

Transport for London Investment Programme Report

Quarter 2 2021/22

Contents

3 Purpose and scope

4 Investment programme
delivery structure

5 Safety performance

9 Schedule performance

11 Major projects

26 London Underground

44 Surface transport

61 Professional services

Purpose and scope

Purpose

We continue to adapt to the evolving situation as London emerges from the restrictions imposed as a result of the coronavirus pandemic.

Our Investment Programme

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

The TfL investment programme is the suite of projects comprising renewals and enhancements to maintain reliability and support growth in London.

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 supports London's growing population and economy, enhances the quality of life for Londoners and creates jobs and improves skills across the UK.

Scope of this report

This report provides an update on a range of projects that will further enhance our world-class transport services in London.

This report covers periods 3, 4 and 5 of 2021/22 (30 May – 21 August 2021).

For each major project or programme, the financial and milestone data represent the position at the end of period 5 and includes commentary on key achievements, progress and challenges. The report also contains updates on notable progress made after the end of the quarter.

Financial records of spend to date, authority and estimated final cost (EFC) represent the entire duration of each separate project, programme or portfolio, except where stated in the date range.

Where authority is significantly lower than EFC, it has been given for the current stage of works and further funding authority will be sought when appropriate.

Commentary is provided for cumulative movements greater than £2m. Some financial information is commercially sensitive and is redacted.





Investment programme delivery structure

Our investment programme is delivered by the following areas of the business and the report structure reflects this

Major projects

Responsible for our largest and most complex projects. It comprises line upgrades, such as the Piccadilly line upgrades and the Four Lines Modernisation, network extensions, major station upgrades, the Elizabeth line and Crossrail.

London Underground

Comprises stations, accessibility, track renewals, power, cooling and energy, rolling stock, and signalling and control.

Surface transport

Comprises healthy streets, air quality, public transport and asset investment.

Professional services

Comprises Technology and Data, Media and the TfL Growth fund.

Safety performance

While lockdown restrictions eased during quarter I, our capital delivery activities continued under the COVID-secure conditions that have been fundamental to the safety of our workforce over the past year

Visits to site continued to be risk-based and, where possible, were conducted virtually. Our site-based workforce was supported with regular communications linked to the safety and wellbeing of our people, and our response to the coronavirus pandemic, while core assurance activities continued to be delivered throughout this period.

Our workforce completed 3 million hours delivering our capital projects during the quarter. Over the past few periods, hours worked have remained relatively stable but are double the hours worked during quarter I of 2020/21. This is because in March 2020, most of the activity at our construction sites came to a Safe Stop. The return to work on our sites was done in a planned and controlled way, from May 2020 onwards. This reflects the hard work that has gone into making sure our sites can operate safely during the coronavirus pandemic.

As we progress from the 'recover' to the 'rebuild' stage, we will continue to review our processes in line with the latest government guidance and research and wider sector good practices.

The coronavirus pandemic required us to approach construction work differently to reduce risks to our workforce and supply chain. This led to innovations in the phasing of activities, the way our sites are established and run, and how we construct.

These changes to our ways of working have had positive safety, health and environment benefits beyond reducing the spread of the pandemic. Consequently, we are reviewing what can be incorporated into 'business as usual' to continue these improvements to our construction processes.



Safety performance

Despite the challenges introduced to our working methods due to the pandemic, the total number of physical injuries continues to decline in 2021/22

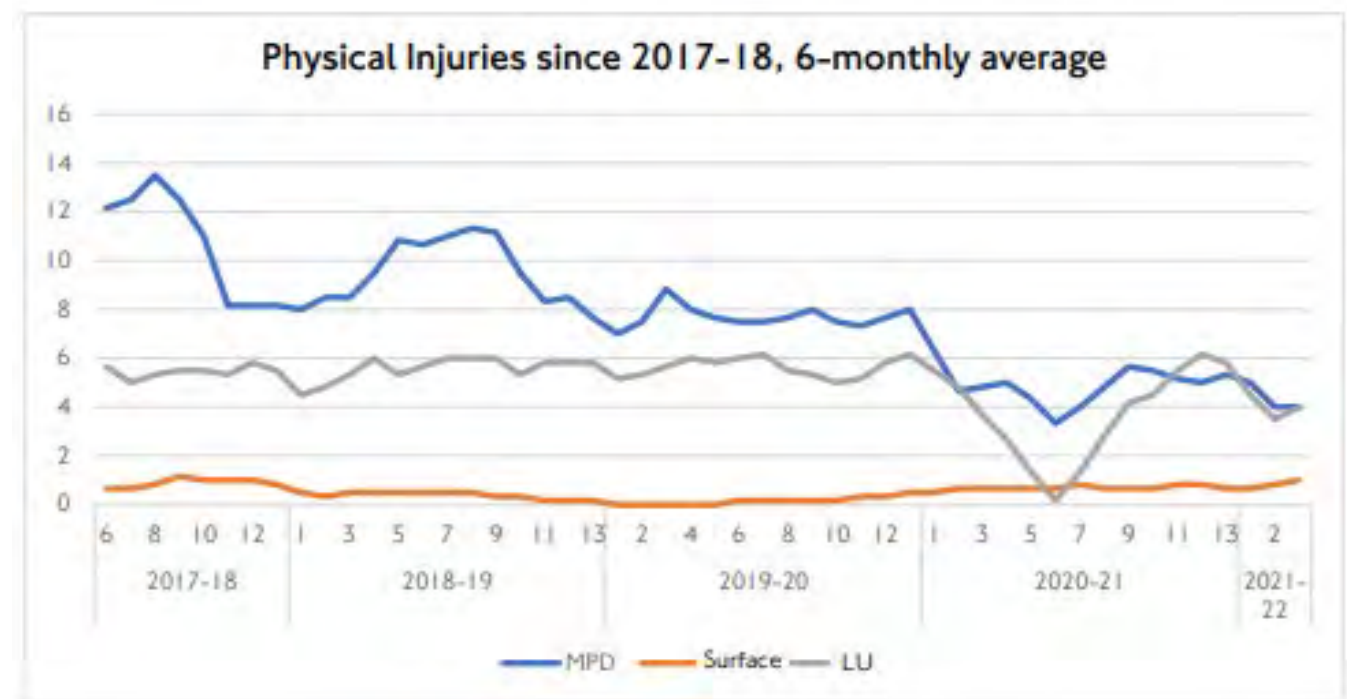
Safety performance key performance indicators: Capital delivery

In alignment with our organisational structure, data reported in this section comes from three key delivery areas: the cross-TfL Major projects directorate, the Surface transport project and programme delivery (Surface), and the London Underground Renewals and Enhancements. Data from other parts of TfL where construction and maintenance are undertaken is reported separately in TfL's public transport workforce data.

Total workforce injuries

There were 24 injuries during quarter I, down from the previous quarter. While this is an increase compared to the injuries sustained in quarter I of 2020/21, last year's quarter occurred during the Safe Stop of construction activity, which means there has been significantly more time spent on site so far this year with more than 3 million hours worked.

The most common cause of injuries were slips, trips and falls and manual handling. All injuries are investigated by the teams and suppliers involved to establish root causes and put in place mitigations to help prevent re-occurrence. Where identified, lessons from local investigations are shared across TfL Capital delivery and, where appropriate, across the wider industry.



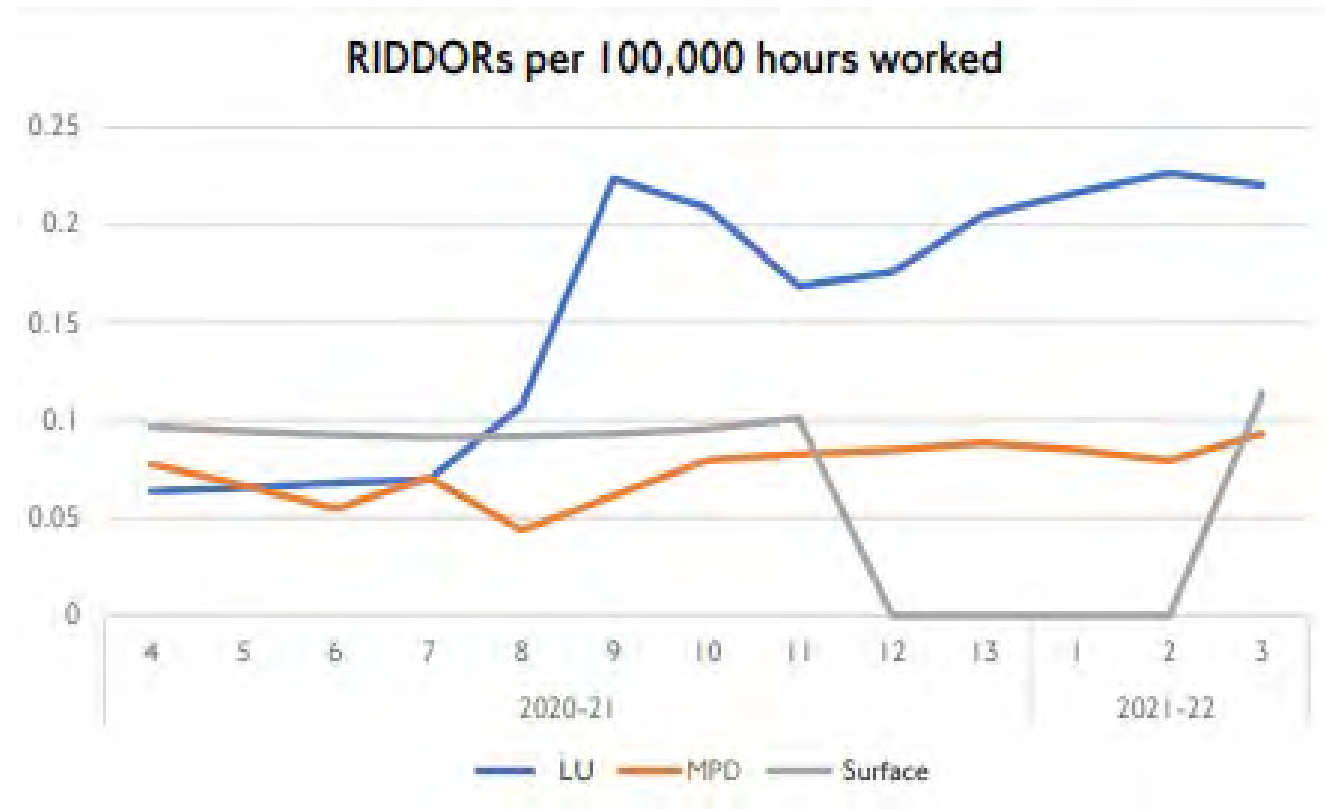
Safety performance

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RIDDOR Accident frequency rate

In quarter 1, there were four accidents reported under the Reporting of Injuries, Diseases and Dangerous Occurrences Regulations (RIDDOR) in our Capital delivery teams. Two of these were in London Underground asset performance and capital delivery, one in the Major projects directorate and one in our Surface transport project and programme delivery.

Despite an increase of one RIDDOR on the previous quarter, rates remain stable and both Major projects and Surface transport project and programme delivery are within the target thresholds of 0.12 and 0.15 respectively. Slips, trips and falls remain the most prominent immediate cause of RIDDOR reportable accidents across our Capital delivery teams. Following each investigation, the key lessons learned are shared across all TfL Capital delivery activities to help address this.



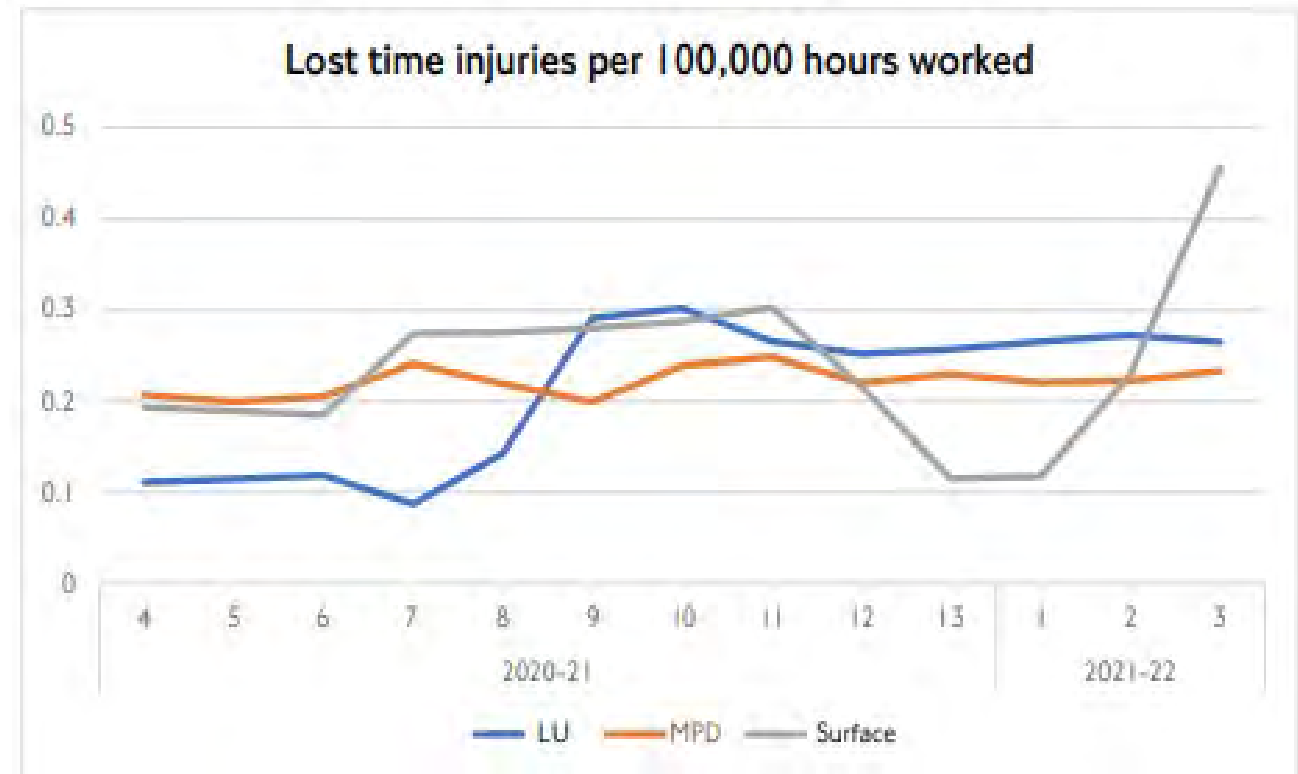
Safety performance

Despite the challenges introduced to our working methods due to the pandemic, the total number of physical injuries continues to decline in 2021/22

Lost time injury frequency rate

Lost time injuries (LTIs) are injuries which cause an employee to be absent for one or more shifts, reflecting the loss of productive work time. There were seven LTIs in our Capital delivery teams during quarter 1, a reduction compared to the previous quarter.

LTI rates in Major projects and London Underground asset performance and capital delivery remain relatively stable and just above the target threshold of 0.2. The LTI rate in our Surface transport project and programme delivery rose following two contractor incidents in period 3. Slips, trips and falls, manual handling and non-compliance with the Health & Safety Executive rules were the top immediate causes of LTIs, with inadequate application of procedures again a prominent root cause.



Schedule performance

Ninety five per cent of our strategic milestones are forecast to be delivered on time or early

Year to date we have delivered on schedule:

Major projects

Northern Line Extension

On 20 September, two new stations on the Northern Line Extension at Nine Elms and Battersea Power Station welcomed their first customers. The two step-free Zone 1 stations are set to dramatically improve the connectivity of these vibrant south London neighbourhoods and contribute to the capital's recovery from the pandemic at a vital time.

Piccadilly line upgrade

We have begun assembly of the new passenger train T1.

Barking Riverside Extension

We have completed viaduct construction (Civils to enable rail systems installation).

Four Lines Modernisation

Implementation of passenger carrying revenue service between Monument and Sloane Square – SMA04. The Four Lines Modernisation SMA05 milestone is currently under review due to software challenges and will be updated in the Q3 report.

London Underground

Developed a decarbonisation strategy.

London Underground asset performance

Completion of the Victoria Line train overhaul programme.

Surface technology

Intelligent Transport System Release 2.0 complete.

Rotherhithe Tunnel

The Rotherhithe Tunnel milestone to make a recommendation for the award of the Design and Build Contract Award is running 70 days late. It was agreed in June with Surface directors that additional work should be undertaken to determine whether the refurbishment of Rotherhithe Tunnel could be deferred until after the Silvertown Tunnel opens. The outcomes are being reviewed with the options being presented in early autumn this year.

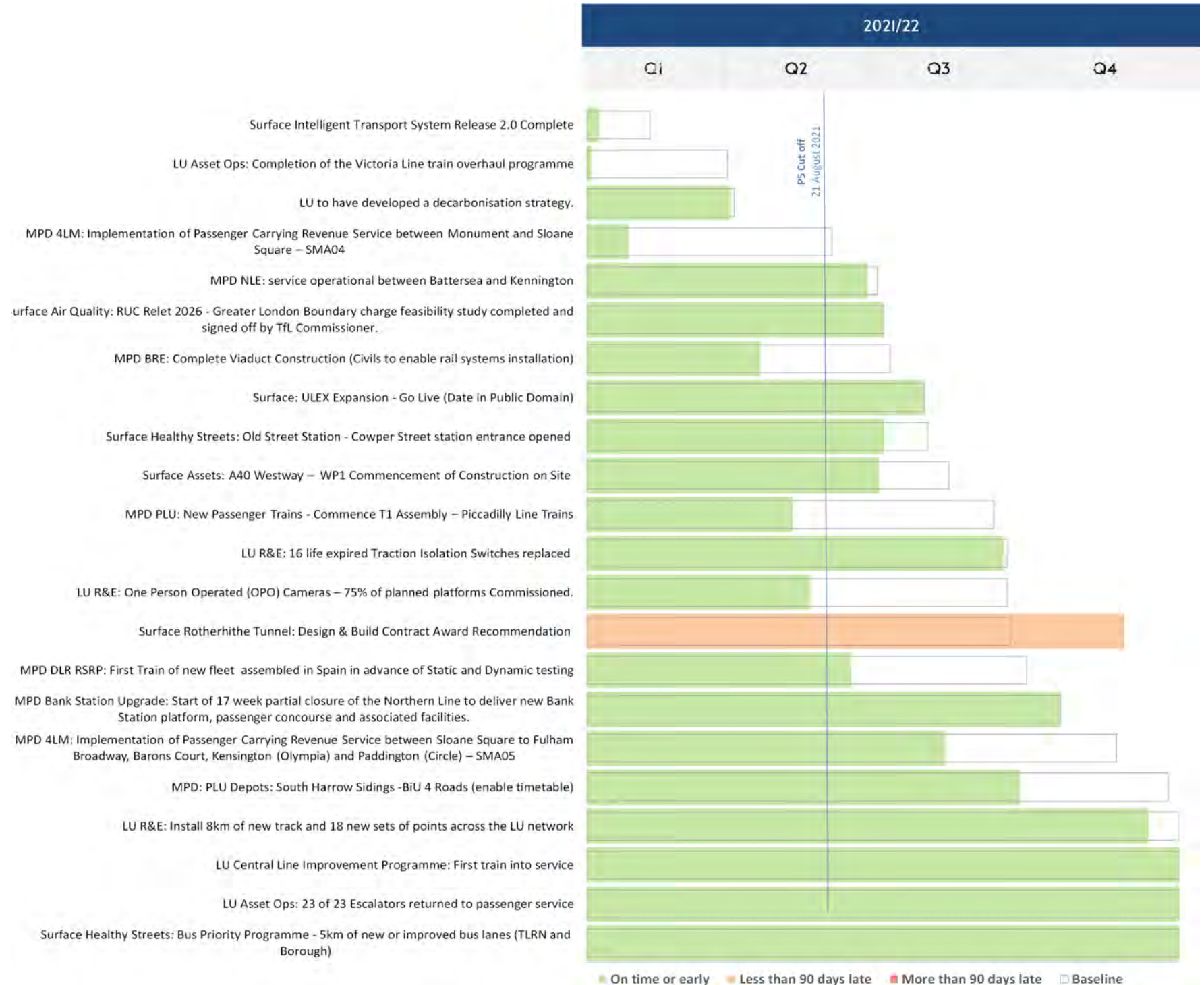


Schedule performance

Ninety five per cent of our strategic milestones are forecast to be delivered on time or early

2021/22 Strategic milestones

The graphic shows our 2021/22 strategic milestones. The hollow box shows when the milestone was due to be met, while the coloured block shows when it was achieved or was forecast to be achieved.





Major projects

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

Elizabeth line

On-network stations improvement programme

Forecast completion year	Spend to date £m	Programme and project authority £m	EFC £m	Cost to go £m
2021/22	94	94	95	1

The On-network station improvement programme is the TfL sponsored/delivered programme of upgrade works at surface stations on what will form the Elizabeth line route.

The programme comprises step-free access work at seven stations and station refurbishment work across all 22 TfL operated surface stations.

Despite the resource challenges in Network Rail set out in last quarter's report, there has been good progress on handing over the completed step-free access schemes at Hanwell, Iver, Langley and Taplow to Network Rail with all relevant paperwork now signed.

On the completed eastern step-free access works (Maryland, Manor Park and Seven Kings) progress has been made on the close-out activities with sign off anticipated by end of September 2021. Both east and west step-free access schemes have experienced significant delays in achieving handover due to the complexities of remote working and restructuring of teams - both resulting from the coronavirus pandemic.

The station refurbishment half of the programme, delivered in partnership with our operator MTR Elizabeth Line, continues. Work has recently been completed at Taplow which has seen a full refurbishment and modernisation of the ticket hall and staff areas.

The project team has also been evaluating tenders for the next phase of work which comprises the installation of platform canopies at Ealing Broadway and Hayes and Harlington stations, which will complement the recently completed development work by Crossrail/Network Rail.



Elizabeth line

Rolling stock

Forecast completion year	Spend to date £m	Programme and project authority £m	EFC £m	Cost to go £m
2024/25	990	1,149	1,006	16

The Elizabeth line is the first new London Underground line in over forty years bringing a train every two and a half minutes at peak time to around 200 million passengers.

The number of nine-car Class 345 trains operating timetabled Trial Running in the Elizabeth line central section increased to 18 on 13 July (12 trains per hour).

Successful advance testing of the train and signalling software for entry into trial operations took place in the central section between 22 and 25 July.

Class 345 trains

Passenger services between Reading and Heathrow continue to be operated by nine-car Class 345 trains. The current train control software has not delivered the expected reliability, but defects are generally rectified by a system reset and the efficacy of the containment measures put in place by the operator MTR Elizabeth Line has mitigated the impact on the railway. New train software with improved performance is in the process of being loaded to the fleet.

The number of nine-car Class 345 trains operating passenger services between Shenfield and Liverpool Street, supplementing seven-car Class 345 and eight-car 'legacy' Class 315 trains, increased from three to six in July. The transition of the Liverpool Street to Shenfield service to a full nine-car Class 345 operation, with up to 22 trains, will start in autumn 2021.

Challenges

Reliability of the nine-car Class 345 fleet is below target, suppressed principally by software defects, and some hardware issues. Improvements are expected from the new software currently being loaded to the trains and a further planned update to the fleet later in autumn. The manufacturer, ALSTOM, has also instigated additional new versions of train control software focussed on defect fixes to boost reliability growth. These will be tested in the autumn and are expected to be available to deploy on the fleet from winter 2021.



Crossrail

Crossrail is the biggest railway infrastructure project in Europe and is one of the largest single investments undertaken in the UK

Forecast completion year	Spend to date £m	Programme and project authority £bn	EFC £m	Cost to go £m
2022/23	*	18.4	*	*

Crossrail will deliver 42 km of new rail tunnels under London, 50km of new, permanent track and 10 new stations to the London Underground network each with its own, distinct character, conceived by different architects, which reflect the environment and heritage of the local area.

Following a successful controlled start focused on maintenance activities, the timetabled trial running phase began in May, which initially ran four trains per hour. At the beginning of June, we increased to eight trains per hour and it was then increased to 12 trains per hour on 13 July. This ramp-up period is helping to increase confidence and experience of drivers and staff in the Romford Control Centre.

On 21 June, Crossrail started an 18-day 'blockade' to finish works affecting tunnels and systems to eliminate any future disruptive access to the railway. The closure completed on 11 July and achieved a 95 per cent productivity.

Completion of trial operations will mark the final step before passenger services can start in the first half of 2022.

We are making good progress with the central station handover, with Woolwich Liverpool Street, Paddington and Whitechapel handed over to us during the period.

A revised stage opening plan for the end-to-end Elizabeth line has been developed with the aim of bringing forward the benefits by up to six months.

Challenges

Works continue at Canary Wharf station to support its scheduled handover to TfL after Whitechapel station; Bond Street is currently showing encouraging signs that it will meet its requirements to be able to support trial operations, although there is still considerable work to do at the station for it to be ready for passenger service at the front end of our opening window.

Before being able to commence trial operations a number of programme milestones need to be achieved in addition to commissioning the remaining stations.

Following the completion of the closure and the move to 12 trains per hour trial running, the two remaining key milestones include:

- Completion and integration of the ELR 100 software release; the train and signalling software that will be used for passenger service
- Completion of the integration and testing phase to ensure that all of the components work seamlessly together

* data has been redacted due to commercial sensitivity

Line upgrades

Four lines modernisation

Forecast completion 2025	Spend to date £m	Programme and project authority £m	EFC £m	Cost to go £m
2025	5,061	5,447	5,445	384

The Four Lines Modernisation programme continues to progress on the signalling upgrade between Sloane Square, Paddington, Fulham Broadway and Barons Court, which is targeted to go live in winter 2021/22.

This phase will involve upgrading the highly complex junction at Earl's Court and once delivered, will mean that the entire Circle line will have been upgraded to the new signalling system which is a significant milestone for the programme.

We are making progress and have successfully completed a number of key works during closures, including further system testing of future signalling migration areas 5 and 8. There are challenges in the SMA05 software development and this is currently under review.

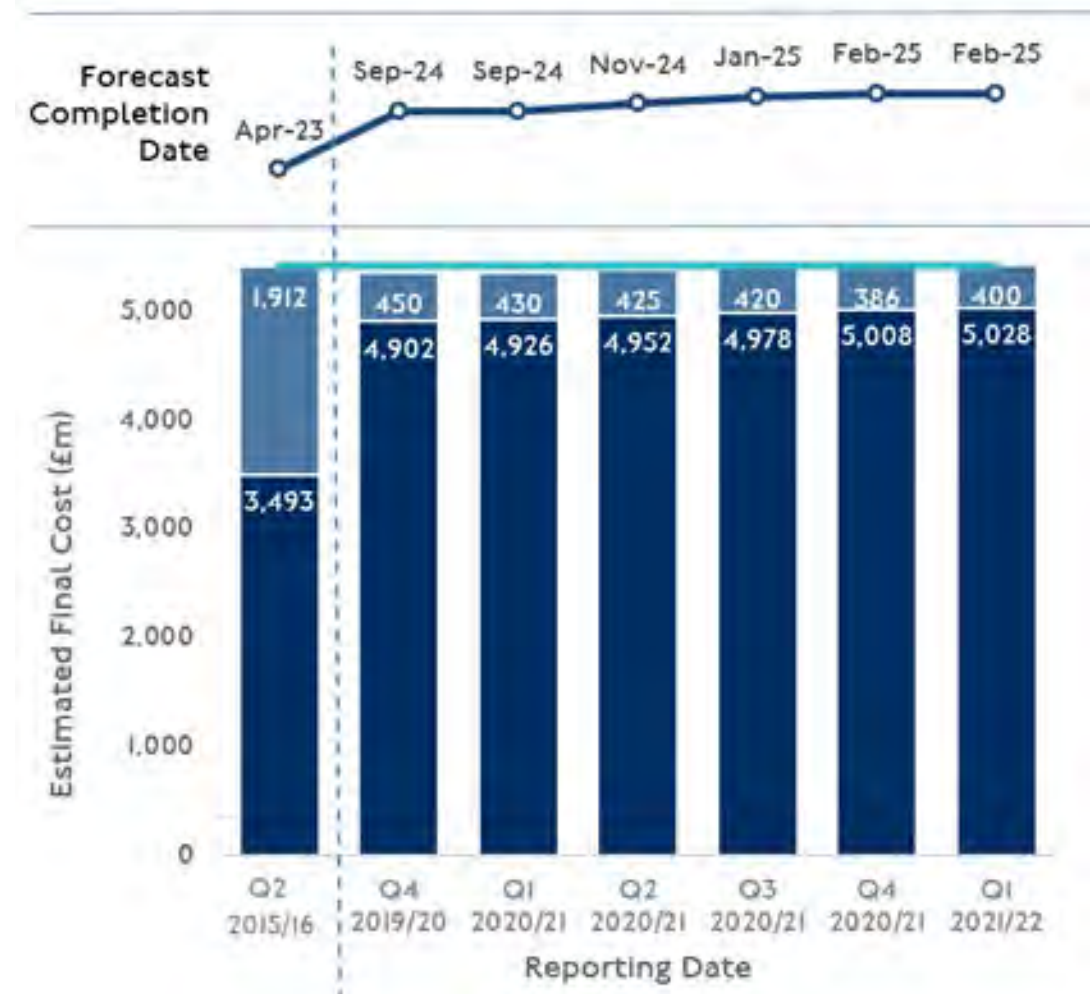
Key activities have been completed during closures in the east end of the District line and the remaining migration areas that will complete the Circle line.

On the Metropolitan line, significant work continues in the Neasden area which has further advanced readiness for testing of the first section, extending future operation beyond Finchley Road.

Safety

The programme has two ongoing formal investigation reviews into potential incidents identified during the launch of signalling migration area 3 and while system testing in migration area 5. No incidents actually occurred, but the Formal Investigation Reviews are expected to identify key learning points. The outcome of these reviews will be published in due course.

EFC performance over time



Cost

Following the increase in authority granted at the Programmes and Investment Committee in July 2021 as advised, further analysis of the programme has been undertaken to particularly focus on the key risks associated with the software programme required for the completion of this programme. This analysis is ongoing. It will be used to validate the programme and derive more metrics to show how the risk is being managed in the future.

The validated programme will be the catalyst to drive further collaboration and confidence and will support the conclusion of our programme reviews by the end of the year.

Line upgrades

DLR rolling stock and systems integration

Forecast completion year	Spend to date £m	Programme and project authority £m	EFC £m	Cost to go £m
2026	116	864	848	732

Our new DLR rolling stock programme will manufacture and supply 43 new trains – 33 to replace the expired B92 fleet and 10 to increase capacity.

It will also include an expanded depot at Beckton to stable and service the new fleet, and signalling modifications to the Thales automatic train operation system to work with the new trains and functionality.

There will also be a telecoms system modification to provide enhanced customer information and traction power capacity works.

Rolling stock manufacturing

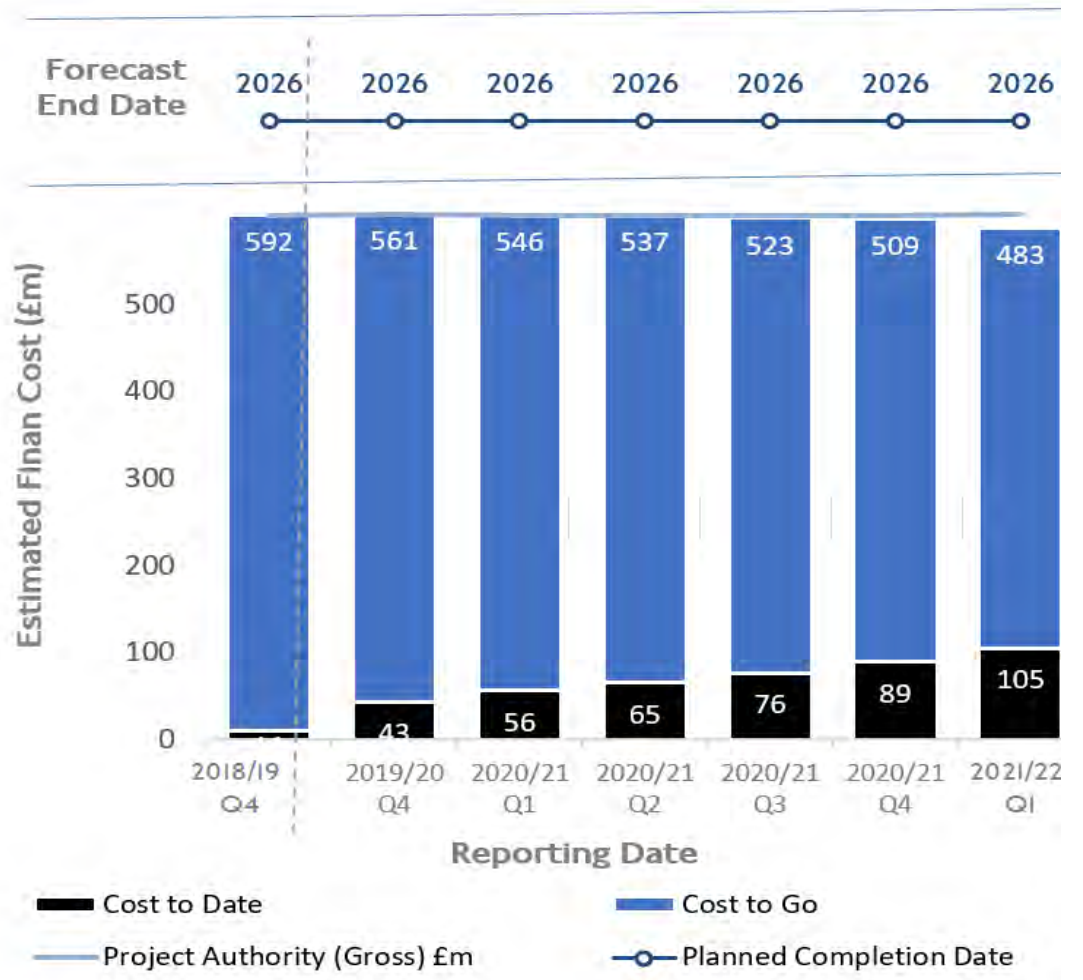
Rolling stock manufacturing is underway with the initial series run of 20 car bodies (trains 1-4) being in production. Train cars 1 to 3 are now complete. Train 1 is due to be ready for static testing in December 2021 and dynamic testing is due to commence in 2022.

At Beckton, work on the northern sidings has started and work on the sub-station is due to start on site in October 2021.

Signalling software development for the new trains continues to progress to programme with the first software releases due in March 2022.

The funding agreement with the Ministry of Homes, communities and local government is in place delivering a further 14 or 11 additional trains (to be confirmed in autumn 2021) to support the development of up to 12,000 homes.

EFC performance over time



Our forecast end date and Programme and Project Authority have remained consistent since December 2018. We have reduced our estimated final cost to reflect procurement savings made in the year and taking an aggressive stance with the remaining risk exposure as the rolling stock design approaches completion.

Line upgrades

Piccadilly line rolling stock

Forecast completion year	Spend to date £m	Programme and project authority £m	EFC £m	Cost to go £m
2027	323	3,294	2,843	2,520

Phase one of our upgrade of the Piccadilly line will introduce 94 new generation, high-capacity, walk-through, air-conditioned trains and supporting infrastructure.

These will replace some of the oldest trains on our network and will enable a peak frequency increase from 24 to 27 trains per hour.

Progress

In August 2021 our train supplier Siemens achieved a key milestone to begin the manufacture of the first intermediate car as planned in line with the phased assurance of the design to achieve assurance stage I in December 2021. This was confirmed by Siemens with a virtual tour of the factories.

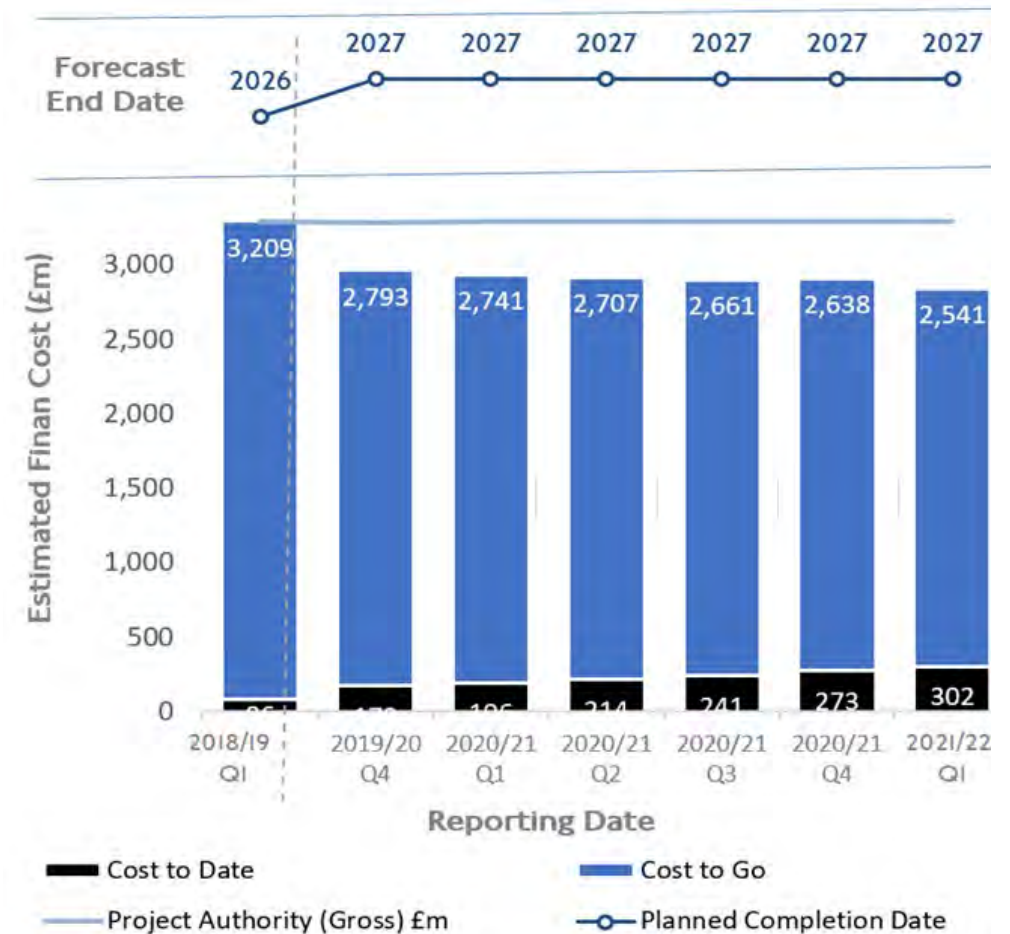
Work has progressed to construct the track formations at South Harrow Sidings. On roads 1 to 4 activities included ground testing, excavation, laying of a geogrid textile and back filling. Once completed, these additional sidings will provide train stabling to support the upgrade construction work at Northfields depot, where sidings will be temporarily removed from service.

Power upgrades are required to support new train introduction and increased service frequencies on the Piccadilly line. The High Voltage Power (design and build) framework Invitation to Tender was issued in April. Tender submissions were received as planned in August and tender evaluation is on track for completion in early autumn 2021. This will lead to issuing the award recommendation targeted for January.

An Invitation to Tender has been issued to prospective Civils suppliers for the legacy signalling modifications needed for new train introduction. Once awarded the contract will for the installation of the new structures required to support the signalling immunisation and signal sighting work packages. Contract award is targeted for November 2021.

The programme has established a carbon footprint baseline. This will be used to identify top carbon risks and opportunities as well as to monitor effectiveness of programme delivery in support of both the Mayor's and TfL's ambition for a zero-carbon railway by 2030.

EFC performance over time



Since May 2018, our forecast end date has been delayed by five months, driven by review and development of scope requirements.

We have reduced our estimated final cost due to active risk management and an ongoing focus on value and efficiency generating an authority surplus.

Network extensions

Northern Line Extension

The two new stations making up the Northern Line Extension at Nine Elms and Battersea Power Station welcomed their first customers on 20 September.

Northern Line Extension is a twin-tunnelled extension from Kennington to a new terminus at Battersea Power Station, via a new station at Nine Elms. This supports the regeneration of the Vauxhall Nine Elms Battersea Opportunity Area.

Step free Zone 1 stations

The two step-free Zone 1 stations have dramatically improved the connectivity of these vibrant south London neighbourhoods and contribute to the capital's recovery from the pandemic at a vital time. Major construction on the 3km twin-tunnel railway began between Kennington and Battersea Power Station, via Nine Elms, in 2015 and despite the challenges of the coronavirus pandemic, the construction project remained on track for the autumn opening.

The Northern Line Extension is the first major Tube extension this century and is supporting around 25,000 new jobs and

more than 20,000 new homes. In addition, construction of the extension boosted the UK economy and supported around 1,000 jobs, including 79 apprenticeships.

Construction of the Northern Line Extension project began with the excavation of the sites for the two new stations. The main 3.2 km bored tunnelling was completed in November 2017 with breakthrough at the new Kennington shafts. By February 2020, physical construction of the extension was broadly complete, with platforms, escalators and even the Tube roundels installed in the stations.

The first 1995 Stock train ran onto the extension over the 2020 Christmas period, marking the start of the extensive signal testing period.



Network extensions

Northern Line Extension

Forecast completion year	Spend to date £m	Programme and project authority £m	EFC £m	Cost to go £m
2021	1,080	1,260	1,107	27

Tube services on the extension began running from Kennington station on the Charing Cross branch on 20 September 2021. There will be an initial peak time service of six trains per hour on the extension, increasing to 12 trains per hour by mid-2022. There will be five trains per hour during off-peak times, doubling to 10 trains per hour next year (once the Bank closure has concluded).

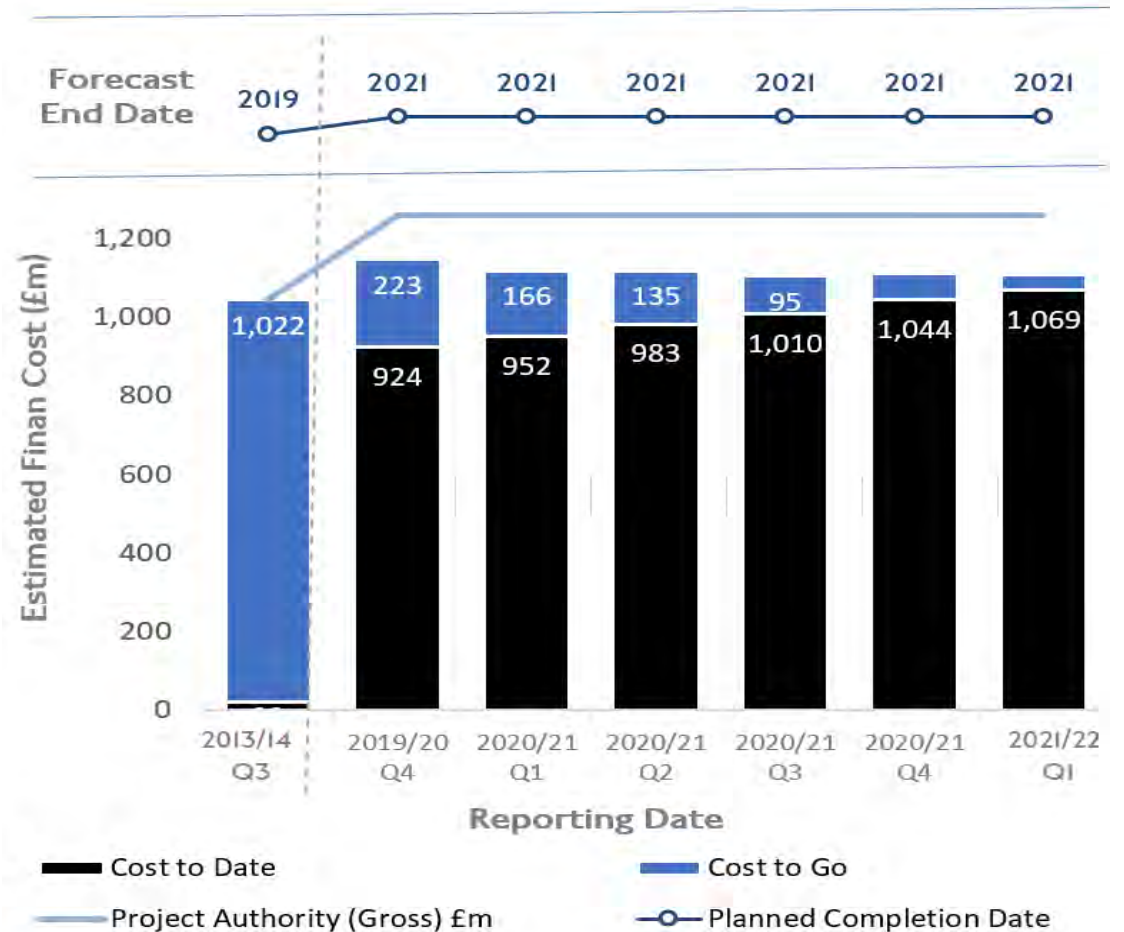
Trial operations

Train-based trial operations began in early July and we have made good progress with training our Instructor/Operators. Training continued in the lead up to the opening. For the trial operations during weekend closures, we were operating four trains per hour on the extension.

At the end of July, the Northern Line Extension entered station-based trial operations. Staff familiarisation was carried out and scripted Trial Operations of the station systems were carried out throughout August. Stations entered 'shadow running' two weeks before revenue service, at this point they became managed and staffed by operations, rather than being run by the contractor as worksites.

During trial operations we familiarised the majority of the line's Instructor Operators (approximately 50 people). In addition to this, more than 80 station staff were also familiarised prior to opening. Maintenance teams across the asset groups have now undertaken familiarisation with the new assets.

EFC performance over time



TfL has delivered the Northern Line Extension £160m under budget, bringing its estimated final total cost to £1.1bn, despite the cost pressures brought about by the pandemic. The spending authority budget was increased to £1.26bn in January 2016, but TfL has worked hard to ensure the project provides strong value for money.

Network extensions

Silvertown Tunnel

Forecast completion year	Spend to date £m	Programme and project authority £m	EFC £m	Cost to go £m
2025	60	173	174	114

Site works

Site works continue in both Greenwich and Silvertown, including where the Tunnel Boring Machine launch chamber will be constructed and, following demolition of existing buildings and site clearance, the piling works are well under way. The launch chamber piling is now complete. We have started works on the River wall and, on cabling and diversions to enable the power supply for the Tunnel Boring Machine. The contract for the design and manufacture of the Tunnel Boring Machine is progressing to plan, with delivery expected in Spring 2022.

We have served temporary possession notices and taken possession of land from existing tenants to facilitate handover of 46 out of 63 sites to date to our contractor Riverlinx.

We have placed contracts for transport and traffic, socio-economic and environmental monitoring, which are part of our Development Consent Order obligations.

Environmental monitoring continues, with other monitoring planned to start later this year. This will support our wider

air quality monitoring and is in addition to that required under the Development Consent Order obligations.

Virtual exhibition

A new virtual public exhibition about the Silvertown Tunnel project was launched on 19 August on the Riverlinx website, which includes new CGI images showing what the fully accessible walking and cycling bridge across the A102 Blackwall Tunnel approach will look like once complete.

EFC performance over time



Our forecast end date has been stable since net Programme and Project Authority was awarded in May 2019. Our Programme and Project Authority was granted net of reimbursements. EFC increased due to an increase in costs for implementation of road user charging infrastructure and reduced in Q1 2021/22 after the road user charging infrastructure scope and budget was transferred to Surface Project and Programme Delivery to achieve synergies with TfL's other Road User Charging schemes. Sponsorship will remain with the Major projects to ensure project objectives are met.

The EFC is currently (£0.8m) over the delegated Project Authority which is due to new risks for future business rates and an increase in risk exposure for potential remedial works due to poor condition of existing assets planned for signage. The project team is continuing to look for opportunities to bring the EFC back in line with Authority. Please note: All numbers shown as net of income and third-party contributions.

Network extensions

Barking Riverside Extension

Forecast completion year	Spend to date £m	Programme and project authority £m	EFC £m	Cost to go £m
2022	289	329	331	42

Following the disruption and re-planning required due to the pandemic, the delivery programme has stabilised, and we have made progress with Network Rail in securing the additional possessions needed to complete the works.

Our most likely entry into service date remains as autumn 2022.

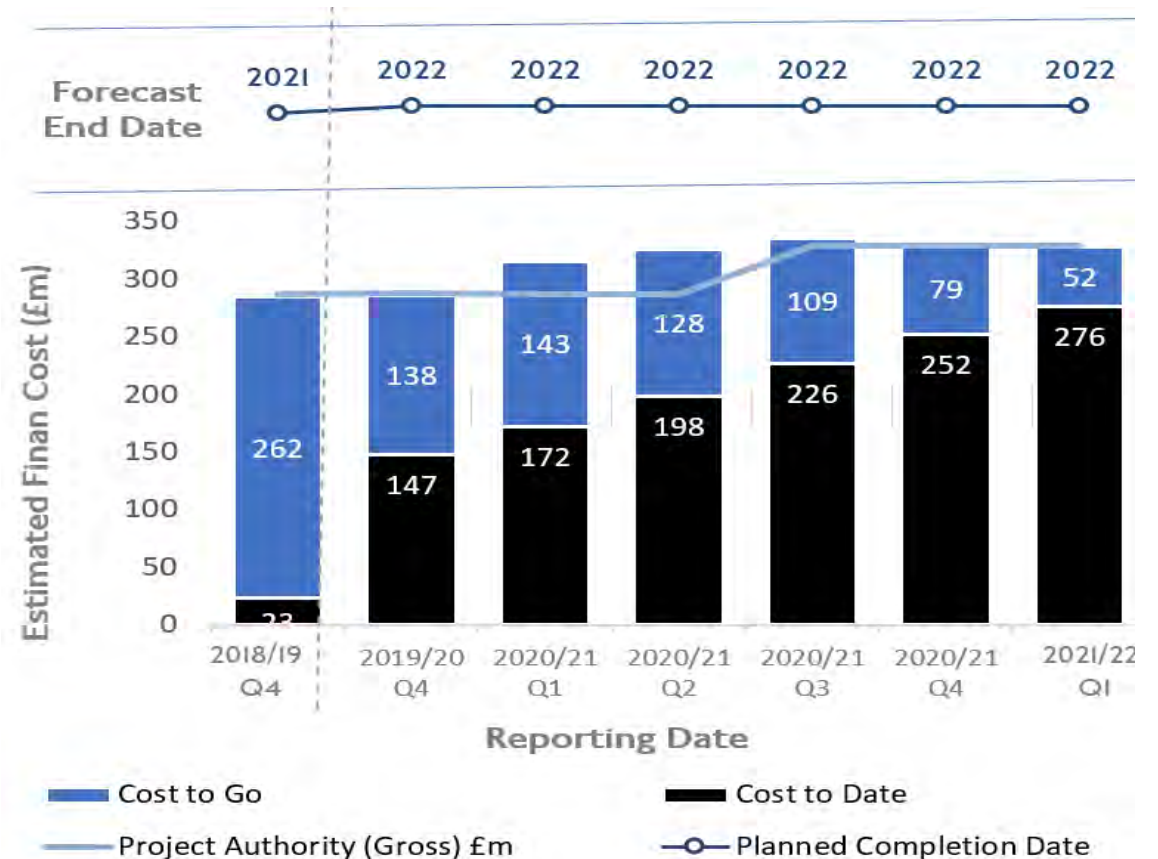
Completed viaduct structure

In July, we formally handed over the completed viaduct structure for the installation of track and associated rail systems; the track slab is on target to be completed in October 2021. On the existing Network Rail infrastructure, two new power supplies were successfully commissioned at Eldred Road and Renwick Road in July and August respectively. Stage I4 signalling commissioning was completed in July and the penultimate stage, Stage I5, connecting the viaduct to the existing network, was completed during an extended possession over the August bank holiday weekend. The final stage of signalling commissioning for rail systems on the viaduct is planned over a series of weekends in March and April 2022.

Station installation

At the new Barking Riverside station, the installation, testing and commissioning of mechanical and electrical equipment has continued and there is an increasing focus on finalising assurance documentation. At platform level, the platform finishes and placement of coping stones at the platform edges have been completed. Outside the station, we are progressing the drainage and public realm areas interfacing with the Barking Riverside development.

EFC performance over time



The programme was given an increased Programme and Project Authority in December 2020 of £328.5m based on a minimum EFC. The Programme completed a deep dive for IIPAG, ahead of an update to the Programmes and Investment Committee in May 2021. A further deep-dive and an integrated assurance review is planned for November 2021 ahead of the Programme and Investment Committee in December 2021.

Our forecast end date has been delayed by nine months since Programme and Project Authority was increased in December 2018, following the discovery of unchartered utilities on site and a delay in securing Network Rail possessions. A further increase was made in December 2020 following the impact of the delays to completion as well as costs associated with the Safe Stop of work. Our team continue to closely review all options to mitigate cost increases and minimise risks.

Major station upgrades

Bank station capacity upgrade

Forecast completion year	Spend to date £m	Programme and project authority £m	EFC £m	Cost to go £m
2022	592	701	700	108

On 12 July, a public announcement was made regarding the 17-week closure of the Bank branch of the Northern line, from Kennington to Moorgate from January 2022 to facilitate complex final stages work.

New station cabling system

The installation of the new station system cabling is now substantially complete in all public and non-public facing areas. All station power modes are now live, allowing downstream live testing to start to plan. The new station finishes have been progressed in all areas, however, quality and supply issues with the wall panels has caused delays. The issue has been escalated and an action plan and firm commitment from all parties to mitigate and recover delays in readiness for the closure has been agreed.

Escalators

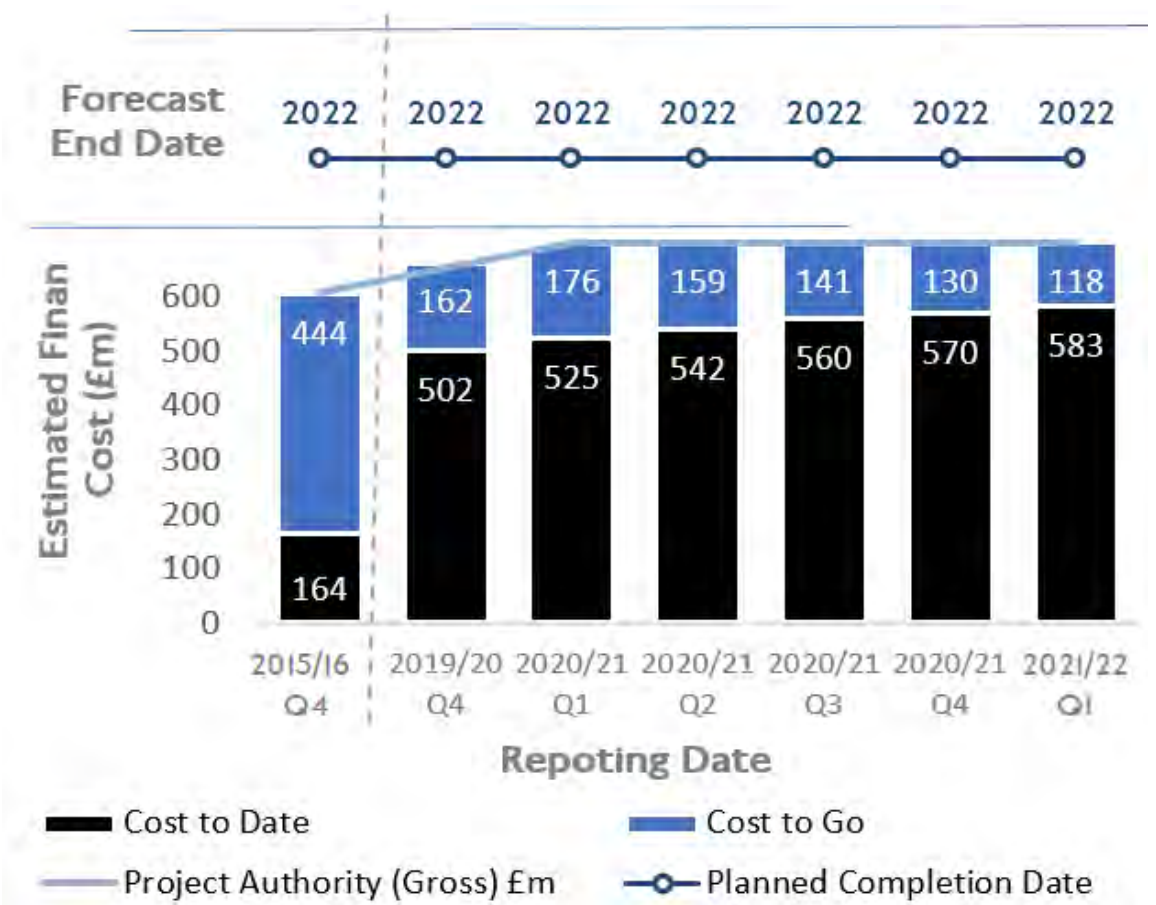
The primary installation of escalator trusses has been completed on two of the four escalator banks. All 12 escalators and the two moving walkways are planned to be delivered and installed in the next quarter.

17-week closure

The closure will allow TfL and its contractors to complete the intricate work needed to connect the new tunnels to the existing railway, as well as fit out the new station, install the final sections of track, complete work in the tunnels constructed during the project and integrate all the new systems installed in the station.

We are focused on the preparation for the closure, helping customers to reach their destinations easily during the closure, including enhancing services on the Charing Cross branch of the Northern line and a new bus route between Oval and the city, additional staff to assist customers, working with Network Rail and other train operators on alternative travel options and a communications campaign to give customers the tools and advice they may need to plan their journeys.

EFC performance over time



The EFC has remained stable since setting the budget and compared to last quarter.

Our forecast end date has remained consistent since January 2016. Estimated final costs have increased over the last 18 months, driven by the impact of the coronavirus pandemic and the Safe Stop of all construction works as well as the discovery of asbestos and the resultant programme delays.

Major station upgrades

Elephant & Castle

Forecast completion year	Spend to date £m	Programme and project authority £m	EFC £m	Cost to go £m
2029/30	6	*	*	*

Our negotiations with the developer continue, with a number of matters remaining outstanding.

The latest target date for concluding the fundamental components of the Development Agreement is in early autumn 2021 and a formal submission is going to this October Programme and Investment Committee to request full authority.

Developer negotiations

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The latest target date for concluding the fundamental components of the Development Agreement is in early autumn 2021 and a formal submission is going to this October's Programme and Investment Committee to request full authority.

Funding

Funding discussions with third parties (including GLA and London Borough of Southwark) have generated a successful outcome and the station box, connecting tunnels and early works are now secured.

Station fit-out remains unfunded but TfL will seek to secure funding at a later date. The project plans to approach Programme and Investment Committee following the Developer Agreement in order to secure the necessary uplift to authority to proceed with the third party funded works.

Current technical activity includes preparations for early enabling works contracts to allow us to take advantage of the forthcoming Bank closure.

* data has been redacted due to commercial sensitivity



High Speed 2

Forecast completion year	Spend to date £m	Programme and project authority £m	EFC £m	Cost to go £m
2027/28	18	22	62	44

Programme and Project Authority is £40m lower than EFC as it is granted on an annual basis for the following year's spend.

Construction progress

High Speed 2 (HS2) Limited's construction activity is continuing across London. We are working with HS2 to mitigate the impacts of construction on the road network at Hampstead Road. For instance, the haul road has been established and is now being used by HS2 construction traffic, to reduce the impact on traffic on local roads for residents, while this major construction work is undertaken.

To further reduce the impacts of HS2 related construction traffic in London, materials have begun in July to be transported by rail from Old Oak Common station where large-scale piling works for the structures of the station box are now continuing. We continue to work closely with HS2 to ensure the adjacent Elizabeth line depot is protected.

Station designs

We are supporting HS2 Ltd on their designs for the stations as they progress into concept design at Euston and detailed design at Old Oak Common. This includes developing designs for the London Underground station at Euston and bus station. We are also working closely with HS2 Ltd, Network Rail, London Borough of Camden and Lendlease, under the umbrella of the Euston Partnership, to refine designs for the long-term vision of the wider Euston campus partnership.

Railway systems enhancements

Forecast completion year	Spend to date £m	Programme and project authority £m	EFC £m	Cost to go £m
2023/24	140	245	192	52

The EFC is £53m lower than the Programme and Project Authority, due to historical Jubilee and Northern line additional trains being taken out of scope, and scope transfer for high voltage works at Stockwell station to another project.

Kennington works

The Kennington speed uplift team has successfully completed all works on the northbound track with the southbound track completed in early autumn this year. The work has improved the track condition as required in advance of the start of the Northern Line Extension revenue service.

Stockwell substation

Coupling transformers have been commissioned in their temporary locations. This is to support the Northern line Power Upgrade works which are ongoing in order to provide system capacity for reliable services during planned or unplanned outages following service enhancements.

Jubilee line rolling stock

We have carried out modifications to Jubilee line rolling stock to enable an increase in entry and exit speeds at Neasden depot. This ensures compatibility with adjacent Metropolitan line services following the introduction of new signalling on the Circle, District, Hammersmith & City and Metropolitan lines (Four Lines Modernisation) and support the future timetable uplift.



London Underground

This portfolio is made up of stations, accessibility, track renewals, power, cooling and energy, rolling stock, and signalling and control

London Underground

Enhancements

Forecast completion year	Spend to date £m	Programme and project authority £m	EFC £m	Cost to go £m
2022/23	400	532	538	138

The enhancements programme covers a range of improvement projects, mainly on stations and depots. We improve stations primarily through enhancing accessibility, relieving congestion and carrying out large scale capacity upgrades.

Crossrail Station developments

Our work on stations reflects our ambition not only to deliver improvements for our customers but to contribute to significant local regeneration by working in collaboration with local boroughs and developers.

Paddington

At Paddington, we continue to work with Great Western Developments on a co-funded scheme that will bring substantial benefits to customers accessing the Bakerloo line. The development includes an enlarged ticket hall and step-free access to the Bakerloo line platforms. Civil and structural works continue steadily. Tunnelling works to create the new cross-passage at platform level are now due to start later in the year and continue into early 2022. The project is due for completion in late summer 2022.

Knightsbridge

Work to fit out the new Hooper's Court and Brompton Road entrance of Knightsbridge station is ongoing. The manufacture of the three lifts to make the station step-free is continuing and due to complete in quarter 3. The site installation will begin shortly after that.

A station-wide speaker upgrade has been recently commissioned and the replacement works have begun. The new facilities will be opening to the public in a staged process with the Brompton Road entrance being available to the public in early 2022.

Waterloo Elizabeth House

As part of a wider redevelopment which will see the demolition of Elizabeth House, we are evaluating a project to provide step-free-access to the Northern line platforms. Discussions with the developer are ongoing and are expected to conclude later in 2022. Step free access would be subject to TfL affordability.

Tottenham Hale

At Tottenham Hale we are creating an interchange with Network Rail as well as a capacity upgrade and new ticket hall. The work continues and is integrated with the delivery of step-free access. Remaining works are focused on the internal fitout which is progressing well ahead of entering final system integration testing and the bringing into use of the newly constructed assets in late 2021.

King's Cross St Pancras Station – Belgrove House

We are evaluating a developer funded scheme to upgrade the station entrances on the south side of Euston Road as part of a wider redevelopment of the area. This project would improve the urban realm and provide additional step free access. Negotiations are expected to conclude in mid-2022.

London Underground

Enhancements – Station developments

The enhancements programme covers a range of improvement projects, mainly on stations and depots. We improve stations primarily through enhancing accessibility, relieving congestion and carrying out large scale capacity upgrades.

South Kensington

We are aiming to improve South Kensington station, integrating our work with a third-party development. With our joint venture partner Native Land, we await the outcome of a planning application for the proposed around station development. A decision is expected from the Royal Borough of Kensington and Chelsea in November.

Colindale

At Colindale, we continue to work in partnership with our key stakeholder the London Borough of Barnet to progress a scheme which will relocate the ticket hall, increase capacity and provide step-free access. The detailed design phase was successfully completed in July. The project is now focused on defining an efficient schedule and affordable cost model. The decision point on transition into the construction phase is expected by the end of 2021.

Stratford

A new south-western station entrance at Stratford station is forecast to open in 2023. It is a collaborative venture with London Legacy Development Corporation and the London Borough of Newham who are funding the capital works. Concept design is currently underway and is scheduled to be completed by early 2022.

West Ham

We continue to work with the developer Berkeley Homes on a new western ticket hall from the Twelve Trees Park housing development which it is funding. The developer is carrying out enabling works as part of its project and this is ongoing. These works will continue with a target of starting on the new station entrance in 2022.

Leyton

At Leyton, we continue to work closely with our key stakeholder the London Borough of Waltham Forest to progress an efficient and affordable scheme that will create a new ticket hall, increase capacity and provide step-free access. This is at early development stage and will be subject to a future commercial agreement.

Walthamstow

The Walthamstow Central project will address existing capacity limits and supports the London Borough of Waltham Forest in its wider regeneration plans. The project plans to deliver step free access and improved customer facilities. Current activity is focused on developing funding options and safeguarding the planned scheme.

Ladbroke Grove

We continue to work closely with our key stakeholder the Royal Borough of Kensington and Chelsea to evaluate the merits of a scheme to provide increased capacity and step-free access. A feasibility study (funded by the Royal Borough of Kensington and Chelsea) started in summer this year, and dialogue continues on funding opportunities from the borough and exploration of other third-party contributions.

London Underground

Enhancements – Depot construction

Acton train modification unit

This project supports the ongoing London Underground fleet renewals programme including the heavy overhauls and modernisation on the Central line trains. The delivery of the new train modification unit at Acton depot achieved practical completion in July 2021. The first train was successfully moved into the facility in August and the facility is in project use.

Acton warehouse

This project will address the deteriorating asset condition of an existing warehouse at Acton depot and create a temporary material storage facility to initially support the Central Line Improvement Programme. Funding for the first phase of the work has been secured and activity will focus on ensuring the existing structure is made safe with the current equipment and contents safely removed. Extensive survey works (including hazardous materials) will follow in tandem with the progression of detailed design. The future decision point around transition into the construction of the new storage facility is expected by the end of financial year 2021/22.

Lillie Bridge depot

As part of the regeneration of the Earls Court area, we are planning to move our Lillie Bridge depot facilities and vacate the site. This includes complex moves of existing train stabling as well as other business activities.



London Underground

Enhancements – Energy and cooling

Substation ventilation

As part of the enabling works for the Four Lines Modernisation programme, works to upgrade cooling capacity within key substations are ongoing. These works are needed to keep our substations cool as we progressively run trains more quickly and at greater frequency. Critical improvements to the final seven substations in scope are currently ongoing. Earls Court and Shepherds Bush have achieved completion of the main installation with final commissioning imminent. On-site works are progressing at Acton and design is near completion for Embankment. The Bouverie Place contract award is due in quarter 3.

In the next quarter it is planned that Acton will be commissioned and handed over, and with Embankment, Bouverie Place, Victoria and Notting Hill Gate nearing practical completion.

Waste heat and private wire

These are environmental projects that form part of the wider TfL energy and carbon strategy. They are early stage projects in development.

The waste heat project builds on our success with the London Borough of Islington in the Bunhill development. It aims to use the thermal energy of the ventilated air from London Underground networks to power heating and hot water in non-TfL buildings, with potential to serve over 15,000 households.

Solar private wire will enable us to directly receive zero-carbon electricity from local solar assets, reducing the carbon emissions associated with the operation of the London Underground network. The project is specifically focused on direct connection to new-build solar photovoltaic generation. Based on a typical solar generation profile the opportunity represents up to 64 megawatts of renewable generation, equivalent to five per cent of TfL's annual energy load.



London Underground

Accessibility – step-free access

Forecast completion year	Spend to date £m	Programme and project authority £m	EFC £m	Cost to go £m
2022/23	102	120	120	28

We are making 12 stations accessible as part of the London Underground accessibility programme.

We have delivered step-free access at nine stations since 2018 (Newbury Park, Buckhurst Hill, South Woodford, Mill Hill East, Cockfosters, Amersham, Debden, Ickenham and Wimbledon Park), with the remaining three to be made step-free by the end of 2021.

Wimbledon Park is the most recent, becoming the 86th step-free station on the Tube network on 25 August.

Main works and lift installations continue at Osterley, Harrow-on-the-Hill and Sudbury Hill. Subject to discussions with TfL's supply chain, we also intend to

restart on the paused step-free improvements at Burnt Oak, Hanger Lane and Northolt later this year to enable them to be completed in the coming years.



London Underground

Accessibility – lifts and escalators

Forecast completion year	Spend to date £m	Programme and project authority £m	EFC £m	Cost to go £m
2022/23	462	885	591	129

There are 447 escalators, 259 lifts and four passenger conveyors on the London Underground network that are essential to ensuring that customers have safe, reliable and quick access to our train service.

Many of our lift assets also provide step free access to our network. These numbers will grow by 30 per cent between now and 2026 as a result of major station projects, the accessibility programme and the Elizabeth line.

This programme provides the rolling asset renewals work to keep these assets in operation.

South Kensington

Works continue to replace five life-expired escalators at South Kensington station. This means that Piccadilly line trains are not stopping at the station until Spring 2022, however the Circle and District line platforms remain open. Removal of the existing escalators is complete, and preparations are nearing completion on the civil construction phase ahead of delivery and installation of the new escalators.

Marylebone

At Marylebone station we are replacing the two existing, life-expired escalators and adding an additional third escalator to boost capacity. All works are due to complete in 2023.

Oxford Circus

Refurbishment work to improve the condition and reliability of the escalators at Oxford Circus began in May 2021 and the first escalator was completed and returned to service in July ahead of schedule.

Elephant & Castle, Borough and Tottenham Hale

Following successful completion of life extension works of two lifts at Elephant & Castle station in May 2021, we have now started lift replacement works at Borough and Tottenham Hale stations. The work at Borough will continue into 2022 and have been planned to coincide with the temporary Bank branch Northern line closure to minimise disruption to customers.



London Underground

Track renewals

Forecast completion year	Spend to date £m	Programme and project authority £m	EFC £m	Cost to go £m
2022/23	105	402	402	297

The track programme remains on course to deliver the year-end target of installing 8km of new track across the network.

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 a state of good repair.

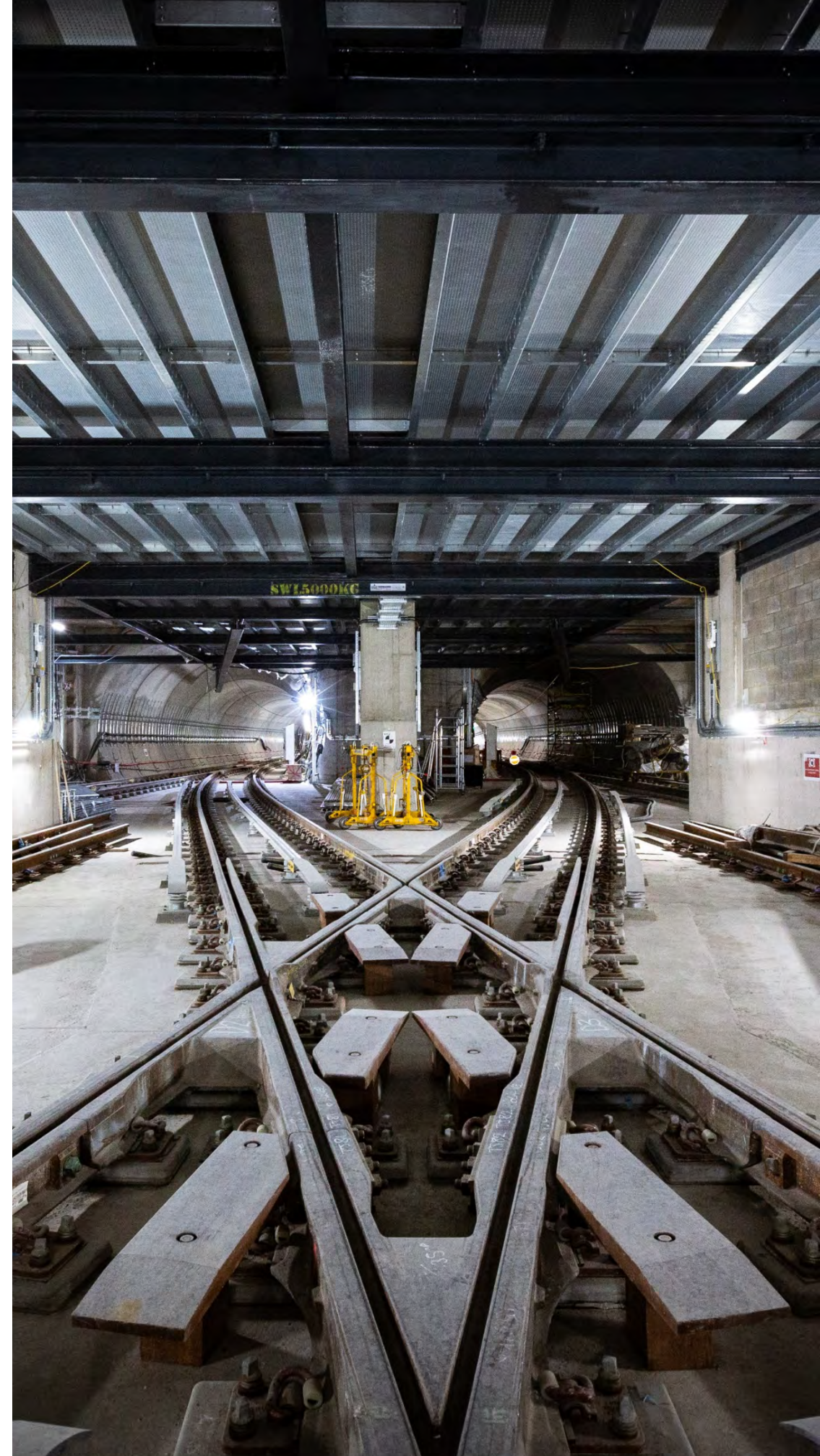
Depending on the configuration and how much it's used, each section of track may have a life of between 40-60 years. The result is that we need to renew two to three per cent of our track every year, as well as ongoing programme for component replacements.

Ealing Common depot

We have successfully completed a three-week project to renew the track within Ealing Common depot.

Timber track replaced

Over a nine-day closure in August between Embankment and Earl's Court we removed outdated long timber track, replacing it with concrete slab track and packing ballast underneath to provide support. This involved pumping over 100 tonnes of concrete from road level. These works will provide faster and smoother journeys with greater reliability.



London Underground

Rolling stock

Forecast completion year	Spend to date £m	Programme and project authority £m	EFC £m	Cost to go £m
2026/27	241	705	1,049	809

Over their design life of 35-40 years, each of our fleets needs regular interventions to keep it running smoothly.

These include day to day maintenance, routine heavy overhauls and midlife renewals. If it is necessary to extend their design life further, then additional interventions are required. A heavy overhaul, like a road car service, is needed periodically to replace worn parts and maintain safety levels. Together with more intensive renewals this forms a rolling programme of work across all nine lines.

Modern rolling stock incorporates more computer-based systems, which significantly improve both performance and efficiency, however this creates the need for significant obsolescence-driven interventions to maintain these performance expectations. The Central Line Improvement Programme is an example of us combining interventions into a single project.

Accessibility

Our programme of works on the Bakerloo and Central line fleets is critical to improving Rail Vehicle Accessibility for our customers. Both projects are progressing with detailed design validation through the installation and testing of prototype systems. A Bakerloo line train is currently at Acton maintenance shed, having the first wheelchair bays and new grab pole installed. The team is developing designs and prototype installation for the passenger information system.

A Central line train is currently at Ruislip maintenance shed, having wheelchair bays, new door entry tread plates, vinyl floors and grab poles installed. This train is also having a passenger information system installed in each carriage. We expect to meet our target of a successful dynamic test of the Central line saloon design by the year end.



London Underground

Rolling stock – continued

Reliability

We are including critical reliability improvements in our Central line programme of works, through the conversion of the now obsolete direct current (DC) power traction to the much more reliable alternating current (AC) traction equipment. The AC traction prototype installation on the first train is complete and we have made a back to back comparison (four-car AC with four-car DC) on the London Underground network. This yielded a good quantity of performance and operational data. We expect to meet our target of a dynamic train test on the London Underground network by the year end.

As part of the Jubilee line reliability improvement programme, the feasibility study on reducing the risk of structural fatigue cracking in the carriage subfloor continues to make good progress, with capital investment authority to proceed into concept design and delivery due to be requested in quarter 3.

Safety

We are also working to improve customer safety on the Central and Bakerloo line fleets. The first Bakerloo train, with new LED lighting throughout, was returned to

service in quarter 1 and we expect to meet our target of 15 trains by year end. On the Central line, we have achieved 95 per cent of the saloon design electrical installation on the second train, with the last elements of the electrical installation. The remaining LED luminaires were completed in quarter 2 and are now ready for testing. We have approved the design for the CCTV on the Central line, and we are progressing the prototype CCTV installation. We expect to meet our target of a successful dynamic test of the Central line saloon design by the year end.

We have restarted a programme of works to improve the train operator's cab security. In quarter 2 we will be conducting security and behavioural assessments to compare market prices and resequencing the installation plan to reflect prioritisation of Waterloo & City line, while its operation is on hold, ahead of the other fleets.



London Underground

Rolling stock – continued

Engineering vehicles

The mechanised renewal vehicle will change the way we replace track by mechanising concrete track renewal in the deep Tube. Made up of three wagons, the vehicle has been fitted with track renewal equipment and access steps. Trials are planned to start in the coming weeks. The first live track renewal site has been identified we plan to book the necessary train paths to and from the site.

We are purchasing a new fleet of engineering wagons from CRRC, the world's largest rolling stock manufacturer. The first four prototype wagons have arrived in the UK and are undergoing final engineering works before the dynamic testing can begin. Once dynamic testing has passed, they will be joined by a further three prototype wagons to undergo infrastructure testing on the London Underground network. After this, the remaining 66 wagons will enter production in China before being shipped to the UK early 2023.

We purchased two rail-mounted cranes and eight tilting wagons from Kirow in Germany. The Kirow cranes are currently undertaking clearance runs before they undergo dynamic brakes testing on the London Underground test track. Once approved the cranes and tilting wagons will be presented for

approval to operate outside Ruislip Depot. This will be first in open sections and then in sub-surface tunnel environments. The cranes and tilting wagons enable us to transport wide track panels from the manufacturer's site to the track renewal location, giving time and quality benefits.

Track recording vehicle

A tender for the replacement track recording vehicle has been published with a better than expected response rate so far.

Ruislip depot

The Ruislip depot development is under way to ensure our infrastructure is suitable for the new engineering vehicles being introduced.

Battery locomotive fleet replacement

We are currently exploring options to replace the existing battery locomotive fleet. Options development is underway and early market engagement is complete. We use battery locomotives to haul most of our engineering vehicles around the London Underground network, facilitating maintenance and project works. The project will also enhance the existing engineering locomotive fleet to ensure it remains operational while the replacement fleet is progressed.



London Underground

Fleet heavy overhauls

Forecast completion year	Spend to date £m	Programme and project authority £m	EFC £m	Cost to go £m
2026/27	79	398	241	162

Over and above day-to-day work, every few years our trains need large-scale heavy overhauls to enable them to remain in safe and reliable operation until they are replaced.

This rolling programme of scheduled work maintains the condition of the fleets across the network.

Typically, this takes them out of service for several days or weeks. Overhauling the suspension, wheelsets, motors and brakes involves physically lifting the train off the tracks and working on its underside.

Victoria line

We have continued work to replace the pressurised ventilation fans which provide air in the train carriage in place of air-conditioning with an improved design which requires less maintenance. We have developed prototypes and carried out trial fittings.

Metropolitan line

The programme lift project has continued mobilising. The first two trains are back in service and we have completed the first overhauled bogies.

A station wide speaker upgrade has been recently commissioned and the replacement works have begun. The new facilities will be opening to the public in a staged process with the Brompton Road entrance being available to the public in early 2022.

Piccadilly line

The life extension works have continued to schedule with the motor overhaul being completed in-house. We have replaced 90 per cent of the seats and 65 per cent of the floors.

Jubilee line

Mobilisation is progressing with the temporary fitout shed having train lifting jacks installed and refurbishment of cabins. The temporary fitout shed is the primary location for overhaul works.

To mitigate resource constraints, the engineering team is using a new framework to get a supplier in place for external engineering resource to support the programme.



London Underground

Renewals

Forecast completion year	Spend to date £m	Programme and project authority £m	EFC £m	Cost to go £m
2024/25	134	285	341	207

The London Underground Renewals programme covers a range of assets across buildings and stations, civils, power, electricals and cooling to ensure safety compliance and continued reliability. Our various core asset renewal programmes are driven by the state of good repair of the systems and their parts.

Buildings and stations asset resilience

We undertake rolling programmes of targeted interventions to building systems (communications, fire and mechanical assets) and the built environment (fabric and surfaces that our customers and staff interact with) in stations, buildings and other London Underground premises to improve asset condition.

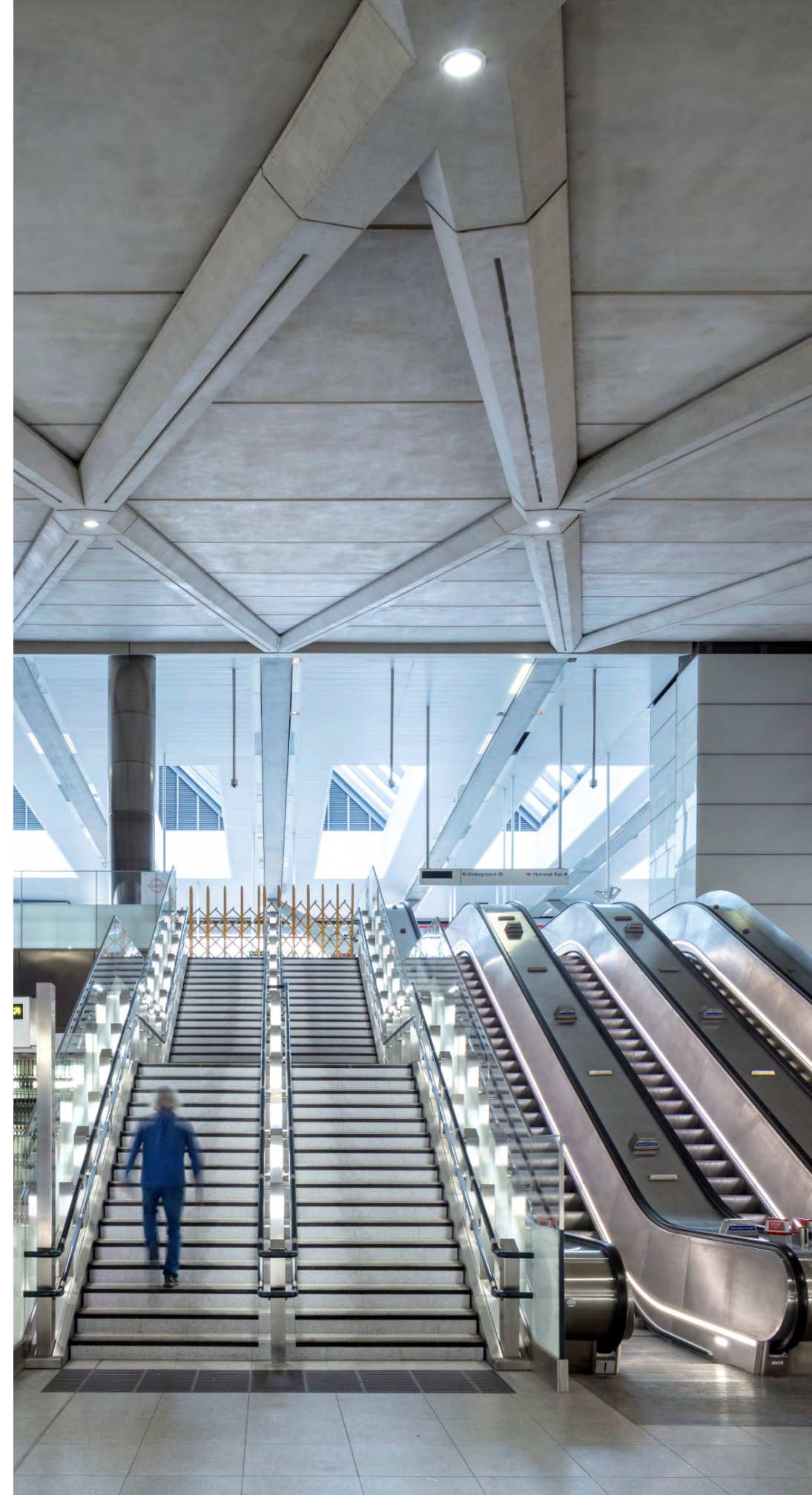
We have recently awarded a contract to replace the roof of the power substation at Plaistow.

We started detailed design work to replace obsolete communications equipment at King's Cross, including station management systems, local area networks, closed circuit television (CCTV), the public address and alarm system, lift intercom system, visual information

displays and ticket hall information displays, as well as passenger help point systems.

In addition, concept design work has progressed on London Bridge, North Greenwich, Canary Wharf, Canada Water, Canning Town, West Ham, Southwark and Bermondsey for the replacement of station information management systems, public address and voice alarm system, as well as the passenger help point system. These works will ensure that all communication systems including CCTV are upgraded to the current standards.

We also completed the replacement of heat detection systems in the escalator machine rooms at Bounds Green and Southgate Stations to ensure the continued safe operation of these stations.



London Underground

Renewals – continued

Civils

Civil assets account for 30,000 assets across the network. They provide structural support, stability and protection to the railway. The asset base is wide-ranging and includes over 16,000 bridges and structures and 235km of embankments and cuttings, as well as tunnels, lighting masks and flood protection assets.

We are undertaking a programme of condition assessments to further improve our understanding of our asset base which will help us to plan future interventions.

Works have recently started onsite to stabilise the cutting between Grange Hill and Chigwell stations on the Central line to ensure the continued safe running of the railway.

Meeting Rail Vehicle Accessibility Regulations requirements to ensure level access between the train and platform for customers on the Jubilee line will improve safety and have a positive impact for passengers who are less mobile.

The Jubilee line Rail Vehicle Accessibility Regulations programme of works is now completed following the platform edge door modifications and the installation of tiled ramps with associated platform blue disc signage at North Greenwich, Canary Wharf, Canada Water, Bermondsey, Waterloo, London Bridge and Westminster stations. Modifications to the platform profile nosing stones at Stratford, West Ham and Canning Town Stations were also completed as well as the canopy modification works on Platform 3 at Wembley Park.



London Underground

Renewals – continued

All our fleet is electric, and London Underground is the largest consumer of power in London. We operate our own high voltage distribution network and backup power generation capability. Based on the state of good repair of the assets and the expected age, we deliver a rolling programme of renewals to maintain the integrity of power delivery to the railway.

Power and electrical

Work is under way to replace 22 life-expired uninterruptible power supply units feeding station signalling equipment. This will address critical signalling risks to the railway. Detailed designs have been completed with site works planned for late this year.

Procurement has started for the replacement of 20 life-expired offline battery power inverter units supplying station emergency lighting systems required for safe evacuation in the event of main power supply failures. The project will include developing standardised modular equipment which can be retrofitted into existing installations, and site trials to reduce the installation work and improve value for money. The replacement of 16 traction isolation

switches is in progress at Hainault Depot to address equipment non-compliance and remove operational restrictions. These works have proved challenging due to the operational access limitations in depots, but the internal delivery team method adopted for these works has achieved valuable benefits in flexible working and cost efficiencies.

Civil works are in progress at Greenford substation as scheduled in preparation for the replacement of the high voltage switchboard. The impacts of the pandemic on the overseas manufacture of the switchboard have been successfully mitigated and manufacturing accelerated to minimise delivery risks.



London Underground

Renewals – continued

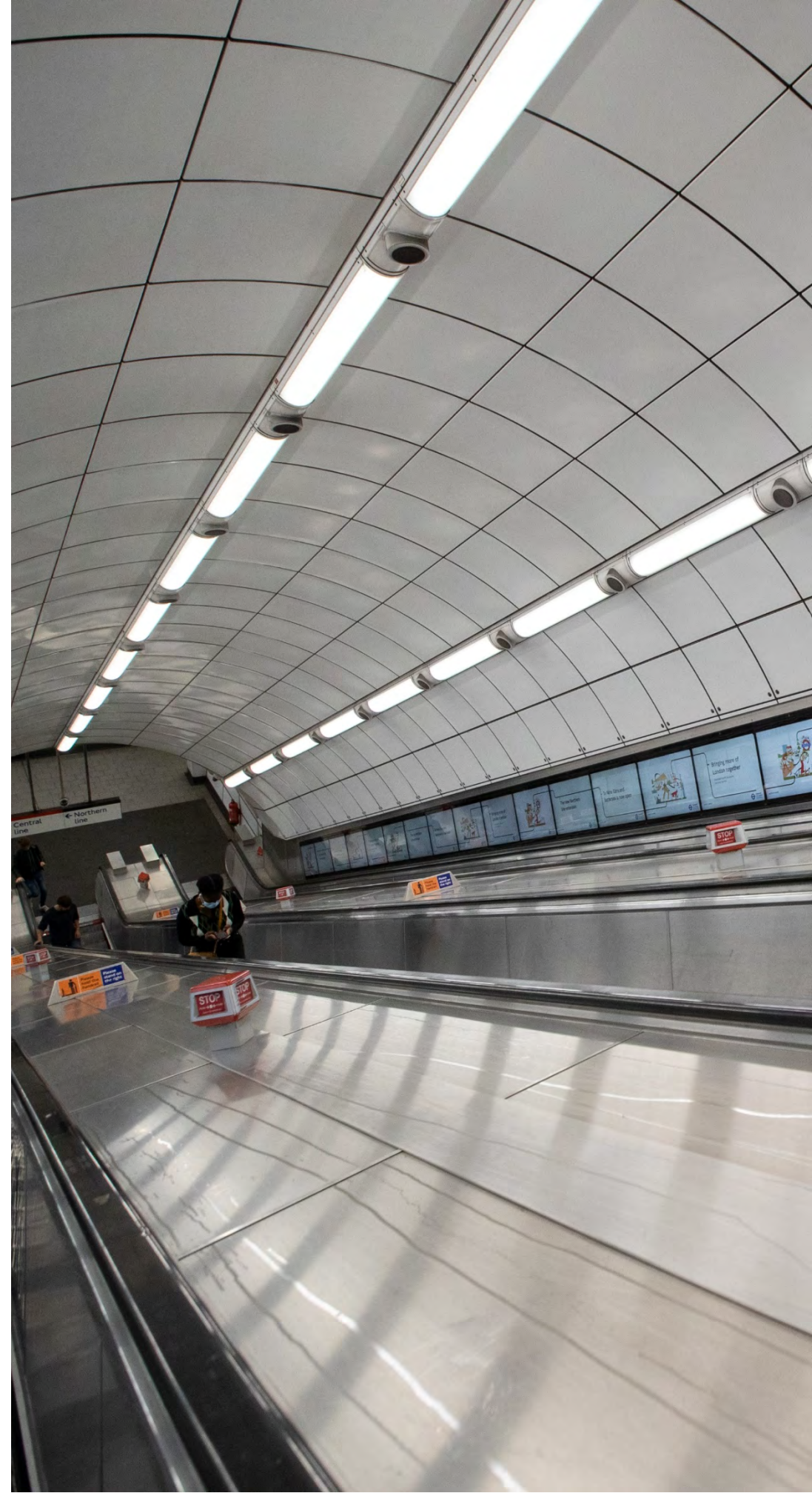
Power control

We are nearing completion of the factory acceptance testing and site installation of the network-wide power control system replacement project to improve safety and reliability. The power control system comprises control centres linking to circuit breakers across the network which enable train traction control. All electrical systems on the network have plant that is controllable from these locations. This important step means we can go ahead with site testing, training of operational staff and commissioning towards the end of 2021/22. Unfortunately, the pandemic has continued to impact these works, and completing them remains dependent on lifting the Government's current coronavirus travel restrictions.

The first of the control system upgrades on the electricity generators at Greenwich Power Station is planned for completion in early autumn 2021. The upgrades will remove obsolescence and improve the long-term reliability of the essential emergency generating plant.

LED lighting

As part of the Mayor's Transport Strategy zero carbon target, we have continued with the planned conversion of traditional fluorescent lights to low energy LED lighting, improving efficiency and reducing ongoing maintenance costs. A new delivery programme for a further 21 stations to be completed during 2021/22 has begun with additional conversions also being planned to begin at prioritised train depots.



London Underground

Signalling and control

Forecast completion year	Spend to date £m	Programme and project authority £m	EFC £m	Cost to go £m
2024/25	95	212	216	121

The signal systems that control the railway are a complex mix of physical assets and safety / control hardware and software. We continue to move towards more and more modern computer-based systems which provide greater service capacity. While these need less day to day maintenance compared with traditional electro-mechanical signalling, they do need significant obsolescence-driven renewals during their life.

Signalling and control

We have completed concept designs on the Central line signalling life extension and control and information projects. Early deliverables will have direct reliability and resilience benefits. Notably, installing fibre optic communication systems will remove obsolescence and provide infrastructure that can be used long into the future.

Other benefits of the projects include providing line spares to assist in maintaining a safe and reliable railway. Strategically these projects are vital for maintaining the operational railway until the later signalling upgrades are delivered.

The Central line projects identified a number of efficiencies reducing the EFC. This was achieved by realising the opportunity to deliver some works where London Underground has the expertise.

Signalling upgrade

The first five-year tranche of the Incremental signalling upgrade programme is progressing well, with design starting on updating the Bakerloo line control system. Early contractor engagement is also taking place to address replacement of obsolete signalling sub systems on the Jubilee and Northern lines. We are also planning the first upgrade for the Central line signalling system.



London Underground

Technology

Forecast completion year	Spend to date £m	Programme and project authority £m	EFC £m	Cost to go £m
2024/25	86	95	205	119

Our technology assets include a network-wide radio system and data network as well as all the software to manage our assets and deliver customer service. The fast-evolving IT market necessitates a programme to keep software in manufacture support as well as taking advantage of new technology to improve the way we deliver service.

Networks and connectivity

We are continuing to upgrade key components of London Underground's operationally critical Connect radio system and are now focussing on the roll out of new radio hardware base-stations across the London Underground network. This second phase will continue through financial year 2021/22 and is expected to be complete in mid-2023. As a result of this work, the Connect system will be able to function into the 2030s. To date, we have installed new hardware at 27 of the required 293 locations and installation is progressing well.

We are also in the process of issuing replacement mobile devices to many of our operational staff. These will ensure our staff can continue to work effectively and assist our customers, while remaining secure and supportable. This work will be

complete in early 2022 and entails rolling out around 7,700 devices to our front-line staff. Over 4,000 replacement devices have been issued to date. Old devices will be collected and will be either recycled or donated.

Asset management

To improve our approach to asset management and long-term investment planning, we are consolidating our asset management information systems into a single platform for London Underground and London Trams and are now in the process of migrating London Underground assets onto this new single platform. This work will continue through 2021/22 and is anticipated to complete in late 2022. The project is part of a pan-TfL initiative to streamline our approach to asset management, migrating to the same single asset management platform over the coming years.

In addition, we are working to improve the quality of our asset condition data by undertaking surveys across a wide range of assets on our network. This work will be complete by mid-2022 and will help us improve the planning and co-ordination of essential maintenance works.





Surface transport

This comprises healthy streets, air quality, public transport and asset investment

Surface transport

Healthy Streets

Forecast completion year	Spend to date £	Programme and project authority £m	5 year forecast £m	Post plan movement
2024/25	196	309	751	(2)

In March 2021, we largely concluded the rapid delivery of new temporary schemes under the Streetspace for London programme, in response to the challenges of the pandemic. Further government funding was allocated to the programme in quarter I, with £100m to 11 December 2021 identified for supporting active travel.

We have now remobilised our longer-term Healthy Streets investment programme, while continuing with some temporary and experimental schemes on borough roads through the Government's Active Travel Fund.

A lot has changed since the programme was paused and we are now in a markedly different context. Our approach to Healthy Streets planning and delivery has adapted to reflect this with a review of some historic schemes, a new integrated pipeline of future schemes, and adoption of lessons learnt through the delivery of the Streetspace for London programme. Furthermore, we have reviewed our strategies and policies which have led to a reshaping of the programme and its priorities, to ensure they align with these commitments - spanning the next three years to May 2024.

The continuing Healthy Streets programme will deliver positive changes for road danger in line with our Vision Zero action plan, walking, cycling and bus travel across London. It will accelerate progress towards mode shift, decarbonisation, economic recovery and tackling health inequalities. Healthy Streets will also be an indispensable complement to our other initiatives – such as Crossrail, the electrification of the bus fleet, and the ULEZ expansion – and help power London's wider recovery.

The Healthy Streets Investment programme and project authority was increased at the July 2021 Programmes and Investment Committee. This includes all spend from 2020/21 to 2022/23.

The investment programme is currently reporting a £2m underspend. This is against the revised budget agreed by the TfL Board in July 2021. The underspend reported mainly relates to borough expenditure which is expected to be lower in this financial year based on current allocations and the run rate of spend to date.

The Tolworth project is also forecasting lower spend in this financial year based on expected efficiency savings. It should be noted that the estimated five-year gross expenditure has been reduced from £999m to £751m since Q1. The forecast has been updated to reflect a similar level of spend as that seen during the pandemic due to ongoing funding constraints and uncertainties. Discussions are ongoing with the Government to agree a long-term funding settlement which would allow investment on cycling, walking and safety to return back to a similar level to the pre-pandemic period.

Surface transport

Healthy Streets – continued

Old Street Roundabout

Construction continues to progress on the highways and drainage and station roof strengthening elements in the lead up to the next traffic management phase were completed over the August bank holiday weekend. On the peninsula area, construction of the new main station entrance continues with the substructure works, including all the internal and external walls. Works have commenced on the above ground superstructure with the precast concrete central column and stairs installation planned for October 2021. The pit and sump for the new goods lift were completed in early August 2021 and works have commenced on the lift shaft.

Refurbishment of the existing stairs at the north west entrance (Subway 4) is nearing completion. The stairs were re-opened, and the adjacent ramp was permanently closed on 30 August 2021 allowing for the new passenger lift works to commence. The green line to Moorfields Eye Hospital was reinstated along the stairs.

Construction of the new station entrance at Cowper Street is also nearing completion following the glazing installation. The entrance was opened and brought into

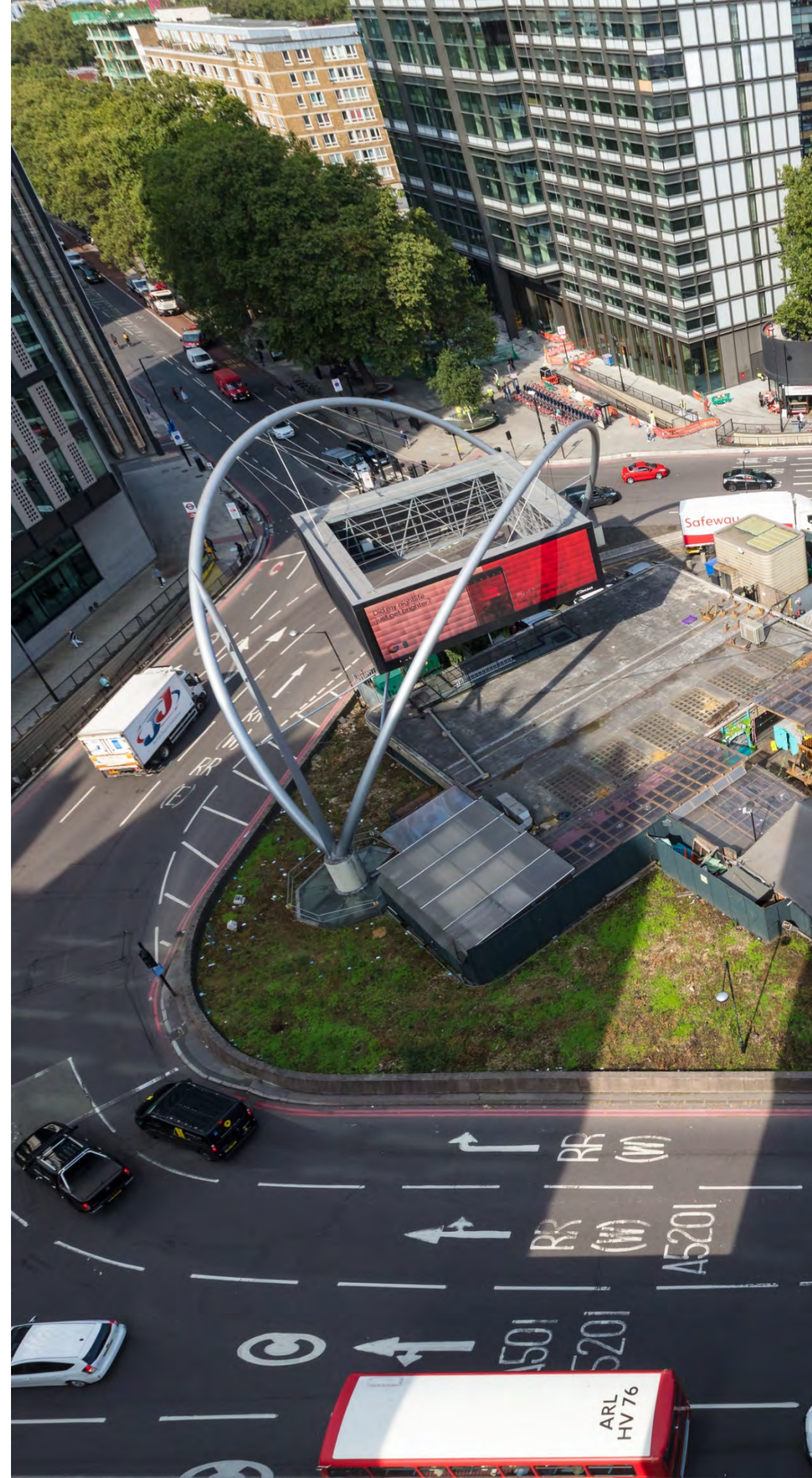
public use on 30 August 2021 which allowed the permanent closure of the north east entrance to the station (Subway 1). The south west entrance to the station (Subway 3) remains open for public use until May 2022.

Installation of the new mechanical and electrical and new fire safety systems works in the below surface shopping arcade area, is continuing as planned.

The scheme will substantially improve safety for pedestrians and cyclists at this major junction. Completion is scheduled for Autumn 2022.

Cycleway 4

Works along Creek Road within the Royal Borough of Greenwich completed at the end of May 2021 and the project team are liaising with the borough to ensure their works on Creek Road Bridge are completed as soon as possible. The next section of construction along Evelyn Street in Lewisham started in July to install 2.8km of segregated cycle track. A southbound diversion for traffic was put into place from 31 August to late November to allow this construction. The works are due to complete in summer 2022.



Surface transport

Healthy Streets – continued

Cycleway 9

Work on the eastern arm of Kew Junction towards Chiswick Roundabout and on Kew Bridge towards the south have been completed and the signals commissioned. Work for the western arm of Kew Junction towards Brentford is continuing with the planning phase and designs are in the process of being completed. Hammersmith gyratory detailed design has commenced and is due to be completed in early autumn 2021.

Responding to the coronavirus pandemic

Borough delivery continues at pace, with more than 20km of cycling routes under construction. The London Borough of Barking and Dagenham is making good progress on their cycle route due to be completed in the autumn this year between Barking town centre and Barking Riverside.

In May, Islington publicly launched its Cycleway between Finsbury Park and Highbury Fields (C38), which features north London's first Dutch-style roundabout. We are now working with London boroughs to explore making temporary schemes permanent. This involves pulling together data from monitoring of impacts and making

decisions on whether temporary schemes are made permanent, amended or removed. It remains an option for some temporary schemes to become experimental orders where further monitoring of impacts is desirable.

We have successfully appealed the judgment in the judicial review challenge brought by two taxi groups, the Union Trade Action Group and the Licensed Taxi Drivers Association Limited (London), to challenge the Streetspace for London Plan, the temporary traffic scheme in Bishopsgate (A10) and the issuing of our interim Streetspace for London guidance to boroughs.

On 16 June, the Court of Appeal allowed our appeal and overturned the order to quash the A10 scheme order, the Streetspace for London Plan and the interim guidance. UTAG and LTDA have made an application to the Supreme Court for permission which we have objected to. A decision from the Supreme Court about whether any further appeal should have permission to proceed is awaited.



Surface transport

Healthy Streets – continued

Safer streets

We are working on more than 120 vital projects delivering measures to address historical collisions and reduce road danger on our roads to contribute to the Mayor's Vision Zero ambition to eliminate deaths and serious injuries from London's roads by 2041. Measures include new and upgraded crossing points, improved pedestrian and cycle facilities, speed limit reductions and innovative pedestrian crossing technology. We are progressing these projects, but final delivery will be subject to future funding.

In May 2021, we agreed with City Hall to accelerate the Lowering Speed Limits programme, to introduce 140km of 20mph on the TfL Road Network by March 2023. New delivery programmes have been prioritised and additional resourcing for this programme is underway.

In 2021/22, design work is progressing well on the latest projects to lower the speed limit to 20mph on more than 140km of our roads. We will introduce 20mph limits across 13km of our roads within Westminster, as well as 12.7km on the A13

in Tower Hamlets, the A23 London Road in Croydon, the A107 corridor in Hackney, the A10 – A503 corridors in Haringey and the A232 West Wickham and A205 Putney town centres. We will also introduce 2km of 30mph limits on the A10 Great Cambridge Road in Haringey as well as A4180 Ruislip Road in Ealing.

Detailed design work has begun on five of these projects which will be delivered by December 2021: A10 Great Cambridge Road, A13 Commercial Road, A23 London Road, A107 corridor and A10-A503 corridors. We engaged with local stakeholders on the above projects from this summer. In addition, we met with key external stakeholders such as the Metropolitan Police Service, emergency services, 20s Plenty, London Cycling Campaign and boroughs throughout September 2021.

Safety measures have been introduced at 43 Safer Junction locations and we continue advanced design work on York Road Roundabout and Holloway Road / Drayton Park.

Detailed design work is progressing well on the new signal crossing installation over the north side of Battersea Bridge at the junction with Grosvenor Road, after a pedestrian was tragically killed. Phase one of the project, delivering a new crossing over the bridge and introducing a 20mph speed limit, is expected to be delivered by late autumn

Surface transport

Healthy Streets – continued

Challenges

The three short-term funding settlements limited our ability to issue works instructions to contractors to start construction on schemes that would commit TfL to spend beyond 11 December. Delays have been compounded by the mobilisation of the new Surface Transport Infrastructure Construction delivery framework from 1 April 2021. We continue to develop scheme designs, undertaking the assessment of pipeline schemes and conducting detailed monitoring and assessment of trial and temporary schemes delivered as part of TfL's pandemic response under the London Streetspace Plan. These delays mean that the next tranche of Healthy Streets scheme construction is expected to take place from late summer. The build of Cycleway 4 (Evelyn Street) began in July 2021.

Delivery of Healthy Streets by both TfL and boroughs for 2021/22 is more constrained than in previous years due to the allocation as part of the government funding settlement. £100m is set aside for Active Travel/Healthy Streets. The progress of schemes which commit us to more than the £100m will be limited and will result in TfL only being able to progress the design

element of many of the Healthy Streets projects. This constraint is particularly impactful on projects delivered through the annualised portfolios of smaller schemes (safer junctions, cycle network development, Healthy Streets local schemes and TfL Road Network bus priority), where construction is typically later in the year and therefore falls beyond the end of this funding settlement date of 11 December 2021. The focus of delivery in this period will be to develop a package of schemes ready to be issued to contractors for detailed design and delivery under the next funding settlement. An inability to know future available budgets also limits the ability for TfL and boroughs to plan adequately for the development and delivery of schemes in 2022/23

London boroughs remain critical to the delivery of Healthy Streets outcomes and budgets are reduced as a result of the current funding constraints. There is £11m of Department for Transport (DfT) Active Travel Funds carried forward from the last financial year, which combined with the Healthy Streets allocation from the £100m, sets aside around £45m for Borough schemes to 11 December.

As part of the funding requirements the DfT required the re-establishment of an Active Travel Oversight Group with representatives from the DfT and the Government, and an observer representing London Councils Transport and Environment Committee alongside senior TfL representation. Priority will be given to schemes already in-flight, to support decisions about the future of trial and temporary schemes and deliver any necessary changes on streets. In effect this ensures the money is spent where it needs to be immediately and is spent in boroughs who have been delivering. Some borough programmes will be paused, with delivery delays into the next financial year. We have also asked the boroughs to compile a list of deliverable projects looking to focus on Vision Zero. The full shape of the delivery programme for work delivered through the London boroughs is therefore not yet known at this time

Surface transport

Air quality

Forecast completion year	Spend to date £m	Programme and project authority £m	5 year forecast £m	Post plan movement
2024/25	178	255	692	1

Since the central London Ultra Low Emission Zone (ULEZ) was introduced, we have already seen significant air quality improvements, including a reduction of roadside concentrations of nitrogen dioxide by more than 40 per cent.

By toughening the Low Emission Zone (LEZ) standards and expanding the central London ULEZ, it is predicted that more than 100,000 fewer Londoners will be living with levels of air pollution above the legal limits in 2021 than would otherwise be the case. Improvements will continue in future years, both inside and outside the zone

After the ULEZ is expanded to the North and South Circular Roads and tougher LEZ standards are introduced London-wide, 96 per cent of roads in outer London will comply with legal nitrogen dioxide limits by the end of 2021.

ULEZ expansion scheduled to launch on 25 October 2021

Progress on the ULEZ expansion schemes is on track. The installation of enforcement cameras has progressed well, with more than 700 installed to the end of August.

Installation of foundation infrastructure for the boundary signs is nearing completed, installation of boundary signs well under way with 435 out of 592 boundary signs installed to end of August. Work continues on camera and new sign installation and planning of the go-live weekend on street activities has begun.

Migration of the back-office processing systems to the cloud by our supplier is well under way, with three of the four tranches already migrated to the new cloud platform. Longer than expected lead times were experienced in the testing phases due the level of complexity of the migration, however, this was mitigated through working closely with the supplier to rebalance the time allocated for assurance activities pre-scheme go-live and deployment of additional specialist resources.

Work continues on the marketing campaign to raise awareness of the ULEZ expansion and educate drivers on how and where the scheme will operate, encouraging them to check their vehicles and plan their options ahead of October. This campaign includes posters, radio adverts, press and online advertising, leaflets for residents living along the boundary, press activity and stakeholder engagement, and will run until the scheme launches.

The Air Quality Programme and Project Authority was increased at the December 2020 Programmes and Investment Committee. This includes all spend (2017/18 - 2020/21) and expected contracted spend for (2021/22-2024/25) required before March 2023.

The Air Quality portfolio is forecasting a minor increase in expenditure of (£1m) against the Revised Budget.

A further contribution has been received from the GLA (£5m) to increase the number of polluting vehicles which are scrapped following the overwhelming demand for the scheme ahead of the launch of the expanded ULEZ area. Cost reductions have been identified in the expanded ULEZ scheme area and our other road user charging programmes.

Surface transport

Air quality – continued

Vehicle scrappage and support schemes

We have continued to operate the Mayor's scrappage schemes to help drivers scrap their older, more polluting vehicles to meet required emissions standards. To date, the schemes have supported the scrapping of nearly 10,000 vehicles, with more than £43.7m of grant payments issued. A further £5m funding has been secured to enable the ULEZ car and motorcycle scrappage scheme to extend. The availability of this important mitigation measure for those who are disproportionately affected by the ULEZ expansion, helping to remove up to a further 2,500 polluting cars/motorcycles from London's roads.

Rapid charging

To support the growing number of zero-emission capable taxis and wider take-up of electric vehicles, we have invested £18m to build a network of electric vehicle rapid charging points. Despite delays caused by the pandemic, we achieved our original target of installing 300 rapid charging points by 31 December 2020. On 1 September, we launched our new hub site at Glass Yard in Woolwich. The site resembles more of a typical petrol station layout, with eight charging points in a single location. This provides convenience to users when

searching for available charge points, with a rapid charge taking just 20-30 minutes. A further hub site at Baynard House in the City of London is being finalised and, when complete, will add a further six units.

Electric Vehicle (EV) strategy

Following the successful implementation of over 300 Rapid Charge Points and supporting boroughs to deliver in excess of 3,000 residential charging points to date, attention has now turned to creating a strategy for delivering London's electric vehicle infrastructure in the longer term. The EV strategy outlines updated forecasts for London's infrastructure needs by 2030, identifying how the public sector can support this and remove barriers for the private sector, and what government funding or enablers may be required.

Electric Vehicle Infrastructure Delivery

In addition to producing an EV infrastructure strategy, we have been working with a variety of stakeholders, including boroughs, charge point operators and the GLA functional bodies, to identify specific delivery models to achieve the increase in charge points London will need to meet future demand. The Electric Vehicle Infrastructure Delivery

Programme has included exploring opportunities to accommodate EV charge points on GLA-owned land, with a view to introduce flexible procurement models and commercial arrangements. This will allow us to engage effectively with the private sector when achieving a shared goal of encouraging and enabling a switch to electric. Proposals for a 'Tranche 1' of delivery will be presented to the GLA Collaboration Board in October 2021.

Surface transport

Air quality – continued

Greener fleet

The bus fleet continues to meet or exceed the latest ultra-low Euro VI emission standard. We are also increasing the number of zero-emission buses into the fleet. There are now 550 zero-emission buses in service, with the Mayor successfully launching 20 new hydrogen double deck buses at Perivale bus garage in June, and ten percent of London's bus network will be zero-emission by the end of 2022, with a further 400 zero-emission buses on order.

All buses operating in our Dial-a-Ride fleet now comply with the Euro VI emission standard, which ensures they meet the requirements associated with the planned expansion of the ULEZ.

Zero emission fleet – Option selection

The 'Grid to Gate' (G2G) project proposed to fund bus garage power upgrades to allow for the operation of electric buses in advance of bus route tenders. This proactive approach would negate the need for incremental and potentially less cost-effective upgrades aligned with the bus route tender programme.

While recognising that the business case for the G2G programme is financially positive, the decision has been made not to proceed with the option of a G2G programme after the following considerations:

Funding: The lack of funding certainty means our plans to directly support connections to bus garages are unable to proceed. However, the supply chain has demonstrated that it can deliver garage upgrades and new zero-emission vehicles cost effectively, sooner than we originally expected. What is more, TfL recently announced that all new buses entering the fleet will be zero-emission buses, so that a fully zero-emission bus network can be delivered three years earlier in 2034 which the route tendering option selected will enable us to achieve. With government support, TfL can bring London's bus fleet into the scope of delivering on that target and achieve a fully zero-emission fleet by 2030.

Re-phasing G2G: Phasing funding approval as a two-step approach a) design and b) build, was considered. This would not affect the number of garages delivered in the first year as the design phase was factored into the schedule, but it adds an additional funding approval step. Launching the scheme in design mode initially provides operators with the benefit of design works being paid for upfront but without certainty of delivering the full scheme. As such, TfL cannot provide enough certainty for the market to make the most efficient decisions.

It was recognised that while G2G would be a preferred method of meeting the zero emission bus fleet targets, it is not the only option. The 2030 zero emission buses ambition can still be achieved by the route tendering option. While waiting for funding certainty on G2G, the route tendering system has continued to award ZE bus routes enabled by garage power upgrades. There are now 30 garages out of 77 with necessary upgrades installed or pending. Though more expensive overall, this option is more affordable in the near term and we are confident that the bus operating market in London can deliver a 100 per cent zero emission bus fleet by 2030. We also have trials underway for the two alternative methods of charging buses: Hydrogen and Opportunity Charging for bus routes that are harder to transition. These are typically the longest routes that exceed battery range.

Surface transport

Asset investment

Forecast completion year	Spend to date £m	Programme and project authority £m	5 year forecast £m	Post plan movement
2024/25	130	494	955	0

Work is under way on ensuring the safety and operability of our highest priority assets that need urgent renewals, including critical tunnels, such as Rotherhithe and Blackwall, and structures, such as the A40 Westway, Brent Cross, Croydon Flyover and Gallow's Corner.

Design work is progressing to plan on the replacement of the bridge expansion joint scheme on the A40 Westway, with the works forecast to begin in November 2021. The remaining joints, parapets and other planned works will commence in 2022.

The detailed design for protective security measures at Westminster Bridge has now received consent from both local authorities and plans are progressing well with the works scheduled to begin on site in late 2021.

The major project to upgrade fire systems to the Rotherhithe Tunnel is progressing through the concept design phase as scheduled and this stage was completed on 30 June 2021. Advance critical works to install an over-height barrier and replace the approach road lighting are progressing well. The approach road lighting is currently being constructed with work planned to complete in early autumn and design work for the over-height barrier is ongoing. These

interventions will ensure the continued safe operation of the tunnel in advance of the major renewal, which is scheduled to commence in 2023.

We have awarded a contract to progress the design for the renewal of Blackwall Tunnel Southbound. We have also replaced a linear heat detector, which is used to help determine the precise location of any fire within the tunnel. This was replaced ahead of the main refurbishment due to its importance and to support the ongoing safe operation of the tunnel.

Tender returns have been received on two key projects, Brent Cross Structures and the renewal of Kingston Cromwell Road bus station. The tenders have been appointed for Brent Cross and are currently being reviewed ahead of appointments for Kingston in October 2021.

Asset Investment Programme and Project Authority was increased at the March 2021 Programmes and Investment Committee. This includes all spend from 2020/21 to 2022/23. There are no significant changes reflected in the latest forecast from when the revised budget was published in July.

In 2021/22 work includes construction commencing on A40 Westway, appointment of a detailed design contractor at Rotherhithe Tunnel and critical investigations on Hammersmith Bridge, which helped inform its limited reopening to pedestrians and cyclists in July 2021. However, an agreement to the costs and funding proposal between the DfT, London Borough of Hammersmith and Fulham and TfL must be found before further activity can progress on the bridge.

Work on reducing the number of interim measures on critical assets has begun including A40 Westway and MARP Brent Cross.

Surface transport

Asset investment – continued

Hammersmith Bridge

The pedestal casing removal and blast cleaning of Hammersmith Bridge that were completed by TfL earlier this summer helped inform the reopening of the bridge by London Borough of Hammersmith and Fulham on 17 July 2021 to pedestrians and cyclists and river traffic. The results of the analysis showed recorded cracks in the pedestals are not detrimental to the overall reliability of the structure, provided the bridge is subject to pedestrians and cyclists only and the temperature control system for the anchorage chains is maintained. This also means a simpler repair methodology can be employed for the stabilisation works and London Borough of Hammersmith and Fulham have appointed Mott MacDonald to progress the required designs. In parallel, TfL is working with the London Borough of Hammersmith and Fulham and DfT to progress the required Memorandum of Understanding that will set out how the works are funded, with a revised draft of the Memorandum of Understanding expected from the DfT in the autumn.

Hammersmith and Fulham has been able to re-open Hammersmith Bridge to pedestrians, cyclists and river traffic. As requested by the Government, we are continuing to develop plans for a ferry should the bridge need to close at short notice for repairs or for planned work. Along with them and Hammersmith and Fulham, we are working to ensure people can continue to cross the river in the local areas.

Carriageway renewal

Work to renew 325,000m² of carriageway continues at pace with 98,000m² delivered to date. Schemes have been delivered across the network, with large schemes being delivered on the A205 South Circular and A232 Croydon Road. Schemes in the next quarter include A3229 Warwick Road and A10 Great Cambridge Road. Design work to facilitate future years' renewals progresses well.

A40 Westway

Design and investigation work on further stages of the Westway project has been progressing well. This includes renewal of areas of concrete deterioration, parapet protection, comb joint replacement and carriageway renewal. The design for this phase of the project is due to complete by December 2021.

The first stage of work is to replace the life expired 'Roller Shutter' Joint (RSJ). At present interim measures are in place including speed restrictions, enhanced inspections together with a temporary plating system which could be deployed if the RSJ fails.

The replacement work is being undertaken by Costain and is scheduled to commence in November 2021. Discussions to confirm the

contract terms for the delivery of the RSJ have concluded and a Notice to Proceed was issued to Costain in September. In addition, we have been engaging with the local authorities and other stakeholders to gain agreement for the traffic management plans. The works have been planned to retain two-lane traffic working in both directions during weekdays but requires directional weekend closures.

Surface transport

Public transport

Forecast completion year	Spend to date £m	Programme and project authority £m	5 year forecast £m	Post plan movement
2024/25	94	249	747	(6)

London Overground is developing mobile functionality and improving the reporting functionality of the new asset management information system, Maximo.

A further six Class 710 trains will be delivered later in 2021. These will be used on the Barking Riverside Extension as operational spares and provide additional capacity to meet forecasted growth on the London Overground network.

Elizabeth line fleet

We have installed a safety system on the eastern and western Network Rail sections of the Elizabeth line on behalf of London Underground to guard against inadvertent incorrect side-opening of doors at stations. This will complement the automatic correct-side door control provided by Crossrail in the central section. The system uses new trackside equipment that verifies location so that the train knows the next station and position of the platform. Installation has been in phases, with both the eastern section between Liverpool Street and Shenfield and the western section between Paddington and Heathrow and Reading, now complete. Handover of the installed equipment to London Underground (RfL Infrastructure) is expected in early autumn 2021 and the Elizabeth line operator intends to bring the system into use in November 2021.

Public Transport Investment Programme and Project Authority was increased at the July 2021 Programmes and Investment Committee. This includes all spend from 2020/21 to 2022/23.

The Public Transport portfolio is forecasting a decrease in gross expenditure of (+£6m) from the Revised Budget.

The five-year forecast reflects lower spend, mainly driven by Royal Docks (+£7m), as approval of the revised programme scope originally planned for July was re-scheduled for September, resulting in activity for a work package relating to Pontoon Docks taking place in 2025/26.

The revised programme scope for the Royal Docks programme was put to the GLA board for approval at the beginning of September.

Further slippage of the Croydon Capacity Upgrade delivered in Trams (+£1m) as programme activity has slowed



Surface transport

Public transport - continued

DLR

In quarter 2, both construction and procurement activities for the renewal portfolio are continuing to gather pace. The team including our contractors continue to assess the impact of coronavirus and mitigations and continuous testing has allowed us to see minimal impact.

The Vehicle Control Centre borders signalling project was successfully completed following full commissioning and operational testing at both Beckton and Poplar control centres. This simplifies train service operation and reduces train control risk.

Depot Conductor Rail replacement works were completed, and the Poplar Direct Current High Voltage project has progressed to the final commissioning stage. Site surveys were undertaken, and design is currently under way for key high voltage projects to replace the East Route Ring main units and other vital DLR power substation equipment, such as VMX switchgear and HSNP DC circuit breakers, obsolete battery charger replacements and a new transformer rectifier set at Royal Mint Street.

Good progress has been made on the Poplar and West India Quay station lighting upgrade projects, migration and final commissioning works are in progress, 80 per cent of the Beckton depot shore supply equipment

successfully replaced and commissioned into service. Intrusive lighting and power surveys have been completed at several stations which will allow us to progress with technical documentation for tender.

The lift system upgrade project continued to make good progress with ten lifts completed. Following a successful tender process, a contract has been awarded for escalator replacement works at Custom House and London City Airport stations, replacement step chains have been ordered to avoid long lead time delays

Work has started on repairing platform stairs and station Work has started on repairing platform stairs and station surfaces with Bank station being the priority, new tactile paving and copers have been installed. Waterproofing works have been undertaken at Limehouse arches and at Woolwich Arsenal.

The B92 train bogie frames replacement project has made progress, with 60 new frames delivered. A new forklift truck was purchased to facilitate maintenance activities at Beckton depot.

Procurement activity has continued at a good pace with key projects currently out to tender.

The GLA-funded Royal Docks stations programme concept designs now approved for Royal Victoria and Beckton Park. GLA had previously put the programme on hold due to funding uncertainty pending a decision at its June board. The revised programme scope was put to the GLA board for approval at the beginning of September.

Surface transport

Public transport - continued

London Trams

The Tram Rolling Stock Replacement Programme will replace the life expiring Bombardier CR4000 trams, which are experiencing declining reliability and have one of the lowest states of good repair categorisations across our fleets. The programme has been assessing the outputs from the Sandilands inquest and has fed these into the current Tram market study to understand safety innovations available for modern fleets.

The market study, plus assessments of the current depot and infrastructure will complete in the autumn ahead of starting the formal market engagement exercise in Q4.

Installation work commenced for both the wayside and on-tram upgrades to tram communication (Vecom) equipment, which is a precursor to enabling a Correct-Side Door Enable-system on the Bombardier CR4000 trams to mitigate the risk of wrong-side door opening events. The next milestone is the completion of the wayside works in the autumn.

Our renewals programme continues across six asset groups, including rolling stock, power, civils, systems and permanent way infrastructure. The third phase of the Reeves Corner embedded track renewal began during a 16-day part-closure of the tramway on 16

August. Highway resurfacing work in the centre of Croydon and further repair works to the Addiscombe Road Bridge were also completed during the possession. Contracts have been awarded for the bridges and structure and Morden Road staircase civil renewals, and the invitation to tender for the Birkbeck retaining wall has been issued.

Tram 2547 was transported to Alstom's depot in Ilford for the condition assessment and repair works to begin. A further technical issue was experienced during repeat trial-running for the First-in-Class Stadler on the CCTV upgrade project (to help mitigate door trapping and anti-surfacing events), however this is believed to be resolved and the roll-out is now forecast to complete by the end of September.



Surface transport

Public transport - continued

Santander Cycles

Work to modernise, electrify and expand Santander Cycles is continuing as planned. This initiative aims to broaden and increase Santander Cycles usage, drive revenue, ensure operating costs deliver value for money and adapt to the requirements of the latest applicable regulations. It will improve the customer offering including the introduction of 500 electric bikes (e-bikes) and enhanced app functionality. On 28 May, we ordered 500 e-bikes, and launch remains on track for summer 2022. In July we received and reviewed the detailed design from Cubic, and started to form the team needed to integrate the back-office payment system, e-bikes and website/app. Options are being explored to expand the geographical footprint of Santander Cycles, with third-party funding secured from the London Borough of Southwark for a small expansion within the borough. Work to progress site selection and design there is progressing. We are also working to develop a business case including a recommended priority list for further areas that would benefit from expansion.

Woolwich Ferry Resilience and Renewals Programme

Following the transfer of the Woolwich Ferry from the Assets portfolio to the Public Transport portfolio, the Woolwich Ferry Resilience and renewals programme has been

created to establish a prioritised work bank of projects with the overarching aim of reducing operational expenditure costs, maximising the use of the assets, and exploiting opportunities to generate additional revenue where possible. Projects in the Resilience and renewals work bank are supporting the delivery of the overall project objectives, reducing cost, improving safety and making services more reliable. The Resilience and renewals programme absorbs the previous WF Life Extension Phase 3 package of measures, including the need for unrestricted vessel access to a lay-by berth, maintenance access ramp, fender deformation issues, and backup mooring plan.

By law, the Woolwich Ferry is required to operate without charge to passengers. The strategic aim is therefore to reduce the net cost of overall operations (including through the generation of additional revenue where possible), improve safety throughout the system, and to maximise the value of the assets / operating expenditure by carrying more passengers. To achieve the latter, the focus is on improving service reliability and resilience as well as attracting new users and winning old users back (particularly local users) through better awareness and improved customer experience.

Following on from the multiple safety critical work packages have been delivered earlier this year. The Woolwich ferry Resilience and Renewals programme has re-focused its work bank highlighting on key priorities. This includes the feasibility of a new Layby Berth and Fuelling system, Highway's enhancements in the surrounding area and Real time information changes. These projects are all within feasibility with the Layby berth and Fuelling projects expecting early design work for early autumn 2021

Surface transport

Technology

Forecast completion year	Spend to date £m	Programme and project authority £m	5 year forecast £m	Post plan movement
2024/25	31	130	360	2

Compliance, enforcement and safety technology

We are delivering a suite of projects under the Compliance, Enforcement and Safety Technology programme, using technology to improve safety and security on our network. Projects include enforcement, and compliance operational system, which is upgrading the digital capability of our Compliance, Policing, Operations and Security directorate, ensuring our 600 on-street compliance officers and back-office support staff can enforce the safety and security of our network efficiently and effectively.

Work is also continuing to deliver deployable enforcement cameras. Each year more than 4,000 people are killed or seriously injured in collisions on London's roads. Seventy-six per cent of collisions happen at junctions – many of which involve moving vehicles contravening road traffic rules. Driving in bus lanes or waiting in yellow box junctions also negatively impacts bus reliability. These cameras can be flexibly deployed at locations not covered by existing CCTV cameras, which will greatly improve enforcement coverage, reduce collisions and support bus reliability. During a trial, the junctions where these cameras were deployed have seen at least a

40 per cent improvement in compliance. A contract was awarded on 26 July 2021 to enable the new cameras to be introduced from late 2021.

The Surface Technology Programme and Project Authority was increased at the March 2021 Programmes and Investment Committee. This includes all spend (2020/21 - 2021/22) and expected contracted spend for (2022/23-2024/25) required before March 2022.

The five-year expenditure has increased by £1.7m from the Revised budget. The majority of this movement is an increase in expenditure for the Cycling Expansion project (£1m - fully funded through Southwark Borough).

Roads technology

We are leading the way in delivering innovative new road traffic management systems to make journeys by walking, cycling and bus, as well as essential emergency services and freight trips, as efficient as possible. Delivery of elements of the Surface Intelligent Transport Systems programme remains on track. The third release of our Common Operational View Incident Management System has now been deployed into live operation in our Network Management Control Centre.

The latest release includes enhanced data on buses, including passenger counts and delay data, and information on Santander Cycles docking stations, enabling us to focus our response to incident management around the four Ps of Pedals, Passengers, Pedestrians and Protection.

Surface transport

Technology - continued

Public transport technology

We are maintaining and developing technology to improve operation of our public transport networks and enhance customer experience. This includes replacing the booking and scheduling system for Dial-a-Ride, which will enable us to book and deliver more trips with the same number of vehicles, better serving Londoners who rely on accessible travel. Procurement for this system is progressing well, with virtual site visits with potential suppliers concluded in May.

We are also replacing the iBus system, which is a back-office system that is vital to ensure buses continue to operate effectively in London. Replacing this critical system is a key priority, as it enables us to provide real-time information to customers, enable bus priority at more than 1,800 junctions and supports performance payments to bus operating companies. Refreshing it gives an opportunity to improve bus passenger experience, with targeted enhancements including providing real-time information when a bus cannot follow its normal route and linking virtually to traffic lights at more junctions to help buses travel more quickly. We have published the Contract Notice for the iBus2 replacement project on the Find a Tender service and expect to shortlist suppliers to participate in dialogue later this year.





Professional services

This comprises technology and data, media and the TfL Growth fund

Professional services

Technology and data

Forecast completion year	Spend to date £m	Programme and project authority £m	5 year forecast £m	Post plan movement	Cost to go
2024/25	157	320	328	(9)	171

Payments

The revenue collection assets for the new entrance to Liverpool Street station were handed over to London Underground on time for the opening into public service on 5 July. This was the first delivery for a Crossrail Central area station and was achieved despite late difficulties with power supplies and a very short handover period of just two days.

In July, we supported the Mayor's policy to continue to require face coverings to be worn when using our services by updating our Conditions of Carriage to incorporate the requirement now that the previous national legal regulations for face coverings have been lifted.

We provide a self-serve online portal which allows customers to check their eligibility and apply for free and discounted travel. Once a customer has received their Oyster photocard they can top-up, buy season tickets and report a card lost stolen or damaged via the portal. On 27 July we replaced the existing online portal with a new and improved site which offers more benefits and improved functionality including the ability to create one single account to apply for both adult and child Oyster photocards, a more intuitive design,

consistency with the rest of our digital style and making it more accessible on mobile devices.

In addition, the new site has moved to the Cloud delivering annual hosting savings.

Authority and EFC shown are for financial years 2019/20 to 2022/23 as per the Programmes and Investment Committee Paper approved on 6 March 2021.

Values shown are for Technology and Data funded projects only and exclude Emergency Services Network, Public Cellular Network and Telecoms Commercialisation projects.

Other telecoms spend is included from FY2021/22 as it was included within the latest Programmes and Investment Committee approval.

iBus2 spend is excluded from FY2021/22 onwards as it transferred to Surface from 1 April 2021.

EFC movement is due to other telecoms income transferred to business as usual operating expenditure and Surface over programming transferred with iBus2 to Surface as part of the Revised Budget.

Professional services

Technology and data - continued

Digital workplace

The sub-projects within the Evergreen programme closed at the end of FY 2021, having successfully met their objectives of updating all obsolete PCs, moving all 32,700 users to Windows 10/Office 365, and migrating 44,323 e-mailboxes and archive data to Exchange Online. The majority of the legacy infrastructure has been de-commissioned (minimum legacy infrastructure remains in place for those users that still require Windows 7), and new desktop updates have moved to 'business as usual' operations

The consolidation of all legacy versions of Microsoft SharePoint sites onto SharePoint Online continues to progress ahead of schedule with a total of 1,042 of 1,225 sites now completed. This project provides a common, online data platform for all our SharePoint sites, giving improved accessibility, security and eliminating the cost and complexity of managing the obsolete infrastructure.

Hosting – data centre rationalisation and Cloud migration

Our lease on one of the strategic TfL data centres - DC (b) - has been renewed for five years with an option to extend by a further three years. This will deliver savings of £4.8M over the full term.

Work continues to refresh our hosting platforms however no major milestone achieved this quarter.

Networks

Our Telecoms Concession Agreement was signed with BAI UK Ltd. on 21 June 2021. The on-boarding plan has been completed. Governance meetings are scheduled, and the initial meetings have taken place with good attendance from both sides. Meetings with key stakeholders both inside and outside TfL are being arranged. Work on site has started and good progress is being made with the delivery. We received the draft detailed implantation plan and there are no major changes to the one submitted as part of the proposal. The Emergency Service Network is scheduled for completion in September 2023 and the public mobile service will be completed by the end of 2024.

We continue to deliver infrastructure to support the Home Office's national Emergency Service Network communications system. In tunnels, we have pulled 417km (99 per cent, up two per cent) of the leaky feeder cable, with 383km fixed (nine per cent, up five per cent) and tested 330km of the cable (78 per cent, up 15 per cent). We have also installed 411km of tunnels fibre (97 per cent, up two per cent). We have completed 92 per

cent (up three per cent) of the required station cabling works at the first 70 stations and started work at a further 12 stations which have now been handed over to the TCP concession to complete and will tracked as part of that project.

Professional services

Technology and data - continued

Technical service operation

Transition of IT infrastructure/services are progressing well with our project work complete for Woolwich Ferry and consolidation of JNP services at TfL sites, and the design for remaining service resiliency improvements is underway. A key focus for the next quarter is continuing to support GLA's head office move and their initiative for future management of IT services.

We are also progressing projects to improve our management and optimisation of IT licenses, including introduction of a software asset management provider for which we will shortly be awarding the contract.

Enterprise resource planning

On 6 September we successfully launched our new people management solution for employee performance appraisals and succession management known as 'MyJourney'. Go-live was for 1,800 early adopters across HR, Technology and data, and London Underground. Full release to all business users is planned four weeks later in early October and further functionality lands in early November for all employees. Initial user feedback has been very positive with no significant technical issues reported.

The new solution called MyJourney, is built around the SAP SuccessFactors product and is the first project in our roadmap to change our people management processes and systems.

The Procurement and Supply Chain improvement project continues with the market tender completed, a supplier selected and contracted to support our implementation of SAP Ariba technology. Focus is on the delivery of the upstream sourcing and contract management capabilities first by Q4 2021/22 as these govern and control purchasing which is planned to be transformed by Q3 2022/23.

Contact Centre operations

Our focus remains to maintain the quality and efficiency of the contact centre's services. Business critical Oyster contact handling services were re-tendered in line with our plans and went live in July. The Cycle Hire contact handling services re-tender continues to progress in line with forecast. In addition, our long-term outsourcing strategy has also picked up crucial momentum within our early market engagement stage. We have signed off all of our requirements for the automating of large quantities of contactless payment card correspondence and are now focusing on the co-ordination of the needed technical resources to implement.

Replacing our main, legacy and business critical lost property system made key progress in the previous quarter. The evaluation of suppliers' bids has been completed. The project team will now focus on contract award recommendation and wider governance to ensure we are then ready for a successful implementation.

Data analytics

We successfully went live with the 'live station busyness' feed for WiFi.

Working in collaboration with Digital we have provided the feed for the busyness data which has now gone live on TfL Go and the website. This is a great feature for customers to take advantage of as the recovery from the coronavirus pandemic continues and customers gradually return to the network. This will enable our customers to have a look at how busy lines are and when the quieter times to travel will be.

Professional services

Technology and data - continued

Digital

We have launched live busyness information in TfL Go, powered by depersonalised WiFi data. Customers can now see whether stations are quiet now, busy now or very busy now. We continue to make progress with the integration of account, journey history and payment card functionality (top up and so on). We have also made general improvements to the app experience resulting in an App Store rating of 4.6 stars and over 100k weekly active users (375k downloads in total).

Challenges

Across Technology and data one of our biggest challenges to delivery is resourcing, particularly with attracting and retaining resources with specific skill sets along with the required increase in FTE needed to deliver against our Investment Programme.

Outside of Technology and data we are further impacted by resource challenges, such as those being experienced by P&SC which are having a direct impact on the delivery of more and more projects, such as Enterprise resource planning, SHE and Asset management.



Professional services

Growth fund

Forecast completion year	Spend to date £m	Programme and project authority £m	EFC £m
2029/30	0	258	258

Growth fund

As the Growth fund schemes have developed, and costs and potential funding have become clearer, it has been possible to identify savings in required Growth fund contributions.

The revised budget classifies all Growth fund schemes as fully meeting the Mayoral objectives but 'contingent on additional funding'. This means that, although all Growth fund projects have already secured a strong commitment and a significant degree of third-party funding for their delivery, a further commitment by [the](#) Government or other third-party sources is needed to complete their funding packages

Over the last quarter, the Growth fund has continued to progress schemes with contractual obligations while feeding into strategic conversations with central Government on TfL's long and medium-term Capital Plans.

We are working to identify additional funding streams while continuing to support all urgent Growth fund projects by providing case-making and programme-level support. We are also working closely with the GLA, central Government and other partners to discuss further third-party funding for Growth fund schemes.

Challenges

The main challenges centre around continued funding uncertainty for Growth fund projects which are necessary to unlock new homes and jobs in areas of high need in London. Several Growth fund projects with previously complete funding packages are currently at risk due to the Growth fund being contingent on additional funding.

As a result, several projects have been delayed or paused in anticipation of funding certainty, while some critically urgent projects have tried to bid for and secure alternative funding contributions over the last couple of months.

About TfL

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

We have a key role in shaping what life is like in London, helping to realise the Mayor's vision for a 'City for All Londoners' 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 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, TfL Rail, London Trams, London River Services, London Dial-a-Ride, Victoria Coach Station, Santander Cycles and the Emirates Air Line. The quality and accessibility of these services is fundamental to Londoners' quality of life. By improving and expanding public transport and making more stations

step free, we can make people's lives easier and increase the appeal of sustainable travel over private car use.

We manage the city's red route strategic roads and, through collaboration with the London boroughs, we are helping to shape the character of all London's streets. These are the places where Londoners travel, work, shop and socialise. Making them places for people to walk, cycle and spend time will reduce car dependency, improve air quality, revitalise town centres, boost businesses and connect communities. As part of this, the Ultra Low Emission Zone scheme and more environmentally friendly bus fleets are helping to tackle London's toxic air.

During the coronavirus pandemic we have taken a huge range of measures to ensure the safety of the public. This includes enhanced cleaning using hospital-grade cleaning substances that kill viruses and bacteria on contact, alongside regular cleaning of touch points, such as poles and doors, and introducing more than 1,000 hand sanitiser points across the public transport network.

Working with London's boroughs we have also introduced Streetspace for London, a temporary infrastructure programme providing wider pavements and cycle lanes so people can walk and cycle safely and maintain social distancing.

At the same time, we are constructing many of London's most significant infrastructure projects, using transport to unlock much needed economic growth. We are working with partners on major projects like the extension of the Northern line to Battersea, Barking Riverside and the Bank station upgrade.

Working with Government, we are in the final phases of completing the Elizabeth line which, when open, will add 10 per cent to central London's rail capacity. Supporting the delivery of high-density, mixed-use developments that are planned around active and sustainable travel will ensure that London's growth is good growth. We also use our own land to provide thousands of new affordable homes and our own supply chain creates tens of thousands of jobs and apprenticeships across the country.

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

We are constantly working to improve the city for everyone. This means using data and technology to make services intuitive and easy to use and doing all we can to make streets and transport services accessible to all. We reinvest every penny of our income to continually improve transport networks for the people who use them every day. None of this would be possible without the support of boroughs, communities and other partners who we work with to improve our services.

By working together, we can create a better city as London recovers from the pandemic and moves forward.