

Transport for London investment programme report

Quarter 2 2019/20 (23 July – 14 September 2019)

MAYOR OF LONDON



**TRANSPORT
FOR LONDON**
EVERY JOURNEY MATTERS

About Transport for London (TfL)

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

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

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

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

We are moving ahead with many of London's most significant infrastructure projects, using transport to unlock growth. We are working with partners on major projects like Crossrail 2 and the Bakerloo Line Extension that will deliver the new homes and jobs London and the UK need. We are in the final phases of completing the Elizabeth line which, when 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 freezing TfL fares so everyone can afford to use public transport, using data and technology to make services intuitive and easy to use, and doing all we can to make streets and transport services accessible to all. We reinvest every penny of our income to continually improve transport networks for the people who use them every day.

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

Contents

4 Introduction

8 Mayor's Transport Strategy themes

10 Business at a glance

12 Key achievements

19 2019/20 Strategic milestone performance summary

20 Major projects

- 20 Line upgrades
 - 26 Network extensions
 - 32 Major stations
 - 37 Future projects
-

38 London Underground

- 38 Stations
 - 42 Accessibility
 - 43 Track renewals
 - 44 Power, cooling and energy
 - 46 Rolling stock renewals
 - 48 Signalling and control
-

50 Surface

- 50 Healthy Streets
 - 64 Air quality
 - 68 Asset investment
 - 72 Public transport
 - 78 Surface technology
-

80 Other

- 80 Technology and data
 - 88 Growth Fund
 - 91 Elizabeth line
 - 94 Crossrail
-

96 Appendix

- 96 2019/20 Strategic milestone performance
-

Please note that safety and sustainability information will no longer be referenced in this report. There is a quarterly Safety, Sustainability and Human Resources Report published on our website, which provides an overview of health, safety and environmental performance for London Underground, TfL Rail, Surface Transport and Crossrail services.

Introduction

This investment programme quarterly performance report provides an update on a range of projects that will create world-class transport services in London.

The report gives a progress update on the major projects and sub-programmes that seek authority each year (unless extraordinary approvals are needed) to the Programmes and Investment Committee.

For each major project or programme, the financial and milestone data represents the position at the end of the quarter and we include commentary for key achievements and progress made. The report also contains, as far as possible, updates on any notable progress made after quarter end.

For a programme and project with a defined start and end, we include when it is planned to be substantially complete and being used by customers. Works that are delivered in a prioritised sequence, such as road resurfacing or track renewal, are referred to as 'annual' as they are controlled and measured within each financial year. This report only includes progress on committed projects and programmes.

Financial records of spend to date, authority and Estimated Final Costs (EFC) represent the entire duration of each separate project or programme, except for annual portfolios where spend to date, authority and EFC figures represent the current financial year. Where authority is significantly lower than EFC,

it has been given for the current stage of works and further authority will be sought when appropriate.

To ensure continued transparency across our organisation, the reporting EFC for projects is based on the current risk profile and opportunity realisation at the time of publication. As a result, project EFC could fluctuate every quarter, however this does not automatically mean there is an increase in spend authority.

The EFC of each sub-programme or project may display a red, amber or green (RAG) status, which represents the level of change in EFC from the previous quarter, such as:

EFC increase of two per cent or more:



EFC increase of five per cent or more:



EFC decrease of two per cent or more:



EFC decrease of five per cent or more:



Where no symbol is used, the EFC increase or decrease (if any) is less than two per cent.

We also include cumulative EFC movements for savings and efficiencies that have been embedded since our 2018 Business Plan, while protecting safety, services and reliability. Numbers in brackets represent an EFC increase and numbers without brackets represent an EFC decrease. Commentary is provided for cumulative movements greater than £2m.

This report does not contain commercially sensitive information and therefore some EFCs and authorities are marked with an asterisk until the main contract has been awarded. On schemes where there is commercial confidentiality, the EFC, authority and spend to date may also be withheld.

All financial figures are gross and may not appear to align with costs detailed in the TfL Budget, which are net of any third-party funding. In addition to the committed projects and programmes included in this report, we will be seeking to obtain capital spend authority for schemes such as the Bakerloo Line Extension and Crossrail 2.

Each programme or project also has an overall RAG milestone status, which represents the average forecast date variance against plan for 2019/20 strategic milestones:

On time or early:



Up to 89 days late:



90 or more days late:



N/A (without 2019/20 strategic milestones):





London Overground at Gunnersbury station

Strategic milestones for 2019/20 – the key milestones listed in the TfL Budget – are detailed in the Appendix (page 96).

Our investment programme is delivered by the following areas of the business: Major projects, London Underground, Surface and Other and the report structure reflects this

- Major projects is responsible for our largest and most complex projects. It comprises line upgrades, the Piccadilly line upgrade, network extensions, and major stations, which are covered in pages 20-35 of this report. Future projects (see page 37) will be reported in detail following financial authority approval
- London Underground comprises stations, accessibility, track renewals, power, cooling and energy, rolling stock renewals, and signalling and control, which are covered in pages 38-49
- Surface Transport comprises Healthy Streets, air quality, public transport, and asset investment. These are covered in pages 50-79
- Other comprises technology and data, TfL Growth Fund, and the Elizabeth line (including Crossrail), which are covered in pages 80-95

Tragic incident at Waterloo

We would like to start this report with a tribute to one of our colleagues, Christian Tuvi, who tragically died as a result of an injury received while working for one of our contractors, Cleshar, at Waterloo Underground station on 18 September 2019. We are deeply saddened by this tragic incident and are working closely with British Transport Police and the Office of Rail and Road as part of their investigations to understand why this terrible incident happened. No one should lose their life at work and it is critical we understand what went wrong and how we can ensure that it never happens again. Support is being provided to Mr Tuvi's family by his employer, Cleshar, and we have also offered any support necessary to his family and to those who were involved in the incident.

Tragic incident at Orpington

On 31 October 2019 our bus driver colleague, Kenneth Matcham, died as a result of injuries sustained in a major road traffic collision in Orpington. A total of 15 people were hurt, three seriously, and the buses also damaged residential property. The police arrested and charged the car driver with causing death by dangerous driving and driving under the influence of drugs. We are working with Go Ahead on the investigation into the incident in liaison with the police, and support has been offered to all victims via the Sarah Hope Line and Go Ahead's employee assistance programme.

Mayor's Transport Strategy themes

The Mayor's Transport Strategy sets out a bold vision for a growing, welcoming London, where 80 per cent of journeys will be made by walking, cycling or public transport by 2041.

We are increasing services as needed on existing lines and routes and are in the final phase of completing the Elizabeth line. We are also making

streets healthy, pleasant and productive places to stop at, travel through and live. Listening to, and acting on, the suggestions of our users and customers will allow us to make walking, cycling and public transport the first choice for the vast majority of trips, and everyday operational excellence will unlock the new jobs and homes our city needs.

This report looks at our investment programme in respect of the following themes from the Mayor's Transport Strategy:

Healthy Streets and healthy people

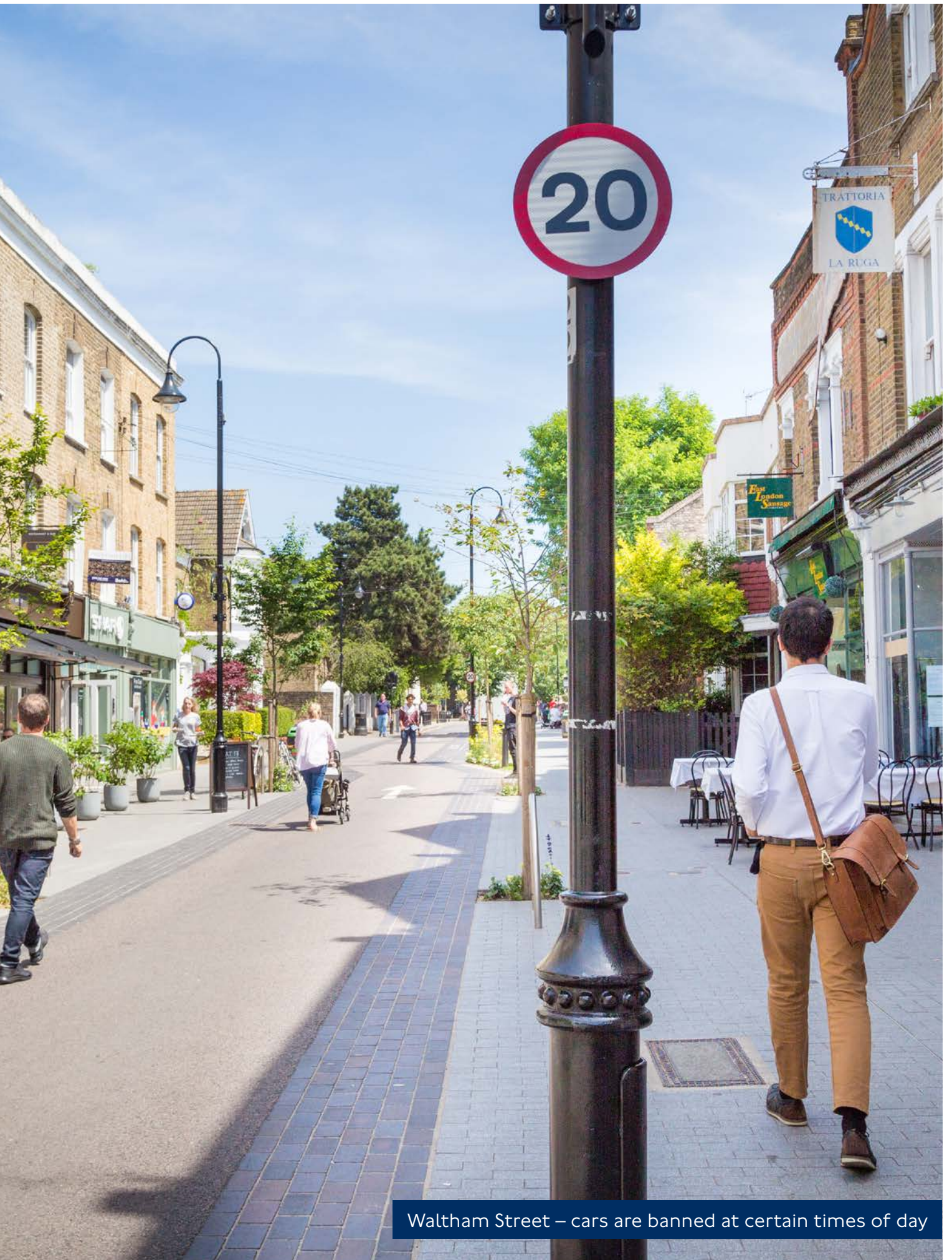


A good public transport experience



New homes and jobs



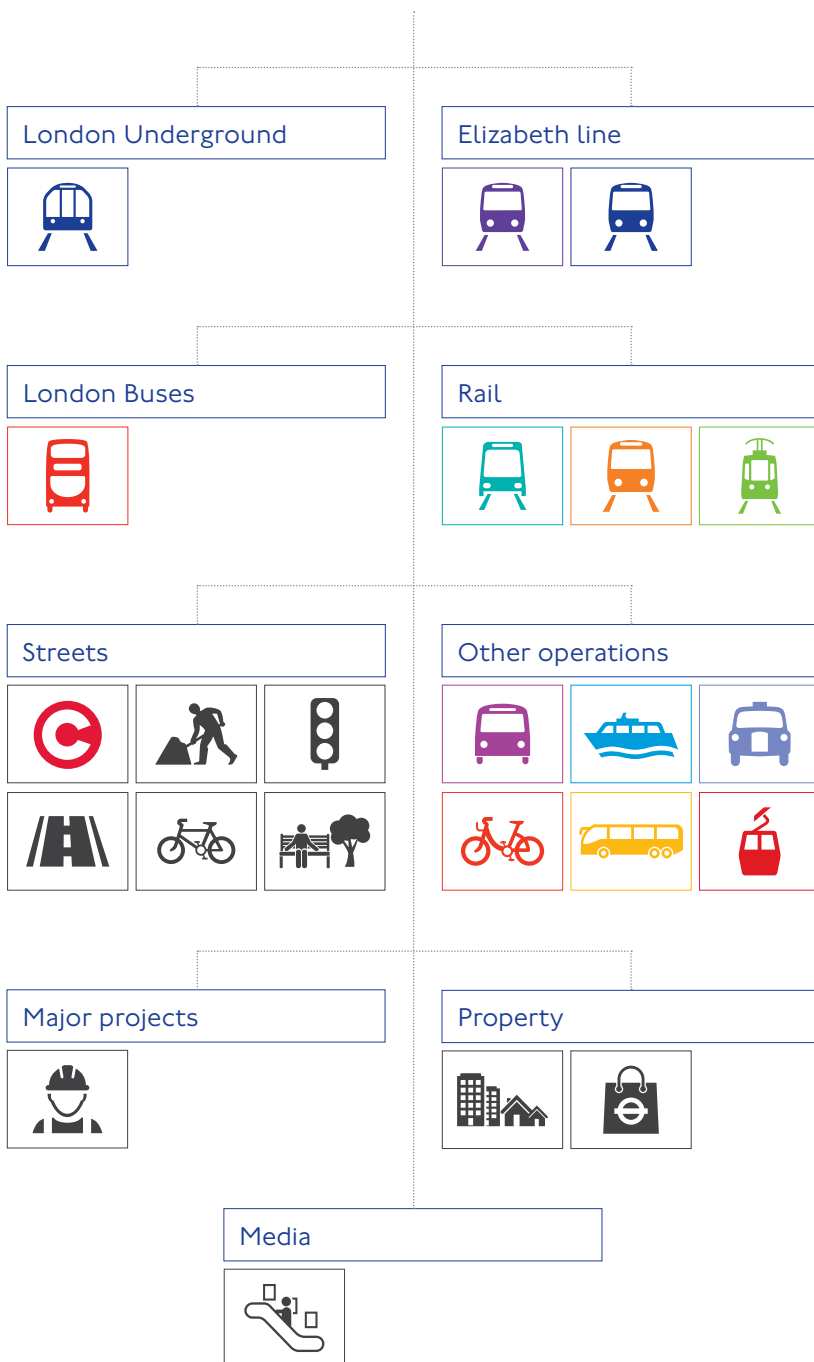


Waltham Street – cars are banned at certain times of day

Business at a glance

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

How we report on our business



Facts and figures

945 Trains on the TfL network



580km

TfL-operated highways



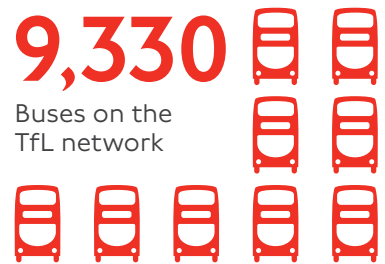
720km

TfL-operated Rail and London Underground routes



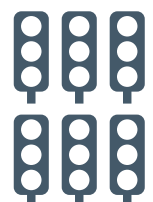
9,330

Buses on the TfL network

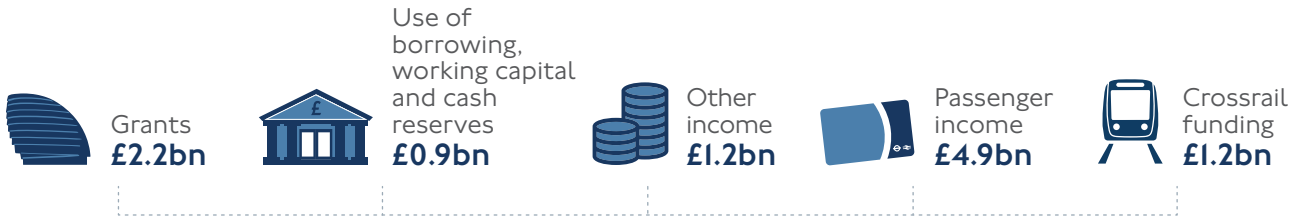


6,365

Traffic signals operated by TfL



Budget at a glance



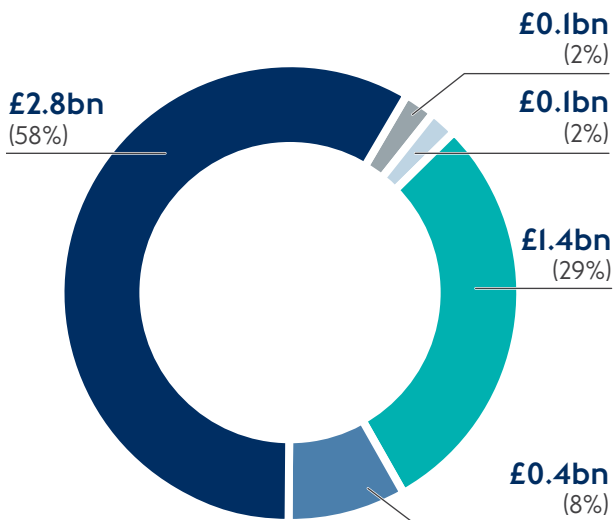
Sources of funds
£10.3bn

79%
spent on running and operating the network every day



21%
spent renewing and improving the network through one of the largest capital investment programmes in Europe

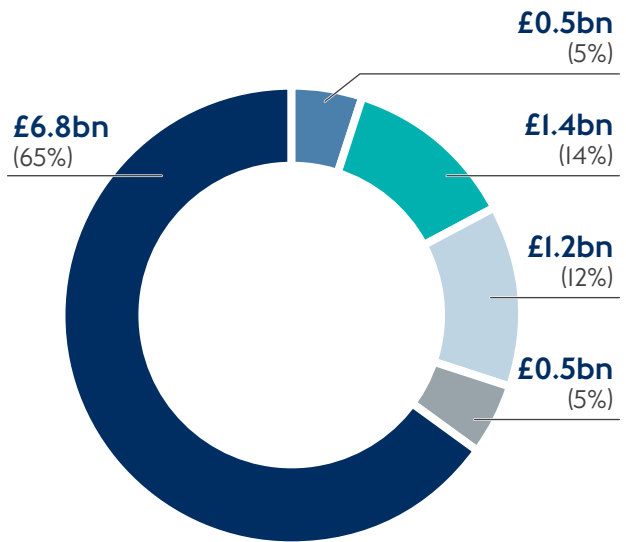
Total passenger income



Total: **£4.9bn**

- London Underground
- Buses
- Rail
- TfL Rail
- Other operations

Total costs



Total: **£10.3bn**

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

Key achievements

Major projects

Line upgrades

Four Lines Modernisation

On the Four Lines Modernisation programme, operation of the new signalling system has been extended from Latimer Road to Euston Square on the Circle and Hammersmith & City lines and from there to Finchley Road on the Metropolitan line, and to Paddington on the District and Circle lines. All the S-stock fleet – comprising 59 eight-car trains for the Metropolitan line and 133 seven-car trains for the Circle, District, Hammersmith & City lines – has been fitted with automatic train control equipment to support communications-based train control. We are working with Thales to eliminate some of the initial software problems.

Piccadilly Line Upgrade

The CCTV contract for the Piccadilly line is out for tender and bids have now been returned. The system will allow train operators to ensure safe departure of the new train from the platform.

Network extensions

Northern Line Extension

On the Northern Line Extension at Nine Elms station, blockwork is complete and we have commenced applying the finishes.

Railway track installation is complete and all six kilometres of high voltage power cables are in place.

For the first time, the distribution network operator transformer rooms were energised at Kennington Green and Kennington Park.

Barking Riverside Extension

Since the contract award in December 2018, several key milestones have been achieved including securing planning permission for the Barking Riverside station and viaduct structure and the successful completion of a two-week long blockade of Network Rail lines to deliver essential groundworks for the viaduct. Following intensive engagement of rail industry parties, 'Network Change' approval for the scheme has now been granted by Network Rail.

Major stations

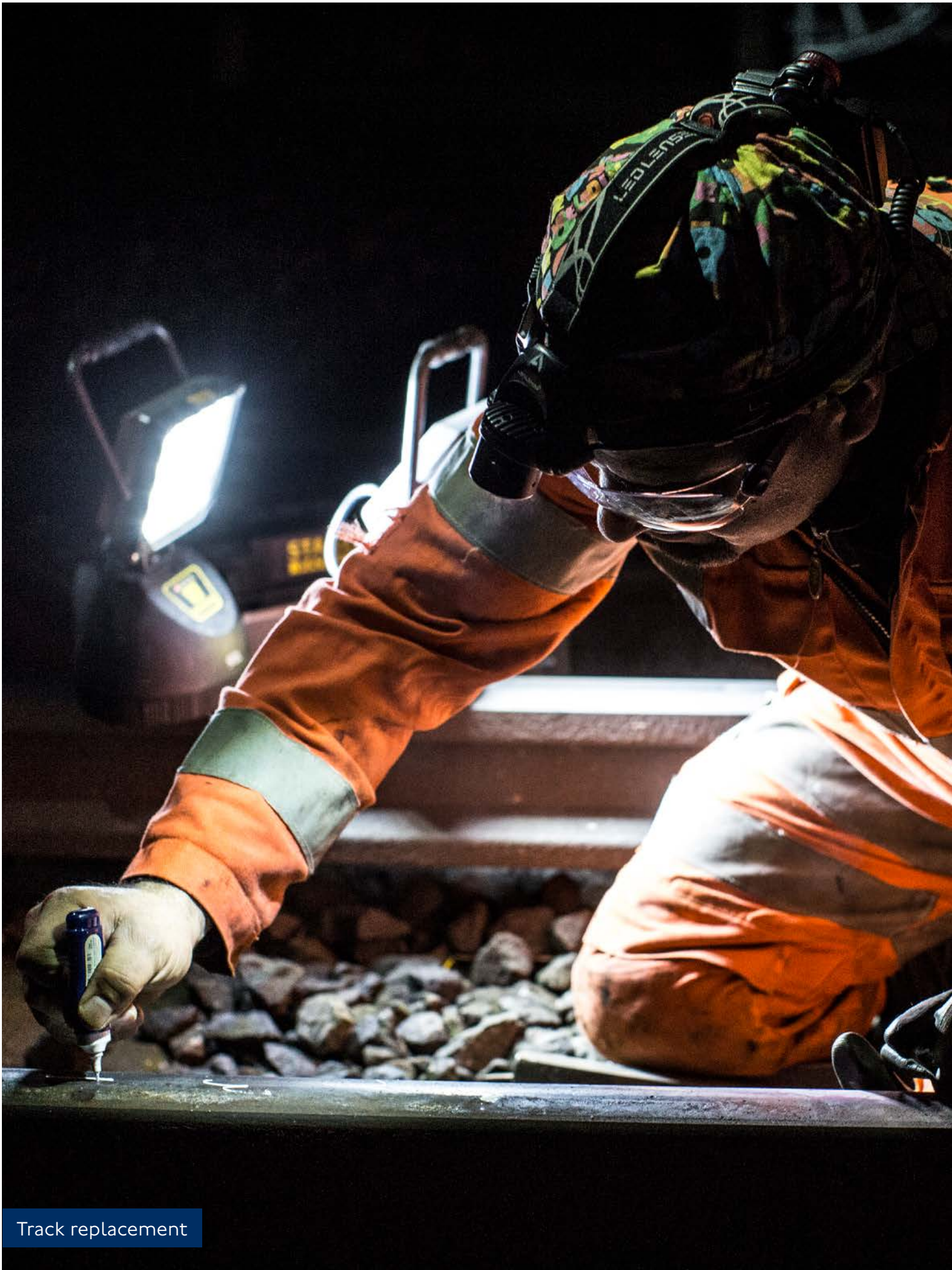
Bank Station Upgrade

A major milestone was reached this quarter with the DLR central concourse now handed over to the project, four weeks earlier than originally planned. This marks the end of two years of enabling works within the DLR area of the station to facilitate the escalator tunnel construction that will link the Northern line and the DLR via three new escalators.

The escalator barrel excavation that will form a new link to the Central line is now complete, allowing the works to connect to the existing Central line platform to commence.



Barking Riverside – proposed extension



Track replacement

London Underground

Stations

We have completed works on nine stations, (Moorgate, Liverpool Street, Charing Cross, Ealing Broadway, Holland Park, Paddington, Sloane Square, Vauxhall and Whitechapel), including three that will interchange with the Elizabeth line.

We have also completed the concept design for the South Kensington station capacity upgrade project.

Track renewals

We replaced 1.5km of ballasted track this quarter, which included the District, Hammersmith & City and Central lines. We also replaced more than 450 metres of drainage on the District line.

On our deep Tube track network, we replaced 2.4km of an older track with modern flat bottom rails and renewed a further 0.8km of concreted deep Tube track.

We have completed key milestones in this quarter including the installation of 2.5km of new track, achieved in July 2019, and installation of 1.7km of concreted deep Tube track which was achieved in September 2019.

We have also completed the installation of two points and crossings on the Piccadilly line at South Harrow.

Power, cooling and energy

We have completed the testing of new specialist equipment at Greenwich Power Station that protects the Four Lines Modernisation programme's network resilience by improving the quality of the power supply. In August we completed works at Bond Street station to provide improved airflow to the new Elizabeth line tunnel.

Signalling and control

We have finalised commissioning of all the new Piccadilly line signalling control system at the control centre in west London. All migrations are now complete.

Surface

Healthy Streets

Highbury Corner

The transformation of Highbury Corner is now complete; the road network is reconfigured and the gyratory removed, creating a new public space, segregated lanes and improved crossings. Trees are currently being planted and new hostile vehicle measures on the new public space outside Highbury & Islington station will follow later in the year once approval has been obtained from Network Rail. The Mayor visited on 2 October to officially open the scheme.

Walking and cycling

For the Cycleway between Hackney and the Isle of Dogs, detailed design for the first section of Burdett Road has been completed ahead of the start of construction currently planned for early next year.

We have constructed over 140km of high-quality cycle routes under this administration and have a further five kilometres under construction through inner and outer London. All newly completed routes will now be signed as Cycleways.

The Safer Junctions programme is on target and we have now reconstructed 31 out of 73 of the most dangerous junctions on our road network.

Air quality

On the Ultra Low Emission Zone project, the preliminary estimates indicate that after six months NOx emissions from road transport in the central zone have reduced by 31 per cent (200 tonnes) compared to a scenario where there was no ULEZ. This is ahead of schedule to meet the 45 per cent NOx emissions reduction expected in the first year.

Fleet compliance

To help meet the Mayor's air quality objectives in 2020, we are upgrading the entire bus fleet to meet Euro VI emission standards. This includes retrofitting up to 4,000 mid-life buses to meet Euro VI emission standards. We have now retrofitted over 3,400 buses and have delivered all 12 Low Emission Bus Zones around a year earlier than planned.

Asset investment

On the Ardleigh Green Bridge replacement programme, all construction works to replace the bridge have been completed and the bridge is fully open to the public.

Public transport

Works at White Hart Lane London Overground station were completed in August. This sees new station entrances with bigger, brighter and more accessible facilities which include step-free access from street to platform for the first time.

We have installed, tested and commissioned the train protection warning system for the Richmond to Gunnersbury section. Construction works were completed in the autumn.

On the DLR, high voltage works have successfully been completed at Stratford Street Market, Abbey Road exit. Once operational it will provide future resilience. We have finished a number of infrastructure projects on the North route section of railway between All Saints and Stratford, including repointing the bridge at Bow and staircase works at Bow, Devons Road and All Saints. The public address system installation is now complete and commissioned.

On London Trams, the overhaul of the hydraulic power units and brake callipers on the Bombardier CR4000 fleet of vehicles has been completed ahead of schedule and on budget.

During a successful ten-day closure of the eastern branch of the tram network in August we replaced the worn embedded rails at Chepstow Road, as well as a series of other major works to systems and infrastructure.

Tram track renewals between Addiscombe Road and Blackhorse Lane have been successfully delivered.

Other

Technology and Data

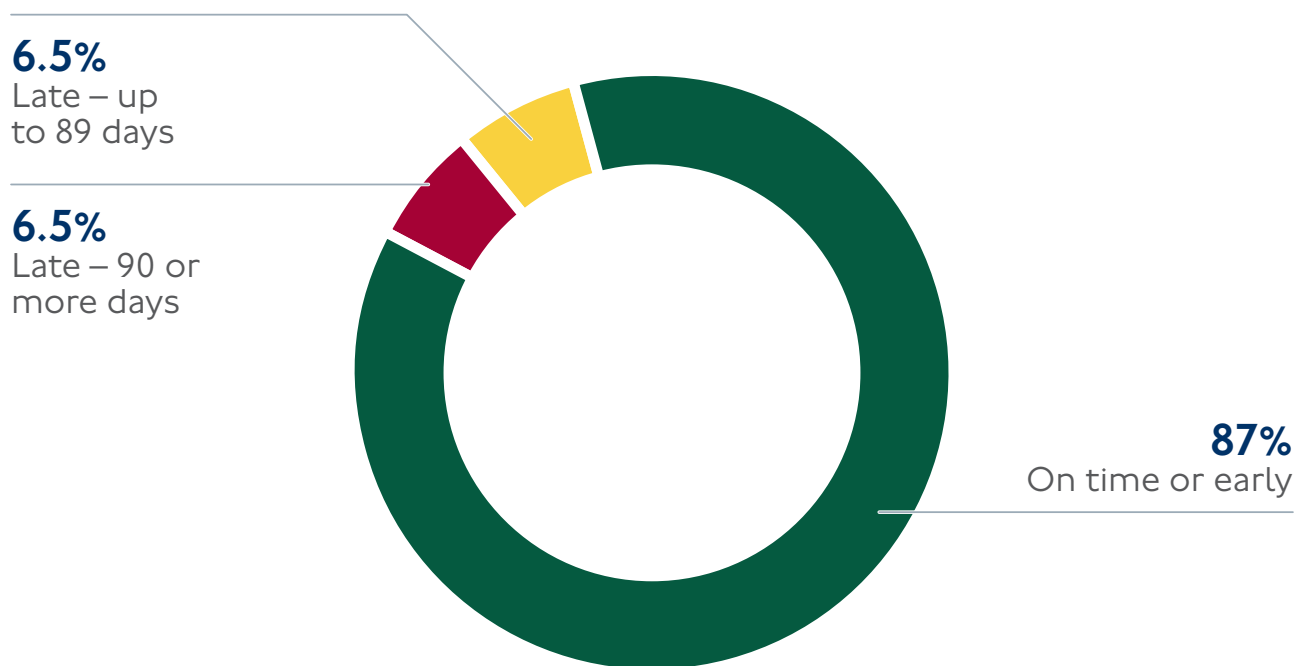
Under Technology and Data, the Future Bus Systems project has delivered the design documentation for the solution to replace our obsolete bus scheduling tools: BusNet, Caesar and SSTT. The first phase of development has been completed and early user testing has been undertaken. Development and testing activities will continue over the next 12 months. iBus2 will be replacing the current bus location and performance information systems that underpin all the bus services.

We have upgraded the back office system which calculates the fares for contactless payments. This was essential in order to cope with the increasing demand for contactless payments, which is now the single most popular way to pay for travel. It brings the contactless system into alignment with the new technology deployed ready to determine weekly capping for Oyster customers. Added benefits are that end-of-day processing of contactless payments to allow settlement with the banks happens more quickly, future fares changes are easier to implement and it reduces back office maintenance and support costs.

Following a successful prototype of a product which detects fare evasion from patterns in ticketing data, the first phase of this is being transitioned into the development area to create a final product.

2019/20 Strategic milestone performance summary

The overall performance for all TfL 2019/20 strategic milestones is summarised as follows:



The late milestones are shown in the Appendix on page 96.

Major projects

Line upgrades 

Four Lines Modernisation*

Forecast completion year

2023

Spend to date (£m)

4,785

Spend authority (£m)

5,412

EFC (£m)

5,350

EFC movement post plan (£m)

(83)

2019/20 strategic milestone RAG

The first section of the new signalling system was successfully introduced earlier this year. This quarter, operation of the new signalling system has been extended from Latimer Road to Euston Square on the Circle and Hammersmith & City lines and from there to Finchley Road on the Metropolitan line, and to Paddington on the District and Circle lines. This is a significant step for the project as it continues to boost capacity.

The introduction followed extensive testing of the new signalling overnight and during planned weekend closures. This section has included the major junctions at Baker Street and Edgware Road, with the latter allowing the closure of a signal cabin that had routed trains manually for 94 years. Since then we have experienced reliability issues which have led to disruption for our customers. These have largely centred around communications issues between the software systems on and off the trains on the Hammersmith & City, Circle and Metropolitan lines. To address the reliability challenges, we have developed a plan with our signalling supplier, Thales, which includes the modification of the trains communications system as well as the line's signalling.

In Quarter 2, a review of the programme schedule and EFC was undertaken, focusing on assurances over key forecast assumptions and risk exposure, supported by an extensive senior management review. The outcome of this review has led to an EFC increase of £49m in the quarter and £83m in total since the 2018 Business Plan was set.

The EFC at £5,350m remains £62m under authority. The £62m reduction to date has been achieved by a previous schedule aimed at delivering the benefits ahead of the authority milestone dates, value engineering solutions, innovation, and providing the optimum scope to bring about the planned benefits.

The programme continues to periodically review scope, outturn costs, risks and opportunities in order to mitigate further increases. Initiatives are underway at a senior level to ensure pressure and scrutiny is applied to cost and time.

* This page has been updated on 11 December 2019



New Metropolitan S-stock train at Baker Street

In parallel the schedule for the software development for the remaining migration areas is under review as there is a concern that the suppliers schedule is unrealistic and it may not reflect the true complexity of the subsurface railway. We are working with them to arrive at a mutually agreed schedule.

While there has been a delay to the forecast date for completing the new signalling system on the Circle line, there is no impact on the planned introduction of the first timetable benefits on this line in December 2021.

Based on the current schedule, commissioning of the final signalling area between Rayners Lane and Uxbridge remains on schedule to support the final service frequency increases in 2023.

We have already introduced 192 new S-stock trains on the Circle, District, Hammersmith & City and Metropolitan lines.

All the S-stock fleet – comprising 59 S8 (eight-car) trains for the Metropolitan line and 133 S7 (seven-car) trains for the Circle, District and Hammersmith & City lines – have been fitted with automatic train control equipment to support communications-based train control.

This work has been completed ahead of, and in readiness for, commissioning the Automatic Train Control system in the remaining signalling areas of the sub-surface railway network. Fitting of the new signalling system to engineering vehicles is now complete. The engineering vehicles are planned to be operational under the new signalling system at the same time as the commissioning of the next signalling area.

Key milestones have been achieved at both Ealing Common and Upminster depots which have been upgraded in support of maintenance and stabling of the District line S7 trains.



Railway System Enhancements (formerly World Class Capacity)

Forecast completion year

2024

Spend to date (£m)

117

Spend authority (£m)

245

EFC (£m)

195▼▼

EFC movement post plan (£m)

12

2019/20 strategic milestone RAG

This programme includes upgrades to signalling, power, trains and track to maximise capacity on the Jubilee and Northern lines with the existing train fleets. While many of the works are stand-alone, a significant proportion are essential to other programmes, including further upgrades to the Jubilee line and the opening of the Northern Line Extension, as well as the reconfiguration of the Northern line at Bank.

To enable the new capacity works, we have completed speed improvement and track works to the Northern line and continue to focus on delivering power enhancement works with Balfour Beatty.

Enhancements to the Jubilee line continue and include improving the speed at which trains exit the depot onto the mainline at Neasden. A tender was issued in September 2019 for the signalling works.

EFC has reduced by £10m since last quarter and is now £12m below 2018 Business Plan. This is primarily as a result of transferring the Stockwell HV cable scope to the Piccadilly Line Upgrade project and savings made through depot activities.



DLR Rolling Stock and Systems Integration

Forecast completion year

2025

Spend to date (£m)

23

Spend authority (£m)

603

EFC (£m)

603

EFC movement post plan (£m)

30

2019/20 strategic milestone RAG

New DLR trains and infrastructure are vital to support the ongoing regeneration of east London, including housing growth and business opportunities.

The programme will replace 60 per cent of the existing DLR fleet that is nearing the end of its design life and provide additional trains, which will increase capacity to meet the projected housing and employment growth in the Docklands area. The depot at Beckton will be extended, with further sidings for the new trains, a new maintenance facility and an extended automatic train operation test track. The Thales automatic train operation signalling system also requires updating and the traction power system needs to be strengthened.

The contract for the supply of the next generation of DLR trains by Construcciones y Auxiliar de Ferrocarriles (CAF) is underway.

Beckton depot enabling works have commenced on site. The first sidings package is out to tender. The signalling contract with Thales has been signed.

Following a well-planned competitive procurement exercise, the contract for the supply of DLR trains was awarded to Construcciones y Auxiliar de Ferrocarriles in June 2019. Driving down cost and gaining more certainty around the contract has led to an EFC reduction of £30m against 2018 Business Plan.



Piccadilly Line Upgrade – rolling stock and enabling (formerly Deep Tube Upgrade Programme)

Forecast completion year	Spend to date (£m)	Spend authority (£m)
2030/31	135	3,294

2019/20 strategic milestone RAG On Track

The Piccadilly Line Upgrade programme is designed to deliver a fleet of newly designed, high-capacity, walk-through, air-cooled trains to replace some of the oldest on our network.

We achieved the milestone to complete the concept design for the new Piccadilly line trains and to present a first-look walkthrough of the air cooled trains over two months ahead of target at the beginning of November. The concept design report was made up of over 50 individual design submissions. We are already starting to progress to the next (preliminary) stage of design. This concept stage is carried out to ensure requirements have been fully understood. The successful completion of the concept design allows later design stages to be finalised before beginning the manufacture and testing stages.

The CCTV contract for the Piccadilly line is out for tender and bids have now been returned. The system will allow train operators to ensure safe departure of the new train from the platform. Award of the CCTV system contract is planned for Quarter 4 of 2019/20 (previously Quarter 3). This is to account for the extra time afforded to the tenderers for a scope addition and the need for increased time to evaluate the offers as more viable bids were returned than originally planned for.

EFC (£m)	EFC movement post plan (£m)
2,965▼▼	144

The EFC and spend authority relates only to works and enabling associated with the Piccadilly line trains introduction programme. Work continues to support the case to gain funding for new signalling on the Piccadilly line, which forms part of a wider programme EFC.

A contract was signed in 2018 with Siemens to design and build 94 Tube trains to replace the existing 1970s fleet. As the programme progresses, the train design has matured and a decision has been taken to reduce the uncertainty in cost provision on rolling stock accordingly by £70m. Further to this, a change of approach in the delivery model has also led to a saving of £58m. The remainder of the reduction in the quarter is as a result of changes in the risk profile held against individual projects.

Network extensions



Northern Line Extension

Forecast completion year

2021

Spend to date (£m)

822

Spend authority (£m)

1,260

EFC (£m)

1,147

EFC movement post plan (£m)

33

2019/20 strategic milestone RAG On Track

The Northern Line Extension (NLE) 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.

Good progress continues across all NLE work sites.

Primary civils and structural work is complete across the NLE and fit-out of the stations and head houses is the focus to get the NLE available for revenue service in autumn 2021.

At Battersea station, blockwork is nearing completion and we have commenced applying the finishes. The first escalator truss has arrived on site and been lowered into position. Fit-out of the transformer and signalling rooms nears completion. The first tunnel vent fan was delivered to site and lowered into the fan room beneath the western ramp.

The EFC is £113m under authority and £33m under the 2018 Business Plan. The EFC is supported by a revised forecast profile developed as part of the execution of the supplementary agreement in June 2019 with the primary main works contractor Flo. Associated with this agreement is the reassessment of risk to reflect the anticipated benefit from the execution of the supplemental agreement and programme improvement. Additionally EFC includes efficiencies relating to the Railway System packages following contract award and savings delivered from waterproofing at Battersea, revised craneage strategy and delivery and installation of rail.



Southbound tunnel of the Northern Line Extension

At Nine Elms station, blockwork is complete and we have commenced applying the finishes. Escalator trusses were delivered to site and temporary works have been completed for the first truss to be moved into position. The architectural metal-pipe ceiling in the escalator atrium is nearly complete and work continues on the erection of the acoustic panelling in the ticket hall. Fit-out of the transformer and signalling rooms nears completion.

Railway track installation is complete and all six kilometres of high voltage power cables are in place. Work has commenced on wayside signalling installation.

For the first time, the electricity supplies to the transformer rooms were energised at Kennington Green and Kennington Park.

NLE has been shortlisted in the New Civil Engineer's Tunnelling Awards under two categories:

- Innovation in Design and Delivery for the Kennington Station cross-passage works
- Innovation in Tunnel Lining for the secondary lining travelling shutter formwork, with Tecozam

The results will be announced at the awards ceremony in December.



Silvertown Tunnel

Forecast completion year

2025

Spend to date (£m)

57

Spend authority (£m)

*

EFC (£m)

*

EFC movement post plan (£m)

*

2019/20 strategic milestone RAG**

The Silvertown Tunnel will tackle traffic congestion at the Blackwall Tunnel and the consequential effects this has on travel, the environment, the economy and growth across the wider east and southeast London area.

The tunnel will connect Silvertown and the Greenwich Peninsula, which are areas being developed by third parties with numerous tenants and landowners. The new twin-bore tunnel, within the extended Ultra Low Emission Zone (ULEZ), will effectively eliminate congestion and the problem of 'standstill' traffic to deliver an overall improvement in air quality. It will also provide several new cross-river bus routes in east London which are expected to be zero-emission from launch.

The project will be procured through a Design, Build, Finance and Maintain contract.

Following a competitive procurement process, the Riverlinx consortium was awarded a design, build, finance and maintain contract at the end of November for the construction and maintenance of the tunnel. We will start making payments once the tunnel

is open and available for use. We will be able to reduce payments should the tunnel not meet certain key standards, such as availability for use by traffic and physical condition.

Pre-build activities to facilitate a smooth start to construction, once the contract is awarded, have continued. Design for the replacement of North Greenwich car parks is complete and work is ongoing with utility companies to agree how to progress early service diversions. Monitoring of both existing structures and noise continue ahead of the start of construction. Discussions are ongoing with third parties to put in place the relevant agreements including negotiating land access.

* This information is withheld for reasons of commercial sensitivity.



Barking Riverside Extension

Forecast completion year	Spend to date (£m)	Spend authority (£m)
2022	82	287

2019/20 strategic milestone RAG On Track

We are delivering a new rail link to serve the 10,800 new homes planned for the Barking Riverside development area. We will build a spur from the Tilbury Loop line east of Barking, to extend our service to Barking Riverside. Train services are planned to start in 2021.

Since contract award in December 2018, several key milestones have been achieved including securing planning permission for the new Barking Riverside station and viaduct structure and the successful completion of a two-week long blockade of Network Rail lines to deliver essential groundworks for the viaduct. Following intensive engagement of rail industry parties, 'Network Change' approval for the scheme has now been granted by Network Rail.

Piling for Barking Riverside station has been completed, construction of the pier walls and lift shaft are well advanced and installation of decking has now commenced. The upgrade of the existing line from Barking station has also made good progress despite some challenging ground conditions hampering piling for the new overhead line equipment structures.

EFC (£m)	EFC movement post plan (£m)
285	1
<p>The main works contract was awarded in December 2018 and the EFC remains in line with the approved programme and project authority. As detailed below, the discovery of uncharted utilities continues to pose a significant risk to the programme. Issues arising as a result are putting the EFC under pressure and this will remain under close review.</p>	

Discovery of uncharted utilities within the viaduct ramp area and at viaduct pier locations across the site continues to represent the major risk to programme. There has been progress in reducing both the number and impact of issues presented by these utilities, including instructing the redesign of pier foundations to mitigate the impact of diversion timescales on the critical path. However, significant utilities challenges remain and further mitigations are required, meaning the planned opening date of December 2021 continues to be under pressure (a report on this matter is due to be considered at the Programmes and Investment Committee on 18 December 2019).

Major stations

Victoria station upgrade and finishes

Forecast completion year

2019

Spend to date (£m)

580

Spend authority (£m)

604

EFC (£m)

585

EFC movement post plan (£m)

(4)

2019/20 strategic milestone RAG

We have opened a new north ticket hall and 300 metres of subways, and have increased the size of the south ticket hall by 50 per cent. Step-free access to all platforms is now in place. The station is used by 83 million people each year.

The project is complete other than some minor works to be closed out. It should be noted, however, that other works are taking place at Victoria station, escalator refurbishment among others, but these are unconnected with the Victoria Station Upgrade project.

The Terminus Place reinstatement works are also now complete and we expect to reopen the road in the next quarter.

The EFC has increased by £1m since last quarter and £4m since the 2018 Business Plan to reflect the prolongation of the programme to complete works and final account settlements. The EFC remains £20m below authority. The project is on course to complete works on site and to close the project in December 2019.



Bank station upgrade

Forecast completion year

2022

Spend to date (£m)

458

Spend authority (£m)

656

EFC (£m)

664

EFC movement post plan (£m)

(8)

2019/20 strategic milestone RAG



We are boosting capacity at Bank station by 40 per cent. This includes creating a new Northern line tunnel, platform and circulation spaces, a new entrance on Cannon Street, the introduction of step-free access to the Northern line, additional interchange between the DLR platforms, and two new moving walkways between the Central and Northern lines to reduce customer journey times.

A major milestone was reached this quarter with the DLR central concourse now handed over to the project. This marks the end of two years of enabling works within the DLR area of the station to facilitate the escalator tunnel construction that will link the Northern line and the DLR via three new escalators.

The escalator barrel excavation that will form a new link to the Central line is now complete, allowing the works to connect to the existing Central line platform to commence.

The construction of the new station entrance on Cannon Street continues with the interior wall construction and station fit-out commenced. The cross-passages to the new Northern line tunnel are underway and will enable the new southbound running tunnel and platform to be connected to the existing Northern line in 2021.

The EFC remains static in the quarter. The EFC is £8m higher than the 2018 Business Plan due to a changed risk profile and additional external scope items required to deliver the upgrade. Risk mitigation reviews are continuing to be held each period along with opportunities to reduce the current EFC. We continue to work collaboratively with the main contractor to identify and realise potential savings with a view to reducing the EFC back to the 2018 Business Plan position.



High-speed train at St Pancras International



HS2

Forecast completion year

*

Spend to date (£m)

7

Spend authority (£m)

11

EFC (£m)

46

EFC movement post plan (£m)

1

2019/20 strategic milestone RAG

Our interface with the new high-speed railway connecting London to the West Midlands and the north of England comprises new TfL assets, infrastructure and operational facilities at Euston and Old Oak Common.

We continue to work with HS2 Ltd to deliver the agreed protection of our assets and design assurance work required for the HS2 programme. This includes design reviews for the work that HS2 Ltd will undertake at Euston and the interfaces with the London Underground stations at Euston and Euston Square.

The government announced a major review in August of whether and how to proceed with HS2 due to cost and schedule pressures. The panel was given a brief to look at options such as reducing speeds and making Old Oak Common the London Terminus, (at least for a period). In September we met with the HS2 review panel, alongside the Deputy Mayor for Planning, Regeneration and Skills to highlight the key issues for London, and the stations required at both Old Oak Common and Euston to maximise passenger benefits, ensure effective capacity relief and support growth in jobs and homes in these areas. The views expressed were confirmed in a letter from the Mayor on 3 October 2019. The review is expected to report its findings in the autumn of 2019.

This project is fully refundable by a third party client and the scope of works is dependent on the third party client's instructed requirements. Since the Business Plan and Quarter 1 EFC were set, there have been client-instructed changes to the scope of works which are reflected in the current EFC.

* The forecast completion date is to be confirmed following the outcome of the Oakervee report and an enhanced baseline review



Bakerloo line, Willesden Junction

Future projects



We continue to develop major projects – currently at an early stage – that will deliver the new homes and jobs that London and the UK need.

Crossrail 2

Following the submission of the Strategic Outline Business Case (SOBC) to Government in June 2019, a Crossrail 2 Project Assurance Review (PAR) took place in September on behalf of the Cabinet Office and HM Treasury. The Review findings will be shared with the Department for Transport's Board Investment & Commercial Committee, TfL Programmes and Investment Committee and HM Treasury so they can be assured of the quality and robustness of the SOBC. Government will take on board PAR's advice when making a decision on the best way to take the project forward.

Work continues to ensure Crossrail 2's assurance processes are fit for purpose. In support of the work of the Independent Assurance Panel, which is being led by David Orr, a number of expert review groups have been convened to test, challenge and scrutinise the work of the team with a particular focus, at present, on the Cost and Risk, Tunnelling and Digital workstreams.

Bakerloo Line Extension

We have continued to develop our plans to deliver an extension and upgrade to the Bakerloo line to support development and regeneration in southeast London. It will transform capacity and connectivity across London and the South East. The extension could relieve congestion on overcrowded lines, open up more opportunities to more people and improve air quality. It would support thousands of jobs and homes in the New Cross, Lewisham and Catford and Old Kent Road Opportunity Areas. We are working closely with Network Rail, the GLA and the London Boroughs of Southwark and Lewisham, to make sure we can deliver the best possible scheme and to prepare for the next round of public consultation, which launched on 14 October. The consultation is seeking views on new features of the extension proposals, including the proposed route of the tunnels, proposed worksite locations, a new proposal for a combined new Bakerloo and Northern line station entrance at Elephant & Castle and the possible names for the stations on the Old Kent Road. Following the public consultation, we will continue to develop the scheme, including working with central Government, the GLA and local authorities to develop a funding agreement for the scheme and safeguard the preferred route alignment.

London Underground

Stations 

Forecast completion year

2023/24

Spend to date (£m)

2,055

Spend authority (£m)

3,230

EFC (£m)

2,379 ▼▼

EFC movement post plan (£m)

0

2019/20 strategic milestone RAG ████████████████████

The targeted renewal of existing assets will improve safety, reliability and ambience, and maintain resilience. Station enhancements will reduce congestion and improve customer journey times.

Integrated stations programme

We have completed works on nine stations, (Moorgate, Liverpool Street, Charing Cross, Ealing Broadway, Holland Park, Paddington, Sloane Square, Vauxhall and Whitechapel), including three that will interchange with the Elizabeth line. This programme of work is now complete and is in the final stages of being formally closed.

Station enhancements

At Finsbury Park, work on the new western station entrance continues and we plan to open this in late 2019.

We have completed the concept design for the South Kensington station capacity upgrade project and we are working on the next stage in anticipation of commencing detailed design.

We will provide step-free access at Knightsbridge and build two new entrances on Brompton Road and Hooper's Court in partnership with a developer, who will enable and part-fund the works. The civil engineering works on the lift shaft to the platform were completed in June.

The EFC, which covers all projects including those completed within the stations programme, has increased from £2,553m at Quarter 4 as a result of increased costs on developer-led projects including Crossrail and Stratford.



Moorgate station

We continue the redevelopment and upgrade of Tottenham Hale station. The new station structure is in construction.

Concept design and the construction support study for Colindale station is now complete and detailed design due to commence in early 2020. Full planning consent for the new entrance, along with outline consent for the adjacent residential developments, was granted in July 2019. The project will bring significant improvements, including a spacious new entrance, a new lift providing step-free access to the platforms and new homes around the station.

Station developments

We are working with Berkeley Homes to create a new western entrance at West Ham station, which will provide a direct route into the Jubilee line areas of the station from the development site. The developer's consultants have drafted the concept design specification documents and we are working with the developer to finalise agreements.

We have completed the new South Bank station entrance at Waterloo with three new escalators (including one to replace the previous fixed staircase) and associated back-of-house systems and accommodation facilities are now all in service. The entrance was formally opened in May 2019.

We are creating 11 retail units in the railway arches beneath Wood Lane station, where we continue to progress installation of core services.

In July, the London Borough of Southwark recommended planning permission be granted for a new town centre at Elephant & Castle, subject to agreement and approval by the GLA and the Secretary of State. We continue to await final approval on the Section 106 agreement with the developer and the London Borough of Southwark. As part of the development, a new station box with connecting tunnels to the existing platforms will be built to increase capacity at the station and provide step-free access to the Northern line.

At Paddington, we are working with Great Western Developments to enable them to construct a new entrance to the Bakerloo line, with a much enlarged ticket hall and step-free access to the platforms, as part of their redevelopment of adjacent buildings. We successfully completed negotiations with Great Western Developments and their consultants, which has led to the signing of the Land and Works agreement. This in turn now means we can progress the project and anticipate starting on site in February 2020.

At Stratford, we continue to work with stakeholders to consider access and capacity improvements. This includes working with the London Legacy Development Corporation on reviving proposals for a new entrance and ticket hall to serve the Carpenters Road area, and on improvements to step-free access and capacity in the adjacent western subway.

Accessibility



Forecast completion year

2023/24

Spend to date (£m)

56

Spend authority (£m)

244

EFC (£m)

156▲

EFC movement post plan (£m)

20

2019/20 strategic milestone RAG

We are working on a wide programme of accessibility improvements, customer service and information enhancements across the Underground network. We will make over one-third of stations accessible by 2020 by providing step-free access at a further 15 stations.

Fifteen stations will become step-free by spring 2020 as part of the Mayor's funding for step-free access. We delivered step-free access at three stations in 2018/19.

The remaining 12 step-free projects are all on-site (Amersham, Burnt Oak, Cockfosters, Debden, Hanger Lane, Harrow-on-the-Hill, Ickenham, Mill Hill East, Northolt, Osterley, Sudbury Hill and Wimbledon Park). These projects include the construction of new lifts and overbridges, and other assets will be upgraded while we carry out these works.

We have started the installation of the first new lift at Mill Hill East, making good progress with piling, lift pit construction and steelwork installation at some sites such as Cockfosters. Challenges remain at other sites, with buried services, such as power cables and drainage channels that were not identified on the station plans or during the surveys causing delay to piling.

The EFC has decreased from £165m at Quarter I in line with the 2018 Business Plan but still represents unprecedented investment in Tube accessibility. The EFC has changed as the programme matures and site conditions and restrictions are better understood.

Track renewals

Forecast completion year

Annual

Spend to date (£m)

59

Spend authority (£m)

122

EFC (£m)

130▼

EFC movement post plan (£m)

(8)

2019/20 strategic milestone RAG On Track

We are replacing our ballasted and deep Tube track, points and crossings, and track drainage infrastructure to improve reliability, reduce maintenance costs and increase capacity.

We replaced 1.5km of ballasted track in the second quarter of the 2019/20 programme, which included the District, Hammersmith & City and Central lines. We also replaced more than 450 metres of drainage on the District line.

On our deep Tube track network, we replaced 2.4km of an older track with modern flat bottom rails and renewed a further 0.8km of concreted deep Tube track.

The Track Renewals programme has completed key milestones in this quarter which includes the installation of 2.5km of new track, achieved in July 2019, and installation of 1.7km of concreted deep Tube track which was achieved in September 2019.

Furthermore, during Q2 the Track programme has completed the installation of two points and crossings on the Piccadilly line at South Harrow.

The EFC has increased by £8m since budget was set to reflect the current delivery programme for 2019/20. The forecast now includes additional scope and acceleration of works approved by the programme board. It also includes scope for the additional instructions issued by the Sponsor since the budget was set.

Power, cooling and energy



Forecast completion year

2023/24*

Spend to date (£m)

48

Spend authority (£m)

90

EFC (£m)

88 ▼▼

EFC movement post plan (£m)

0

2019/20 strategic milestone RAG

Our renewals programme aims to improve safety, reliability and legal compliance of our power assets, introduce cooling in key locations to improve the customer experience and increase the energy efficiency of our assets.

Power

We continue to support the delivery of a number of third-party and major projects by providing power works, such as relocating the substation at Euston for High Speed 2, installing cable routes for the Northern Line Extension and works for the Piccadilly Line Upgrade, and the Bank Station Capacity Upgrade.

We are delivering a rolling portfolio of power renewal works to improve asset condition through a prioritised work bank of projects. Installation work on the first of these safety related projects has been completed with several others now in delivery, and designs for the next priorities completed and moving into procurement. Key objectives and forthcoming milestones include projects to replace depot traction isolation and

high voltage network switchgear plus station emergency lighting power supply equipment.

We have completed the testing of new specialist equipment at Greenwich Power Station which protects the Four Lines Modernisation network's resilience by improving the quality of the power supply, which will be commissioned into service before the end of 2019.

We are in the advanced stages of procurement for a project to extend the life of the main power control system to address obsolescence risks and consolidate three power control systems to a single system. The system, once completed, will remotely monitor and safely operate traction, station, signalling and depot power supplies on all lines.

* The figures represent power and energy projects until 2023/24 and authority is sought in stages for future unapproved works

Cooling

In August we completed works at Bond Street station to provide improved airflow to the new Elizabeth line tunnel. We continue to upgrade the cooling of our power assets to support the new Four Lines Modernisation signalling system.

Energy

We are installing 1.1 megawatts of solar power at three depots and are also assessing other sites across our estate for suitability of solar either on rooftops or on land. The project team is assessing the feasibility of installation at alternative sites to meet the Mayor's solar energy commitment.

Rolling stock renewals

Forecast completion year

2023/24

Spend to date (£m)

195

Spend authority (£m)

525*

EFC (£m)

968▼

EFC movement post plan (£m)

15

2019/20 strategic milestone RAG 

We are modifying our passenger rolling stock to improve safety, accessibility, reliability and customer satisfaction, and reduce maintenance costs. We are also modifying or replacing some of our existing engineering vehicles that support track maintenance and infrastructure renewals.

The Quarter 1 EFC reported figure of £983m has reduced by £15m to £968m in Quarter 2, mainly due to reduction of risk in other programmes and some programmes have been removed from the calculation as they are closed.

On the Jubilee Line, we have been running a reduced frequency service due to mechanical issues found on the trains.

We have refurbished 58 out of 63 Jubilee line trains. The refurbishments include a wheelchair area, new flooring, refreshed interior (including grab-poles and handles), and new sealing to the roof and windows. We have now started to install the new priority seating moquette.

We are carrying out improvements to ensure continued reliability of the Bakerloo line fleet. We have completed structural weld repairs to carriages on all 36 trains. We are refitting the vinyl of the first eight trains to make them consistent with later trains, and this will complete in December 2019.

* The authority is lower than the EFC as authority is sought in stages.

On the Central line improvement programme, four carriages are being prototyped at the supplier's site. The new Train Management System has started dynamic testing on a second prototype train on London Underground premises. We continue to work with our supply chain on the enabling of the installation facilities for the improvement programme on the full fleet.

The construction of a new facility to support the Train Modification Unit based at Acton has progressed on site. Foundations, foundation slabs and structural steel are all complete. The roof and exterior cladding has begun, and we have started work on the track layout.

The manufacturing of the first seven pre-production wagons (engineering vehicles) in China is nearing completion. They will undergo static testing in China before being shipped to the UK. Four of these wagons will undergo dynamic testing in the UK during spring 2020 and three wagons will be delivered to Ruislip. Once the pre-production wagons have been fully tested and approved, the manufacture of the remaining 66 wagons is expected to commence in summer 2020.

The Mechanised Renewals Vehicle will improve the way track is renewed in the deep Tube sections (Bakerloo, Central, Victoria, Jubilee, Northern and Piccadilly lines) of the London Underground

network. We are working to develop a cost-effective solution to deliver cost and safety benefits to the track programme next year.

The two Kirow cranes and eight tilting wagons being procured to facilitate mechanisation of points and crossing renewals have undergone final testing in Germany, and are currently being prepared for transport to the UK via rail later this year.

To ensure the infrastructure is ready to receive the engineering vehicles, Ruislip depot is undergoing infrastructure upgrades to facilitate stabling and loading of these vehicles.

Following an option selection evaluation exercise, we have started the tender phase for replacing our track recording vehicle, which records and monitors the alignment and condition of the track, supporting track maintenance and renewal activities.

The project to provide train operators enhanced control over unauthorised entry into the cab from the saloon is progressing well – contract award is due shortly and installation support is being finalised.

Signalling and control

Forecast completion year

2023/24

Spend to date (£m)

79

Spend authority (£m)

145

EFC (£m)

180▲

EFC movement post plan (£m)

0

2019/20 strategic milestone RAG 

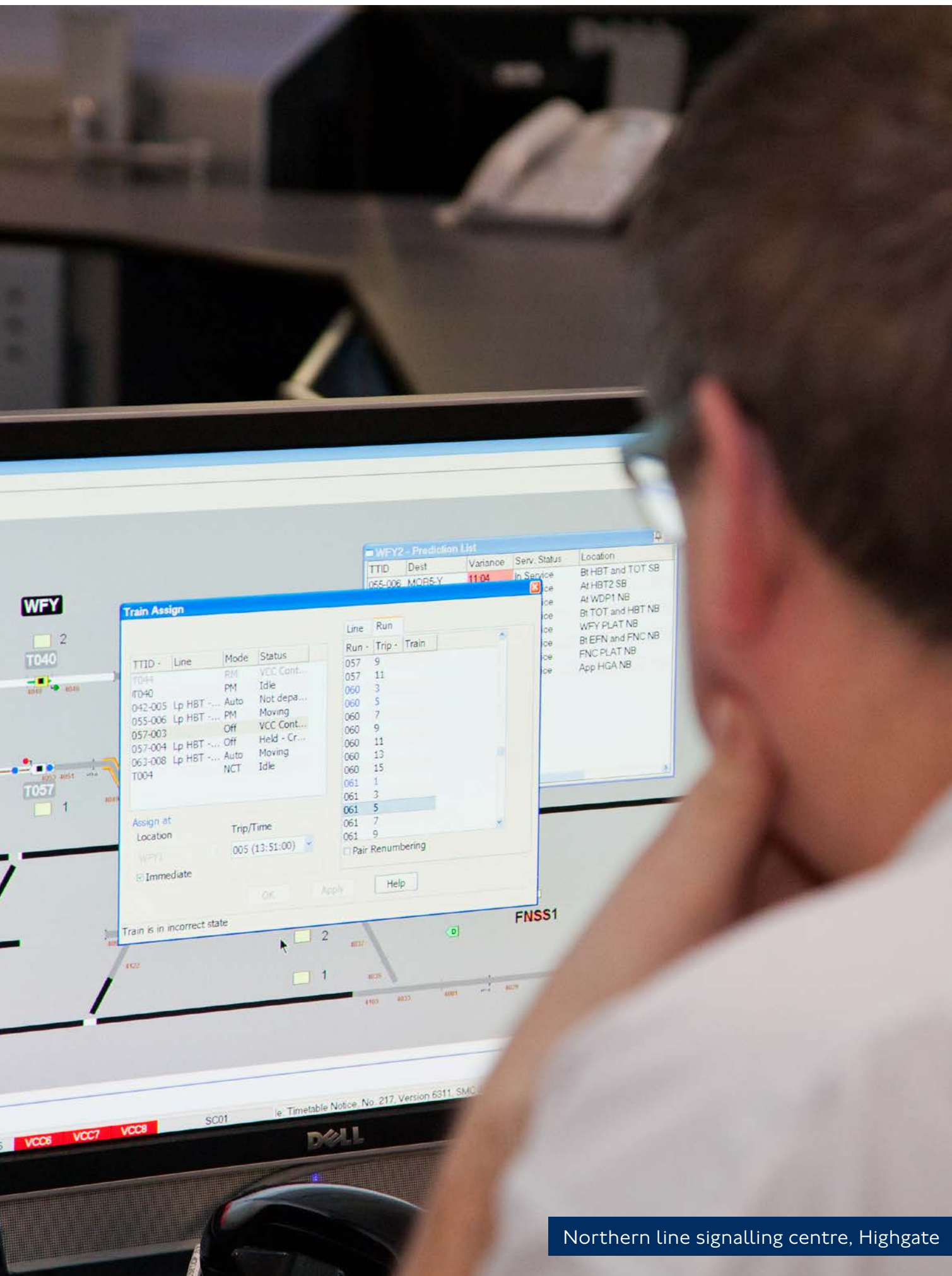
We are extending the life of our track-based signalling and control assets. This ensures they can continue to support a safe, reliable and maintainable service until then.

The EFC has been updated to £180m in line with the latest Programmes and Investment Committee paper, excluding future projects beyond the next five years.

Siemens is continuing the design for the life extension of the Central line signalling and control systems. This project will maintain the reliability, availability, maintainability and safety of the signalling assets and resolve obsolescence concerns. Once the design of a number of items has been finalised, we will work with Siemens to deliver pilot sites and complete trials.

We have finalised commissioning of all the new Piccadilly line signalling control system at the control centre in west London. The migration of control has progressed well and all migrations are now complete. This project is now in the process of closing down.

Works to enable the replacement of the signalling system in Northumberland Park depot on the Victoria line has commenced; this is required to interface with the new depot control system. A contract award has been awarded for the design phase.



TTID	Line	Mode	Status
T044		RM	VCC Cont...
T040		PM	Idle
042-005	Lp HBT	Auto	Not depa...
055-006	Lp HBT	PM	Moving
057-003		Off	VCC Cont...
057-004	Lp HBT	Off	Held - Cr...
063-008	Lp HBT	Auto	Moving
T004		NCT	Idle

Assign at Location: WFY1
Trip/Time: 005 (13:51:00)
 Immediate

Buttons: OK, Apply, Help

TTID	Dest	Variance	Serv. Status	Location
055-006	MORSEY	11.04	In Service	BT HBT and TOT SB
				At HBT2 SB
				At WDP1 NB
				BT TOT and HBT NB
				WFY PLAT NB
				BT EFN and FNC NB
				FNC PLAT NB
				App HGA NB

Line	Run
Run - Trip - Train	
057	9
057	11
060	3
060	5
060	7
060	9
060	11
060	13
060	15
061	1
061	3
061	5
061	7
061	9

Pair Renumbering

Northern line signalling centre, Highgate

Surface

Healthy Streets

Forecast completion year

2021/22

Spend to date (£m)

507

Spend authority (£m)

1,207

EFC (£m)

1,473▼▼

EFC movement post plan (£m)

134

2019/20 strategic milestone RAG 

The Healthy Streets Approach prioritises health and wellbeing, with the overall objective of creating a transport system where everyone can travel safely by the healthiest and most resource-efficient means, specifically walking, cycling and public transport. It is central to achieving the 80 per cent mode share target in the Mayor's Transport Strategy.

Highbury Corner

The main highway and urban realm work is now complete; the road network is reconfigured and the gyratory at Highbury Corner removed. Planting of new trees and installation of new hostile vehicle measures within the urban realm area and outside Highbury & Islington station will follow later in the year once approval has been obtained from Network Rail. The Mayor visited on 2 October to officially open the scheme.

The scheme is expected to be fully complete by the end of 2019.

Wandsworth Gyratory

The purchase of properties from landowners on Putney Bridge Road is progressing, with the acquisition of the remaining three properties expected to complete in November 2019. The revised scheme layout in Armoury Way has been completed with the design refinements requested

The EFC covers 2021/22 to provide a direct comparison to the programme as originally approved in 2017/18. In June 2019 we announced our intention for the Rotherhithe to Canary Wharf crossing project to return to feasibility stage, and we are currently reviewing options to deliver a ferry crossing. This accounts for the majority of the reduction in EFC compared to the previous quarterly report.



Walking & Cycling Commissioner Will Norman launches the Quietway campaign in Hackney

by the London Borough of Wandsworth. Agreement for the amended layout has passed committee and was approved subject to public engagement by the Executive at its meeting on 7 October. Detailed design remains on track to run in parallel with the Compulsory Purchase Order process. We plan to start construction at the end of 2021.

Fiveways

The project aims to alleviate congestion and smooth traffic flows at Fiveways Corner in Croydon. Work is continuing to update the business case and ensure the project remains aligned to the latest developments within the Croydon Growth Zone. Preparations have been made for a planning application to be submitted and a tender for a design and build contract to be let, both during 2020.

Vauxhall Cross

This project has been paused since the interfacing developer's planning application was called in by the Secretary of State for Housing, Communities and Local Government in May 2019. Following the Inspector's report expected in early 2020, the Secretary of State's decision is anticipated in summer 2020. We will not be going out to tender for the design and build contract until we have a positive outcome from the planning decision.

King's Cross

Safety, cycling and pedestrian improvements are being delivered in phases in the King's Cross and Euston Road area, with Phase I construction planned for December 2019.

Safety improvements for the Duke's Road and Churchway junction on Euston Road will be the first phase. Proposals include a 'green man' pedestrian crossing across both Churchway and Duke's Road and provision of safer north-south movements for cyclists.

Waterloo City Hub

This scheme provides a significant upgrade for the safety and comfort of pedestrians, cyclists and public transport users. The scheme will provide a new pedestrian walking route to the river, improved crossings, segregated cycling facilities and improved bus waiting and boarding areas. The proposed transformational scheme is currently in detailed design. We continue to work closely with the London Borough of Lambeth and developers in the area, to ensure delivery is coordinated with existing and future plans for Waterloo.

Old Street Roundabout

Construction is progressing at Old Street Roundabout, where a new design will bring safety improvements to cyclists and pedestrians by providing new and improved crossings, fully segregated cycle lanes, and a new public space with an accessible main entrance to the Underground station and the shopping arcade.

Following the temporary traffic switch in May 2019 which closed the southeast arm of the roundabout, construction work continues on the new entrance to Old Street Underground station near to Cowper Street. Utility diversions by Thames Water, UKPN and Cadent Gas have been completed in the area and excavation is underway for this new entrance which will be completed in spring 2020.

Within the peninsula area, site clearance works have commenced as well as installation of a temporary goods lift for the shopping arcade area. This allows removal of the existing goods lift in readiness for demolition works for the new main entrance which starts later this year. Early next year, a further traffic switch will take place to reopen the southeast arm of the roundabout and permanently close the northwest

arm, facilitating the construction of the public space, new passenger lift and new main station entrance in the peninsula area. Planning consent for the new main station entrance was obtained from Islington Council in September 2019.

Lambeth Bridge North and South

This scheme provides a significant upgrade for the safety and comfort of pedestrians and cyclists, by removing the current roundabouts on both sides of the river and replacing them with signal controlled junctions. The proposal includes segregated approaches for cyclists with dedicated cycle phases at the junction and new signal controlled pedestrian crossing facilities. We continue to detail the scope of the work required to replace the waterproofing, drainage and expansion joints on the bridge deck. The design of the permanent protective security measures (PSM) on the bridge is progressing well. We have secured endorsement from the PSM Oversight Group on the PSM design principles. This reflects conversations which we have had with heritage officers, whose agreement is needed to make changes to this listed bridge. We continue to work with Westminster City Council to identify a design for the northern roundabout which responds to concerns raised during the 2017 consultation.



Cycleway 9 plans for Kew Bridge

Cycling improvements between Wood Lane and Acton

The works are progressing well to deliver 3.5km of upgraded shared-use facility for pedestrians and cyclists and a new off-carriageway bi-directional cycle track along the A40 between Wood Lane and Acton.

Works to install the new cycle track and footway are complete between Savoy Circus and Gibbon Road and have commenced between Leamington Park and Horn Lane. Upgrades to the existing shared-use facility between Wood Lane and Sundew Avenue are now complete, and work has commenced between Sundew Avenue and Banstead Court.

Proposed cycling improvements between Wood Lane and Notting Hill Gate

We are continuing to review our proposals for improvements between Wood Lane and Notting Hill Gate, considering feedback from the consultation which closed on 16 June. We published the consultation report on 5 November and are now awaiting feedback on our revised proposals from Kensington and Chelsea and Hammersmith & Fulham councils.

Cycleway 4

Construction started for Cycleway 4 on 5 July 2019 and is making good progress along the A200 Jamaica Road, Rotherhithe roundabout and Tooley Street, with the works anticipated to

complete by May 2020. The Mayor visited the construction on the 27 August and announced that we will introduce five new Santander Cycles docking stations along the route between Tower Bridge and Canada Water. We are also planning the construction phases for the Lewisham and Greenwich sections of the project. The Greenwich section is currently planned to start at the end of November 2019. Consultation for the Lower Road section of the route led by Southwark Council completed on 4 October, and includes their proposals to make some roads in the area two-way.

Cycleway 9

Following the completion of re-consultation of two elements of the scheme in February, the 'Response to Issues Raised' report was published in July 2019. Detailed design for the Kew Bridge section was completed in early September with road safety audits currently being undertaken. London Borough of Hounslow's Cabinet approved the scheme within Hounslow on 3 September 2019. The London Borough of Hammersmith & Fulham is due to go to Cabinet in December 2019 for a decision to construct its section. Subject to the remaining stages of the decision-making process, construction work is scheduled to commence on Kew Bridge in December 2019.

Cycleway between Hackney and the Isle of Dogs

We ran a public consultation for this route between 8 May and 21 June, with results published on 3 October. Detailed design for the first section of Burdett Road has been completed ahead of the start of construction currently planned for early next year. Planning permission has been secured for a relocated cycle hire station, and arrangements made for advanced utility works and relocation of assets including bus shelters. We are continuing to work closely with Tower Hamlets Council to coordinate the Grove Road proposals with their proposed Liveable Neighbourhood scheme in the same area.

The northern section of the route is being delivered by the London Borough of Hackney and it is progressing with detailed design with the aim to start construction in early 2020.

The Isle of Dogs section has now been de-scoped from the main project as traffic and cycle flows are too low to justify a fully segregated layout. Improvements in the Isle of Dogs will be progressed as part of the Cycleway Network development with Tower Hamlets Council.

Future Cycleway routes

Design work continues on several major new cycle routes identified in the 2017 Strategic Cycling Analysis. In addition to the public consultation for the first route between Hackney and the Isle of Dogs, other public consultations that have recently closed include the proposed Cycleway between Ilford and Barking Riverside, and the first section of the Cycleway between Lea Bridge and Dalston, which was followed by the second section in early November. We also plan to consult the public on a Cycleway between Greenwich and Woolwich before Christmas or early next year.

Cycleway between Camden and Tottenham Hale

We have begun full remodelling of the scheme following a design review of the route which would run between Camden and Tottenham Hale. This review has enabled us to further refine the proposals and to engage with key stakeholders including the relevant local boroughs. These activities have aimed to ensure the scheme that goes out to public consultation in 2020 is the best that can be achieved for the local communities and road users along this route and surrounding areas.

Mini-Hollands and Cycleway Network development

We continue to make good progress on the Mini-Hollands, and the development of the wider Cycleway Network, with a focus on completing and opening whole or significant sections of these routes. We have constructed over 140km of cycle routes and have a further five kilometres under construction through inner and outer London. All newly completed routes will now be signed as Cycleways.

The Mini-Hollands programme involves 98 infrastructure schemes and five behaviour change schemes across three outer London boroughs – Waltham Forest, Enfield and Kingston. Thirty-two of the 103 Mini-Holland schemes are now complete, including the A105 Green Lanes scheme, a five-kilometre protected cycle route linking Enfield Town to Palmers Green and the Kingston Station Plaza, which sees improved accessibility for both pedestrians and cyclists. Schemes currently under construction include protected cycle routes on Wheatfield Way in Kingston, on the A1010 in Enfield, and on Lea Bridge Road in Waltham Forest. Further schemes are progressing through design and consultation, including a number of cycle links and Enfield's Quieter Neighbourhoods.

The Deputy Mayor for Transport, Heidi Alexander, opened new public spaces, crossings and cycle routes as part of Waltham Forest's award-winning Enjoy Waltham Forest scheme on 17 October. The Enjoy Waltham Forest programme is nearing completion with cycling routes along Markhouse Road and Temple Mills Lane, a transformation of the Blackhorse Junction, and new cycle parking at Blackhorse Road station to be completed next year along with the Coppermill Area Liveable Neighbourhood scheme.

Rotherhithe to Canary Wharf Crossing

Following the decision of the Programmes and Investment Committee on 21 June that the crossing should revert to feasibility, we have been examining options for a new ferry service, with work focused on route planning, fares, vessels, piers and connectivity to the local area. It is envisaged the feasibility work will continue through to October, at which time a report will be prepared for the Programmes and Investment Committee setting out the recommended way forward. The work on a new ferry to improve connectivity for pedestrians and cyclists between Rotherhithe and Canary Wharf is alongside the wider investment we are making in walking and cycling across the area, including delivery of Cycleway 4 and new cycle routes from Rotherhithe to Peckham and Hackney to the Isle of Dogs.

Safer Junctions

In April 2017, the Safer Junctions list highlighted the 73 most dangerous junctions on our road network (defined as those with the highest vulnerable road user collision rates between 2013 and 2015). Following completion of Highbury Corner in September, we have now constructed 31 of these junctions and all of them have had mitigation measures introduced to reduce road danger. Construction of Camberwell Town Centre Safer Junction began in October, and work continues on the Rotherhithe Tunnel junction as part of Cycleway 4. The programme is currently on target to complete 41 junctions by May 2020, in line with the Mayor's Vision Zero commitment – although there are challenges to be overcome in relation to concerns raised by stakeholders during recent consultations.

Public consultation reports have been completed on the following Safer Junction projects:

- Kingsland Road/Balls Pond Road
- Kennington Park Road/Braganza Street
- East India Dock Road/Birchfield Street
- Edgware Road/Harrow Road,
- Clapham Road/Union Road

- Holloway Road/Drayton Park/
Palmer Place
- Camden Street/Camden Road

Lowering speed limits

The consultation report for introducing 20mph in central London has now been published, and detailed design is well advanced. The Traffic Regulation Orders have also been published for consultation, which are needed to ensure the new speed limit is legally enforceable. The construction schedule is under development, with the aim of completing the bulk of works by February 2020; this will enable behaviour change marketing communications to take place ahead of the scheme launch.

Direct Vision Standard (DVS)

The DVS was created to improve the safety of all road users, particularly the most vulnerable, such as pedestrians, cyclists and motorcyclists, by assessing vehicle blind spots. The proposed Heavy Goods Vehicle (HGV) Safety Permit Scheme was launched by the Mayor on 29 October and will require all HGVs weighing more than 12 tonnes to obtain a permit to operate in London and all those with an unacceptably low DVS rating to fit additional safety equipment.



Healthy Streets, Kingsland Road



Liveable Neighbourhoods, Waltham Forest

In April 2019 we published the findings of a consultation on the proposals. This showed 60 per cent support and feedback has been used to make further refinements to our proposals. On the same day the consultation on the finalised scheme proposals was launched, including on a Traffic Regulation Order to make the scheme mandatory from October 2020. This additional consultation closed on 23 May 2019. Four non-qualifying objections were raised but no public inquiry was required. London Councils have signed the Traffic Order and the Notice of Making was published on 27 August 2019. Permits for HGVs were launched on 28 October 2019, with scheme enforcement commencing in October 2020.

Crossrail complementary measures

We are working with the boroughs, Crossrail Ltd and Network Rail to develop and deliver a programme of improvements to 17 stations in outer London, to create capacity for additional footfall and help regenerate local communities. So far, Crossrail complementary measures works are complete at five stations (Abbey

Wood, Chadwell Heath, Goodmayes, Manor Park and Romford). Site works at 10 stations (Forest Gate, Gidea Park, Hanwell, Harold Wood, Ilford, Maryland, Seven Kings, Acton Main Line, West Ealing and West Drayton) are at various stages of construction. Two stations (Southall and West Ealing) are at design or consultation stage.

The original Crossrail programme has slipped and a new programme is being developed for station works. Complementary works at some stations are dependent on station works – and some of the west London stations will be completed later than December 2019, as a result.

Liveable Neighbourhoods

Liveable Neighbourhoods is a key part of the Mayor's Transport Strategy, which aims to create locally-led, attractive, healthy and safe neighbourhoods that encourage walking, cycling and public transport use and reduce car journeys. In 2018/19, feasibility funding was awarded for the first phase of the programme.

Eighteen projects are now in progress across 18 boroughs:

- West Ealing, London Borough of Ealing
- Greenwich Town Centre, Royal Borough of Greenwich
- Hackney Central, London Borough of Hackney
- Crouch End, London Borough of Haringey
- Romford Town Centre, London Borough of Havering
- Deptford Parks, London Borough of Lewisham
- Coppermill Village, London Borough of Waltham Forest
- Shortlands, London Borough of Bromley
- Holborn, London Borough of Camden
- Old Town, London Borough of Croydon
- Enfield Town, London Borough of Enfield
- South Chiswick, London Borough of Hounslow
- Brixton, London Borough of Lambeth
- Custom House, London Borough of Newham
- Bramcote Park, London Borough of Southwark
- Bow, London Borough of Tower Hamlets
- Ilford, London Borough of Redbridge
- City Cluster, City of London

Early works commenced on the Coppermill Village project and public consultation was launched for phase one of the West Ealing project. In addition, Croydon Old Town, Enfield Town, South Chiswick, Brixton, Custom House and Bow began their feasibility phase. In July 2019, the inaugural Liveable Neighbourhoods conference took place in Alexandra Palace.

Borough Local Implementation Plan projects

Blackhorse Road/Forest Road

The London Borough of Waltham Forest commenced construction in June and are expected to be on-site for 12 months. The works are on-programme and the contractor is now undertaking the improvements outside the Underground station.

West End Project

The London Borough of Camden has completed the majority of the works on Tottenham Court Road, which is now operating two-way (buses and cyclists only southbound). Works are currently on-site at Gower St/Princess Circus and scheduled to finish by summer 2020.

Feltham Town Centre

The London Borough of Hounslow (High Street improvements) and Network Rail (station) works are well underway. All phases and elements of the scheme will be completed and allocation fully spent by November 2019.

Air quality



Forecast completion year

2022/23

Spend to date (£m)

173

Spend authority (£m)

280

EFC (£m)

508▲

EFC movement post plan (£m)

(37)

2019/20 strategic milestone RAG

The Air Quality programme reduces the impact of transport on air quality and climate change by targeting vehicles in our contracted and regulated fleets, and all vehicles driving in London.

Ultra Low Emission Zone

In April 2019 we successfully introduced the new Ultra Low Emission Zone (ULEZ) in central London. It enforces the world's toughest vehicle emission standard and the first to operate 24/7. The ULEZ has replaced the T-Charge and operates in the same area of central London as the Congestion Charge. The initial running of the scheme has gone well, with customer call centre volumes very high on the day of launch but much reduced thereafter.

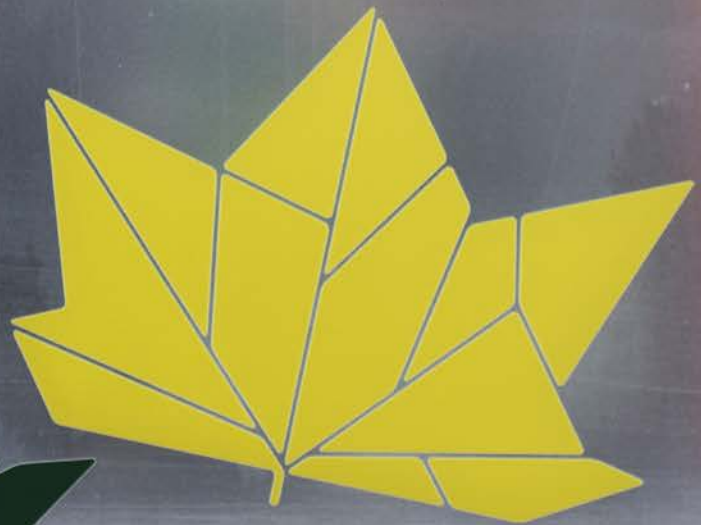
In the first six months of the scheme, up to September 2019, there was a large reduction in the number of older, more polluting, non-compliant vehicles detected in the zone: some 13,500 fewer on an average day, a reduction of 38 per cent in Congestion Charging hours.

Preliminary estimates indicate that after six months NOx emissions from road transport in the central zone have reduced by 31 per cent (200 tonnes) compared to a scenario where there was no ULEZ. This is ahead of schedule to meet the 45 per cent NOx emissions reduction expected in the first year.

The EFC reflects the financial authority up to 2022/23. The £37m increase is materially driven by the transfer of the Van and Minibus Scrappage Scheme and the Car & Motorcycle Scheme into the Air Quality and portfolio, providing an additional £48m to support the Mayor's initiative to remove the most polluting vehicles from the roads. This pressure has been offset by more mature costings for projects including an £8m reduction in costs in ULEZ Expansion, and £3m for the Direct Vision Standard. In addition, Selective Catalytic Reduction (SCR) retrofit has decreased by £3m due to reduction in delivery units and release of risk. Spend authority is to the end of 2022/23.



LOW EMISSION
BUS ZONE
CLEANER AIR
FOR LONDON



Low emission bus zone, Putney

Low Emission Zone 2020

We are tightening the existing Low Emission Zone (LEZ) standards from 26 October 2020. The emissions standards for lorries, vans and other specialist heavy vehicles over 3.5 tonnes as well as for buses, minibuses and coaches over five tonnes will change from Euro IV to Euro VI. The aim is to encourage increased efficiency of road freight movements and to promote the consolidation of road freight. Owners of vehicles not meeting the tighter emissions standards will need to pay a daily charge to drive within the LEZ.

Fleet compliance

To help meet the Mayor's Air Quality objectives in 2020, we are upgrading the entire bus fleet to meet Euro VI emissions. This includes retrofitting up to 4,000 mid-life buses to meet Euro VI emissions. We have currently retrofitted over 3,400 buses and have delivered all 12 Low Emission Bus Zones around a year earlier than planned.

The zones are:

- Putney High Street
- Brixton – Streatham
- A2 Camberwell – New Cross
- A3 Wandsworth – St. John's Hill
- High Road (Haringey) – Green Lanes

- A12 Eastern Avenue (Homerton Road)
- A5 Edgware Road (Kilburn – Maida Vale)
- A21 Lewisham – Catford
- Edmonton to Seven Sisters corridor
- Stratford
- Chiswick High Road – Kensington
- Uxbridge Road – Shepherds Bush

Ultra-low emission vehicles – rapid charging infrastructure

To support the growing number of Zero Emission Capable (ZEC) taxis and the wider take-up of electric vehicles, we are spending £18m and working with the London boroughs and other organisations to build a network of rapid charge points across London. The total number of charge points installed under this scheme exceeded 200 in September 2019 and installations are on track to achieve 225 by December 2019, which will be a major step towards our target of 300 rapid charge points by December 2020.

At present, there are more than 2,000 ZEC taxis licensed in London. Of the rapid charge points that have been installed under this scheme, 73 are dedicated to taxi use. We are working with the taxi trade to identify the most favourable locations and are focusing on the central charging zone for taxi-dedicated sites

following feedback from the taxi trade. We are also developing the designs for two hub sites, one in Greenwich and another to be located in the City of London. The hubs will consist of at least six rapid charge points that can be used simultaneously to support both taxi and public electric vehicle users.

Mayor's Air Quality Fund

The Mayor's Air Quality Fund (MAQF) is a £22m fund over 10 years to support projects by London boroughs to improve air quality.

Projects supported in the third round of the MAQF were announced by the Mayor on 7 June 2019. In this round he is supporting four Low Emission Neighbourhoods and 11 other innovative air quality projects.

Go Ultra Low City Scheme

London's Go Ultra Low City Scheme bid was awarded £13m in capital funding to drive the uptake of ultra-low emission vehicles in the period 2015/16 – 2019/20. To date, 1,200 residential electric vehicle charge points have been installed by boroughs. The final round of funding, £4m, is now open for boroughs to bid for with a submission deadline of 31 October 2019.

Asset investment

Forecast completion year

2021/22

Spend to date (£m)

258

Spend authority (£m)

303

EFC (£m)

634▲

EFC movement post plan (£m)

(35)

2019/20 strategic milestone RAG 

We maintain our surface assets are in a safe condition through prioritised and planned works to replace, refurbish or reconstruct them. This programme maintains and lengthens the useful life of a wide range of assets, including carriageway, footway, lighting, drainage, bridges and tunnels, traffic signals, bus stations and river assets.

Ardleigh Green Bridge replacement

All construction works to replace the bridge have been completed and the bridge is fully open to the public. The remaining railway-side work to remove remnants of the old bridge, have been discussed with Network Rail and are planned to be completed by Christmas 2020 when a suitable railway possession is available.

Bus driver facilities

Providing bus driver facilities aligns with the Mayor's Transport Strategy of making the bus network operationally efficient and reliable. It ensures our bus drivers have basic human facilities and helps improve the service to our customers by avoiding the need for unscheduled, mid-route stops, which can cause delays. In addition, it also removes the risk of potential distractions for bus drivers, helping to enable them to drive safely.

This is the second year without any Government operating grant. In the medium to long term, new sustainable funding sources for London's roads will need to be identified.

The EFC covers 2021/22 to provide a direct comparison to the programme as originally approved in 2017/18. The Q2 EFC forecast has increased due to costs relating to the Rotherhithe Tunnel. In September 2018 we conducted a detailed analysis of the ventilation system which would extract smoke and other dangerous fumes from the tunnel in case of fire. This analysis showed that the repair work needs to be carried out urgently.



Bridge replacement works at Power Road bridge, Chiswick

The majority of these new facilities will be stand-alone permanent toilet units, adjacent to the bus stands where they are required. Where possible we are adapting existing infrastructure to ensure integration with the local environment.

Good progress has been made since the Mayor announced increased funding for bus driver facilities in February 2018.

By the end of July 2019, we delivered 17 permanent facilities and 26 temporary facilities on all the 42 priority bus routes.

We are working towards the final target of having permanent facilities on all 42 priority bus routes by the end of March 2020. We are planning to connect 25 temporary units to the utilities: foul sewer, water supply and power supply, and construct permanent concrete foundations. To date we have made five of the temporary units permanent.

Hammersmith Bridge

Recognising the impact the closure of this strategic route is having on residents and bus operations, we have moved quickly to complete an options analysis with high-level costs and benefits on behalf of the London Borough of Hammersmith and Fulham who own the bridge.

We have jointly agreed with the Borough the intention to restore the bridge to restore the bridge with a 7.5 tonne limit for general traffic, together with future-proofing for limited electric buses. We have committed £25m to progress with the concept and detailed design phases, together with advanced works. In August, the concept design work for the bridge was awarded to Pell Frischmann and it is expected to be completed by the end of March 2020.

We are using all the tools we have available to measure, understand and mitigate the effect of the closure on traffic. We are using our network data to make informed decisions on traffic-light timings and implement contingency plans to manage unplanned events; for example, we have completed a significant redesign of timings around Hogarth Roundabout, a comprehensive change to timings around Hammersmith, and the rebalancing of priorities at Chalkers Corner and Lower Richmond Road. Journey times are showing some improvement as a result of these traffic-light changes.

Rotherhithe Tunnel

Rotherhithe Tunnel, opened in 1908, is a single-bore road tunnel carrying the A101 beneath the River Thames in east London. Rotherhithe Tunnel refurbishment works include: renewal of tunnel lighting and its cable support; replacement of the fire main system; provision of resilient power supply; upgrade and reconfiguration of the ventilation system, as well as other mechanical, electrical and civil assets which are life- expired or safety-critical to the operation of the tunnel.

Concept design for the refurbishment of the Rotherhithe Tunnel has commenced and is due to be completed in summer 2020. A separate workstream to install additional protective measures at the tunnel entrances and to prevent excess-height vehicles entering the tunnel has commenced and is planned to be operational by summer 2020.

We are making enforcement of vital safety restrictions in the Rotherhithe Tunnel stricter from December to stop vehicles that are more than two metres (six foot six inches) wide or two metres high, or goods vehicles weighing more than 2 tonnes, from endangering other road users by entering the tunnel. From 2 December, non-compliant vehicles entering the tunnel could now receive a fine for each journey through the tunnel, rather than one fine per day.

Public transport

Forecast completion year

2021/22

Spend to date (£m)

253

Spend authority (£m)

347

EFC (£m)

480▲

EFC movement post plan (£m)

(86)

2019/20 strategic milestone RAG

The public transport programme oversees London Buses, London Overground, the DLR, London Trams, Emirates Airline, Santander Cycles and the London River Service.

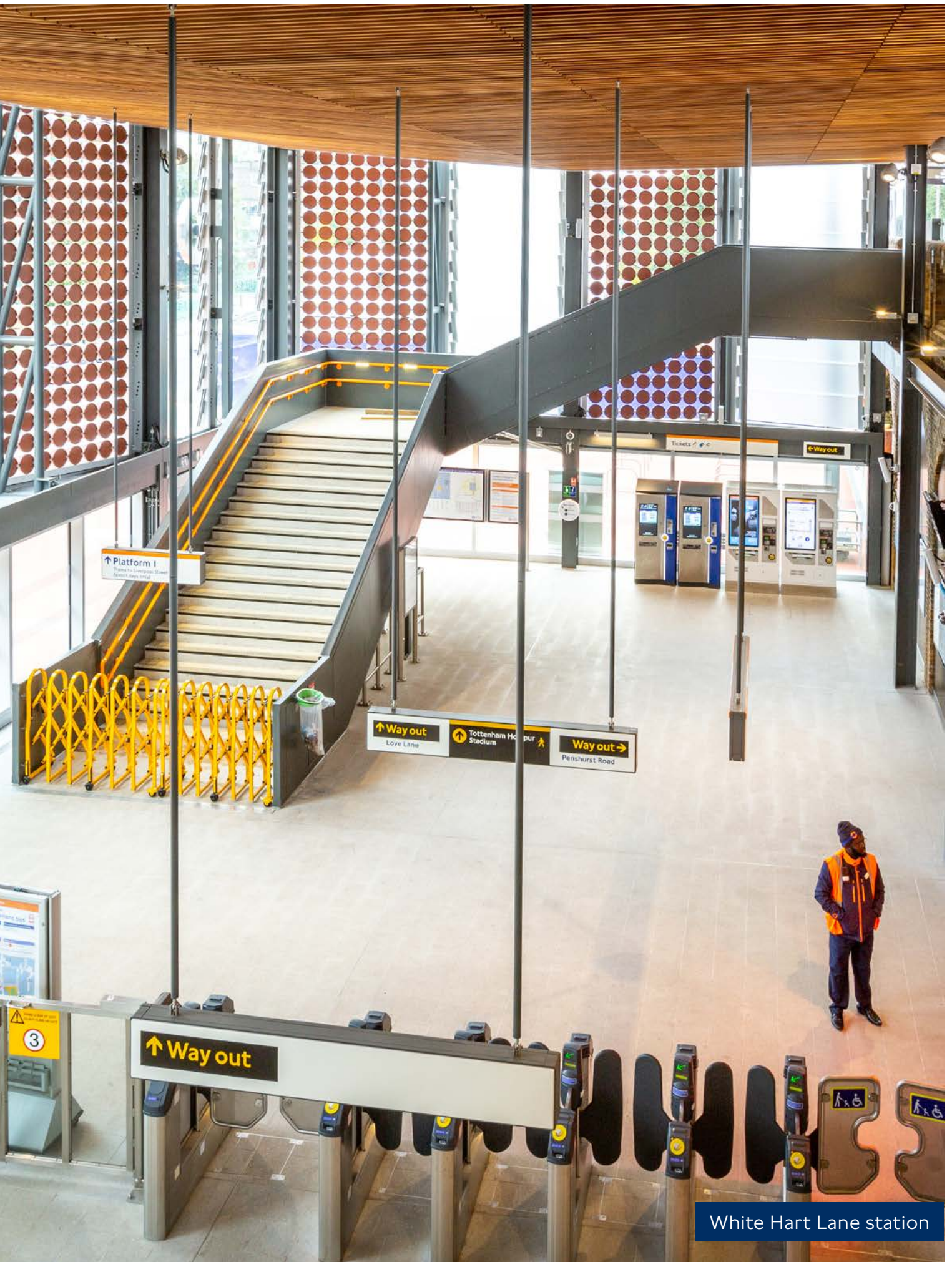
London Overground

Works at White Hart Lane London Overground station were completed in August. There are new station entrances and step-free access from street to platform for the first time.

We have installed, tested and commissioned the Train Protection Warning System (TPWS) to the Richmond branch of the London Overground network. This system is a safety feature to reduce the risk of trains passing into sections of the track until they are clear to do so. The benefit of this project is to allow the new class 710 London Overground train to use this section of track as the new fleet is equipped with this compatible system. Without installing TPWS the new fleet would not run on this section of track thus affecting reliability and the customer benefiting from a newer train fleet. Construction works were completed in the autumn.

At West Hampstead, following the opening of the new concourse to passengers in the previous quarter, the next steps are to complete the platform widening at the western part, which is planned to be completed this autumn.

The increased EFC reflects the transfer of the Rotherhithe to Canary Wharf Ferry to this portfolio, increased spend in critical renewals and all our third-party funded projects are now reported at the gross value. The increased EFC spend authority is to the end of 2021/22.



White Hart Lane station

We are progressing with a design for updated signalling to enable the East London line to run 18 trains per hour. The works are planned to be implemented in summer 2020 ahead of the December timetable change.

DLR

High-voltage (HV) works have successfully been completed at Stratford Street Market with the testing and commissioning remaining for the new transformer. Once operational it will provide future resilience. Detailed designs have begun for similar works at Poplar depot.

We have finished a number of infrastructure projects, including repainting of bridges and viaducts, and North Route staircase tread replacement. Further infrastructure works, track access, drainage and HV weather protection have commenced.

Replacement of old lighting with LED continues at West India Quay and Poplar.

Track renewals continue to be delivered during weekend closures and non-operational hours. Sections of track around Canary Wharf and Gallions Reach have been completed to date.

The upgrade and fit-out works at Custom House station are progressing while the station remains operational.

The public address system installation has been completed and commissioned. The main radio resilience works have been completed with testing and commissioning planned for this financial year. The contractor will be appointed to upgrade the Automatic Passenger Counting System during this financial year.

London Trams

As part of our commitment to making the tram network safer following the tragedy at Sandilands in 2016, we are continuing to address the recommendations from the Rail Accident Investigation Branch. We have completed a number of initiatives and are currently in the delivery phases of the Physical Prevention of Over-Speeding automatic braking system and the enhanced lighting for the Sandilands tunnel. We continue to evaluate design for tram emergency lighting.

Our renewals programme of works consists of around 37 projects across seven asset groups including fleet, power, civils, systems and permanent way infrastructure.

Key highlights this quarter include the overhaul of the hydraulic power units and brake callipers on the Bombardier CR4000 fleet of vehicles being completed ahead of schedule and on budget. The overhaul of the Bombardier vehicle bogies is also nearing completion.

During a successful ten-day closure of the eastern branch in August, we replaced the worn embedded rails at Chepstow Road, alongside a series of other major works to systems and infrastructure.

A contract to replace the switchgear system at Oaks Road substation is due to be awarded by November 2019. This year's programme for the replacement of parafil support wires, which hold up the overhead power lines, continues to progress well. We have finalised additional design work for the rebalancing of power within the tram depot and we will be appointing a contractor to deliver the works in the new year.

Following the switch to cashless trams in July 2018, we have removed the existing ticket machines which dated back to the opening of the system, from all tram stops barring one at Wimbledon, which is pending an access agreement from Network Rail to allow removal.

We have commissioned the centre platform at East Croydon, and drivers have been trained on the new operational arrangement. This will improve local operations at East Croydon and increase the resilience of the tram network, particularly in the town centre.

Discussions are ongoing with Network Rail on a revised programme and cost for completing the outstanding works at Wimbledon Platform 10.

Replacement of the two Victorian bridge decks at Blackhorse Lane has been completed with all necessary utility service diversions. We continue with works to reconstruct the highway above the bridges, to be finished during spring 2020, with single-lane traffic operation expected to be in place by the end of 2019.

Tram track renewals between Addiscombe Road and Blackhorse Lane have been successfully delivered, and we are in the planning stage for track renewals at Love Lane, which will take place in March 2020. We completed replacement of the retaining wall at Ampere Way in August 2019.

The systems obsolescence management project enabling works are complete and we are well underway towards finishing the critical migration activities on each tram stop across the network. We will continue the migration through to December 2019 as well as improvements within the control room and the depot.

Bus Safety Standard

Vision Zero aims to achieve zero fatalities and serious injuries on our road network by 2041. The interim target for buses is zero fatalities on or caused by a bus, by 2030. The Bus Safety Standard is the programme of work that is looking at improving the safety of London's buses in working towards Vision Zero.

The Intelligent Speed Assistant (ISA) application controls the speed of the bus using geo-fencing via GPS to the bus, linked to a safety zone speed map. This is an aid to the driver and does not replace the driver responsibility for maintaining the correct speed. As of September 2019, 900 buses have been ISA enabled and a further 200 buses are expected to achieve the same by March 2020. New buses entering service from September 2019 will be ISA enabled as standard.

The Acoustic Vehicle Alerting System (AVAS) is a system that can be fitted to quiet running buses: electric, hydrogen and hybrid (when in electric mode). The system comprises a distinctive sound to alert the public that a quiet running bus is approaching, moving off from stationary or accelerating.

Evidence suggests that current near-side-mounted bus mirrors have blind-spots, which has resulted in cyclists and the walking public being injured. A new near-side blind-spot mirror (BSM) is being rolled out to replace the existing mirror. The off-side mirrors are also being replaced to further reduce blind-spots and avoid driver confusion by standardising the side-mounted mirrors across our fleet. The BSM retrofit started in August 2019 with approximately 18,000 BSMs expected to be fitted to 9,000 buses by March 2020. All new buses will have the BSMs fitted as standard.

Hydrogen buses

To help reach the Mayoral target for all buses to be zero emission by 2037 and meet the Mayor's air quality objectives, we are procuring 20 hydrogen fuel cell buses and building a Hydrogen Refuelling Station (HRS).

The contract has been awarded for the construction of the HRS which is to be built at Perivale Bus Garage and operated by bus operator Metroline. The supplier has produced initial designs and these have enabled the compiling of a planning application for the construction of the HRS which was submitted to Ealing Council who awarded planning permission for the project on 11 September 2019.

Funding is provided by a consortium, including ourselves, various European bodies, and the Office of Low Emission Vehicles for the buses. Orders for the buses were placed in May 2019. In September 2019 the manufacturer of the buses, Wrightbus, entered administration and was subsequently purchased by the Bamford Bus Company on 22 October 2019. We are working closely with the new owners and the funding consortium to determine the most suitable option for the future of this project.

Surface technology

Forecast completion year	Spend to date (£m)	Spend authority (£m)	EFC (£m)	EFC movement post plan (£m)
2023/24	5	85	170 ▼	7

2019/20 strategic milestone RAG

This is a new programme responsible for overseeing strategically important technology projects within our five-year business plan and, from April 2019, to provide a structure for all future technology projects being delivered by surface transport.

Surface Intelligent Transport Systems

We are leading the way in delivering innovative new road traffic management systems to make journeys on foot, bike and bus, as well as essential emergency services and freight trips, as efficient as possible. We are working with Siemens to develop the Real Time Optimiser system. This will manage the flow of people on London's road network by controlling the phasing of traffic signals using pre-planned timetables, manual interventions and optimisation techniques. We have recently finalised a procurement process and have appointed Sopra Steria as a new delivery partner to work with us to design, develop and implement a new incident management system, which will enable us to increase the speed at which we detect and respond to incidents on the road network.

Operational safety and compliance

We are developing a consolidated compliance and enforcement programme to support a more versatile compliance, policing and on-street services operation. This will contribute towards making greater efficiencies and supporting safe, secure and reliable journeys. We are currently in the process of defining the project scope, with a view to confirming a delivery strategy next year.

This programme includes procuring systems and services to support our licensing of taxi and private hire vehicles (PHVs), drivers and operators. We will ensure business continuity is maintained, protecting customers and ensuring vehicles are safe, accessible and meet strict environmental standards. The new system aims to provide an

efficient service to taxi and private hire vehicle owners, drivers and operators. Following early market engagement, a Periodic Indicative Notice was issued in September 2019.

Public transport technology

To support a good public transport experience, we are maintaining and developing technology to operate our public transport networks and improve customer experience. This includes upgrading the technology systems which underpin the bus network, providing better information systems and improving the booking system for Dial-a-Ride.

Other

Technology and data

Forecast completion year

2020/21

Spend to date (£m)

85

Spend authority (£m)

228

EFC (£m)

228▲

EFC movement post plan (£m)

33

2019/20 strategic milestone RAG 

The Technology and Data programme provides the core infrastructure, services and technologies that allow us to achieve our strategic priorities.

The Technology and Data programme provides the core infrastructure, services and technologies that allow us to achieve our strategic priorities.

Payments

The Mayor has agreed with our recommendations that when we start operating the local services to Reading, the extension of pay as you go will be for contactless payment cards only and will be introduced from 2 January 2020 to align with other changes Great Western Railway are making to fares to support the introduction of pay as you go. Development work to support the new pay as you go proposition is coming to an end, with testing due to starting this month. Our discussions with the train operating companies on the changes to our agreements with them to facilitate the new pay as you go arrangements are continuing and remain on track. Introduction of the new arrangements will also be subject to the train operating companies' approval of changes being made to how we allocate pay as you go revenue between the parties.

Authority and EFC shown are for financial years 2018/19 to 2020/21. The main reason for the decrease in EFC is due to an overprogramming adjustment that was included in the Q2 business plan values to deal with slippage into future years. The total value for this adjustment in FY2019/2020 and FY2020/2021 is £38m.

Evergreen programme

The Evergreen programme is aimed at renewing over 80 per cent of our desktop PCs, and moving all users to Windows 10/Office 365 by the end of March 2020. By dealing with technology obsolescence we will significantly reduce the operational, security, and financial risks of unsupported IT hardware and software. We will be providing users with modern, fit for purpose IT tools that will help them connect, communicate and collaborate more easily, and be effective in their roles.

The Smart Working Programme is a key enabler for our Accommodation Strategy, and the resulting move to a 7:10 desk ratio in the main office buildings. The programme includes several technology enabler projects from Digital Workplace, such as providing circa 1,700 new laptops for users who are changing their way of working to become more mobile, using IT tools to connect from any location.

Excellent progress has been made on both these programmes. Around 7,500 new 'thin client' PCs have been successfully deployed, with excellent user feedback. These are the small, low-cost PCs found in most office neighbourhoods and community areas. They are shared devices available for all our account users to log on and receive

their desktop profile. A further batch is being acquired to support the Windows 10 roll-out in the coming months.

Since August 2019 over 2,400 users have already been migrated to Windows 10 using 'thin client' devices. To allow these devices to run Windows 10 user desktops they now connect to a new server infrastructure which was successfully installed in our data centres during the summer.

We have also successfully deployed over 2,500 laptops with Windows 10 and Microsoft Office software, including over 1,000 new laptops for the Smart Working Programme roll-out. Approximately 600 additional Windows 10 laptops will be ordered for the remaining waves of Smart Working occurring between November 2019 and March 2020.

Content and collaboration

Microsoft SharePoint is one of our main departmental file sharing applications. However, three versions exist which need to be consolidated into a single version, SharePoint Online, for the future. To date, all SharePoint 2007 sites have been migrated, and 217 SharePoint 2010 sites have also been migrated with only 18 remaining. The next major phase (SharePoint 2013 migration) starts in April 2020.

Livelihood is our document management tool, largely used for engineering documentation. The current version is not supported, and needs to be upgraded to run under Windows 10. The test and development environments for the new version have been completed and the pre-production infrastructure build initiated.

The Intranet Consolidation/Renewal project is to replace the two current portals with a single new portal, based on Microsoft 365 software, with a new front end that facilitates easier search and customisation to individual organisations' data preferences. The project has completed the procurement phase.

Operating and monitoring systems

The Future Bus Systems project has delivered the design documentation for the solution to replace our obsolete bus scheduling tools: BusNet, Caesar and SSTT. The first phase of development has been completed and early user testing has been undertaken. Development and testing activities will continue over the next 12 months.

iBus2 will be replacing the current bus location and performance information systems that underpin all the bus

services. The project has delivered its feasibility options and had the recommended options endorsed through governance, commenced requirements gathering and the procurement strategy is currently being developed.

Hosting – data centre rationalisation and cloud migration

The new lease agreement for our primary data centre has been executed by both parties. Two-thirds of the data centre was vacated and returned to the landlord ahead of the lease end date of 31 July 2019 and circa £24m operating savings will be achieved over the next five years.

Hosting continues to develop a hybrid operating model in which we have extended our data centre core capabilities into the public cloud through Amazon Web Services (AWS) and Azure. The expanded capabilities to deliver stronger governance, operational controls and cost transparency to yield additional efficiencies has been delivered in Azure and good progress is being made in AWS. The first tranche of a new infrastructure technology was implemented in our data centre as part of the technology refresh project. This delivers further operational efficiencies and ensures our estate remains technically supported.



oyster[®]



Contactless payments
accepted:



**Please touch
your card flat
on the reader**

See tfl.gov.uk/tickets for terms
and conditions

Contactless payment on London buses

Cyber security

As part of our response for compliance with the Networks and Information Systems regulation, submission of the cyber assessments of systems that underpin the critical services we deliver to the Department for Transport (DfT) have been completed. Our Executive Committee has accepted recommendations provided by the Chief Information Security Officer to establish cyber security steering groups aligned with operational business areas, Surface and London Underground, to oversee the mobilisation of cyber security improvement initiatives and control associated risk. Terms of reference for these initiatives to deliver capability improvements within the Cyber Security Incident Response Team (CSIRT) have been mobilised. These are, specifically, to improve security incident event management and handling of calls and contact within the CSIRT function.

Data and analytics

We have upgraded the back office system which calculates the fares for contactless payments. This was essential in order to cope with the increasing demand for contactless payments, which is now the single most popular way to pay for travel. It brings the contactless system into alignment with the new technology deployed ready to determine weekly

capping for Oyster customers. Added benefits are that end-of-day processing of contactless payments to allow settlement with the banks happens more quickly, future fares changes are easier to implement and it reduces back office maintenance and support costs.

Following a successful prototyping of a product which detects fare evasion from patterns in ticketing data (Irregular Travel Analysis Platform – ITAP), the first phase of this is being transitioned into the development area to productionise. Elements within this product use new insight from ITAP and include an operational resource planner for the detection of habitual offenders for targeted intervention (by automated email if registered and onward investigation for prosecution using CCTV technology to confirm identify). We have secured future funding and the prototype work continues by looking at automating the revenue and performance evaluation of a revenue exercise in support of the recruitment of additional operational staff by London Underground.

A solution has been developed to record WiFi connection data in stations, and the first phase of this project, which includes ingestion of the data and our first customer benefits, will be turned on over the next quarter. The customer benefit

will allow our customers to understand a more accurate picture of the average walk-time between interchanges/ platforms, giving a more accurate reflection of journey times.

The Data and Analytics team are continuing to provide analytic services that underpin London Underground's visualisation programme. We are working with the Performance Analysis and Improvement programme and have created various reports and implemented system changes in the past quarter.

Networks

The delivery of the London Underground Connect radio system upgrade has started, with equipment being installed and port and switch acceptance testing completed at all five core sites. The transition to the successor arrangements with Thales are on schedule to complete by November 2019.

Networks continue to deliver infrastructure to support the Home Office's new national Emergency Service Network communications system. We have now installed 322km of tunnel fibre (78 per cent), pulled 366km of the tunnel's leaky feeder (88 per cent) and fixed 143km of this leaky feeder (34 per cent). The outstanding snagging work has been completed at half of the first 25 stations

(Phase IA), installation work is 80 per cent complete at the next 14 stations (Phase IB) and design work is completed for a further 12 stations (Phase IC), with work started at the first five of these stations.

In parallel, we have installed and fixed (and are currently testing) a second leaky feeder (22km) on the eastern half of the Jubilee line to support our 4G Pilot project. A second leaky feeder has been pulled (required for public 4G services) on the Victoria line (47km) which we will start fixing from November. The design work on the Elizabeth line and Northern Line Extension has been completed and opportunities to start installation work on the Elizabeth line are being looked into (access should be secured over the next six months).

The 4G pilot project is now well underway and we continue to target a go-live in March 2020, noting that this is a very aggressive schedule and thus represents a risk to that date. The design work has been completed for all in-scope tunnels and stations and we expect to complete the outstanding base station hotel (data centre) design in the next three weeks. Installation work is underway in all stations and six of the eight tunnel sections. Design work has been completed with three of the four UK mobile operators and we

have signed terms and conditions for pilot participation with the first mobile operator. We expect to complete the outstanding design work and sign terms with the remaining mobile operators during November.

Our project to secure a partner to commercialise our telecoms assets continues according to plan. Networks have received three compliant first-round bids which the project team are currently evaluating before commencement of the dialogue stage of the process in November.

Technical refresh and technical service operation

Our mission-critical systems have been identified, prioritised for restoration and assessed in terms of resiliency. Implementation has commenced for delivering resiliency for underpinning technical services and business services with the highest risk.

The Technology and Data team are in the contract award phase with the successful bidder who will supply service desk operations, second-line support and hardware repair/build services. These services are currently supplied through multiple providers and this procurement process brings them under a single contract and supplier. Contract award

took place in Q2 of 2019/20 with an expected service commencement date in Q4 of 2019/20.

The in-housing of managed service transition activities due to complete in Q3 2019/20 are on track and progressing to expectation.

Enterprise Resource Planning (ERP)

In October 2019, the Oracle decommissioning project successfully went live, integrating the Metro Maximo asset management system with our SAP ERP system. This improved solution is used for asset maintenance on the Jubilee, Northern and Piccadilly lines and has delivered a way of managing materials and inventory for London Underground. This was achieved by developing common processes for our people between the systems, allowing us to decommission Oracle, a legacy system of the former TubeLines. The project, delivered in-house by the Technology and Data team, was successfully implemented on time, on budget and has already delivered significant savings.

In June 2019 we delivered the new electronic payslip service for all our people. This new safe and secure system has replaced the paper payslip and is accessible using both TfL and personal devices.

For our Finance teams, in August 2019 we re-implemented the SAP Business Planning and Consolidation system to reduce manual activity and increase finance efficiency. The system is being populated with data ready for full use by financial year end.

Our ERP technology transformation continues with selection of AWS as our public cloud hosting provider for SAP. Work is underway to prepare the SAP platform for migration onto AWS which will increase SAP performance, remove several technical support risks and put in place the technical prerequisites required for a full upgrade of SAP over the Business Plan. This is a significant enabler for our ERP upgrade strategy over the next five years.

Contact centre operation

The Photocard Concessions Project has seen progress since contract commencement. Technical testing has begun and external testing has taken place with successful outcomes giving us confidence in a quality product for our customers. Delivery is on track for the new online customer portal in the new year.

Growth Fund



Forecast completion year

2024/25

Spend to date (£m)

1.5

Spend authority (£m)

144

EFC (£m)

144

EFC movement post plan (£m)

0

2019/20 strategic milestone RAG



£0.4m towards Walthamstow Central and £0.8m towards Ilford station due to transfer shortly.

This programme allocates funding to support transport schemes that help to unlock housing and commercial developments and support regeneration opportunities in some of London's key growth areas.

Existing Growth Fund schemes

The Growth Fund contributes to 15 existing schemes that will support more than 55,000 new homes and 30,000 new jobs. Recently completed schemes include the transformation of the northern roundabout at Elephant & Castle.

Significant progress has been made in upgrading and developing stations such as Woolwich (Elizabeth line), Tottenham Hale and West Ham. White Hart Lane station reopened in late August this year. All these improvements support new housing developments. Our investment in the transport infrastructure has been supported by financial contributions from developers and other sources, including the GLA.

Sutton Link

A detailed option selection process has been undertaken, including a public consultation on a shortlist of choices. Further work is now being progressed to develop the business case and funding package.

Committed schemes

We made recommendations to the Programmes and Investment Committee to provide contributions to support five schemes that met our agreed criteria.

These are:

- A new southern entrance at Ilford station to address capacity issues resulting from growth in the area, and to benefit bus passengers arriving at the station
- An upgrade at Colindale station in the first phase of a development programme to bring 10,000 new homes to the local area
- An upgrade at Walthamstow Central station, with improved entrances and step-free access, to provide additional capacity to support new homes and jobs in Walthamstow town centre
- A new DLR station, Thames Wharf, to support the Thameside West development which is set to deliver around 7,000 new homes
- An enhancement to Renwick Road which will provide the additional capacity needed to unlock Barking Riverside development's delivery of around 7,000 new homes

The Elmers End scheme is currently funded for design development and the acquisition of consents and necessary land. We are continuing to liaise with the London Borough of Croydon and others on funding opportunities to deliver these and other improvements to the London Trams network.

We are working with the GLA to select the next set of projects to receive Growth Fund support and to seek funding for certain schemes through the Government's Housing Infrastructure Fund and Business Rates Retention Pilot scheme.



Construction progress at Tottenham Court Road Elizabeth line station

Elizabeth line



On-network stations improvement programme

Forecast completion year	Spend to date (£m)	Spend authority (£m)	EFC (£m)	EFC movement post plan (£m)
2020	79	94	95	1

2019/20 strategic milestone RAG

This programme focuses on 22 existing stations, ensuring improved customer experience and step-free access, and a consistent station environment across the Elizabeth line.

Work on Great Eastern step-free schemes has been completed with lifts at Maryland, Manor Park and Seven Kings in use since late February 2019. The handover of the assets from the contractor to Rail for London Infrastructure is also nearing completion and final inspections were finished in early September. The contractor has been slow to progress as-built paperwork required for the formal handover but committed to seeing it is delivered to the required quality.

On the Great Western section lift schemes at Hanwell, Iver, Langley and Taplow, all critical possession-related work has been completed with the remaining tasks predominantly being fit-out work and testing and commissioning. Works at Langley and Hanwell stations have slipped due to previous possession cancellations and issues with existing

asset condition respectively, but the contractor has sought to mitigate the effect. Notwithstanding this, it is likely that completion at these sites will be in spring 2020.

MTR Elizabeth Line is continuing its station refurbishment programme with work on the locally listed Victorian booking hall recently completed at West Drayton which has been well received by both staff and customers. Works are ongoing at Hanwell, where again asset condition is proving an issue, but activities are being resequenced to ensure that the benefits of the work (new waiting rooms and refurbished toilets) are brought to customers as early as possible. In early 2020 MTR will start on the refurbishment of the Langley station building which will also facilitate the installation of automatic ticket barriers.



Rolling stock

Forecast completion year

2020

Spend to date (£m)

959

Spend authority (£m)

1,149

EFC (£m)

990

EFC movement post plan (£m)

10

2019/20 strategic milestone RAG

The EFC has decreased this quarter due to a reassessment of the remaining scope.

We are introducing the new Elizabeth line train fleet in phases and have built a depot to provide train maintenance facilities.

Testing of the train and Automatic Train Operation (ATO) signalling continued in the central section tunnels of the Elizabeth line, including transitions to the Network Rail mainline routes to the east and west and running multiple trains in the same tunnel under the control of the ATO system. Train and train signalling control software is progressing to the end of the development stage. The functionality for the next phase of the Elizabeth line – trial running – has been confirmed and is planned into the respective software versions on the train and the wayside which are scheduled to be tested in the early part of 2020.

Integration testing of the European Train Control System (ETCS) for operation to Heathrow Airport has completed. Safety-assurance submissions are being prepared for industry stakeholders (including the Office of Road and Rail) pursuant to authorisation to operate ETCS-fitted Elizabeth line trains for driver training and then passenger service.

Elizabeth line trains with integrated ETCS and ATO signalling equipment (but using legacy Network Rail AWS/Train Protection & Warning System train protection) continue to operate selected passenger services between Paddington and Hayes & Harlington. Driver training runs to Maidenhead and Reading on the Great Western Main Line with 23,000 miles accumulated in the quarter.



Class 345 trains at Old Oak Common depot



Crossrail

Forecast completion year

TBA

Spend to date (£m)

*

Spend authority (£bn)

17.6

EFC (£m)

*

EFC movement post plan (£m)

*

2019/20 strategic milestone RAG

Crossrail Limited's latest assessment is that the opening of the central section of the Elizabeth line will take place as soon as practically possible in 2021.

At the Crossrail Board on 7 November, they stated they will need further time and funding to complete the complex testing of trains and managing the handover of the railway safely and reliably into passenger service.

Full testing is due to get underway next year and there can be no shortcuts on this hugely complex project. The latest assessment is that the opening of the central section of the Elizabeth line will not occur in 2020 but it will open as soon as practically possible in 2021.

The latest cost projections indicate that Crossrail will need a further £400 million to £650 million over the revised funding that was agreed with the Mayor and Government in December 2018.

We are currently discussing with the Department for Transport (DfT) how these additional costs will be funded. Any potential financial impacts to revenue will be considered in our 2019 Business Plan.

While this is disappointing news, as joint sponsors with the DfT, we will continue to work closely with Crossrail Ltd to ensure this vital project is delivered safely and as quickly as possible.

This quarter, Rail for London (Infrastructure) Limited (RfLI), the infrastructure manager for the central section of railway, has taken on landlord responsibilities for Victoria Dock Portal and Pudding Mill Lane following a successful handover from the project in August and September, respectively. As the first elements to be handed over, Crossrail and RfLI have been able to test the handover completion process and learn lessons which will be used for the remaining elements.

The hoarding in the ticket hall at Farringdon station was removed in September. This means most major work at the station is now complete so hard hats and hi-vis jackets are now no longer necessary for everyone on-site.

* This information is withheld for reasons of commercial sensitivity

Siemens and Bombardier collaboration remains strong with senior resources co-located in Westferry Circus and with the right level of CEO engagement, including recent meetings in Germany with senior officials from Crossrail, Siemens and Bombardier. This has been a major achievement for the programme and will ultimately de-risk the development and assurance process.

In July, the first nine-car (full-length) train in TfL Rail passenger service was successfully introduced in the western section between Hayes & Harlington and Paddington mainline station. This is an important step in operating the full-length trains which will be used for future opening stages of TfL Rail and the Elizabeth line.

Appendix

2019/20 Strategic milestone performance

The TfL 2018/19 Budget milestones for the projects or programmes covered in this report are listed below. The RAG status indicates delivery forecast against the current plan date in line with the following key:

On time or early
 1-89 days late
 90 or more days late

Commentary is provided on milestones that are forecast to be delivered significantly (more than 90 days) late. These milestones also indicate the history of forecast date movements by showing the RAG status and variance (the number of days difference) between the plan date and the forecast date at each quarter end. Programme impact and mitigations are also detailed.

Milestone description	Plan date	Actual/ forecast date	Status
Major projects			
Four Lines Modernisation ■			
First customer services start on the new higher capacity moving block signalling system	30-Apr-19	17-Mar-19	Complete ■
Use of the new, higher capacity signalling system for customer service extends to the north side of the Circle line and to all other lines	01-Jan-20	23-Feb-20	■
Piccadilly Line Upgrade programme ■			
Complete the concept design of new Piccadilly line rolling stock and present first look walkthrough of air-cooled trains	15-Jan-20	01-Nov-19	■
Network extensions			
Northern Line Extension ■			
Track installation complete	28-Jun-19	03-May-19	Complete ■
Essential power supplies available at all sites for testing and commissioning work to begin	16-Mar-20	25-Feb-20	■
Silvertown Tunnel ■			
Contract to design, build, operate and maintain the tunnel begins*	29-Oct-19	14-Nov-19	■

*Due to the legal challenge at post quarter end, the forecast date for the contract award is now 14 November

Milestone description	Plan date	Actual/ forecast date	Status
Barking Riverside Extension ■			
Main works commence for Barking Riverside Extension	19-Apr-19	19-Apr-19	Complete ■
Completion of I6 Day Network Rail Blockade (works to Support New Viaduct)	04-Aug-19	03-Aug-19	Complete ■
Major stations □			
Bank station – commence construction of new triple escalator tunnel to serve DLR customers at Bank station and relieve congestion	31-Mar-20	07-Feb-20	■
London Underground			
Station renewals and enhancements ■			
22 lift and escalator replacement and refurbishments complete on London Underground	31-Mar-20	12-Mar-20	■
Tottenham Hale – new station entrance and concourse opens to the public	31-Mar-20	14-Dec-20	■
<p>The construction of the new interchange requires significant Network Rail access based on possession working. The current programme now incorporates three agreed possessions with any further works undertaken in engineering hours. This programme based on this approach has now been agreed and is reflected in the latest forecast. Mitigations include a temporary gateline relocation to unlock phase four of the works and in addition we are working collaboratively with our contractors to reduce construction timescales and to mitigate impact.</p>			
Accessibility ■			
Eight more London Underground stations become step-free	31-Mar-20	30-Jun-20	■
<p>Currently four out of eight stations are forecasting completion by the milestone date. A recovery plan for the remaining stations has been received. We are working collaboratively with our contractors to reduce construction timescales and lift installation durations need to be sustained to mitigate this delay.</p>			
Track renewals ■			
Install 7.5km of new track across the London Underground network	30-Mar-20	04-Mar-20	■
Rolling stock renewals ■			
Victoria line Fleet Programme Lift – first train enters production	31-Jul-19	01-Jul-19	Complete ■
Jubilee line fleet refurbishment is complete and all trains are compliant with the Rail Vehicle Accessibility Regulations (RVAR)	31-Jan-20	28-Nov-19	■

Milestone description	Plan date	Actual/ forecast date	Status
Central line – begin refurbishment and life extension work on first production train	31-Mar-20	22-Oct-19	■
Signalling and control ■			
Piccadilly line interim signal control upgrade complete	26-Jan-20	28-Oct-19	■
Power cooling and energy ■			
First solar panels installed, representing the commencement of large-scale solar generation on our buildings (BIU Tranche1)	18-Feb-20	13-Feb-20*	■
*A further decision was made to delay the forecast date to 26 March 2020 (37 days late) and will be reported in Quarter 3.			
Surface			
Healthy Streets ■			
Old Street Roundabout Removal – main works start	31-May-19	28-May-19	Complete ■
Highbury Corner Gyratory Removal – traffic switches to two-way system	13-Jul-19	22-Apr-19	Complete ■
Cycle Superhighway 4 – detailed design for Jamaica Road signed off	30-Aug-19	04-Jul-19	Complete ■
Direct Vision Standard – launch of system to enable heavy goods vehicle drivers to request Direct Vision Standard permits	29-Oct-19	28-Oct-19	■
Cycle Super Highway 9 – completion of detailed design for Kew Bridge section	06-Dec-19	13-Sep-19	■
Air quality and environment ■			
Launch of central London ULEZ scheme	08-Apr-19	08-Apr-19	Complete ■
All buses in Low Emission Bus Zones are retrofitted with new bespoke exhaust systems to reduce nitrogen oxides and particulate matter	31-Dec-19	16-Aug-19	Complete ■
Assets ■			
Concept design for the renewal of major assets starts	01-Dec-19	09-Aug-19	Complete ■
Bus driver facilities – install permanent facilities on 42 routes	31-Mar-20	28-Feb-20	■

Milestone description	Plan date	Actual/ forecast date	Status
Public transport <input type="checkbox"/>			
Repairs to Blackhorse Lane Bridge – demolition of Blackhorse Lane Bridge begins	17-Aug-19	15-Apr-19	Complete <input checked="" type="checkbox"/>
White Hart Lane Station Capacity Upgrade – existing station entrance demolition complete	27-Mar-20	24-Dec-19	<input checked="" type="checkbox"/>
Other <input type="checkbox"/>			
Technology and Data			
Enable pay as you go to support the Elizabeth line extension to Reading	08-Dec-19	08-Dec-19	<input checked="" type="checkbox"/>
Preferred bidder selected for rolling out a 4G network across all London Underground lines and implementing other connectivity improvements across London	31-Mar-20	31-Mar-20	<input checked="" type="checkbox"/>

