.

The main challenges continue to centre around supporting third-party funded projects that are necessary to deliver the Mayor's Transport Strategy outcomes in areas of development and high need in London. Several projects with previously complete funding packages are currently at risk due to the programme being reliant on additional funding.

As a result, a number of projects have been delayed or paused in anticipation of funding certainty, while others have secured alternative funding contributions.



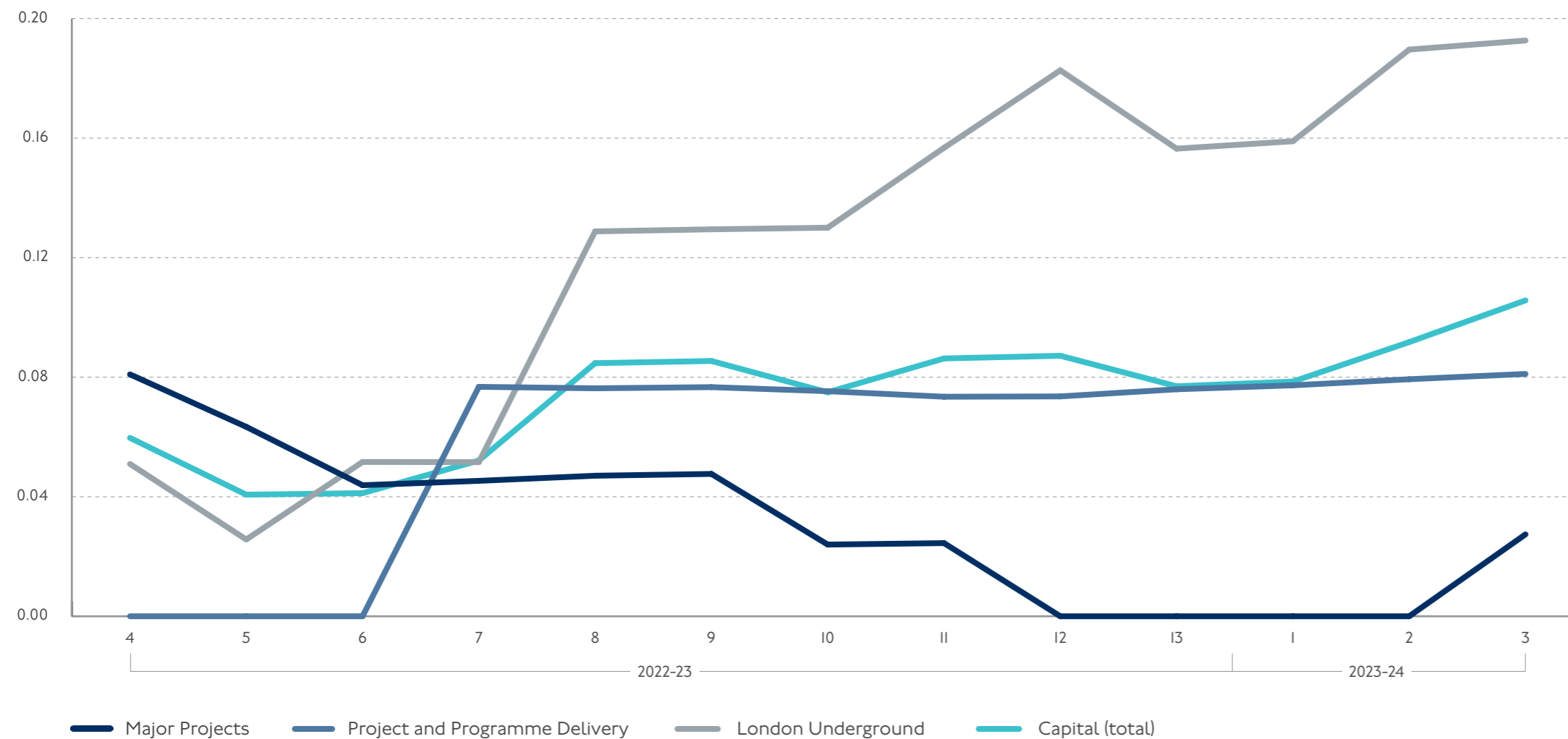
We plan to renew each of our 526 escalators every 40 years

Appendix

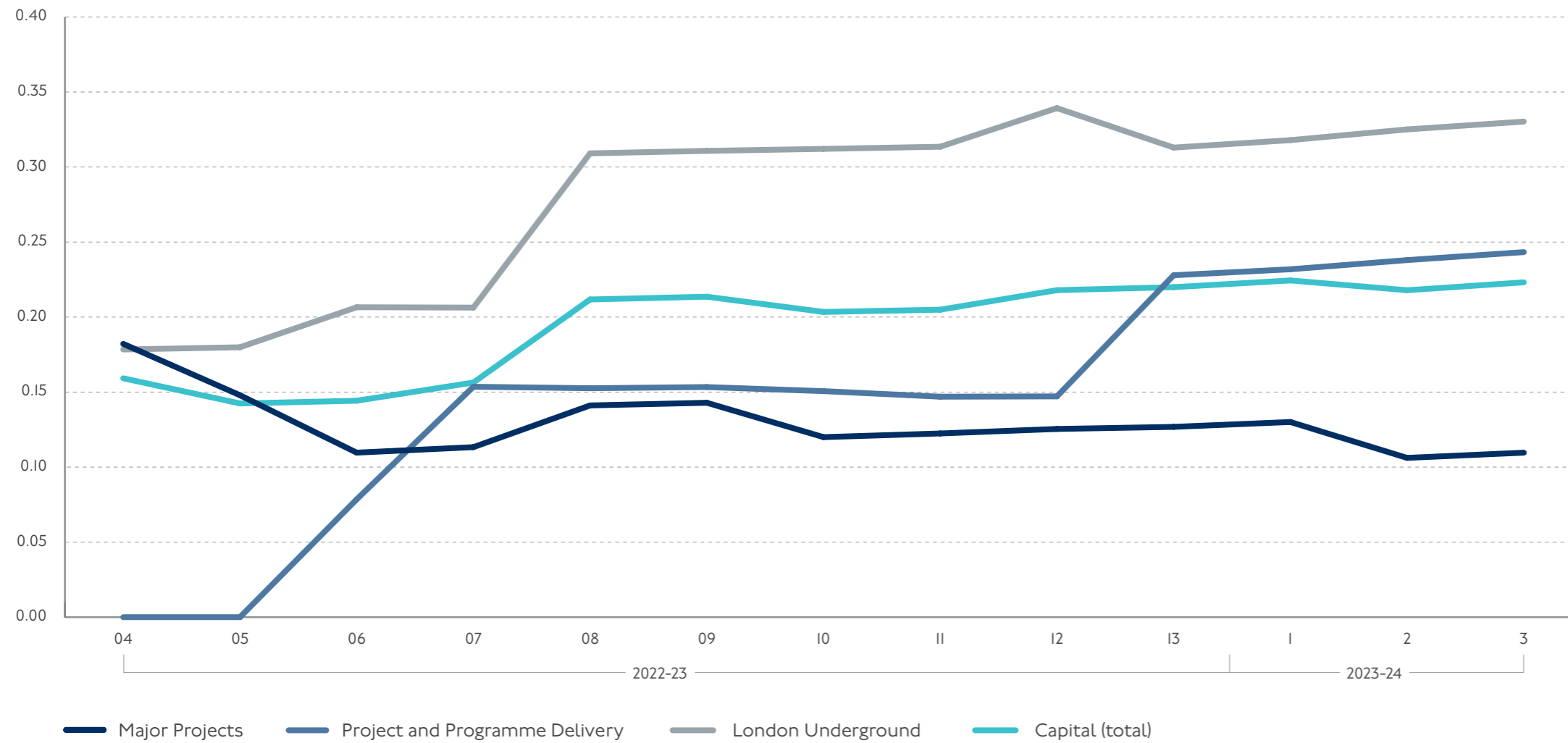
Our safety performance data

We track the number of injuries among our workforce to show our progress towards our safety ambitions

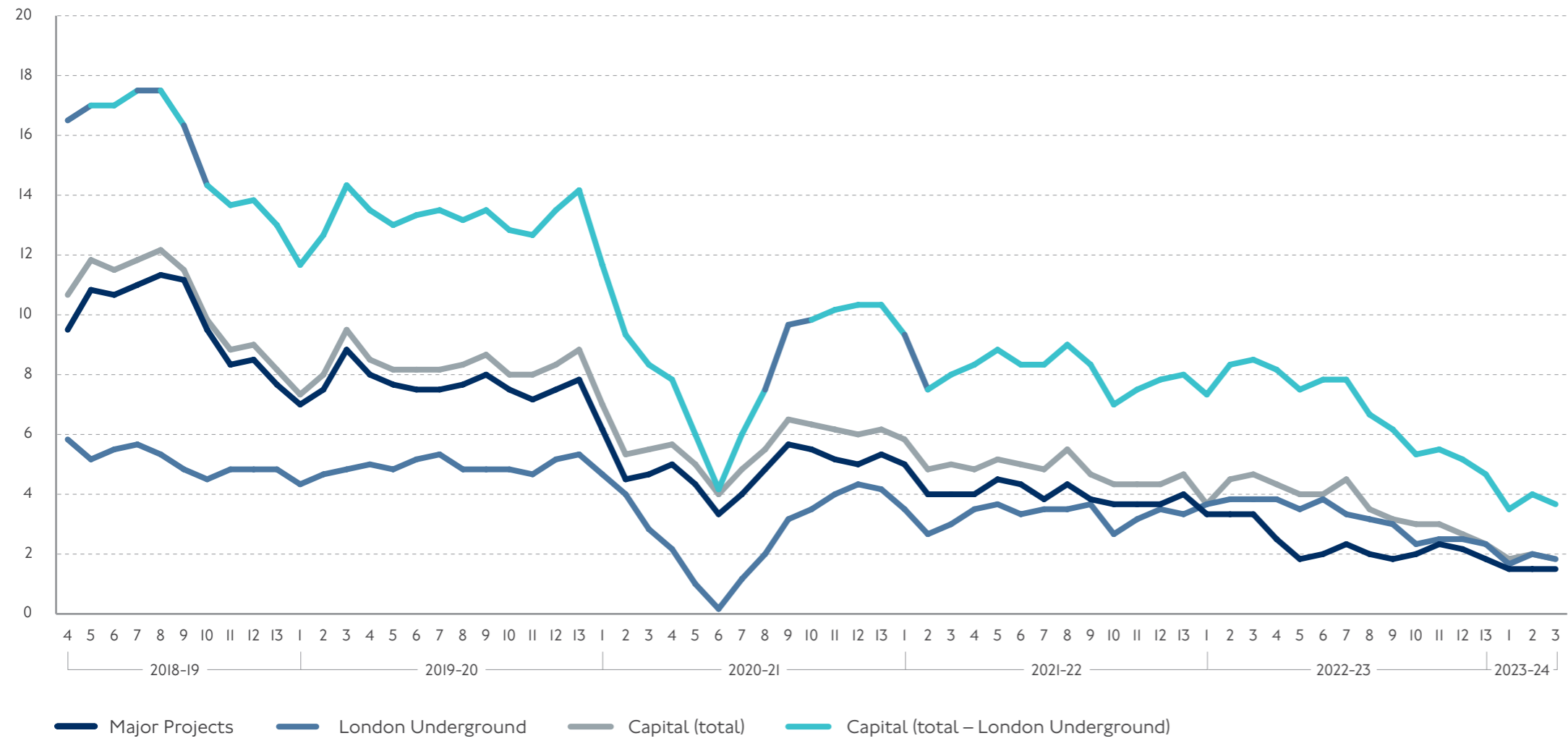
RIDDOR accident frequency rate
(per 100,000 hours worked)



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



Total Capital workforce injuries
(six-period average since 2018/19)



About us

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' and helping to create a safer, 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 by walking, cycling or using public transport by 2041. To make this a reality, we prioritise safety, sustainability, health and the quality of people's experience in everything we do.

We run most of London's public transport services, including the London Underground, London Buses, the DLR, London Overground, Elizabeth line, London Trams, London River Services, London Dial-a-Ride, Victoria Coach Station, Santander Cycles and the IFS Cloud Cable Car.

We manage the city's red route strategic roads and are responsible for the maintenance, management and operation of more than 6,000 sets of traffic lights across the capital. The London boroughs are responsible for all the remaining roads within their boundaries. The experience, reliability and accessibility of our services are fundamental to Londoners' quality of life. Safety remains our number one priority and we continue to work tirelessly to improve safety across the network for both colleagues and customers.

Our vision is to be a strong, green heartbeat for London. We are investing in green infrastructure, improving walking and cycling, reducing carbon emissions, and making the city's air cleaner. The Ultra Low Emission Zone, and fleets of increasingly environmentally friendly and zero-emission buses, are helping to tackle London's toxic air. We are also improving public transport options, particularly in outer London, to ensure that more people can choose public transport or active travel over using their vehicles.

That is why we are introducing the outer London Superloop bus network, providing express bus routes circling the entire capital, connecting outer London town centres, railway stations, hospitals and transport hubs.

We have constructed many of London's most significant infrastructure projects in recent years, using transport to unlock economic growth and improve connectivity. This includes major projects like the extension of the Northern line to Battersea Power Station and Nine Elms in south London, as well as the completion of the London Overground extension to Barking Riverside and the Bank station upgrade.

The Elizabeth line, which opened in 2022, has quickly become one of the country's most popular railways, adding 10 per cent to central London's rail capacity and supporting new jobs, homes and economic 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 using information, data and technology to make services intuitive and easy to use and doing all we can to make streets and transport services accessible and safe 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. By working together, we are creating brighter journeys and a better city.

