

Agenda

Meeting: Programmes and Investment Committee

Date: Wednesday 6 March 2019

Time: 10.15am

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

Members

Prof Greg Clark CBE (Chair)
Dr Nelson Ogunshakin OBE (Vice-Chair)
Heidi Alexander
Ron Kalifa OBE
Dr Alice Maynard CBE

Mark Phillips
Dr Nina Skorupska CBE
Dr Lynn Sloman
Ben Story

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

This meeting will be open to the public, except for where exempt information is being discussed as noted on the agenda. There is access for disabled people and induction loops are available. A guide for the press and public on attending and reporting meetings of local government bodies, including the use of film, photography, social media and other means is available on www.london.gov.uk/sites/default/files/Openness-in-Meetings.pdf.

Further Information

If you have questions, would like further information about the meeting or require special facilities please contact: Jamie Mordue, Senior Committee Officer; Tel: 020 7983 5537; email: JamieMordue@tfl.gov.uk.

For media enquiries please contact the TfL Press Office; telephone: 0845 604 4141; email: PressOffice@tfl.gov.uk

Howard Carter, General Counsel
Tuesday 26 February 2019

**Agenda
Programmes and Investment Committee
Wednesday 6 March 2019**

1 Apologies for Absence and Chair's Announcements

2 Declarations of Interests

General Counsel

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

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

**3 Minutes of the Meeting of the Committee held on 11 December 2018
(Pages 1 - 10)**

General Counsel

The Committee is asked to approve the minutes of the meeting of the Committee held on 11 December 2018 and authorise the Chair to sign them.

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

General Counsel

The Committee is asked to note the updated actions list.

5 Crossrail Update (Pages 17 - 22)

Managing Director London Underground (Interim)

The Committee is asked to note the paper.

6 Investment Programme Report - Quarter 3 2018/19 (Pages 23 - 120)

Director Major Projects and Managing Directors London Underground (Interim) and Surface Transport

The Committee is asked to note the paper.

7 Independent Investment Programme Advisory Group - Quarterly Report (Pages 121 - 134)

Director of Risk and Assurance

The Committee is asked to note the Independent Investment Programme Advisory Group's Quarterly Report and the Management Responses.

8 Use of Delegated Authority (Pages 135 - 146)

General Counsel

The Committee is asked to note the paper.

9 Emergency Services Network and Telecommunications Commercialisation Projects (Pages 147 - 152)

Director of Strategy & Chief Technology Officer

The Committee is asked to note the paper and supplementary information on Part 2 of the agenda.

10 Technology and Data Programme and Project Authority for Financial Years 2019/20 and 2020/21 (Pages 153 - 178)

Director of Strategy & Chief Technology Officer

The Committee is asked to note the report and approve authority.

11 Surface Technology Programme 2019/20 and 2020/21 (Pages 179 - 198)

Managing Director Surface Transport

The Committee is asked to note the paper and approve authority.

12 Air Quality Management (Pages 199 - 212)

Managing Director Surface Transport

The Committee is asked to note the paper and approve authority.

13 Crossrail 2 (Pages 213 - 218)

Managing Director Crossrail 2

The Committee is asked to note the paper and approve authority.

14 London Underground Major Stations Programme (Pages 219 - 230)

Managing Director London Underground (Interim)

The Committee is asked to note the paper and approve authority.

15 London Underground Renewals and Enhancements Signalling and Control (Pages 231 - 238)

Managing Director London Underground (Interim)

The Committee is asked to note the paper and approve authority.

16 London Underground Renewals and Enhancements Fleet (Pages 239 - 248)

Managing Director London Underground (Interim)

The Committee is asked to note the paper and approve authority.

17 Northern Line Extension Deed of Variation (Pages 249 - 252)

Managing Director London Underground (Interim)

The Committee is asked to note the paper and approve the deed of variation.

18 Member suggestions for future agenda discussions (Pages 253 - 256)

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

19 Any Other Business the Chair Considers Urgent

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

20 Date of Next Meeting

Wednesday 15 May 2019 at 10.15am.

21 Exclusion of the Press and Public

The Committee is recommended to agree to exclude the press and public from the meeting, in accordance with paragraph 3 of Schedule 12A to the Local Government Act 1972 (as amended), in order to consider the following items of business.

22 Emergency Services Network (Pages 257 - 266)

Exempt supplementary information relating to the item on Part 1 of the agenda.

23 London Underground Major Stations Programme (Pages 267 - 270)

Exempt supplementary information relating to the item on Part 1 on the agenda.

24 Northern Line Extension Deed of Variation (Pages 271 - 278)

Exempt supplementary information relating to the item on Part 1 on the agenda.

[page left intentionally blank]

Transport for London

Minutes of the Programmes and Investment Committee

**Committee Rooms 1 and 2, Palestra,
197 Blackfriars Road, London, SE1 8NJ
10.15am, Tuesday 11 December 2018**

Members Present

Professor Greg Clark CBE (Chair)
Dr Nelson Ogunshakin OBE (Vice-Chair)
Heidi Alexander
Dr Lynn Sloman
Ben Story

In Attendance

Executive Committee

Mike Brown	Commissioner
Howard Carter	General Counsel
Stuart Harvey	Director of Major Projects
Simon Kilonback	Chief Finance Officer

Other Staff

Alexandra Batey	Head of Public Transport Sponsorship, Surface Transport (for minute 77/12/18 and 78/12/18)
Michael Bridgeland	Head of Project Assurance, General Counsel
Andrea Clarke	Director of Legal, General Counsel
Tanya Coff	Divisional Finance Director, London Underground
Patrick Doig	Finance Director, Surface Transport
Jonathan Fox	Director of Rail and Sponsored Services (for minute 77/12/18 and 78/12/18)
Lucy Hayward-Speight	Policy Manager, Strategy, City Planning (for minute 76/12/18)
David Hughes	Director of Strategy & Network Development, London Underground
Rob Niven	Head of Major Projects Sponsorship, London Underground (for minute 80/15/18)
Ben Plowden	Director of Project & Programme Sponsorship, Surface Transport
Lee Rudderham	Lead Commercial Manager, Rail Operations (for minute 79/12/18)
Clive Walker	Director of Risk and Assurance, General Counsel (for minute 75/12/18)
David Wylie	Chief Procurement Officer (for minute 79/12/18)
Jamie Mordue	Secretariat

Independent Investment Programme Advisory Group (IIPAG) Attendance

Alison Munro	Chair, IIPAG
Kenny Laird	IIPAG Member
Jonathan Simcock	IIPAG Member
Joanne White	IIPAG Member

Also in Attendance

Mark Wild

Chief Executive, Crossrail Limited

67/12/18 Apologies for Absence and Chair's Announcements

Apologies for absence were received from Ron Kalifa OBE, Dr Alice Maynard CBE and Dr Nina Skorupska CBE. Gareth Powell, Managing Director Surface Transport, and Nigel Holness, Interim Managing Director London Underground, were also unable to attend the meeting.

The Chair informed the Committee that he had agreed to take item 14 on the agenda, Crossrail Update, as the second substantive item at the meeting.

The Chair welcomed Kenny Laird, Jonathan Simcock and Joanne White, new members of the Independent Investment Programme Advisory Group.

68/12/18 Declarations of Interests

Members confirmed that their declarations of interests, as published on tfl.gov.uk, were up to date.

69/12/18 Minutes of the meeting of the Committee held on 11 October 2018

The minutes of the meeting held on 11 October 2018 were approved as a correct record and signed by the Chair.

70/12/18 Matters Arising and Actions List

Howard Carter introduced the paper.

The Committee noted the actions list.

71/12/18 Investment Programme Report – Quarter 2 2018/19

Stuart Harvey introduced the paper, which summarised progress against the Investment Programme in Quarter 2 2018/19. The Committee noted that the Silvertown Tunnel project was red against its 2018/19 budget milestone RAG owing to a delay in letting the contract to ensure a more favourable commercial outcome. The Barking Riverside Extension project was also red against their 2018/19 budget milestone RAG owing to a delay in letting the contract; it was not envisaged that this would adversely impact on the end dates of the schemes. An estimated final cost (EFC) review had been conducted on the Bank Station Upgrade, resulting in the EFC being revised upward by £34m, largely due to the additional time taken to access the site, given its constrained nature.

Ben Plowden informed the Committee that TfL had submitted an application for planning permission at Old Street Roundabout to Islington Borough Council, specifically related to the station entrance. This would not stop planned highways works at the site. The Committee asked for an update on Cycle Superhighway 9 and was informed that discussions with the London Borough of Hammersmith and Fulham were taking place and more information would be available in early 2019.

The Committee asked how potential labour and raw material costs might impact upon projects. Simon Kilonback told Members that, in addition to considerations being taken in business planning and strategic risk management, a team was working on the impacts of Brexit and other impacts on the supply chain, including tariffs and foreign exchange prices. Mike Brown told the Committee that, whilst there had been lots of comment on a possible labour shortage, there was little empirical evidence that this was happening across the supply chain at present. TfL would maintain awareness on the issue.

Members said that progress on the Liveable Neighbourhoods programmes was encouraging, particularly in the context of providing alternative modes of transport in outer London, and congratulated staff on their work on the Healthy Streets approach.

The Committee noted the paper.

72/12/18 Crossrail update

David Hughes introduced the paper, which presented an update on the status of the Crossrail project, and provided a verbal summary of the funding package that was announced on 10 December 2018.

The emerging findings of KPMG indicated that the cost impact of the delay to the project was £1.6-£2bn, inclusive of the £300m additional funding announced in July by TfL and the Department for Transport (DfT). The GLA would borrow £1.3bn from DfT, which was to be repaid through business rates and MCIL, and provide £100m in cash to TfL in the form of a capital grant. TfL had also agreed a loan facility up to £750m as a contingency. The revised opening date of autumn 2019 was also under review. TfL was now in a position to give Crossrail Limited (CRL) financial certainty to progress the project.

The Chair paid tribute to the dedication of those involved in agreeing the funding arrangements. Mike Brown echoed the Chair's sentiments and welcomed the certainty that the funding arrangements brought to CRL and TfL. It was imperative that TfL support CRL and the new Chief Executive, Mark Wild, to deliver the project. Mark Wild told the Committee that he was delighted to take up the role of Chief Executive and paid tribute to CRL staff, who shared his desire to be more forward looking. Prior to Christmas 2018, the executive leadership team of CRL would be augmented to ensure that it had the right balance of skills and experience. Mark Wild intended to be a regular attendee at Committee meetings and wanted to ensure that there was transparency in the reporting of the progress of the project.

Presently, CRL could not commit to opening the central section of the Elizabeth line in 2019. More work was needed to determine a realistic window for opening. There

were two critical paths for the project: completion of the stations fit out and systems integration; and development of the train control system and signalling interfaces.

With regard to stations integration, none of the stations were fully complete, with residual work being required at all stations to varying degrees. Woolwich station was on schedule to be completed before Christmas 2018 and Farringdon station early in 2019. Completion of Bond Street, on the other hand, could slip to late 2019 or even beyond. Mark Wild explained that completing the critical stations infrastructure as soon as possible was critical to minimising the cost overrun. It was important to demobilise the large engineering workforce at the earliest opportunity. The importance of ensuring that the operator was at the heart of the programme in order to define the minimum requirements needed to operate the railway safely was also emphasised.

On train control systems, full dynamic testing would begin on 14 January 2019, five days a week; previous testing was not successful, primarily down to immature software and installation works needing to be completed. It was important to conduct dynamic testing as soon as possible so that software bugs could be redressed. To ensure the delivery of a safe railway, work was ongoing with Bombardier and Siemens and an independent readiness review would be conducted.

Mark Wild told the Committee that there would be no compromise on safety. On staffing, certain key areas of CRL had been demobilised too quickly (for example, project communications). TfL executives were assisting to reallocate resources to ensure that CRL can run effectively, whilst being mindful of the need to ensure other TfL programmes and projects remain properly staffed.

Mark Wild explained that his intent was to have in place a new leadership team by Christmas. Mike Brown told the Committee that he welcomed the new approach and that taking a more holistic view of the system integration was appropriate.

The Committee noted the report.

73/12/18 Independent Investment Programme Advisory Group – Quarterly Report

Michael Bridgeland introduced the paper, which provided the quarterly report from the Independent Investment Programme Advisory Group (IIPAG) and TfL management responses to the main issues raised.

Alison Munro introduced the new members of IIPAG, Kenny Laird, Jonathan Simcock and Joanne White. The Committee was told that IIPAG was encouraged by the number of closed recommendations.

The Committee stated that it would be useful if IIPAG was to determine whether TfL applied the most appropriate standards to its programmes to ensure the greatest efficiency. Mike Brown told the Committee that TfL welcomed the mature assurance that IIPAG provided and would welcome assurance on the strategic priorities.

The Chair and the Committee thanked Michael Bridgeland for his work as Head of Project Assurance and wished him well in his future role.

The Committee noted the paper.

74/12/18 Use of Delegated Authority

Howard Carter introduced the paper, which set out details of the use of delegated authority by the Commissioner and the Chief Finance Officer. Since the meeting of the Committee on 11 October 2018, there had been one use of delegated authority.

There had been two uses of Chair's Action since the last meeting, in relation to the Northern line Extension and Barking Riverside Extension. The Committee noted that the use of Chair's Action in relation to Barking Riverside Extension occurred after the publication of papers for this meeting.

The Committee noted the paper.

75/12/18 Strategic Risk Update – SR12

Stuart Harvey introduced the paper, which provided an update on how TfL managed Strategic Risk 12 – 'Delivery of Key Investment Programmes'. The Major Projects Directorate was established to enable delivery of TfL's most sensitive projects with the highest level of assurance on cost, time and quality. The Programme Management Office was central to embedding strong project disciplines and independent assurance of delivery. Work was ongoing to embed the same level of controls across all projects and programmes across TfL, ensuring that the correct processes are followed.

Members discussed how TfL was managing the Delivery of Key Investment Programmes Strategic Risk and the need to have one lead person per control and action.

The Committee noted the paper and the exempt supplemental information provided on Part 2 of the agenda.

76/12/18 Air Quality and Environment Programme 2018/19

Ben Plowden introduced the paper, which presented the strategic case for the Surface Transport Air Quality and Environment Programme (AQE Programme) and sought additional Programme and Project Authority for £78m.

The Committee noted that the AQE Programme was important for achieving the Mayor's Transport Strategy (MTS), specifically policies 6 and 7. The AQE Programme achieved excellent delivery in 2017/18 in terms of meeting outcomes and delivering significant value engineering/management savings, enabling projects to stay within their budgeted estimated final cost. The Programme had an original approved gross budget of £55m against an actual outturn cost of £44m. The Committee noted the key components of the AQE Programme, including the delivery of a network of rapid charge points; the Go Ultra Low City Scheme; the Mayor's Air Quality Fund; the T-Charge; Vehicle Compliance Zones; Taxi and Private Hire

Vehicles (PHVs); TfL bus fleet compliance with EURO VI requirements; Low Emissions Bus Zones; and TfL Dial-a-Ride fleet compliance.

The Committee was informed that the AQE Programme 2018-2023 proposal would enable TfL to deliver key benefits including: improved air quality; better quality of life and health of Londoners; and increased use of newer and cleaner vehicles, including buses, taxis and PHVs. It would also enable TfL to meet legal compliance with NO2 limits in the shortest practical time. Potential delivery challenges were outlined.

Members stated that the Programme was encouraging and welcome, particularly in regard to localised pollution, but that decarbonisation needed to increase more quickly. The roadmap to achieve the MTS 2050 Zero Carbon target should be produced sooner than the 12 months set out in the October 2018 Sub Programme Review. Lucy Hayward-Speight told the Committee that the Zero Emission Road Transport Group was working on the milestones.

The Committee asked that consideration be given to how TfL, as a broader organisation, ensured that it reduced emissions in all areas of the business. Ben Plowden agreed that work towards the MTS 2050 Zero Carbon target could be more ambitious and would provide an update on the milestones and how TfL was reducing emissions across the business in early 2019. **[Action: Ben Plowden]**

The Committee noted the paper and:

- 1 approved Programme and Project Authority of £280m for delivery of the Surface Transport Air Quality and Environment Programme, covering: £67m in 2017/18, £109m in 2018/19; and £104m for activities which commence in 2018/19 and extend into subsequent years as described in the paper.**
- 2 noted that Procurement Authority in respect of the various elements of the Surface Transport Air Quality and Environment Programme would be sought from Delegated Officers in accordance with Standing Orders.**

77/12/18 Public Transport Programme 2019/20

Alexandra Batey introduced the paper, which set out the request for additional Programme and Project Authority of £89m, for the 2019/20 Public Transport Programme. The Programme was fundamental to delivering the aim within the Mayor's Transport Strategy (MTS) for 80 per cent of trips in London to be made on foot, by cycle or using public transport by 2041.

The Committee heard that Tram track renewals in Croydon town centre and switchgear renewals in Addington Village were successfully delivered. Two new escalators were installed at Limehouse station to improve interchange routes. Custom House station reopened following a scheduled closure.

A Public Transport steering group was established to determine which projects in the Public Transport Programme were prioritised and to ensure that there was a joined up approach, to achieve the aims of the MTS.

Members asked what TfL could do to use alternative sources of funding to drive change. There were a number of projects which made use of third party funding, as set out in table 2 of the report, and, where possible, TfL would facilitate third party funding.

The Committee noted the paper and:

- 1 approved additional Programme and Project Authority of £89m giving a total of £347m comprising:**
 - (i) £258m approved in December 2017 for 2017/18 and 2018/19, of which £59m would be re-profiled into 2019/20;**
 - (ii) an additional £63m to undertake all remaining Public Transport Programme activities during 2019/20; and**
 - (iii) up to £26m to undertake all Public Transport Programme activities for any project stage that is planned to commence in 2019/20 but may extend into subsequent years; and**
- 2 noted that Procurement Authority in respect of the various elements of the Public Transport Programme will be sought from Delegated Officers in accordance with TfL's Standing Orders.**

78/12/18 DLR Rolling Stock Replacement Programme

Alexandra Batey introduced the paper and related supplemental information on Part 2 of the agenda, which sought additional Programme and Project Authority for activities relating to the procurement of DLR trains.

The Committee heard that replacing the life expired fleet would contribute to the delivery of the Mayoral objectives and to the TfL and London Rail objectives, including to: support population and employment growth across the network, particularly planned development in the Royal Docks, the Queen Elizabeth Olympic Park and Isle of Dogs; provide crowding relief by increasing capacity; improve customer satisfaction; and increase revenue by accommodating predicted demand.

An Invitation to Negotiate for the replacement stock of 43 trains, with options for up to an additional 34 trains, was issued in November 2017 and tenders were returned on 1 June 2018. The Committee noted that TfL had been successful in its bid to the Ministry of Housing, Communities and Local Government Housing Infrastructure Fund for an additional 14 DLR trains.

The Committee noted the paper and the related paper on Part 2 of the agenda and:

- 1 noted that Financial Authority of the amount set out in the paper on Part 2 of the agenda exists for delivery of the DLR Rolling Stock Replacement Programme, including the design, supply and manufacture of 43 replacement DLR trains, supply of spares and fleet support services,**

- expansion of the DLR depot at Beckton and other related activities (the Programme);
- 2 approved additional Programme and Project Authority for the amount set out in the paper on Part 2 of the agenda for delivery of the Programme;
 - 3 approved Procurement Authority up to the maximum amount stated in the paper on Part 2 of the agenda for Docklands Light Railway Limited (DLRL) to enter into the following agreements with the bidder identified in the paper on Part 2 of the agenda:
 - (a) a manufacture and supply agreement for the design, supply and manufacture of replacement DLR trains (MSA); and
 - (b) a fleet support agreement for the supply of spares and supporting services (FSA), with a term of 35 years (expiring in 2061) and a fixed and variable scope, which allows DLRL to call off spares supply and services as required; and
 - 4 subject to Financial Authority being in place, delegated approval of additional Programme and Project Authority and Procurement Authority for DLRL to enter into the MSA, up to a maximum amount as stated in the paper on Part 2 of the agenda to Delegated Officers, to reflect any movement in exchange rates applicable to capital expenditure under the MSA prior to the date of execution of the MSA.

79/12/18 London Underground Track Delivery Partner Contract

David Wylie introduced the paper and related supplemental information on Part 2 of the agenda, which provided an update on the process and timescales for awarding a Track Delivery Partner contract for the London Underground Track Programme.

The Track Delivery Partner procurement was due to be awarded in February 2019 and would replace the current Track Partnership contract with Balfour Beatty, which was due to expire in February 2019. Authority would therefore be sought through Chair's Action. The authority request would explain the rationale for the length of the contract and any potential extension options.

The Committee noted the paper and the related paper on Part 2 of the agenda.

80/12/18 Northern Line Extension Project

David Hughes introduced the paper and related supplemental information on Part 2 of the agenda, which set out an update on the progress of the Northern Line Extension.

Good progress had been made at the four key worksites: Kennington Park, Kennington Green, Nine Elms and Battersea. Tunnelling of the whole route had been completed and the track had been laid from Nine Elms to Battersea in both tunnels. The two stations were taking shape and the two junctions that connect with the existing Northern line at Kennington had also been completed. In 2019, the project

will transition into the stations fit out, systems installation and integration stages, followed by testing.

Members welcomed the inclusion of photographs, showing the progress made so far.

The Committee noted the paper and the related paper on Part 2 of the agenda.

81/12/18 Member suggestions for future agenda discussions

Andrea Clarke introduced the paper and the Committee's updated forward programme.

The Committee noted the paper.

82/12/18 Date of Next Meeting

The next scheduled meeting of the Committee would be held on Wednesday 6 March 2019 at 10.15am.

83/12/18 Exclusion of the Press and Public

The Committee agreed to exclude the press and public from the meeting, in accordance with paragraph 3 of Schedule 12A to the Local Government Act 1972 (as amended), when it considered the exempt information in relation to the items on: Strategic Risk Update – SR12; DLR Rolling Stock Replacement Programme; London Underground Track Delivery Partner Contract; and London Underground Northern Line Extension update.

The meeting closed at 12.45pm.

Chair: _____

Date: _____

[page left intentionally blank]

Programmes and Investment Committee



Date: 6 March 2019

Item: Matters Arising and Actions List

This paper will be considered in public

1 Summary

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

2 Recommendation

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

List of appendices to this report:

Appendix 1: Actions List

List of Background Papers:

Minutes of previous meetings of the Programmes and Investment Committee.

Contact Officer: Howard Carter, General Counsel

Number: 020 3054 7832

Email: HowardCarter@tfl.gov.uk

[page left intentionally blank]

Programmes and Investment Committee Action List (reported to the meeting on 6 March 2019)

Actions from the meeting of the Programmes and Investment Committee held on 11 December 2018

Minute No.	Description	Action By	Target Date	Status note
76/12/18	<p>Air Quality and Environment Programme 2018/19 The Committee asked that consideration be given to how TfL, as a broader organisation, ensured that it reduced emissions in all areas of the business. An update on the milestones and how TfL was reducing emissions across the business would be provided in early 2019.</p>	Ben Plowden	May 2019	In progress.

Actions from previous meetings of the Committee

Minute No.	Description	Action By	Target Date	Status note
36/07/18	<p>Independent Investment Programme Advisory Group – Quarterly Report – Telecoms issues A note on how telecoms issues would be resolved would be provided to the Committee.</p>	Shashi Verma	March 2019	Complete. An update is included on the agenda in the item on the Emergency Services Network.
38/07/18	<p>TfL Growth Fund The Committee requested that future updates include details on how projects and the benefits derived were monitored and evaluated.</p>	Alex Williams	March 2019	This action will be addressed in March 2019.

Minute No.	Description	Action By	Target Date	Status note
45/07/18	<p>Member suggestions for future agenda discussions The Committee requested that the following information be provided at future Committee meetings:</p> <ul style="list-style-type: none"> (a) Information on the Northern and Bakerloo line extensions; (b) Oxford Street; (c) Rotherhithe to Canary Wharf Crossing; (d) The interactions between TfL and HS2 systems; (e) Potential issues arising from the expansion of Heathrow Airport, particularly unforeseen cost for Surface Transport; and (f) Information on the overall schedule of work for TfL to be included in the Investment Programme Report. 	Secretariat	Ongoing	<ul style="list-style-type: none"> (a) Complete. (b) On forward plan. (c) Complete. (d) On forward plan (e) On forward plan. (f) Complete.
25/05/18	<p>London Underground Legacy Signalling and Information The Committee requested a future discussion on the use of innovative technology for signalling upgrade works, such as 5G.</p>	David Hughes	Ongoing	This work is being progressed with the development of future signalling strategies and upgrades. An update will be provided to a future meeting.
13/02/18	<p>Member suggestions for future agenda discussions Members were keen to better understand what mechanisms and procedures were in place to drive and demonstrate greater value in the delivery of its investment programme. TfL was undertaking an end to end review of project lifecycles to identify how it could identify opportunities and cultural changes to drive better value. An update would be provided to the Committee when this work was better developed.</p>	Stuart Harvey	May 2019	In progress. An update will be provided to a future meeting.

Minute No.	Description	Action By	Target Date	Status note
19/03/17	<p>Member suggestions for future agenda discussions Members requested that officers consider how investment and cost profiles, and the funding for them, best be shared with Members going forward.</p>	David Hughes	Ongoing	Work on this is ongoing and will be addressed in Board Business Planning discussions.

[page left intentionally blank]

Programmes and Investment Committee



Date: 6 March 2019

Item: Crossrail Update

This paper will be considered in public

1 Summary

1.1 This paper provides an update on the status of the Crossrail Project.

2 Recommendation

2.1 **The Committee is asked to note the paper.**

3 Crossrail update

3.1 Health and safety performance remains good and within annual targets however there has been an increase in the number of incidents in the last period (P11). As the project moves from the construction to the testing and commissioning phase the nature of the health and safety risks is changing. A thorough review of the current health and safety indicators is being carried out to ensure we are prepared for this stage of the project.

3.2 In January 2019, there was one reportable safety incident at Whitechapel station which involved an operative tripping on floor protection. In addition, there were three incidents causing lost time injuries and there were seven high potential near misses across the project. All incidents are investigated, lessons learned shared across the project and safety alerts issued where appropriate.

3.3 A new leadership team has been put in place including a new Programme Director, Peter Henderson and Technical Director, Colin Brown. Their focus is on developing a detailed plan for an opening date and establishing a regime of project and cost control supported by a new visual management process.

3.4 A new visual management process has been put in place across all individual projects including stations, systems and dynamic testing. This is a means of escalating issues quickly to director level for resolution. When fully implemented projects will meet daily, on site, to flag their top issues. These will come to director level on a weekly basis. This significantly changes the dynamic of the project from a periodic rhythm to a daily one. The result will be better reporting, clearer understanding of issues, quicker resolution and greater accountability at all levels.

3.5 A Systems Integration (SI) team has now been established whose immediate remit will be to help develop a migration plan as part of the work to define the opening date. Other key deliverables include leading on the integration of the train and signalling systems, understanding and communicating technical risks and providing support to ensure the programme's assurance plans are fully aligned. The SI team will also focus on delivery of Stages 4 and 5.

- 3.6 Dynamic testing began in January 2019, which includes multiple trains running at service speed through both tunnels. During this process a number of tests are carried out on the onboard train software and signalling systems. While the total number of tests completed is behind target the number of tests passed and the number of test hours completed are both ahead of target. Some of the key issues include lack of engineering resource with key suppliers and coordination between suppliers. The next software update for the train has now been installed ahead of the second run of dynamic testing which started on 15 February 2019.
- 3.7 Testing of the new rolling stock was undertaken in the Heathrow tunnels using European Train Control System (ETCS) during two weekends in January 2019. This was helpful in making progress towards Stage 2 Phase 2 where the 4tph service between Heathrow and Paddington will be provided by the Class 345 rolling stock.
- 3.8 Infrastructure Maintenance resources have commenced deployment alongside, and in support of, the Crossrail Tier 1 contractors in the test and commissioning phase. Currently they are engaged in familiarisation work at Mile End and Eleanor Street shafts, they are also working with the track, points and overhead line electrification teams on the main railway system. In the next few weeks, activities will progress into tangible maintenance application as the team gains competence in readiness for future handover into Operations.
- 3.9 Round two of Operations training has commenced, to start the process of multiskilling our operators and to upskill our existing teams who completed training twelve months ago. We have also agreed a Memorandum of Understanding with the project team to allow our trained operators to support dynamic testing. To support ongoing competence and confidence of our teams, we are conducting Simulated Desktop Exercises to give a realistic experience of the Control Room environment. Trial Operations planning continues with our exercise packs being produced in readiness announcement of new programme dates.
- 3.10 The station delivery schedule includes Tier 1 Substantial Demobilisation (TOSD) dates, staged completion and handover dates for the stations, shafts and portals. Achieving the TOSD dates is critical in reducing CRL's periodic spend. We are making progress with a total of 11 (of 22) TOSDs for stations, shafts and portals now achieved. Whitechapel Crossrail areas were achieved on 18 January 2019 as planned and Plumstead Portal achieved on 31 January 2019.
- 3.11 Further work has been undertaken to gain clarity on completion dates on stations, shafts and portals which are critical to the standing up of the infrastructure managers and, readiness for trial operations and passenger services.
- 3.12 The current rate of static testing in stations remains behind plan and is a significant focus of the new programme and technical leadership on the project. At this time around 65 per cent of stations systems installation is completed and we are focused on improving productivity at each site. This has increased from around 50 per cent complete last period. Following the completion of installation, commissioning and integration still needs to take place.
- 3.13 Network Rail has now awarded Package 3 (Southall, Hayes & Harlington and West Drayton) station enhancement works to Hochtief. Funding is in place to allow the procurement of Package 2 (Acton Main Line, Ealing Broadway and West Ealing) to continue. These enhancements include step-free access works to

ensure that all surface stations on the Elizabeth line will be step-free to platform level.

4 KPMG update

- 4.1 On 25 January 2019, TfL published two reviews by KPMG into Crossrail governance and finance and commercial. These independent, cross-cutting reviews looked at all aspects of the Crossrail project; from the formation and effectiveness of the Sponsor and Crossrail Boards to the function of Crossrail Limited (CRL) in delivering the railway. The report included multiple findings and over 80 recommendations to Crossrail Sponsors (TfL and Department for Transport (DfT)) and CRL for consideration and action to ensure that there is the right level of scrutiny and oversight in place as the project enters the final phase.
- 4.2 These reports were summarised and discussed at the TfL Board on 30 January 2019. At that stage, it was set out that a number of actions had already been taken. This included appointment of a new Chair and Deputy Chair to the Crossrail Board as well as enhancing the CRL Executive and Project Representative. These changes have been key to strengthening governance and assurance on the project.
- 4.3 Following the conclusion of the KPMG reviews, Sponsors and CRL have been working together on a prioritised action plan, taking steps to implement further recommendations across all aspects of the Project. CRL have worked to strengthen their internal project controls and risk functions as well as introducing a new 'visualisation' room to strengthen oversight of delivery and progress. Sponsors have approved further enhancements to the Project Representative team to give greater scrutiny of CRL's delivery of stations and bring about more effective challenge, particularly on CRL's cost and commercial position. Sponsors are working to appoint an independent member to the Sponsor Board and discussions have taken place between Sponsors and CRL regarding Sponsors' expectations of CRL's internal assurance processes which will be key in ensuring a robust cost and schedule to deliver the remainder of the project.
- 4.4 Sponsors are continuing to work with CRL to ensure that any further actions as a result of the KPMG recommendations are implemented as soon as possible. This will help ensure that CRL are in the best possible position to deliver the railway and the Sponsor Board and Crossrail Board are able to provide effective challenge, scrutiny and oversight of the Crossrail Project.
- 4.5 Separately, TfL are also looking at how lessons from the Crossrail Project can be applied to the rest of the investment portfolio. This includes Crossrail 2 which already has effective and robust assurance processes in place and will develop its government model based, taking account of lessons learned from Crossrail.

List of Appendices:

Appendix 1: Updated photos: October/November 2018

List of Background Papers:

None

Contact Officer: Howard Smith, Chief Operating Officer - Elizabeth line
Number: 020 3197 5976
Email: HowardSmith@tfl.gov.uk

Contact Officer: David Hughes, Investment Delivery Planning Director
Number: 020 3054 8222
Email: HugheDa03@tfl.gov.uk

Appendix 1: Updated photos: October/November 2018



Construction Progress at Tottenham Court Road Platform



Construction Progress at Whitechapel Platform



Construction Progress at Bond Street Ticket Hall



Construction Progress at Woolwich Ticket Hall

Programmes and Investment Committee



Date: 6 March 2019

Item: Investment Programme Report – Quarter 3, 2018/19

This paper will be considered in public

1 Summary

1.1 The Investment Programme Report describes the progress and performance in Quarter 3, 2018/19 of a range of projects that will deliver world-class transport services to London.

2 Recommendation

2.1 **The Committee is asked to note the report.**

List of appendices to this report:

Appendix 1: Investment Programme Report Quarter 3, 2018/19.

List of Background Papers:

None

Contact Officers: Gareth Powell, Managing Director Surface Transport
Number: 020 3054 8196
Email: GarethPowell@tfl.gov.uk

Contact Officers: Nigel Holness, Managing Director London Underground (Interim)
Number: 020 3054 4308
Email: nigel.holness@tube.tfl.gov.uk

Contact Officers: Stuart Harvey, Director of Major Projects
Number: 020 7126 2909
Email: StuartHarvey@tfl.gov.uk

[page left intentionally blank]

Transport for London investment programme report

Quarter 3 2018/19



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

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

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

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

We are constantly working to improve the city for everyone. This means freezing TfL fares so everyone can afford to use public transport, using data and technology to make services intuitive and easy to use, and doing all we can to make streets and transport services accessible to all. We reinvest every penny of our income to continually improve transport networks for the people that 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	56	Surface
		57	Healthy Streets
		65	Air quality and environment
		69	Asset investment
		72	Public transport
8	Mayor's Transport Strategy		
10	Business at a glance		
12	Key achievements		
17	2018/19 Budget milestone performance summary		
18	Major projects	78	Other
19	Line upgrades	79	Technology and data
26	Deep Tube Upgrade programme	84	The Growth Fund
29	Network extensions	86	Elizabeth line
35	Major stations	89	Crossrail
41	Future projects		
42	London Underground	90	Appendix
43	Stations	90	2018/19 Budget milestone performance
46	Accessibility		
47	Track renewals		
48	Power, cooling and energy		
50	Rolling stock renewals		
53	Signalling and control		

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.

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

It presents 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 sub-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 sub-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.

Financial records of spend to date, authority and estimated final cost (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.

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 sub-programme or project also has an overall RAG milestone status, which represents the average forecast date variance against plan for 2018/19 budget milestones:

On time or early:



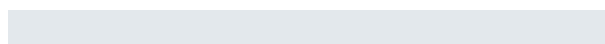
1-89 days late:



90 or more days late:



N/A (without 2018/19 budget milestones):





Our investments will support the Mayor's Healthy Streets aims

Budget milestones for 2018/19 – the key milestones listed in the TfL Budget – are detailed in Appendix A (page 90).

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, Deep Tube Upgrade, network extensions, and major stations, which are covered in pages 26-40 of this report. Future Major Projects schemes (see page 41) 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 on pages 42-55
- Surface Transport comprises Healthy Streets, air quality and environment, public transport, and asset investment. These are covered in pages 56-77
- Other comprises technology and data, Growth Fund, and the Elizabeth line (including Crossrail), which are covered in pages 78-89

Mayor's Transport Strategy

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 providing more trains on our busiest services and opening 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 customers will enable 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 that 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





We are working to make cycling a safer and more appealing option

Business at a glance

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

How we report on our business

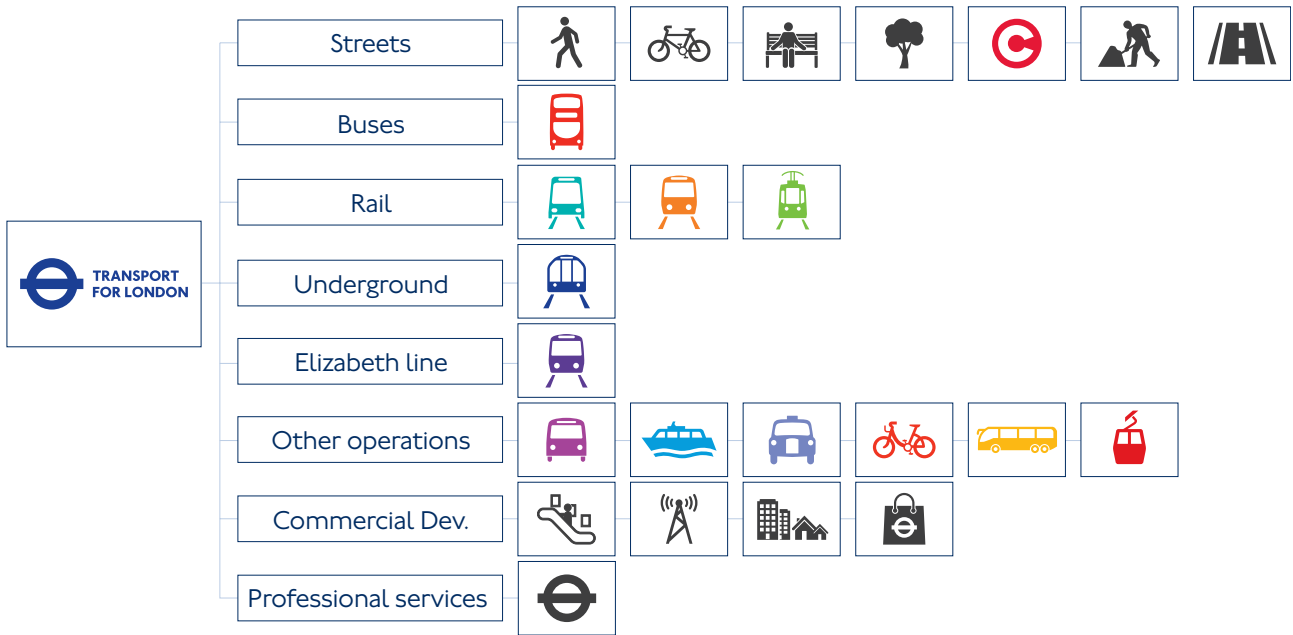
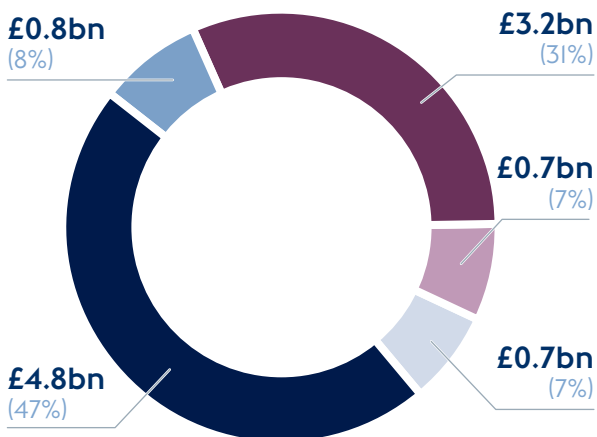
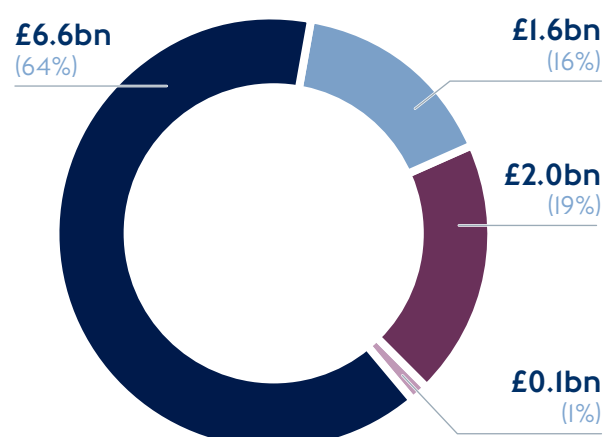


Figure 3: Sources of funding
2018/19 – projected



Total: **£10.2bn**

2023/24 – plan



Total: **£10.3bn**

■ Passenger income ■ Grant funding ■ Other income ■ Property and asset receipts ■ Use of borrowing and cash reserves

The 2018/19 grant funding includes Crossrail funding sources

Facts and figures

By 2023/24...

790km
of track on our rail and Underground routes (from 725 km in 2018/19)



100%
of the bus fleet will have Euro VI engines (from 65% in 2018/19)

2 new, auto-mooring, accessible, hybrid-powered ferries



985
trains on our network (from 970 in 2018/19)



32,000
daily cycle hire journeys (from 29,000 in 2018/19)

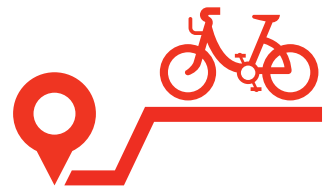
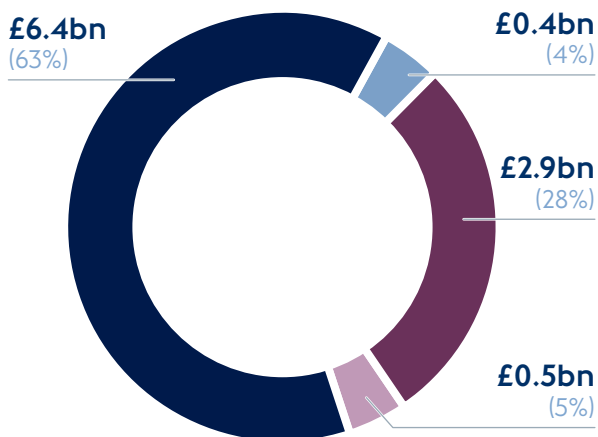
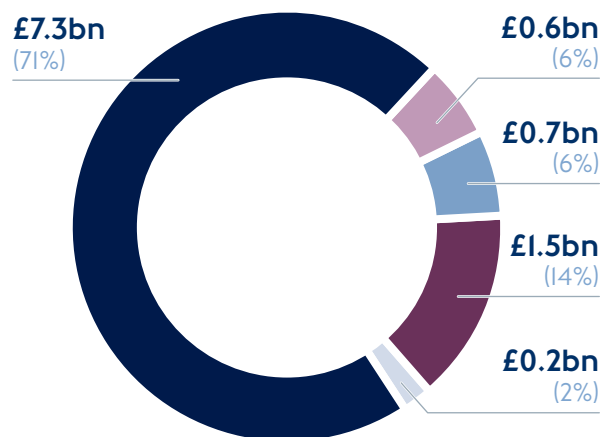


Figure 4: Total costs
2018/19 – projected



Total: **£10.2bn**

2023/24 – plan



Total: **£10.3bn**

■ Operating costs ■ Net financing costs ■ Capital renewals ■ New capital investment ■ Increased cash reserves

The 2018/19 new capital investment includes Crossrail capital expenditure

Key achievements

Line upgrades

We have already completed the speed improvement and track works for more capacity on the Northern line and started power enhancement works with the award of a design and build contract to Balfour Beatty.

Deep Tube Upgrade

In November 2018, we signed a £1.5bn contract with Siemens to design and build a new fleet of Piccadilly line trains after the High Court lifted a temporary restriction that had put the procurement on hold.

Network extensions

The first engineering train on the Northern Line Extension ran on recently installed rails in October 2018, delivering long welded rail for the bulk of the track installation. It entered the Northern Line Extension tunnel delivering 90 metres of rail to the Kennington Green shaft site, which reduced heavy lorry movements.

We also completed platform works at Nine Elms in November 2018, which included installing almost 600 off-site precast units, weighing around six tonnes each.

The first 22kV cable was successfully installed through Oval southbound platform. This represents a major milestone for the Northern Line Extension as we start to energise the power distribution systems. The last engineering train delivering cable ran successfully in the week before Christmas.

In December, we won three awards at the New Civil Engineer Tunnelling awards:

- Best Health, Safety and Wellbeing initiative for our Mental Health Programme
- Young Tunneller of the Year went to Alejandro Vazquez
- Tunnelling Project of the Year (\$100M to \$1bn)

Additionally, our ground-breaking work to raise awareness around mental health received accolades at both the NCE Tunnelling Awards and the TfL Supplier Awards.

Furthermore, we were awarded a Green Apple Champion Award for maximising the transport of materials by river, therefore reducing lorry movements through London. The benefits of this include reducing toxic emissions and road congestion therefore reducing the risk to vulnerable road users.

We completed track installation through the platforms and overrun tunnels at the new Battersea station.

Barking Riverside Extension saw the successful completion of key enabling works on the overhead line equipment sectioning and switching works during a Network Rail Christmas possession. In December, the Main Works Contract was awarded to a joint venture of Morgan Sindall VolkerFitzpatrick.



Our tunneling projects won three awards in December

Stations and infrastructure

Victoria station is now step-free. We achieved a major milestone in the seven-year upgrade project, which includes two new entrances, seven new lifts, nine new escalators, one new ticket hall and the doubling in size of the southern ticket hall. Journeys are step-free between the street and Victoria line trains and the District and Circle line platforms. Victoria is the fourth busiest station on the Underground, serving more than 79 million customers each year. The new lifts will help ensure the station is accessible to all customers.

The new Waterloo & City line entrance at Bank opened on 30 November 2018 and was officially opened on 12 December 2018 by the Mayor Sadiq Khan, Michael R Bloomberg and the Commissioner Mike Brown MVO. This new entrance will help relieve congestion for Waterloo & City line customers. It is the first major milestone in the Bank Station Capacity upgrade programme, which will see the station capacity increase by 40 per cent by 2022.

On 30 November 2018, testing and commissioning works were completed, which enabled the Bakerloo line link to be ready for integration with the Elizabeth line.

This quarter, we have replaced more than 680 metres of ballasted track and more than 600 metres of drainage. We have completed track and drainage works to improve reliability between Baker Street and Finchley Road on the Metropolitan line.

As part of the Mayor's funding for step-free access, we delivered step-free access at Newbury Park in November 2018. We installed two lifts to provide step-free access from street to platform and manual boarding ramps have been provided to give step-free access from the platform to the train. Since the end of the quarter in January, we have also delivered Finsbury Park.

London Underground – Power, energy and cooling

In late 2018, we improved the tunnel ventilation system to reduce temperature increases in the Jubilee line tunnels between Baker Street and Green Park following the introduction of a new timetable.

Surface

As part of the Healthy Streets project, the main construction works at Trinity Square were completed in October. The resurfacing works were completed in early December.

As the Direct Vision Standard and HGV Permit Scheme proposal for London amounts to a technical regulation, we were required to notify the European Commission to ensure it did not conflict with free movement within the European Union. On 6 December, we were notified that the European Commission had no objections to our proposals. Achieving this milestone means we remain on track for issuing permits in October 2019.



The new Waterloo & City line entrance was officially opened on 12 December 2018

As part of the Power Road Green Bridge replacement project, all four carriageway lanes were opened to traffic on schedule in November 2018. The remaining carriageway and footway works are progressing and are scheduled to be completed in February 2019, followed by the removal of the site compound.

There are now more than 2,200 Ultra Low Emission Zone (ULEZ) compliant buses, both single and double-deck, in service. As a result, more than 86 per cent of the bus fleet travelling in the zone is already compliant with the new emission standards.

Walking

We have completed work at 26 of the junctions identified on the safer junctions list and all have had mitigation measures introduced to reduce road danger. We are taking the remaining 47 schemes through design, with 15 of these scheduled for construction by spring 2020.

Work started in November as planned at Old Street roundabout. The project will transform the area. Key features include the removal of the gyratory system, the creation of a large public space, new and improved pedestrian and cycling facilities, as well as new entrances to Old Street Underground station.

Cycling

Reviews have started for the detailed design of a new cycle route on the A40/Western Avenue from Kathleen Avenue to Wood Lane. Subject to relevant approvals, the design is due to be complete by the end of January 2019.

Woolwich Ferry

The three old Woolwich ferries have been replaced with two new, modern, low-emission ferries and have increased capacity, cycle-specific facilities and use a quieter, low-emission engine, all helping to deliver the Mayor's ambition to grow river transport and improve air quality. The Woolwich ferry fully returned to service on 30 January 2019.

The new ferries provide 14 per cent more space than the old vessels and have separate dedicated step-free areas for pedestrians and cyclists, for improved accessibility.

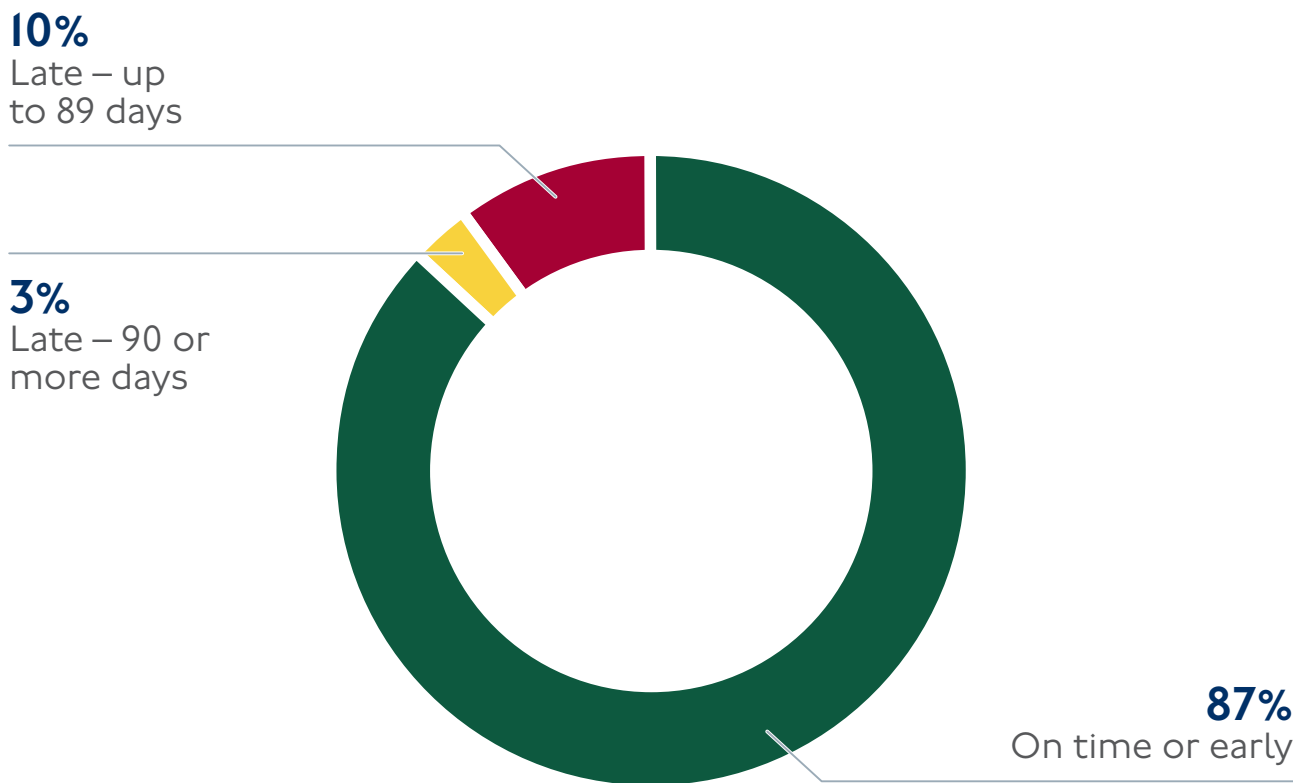
Other

Weekly capping for bus and tram fares was successfully launched on 17 December. An agreement was reached with the train operating companies on 28 November to allow us to now proceed towards a launch of weekly capping on rail modes in spring 2019.

We have installed all buses with new radio equipment and have transferred 90 per cent of the network to the new digital system. We are on target to complete the switchover and core project within this financial year. Staff are already experiencing the benefits of reduced call queuing times on the digital service.

2018/19 Budget milestone performance summary

The overall performance for all TfL 2018/19 Budget milestones is summarised as follows:



The late milestones are shown in Appendix A.



Our new S-stock trains and signalling system will provide a more reliable service

Major projects

Line upgrades   

Four Lines Modernisation

Forecast completion year

2023

Spend to date (£m)

4,548

Spend authority (£m)


5,412

EFC (£m)

5,243

EFC movement post plan (£m)

23

2018/19 budget milestone RAG 

We have already introduced 192 new S-stock trains on the Circle, District, Hammersmith & City and Metropolitan lines, and are working to complete the associated depot, station, siding and signal modifications to accommodate them. We are upgrading three depots to support new train maintenance.

The new automatic train control signalling system will control train movements, enabling more frequent and reliable services. In addition to designing and installing the system, we are working on the related infrastructure and fitting S-stock trains and engineering vehicles with in-cab signalling equipment.

We continue to test the automatic train control system to ensure its reliability before it is brought into service. The scope of testing has been extended and now includes the route from Hammersmith to Stepney Green, Monument and Finchley Road, and around Earls Court. The first section will go live in the first quarter of 2019. Reliability is essential as there are 14 migration areas to follow as planned.

The EFC remains at £5,243m this quarter, £169m under authority. The £169m savings to date have been achieved by an aggressive schedule aimed at delivering the benefits ahead of the required authority milestone dates, value engineering solutions, innovation, and providing the optimum scope to bring about the planned benefits. Even though good progress has been made on reducing the EFC, the programme is facing some cost challenges that have the potential to affect the current EFC. The Business Plan included a provision of £29m for potential cost increases and work is being undertaken to review the major contracts and risk provisions, which will help determine a clearer view on EFC. The expected range of this could be £10m to £50m in addition to the £29m Business Plan provision. This additional pressure is currently undergoing extensive senior management review and challenge. The approach to driving down costs will continue and be reported in the next quarterly investment programme report.

We are targeting commissioning of the whole Circle line by the end of 2019 to support an early timetable uplift in March 2020. Commissioning of the final signalling area between Rayners Lane and Uxbridge remains on schedule to support the final timetable uplift in May 2023.

All trains are being fitted with automatic train control equipment. We have converted 75 trains, which is enough to support automatic train operation in the first section of the railway between Hammersmith and Latimer Road. We are on schedule to upgrade sufficient trains for the remaining sections of the railway.

Assurance

Project Assurance completed an integrated assurance review on the Four Lines Modernisation programme submission to the Programmes and Investment Committee meeting on 11 October 2018. Fifteen recommendations were made and accepted, including 11 by the Independent Investment Programme Advisory Group (IIPAG). We are making good progress to close out the recommendations. Project Assurance tracks progress against the recommendations made, including by IIPAG, as part of its continuous assurance.



We have been testing our new train control system



Capacity Optimisation – World Class Capacity

Forecast completion year

2024

Spend to date (£m)

105

Spend authority (£m)

245

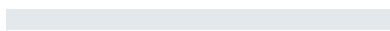
EFC (£m)

209

EFC movement post plan (£m)

2

2018/19 budget milestone RAG



This is a programme which includes upgrades to signalling, power, trains, track and data with the target of increasing capacity on the Jubilee and Northern lines without the need to procure new trains. While a lot of the works are standalone, a significant proportion is essential to other programmes, including further upgrades to the Jubilee line and Victoria line.

The World Class Capacity programme is directly responsible for signalling works for the Northern Line Extension and Bank capacity upgrade.

To enable the new capacity works, we have already completed speed improvement and track works to the Northern line and started power enhancement works with the award of a design and build contract to Balfour Beatty.

Enhancements to the Jubilee line continue to be developed, which includes improving the speed that trains exit the depot onto the mainline at Neasden, which is an essential service enabler for the Four Lines Modernisation. Train crew accommodation enhancement works at North Greenwich have also been completed.

The EFC has increased by £2m compared to the 2018 Business Plan, driven by works at Neasdon Depot, which are required to enable the Jubilee line capacity improvement programme. This will increase the capacity to 32 trains per hour on the central section in the peak by the end of 2021.

Assurance

Project Assurance completed an integrated assurance review on the World Class Capacity programme submission to the Programmes and Investment Committee meeting in July 2018. A quarterly update was provided to the Committee on 11 December 2018 on the six recommendations that were made and accepted, including three by the IIPAG. All recommendations are now closed.



Capacity Optimisation – DLR Rolling Stock and System Integration

Forecast completion year

2025

Spend to date (£m)

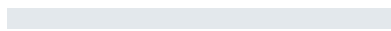
11

Spend authority (£m)

EFC (£m)

EFC movement post plan (£m)

2018/19 budget milestone RAG



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

We continue to achieve key milestones in all areas and have established credible and achievable future plans. There have been no accidents or injuries.

The programme will replace 60 per cent rolling stock that is nearing the end of its design life and provide additional trains, which will increase capacity to meet the projected growth in the Docklands area. The depot at Beckton needs to 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 needs updating and the traction power system needs to be strengthened.

Tenders to replace the rolling stock were received on 1 June 2018, with technical evaluation done in September 2018. The depot concept design has been accepted and a detailed design contract let for the enabling works and sidings design. Topographical and drainage surveys are complete and geotechnical surveys are under way on site.

Since the end of Quarter 3, on 11 December 2018, the Programmes and Investment Committee granted authority to procure 43 DLR trains to increase capacity and to replace approximately 60 per cent of the existing fleet (33 trains) and for the associated enabling works.

* This information is withheld until final contract is awarded

Workshops with Keolis Amey Docklands to plan how the operational service will be maintained during the depot enhancement works has begun and detailed operational modelling for the early stages completed. Negotiations with UK Power Networks to secure additional power supplies have started and a solution proposed. Negotiations continue with Thales to agree the scope of services for the signalling upgrade required to support the replacement rolling stock.

Assurance

Project Assurance completed an integrated assurance review on the DLR Rolling Stock Replacement programme submission to the Programmes and Investment Committee meeting on 11 December 2018. Five recommendations were made and accepted, including three by the IIPAG. Good progress is being made to close the recommendations. Project Assurance tracks progress against the recommendations made, including by IIPAG, as part of its continuous assurance.



We are reviewing the scope of our Deep Tube Upgrade programme

Deep Tube Upgrade programme



Deep Tube Upgrade programme

Forecast completion year

2030/31

Spend to date (£m)

98

Spend authority (£m)

3,294

EFC (£m)

3,105

EFC movement post plan (£m)

4

2018/19 budget milestone RAG



There will be new signalling systems and a fleet of newly designed, high-capacity, walk-through, air-cooled trains to replace some of the oldest on our network. The initial focus is on the upgrade of the Piccadilly line.

The Business Plan, published on 12 December 2018, discontinued the current procurement of signalling and the bidders were informed of this on 12 December 2018.

We remain committed to delivering new signalling on the Piccadilly line, as well as the other Deep Tube lines, once long-term capital funding is secured.

Following the signing of the rolling stock contract in Quarter 2, we held a series of meetings with Siemens leading to the development and agreement of its 100 day plan. This plan focuses on contract and team mobilisation, and the development of the draft Piccadilly line rolling stock concept design.

We have advised applicants of the outcome of the one person operation CCTV selection process. Our efforts are now focused on finalising the Invitation to Tender and contract documents ahead of issuing in Quarter 4.

The EFC and spend authority relates only to works and enabling associated with the introduction of the Piccadilly line rolling stock. Work continues on additional scope for the Deep Tube Upgrade programme, which forms part of a wider programme EFC. During Quarter 3, a contract was signed with Siemens Mobility Limited to design and build 94 Tube trains to replace the existing 1970s fleet. This has resulted in a £4m reduction in EFC since the 2018 Business Plan. The EFC has reduced by £120m since last quarter, driven by the removal of works on lines other than the Piccadilly line following the business plan finalisation, as well as efficiencies related to Piccadilly line works such as savings on signalling, power and cooling, and resources.

Assurance

Project Assurance completed an integrated assurance review on the Deep Tube Upgrade programme submission to the Programmes and Investment Committee meeting in May 2018. A quarterly update was provided to the Committee on 11 December 2018 on the 10 recommendations that were made and accepted, including five by the IIPAG. Nine recommendations are closed and good progress is being made to close the one remaining. Project Assurance tracks progress against the recommendations made, including by IIPAG, as part of its continuous assurance.

Network extensions



Northern Line Extension

Forecast completion year	Spend to date (£m)	Spend authority (£m)	EFC (£m)	EFC movement post plan (£m)
**	682	*	*	*

2018/19 budget milestone RAG

This project provides 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.

We completed the platforms at Nine Elms station in November 2018, including installing almost 600 off-site precast units, weighing around six tonnes each. The casting of the lining wall and column encasement continues. Blockwork installation, to create the internal walls and rooms continues. Enabling works to support the escalators are complete. Now that the gantry crane has been dismantled and removed from site, construction of the eastern superstructure columns has begun. Cable management system modules were delivered to the site in early December 2018 and are now being installed.

At Battersea, we have installed the track through the platforms and overrun tunnels at the station. The civils works were completed with the pouring of the western core concrete

roof slabs. Blockwork has started on the internal walls to form the rooms in the new station and we have installed the architectural ceiling in the station ticket hall, apart from the last four sections. These will be installed when the tower cranes are decommissioned and removed from site. The final transfer beam, to support the future over-station development, was installed in the crossover box in December 2018. Construction of the Prospect Way access road has begun.

At Kennington Green, work continues to join the shaft to the basement. The cable management system installation between Kennington Park shaft and Nine Elms station was completed in October 2018. Excavation at Kennington Park was also finished in October 2018.

* This information is withheld for reasons of commercial sensitivity.

** The end of December 2020 target opening date is currently under review. This is driven by the need to adapt the construction programme as the designs for Battersea Power Station's over-station development and Tube station have evolved.



The Northern Line Extension and GPS Marine were awarded a Green Apple Champion Award for environmental best practice

The first engineering train on the Northern Line Extension ran in October 2018, delivering long welded rail. It entered the Northern Line Extension tunnel over the northbound step-plate junction points, delivering rail to the Kennington Green shaft site. This paves the way to deliver materials and equipment for other NLE systems over the next 18 months.

All long welded rail deliveries are now complete as is rail installation in the northbound tunnel. Rail installation in the southbound tunnel continues.

The first 22kV cable was installed through Oval southbound platform. This represents a major milestone for the Northern Line Extension as we start to energise the power distribution systems. The last of the engineering trains delivering cable ran in the week before Christmas.

In December, we won three awards at the New Civil Engineer Tunnelling awards:

- Best Health, Safety and Wellbeing initiative for our Mental Health Programme
- Young Tunneller of the Year went to Alejandro Vazquez
- Tunnelling Project of the Year (\$100M to \$1bn)

Additionally, the ground-breaking work we are doing to raise awareness around mental health received accolades at both the NCE Tunnelling Awards and the TfL Supplier Awards.

The Northern Line Extension and GPS Marine were awarded a Green Apple Champion Award, which recognises environmental best practice, for efforts in maximising the transport of materials by river, thereby minimising lorry movements through central London. The benefits include reducing emissions of toxic pollutants and substantial carbon savings compared to heavy goods vehicles (HGVs). It also reduces congestion and the risks to vulnerable road users. This is the second Green Apple Award for the project, having won in 2015 for our advanced environmental monitoring system.

Assurance

Project Assurance completed an integrated assurance review on the Northern Line Extension programme submission to the Programmes and Investment Committee meeting on 11 December 2018. Ten recommendations were made and accepted, including six by the IIPAG. Good progress is being made to close the recommendations. Project Assurance tracks progress against the recommendations made, including by IIPAG, as part of its continuous assurance.



Silvertown Tunnel

Forecast completion year

2024

Spend to date (£m)

49

Spend authority (£m)

EFC (£m)

EFC movement post plan (£m)

2018/19 budget milestone RAG



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

Bidders will submit their final technical and financial proposals in early 2019, and we will award the contract in the summer. We have been concluding the negotiation stage and held clarification meetings responding to queries. The first stage technical submission has also been evaluated by our engineering specialists.

We have started a number of pre-construction activities to facilitate a smooth start to construction once the contract is awarded. This includes the design for enabling works packages and we completed concept designs for the replacement North Greenwich car parks in September. In October, we started baseline monitoring of existing assets in the area to ensure at least a 12-month monitoring period before the main tunnel construction works commence. We are also working with utilities companies to deliver design and progress early investigation and service diversions.

The tunnel will connect Silvertown and the Greenwich Peninsula, which are areas being developed by third parties

with numerous tenants and landowners. We have been establishing third party agreements with each of them and negotiating land access. We have also been developing our consent obligations and borough agreements to ensure benefits of the tunnel are maximised and the area around the tunnel is enhanced.

Assurance

Project Assurance completed an integrated assurance review on the Silvertown Tunnel programme submission to the Programmes and Investment Committee meeting in July 2018. A quarterly update was provided to the Committee on 11 December 2018 on the 10 recommendations that were made and accepted, including six by the IIPAG. Six recommendations are closed and good progress is being made to close the remaining four. Project Assurance tracks progress against the recommendations made, including by IIPAG, as part of its continuous assurance.

* This information is withheld for reasons of commercial sensitivity.



Barking Riverside Extension

Forecast completion year

2021

Spend to date (£m)

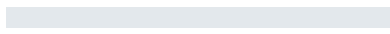
23

Spend authority (£m)

EFC (£m)

EFC movement post plan (£m)

2018/19 budget milestone RAG



We are delivering a new rail link to serve the 10,800 new homes that are 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.

In August 2017, the Secretary of State for Transport granted powers to deliver the 4.5km Barking Riverside extension and we plan to start the main construction works in spring 2019. Demolition works for the site were completed in May 2018 and the overhead line equipment sectioning and switching works has been procured over Christmas 2018. These works will further enable the possession of Network Rail infrastructure by the Main Works Contractor, planned in 2019, to take place.

Tender returns for the Main Works Contract were received in July 2018 and, after a value engineering exercise and best and final offer stage, the contract was awarded in December 2018 to a joint venture of Morgan Sindall VolkerFitzpatrick.

Assurance

Project Assurance completed an integrated assurance review on the Barking Riverside Extension programme submission to the Programmes and Investment Committee meeting on 11 December 2018. Seven recommendations were made and accepted, none by the IIPAG. Good progress is being made to close the recommendations. Project Assurance tracks progress against the recommendations made, including by IIPAG, as part of its continuous assurance.

* This information is withheld for reasons of commercial sensitivity.



The developments at Victoria station will help relieve congestion for customers

Major stations

Victoria station upgrade and finishes

Forecast completion year

2019

Spend to date (£m)

572

Spend authority (£m)

612

EFC (£m)

582

EFC movement post plan (£m)

1

2018/19 budget milestone RAG



We have built 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 will meet the needs of the 83 million customers who use the station each year.

Three new escalators leading down from the south ticket hall were brought into use in August 2018, as well as reinstating the stairs linking the south ticket hall with the Network Rail station. This has relieved congestion by providing a new route from the south ticket hall to the Victoria line platforms via six further escalators.

We continue to refurbish the Duke of York pub, which was closed to enable jet grouting works for the tunnels. Stairwell construction, internal plastering and mechanical and electrical works are now well under way with remedial works now commencing on the shop front.

The new station was opened in stages. Within this quarter, all passenger facing facilities have been opened. The overall completion of the station, surrounding buildings and urban realm are planned for mid-2019.

We achieved a major milestone this quarter as Victoria station became step-free. The new lifts are part of an upgrade project that has almost doubled the size of the station.

The EFC has increased by £1m since the last quarter to £1m over the 2018 Business Plan as the project nears completion. Authority has decreased by £48m following reallocation to the Bank station capacity upgrade project.



Bank Walbrook

Forecast completion year

2018

Spend to date (£m)

52

Spend authority (£m)

58

EFC (£m)

58

EFC movement post plan (£m)

0

2018/19 budget milestone RAG



Alongside the Bloomberg Place site redevelopment next to Walbrook, we have built a new entrance for the Waterloo & City line, with connections to the existing concourse. The station box was constructed by Bloomberg on our behalf.

The new Bloomberg entrance onto Walbrook opened to customers on 30 November, and had its formal opening on 12 December 2018. The focus is now on a successful handover of the newly installed assets to our maintenance and operational teams as well as to formally close the project.

The EFC has remained static since last quarter and is aligned to the 2018 Business Plan.



Bank station upgrade

Forecast completion year

2022

Spend to date (£m)

400

Spend authority (£m)

656

EFC (£m)

656

EFC movement post plan (£m)

0

2018/19 budget 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 and within the ground floor of Bloomberg's European headquarters, the introduction of step-free access to the Waterloo & City line and Northern line, and additional DLR platforms, and a moving walkway between the Central and Northern lines to reduce customer journey times.

Tunnelling works are progressing well at Bank, with most of the tunneling nearly complete and the waterproofing of the new tunnels continues ahead of schedule. The secondary lining has now started, along the new Central line moving walkway tunnel. The remaining tunnelling works are on schedule.

At the Whole Block site we have completed pouring the final base slab concrete for the new station entrance box. Tunnelling works from the new station box for the new lift shaft has started. This will deliver step-free access to the Northern line in 2022. Enabling works at the Northern line platform are complete and will ensure an efficient connection between the existing and the new parts of the station.

The EFC has remained static since last quarter and is aligned to the 2018 Business Plan. Authority has increased by £48m and is now aligned to EFC, following a reallocation from the Victoria station upgrade project. The project is committed to identifying further opportunities and has a collaborative approach with the main contractor to identify opportunities and realise potential savings.



Bakerloo line link

Forecast completion year

2018

Spend to date (£m)

66

Spend authority (£m)

69

EFC (£m)

69

EFC movement post plan (£m)

0

2018/19 budget milestone RAG



The EFC has remained static since last quarter and is aligned to the 2018 Business Plan.

A new step-free pedestrian walkway at Paddington is being constructed to link the Bakerloo line platforms with the new Elizabeth line station.

The new pedestrian walkway will provide a step-free access from the Bakerloo line to the new Paddington Elizabeth line station. Two new escalators and a new lift have been installed. On 30 November, the project completed the testing and commissioning works, which enabled the Bakerloo line link to be ready for integration with the Elizabeth line.



Holborn station capacity

Forecast completion year

2031

Spend to date (£m)

5

Spend authority (£m)

5

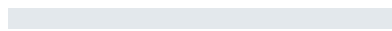
EFC (£m)

5

EFC movement post plan (£m)

0

2018/19 budget milestone RAG



The proposed upgrade will see the station more than double in size, increasing capacity by around 140 per cent, as well as creating a second station entrance and exit on Procter Street. Step-free access will also be provided as part of the plans, with the installation of three new lifts in the existing Kingsway entrance. Seven hundred metres of tunnel will create new interchange routes between the Central and Piccadilly lines, helping to reduce crowding during peak periods.

Our 2018 Business Plan confirmed our intention to progress the Holborn capacity upgrade, which will be crucial to supporting our upgrade of the Piccadilly line. We will shortly start a process to drive innovation and savings on the current proposed design for the station, which will take approximately 12 months.

The EFC represents early stage works, including concept design and Transport and Works Act Order preparation and is aligned with the current spend authority. Work continues beyond this stage forming part of a wider EFC. The EFC has remained static since last quarter and is aligned to the 2018 Business Plan.



Camden Town station capacity upgrade

Forecast completion year

TBC

Spend to date (£m)

10

Spend authority (£m)

24

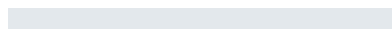
EFC (£m)

24

EFC movement post plan (£m)

0

2018/19 budget milestone RAG



The station upgrade will provide a new fully accessible station entrance to the north of the existing station, connected by tunnels to the existing platforms.

As our 2018 Business Plan explains, we are reliant on steady and sustained investment from the Government to support major capital investment. We currently have no certainty of capital funding beyond 2020, and over the next year we will be making the case to Government for confirmed capital support to enable critical infrastructure projects, such as Camden Town.

In the meantime we continue to look to identify third party funding and work with potential development partners, which could help fund the new station entrance and capacity improvements.

Assurance

Project Assurance completed an integrated assurance review on the Major Stations programme submission to the Programmes and Investment Committee meeting in February 2018. A quarterly update was provided to the Committee on 11 December 2018 on the 15 recommendations that were made and accepted, including nine by the IIPAG. All recommendations are now closed.

The EFC represents early stage works, including concept design and Transport and Works Act Order preparation along with property purchases and is aligned with the current spend authority. Work continues beyond this stage forming part of a wider EFC. The EFC has remained static since last quarter and is aligned to the 2018 Business Plan.

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.

Following the submission of the Independent Affordability Review's Draft Interim Report to the Mayor and Secretary of State for Transport in the summer, we have been working with the Department for Transport and Network Rail to address some of the recommendations put forward by the panel. A meeting was held with the Independent Affordability Review Chair to brief him on our progress.

Despite the delays to the opening of the Elizabeth line, we remain committed to Crossrail 2. We continue to develop and refine the scheme as we prepare to provide the Government with an update to our business case in anticipation of the next phase of work. We are also supporting the Greater London Authority (GLA) in its work with Homes England and the Department for Communities and Local Government to deliver 200,000 homes across London and the South East.

The Bakerloo Line Extension from Elephant & Castle to Lewisham will increase capacity and improve resilience, reduce journey times and support at least 20,000 new homes in the Old Kent Road Opportunity Area. Following our initial consultation response in mid-February, we published a further response on 12 September 2018. We are now developing the scheme and engaging with stakeholders ahead of a further public consultation. We also intend to commence market engagement for construction and financing.



Station improvements at Liverpool Street station have improved capacity and safety for customers at this busy interchange

London Underground

Stations 

Forecast completion year

2023/24

Spend to date (£m)

1,995

Spend authority (£m)

3,207*

EFC (£m)

2,533▲

EFC movement post plan (£m)

0

2018/19 budget 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 are improving a number of stations, including three that will interchange with the Elizabeth line. We completed improvements at Liverpool Street, Paddington and Moorgate stations at the end of 2018.

Station enhancements

At Finsbury Park, a new passageway linking the existing station to the future western station entrance is almost complete. Testing and commissioning of the new lifts was completed and the station became step-free at the end of January.

We have completed the concept design for the South Kensington station capacity upgrade project and continue work to appoint a design and build contractor by March 2019 to deliver the works.

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. We have started enabling and civils works on the lift shaft to the platform.

The EFC, which covers all projects including those completed within the stations programme, has increased from £2,440m at Quarter 2 as it now includes the financial year 2023/24.

* The authority has increased by £66m since Quarter 2 mainly because of the introduction of the Asset Resilience programme.

We continue the redevelopment and upgrade of Tottenham Hale station. Works to non-customer areas were completed on 7 November and foundation works have also been completed. Works above ground level will follow pending a resolution with the train operating company and Network Rail regarding revenue protection issues.

In early December we held a public consultation exhibition on the Colindale station redevelopment at the RAF Museum and concept design has now started. 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.

Developer funded works

We are working with Berkeley Homes to create a new entrance at West Ham station with step-free access between the entrance and Berkeley's development site. We have drafted the concept design specification documents and are working with the developer to produce a legal agreement.

We are working with Canary Wharf Group to deliver a new station entrance and three new escalators at Waterloo. Communications and public announcement systems installations are almost complete and we plan to open the new entrance in spring 2019.

We are creating 11 retail units in the railway arches beneath Wood Lane station. Shop front and service installation works are under way.

Collaborative enhancements and third-party projects

In July, the London Borough of Southwark recommended that planning permission be granted for a new town centre at Elephant and Castle, subject to legal agreement and approval by the GLA and the Secretary of State. We have reached a Section 106 agreement with the developer and the London Borough of Southwark and we are awaiting final approval. 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 construct a new entrance to the Bakerloo line, with an enlarged ticket hall and step-free access to the platforms, as part of its redevelopment of adjacent buildings. Demolition works at street level are now complete and we continue to collaborate with Great Western Developments and its consultants to confirm the scope, agree commercial terms and finalise a Works Agreement before starting the concept design phase.

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 to serve the Carpenters Road area, along with improvements to step-free access and capacity in the adjacent subway.

Assurance

Project Assurance completed an integrated assurance review on the Stations programme submission to the Programmes and Investment Committee meeting in July 2018. A quarterly update was provided to the Committee on 11 December 2018 on the eight recommendations that were made and accepted, including three by the IIPAG. Three recommendations are closed and good progress is being made to close the remaining five. Project Assurance tracks progress against the recommendations made as part of its continuous assurance process.

Accessibility



Forecast completion year

2023/24

Spend to date (£m)

35

Spend authority (£m)

244

EFC (£m)

165▼▼

EFC movement post plan (£m)

25

2018/19 budget milestone RAG



We are working on a wide programme of accessibility improvements, customer service and information enhancements across the Underground network. We will make 34 per cent of stations accessible by 2020 by providing step-free access at a further 15 stations.

We have announced the 15 stations that will be step-free by March 2020. As part of the Mayor's funding for step-free access, we delivered step-free access at Newbury Park in November 2018. We installed two lifts to provide step-free access from street to platform and manual boarding ramps have been provided to give step-free access from platform to train. As part of the fire strategy, platform places of relative safety and additional fire escapes have been provided. Additionally, an accessible toilet is being constructed.

We are working to provide step-free access at a number of other locations, including Harrow-on-the-Hill.

We awarded a design and build contract for seven further stations on 7 December 2018, and design work has started. The stations are Burnt Oak, Debden, Hanger Lane, Ickenham, Northolt, Sudbury Hill and Wimbledon Park. Award of this contract was a key milestone and we are on schedule to deliver step-free access at these stations by 2020.

We are also working on designs for additional step-free stations to be delivered in the mid-2020s.

The EFC has decreased from £197m at Quarter 2 as Lot 3 stations and unannounced Lot 2 stations are not funded in the 2018 Business Plan.

Track renewals

Forecast completion year

Annual

Spend to date (£m)

74

Spend authority (£m)

107

EFC (£m)

106

EFC movement post plan (£m)

0

2018/19 budget milestone RAG



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.

This quarter, we have replaced more than 680 metres of ballasted track and more than 600 metres of drainage. On our deep Tube track network, we replaced 1.75km of an older track type with modern flat bottom rails and renewed a further 850 metres of concreted deep Tube track.

We have completed planned works to improve reliability between Baker Street and Finchley Road on the Metropolitan line. In total this year, the project has replaced 1.1km of track and improved drainage in this area.

Procurement of our 2019/20 track delivery partner is on schedule and we expect to award the contract in spring 2019.

Assurance

Project Assurance completed an integrated assurance review on the Track Renewals programme submission to the Programmes and Investment Committee meeting in February 2018. A quarterly update was provided to the Committee on 11 December 2018 on the seven recommendations that were made and accepted. Four recommendations are closed and good progress is being made to close the remaining three. Project Assurance tracks progress against the recommendations made as part of its continuous assurance process.

Power, cooling and energy



Forecast completion year

2023/24*

Spend to date (£m)

39

Spend authority (£m)

90

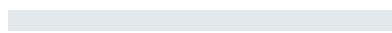
EFC (£m)

133▼▼

EFC movement post plan (£m)

0

2018/19 budget milestone RAG



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

The EFC has decreased from £197m at Quarter 2 due to the reduction in funding in the 2018 Business Plan

Power

We are supporting 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 providing a programme of works for the Deep Tube Upgrade.

We are delivering power renewal works to ensure our power assets are safe and compliant and enable a reliable service to our customers. This is being delivered through a work bank of projects that will run until at least 2021.

We have agreed the procurement strategy to extend the life and address immediate obsolescence risk on the three power control systems across the Underground network by consolidating them into a single system. The systems remotely monitor and safely operate traction, station, signalling and depot power supplies.

* The figures represent power and energy projects until 2023/24.

Cooling

We improved the tunnel ventilation system in late 2018 to reduce temperature increases in the Jubilee line tunnels between Baker Street and Green Park following the introduction of a new timetable.

Works continue at Bond Street station to provide improved airflow to the new Elizabeth line tunnel.

Following the commissioning of the City Road ventilation and heat recovery scheme last quarter, the remaining works, which will deliver low carbon heat from the Northern line to local homes and businesses, are expected to be delivered by the London Borough of Islington in early 2019.

Energy

We are progressing the project to install solar panels on the roof of the Acton workshop as part of the Mayor's drive to be a zero-carbon city by 2050. In 2019, we will assess the feasibility of installing solar panels at further sites. The 700kWp system will generate more energy than is consumed on site, with the excess feeding our other buildings and assets.

Assurance

Project Assurance completed an integrated assurance review on the Power, Cooling and Energy programme submission to the Programmes and Investment Committee meeting in July 2018. A quarterly update was provided to the Committee on 11 December 2018 on the 13 recommendations that were made and accepted, including eight by the IIPAG. Eight recommendations are closed and good progress is being made to close the remaining five. Project Assurance tracks progress against the recommendations made as part of its continuous assurance process.

Rolling stock renewals



Forecast completion year

2029

Spend to date (£m)

204

Spend authority (£m)

612*

EFC (£m)

1,012▲

EFC movement post plan (£m)

0

2018/19 budget 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.

We are making improvements to ensure continued reliability of the Bakerloo line fleet until its replacement by the Deep Tube Upgrade programme. We have completed structural weld repairs to carriages on 30 out of 36 trains and expect to complete the remaining trains by mid-2019.

On the Jubilee line, 37 refurbished trains out of 63 trains are back in service. The refurbishments include a wheelchair area, replaced flooring, refreshed interior, which includes grab-poles and handles, and sealing to the roof and windows.

On the Central line improvement programme, the new AC traction package contract, which will provide a more reliable power supply to the fleet, continues as planned. We moved a carriage to the Bombardier test site to start prototyping for the new traction. We have awarded the LED lighting contract and are at preferred bidder stage on new flooring.

We continue the design for 71 new engineering vehicles to support track renewal and maintenance activities.

The EFC increase from £1,006m at Quarter 2 mainly relates to the introduction of a project to enhance train operator security part of which will install safety glass casing over the cab door handle where it is not already installed across our existing fleets.

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



We have refurbished 37 trains on the Jubilee line and they are now back in service

We are designing and building a track renewal vehicle to reduce the cost of deep Tube track renewal and maintenance by mechanising the renewal process. The engineering vehicles required for the prototype are currently being overhauled. Areas within Ruislip Depot are being investigated to ensure the necessary capability and space is available to support the future operation of the engineering vehicles.

A contract has been placed to overhaul the engineering vehicles that provide our Kirow cranes with secure boom retention points to carry out track renewal works.

We are evaluating the options for replacing our track recording vehicle, which records and monitors the alignment and condition of the track.

Assurance

Project Assurance completed an integrated assurance review on the Rolling Stock Renewals programme submission to the Programmes and Investment Committee meeting in February 2018. A quarterly update was provided to the Committee on 11 December 2018 on the eight recommendations that were made and accepted. Six recommendations are closed and good progress is being made to close the remaining two. Project Assurance tracks progress against the recommendations made, as part of its continuous assurance process.

Signalling and control



Forecast completion year

2023/24

Spend to date (£m)

66

Spend authority (£m)

143*

EFC (£m)

188▲

EFC movement post plan (£m)

0

2018/19 budget milestone RAG



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

Siemens Mobility has started the design for the life extension of the Central line signalling and control systems. Once the design has been finalised we will run a pilot to test the solution. This project will maintain the reliability, availability, maintainability and safety of the assets to resolve obsolescence concerns.

We have started commissioning the new Piccadilly line signalling control system at the control centre in west London. We continue to complete snagging works in the building and the next commissioning, which will migrate control between Acton Town and South Harrow, will follow in spring 2019. The programme is progressing well and all remaining migrations are due by the end of 2019.

Work continues to award the contract in early 2019 for re-signalling the Northumberland Park Depot.

The EFC increase from £181m at Quarter 2 reflects an increase in costs on life extension works on multiple Tube lines, plus maturing cost estimates for the Northumberland Park signalling modernisation programme.

* Additional authority of £74m was granted by the Programmes and Investment Committee on 3 July 2018, taking the total to £143m for works to 2023/24. Further authority will be sought in future.

Assurance

Project Assurance completed an integrated assurance review on the signalling and control programme submission to the Programmes and Investment Committee meeting in May 2018. A quarterly update was provided to the Committee on 11 December 2018 on the nine recommendations that were made and accepted, including six by the IIPAG. Five recommendations are closed and good progress is being made to close the remaining four. Project Assurance tracks progress against the recommendations made as part of its continuous assurance process.



We have started commissioning the new Piccadilly line signalling control system at the control centre in west London



We are encouraging more people to cycle by making it a safer option

Surface

Healthy Streets

Forecast completion year

2021/22

Spend to date (£m)

359

Spend authority (£m)

957

EFC (£m)

1,759

EFC movement post plan (£m)

2018/19 budget 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

Construction is progressing well for the major reconfiguration of the road network and removal of the gyratory at Highbury Corner, with highway works due to be completed by summer 2019.

The latest phase of construction has focused on completing gas works on Canonbury Road, where we have saved time by working closely with Cadent Gas. The project has also secured significant savings through value engineering activities, with £800,000 returned to the business so far.

Wandsworth Gyratory

The purchase of properties from landowners on Putney Bridge Road is in progress and targeted for completion in June 2019. The scheme layout in Armoury Way is being reviewed in light of the focus to reduce costs by ensuring all land take is essential. Initial traffic modelling outputs indicate minimal traffic impact as a result of the changes, ahead of securing endorsement from Wandsworth and us to adopt the revised layout. We plan to start work on site in 2021.

The EFC reflects the latest Business Plan up to 2021/22 to provide a direct comparison to the original authority requested. Spend authority is to the end of 2019/20.

Fiveways

The concept design has been completed and is being reviewed for final Technical Approval and subsequent audit. Following this, we expect to issue a tender to invite bids for the detailed design and construction contract in July 2019.

Croydon, the Local Planning Authority, has confirmed that no Environmental Impact Assessment is required. We are now compiling a planning application, which is expected to be submitted in October 2019. Planning approval is required before we proceed with the necessary compulsory purchase order for essential land. The compulsory purchase order process is expected to start in June 2020, following TfL Board approval.

Vauxhall Cross

We are transforming Vauxhall gyratory to make it safer for cyclists and pedestrians, improve the bus station, and accommodate the increased level of passengers as a result of the Vauxhall, Nine Elms, Battersea development.

The proposals are subject to a number of complex consents. The revised plans for the Vauxhall Cross Island site, located in the middle of the gyratory, were approved by Lambeth Council Planning Committee in December and will now be referred to the Mayor, with a decision expected in early 2019. This planning permission is the last external consent required and, subject to a review by the Secretary of State for Transport, we

will progress with a mini-competition through our civils project framework to appoint a design and build contractor in winter 2019, for start on site in the latter part of 2021.

Trinity Square (City of London)

The main construction works at Trinity Square were completed in October. The resurfacing works were completed in early December, with the anti-skid treatment planned for January. Following agreement with the Historic Royal Palaces, the highway boundary markers are being fabricated and will be installed by the end of January 2019.

Waterloo City Hub

The scheme provides a significant upgrade for the safety and comfort of pedestrians, cyclists and public transport users, with pedestrian crossings, segregated cycling facilities and improved bus waiting and boarding. It also provides a better urban realm connecting the Southbank area and public transport services.

The proposed transformational scheme at this busy junction is progressing well and the initial concept design has been prepared. This early design will aid engagement with key stakeholders and the public. We are now working with our supply chain to review the buildability, risks and opportunities in our current proposals. We hope to start construction in spring 2020, subject to securing the necessary consents. In December, we obtained a decision

from Lambeth Council confirming that an Environmental Impact Assessment for the scheme was not required. Pre-application meetings and dialogue with the council will continue over the coming months, ahead of a planning application submission in spring 2019.

Old Street Roundabout

The initial stages of construction commenced in November as planned at Old Street roundabout, with the main works due to follow in May. As well as improving safety at this critical and busy junction, the project will transform the area. Key features include removing the gyratory, creating a large public space, new and improved pedestrian and cycling facilities, and new entrances to Old Street Underground station.

Direct Vision Standards

We plan to improve safety for vulnerable road users by setting higher standards for heavy goods vehicles (HGVs) coming into London with our Direct Vision Standard. This standard will use a zero- to five-star rating system to define how much an HGV driver can see directly from each vehicle's cab, rather than through mirrors or other equipment. It will give regulators, manufacturers, operators and contractors an objective standard by which to rate and improve the safety of HGVs.

As the Direct Vision Standard and HGV Permit Scheme proposal for London amounts to a technical regulation, we were required to notify the European

Commission to ensure that it did not conflict with 'free movement' within the European Union. On 6 December, we were notified that the European Commission had no objections to our proposals. Achieving this milestone means we remain on track for issuing permits in October 2019.

Although we have consulted on these proposals in the past, as the scheme has developed, we want to share more detail on how it works in practice. As such, an additional consultation is open on our website until 18 February 2019.

Surface Intelligent Transport System

We are leading the way in terms of delivering an innovative new road traffic management system that makes journeys on foot, bike, bus, as well as essential emergency services and freight trips, as efficient as possible. We are in the design phase and on target to deliver the first set of improvements in late 2020.

Cycleways

The detailed design for the detailed design for a new cycle route on the A40/Western Avenue from Kathleen Avenue to Wood Lane is progressing well. Internal and external reviews have been done and, subject to relevant approvals, the design is due to be complete by the end of January 2019. Following initial strategic modelling results received in the summer, further design and modelling has been carried out on the inner section of the route between Wood

Lane and Notting Hill. This work is due to be complete by the end of January 2019 ahead of public consultation in spring.

Following a court hearing on 6 September, a ruling was passed down on 13 September and an order granted preventing us from starting construction works at Swiss Cottage for a new cycle route between Swiss Cottage and the West End. An application for permission to appeal to the Court of Appeal was filed on 11 October and we are awaiting the Court's decision.

Bus Stop Bypasses

We are progressing with work to retrofit zebra crossings to Bus Stop Bypasses following engagement with interested stakeholders and an on-street trial. During the trial, visually-impaired users found the addition of a zebra crossing at Bus Stop Bypass crossing points made their experience more comfortable and enabled them to find the crossing point more easily. We took the decision to update our guidance on bus stop bypasses to include a zebra crossing, and committed to retro-fit zebra crossings at all existing bus stop bypasses. We have completed 60 per cent of the sites identified and the completed crossings are now in use. The remaining sites are planned to be completed by the end of March 2019.

We continue to make good progress on our work with London boroughs to create new cycle routes across the capital, with a focus on completing and opening whole or significant sections of new routes.

We have constructed 112km and have a further seven kilometres of the proposed 250km network of cycle routes through inner and outer London under construction.

Almost 100 cycle infrastructure schemes and five behaviour change schemes across three outer London boroughs – Waltham Forest, Enfield and Kingston are under way. 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. Initial post implementation monitoring of the A105 Green Lanes scheme has shown a 52 per cent rise in cycling along this route compared to surveys from 2016. Further schemes under construction include segregated cycle routes on Wheatfield Way in Kingston, the A1010 in Enfield, and Lea Bridge Road in Waltham Forest. Further schemes are going through design and consultation, and will complement other cycling and healthy streets schemes in and around these boroughs.



We continue to work with London's boroughs to develop our network of cycle routes

Rotherhithe to Canary Wharf Crossing

This project will provide a much needed new walking and cycling crossing between the two key Opportunity Areas of the Isle of Dogs/South Poplar and Canada Water. This will provide a safe, attractive and direct route for pedestrians and cyclists, relieving existing transport links and encouraging more active travel.

We continue to develop plans for our provisional preferred option of a navigable bridge. We have been discussing a number of key aspects of the crossing with stakeholders, including preferred height, alignment and landing arrangements. We have also been developing further details around how the bridge will be operated, maintained and constructed. This will lead to a full public consultation on our detailed proposals in 2019, which will help inform preparation of an application under the Transport and Works Act 1992, also planned for 2019.

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. We have now completed work at 26 of these junctions and all have had mitigation measures introduced to reduce road danger. We are currently reviewing the completed projects to ensure they have successfully reduced collisions. We are taking the remaining 47 schemes through design, with 15 scheduled for construction by spring 2020.

Crossrail complementary measures

We are working with the boroughs, Crossrail Limited, Network Rail and Rail for London to develop and deliver a programme of improvements to 17 stations in outer London that will form part of the Elizabeth line when the full service starts operating.

So far Crossrail complementary measures works are complete at five stations (Romford, Chadwell Heath, Goodmayes, Abbey Wood and Manor Park). Site works at eight stations (Ilford, Harold Wood, Gidea Park, Seven Kings, Forest Gate, Maryland, Hanwell and West Drayton) are at various stages of development. Four stations, (Southall, Ealing Broadway, Acton Main line and West Ealing) are at design or consultation stage.



We have completed work at 26 areas as part of our Safer Junctions programme

Works to some of the west London stations will be completed later than December 2019 due to challenges in aligning Crossrail station works, which has slipped significantly, with the Crossrail complementary measures.

Borough Local Implementation Plan projects

Construction of schemes at Baker Street, Stratford Gyratory, Tottenham Court Road (West End project), White Hart Lane, Beddington, Hayes town centre and Feltham are currently under way in accordance with the agreed programmes and budget allocations.

The works at Bond Street, Beckenham town centre and West Norwood are now complete. Construction is due to start at Hornsey Lane Bridge and the Blackhorse Road junction with Forest Road in spring this year.

Boroughs have submitted their draft Local Implementation Plans to us, and feedback was sent to them before Christmas. The final documents will be submitted to us in February. They will be further assessed before being passed to the Mayor for his consideration and approval in March.

Assurance

Project Assurance completed an integrated assurance review on the Healthy Streets programme submission to the Programmes and Investment Committee meeting in July 2018. A quarterly update was provided to the Committee on 11 December 2018 on the nine recommendations that were made and accepted, including four by the IIPAG. Seven recommendations are closed and good progress is being made to close the remaining two. Project Assurance tracks progress against the recommendations made, including by IIPAG, as part of its continuous assurance.

Air quality and environment



Forecast completion year

2022/23

Spend to date (£m)

91

Spend authority (£m)

280

EFC (£m)

433

EFC movement post plan (£m)

-28

2018/19 budget milestone RAG



The Air quality and environment programme reduces transport’s impact 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 update

From April 2019, the central London Ultra Low Emission Zone (ULEZ) will replace the T-Charge and operate in the same area, alongside the Congestion Charge. Unlike the T-Charge and Congestion Charge, which are only in place on weekdays, the ULEZ will operate 24 hours a day, seven days a week, 365 days a year. In addition to the Congestion Charge, there will be two ULEZ charge levels: £12.50 a day for cars, vans and motorbikes and £100 a day for lorries, buses and coaches.

The core elements of development on our website are complete. We continue our testing to ensure the systems integrate correctly, with regression and performance testing in progress. We have also started installing the road signs at the boundary of the zone. We continue to act to maximise vehicle compliance, to the required standards, by ramping up our comprehensive communications and stakeholder engagement strategy and a targeted letter drop campaign and messaging on our variable message signs.

Fleet compliance

There are now more than 2,200 ULEZ compliant buses, both single and double deck, in service. As a result, more than 86 per cent of the bus fleet

The EFC reflects the latest high-level estimate for implementation costs of the Ultra Low Emission Zone expansion in 2021 and Low Emission Zone tightening in 2020. This was not reflected in the Business Plan as we are still developing the delivery strategy for these schemes and there is still a degree of uncertainty over the implementation costs. Once the delivery strategy has been confirmed we will formally re-baseline the EFC. Although these schemes are not designed for revenue generation, the implementation cost will be funded through the income they generate.



We plan to have 175 rapid charging points installed by April

travelling in the ULEZ is already compliant with the new emission standards.

We continue to install nitrogen dioxide (NOx) abatement equipment on buses. We have completed seven Low Emission Bus Zones, with the retrofitted vehicles now contributing significantly lower NOx emissions on these corridors.

The completed bus zones are:

- Putney High Street
- Brixton – Streatham
- A2 Camberwell – New Cross
- A3 Wandsworth – St. John’s Hill
- High Road (Haringey)
- A12 Eastern Avenue (Homerton Road)
- A5 Edgware Road

The Edmonton to Seven Sisters corridor is more than 90 per cent complete and the Stratford corridor is 70 per cent complete. In addition to vehicles operating in the ULEZ, we are also retrofitting NOx abatement equipment on buses across London. More than 2,000 buses have already been converted, which are directly delivering benefits for the Mayor’s programme to improve air quality.

Ultra low emission vehicles - rapid charge infrastructure

To support the growing use of zero emission capable taxis and electric

vehicles, we are building a network of rapid charging points across London. We had installed 150 points by 31 November, of which 64 are dedicated for taxis.

We continue to prepare sites for installation, with the number of live sites estimated to reach 175 by April 2019. We are also progressing designs for two ‘hub’ sites, which have multiple rapid charging points, and aim to have the first site live by mid-2019.

In addition, residential on street charging is being installed in 24 boroughs via the Go Ultra Low City Scheme programme.

Recognising the need for a strategic approach to electric vehicle infrastructure, the Mayor launched the Electric Vehicle Infrastructure Taskforce in May 2018, to look at how much public infrastructure might be needed in London by 2025 and to mitigate the barriers to implementing it. A Delivery Plan for electric vehicle infrastructure in London to 2025 will be published in the spring.

Assurance

Project Assurance completed an integrated assurance review on the Air Quality and Environment programme submission to the Programmes and Investment Committee meeting on 11 December 2018. Eight recommendations were made and accepted, including three by the IIPAG. Good progress is being made to close the recommendations. Project Assurance tracks progress against the recommendations made, including by IIPAG, as part of its continuous assurance.



The two new Woolwich ferries will help deliver the Mayor's ambition to grow river transport and improve air quality

Asset investment



Forecast completion year

2021/22

Spend to date (£m)

221

Spend authority (£m)

303

EFC (£m)

585

EFC movement post plan (£m)

2018/19 budget milestone RAG



We maintain our surface assets in a safe condition through prioritised and planned works to replace, refurbish or partially 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

The bridge replacement is progressing well, with the highway approach works due to completed in spring 2019. The final phase of the railway-side works has been re-scheduled from December 2018 to 2019 and we discussing with Network Rail to agree an alternative date. This has no impact on the highway works but may delay completion of the project. All costs associated with the re-scheduling and possible delay are to be borne by the principal contractor.

Power Road Green Bridge replacement

All four carriageway lanes opened to traffic, on schedule, in November 2018. The remaining carriageway and footway works are progressing and are scheduled to complete in February 2019, followed by the removal of the site compound.

Woolwich Ferry

The three old Woolwich ferries have been replaced with two new, modern, low-emission ferries and have increased capacity, cycle-specific facilities and use a quieter, low-emission engine. This all helps deliver the Mayor's ambition to grow river transport and improve air quality.

This is the first year without any Government operating grant. As a result, the programme of proactive capital renewals on the road networks has been stopped in the short to medium term, although the safety of the network will be maintained. In the medium to long term, new sustainable funding sources for London's roads will need to be identified. Spend authority is to the end of 2019/20.

The new ferries provide 14 per cent more space than the old vessels and are able to carry 150 passengers, with a total of 210 metres of space for vehicles across four lanes and separate dedicated step-free areas for pedestrians and cyclists to improve accessibility.

The boats are powered by hybrid-propulsion engines, improving fuel efficiency and reducing noise. They are fitted with equipment to reduce emissions of diesel particulates by 90 per cent and NOx by 70 per cent, so they are compatible with the emission standards for the ULEZ.

Familiarisation and testing continued over Christmas with a loading trial held on 28 December 2018 with hired HGVs and transits on the Dame Vera Lynn.

Coaches

We are working to ensure that Victoria Coach Station is maintained and fit for purpose. This includes fire detection and alarm system upgrade, improvements to customer information display systems, refurbishment of the existing ticket office, replacing toilet turnstiles, refurbishing toilets, and a study to understand the feasibility of repairing pavements around concrete bus stands.

Bus driver facilities

This project aligns with the Mayor's Transport Strategy by ensuring that the bus network is operationally efficient and reliable.

Providing bus driver facilities ensures we can run a safe and efficient bus network and ensures our bus drivers have the basic facilities required at work.

Good progress has been made since the Mayor announced increased funding for bus driver facilities in February 2018. A total of 20 priority routes will have a facility installed by the end of December 2018.

We are currently working to deliver facilities on a total of 42 routes by summer 2019. The majority of these new facilities will be standalone permanent toilet units, adjacent to the bus stands where they are required.

Assurance

Project Assurance completed an integrated assurance review on the Asset Investment programme submission to the Programmes and Investment Committee meeting in October 2018. A quarterly update was provided to the Committee on 11 December 2018 on the 12 recommendations that were made and accepted, including five by the IIPAG. Good progress is being made to close the recommendations. Project Assurance tracks progress against the recommendations made, including by IIPAG, as part of its continuous assurance.



Work at Victoria Coach Station will improve safety and ensure it remains fit for purpose

Public transport

Forecast completion year

2021/22

Spend to date (£m)

153

Spend authority (£m)

347

EFC (£m)

394

EFC movement post plan (£m)

-4

2018/19 budget milestone RAG

We maintain the safety, reliability and performance of London Buses, London Overground, DLR, London Trams, Emirates Air Line, Santander Cycles and London River Services through prioritised renewals and enhancements that support growth, housing and jobs, and improve travel choices.

London Overground

An Access for all scheme is under way at West Hampstead station. We are also acting as delivery partner to Crossrail to design and construct schemes at seven stations across the eastern and western sections.

We are continuing construction of the new ticket hall at White Hart Lane station to increase capacity and improve accessibility. We have completed extensive civil works associated with the new structure. The station and existing ticket hall remain operational throughout the works.

Works are under way at Willesden Depot following award of the contract to electrify the sidings.

We are designing a train protection warning system for the Richmond to Gunnersbury branch to enable us to interchange the fleet between lines and improve reliability across the network. Construction works will start in the summer.

We continue to discuss a potential scheme at Hackney Central with the London Borough of Hackney, from whom confirmation of a land transfer is required.

The EFC is £4m higher. This is mainly due to an increase in renewal spend from 2020/21 in trams and London Overground, offset partially by a reduction in the renewals programme in 2018/19.



Investment across the London Overground will help improve access and capacity

Other live projects include lift maintenance at Wapping station, retaining wall renewal works on the East London line, new security for the Thames tunnel and a new hot train wash facility at New Cross Gate Depot.

Our operator, Arriva Rail London, continues to run a full service of six trains per hour on the Gospel Oak to Barking line on weekdays. On weekends, there are four trains operating a 30 minute service, with a standby bus to supplement capacity at times of higher demand.

We continue to push Bombardier to do everything they can to enable us to bring the new electric trains into service as soon as possible. We are working with Arriva Rail London so that driver training can start as soon as the software issues are resolved.

We have extended the lease on the trains currently running on the line to allow for the delay to the new trains. Additionally, Bombardier will deliver an enhanced maintenance programme for the modified electric trains to ensure maximum reliability in this interim period.

The first modified electric four-car train ran from Barking to Gospel Oak at 06:48 on Monday 28 January, with the second one entering service on Tuesday 12 February.

DLR

We have appointed a contractor to refurbish the CT30 DLR shunter locomotive. The works started in April 2018 and are progressing well. We continue repairs on the B2007 vehicle fleet.

We continue to upgrade the vehicle control centre to simplify the signalling borders around the central section of the railway. This removes conflicts that can occur when trains move from one section to another.

We have completed low-voltage renewal works in the new equipment room at Poplar and we have started works at Royal Albert and Pontoon Dock.

We have appointed contractors for drainage, bridge bearing, structural corrosion, noise barriers and station canopy drainage. Bridge repair works were completed at Abbey Road and fencing works continue, with one site at Canning Town remaining. We have finalised the technical specifications to provide systems that will enable the maintainer to work at height.

Radio resilience and public address system designs were submitted for acceptance and 50 per cent of the ticket-vending machines have been commissioned with new software.

At Limehouse station, the final commissioning works have been completed and the two new escalators entered service in December 2018.

We have started works on the London City Airport Visitor Centre and the structural designs have been submitted. We expect the works to be completed in late autumn 2018.

London Trams

As part of our commitment to make 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 now assessing options for track modifications, tunnel lighting and strengthening tram windows. The design of the iTram performance monitoring system is nearly complete, we are evaluating bids for tram emergency lighting and we have started the tender process for a system to physically prevent speeding.

The renewals programme consists of 17 projects across seven asset groups including fleet, power, and permanent way infrastructure.

We are progressing with overhauls of the vehicle hydraulic power units and brake callipers on the CR4000 fleet.

Replacement of the parafil support wires, which hold up the overhead power lines, started in September. We are currently procuring a supplier to help rebalance power within the tram depot to more evenly distribute the supply.

London Trams went 'cashless' in July. The existing ticket machines, which date to the

opening of the system, will be removed and the newly available space at our tram stops will provide additional platform capacity, seating and/or information boards, depending on location.

In conjunction with removal of the ticket machines, work is under way to improve the visibility and locations of card validators across the tram network to make it easier for customers to see and use them. Working in partnership with the tram operator, designs have been drawn up to provide additional validators and/or adjust the location of existing validators at a number of tram stops. These improvements will be phased, starting with East Croydon later this year.

Construction works have completed and regulatory approval has been gained for reinstating automated operations of the points at East Croydon tram stop. Following training of operational staff, 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 for completing the outstanding works at Wimbledon.

Detailed design for the replacement of two Victorian bridges at Blackhorse Lane has been completed by Morgan Sindall and is being reviewed. Most of the construction work is scheduled to take place in 2019, with the work forecast for completion in 2020.

Sponsored services

The Cycle hire renewals programme includes payment software, on-street equipment, bike replacement, docking station relocation and map updates.

A new payment solution support contract was introduced, which included the provision of new on-street keypads and payment software.

Santander Cycles achieved a third record year in a row for hires in 2018, with over 10.5 million journeys made.

Buses

Testing is under way on the potential components of the Bus Safety Standard, including emergency automatic braking and measures to make bus interiors more forgiving if passengers slip or fall. The outcome will be a safety specification that will be incorporated into contracts from January 2019 to ensure new buses entering the fleet are compliant. Initial road trials for autonomous emergency braking were held in March and we are engaging with external stakeholders on the development of the remaining safety measures. We are planning a peer review of the safety measures, with vehicle industry experts chosen from an international pool.

The six bus operators who were allocated funding from the TfL Operator Safety Innovation Fund have all begun working on their safety trials, with the results expected in the autumn. The trials include fatigue detection devices and new driver safety training.

We are working with operators to understand and address driver fatigue and are commissioning independent research into this issue.

Assurance

Project Assurance completed an integrated assurance review on the Public Transport programme submission to the Programmes and Investment Committee meeting on 11 December 2018. Seven recommendations were made and accepted, including two by the IIPAG. Good progress is being made to close the recommendations. Project Assurance tracks progress against the recommendations made, including by IIPAG, as part of its continuous assurance.



The Bus Safety Standard will help improve safety both for bus passengers and for other road users



Weekly capping for buses and trams was successfully launched on 17 December

Other

Technology and data

Forecast completion year

2019/20

Spend to date (£m)

44

Spend authority (£m)

168

EFC (£m)

151

EFC movement post plan (£m)

17

2018/19 budget milestone RAG



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

Payments

Weekly capping for buses and trams was successfully launched on 17 December. An agreement was reached with the train operating companies on 28 November, allowing us to proceed towards a launch of weekly capping on rail in spring 2019.

Evergreen programme

The procurement of 7,000 new thin client PCs is complete, with deployment scheduled from January to March 2019. We have deployed Microsoft Windows 10 and Office build to early adopters within Technology and data, with more planned for January 2019.

A total of 100 business and mission critical applications have now been migrated to Windows 10 (out of a total of 173), early adopters have been scheduled to start testing in January 2019.

Content and collaboration

The SharePoint Legacy Consolidation project is now in the implementation phase, with the migration of SharePoint 2007 sites the first target. So far, 143 sites have been migrated to SharePoint Online, with 33 remaining.

The Livelink Upgrade project has also started implementation, commencing with the design and build of the test environment.

EFC is for the financial years 2018/19 and 2019/20. EFC is net of the Data Centre Consolidation Fund Credit of £16.75m, which is included in the spend authority amount.

Operating and monitoring systems

We have installed all buses with new equipment under the Surface Radio Replacement project and have cut-over 90 per cent of the network to the new digital system. We are on target to complete the switchover and the core project on target within this financial year. Operational staff are already seeing the benefits of reduced call queuing times on the digital service.

The Future Bus Systems project has completed the discovery phase as part of the project to replace our obsolete bus scheduling tools: busnet, SSTT and Caesar.

The tender for the next phase of Surface Intelligent Transport System for a Common Operational View and Incident Management System has been released via the Solutions framework that, when delivered, will provide a common platform for all of Surface Transport's network management function, encompassing the functions currently in three areas of tunnels, bus and road management. The first phase is the real-time optimiser for traffic-light control project, which was let to Siemens, remains on target.

Surface Transport is re-procuring its outsourced taxi licensing business function and technology and data is working closely on the required systems provision and integration.

Hosting – data centre rationalisation and cloud migration

We are 90 per cent complete in reducing our hosting footprint in our primary data centre by two thirds, with dilapidation activities starting in mid-January 2019. This will reduce our overall hosting operating costs by around £4.6m per year.

We continue to develop a hybrid hosting operating model, in which we have extended our data centre core capabilities into the public cloud, AWS and Azure. We are expanding these capabilities to deliver stronger governance, operational controls and cost transparency to yield additional efficiencies.

Cyber security

As part of adopting the European Union directive on security of networks and information systems, known as the NIS Directive, into UK law, we have been identified as the Operator of Essential Services across a number of transport capabilities. The network and information systems underpinning these services need to be assessed as part of this legislation. We have worked with the Department for Transport and the National Cyber Security Centre to develop the cyber assessment framework, which will be used across the transport sector. The assessments of systems in-scope of NIS regulation are now under way, with the target completion and submission to the Department for Transport before the end of March 2019.

Data and analytics

We have developed a new in-house solution for hosting our customer database, which is helping save TfL thousands of pounds a year. This secure database was tens of millions of rows of contact and travel behaviour insight details. In the last month, this new customer database went live and has now been used as the source of customer data for many campaigns, including the weekend travel update, taxi and private hire, bus consultation, cycle hire monthly activity summary, London Overground night service and freight.

Our data is now easily accessible and up-to-date, ensuring we can contact the right customers at the right time with reduced setup time. The email customer information team can now run email campaigns themselves and create monitoring reports to see how well customers are engaging with our messages. This has saved £200k a year, with the opportunity for greater savings in the future.

We are continuing to provide analytic services that underpin London Underground's visualisation programme. We continue to work with the performance analysis and improvement programme and have created various reports and system changes in the past quarter.

Networks

Following the transition of our network services in August, Capita has completed the migration of network assets from the legacy toolset to the new tooling based in the Capita Network Operating Centre. This brings the network fully under Capita's control and completes the transition activities. The core network that will form the basis for the transformed access network and WAN service has been built, tested and delivered, and a number of pilot sites have been successfully migrated onto the new core network and are fully operational in the transformed state. Further pilot sites will be added in 2019.

Since the signature of the new connect contract with Thales, the delivery of the radio system upgrade has started, with completion of the necessary factory acceptance testing on the new radio system hardware and software. Following this testing, equipment has been put into production for delivery and installation at the core site in West Kensington (one of five) in January 2019. The other core sites are on schedule to deliver for the anticipated change over in summer 2020.

We continue to deliver infrastructure to support the Home Office's nationwide Emergency Service Network programme. Across our 422km of tunnels, we have installed 218km of fibre optic cable and placed 301km of leaky feeder in a temporary position, of which 60km has been fixed into its final position. Cabling

works at the first 25 stations is 90 per cent complete. We have agreed a further £10m of funding from the Home Office for works through to the end of the current financial year. Following a joint delivery options review with the Home Office, we are also now aligning the Emergency Services Network project with our telecoms commercialisation project with the aim of achieving delivery and cost synergies between Emergency Service Network works and the planned public cellular network services that we are looking to establish on the Underground.

Technical refresh and technical-service operation

We have published a contract notice to invite bidders to supply a service desk, desktside support and hardware repair and build services. These services are currently provided through multiple providers, and this procurement process will bring these services under a single contract and supplier. The new contract is expected to be awarded in Quarter 2 2019.

Our mission critical systems have been identified, prioritised for restoration and assessed in terms of resiliency. An options paper is now being written to address any required improvements in resiliency across these systems.

An analysis of IT service management tools in the marketplace has been conducted and BMC Remedy has been chosen as our next toolset. A project to deliver this new and improved toolset is now in the delivery phase.

We have completed a scoping and planning exercise to transition some third party managed services to our technology and data teams. The execution of the associated transition activities started in December 2018 and is due to complete in July 2019, resulting in approximately £1.2m reduction in annual operating costs.

Contact centre operation

As part of work to prepare for the predicted increase in items being found on the TfL network, an alternative site has been identified for the Lost Property Office. A decision on the long-term future of the premises at Baker Street will be made in due course.

The concessions contract was awarded to Charles Novacroft at the end 2017, with transition taking place since then. Service commencement for the new contract is 1 January 2019.

Assurance

Project Assurance completed an integrated assurance review on the Technology and Data programme submission to the Programmes and Investment Committee meeting in February 2018. A quarterly update was provided to the Committee on 11 December 2018 on the 11 recommendations that were made and accepted, including seven by the IIPAG. Eight recommendations are closed and good progress is being made to close the remaining three. Project Assurance tracks progress against the recommendations made, including by IIPAG, as part of its continuous assurance



We are inviting bidders to supply service desk, deskside support, hardware repair and build services under a new single contract

The Growth Fund

Forecast completion year

2024/25

Spend to date (£m)

0.4

Spend authority (£m)

144

EFC (£m)

144

EFC movement post plan (£m)

0

2018/19 budget milestone RAG 

The 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.

Programme authority of £200m was approved by the Programmes and Investment Committee on 28 June in Quarter 1 2018/19. There has been £400k spent on Walthamstow Central.

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 and Castle.

Significant progress has been made in upgrading and developing stations such as Woolwich (Elizabeth line), Tottenham Hale, White Hart Lane and West Ham, which all 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 Tram extension

A detailed option selection process is under way and we have identified a shortlist of potential options. We will assess these in detail ahead of a public consultation planned to start in the autumn, which will inform a preferred option. Subject to confirming a full funding package, we plan to submit a Transport and Works Act Order application by early 2020.

Shortlisted schemes

We made recommendations to the Programme and Investment Committee in December to make a contribution to support three 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 Colindale 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

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

Assurance

Project Assurance completed an integrated assurance review on the Growth Fund submission to the Programmes and Investment Committee meeting in July 2018. A quarterly update was provided to the Committee on 11 December 2018 on the 11 recommendations that were made and accepted, including four by the IIPAG. Two recommendations are closed and progress is being made to close the remaining nine. Project Assurance tracks progress against the recommendations made, including by IIPAG, as part of its continuous assurance.

Elizabeth line



On-network stations improvement programme

Forecast completion year

2019

Spend to date (£m)

61*

Spend authority (£m)

94

EFC (£m)

94

EFC movement post plan (£m)

0

2018/19 budget 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.

On the Great Eastern lift schemes at Maryland, Manor Park and Seven Kings, the final inspections for handover are due to be completed by 13 February 2019. This will enable all new infrastructure relating to the step-free works (bridges and lifts) to be brought into public use. Ahead of this, a section of the new footbridge at Manor Park was opened on 19 December 2018 which permitted, during the Christmas closure, the removal of the temporary footbridge that had been serving the station.

On the Great Western section lift schemes at Hanwell, Iver, Langley and Taplow, construction is progressing well with piling completed at most sites and foundation and lift pit construction under way. Steelwork installation planned for Christmas was postponed until mid-February following a review

of the programme. Completion is still scheduled for December 2019.

MTR Crossrail is continuing its station refurbishment programme. Work started in January 2019 on platform refurbishment activities, such as painting and decorating, at Brentwood, Harold Wood, Gidea Park and Romford. The installation of new shelters at Goodmayes and Ilford started in January 2019 and was completed at Chadwell Heath in December 2018.

Refurbishment of the western surface stations not being rebuilt by Crossrail have also progressed with schemes for West Drayton and Hanwell out to tender and the application for listed building consent submitted for Hanwell. Work will start on both these stations in early 2019.



Work continues on the Elizabeth line, including ensuring step-free access is provided at stations

Rolling stock

Forecast completion year	Spend to date (£m)	Spend authority (£m)	EFC (£m)	EFC movement post plan (£m)
2019	939	1,149	1,035	0

2018/19 budget milestone RAG



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

Class 345 seven-car trains are operating on the TfL Rail service between Liverpool Street and Shenfield, and between Paddington and Hayes & Harlington.

Testing of the Class 345 units fitted with the European Train Control System, needed for operation to Heathrow Airport, has continued. Class 345 trains are also being used for dynamic testing of the central tunnel section of the Elizabeth line, the intensity of this testing will increase, with more trains being used.

Signalling and train software is being updated progressively to improve reliability ready for the Elizabeth line entering trial operations and passenger service in the central sections next year.

The new depot at Old Oak Common is fully operational and is being used for driver training and as the base for Class 345 fleet.

Crossrail

Crossrail

Forecast completion year

2019

Spend to date (£m)

*

Spend authority (£bn)

15

EFC (£m)

*

EFC movement post plan (£m)

*

2018/19 budget milestone RAG



The Crossrail project will create a new railway from Reading and Heathrow in the west to Shenfield and Abbey Wood in the east. Crossrail Limited is managing construction, and when our services open through central London, it will be known as the Elizabeth line.

In August 2018, Crossrail Limited announced that the opening of the central section between Paddington and Abbey Wood, which was due to open in December 2018, would be delayed. The new Chief Executive of Crossrail, Mark Wild, and his team are working on a robust and deliverable schedule to complete the final infrastructure and extensive testing required. The delayed opening is disappointing but ensuring the Elizabeth line is safe and reliable for our customers from day one is of paramount importance.

Core elements of the infrastructure being delivered by Crossrail Limited, including the stations and the fit out of the tunnels, are at varying stages of completion and more funding is therefore required to complete it, as well as the extensive safety and reliability testing needed for the new railway systems.

The Mayor and the Government have agreed a financial package to cover this. The GLA will borrow up to £1.3bn from the Department for Transport and repay this loan from the existing Business Rate Supplement and Mayoral Community Infrastructure Levy.

Because the final costs of the Crossrail project are yet to be confirmed, a contingency arrangement has also been agreed between us and the Government. This will be in the form of a loan facility from the Department for Transport of up to £750m.

The focus remains on finalising the remaining infrastructure and testing to get the Elizabeth line safely into passenger service at the earliest opportunity. The full opening of the railway, from Reading and Heathrow in the west to Shenfield and Abbey Wood in the east, will commence as soon as possible after the central tunnels open.

* This information is withheld for reasons of commercial sensitivity.

Appendix

2018/19 Budget 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 ■			
Train services on Hammersmith & City line use new signalling system between Hammersmith and Latimer Road	21-Oct-18	Spring 2019	■
Train services on Hammersmith & City line use new signalling system between Ladbroke Grove and Paddington	18-Nov-18	Summer 2019	■
Due to signalling software readiness issues, commissioning SMA0.5 (between Hammersmith and Latimer Road) was re-forecasted for spring 2019 and as a result, SMA 01 (between Ladbroke Grove and Paddington) has been delayed until summer 2019 and, through revenue gapping, the rest of the migration areas up to SMA 05 received new forecast dates. Discussions are taking place with Thales to find potential mitigation solutions to bring the commissioning dates forward			
Deep Tube Upgrade programme ■			
Preferred bidder for new Piccadilly line rolling stock contract determined	12-Jul-18	15-Jun-18	■
Tenders returned for signalling and train control contract	15-Mar-19	24-Jan-19	■
This milestone is subject to ongoing change control following significant changes resulting from the 2018 Business Plan. A further update will be provided in the next quarter.			
Network extensions			
Northern Line Extension ■			
Nine Elms station civil works complete	26-Sep-18	25-Sep-18	Complete

Milestone description	Plan date	Actual/ forecast date	Status
Kennington station cross passage civil works complete	17-Sep-18	16-Sep-18	Complete

Silvertown Tunnel ■

Preferred bidder selection dependent on national government support	28-Jan-19	22-May-19	■
---	-----------	-----------	---

Q1: 93 days late ■

Q2: 93 days late ■

The contract award has been delayed by five months until July 2019 as additional ground investigation surveys had to be completed. However, the remaining land surveys were delayed due to the DCO postponement affecting private land access which resulted in an increased time to complete arrangements. Surveys are now complete and will inform the bidders' final technical submission, which is expected at the end of January 2019. The first stage of technical submissions were delivered in July and we are evaluating them.

This delay will directly impact the selection of preferred bidder status, which moves the current forecast date from November 2018 to May 2019. The programme will be clarified once the bids are returned.

Barking Riverside Extension ■

Early works contract – completion of all early works	27-Jul-18	20-Jul-18	■
Main works contract – supplier evaluation and award recommendation complete	18-Jul-18	31-Jan-19	■

Q1: 197 days late ■

Q2: 197 days late ■

Tender returns for the Main Works Contract were received in July 2018, which were higher than the project authority. To achieve greater value a series of Value Engineering (VE) exercises were undertaken. The VE outputs were incorporated into a Best and Final Offer, which after further evaluation allowed the contract to be awarded in December 2018. We mitigated the contract award delay by procuring the critical overhead line electrification switch works as a separate package which were successfully completed during a Christmas possession.

Major stations ■

Bank station: preparatory power works complete to allow the start of tunnelling for new escalators	03-Oct-18	15-Aug-18	Complete
All Victoria station passenger facilities available for use	03-Dec-18	19-Oct-18	Complete
Bakerloo line link passage ready for Crossrail trial running	30-Nov-18	30-Nov-18	Complete

Milestone description	Plan date	Actual/ forecast date	Status
London Underground			
Stations renewals and enhancements ■			
Improvement works complete at London Underground stations that interface with the Elizabeth line	09-Dec-18	09-Dec-18	■
Completed post quarter end on 19 December 2018. Completion of the works at Paddington station was delayed as some of the works needed an additional coat of paint.			
Finsbury Park is a step-free station	20-Mar-19	30-Dec-18	■
Post quarter end, provision of step-free access was delayed due to technical issues that arose during commissioning of the lifts between Christmas and New Year. The station became step-free in January 2019.			
Accessibility ■			
Buckhurst Hill is a step-free station	09-May-18	04-May-18	Complete
Newbury Park is a step-free station	26-Oct-18	01-Nov-18	Complete
South Woodford is a step-free station	15-Mar-19	15-Mar-19	■
Track renewals ■			
Install 7.5km of new track across the Underground network	31-Mar-19	31-Mar-19	■
Rolling stock renewals ■			
75 per cent of Bakerloo line fleet refurbishment works complete	31-Dec-18	03-Oct-18	Complete
50 per cent of Jubilee line fleet mid-life refurbishment works complete	31-Dec-18	06-Oct-18	Complete
23 lift and escalator replacement and refurbishments complete	31-Mar-19	22-Dec-18	Complete
Surface			
Healthy Streets ■			
Highbury Corner gyratory – start construction	31-Aug-18	28-Jun-18	Complete
Highbury Corner bridge – construction complete	31-Aug-18	17-Jul-18	Complete
Cycle Superhighway North South – Phase 2 from Stonecutter Junction to Judd Street complete. This completes the CS6 route, running from Elephant and Castle to Judd Street	23-Dec-18	30-Oct-18	Complete

Milestone description	Plan date	Actual/ forecast date	Status
Old Street roundabout – start advance works on site	22-Feb-19	12-Nov-18	Complete
Mini-Hollands – 4.5km of segregated or semi-segregated cycle route across Kingston, Waltham Forest and Enfield complete	31-Mar-19	31-Mar-19	■
Cycle Quietways Borough - construction of 25km of the total 250km completed in 2018/19	31-Mar-19	31-Mar-19	■
Dial-a-ride fleet renewal – Delivery of first vehicle	31-Dec-18	01-Dec-18	■
Local schemes – 75% of agreed regional improvement schemes complete	13-Jun-18	03-Mar-19	■
Liveable Neighbourhoods - feasibility stage complete for three of the seven boroughs that received feasibility funding in 2017/18	31-Mar-19	31-Mar-19	■
Air quality environment ■			
Bus retrofit – Four Low Emission Bus Zone routes complete: • A2 Camberwell – New Cross • A3 Wandsworth – St John’s Hill • A5 Edgware Road • Edmonton – Seven Sisters	31-Mar-19	03-Mar-19	■
Growth fund ■			
Sutton Tram extension – consultation launch	30-Nov-18	30-Nov-18	■
Technology and data ■			
Heathrow extension – extension of Oyster and contactless acceptance to Heathrow	27-Jul-18	27-Jul-18	Complete
Future Ticketing Programme 4 – delivery of weekly capping for Oyster customers	21-Dec-18	21-Dec-18	■
Ticket vending machine – new ticket vending machines to support Elizabeth line central service installed and ready for operation	31-Dec-18	31-Dec-18	■
Commercial development ■			
Announce Elizabeth line partners	31-Oct-18	28-Sep-18	■
Deliver a signed contract for the commercialisation of the telecommunications assets, including the delivery of public cellular services on the Underground	14-Dec-18	15-Apr-18	■

Milestone description	Plan date	Actual/ forecast date	Status
Q1: 123 days late ■			
Q2: 123 days late ■			
<p>The Home Office (HO) has reviewed national Emergency Services Mobile Communications Programme (ESMCP), and announced a revised delivery approach for the programme. Following a joint review of delivery options between the Emergency Services Network and the Telecommunications Commercialisation Project, it has been agreed in principle with the Home Office to align the projects.</p> <p>This has the potential to deliver cost savings and delivery synergies, and we are aiming to release the ITT for the combined Emergency Services Network and Telecommunications Commercialisation Project scope in spring 19.</p>			
Submit planning application – Kidbrooke	04-Feb-19	27-Nov-18	■
Submit planning application – Blackhorse Road	29-Mar-19	17-Aug-18	■
Elizabeth line			
Rolling stock ■			
Elizabeth line passenger services start on central section between Paddington and Abbey Wood	Dec-18	TBC	■

© Transport for London
February 2019
tfl.gov.uk

PUB18_074

Date: 6 March 2019

Item: Independent Investment Programme Advisory Group
Quarterly Report

This paper will be considered in public

1 Summary

- 1.1 This paper presents the Independent Investment Programme Advisory Group (IIPAG) Quarterly Report for Quarter 3 2018/19 and the Management Response. It includes updates on the membership of IIPAG, the effectiveness of the first and second lines of Project Assurance and progress on the implementation of the recommendations from the 2017 IIPAG Review.

2 Recommendation

- 2.1 **The Committee is asked to note the Independent Investment Programme Advisory Group's Quarterly Report and the Management Response.**

3 Background

- 3.1 Under its Terms of Reference (2018), IIPAG is required to produce quarterly reports of its advice on strategic and systemic issues, logs of progress on actions and recommendations and the effectiveness of the first and second lines of project and programme assurance for the Programmes and Investment Committee.
- 3.2 The Quarter 3 IIPAG Report is the first full quarterly report following the change of IIPAG membership. It provides an update on IIPAG recruitment, IIPAG's future work plan and recommendations made in relation to strategic and systemic issues.
- 3.3 There are two recommendations in the IIPAG Quarterly Report.

4 Management Response

Recommendations made in the Quarter 3 IIPAG Report

- 4.1 IIPAG made two specific recommendations within its latest Quarterly Report. These recommendations are copied below, followed by TfL's management response.
- 4.2 "IIPAG recommends that those governing and assuring projects and sub-programmes should be provided with information which shows clearly how the EFC, spend vs budget, spend vs delivery, and expected completion dates have evolved over the life of the projects and sub-programmes. Project Assurance

/Programme Management Office (PMO) should advise on what information should be routinely provided.”

- 4.3 Agreed. TfL Project Assurance will work with the PMO and IIPAG to agree what core financial information should be made available through project and sub-programme assurance reviews.
- 4.4 “IIPAG recommends that, to the extent that work is not already underway, TfL should review its key areas of resource risk, and identify a plan to mitigate and manage these, starting with engineering resource.”

Agreed. The PMO will work with TfL’s Project Management teams to ensure resourcing challenges are fully understood and will develop an action plan to mitigate any resourcing risks that are identified.

5 IIPAG Members

- 5.1 The contracts with two IIPAG members ended on 31 January 2019. They both took part in Sub-programme reviews carried out for submission to the Programmes and Investment Committee on 6 March 2019. Since the meeting of the Committee in December 2018, a new member has been recruited and started on 20 February 2019. IIPAG expects to recruit one more member specialising in Information Technology.

6 Effectiveness of the First and Second Lines of Project Assurance Integrated Assurance Plans

- 6.1 Project Assurance continues to review and update the Integrated Assurance Plans with project teams and sponsors every quarter as part of its Continuous Assurance process.

IIPAG Recommendation Tracking

- 6.2 The Project Assurance team continue to track progress made against IIPAG’s recommendations as part of its Continuous Assurance. There are no new unagreed IIPAG recommendations this quarter.
- 6.3 Seventy-one IIPAG recommendations were closed in the last quarter. Overdue recommendations reduced from 21 to 19, however a number of these are delayed as a result of teams awaiting Business Planning outcomes. The Project Assurance Team will continue to focus efforts on closing overdue recommendations. Revised dates for closing each of the 19 overdue recommendations have been agreed with Project Assurance and none of those are overdue on the revised target dates. Project teams have also been advised to provide more realistic dates going forward.
- 6.4 The September 2018 IIPAG Quarterly Report highlighted eight recommendations that it considered to be not agreed. A detailed status report for the eight recommendations is included in Appendix and all are now closed to IIPAG’s satisfaction or have been superseded by subsequent reviews.

7 IIPAG Review Implementation Update

- 7.1 The Committee has previously received a separate update on the progress being made to implement the recommendations made by TC Chew in his 2017 review of IIPAG.
- 7.2 The outstanding actions against those recommendations include recruitment and establishing a TfL-IIPAG Memorandum of Understanding (MoU). The IIPAG Quarterly Report provides an update on recruitment, with five new members now appointed. TfL arranged for an introductory meeting of those new IIPAG members with the TfL Commissioner and Chairs and Deputy Chairs of the Programmes and Investment Committee and the Audit and Assurance Committee on 11 February 2019.
- 7.3 The MoU will continue to be developed with IIPAG in the coming months as the new model for IIPAG is established.

List of appendices to this report:

Appendix 1: Status of IIPAG Recommendations referred to in IIPAG's September 2018 Quarterly Report

Appendix 2: IIPAG Quarterly Report (March 2019)

List of Background Papers:

None

Contact Officer: Howard Carter, General Counsel
Number: 020 3054 7832
Email: HowardCarter@TfL.gov.uk

[page left intentionally blank]

Appendix 1 – Status of IIPAG Recommendations referred to in IIPAG’s September Quarterly Report

	Project Name	Recommendation	Management Response	IIPAG view (Q3 IIPAG report)	Status (18 February 2019)
1	Major Stations Sub-Programme	No further Supplemental Agreements or CAP arrangements are put in place until a detailed review of them has been undertaken which identifies any benefits that may have accrued from them and sets out their risks and disadvantages.	CAP is embedded in TfL standard forms of NEC3 contract. Any future Supplemental Agreements in this programme will consider the benefits that will materialise before seeking approval. This approach has been reviewed by IIPAG.	Information provided by project team for sub-programme review. Three of four claims now settled and the last one is going through adjudication process, No further information required.	Recommendation Closed
2	Major Stations Sub-Programme	The mechanism for escalating risks associated with claims is clarified and communicated to ensure that it provides appropriate information at all levels in TfL.	A general TfL Dispute Management process is available on the Commercial Toolkit. However a specific strategy for each program will be developed as disputes arise. This may need to remain confidential and have restricted circulation to avoid prejudice.	Information provided by project team for sub-programme review. Three of four claims now settled and the last one is going through adjudication process, No further information required.	Recommendation Closed

	Project Name	Recommendation	Management Response	IIPAG view (Q3 IIPAG report)	Status (18 February 2019)
3	Major Stations Sub-Programme	No further Supplemental Agreements or CAP arrangements are put in place until a detailed review of them has been undertaken which identifies any benefits that may have accrued from them and sets out their risks and disadvantages	<p>The benefits of the Supplementary Agreements are summarised below:</p> <ol style="list-style-type: none"> 1. compensations events to date are agreed; 2. specific contentious issues are identified and plan of action agreed; and 3. contractors are incentivised using KPIs to deliver to set milestones beneficial to passengers. <p>Any Supplemental Agreement would have the advantages and disadvantages set out, including the risk opportunities and threats.</p>	Agreed with IIPAG members this is duplicate of recommendation 1 above.	Recommendation Closed
4	Fiveways Junction A23/A232	That the Project Team provides the evidence to support its view that the current scheme is the appropriate option to select.	The Project Team feels that sufficient evidence has been provided as part of the IAR that supports the view that the current scheme is the appropriate option to select.	Information provided by project team for December update agreed as sufficient with IIPAG members	Recommendation Closed

	Project Name	Recommendation	Management Response	IIPAG view (Q3 IIPAG report)	Status (18 February 2019)
5	Access Network and WAN Services	There should be an independent review of the capex costs included in this contract. TfL's costs to manage this contract effectively should be estimated and also be subject to independent review.	TfL have no issue with sharing the Financial Model that underpins the preferred bidder's tender and capex cost broken down, the purpose of such a review is unclear.	The contract has been awarded so points no longer relevant.	Recommendation Closed
6	Cycle Superhighway 10	HSPB should consider the wider options for access to the rest of the Cycle Superhighway network from the West of London, for example considering whether routes might need to be linked such that there are fewer routes in more central areas.	Alignment of CS10 runs along 2 strategic cycling corridors identified in the Strategic Cycling Analysis (June 2017). Opportunity for further routes in future to link other key destinations. Future Cycle Routes programme submitted to Healthy Streets Portfolio Board 5 Oct 2017.	Information provided by project team for December update agreed as sufficient with Chair of IIPAG	Recommendation Closed

	Project Name	Recommendation	Management Response	IIPAG view (Q3 IIPAG report)	Status (18 February 2019)
7	Rotherhithe Canary Wharf Crossing	IIPAG recommends that the option selection is deferred until greater certainty can be provided of the likely cost and programme of the navigable bridge and a comparison can be made on a more informed basis of the business case underlying both options	Substantial work has gone in to the options analysis work based on benchmarking data to determine the preferred option. However, a reference design is required to establish a preferred bridge design and to narrow the cost range of the scheme. This will be subject to consideration by IIPAG and by the Healthy Streets Portfolio Board.	Superseded by last Integrated Assurance Review (September 2018) and more recent recommendations made by IIPAG.	Recommendation Closed
8	Rail and Underground Step Free Access	Any works not directly necessary for the SFA scheme be funded and managed outside of the SFA Programme.	Funding: Not agreed. We have committed to fund the wider Accessibility Works as part of the Whole Journey approach to accessibility.	IIPAG agrees with TfL's response.	Recommendation Closed.

Independent Investment Programme Advisory Group – Quarterly Report (March 2019)

This paper will be considered in public

1 Summary

- 1.1 This is the first full quarterly report following the change of IIPAG membership. It provides an update on establishing the new IIPAG and our future work plan, and our recommendations on strategic and systemic issues based on the work we have undertaken to date. At this early stage of our work, we also identify some systemic issues which are not the subject of current recommendations, but which we will keep under review.
- 1.2 This report also covers management progress in closing actions on IIPAG recommendations.

2 Recommendations

- 2.1 IIPAG recommends that those governing and assuring projects and sub-programmes should be provided with information which shows clearly how the EFC, spend vs budget, spend vs delivery, and expected completion dates have evolved over the life of the projects and sub-programmes. Project Assurance /Programme Management Office should advise on what information should be routinely provided.
- 2.2 IIPAG recommends that, to the extent that work is not already underway, TfL should review its key areas of resource risk, and identify a plan to mitigate and manage these, starting with engineering resource.

3 Progress with IIPAG

- 3.1 Further to the update in the last IIPAG Quarterly Report, a further IIPAG member, who is a qualified civil engineer, has been recruited to IIPAG. There are now 5 IIPAG members: Alison Munro (Chair), Jonathan Simcock, Kenny Laird, Joanne White and Simon Collins. We expect to recruit one further member, probably specialising in information technology.
- 3.2 A workshop involving IIPAG and key members of the TfL Board was held in February to ensure an understanding of the Board's requirements and expectations from IIPAG, and to discuss areas of focus for IIPAG. This will help shape IIPAG's work programme for 2019/20 and ensure that IIPAG is adding as much value as possible.

4 IIPAG work since last Quarterly Report

- 4.1 The new IIPAG team has been familiarising itself with TfL's business, and members have undertaken a number of sub programme reviews and Project Assurance Reviews (PARs) as detailed below. IIPAG has been impressed by the quality of people and professionalism in TfL, and the generally high quality of project management. Whilst it is early days for coming to a comprehensive view on strategic and systemic issues, there have been a number of recurring themes from the reviews to date.
- 4.2 Coming fresh to the sub-programmes and projects, IIPAG has frequently found it difficult to get a clear view of the history of a programme's or project's EFC, why it has changed, how the EFC compares with relevant budgets, and especially in the case of sub-programmes, how expenditure is tracking against delivery. This information is important for understanding whether there are any significant trends, how well the programme or project is being managed to budget, and whether there are issues in the past that may have current relevance. It is information that should be available to decision makers as well as for assurance reviews. IIPAG recognises that the method for reporting this information is unlikely to be exactly the same for sub-programmes and projects. IIPAG therefore recommends that Project Assurance/ Programme Management Office should consider and define what information should be provided to decision makers and assurers for sub-programmes and projects.
- 4.3 A recurring theme in nearly all reviews has been resourcing. The single biggest issue that has been raised with us is engineering resource, with concerns expressed that shortages will threaten future project and programme delivery, especially teams' ability to take on new work. In some cases we observed a disconnect between the project team's view of requirements for engineering resource and the view of the central resource owners. There were issues about the overall quantum of engineering resource, the need for some very specific specialisms, and the allocation process. Other areas of shortage that have been highlighted are transport modellers, planners, and document controllers. In addition some projects appear to face a high degree of churn, with potential loss of corporate memory and established stakeholder relationships. IIPAG recognises the constraints imposed by TfL's overall financial position, and that the organisation is still in a state of transition with the Transformation Programme, so the allocation process is still bedding in. Nevertheless IIPAG recommends that, to the extent that work is not already underway, TfL should review its key areas of resource risk, and identify a plan to mitigate and manage these, starting with engineering resource.
- 4.4 A number of other systemic issues have been noted by IIPAG, and while there are no immediate recommendations in these areas, we will continue to keep them under review:
- How to ensure that value for money considerations are consistently and continuously addressed in project development and delivery, and in the

specification of technical standards

- The reporting of delivery confidence, and how to ensure robust assessments of schedule.
- The management of political and strategic considerations alongside more quantifiable value for money.
- The scope for engaging the supply chain to a greater extent in identifying innovative and vfm solutions
- Ensuring over-arching long term strategies are comprehensively in place to guide current decisions
- In respect of sub-programmes, clarity about the expectations and requirements for programme management vs portfolio management
- How to ensure that the assurance process is proportionate and prioritised on high risk areas.

5 Work plan for 2019/20

5.1 IIPAG's budget for 2019/20 is the same as in 2018/19, at £395,000. IIPAG's work in 2019/20 will be to provide third line assurance and strategic advice in the following areas:

- Sub-programme reviews for 22 sub-programmes
- PARs for individual projects over £50m, either at key gate stages or as an annual check
- On-going scrutiny of the most significant major projects such as 4LM
- One-off reviews of strategic and systemic issues, including benchmarking.

5.2 IIPAG is considering further how a more risk based approach can be applied to third line assurance in respect of projects and sub-programmes, and also how IIPAG's work is integrated with and complements other assurance activities. Further details will be provided in due course. IIPAG will prepare quarterly reports and attend PIC and AAC, and will attend most Executive governance meetings – Investment Committee, and the London Underground and Surface Transport Investment Boards.

6 Reviews and Actions

6.1 IIPAG has been involved in a total of seven sub-programme reviews and nine Project Assurance Reviews since its last report (11 December 2018). These are listed in Table 1 below:

Sub-Programme Reviews	Project Assurance Reviews
Surface Technology	Power SCADA
LU R&E Fleet	Track Delivery Partner Contract Award
LU R&E Signalling & Control	Bakerloo Line Extension
Tech & Data	CS10
Air Quality Management	CS9
DLR Rolling Stock Replacement	Cycle Future Routes 2&5
Major Station (refresh from October)	Liveable Neighbourhoods programme
	ULEZ Extension
	CrossRail 2

Table 1: IIPAG Involvement in Assurance Reviews

6.2 Figure 1, below, sets out the number of recommendations that are Closed, not yet due (or no date noted) or Overdue (from original baseline date) in the recommendations tracker maintained by Project Assurance.

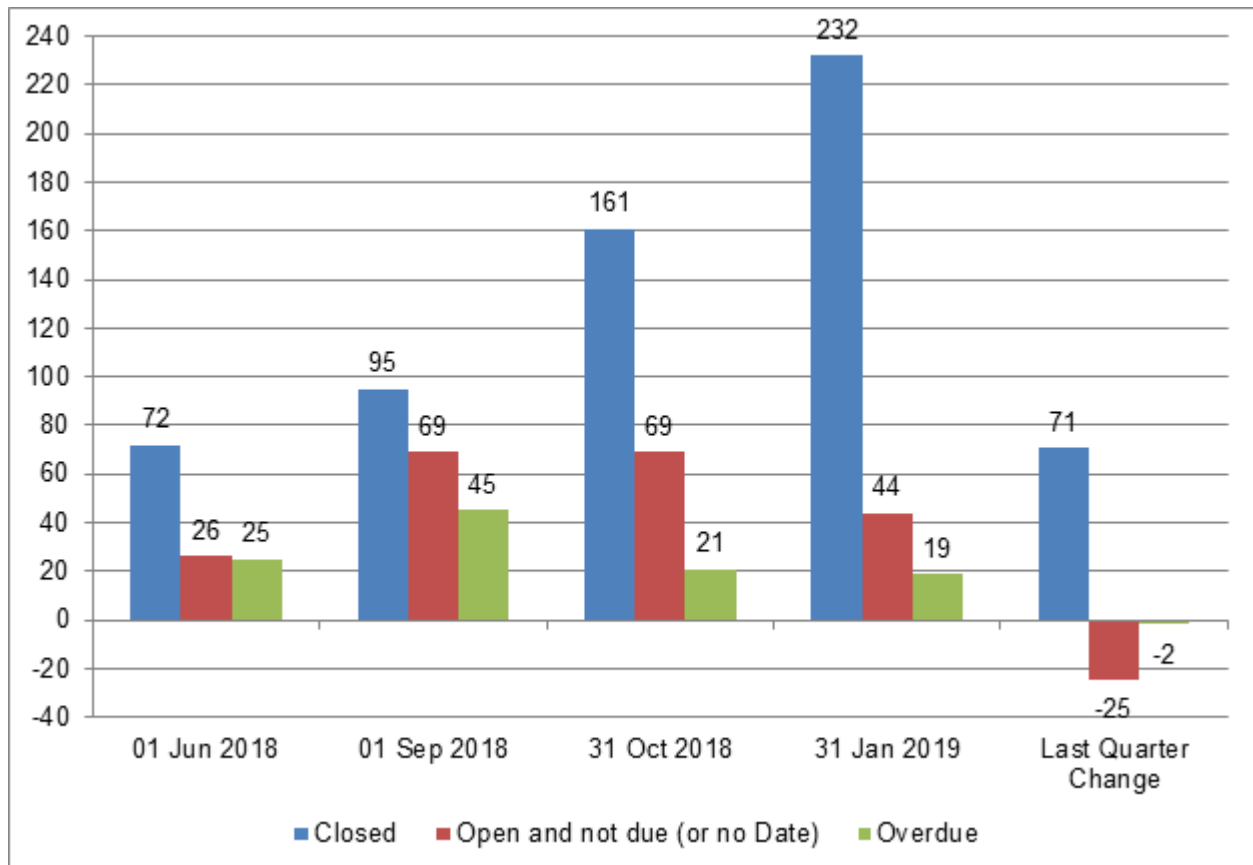


Figure 1: Status of IIPAG Recommendations

6.3 The total number of recommendations has increased from 251 to 295 between 1 November 2018 and 31 January 2019, with a total of 44 new recommendations made.

6.4 There has been a small decrease in the number of overdue recommendations from 21 to 19 in the last quarter. 71 IIPAG recommendations have been closed out in the quarter.

6.5 The previous IIPAG Quarterly Report from September 2018 highlighted 8 recommendations that we considered not to be agreed. Project Assurance has worked with the sponsor and delivery teams to provide an up to date commentary on each, which is included in the Management Response to this report. These have now all been closed out. There are no further unagreed IIPAG recommendations.

List of appendices to this report:

None

List of Background Papers:

None

Contact Officer: Alison Munro
AlisonMunro1@tfl.gov.uk

[page left intentionally blank]

Programmes and Investment Committee



Date: 6 March 2019

Item: Use of Delegated Authority

This paper will be considered in public.

1 Summary

- 1.1 To inform the Committee of the use of Chair's Action and of Programme and Project Authority and Procurement Authority (in respect of matters within the Committee's remit) granted by the Commissioner and the Chief Finance Officer in accordance with delegated authorities under TfL's Standing Orders since the last meeting of the Committee on 11 December 2018. A similar report will be submitted to the Finance Committee in respect of the use of Chair's Action and of Procurement Authority and Land Authority granted by the Commissioner and the Chief Finance Officer in respect of matters within the Finance Committee's remit.
- 1.2 Since the last meeting of the Committee, three matters were approved through Chair's Action and the Chief Finance Officer approved Procurement Authority in relation to four matters.

2 Recommendation

- 2.1 **The Committee is asked to note the paper.**

3 Background

- 3.1 Under Standing Order 114, in situations of urgency, the Board delegates to each of the Chair and the Chairs of any Committee or Panel the exercise of any functions of TfL on its behalf, including the appointment of Members to Committees and Panels. Any use of Chair's Action is reported to the next ordinary meeting.
- 3.2 The Commissioner (and in his absence, the Chief Finance Officer) has delegated authority to approve Programme and Project Authority on programmes and projects up to a value of £50m that contain less than £25m of unbudgeted expenditure.
- 3.3 The Chief Finance Officer has delegated authority to approve Programme and Project Authority for programmes and projects under £25m that contain less than £10m of unbudgeted expenditure. Approval of authority for projects of less than £5m that contain less than £2m of unbudgeted expenditure is delegated to Chief Officers and is not reported here.
- 3.4 The Commissioner (and in his absence, the Chief Finance Officer) has delegated authority to approve budgeted Procurement Authority up to a value of £100m.
- 3.5 The Chief Finance Officer has delegated authority to approve budgeted Procurement Authority up to a value of £25m.

4 Use of Chair's Action since 11 December 2018

- 4.1 Since the last meeting of the Committee, there have been three uses of Chair's Action.

Barking Riverside Extension

- 4.2 On 10 December 2018, the Chair of the Committee, following consultation with available members, approved an increase in Programme and Project Authority and Procurement Authority following a review of Main Works Contract (MWC) risk provision.
- 4.3 The use of Chair's Action was considered appropriate as the grant of Programme and Project Authority and Procurement Authority for the BRE was required to enable the award of the MWC as soon as possible to maintain delivery of the project.
- 4.4 Further information is provided in the paper sent to Committee members, attached as Appendix 1 to this paper. Further information was provided to the Committee, which was and remains exempt from publication to the public or press by virtue of paragraph 3 of Schedule 12A of the Local Government Act 1972 in that it contains information relating to the business affairs of TfL.

Contractual arrangements with Bombardier Transportation UK Limited (BTUK)

- 4.5 TfL has a number of different contractual arrangements with BTUK including in relation to providing new trains for Crossrail, LOTRAIN and London Underground. In 2018 it was proposed that a refinancing arrangement be agreed in respect of payments due under the Victoria Line Trains Contract and that a number of performance issues be addressed.
- 4.6 On 20 December 2018, the Chair of the Committee, following consultation with available members of the Committee and also the Finance Committee, approved revised Financial Authority and Procurement Authority and changes to the performance, delivery and financing of a number of different contractual arrangements with BTUK.
- 4.7 The use of Chair's action was considered appropriate as BTUK wished to secure TfL's agreement before the end of its financial year, 31 December 2018.
- 4.8 The paper sent to the Committee and the Finance Committee and additional information provided was and remains exempt from publication to the public or press by virtue of paragraph 3 of Schedule 12A of the Local Government Act 1972 in that it contains information relating to the business affairs of TfL.

Track Delivery Partner Contract

- 4.9 On 14 January 2019, the Chair of the Committee, following consultation with available members, approved TfL entering into a four year contract with Balfour Beatty for the delivery of all surface Track Renewals primarily for London Underground plain line track, points and crossings and trackside drainage and deep-tube points and crossings and related Procurement Authority.

- 4.10 On 11 December 2018, the Committee was updated on the process and timescales for the award of the contract and noted that approval to award would need to be by Chair's Action. The use of Chair's Action was considered appropriate as TfL had to award the contract at the earliest opportunity to enable delivery of track renewals to commence in April 2019, which was ahead of this meeting of the Committee.
- 4.11 Further information is provided in the paper sent to Committee members, attached as Appendix 2 to this paper. Further information was provided to the Committee, which was and remains exempt from publication to the public or press by virtue of paragraph 3 of Schedule 12A of the Local Government Act 1972 in that it contains information relating to the business affairs of TfL.

Further details on the contract is available in the related press release:

<https://tfl.gov.uk/info-for/media/press-releases/2019/february/tfl-agrees-new-deal-for-tube-track-renewals>

5 Programme & Project Authority Approvals since 11 December 2018

- 5.1 To enable an appropriate level of governance, processes are in place for the authorisation, control and reporting of projects.
- 5.2 Programme and Project Authority will normally be granted by the Committee for all programmes and projects as part of the defined Programmes within the overall Investment Programme. Where individual programmes or projects have a value in excess of £50m and have not already received full approval as part of a Programme, requests will be submitted to the Committee for consideration. Those programmes and projects with an estimated final cost of £50m or below, which have been approved by the Commissioner or the Chief Finance Officer, will be reported to subsequent meetings of the Committee. As the Committee receives and approves more Sub-Programmes, the number of individual approvals at project level will diminish.
- 5.3 Where the main contract has not yet been awarded, the Financial Authority and Estimated Final Cost may not be stated because they are commercially confidential.

Approvals by the Commissioner

- 5.4 Since the last meeting of the Committee, the Commissioner has not approved Programme and Project Authority for any projects.

Approvals by the Chief Finance Officer

- 5.5 Since the last meeting of the Committee, the Chief Finance Officer has not approved Programme and Project Authority for any projects.

6 Procurement Approvals

Approvals by the Commissioner

- 6.1 Since the last meeting of the Committee, the Commissioner has not approved any Procurement Authority in respect of matters within the Committee's remit.

Approvals by the Chief Finance Officer

- 6.2 Since the last meeting of the Committee, the Chief Finance Officer has approved four Procurement Authority requests in respect of matters within the Committee's remit.

List of appendices to this report:

Appendix 1: Public paper on Chair's Action: Barking Riverside Extension

Appendix 2: Public paper on Chair's Action: Track Delivery Partner Contract

Appendix 3: Summary of Procurement Authorities approved by the Chief Finance Officer.

List of Background Papers:

None

Contact Officer: Lorraine Humphrey, Head of Project Assurance

Number: 020 3054 6190

Email: Lorraine.Humphrey@tube.tfl.gov.uk

Date issued: 11 December 2018

**Item: Barking Riverside Extension Programme and Project
Authority and Procurement Authority**

This paper will be published once the decision has been made

1 Summary

- 1.1 The procurement exercise for the main works required for the delivery of the Barking Riverside Extension project (BRE) has concluded, a preferred bidder having been identified for the award the main works contract (MWC).
- 1.2 On 11 October 2018 the Committee delegated authority to Delegated Officers to approve an increase in Programme and Project Authority and Procurement Authority (up to the maximum total amounts set out in the paper on Part 2 of the agenda) to enable the award of the MWC and the BRE subject to Financial Authority being in place.
- 1.3 Financial Authority was granted by the Committee on 5 December 2018 by way of a Chair's Action.
- 1.4 However, since the Committee's delegation of authority to increase Programme and Project Authority and Procurement Authority, review of MWC risk provision indicates that the increase to Procurement Authority required to cover the full costs of the Main Works Contract (MWC) exceeds the total amount in respect of which authority was granted.
- 1.5 For the reasons set out in the paper on Part 2 of the agenda the use of Chair's Action is considered appropriate as the grant of Programme and Project Authority and Procurement Authority for the BRE is required to enable the award of the MWC as soon as possible to maintain delivery of the project.
- 1.6 The contents of this paper and the exercise of Chair's Action will be reported to the next meeting of the Committee / via Committee minutes.
- 1.7 There have been no further changes to the information set out in the papers submitted to the Committee on 11 October 2018 and Chair on 5 December 2018.

2 Recommendation

- 2.1 **The Chair of the Committee (in consultation with its members) is asked to grant:**
 - (a) **Programme and Project Authority of the sum set out in the paper on Part 2 of the agenda; and**

(b) Procurement Authority of the sum set out in the paper on Part 2 of the agenda.

3 Background

- 3.1 As reported to the Committee on 11 October 2018, an extended negotiation phase was conducted with bidders for the MWC, following higher than budgeted tender submissions.
- 3.2 On 11 October 2018 the Committee delegated authority to Delegated Officers to approve an increase in Programme and Project Authority and Procurement Authority (up to the maximum total amounts set out in the paper on Part 2 of the agenda) to enable the award of the MWC subject to Financial Authority being in place.
- 3.3 On 5 December 2018 the Committee (by way of a Chair's Action) granted unbudgeted Financial Authority (at P80 risk level allowance) of the sum set out in the paper on Part 2 of the agenda for the BRE (which included additional funding from the site developer, Barking Riverside Limited and/or the Greater London Authority (as a shareholder in the developer) increasing the total Financial Authority in place previously.
- 3.4 However, as noted at paragraph 1.4 above, review of MWC risk provision has identified the need to seek Procurement Authority exceeding the total amount in respect of which authority was delegated to Delegated Officers. An increase in Procurement Authority to the sum set out in the paper on Part 2 of the agenda is now sought.
- 3.5 Programme and Project Authority of the sum set out in the paper on Part 2 of the agenda (which remains within the delegated authority granted on 11 October 2018) is also requested through Chair's action at this time to consolidate the Authority requests.
- 3.6 The BRE project was asked to consider holding risk at a P80 risk level allowance. Authority at P50 risk allowance levels only is being requested at this time as the BRE project is not able to validate a need to operate at P80. However, the Financial Authority at a P80 risk level allowance is now budgeted (unbudgeted Financial Authority having been granted as per paragraph 3.3 above) and the BRE project will request an increase in Programme and Project Authority and Procurement Authority at this level at a later date if and when required.
- 3.7 Financial and commercial details concerning the Programme and Project Authority and Procurement Authority sought and information concerning the risks of delaying award of the MWC are set out in in the paper on Part 2 of the agenda.

List of Background Papers:

Barking Riverside Extension Paper – 11 October, PIC 2018

Barking Riverside Extension Authority Request – 7 November 2018, Surface Transport Investment Board

Barking Riverside Extension Financial Authority – 5 December 2018 Chair's Action

List of Appendices:

Appendix 1 - Record of Decision

Contact Officer: Alexandra Batey, Head of Public Transport, Technology and Environment Sponsorship

Number: 020 3054 8570

Email: AlexandraBatey@tfl.gov.uk

[page left intentionally blank]

Date: 10 January 2019

Item: Track Delivery Partner Contract

This paper will be published with the papers for the next meeting of the Committee

1 Summary

- 1.1 The purpose of this paper is to seek approval to enter into a contract for the delivery of all surface Track Renewals primarily for London Underground plain line track, points and crossings and trackside drainage and deep-tube points and crossings.
- 1.2 The duration of the contract will be an initial four year term with an option to extend for a further six years (10 years in total). The contract will be cost-reimbursable with incentivised Service Delivery Indicators (SDIs), creating focus on safe and reliable delivery, continuous improvement, cost control and innovation.
- 1.3 The use of Chair's Action is considered appropriate as TfL needs to award the contract at the earliest opportunity to enable delivery of track renewals to commence in April 2019. On 11 December 2018, the Committee were updated on the process and timescales for the award of the contract and noted that approval to award the award would need to be by Chair's Action ahead of the next meeting of the Committee on 6 March 2019.
- 1.4 Part 2 of this paper contains supplementary information that is exempt from publication by virtue of paragraphs 3 and 5 of Schedule 12A of the Local Government Act 1972 in that it contains information relating to the business affairs of TfL and in respect of which a claim to legal professional privilege could be made.
- 1.5 The contents of this paper and the exercise of the Chair's Action will be reported to the next meeting of the Committee.

2 Recommendations

- 2.1 **The Chair of the Committee, in consultation with available Committee members, is asked to:**
 - (a) **award the contract to the bidder set out in the Part 2 paper; and**
 - (b) **grant Procurement Authority for the sum set out in the Part 2 paper.**

3 Background

- 3.1 The current Track Partnership (TP) contract with Balfour Beatty (BB) expires on 15 February 2019.
- 3.2 On 14 June 2018 we commenced a competitive tender process for the delivery of all surface Track Renewals for London Underground plain line track, points and crossings and trackside drainage and deep-tube points and crossings. The procurement strategy is summarised as follows:
- (a) LU and Delivery Partner (DP) will form a co-located and integrated team and work together on all projects from TfL Pathway Stage 2 (Feasibility);
 - (b) the role of Client and Principal Designer will remain with LU;
 - (c) the role of Principal Contractor will be with the Delivery Partner;
 - (d) LU will hold Programme and Project Authority accountability throughout the project lifecycle; and
 - (e) the Delivery Partner will receive the project at TfL Pathway Stage 5 (Delivery) (having worked as part of the Integrated Team through Stages 2-4) and have single point responsibility for coordinating all activities of the LU / DP supply chain through the works.

4 Assurance

- 4.1 A TfL Project Assurance (PA) and Independent Investment Programme Advisory Group (IIPAG) Assurance Review of the Programme has been completed and confirmed that there are no critical issues. Two recommendations were made which are agreed and being progressed.

List of Appendices:

A Part 2 paper contains information that is exempt from publication.

Background papers:

IIPAG Report
Management response to IIPAG report

Contact Officer: David Wylie, Chief Procurement Officer
Number: 020 3054 7334
Email: DavidWylie@tfl.gov.uk

Appendix 3: Summary of Procurement Authority Approvals

Approval Date	Contract / Project Name	Type	Total Value (£k)	Approval
08/02/2019	DLR - Rolling Stock Replacement Programme: New electrical power supply to Beckton Depot	Single source	5,600	Chief Financial Officer
08/01/2019	Hydrogen refuelling station and fuel supply	Contract award	17,400	Chief Financial Officer
26/11/2018	Partial upgrade of Spider SCADA system and 10 years maintenance contract	Single source	19,785	Chief Financial Officer
08/02/2019	Lifts (Lot 1) for Accessibility	Contract award	7,858	Chief Financial Officer

[page left intentionally blank]

Programmes and Investment Committee

Date: 6 March 2019

**Item: Emergency Services Network and Telecommunications
Commercialisation Projects**

This paper will be considered in public

1 Summary

1.1 The purpose of this paper is to:

- (a) provide an update on the progress of the Home Office funded Emergency Service Network (ESN) project, the ESN project work we expect to undertake during 2019/20 and our plans to align the ESN project with TfL's Telecommunications Commercialisation Project (TCP);
- (b) provide an update on the TCP, which aims to establish a long-term concession to exploit our assets to develop new commercial telecommunications services including, but not limited to, 4G Public Cellular Network (PCN) services on the Underground;
- (c) set out our plans for a public pilot of PCN services and related enabling works to accelerate the subsequent delivery of PCN services by the TCP Concessionaire; and
- (d) request the necessary additional Financial Authorities and Project and Programme Authorities to deliver these works.

1.2 A paper is included on Part 2 of the agenda which contains exempt supplementary information. The information is exempt by virtue of paragraph 3 of Schedule 12A of the Local Government Act 1972 in that it contains information relating to the business affairs of TfL. Any discussion of that exempt information must take place after the press and public have been excluded from this meeting.

2 Recommendations

2.1 **The Committee is asked to note the paper and the supplemental information on Part 2 of the agenda and to:**

- (a) endorse exploring a change in Emergency Services Network (ESN) delivery approach to that approved by the Committee on 11 October 2018, to align the ESN project with the Telecommunications Commercialisation Project (subject to the Home Office formally agreeing to align delivery routes);**
- (b) approve Financial Authority and Programme and Project Authority, as set out in the paper on Part 2 of the agenda, for a further extension of the ESN Phase 1 infrastructure installation works (subject to full grant**

funding from the Home Office being agreed for that additional scope of £24.6m through to the end of 2019/20); and

- (c) approve Programme and Project Authority, as set out in the paper on Part 2 of the agenda, for a project to deliver; i) a public pilot of PCN services on a section of the Underground which will make 4G services available from multiple Mobile Network Operators, and ii) the enabling works of additional cabling infrastructure required for PCN services in order to reduce the time between award of the TCP concession and commencement of the first production PCN services.**

3 Background

Emergency Service Network

- 3.1 The Government created the national Emergency Services Mobile Communications Programme (ESMCP) to replace the Airwave service (used by the UK emergency services) with an alternative solution based on a commercial 4G network provided by EE. We have been working with the ESMCP since 2015 to extend the ESN service into the below ground areas of our estate.
- 3.2 The ESMCP had planned for London's ESN service transition (including on our estate) to start in January 2019 and to retire the Airwave service by the end of 2019. In order to meet this timescale we planned to deliver the ESN project in phases; the current Phase 1 cabling works for a limited scope of enabling works, a separate procurement of Phase 2 for the remaining solution delivery, and a Phase 3 to manage the on-going service.
- 3.3 While our Phase 2 ITT was ready for release on schedule, release was delayed at the request of the Home Office while it completed its review of the ESMCP last year. Following this review, the Home Office has revised its ESMCP delivery schedule and extended the Airwave service until the end of 2022.
- 3.4 At its meeting on 11 October 2018 the Committee was updated on the progress of the ESN project and approved an extension of the existing Phase 1 installation works subject to full grant funding from the Home Office being agreed for that scope of c£10m.

Telecommunications Commercialisation Project

- 3.5 In his Transport Strategy published in June 2017, the Mayor committed to improve London connectivity and customer service across the network by ensuring better access to public-sector property for digital infrastructure and by providing mobile phone access in the Underground. In support of this proposal, we plan to leverage our asset base to create new commercial telecoms services in London through the TCP. These include the delivery of PCN services on the Underground, which is a Mayoral commitment.
- 3.6 However, the delay to the ESMCP now means that the ESN Phase 2 procurement would clash with our TCP procurement if we continue to run ESN and TCP as separate projects. As both projects seek to install the same neutral host 4G infrastructure on the Underground, running parallel procurements could create market confusion and delivery risks for both projects.

- 3.7 In addition, in October 2018, the Home Office asked us to undertake a joint review of delivery options for ESN to see if we could identify further delivery efficiencies that would reduce the whole life project cost. As a result, we incorporated the issue of running parallel ESN and TCP procurements within this review.

4 ESN Activity since October 2018

- 4.1 Following the approval of the Committee on 11 October 2018, we agreed adjustments to the Grant Agreement with the Home Office for additional funding for the extension of the Phase 1 works.
- 4.2 As of January 2019, these extended Phase 1 works have installed 255km of fibre optic cable and placed 315km leaky feeder in a temporary position (of which 70km has been fixed into its final position) in the 421km of in-scope tunnels. Cabling works at the first 25 stations has been completed and work is on-going at the next 14 stations of the 127 stations in scope. We have also continued to trial our solution, as part of which a number of Emergency Services users have been able to make 4G calls on platforms and in trains on discrete sections of the Bakerloo, Northern and Jubilee lines.
- 4.3 In parallel to Phase 1 and at the request of the Home Office we have undertaken a joint delivery options review of the ESN project. This review considered the financial, delivery and user impact of four main options; 1) the current “separate projects” approach, 2) aligning the ESN and TCP projects, 3) reverting to the ‘single operator’ solution being pursued before 2017, and 4) maintaining the existing Airwave solution.
- 4.4 Joint analysis with the Home Office demonstrated that the option to align the ESN and TCP projects provides the best balance of benefits to TfL and the Home Office. For TfL, the key benefit is that we preserve our ability to realise our commercial telecoms ambitions on the current timelines we have set (and associated ability to deliver on the Mayoral commitment to PCN services), while at the same time maintaining an overall ESN delivery schedule that is consistent with the Home Office’s objective of retiring the Airwave service by the end of 2022.
- 4.5 We met with the ESMCP Senior Responsible Officer to discuss the outcome of this analysis in February and, subject to the views of the Committee, we will formalise this in a letter from the Commissioner to the Permanent Under-Secretary.

5 TCP Progress and Alignment with ESN Project

- 5.1 Following completion of the SSQ stage of the TCP procurement process, we have opened the procurement data room. We expect to release the Invitation to Participate in Dialogue (ITPD) in May 2019. We plan to engage with the bidders in early March and where possible share drafts of documentation prior to the issue of the ITPD.
- 5.2 The technology, infrastructure and services required to deliver and support ESN and PCN are largely the same, the key difference being the coverage requirements; ESN is required in all areas while PCN is only required to be available in the public areas of the Underground.

- 5.3 Key elements of existing ESN scope have been included as mandatory priced options in the TCP ITPD and will be evaluated as part of the overall procurement. We will de-scope the corresponding design and commissioning elements from the current ESN Phase 2 ITT, which will instead be focused on the installation of cabling and radio equipment in accordance with the Concessionaire's design which will ensure a level playing field. We will also cancel the planned ESN Phase 3 procurement as the Concessionaire will provide the required ongoing service management of ESN. We plan to delay the ESN Phase 2 procurement so that it runs behind the TCP procurement to ensure its scope remains consistent with the scope of a successful concession award.

6 Delivery in 2019/20

Emergency Service Network

- 6.1 We have agreed with the Home Office that a further increment of enabling installation work is required to be removed from Phase 2 and brought forward into the current ESN Phase 1 scope. This will deliver the entire remaining cabling infrastructure within our tunnels and complete a further 10% of the total stations cabling works (50% in total) required for ESN. The Home Office has agreed to this proposed scope and has committed funding in principle.
- 6.2 The award of a contract for ESN Phase 2 works remains dependent on a Home Office commitment to fund the remaining whole life project costs. Based on successful alignment with the TCP and our current planning assumptions, this formal commitment will be required from the Home Office by the end of 2019 when authorities for the TCP procurement are sought.

Telecommunications Commercialisation Project

- 6.3 Following the ITPD release in May 2019, initial bid submissions are expected in the summer after which we will enter into an extended dialogue process. We expect to be able to update the Committee on a preferred bidder by the end of 2019.

PCN Pilot and Enabling Works

- 6.4 In addition to the core TCP procurement we have also looked at ways of accelerating the delivery of PCN services and have focused on two opportunities:
- (a) an extended pilot of PCN services on a section of the Underground which will make 4G services from multiple Mobile Network Operators (MNOs) available to our customers before the end of the financial year 2019/20; and
 - (b) installation of additional cabling infrastructure required for PCN services in order to reduce the time between award of the TCP concession and commencement of the first production PCN services on the Underground.
- 6.5 Subject to the Committee's approval, and appropriate legal review, we plan to increase the scope of the PCN pilot by inviting all four MNOs to participate and substantially extend the number of tunnel sections covered by the pilot. We are currently developing a phased implementation approach which would aim to have

an operational pilot within the in-scope tunnels and platform areas by early 2020, subject to MNO interest.

- 6.6 In addition, subject to the Committee's approval, we plan to complete additional enabling cabling works in tunnels and stations during 2019/20. This work should reduce the period of time between appointment of the Concessionaire and the subsequent start of a production PCN service.

List of Appendices:

Exempt supplementary exempt information is included in a paper on Part 2 of the agenda.

List of Background Papers:

None

Contact Officer: Shashi Verma, Chief Technology Officer
Number: 020 3054 0709
Email: ShashiVerma@tfl.gov.uk

[page left intentionally blank]

Programmes and Investment Committee

Date: 6 March 2019

Item: Technology and Data Programme and Project Authority for Financial Years 2019/20 and 2020/21

This paper will be considered in public

1 Summary

Technology and Data (T&D) Investment Programme for FY19/20 and 20/21				
Existing Financial Authority for FY19/20 and 20/21	Estimated Final Cost for FY19/20 and 20/21	Existing Programme and Project Authority for FY19/20 and 20/21	Additional Authority Requested for FY19/20 and 20/21	Total Programme and Project Authority for FY19/20 and 20/21
£ 166.3m	£ 166.3m	£ 123.5m	£ 42.8m	£ 166.3m

- 1.1 This submission presents the strategic case for the overall Technology and Data (T&D) Investment Programme (the Programme). This authority covers financial years 2019/20 and 2020/21. The Programme will return annually to the Committee to renew and validate a rolling two-year approval. This ensures that approvals are aligned to financial years to complement the nature of this Programme.
- 1.2 This paper describes the project and programme investment delivered by TfL's T&D directorate. We therefore are only seeking authority for activities that are directly funded by T&D.
- 1.3 It is assumed that unused authority in Financial Year 18/19 will be carried forward into Financial Year 19/20.
- 1.4 We have excluded activities T&D is closely involved in delivering but for which authorities are secured separately by other TfL directorates (e.g. Surface Transport, London Underground). We have also excluded activities funded by third parties and which have been specifically authorised (such as the Home Office funded Emergency Services Network programme).

2 Recommendation

2.1 The Committee is asked to note the paper and:

- (a) approve a reduction in Programme and Project Authority of -£17.0m for Financial Year 2019/20 and additional £59.8m for Financial Year 2020/21, resulting in net Programme and Project Authority of £42.8m; and**
- (b) note that Procurement Authority for the various initiatives in the Technology and Data Investment Programme described in this paper will be sought at officer level in accordance with Standing Orders.**

3 Background

3.1 The Mayor's Transport Strategy (MTS) was published in March 2018. It sets out the Mayor's ambitions to improve transport in London over the next 25 years by delivering:

- (a) Healthy Streets and Healthy People;
- (b) a good public transport experience; and
- (c) new homes and jobs.

3.2 To ensure the successful delivery of the MTS outcomes, TfL has set six strategic priorities:

- (a) to put customers and users at the core of all our decision making;
- (b) to drive improvement in reliability and safety across our network;
- (c) to accelerate the growth and increase the capacity of our network;
- (d) to invest in our people and lead them to be the best they can be every day;
- (e) to cost less and to generate more income; and
- (f) to exploit technology to produce better and faster results.

3.3 T&D provides the core infrastructure, services and enabling technologies that allow TfL to deliver its six priorities. The Programme is cognisant of this and of TfL's duty to deliver the MTS outcomes.

3.4 The T&D directorate was formed in July 2017, bringing together teams from across TfL – including IM, Online, Customer Experience and the Technical Services Group – to form a new single function under the now Director of Strategy and Chief Technology Officer, Shashi Verma.

- 3.5 We have organised ourselves around 17 core portfolios¹ and product families and this is reflected in the Programme.
- 3.6 We have continued to develop our operating model to deliver a directorate with clear accountabilities and decision-making responsibilities. This is to ensure that our core portfolios and product families meet TfL's needs in the most efficient way and with the ambition of having complete transparency and clarity regarding where funding is going to be invested.
- 3.7 Technology and data underpins everything TfL does. We provide technical specialist skills, cyber security and data analysis, as required by the business. On a day-to-day basis, we support over 2,000 applications and systems, 30,000 active users (which includes third party contracted users) and 11,000 servers on our estate. We also collect and process vast amounts of data daily, including 12m journeys made using Oyster and contactless payment, 134,000,000 bus telemetry events and 500,000 rows of train diagnostic data on the Central line alone. Our contact centre supports the travelling public, taking 7,000 calls and responding to 1,840 customer emails every day.
- 3.8 In addition to T&D-funded initiatives, we support every other business area to deliver projects they fund that carry a technology or data component. For example, we are supporting London Underground (LU) to assess options and plan for the replacement or implementation of two safety-critical Underground communications networks, Connect and the Emergency Services Network (ESN). Other examples include work with Surface Transport on Cycle Hire and the Ultra Low Emission Zone.
- 3.9 Governance of LU and Surface technology investment below Committee level is handled at LU's Technology and Networks Client Board and Surface's Technology Pipeline Board. We set the strategy for technology investment in TfL and use these boards to ensure that the T&D Programme supports each respective business area.

4 Programme delivery progress in 2018/19

Progress on recommendations from the 2017 Independent Assurance Review

- 4.1 Ten actions were agreed last year within the T&D 2017/18 Programme and Project Authority approval and have all since been completed. Progress has been reported on a quarterly basis to the Committee and is summarised in the Technology & Data 2017 Independent Assurance Review.

Progress against 2017 Technology & Data Committee submission commitments

- 4.2 A detailed breakdown of what we have delivered in each portfolio in FY18/19 has been provided in Appendix 1.

¹ Some of T&D's portfolios do not contain any T&D-funded initiatives e.g. LU Transport Modelling, Digital Pay & ID, and are therefore not included in this submission.

- 4.3 In response to TfL's financial constraints, during the 2018 T&D Business Planning process we reduced our FY18/19-22/23 forecast project spend by £26.7m² through a stringent reprioritisation exercise. Each portfolio undertook a project-by-project review, identified opportunities to defer or de-scope investment and categorised each initiative as:
- (a) safety/regulatory;
 - (b) business criticality;
 - (c) spend to save;
 - (d) innovation or customer benefit; or
 - (e) other.
- 4.4 The T&D senior leadership team then made decisions on what activities to take out of our business plan based on risk appetite and sought further endorsement from other directorates when appropriate. As a result, we eliminated all spend classified as "Other", and most of the investment that remains in our Programme is on activities that are classified as Safety/Regulatory or Business Critical (over 80 per cent).
- 4.5 Following the approval of the TfL Business Plan in October 2018, the updated budget was signed off in February 2019. For T&D, the main outcome of the budgeting process was a reprofiling of £22.7m from FY18/19 into FY19/20. This movement has been factored into this T&D Programme and Project Authority request.
- 4.6 Following discussions on over-programming during the 2019 T&D Programme assurance review, the latest T&D budget includes a £14m deferral from Financial Year 19/20 into 20/21. It is labelled "Management adjustment" in Figure 2 below.
- 4.7 Changes have been made to the scope of T&D's investment plan as follows:
- (a) funding for the 3Hub portfolio (see Technology & Data Portfolios/Product Families) was transferred from the Professional Services directorate to T&D in Financial Year 18/19 and was therefore not included in T&D's 2017 Programme and Project Authority submission;
 - (b) following the formation of the Surface Technology Programme (STP), we have agreed that the authority for iBus 2 in the Surface T&D portfolio (see Technology & Data Portfolios/Product Families) will be transferred to STP, with effect from Financial Year 21/22 onwards. The Future Bus Systems 1 project (FBS1) authority will remain in T&D and FBS 2 and 3 authorities will transfer to STP.

² £36.7m cost savings identified minus £10m new cost pressures

5 Proposal: Programme delivery in 2019/20 and 2020/21

- 5.1 This section sets out the Programme and Project Authority sought for Financial Years 19/20 and 20/21 and what the investment in each portfolio will deliver.
- 5.2 Broadly speaking, the funding requested in this paper falls within two categories:

(a) **Renewal – the refresh of assets and infrastructure:**

The business driver is to replace a service (e.g. hardware or software) and/or keep it in support. While this often applies to end-of-life services, it also applies to services that are upgraded early for strategic reasons.

The service is replaced by either the same technology or a different technology which delivers the same capability, or the same plus enhancements/additional capabilities.

Refresh tends to refer to initiatives that “keep the lights on” by ensuring the longevity of our base infrastructure and its operational stability.

(b) **Enhancement – innovation and transformation:**

The business driver is the need for an entirely new capability or asset.

The driver may also be a requirement to be more efficient in how we use our assets, estate or people and/or to clean up previous decisions that have resulted in inefficient outcomes.

For example, if an initiative replaces an existing capability with technology that will significantly change the way the asset operates and performs, we will likely require significant people, business culture or process change to accommodate.

- 5.3 Approximately two-thirds of the T&D Programme is spent on renewals. The rest is spent on enhancements. Figure 1 below shows this broken down by portfolio.
- 5.4 Appended to this document is a summary of the portfolios which have T&D-funded investment, with an overview of what has been delivered so far this financial year and what we are committing to delivering in Financial Years 19/20 and 20/21 – see Appendix 1.
- 5.5 Owing to the speed of technology advancement and subsequent rate of technological redundancy, T&D may be required to make additional investments to meet the changing needs of our business.

A: Renewal - 62%

B: Enhancement - 38%

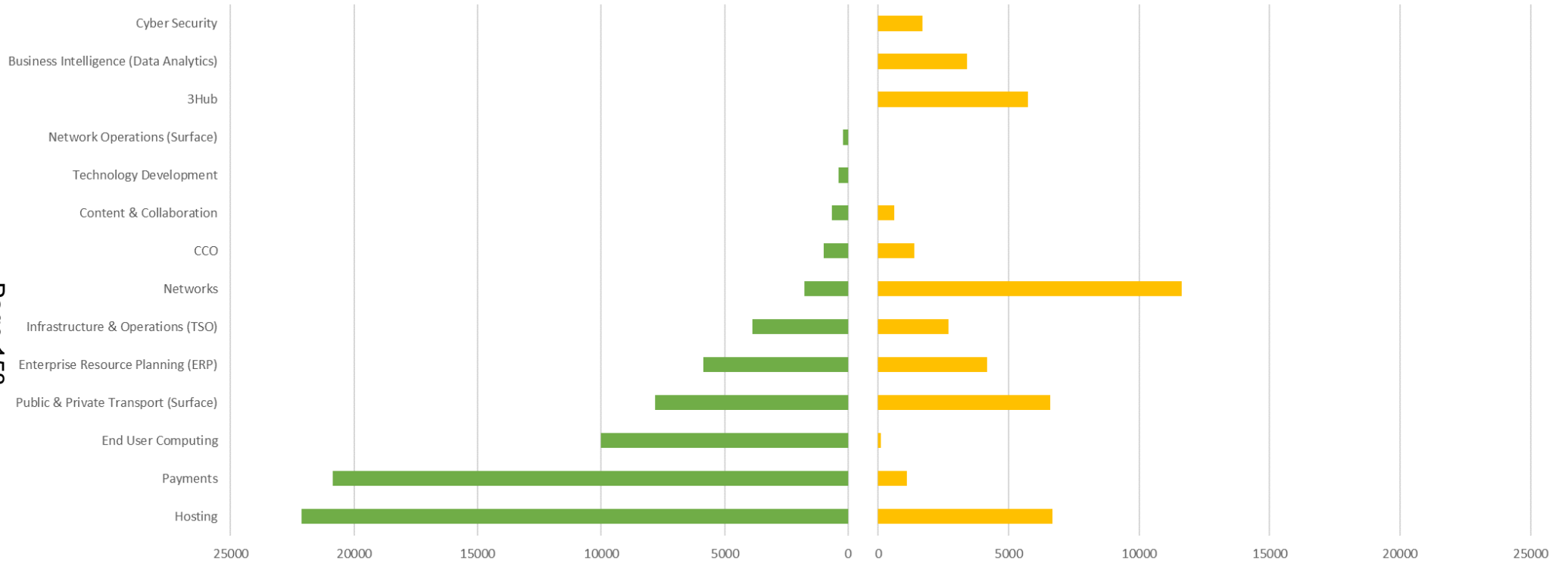


Figure 1: the Technology & Data portfolios' total investment over FY19/20-20/21 (based on the Oct 2018 Business Plan)

Figure 2. Summary of Programme Authority by Portfolio.

Portfolio / Product Family	Estimated Final Cost (£k)		Valid Existing Authority (£k)		Additional Proposed Authority (£k)	
	2019/20	2020/21	2019/20 (incl 18/19 carryover)	2020/21	2019/20	2020/21
	Note 1		Note 2		Note 3	
Payments - CUBIC Service Delivery Assurance	11,018	7,484	12,251	11,762	-	1,234 - 4,278
Payments	13,538	10,350	11,527	-	2,010	10,350
Enterprise Resource Programme (ERP)	7,729	4,341	7,559	-	171	4,341
T&D Surface	9,301	8,049	11,591	444	-	2,290 7,605
Networks	16,198	4,718	9,662	-	6,536	4,718
Hosting	4,440	434	5,065	-	-	624 434
Hosting (formerly Tech Refresh)	9,165	16,080	3,692	-	5,473	16,080
End User Computing (EUC)	9,259	2,495	3,976	-	5,283	2,495
Contact Centre Operations (CCO)	2,536	861	1,759	-	778	861
Cyber Security (CSIRT)	2,674	150	3,335	-	-	661 150
Infrastructure & Operations - Technical Service Operation (TSO)	7,532	1,589	14,541	-	-	7,009 1,589
Business Intelligence (Data & Analytics)	4,161	267	4,989	-	-	829 267
Content & Collaboration	2,095	425	1,820	-	275	425
3 Hub	6,172	520	3,590	400	2,583	120
Tech Dev	1,839	-	553	-	2,391	-
Other Projects (incl Asset Mngmt, Access Networks, Digital, Small Works Management adjustment)	227	683	779	-	-	552 683
Unallocated	-	14,000	-	-	-	14,000 14,000
	-	-	15,378	-	-	15,378 -
Total Authority Required (Note 4)	93,883	72,447	110,961	12,606	-	17,077 59,841
Payments - Credit returned to TfL	-	12,750 - 4,940	-	12,750 - 4,940	-	- -
Total Capital Programme	81,133	67,507	98,211	7,666	-	17,077 59,841

Note 1 - Estimated Final Cost for FY19/20 & FY20/21 based on Period 12 Financial results.

Note 2 - Includes

- £53.9m authority for FY19/20 approved at Programmes & Investment Committee in February 2018
- £29.0m existing authority (£16.4m for FY19/20 & £12.6m for FY20/21).
- £38.3m of unused Authority from FY18/19 carried over into FY19/20
- 3Hub authority which was transferred to T&D in FY18/19

Note 3 - Additional Proposed Authority requested for FY19/20 & 20/21

Note 4 - Total Authority requirements exclude the credit returned to TfL from Cubic

6 Authorities sought

6.1 A summary of the T&D Business Plan and Investment Programme from FY19/20 to FY23/24 is shown in Figure 3.

Figure 3. Summary of the T&D Investment Programme Costs and Funding

		Portfolio	Business Plan Year					Total
		Rounded to £m	19/20	20/21	21/22	22/23	23/24	
Cost	Base Gross Draft Budget values		107.9	58.4	56.5	63.2	70.6	356.6
	Management adjustment to account for schedule optimism		- 14.0	14.0	-	-	-	-
	Investment Programme Total	(A)	93.9	72.4	56.5	63.2	70.6	356.6
Funding	Financial Authority from Draft Budget values	(B)	81.1	67.5	52.0	58.7	66.1	325.4
	Other funding - Credit from Cubic	(C)	12.8	4.9	4.5	4.5	4.5	31.1
Authority	Existing Project Authority	(E)	111.0	12.6	7.6	7.9	-	139.1
	This Project Authority request	= B + C - E	- 17.08	59.84				42.76
	Future Project Authority request	= B + C - E			48.86	55.29	70.58	174.74

(A) is net of the Data Centre Consolidation credit from Cubic

(B) is based on the latest draft Budget, sign off due in late March 2019

- 6.2 This submission seeks Programme and Project Authority for a total of £42.8m for delivery of the T&D funded Programme.
- 6.3 The Procurement Authority for the various initiatives in the Programme will be sought at officer level and in accordance with Standing Orders.

7 Assurance

- 7.1 TfL Project Assurance conducted an Integrated Assurance Review (IAR) on the T&D Programme in January 2019.
- 7.2 The objective of the IAR was to assess the Programme's readiness to deliver its outcomes. The IAR followed nine lines of inquiry to answer the challenge of "Is the Programme sufficiently well managed for the Programme and Investment Committee to award authority?"
- 7.3 Full and open discussions were held throughout the Review, both within the panel itself and with members of the programme team.
- 7.4 IIPAG agreed that the review was carried out in a professional, thorough and competent manner.
- 7.5 No critical issues were identified through the Independent Assurance Review. All recommendations have been accepted.

List of appendices to this paper:

Appendix 1: 2018 Technology and Data Investment Portfolio summaries

List of background papers:

Technology & Data Portfolios/Product Families

Technology & Data 2017 Independent Assurance Review: recommendations and actions

Technology & Data Business Plan 2018

Contact Officer: Shashi Verma, Director of Strategy and Chief Technology Officer
Number: 020 3054 4001
Email: shashiverma@tfl.gov.uk

[page left intentionally blank]

PAYMENTS

Total authority (existing + requested) FY19/20: £24.6m FY20/21: £17.8m

Vision: To improve the efficiency of our payment systems whilst maintaining customer satisfaction.

Objectives: To reliably collect revenue every day; allocate revenue correctly every day; maximise our revenue collection; maximise the efficiency of our revenue collection system; and increase our revenue.

Last year's submission: activities and main deliverables in 2018/19 and 2019/20

Complete the delivery of the Mayoral commitments on Oyster capping and Bus Hopper, enhancements to deliver previously committed savings and provide fare collection solutions for the Crossrail extension to Reading.

More specifically:

- Complete the Future Ticketing Programme Phase 4 (FTP4) – enhancement to Oyster ticketing and Ticketing App
- Complete the development of a New Reader (The Hermes Reader) for operational use
- Implementation of new Fares Model for the Elizabeth Line
- Automation of Oyster route charges to generate fares for Crossrail
- Initiate 1G (“First Generation”) Oyster Migration by introducing on-system changes to remove 1st generation cards from circulation
- Start designing the new Revenue Inspection Device (RID)

Outcomes so far in FY18/19

- Future Ticketing Programme Phase 4 - following the TfL Oyster app’s success in reaching number one in the UK Apple Store in November 2017, we successfully launched contactless payment card acceptance on the app on 15 June 2018. To date we have seen 1.13m downloads, which has succeeded in driving up registration for contactless customers by approximately 50% and has improved transparency of our fares and pricing for contactless.
- Ticketing infrastructure for the Elizabeth Line - 34 new design ticket gates and 29 new ticket machines have been installed to enable Pay As You Go on Oyster and contactless acceptance at the start of TfL Rail services to Heathrow. The success of this relied on an agreement with Heathrow Express on how revenue will be allocated between their services and ours.
- Fares systems for the Elizabeth Line – RFIS (Rail Fares Implementation System): new technology platform developed to enable Elizabeth Line fares data and was ready for the September 2018 fares revision.
- New Reader (Hermes Reader) - the new reader hardware has been developed and is in testing phase to prepare it for operational use. The New Reader software is now at the design study stage.
- New Revenue Inspection Device (RID) – project formally initiated and technical experts procured to support the solution design. New RID enhancements were de-scoped during business planning; the minimal viable product will be delivered.
- Weekly fares capping for Bus and Tram customers has been delivered in line with the Mayor’s commitment.

Changes to FY19/20 authority request

- Revenue Collection Contract 2: the back-office modifications to improve competition for further procurement of the revenue collection system have been more accurately phased
- More accurate re-phasing of the Revenue Inspection Device (RID) replacement project
- Completely de-scoping the Digital Oyster project, which aimed to put a virtual Oyster card in a digital wallet such as Apple Wallet
- Service delivery assurance reduction: reflecting tactical changes we are seeking to agree with the RCC supplier to reduce the expenditure in this area
- 1st generation Oyster Card migration descope; associated risk being managed by the Payments team

AUTHORITY

	Existing 19/20 + 18/19 carryover	Existing FY20/21	New request FY19/20 Δ	New request FY20/21 Δ
Payments – core	11.5	0	2.0	10.3
Cubic service delivery assurance ¹	12.3	11.8	-1.2	-4.3
Total	23.8	11.8	0.8	6.0

¹ Under the Revenue Collection Contract with Cubic we are obliged to fund Cubic’s (the incumbent supplier) ticketing system assurance activities. Full procurement and project authority has been granted for the duration of the contract (expires August 2025)

Activities and main deliverables in 2019/20 and 2020/21

- We will improve the ticketing system to align the Oyster and contactless propositions by:
 - Introducing weekly capping on Oyster concessions by Summer 2020
 - Enhancing the back office to cater for the predicted volume growth of contactless payments by 2020
 - Assessing the feasibility of associating a contactless card with a concession/discount
 - Making changes to our revenue allocation system and processes to support the introduction of the Elizabeth Line.
 - Upgrading ticket machines to accept new £20 note
- Software development for the New Reader (Hermes) to address performance issues, loss of revenue and to support implementation of iBus2
- We will stabilise the Rail Fares Implementation System which is used to deliver the annual fares revision; we will do so by migrating out of an out-of-support platform and into a new solution that has added functionality.
- We will introduce a new Point-to-Zone fares logic for the Elizabeth line (facilitated by the new enhanced Rail Fares Implementation System solution).
- We will commence the feasibility work to re-procure the Revenue Collection Contract which will expire in August 2025.

ENTERPRISE RESOURCE PLANNING (ERP)

Total authority (existing + requested)

FY19/20: £7.7m

FY20/21: £4.3m

Vision: To transform our Enterprise Resource Planning (ERP) system so that it is cost effective, supportable and enables our business leaders to improve core finance, commercial and human resource processes.

Objectives: Deliver a more efficient supply chain capability to Commercial; standardise how Finance plan, budget, forecast and report financial information across the business; provide greater access to user friendly HR technology for our people. We will exploit Cloud technology to enable this.

Last year's submission: activities and main deliverables in 2018/19 and 2019/20

Retain SAP ERP as-is and deliver the following improvements:

- ERP Finance Master Data – standardise the financial accounts structure in ERP to enable consistent reporting of financial information
- Occupational Health Process – improve process flow, reduce dependency on numerous workarounds and reduce costs
- Financial Services Centre Transformation Programme – a series of minor technology solutions to improve processes
- Legacy Portal Migration – retire the legacy portal so that users have one place to review and approve all ERP interactions.
- Initiate the development of Change & Release Management tool to control and automate the release of SAP configuration.
- Initiate the development of ERP Data Scrambling (TDMS) tool to encrypt, randomise and scramble ERP data
- Initiate ERP Cloud Hosting migration and start the preparation for Managed Services retender & SAP S4 upgrade (Cloud SaaS)

Outcomes so far in FY18/19

- We have delivered the legacy portal migration and standardised financial management accounting reports as part of the Finance Master Data project.
- We have initiated two strategic transformation projects which will run throughout FY19/20-20/21; SAP Cloud Hosting to reduce our ERP technical support costs and Supply Chain Upgrade to support and enhance our commercial procurement capabilities.
- Occupational Health Process project has formally begun and we have gone to market to procure new Occupational Health software.

Changes to FY19/20 authority request

- De-scoping the ERP Steering Group carry-over budget
- Development of Change & Release Management tool is being delivered through business as usual ERP team activity
- Development of ERP Data Scrambling (TDMS) tool has been de-scoped since another tool in the TfL estate is available to fulfil the requirements
- Financial Service Centre transformation programme's technology investment has been deferred to allow time for the newly formed TfL Business Services team to settle

AUTHORITY

Existing 19/20 + 18/19 carryover	Existing FY20/21	New request FY19/20 Δ	New request FY20/21 Δ
7.5	0	0.2	4.3

Activities and main deliverables in 2019/20 and 2020/21

Occupational Health Process:

- complete the implementation of the new software by July 2019

SAP Cloud Hosting:

- migrate SAP to a cloud hosting solution by the end of FY19/20, subject to a successful pilot by the end of the current financial year

Supply Chain Upgrade (Ariba):

- complete the build and fully deploy the enhanced procurement capability for the business by summer 2020

Consolidate HR Customer Relationship Management (CRM) tools

- consolidate HR CRM products used to support the HR operating model by end of 2019

Improve Finance Controls (SAP GRC):

- develop recommendations on how to redeploy SAP GRC by end of 2018 to improve governance, technical configuration and access to key systems
- design, build and implement recommendations by mid-2019

Financial Service Centre Transformation

- plan and deliver new automated processes for transactional financial and payment activities

T&D SURFACE

Total authority (existing + requested)

FY19/20: £9.3m

FY20/21: £8.0m

Vision: To provide the strategy, roadmap and leadership for how Technology & Data will deliver increased value for money to TfL Surface and its customers, by identifying new technology solutions, improved process and governance models and reduced cost of ownership.

Objectives: deliver cost efficiencies and improvements through the management of the end-to-end life-cycle of the technology and data services

Last year's submission: activities and main deliverables in 2018/19 and 2019/20

Deliver a number of key procurements to replace and upgrade current bus technology systems:

- Surface Narrow Band Radio Replacement – a safety critical project to replace the Bus radio system. The current system and assets have come to their end of life and the contract has been extended through derogation.
- Initiate iBus2 – replacement of our bus tracking, performance management and real time bus passenger information system, the contract for which cannot be extended past 2022.
- Future Bus Systems – Current bus routes and schedules systems are life expired and already extended by Single Source Justification (SSJ). Loss of these systems would result in a) the inability to manage bus operator performance and b) out-of-date network information and therefore passenger information. This would lead to increased costs due to higher contract payments to operators and significantly degraded customer information.

Outcomes so far in FY18/19

- Surface Narrow Band Radio Replacement – we have completed 100% of the Radio installs on 9,500 buses and have now switched to the Digital Mobile Radio.
- iBus2 – the project has formally begun which will replace our current bus tracking, performance management and real time passenger information system. Work so far includes requirements gathering and procurement planning.
- Future Bus System project - a contract was signed with Trapeze UK on 7 September for the replacement system for our end of life bus scheduling tools: busnet, SSTT and Caesar. This improved platform will ensure we can manage bus operator performance and that we are capturing bus disruption and service change information for the travelling public. The new software and tools will ensure our continued capability to continue to deliver a reliable, accessible and high-quality bus network across London.

Changes to FY19/20 authority request

- Deferring the iBus programme by a year - subject to Business Planning decision by the Executive Committee and confirmation that it is commercially and legally viable

AUTHORITY

Existing 19/20 + 18/19 carryover	Existing FY20/21	New request FY19/20 Δ	New request FY20/21 Δ
11.5	0.4	-2.2	7.6

Activities and main deliverables in 2019/20 and 2020/21

Future Bus Systems (Routes and Schedule):

- design of the replacement system by end of FY18/19
- develop and implement new solution by end of FY19/20

iBus2:

- Technology and Market analysis to determine procurement strategy will complete early in 2019/20 with plan to award in 2020/2021

Surface Radio Replacement:

- Final migration and delivery of remaining project tasks will completed by Q2 FY2019/20.

IMPACT and TPOMA:

- we will decommission two obsolete tools which were used to support the deployment of Metropolitan Police Service and British Transport Police officers by end of FY20/21

NETWORKS

Total authority (existing + requested)

FY19/20: £16.2m

FY20/21: £4.7m

Vision: Timely delivery, on a service provision basis, of well managed, cost-efficient and fit-for-purpose data network and telecommunications services, which satisfy TfL's current and foreseeable future needs.

Objectives: a reduction in the total cost of ownership of data network and telecommunications services; the provision of fit-for-purpose services which deliver what projects and programmes specify they need, where and when they need it; the establishment of best-in-class service management capabilities to oversee the ongoing delivery of the services; the implementation of robust and effective governance and control process to ensure optimal benefits realisation

Last year's submission: activities and main deliverables in 2018/19 and 2019/20

Deliver the new mobile and data network contracts and invest in consolidating our multiple networks leading to costs savings, improved security and stable performance. Key deliveries include:

- Access and Wide Area Networks (WAN) contract transition and transformation
- Mobile Network procurement and transition.
- Network tech refresh – refresh the Network equipment in our core data centre DC(a)
- Data Centre Networks (DCN) – procurement of a third-party service for operational and ongoing duties of managing the DCN
- This portfolio will generate savings of £32m over the business plan

Page 106

Outcomes so far in FY18/19

- Access and Wide Area Networks (WAN) - Our corporate network service with Fujitsu was successfully transitioned to our new strategic agreement with Capita Business Services on 8 August. The transition to Capita was completed without any major impact to the services. This agreement also includes the management of the Data Centre Networks (DCN)
- Mobile Network procurement and Transition - TfL have an agreement with Telefonica UK Limited ("O2") to provide TfL with mobile services. This agreement expires in May 2021 and the project to prepare for this has been formally initiated.
- Network tech refresh – a project has been formally initiated.

Changes to FY19/20 authority request

- Access Networks & WAN Managed Service: Transition and Transformation - last year's numbers were based on assumptions prior to contract award and without finalised transition and transformation plans. The work has matured following the contract award (to Capita) and we now have a better understanding of project costs.

AUTHORITY

Existing 19/20 + 18/19 carryover	Existing FY20/21	New request FY19/20 Δ	New request FY20/21 Δ
9.7	0.0	6.5	4.7

Activities and main deliverables in 2019/20 and 2020/21

Access Networks and WAN contract transition and transformation

- We will complete the transformation work to refresh/standardise infrastructure and assets by end of 2019

Mobile Sourcing

- Strategy for re-procurement of the current mobile services agreement (expiry in May 2021) by April 2019 and start the Service SIM transition which will be complete by end of FY20/21

Connect Strategy

- Develop strategy and execution plan for future Connect assets to realise the network consolidation strategy (including legacy networks) within the LU estate by Q1 2020

WiFi Service Improvements

- Develop recommendations and then implement service improvements to operational WiFi network by end of FY19/20

Interoute (Surface Transport) – Transition and Transformation

- Transition network management services for Surface Transport's Interoute to Capita by end of 2019

HOSTING

Total authority (existing + requested)

FY19/20: £13.6m

FY20/21: £16.5m

Vision: A cost effective, flexible and secure Hosting environment with on demand scalability to meet the changing demand of our business.

Objectives: Reduce application hosting's total operating costs; implement a 'Hybrid Hosting' model which determines the right hosting environment (On-Premise/Public Cloud/Private Cloud); implement a controlled, consistent and pan-TfL approach to hosting with clear policies and standards; develop a flexible, scalable and agile hosting model that allows us to adapt to business needs; ensure data security and compliance where data protection requirements are not compromised; manage the infrastructure life cycle of hardware and software used to host applications

Last year's submission: activities and main deliverables in 2018/19 and 2019/20

Reduce TfL's footprint at our Data Centre leading to savings and establish a Cloud presence through a phased migration of services (to be exploited tactically over time).

Key activities include:

- Decommissioning of retired services – decommission servers (c. 1,000) that were identified as part of the Rapid Discovery Assessment completed by Cloudreach
- Data Centre Footprint Reduction Phase 2 & 3 – the migration of remaining services in scope (Storage and Migration)
- Complete Early migrations for Cloud Hosting for selected services

Outcomes so far in FY18/19

- Decommissioning of retired services – completed: following the identification of 1,000 servers for decommissioning, 80% were decommissioned under this project. A business as usual decommissioning process has been developed and the remaining 20% has been handed over to BAU.
- Data Centre Footprint Reduction Phase – 90% of the remaining infrastructure and services in scope have been migrated into the new location with a delivery plan to address the remainder by Jan 2019. Dilapidation activities will then commence and is anticipated to be completed in April 2019 with three months contingency as the current lease expires on the 30 July 2019.
- Early migrations for Cloud Hosting for selected services – project formally initiated with Single Sign On (SSO) identified as the first service for migration which will also address GDPR compliance requirements.
- Investment in Data Centre Server Infrastructure Refresh – project has been initiated and is currently carrying out a technical evaluation of the new compute offerings on the market, with plans to carry out a proof of concept for adopting Hyper-Converge Infrastructure (HCI), this new technology seeks to combine compute, storage and network capabilities which will deliver operational efficiencies. *Note: this was transferred from the Tech Refresh portfolio*
- Operating System & Database Upgrades – A project has been initiated to identify the services that need to be upgraded and determine the sequencing of upgrade activities. *Note: this was transferred from the Infrastructure and Operations (TSO) portfolio*
- Completing Data Centre Rationalisation for remaining sites – the project has been deferred into 2019/20's business plan onwards due to resource constraints where other projects have been prioritised. *Note: this was transferred from the Infrastructure and Operations (TSO) portfolio*
- We have started implementing and refreshing FTP (ticketing-related) hardware. Estimated completion date is FY19/20.

Changes to FY19/20 authority request

- Early migrations for Cloud Hosting – cloud migrations will be deferred into 19/20 as these service candidates will be derived from other projects (OS/DB, Resiliency and other business demand).
- Delivery of compute hardware has been deferred to 19/20 due to Proof of concept activities on exploring new technology capabilities as opposed to buying more of the same capabilities.
- Storage tech refresh was previously forecasted based on the as-is infrastructure demand profile but did not factor in natural growth of data usage for existing services, this has now been corrected and is planned for FY19/20.
- Operating system and database upgrades deferred to start in 19/20 owing to resource constraints and other investment and initiatives taking priority (e.g compute refresh).

AUTHORITY

	Existing 19/20 + 18/19 carryover	Existing FY20/21	New request FY 19/20 Δ	New request FY20/21 Δ
Hosting – core	5.1	0.0	-0.6	0.4
Hosting – tech refresh	3.7	0.0	5.5	16.1
Total	8.8	0.0	4.8	16.5

Activities and main deliverables in 2019/20 and 2020/21

Application Hosting:

- complete the project to shrink our presence in Data Centre (a) by 60 per cent and consolidate all infrastructure and services before the lease end date in July 2019.
- develop clear standards, policies and governance structure for moving services to the cloud. Following the SSO migration we will migrate up to 15 services to cloud by end of FY19/20.

Payment Infrastructure Refresh:

- Following the FTP infrastructure refresh we will continue the upgrade of the revenue collection (ticketing) back-office infrastructure.

Hosting Infrastructure Refresh:

- replace a fifth of all our physical servers every five years (total of c. 1,100 servers).
- Lifecycle management of existing data storage systems and back-up solutions which are nearing end-of-life. The work will start in FY20/21.

Operating systems database upgrade:

- Lifecycle management of database platforms that are end of life or out of support.

END USER COMPUTING (EUC)

Total authority (existing + requested) FY19/20: £9.3m FY20/21: £2.5m

Vision: All TfL workers are able to use End User Computing products and services that are easy to use, affordable for TfL, and help them to carry out their roles most effectively. The products and services conform to T&D’s requirements, and T&D architectural principles such as standardisation, scalability and value for money.

Objectives: Deliver a modern, integrated, compliant and supportable set of End User Computing products and services, reducing the cost of EUC over the business plan by rationalising the duplicate technologies and exploiting automation capabilities; Promote these tools together with a comprehensive user engagement and communications program to help TfL workers meet their business goals, including the enablement of Smart Working objectives. Look for more sustainable approaches to tech refresh funding, to keep technology up to date (“Evergreen”), and avoid unaffordable capex demand peaks by creating predictable, repeatable renewal cycles.

Last year’s submission: activities and main deliverables in 2018/19 and 2019/20

Transform EUC by moving away from expensive waterfall programmes every 5-6 years to upgrade our desktop software and hardware to a continuous refresh/ update model. This will lower our overall total cost of ownership, negate the need for future large Capex change programmes and support the pan-TfL Smart Working Programme. Invest in Office 365 (Cloud based product) and Windows 10 upgrade that delivers savings and a compliance requirement. More specifically:

- Design and build modern desktop platform compatible with TfL's core applications, migrate Windows 7 and thin client users to a new modern desktop
- Office 365 deployment – deploy Office 2016 to desktops, migrate workloads for email, email archive, skype for business and home drives to Office365's cloud tenancy. Includes support for business change and user migration
- Mobile Management in-housing migration – deployment and migration of a new mobile device management capability
- Continuous Desktop hardware refresh – purchase and deploy new end-point devices to users
- Pull printing expansion – expand the use of the managed print service contract to provide printers in additional locations
- Investment to support Back Office Telephony business case to rationalise the back-office telephony solution.
- Enable Skype For Business Online across all sites (only for internal consumption for video links and voice (ON NET) and not for external video conferencing)

Outcomes so far in FY18/19

- Mobile Management in-housing migration – A new ‘Bring your own device’ solution is now available for TfL staff, allowing users to access their Corporate email and calendar on their personal device. This will save TfL approximately £200,000 over the course of the business plan as the old service will be switched off and the new service is part of our existing contract with Microsoft. Commercial activity has also been completed to procure the new mobile device management platform, “Intune”.
- EUC Evergreen - We have improved the service that allows TfL staff to work remotely by migrating 8,400 users from RSA tokens to the new Multi Factor Authentication service. This project is estimated to reduce operating costs by £500,000 over the five year business plan and provide an improved remote access offering.
- A modern desktop platform compatible with TfL’s core applications has been designed. Build will begin in December with migration of Windows 7 and thin client users by March 2019.

Changes to FY19/20 authority request

- EUC Evergreen – better understanding of the desktop estate’s compatibility with Windows 10 has prompted a need to refresh the estate in a shorter and more immediate timeframe. Investment to do this has been brought forward to FY19/20 to ensure we are ready for Windows 10 support withdrawal in January 2020

AUTHORITY

Existing 19/20 + 18/19 carryover	Existing FY20/21	New request FY19/20 Δ	New request FY20/21 Δ
4.0	0.0	5.3	2.5

Activities and main deliverables in 2019/20 and 2020/21

EUC Evergreen:

- Office 365 deployment – deploy Office 2016 to desktops, migrate workloads for email, email archive, skype for business and home drives to Office365's cloud tenancy.
- Continuous Desktop hardware refresh – purchase and deploy new end-point devices to users to enable the update to Windows 10
- Investment to support Back Office Telephony business case to rationalise the back-office telephony solution.
- Refreshing obsolete hardware
- Migrating Outlook Exchange to the Cloud
- Developing readiness plans application migrating to Window 10 and Office 365

Mobile device management

- rationalise our device management platform by migrating from MAS360 to Microsoft Intune
- decommissioning existing Blackberry services.

Back-office telephony strategy

- rationalise communication mediums currently available to back-office staff and deploy a single telephony solution, which will aim to be cheaper than the current mix of Avaya devices.

CONTACT CENTRE OPERATIONS

New total authorities sought

FY19/20: £2.5m

FY20/21: £0.9m

Vision: To continue to provide high quality resolution to TfL's customers whilst reducing our cost to serve. We will also explore the market and commence a new telephony self-serve contract shared across TfL.

Objectives: Reducing year on year operating expenditure without degradation in TfL's customer service offering, continued contact handling outsourcing, transition from Baker Street facilities to a fit for future Lost Property Service and in doing so avoid renovation costs and the £8m cost burden to TfL.

Last year's submission: activities and main deliverables in 2018/19 and 2019/20

- Review and improve the Lost Property Service.
- Re-tender and transition of the telephony self-serve contracts and Concessions contracts.

Outcomes so far in FY18/19

- Lost Property Service review: finding a cheaper and more sustainable offering - an alternative site has been identified which can be made compliant with health and safety legislation, and caters for the predicted increase in numbers of lost items in London.
- Telephony self-serve contracts retender - cost reductions identified with the incumbent supplier which will be realised from 2019. This has gone through commercial negotiation and we have agreed new terms with the incumbent supplier.
- The concessions contract was awarded to Charles Novacraft at end 2017 with transition taking place since then. Service commencement for the new contract is 1st January 2019.

Page 109

Changes to FY19/20 authority request

- Telephony self-serve re-tender has been deferred - we will continue using existing contract and have sought cost reductions with the current supplier.
- Lost Property Service - securing a new site is integral to delivering this project and was previously expected to be done in FY18/19. Delays to securing a site mean the cost of new site fit-out and move has been moved to FY19/20. Project procurement activities are also better understood which has increased legal costs.

AUTHORITY

Existing 19/20 + 18/19 carryover	Existing FY20/21	New request FY19/20 Δ	New request FY20/21 Δ
1.7	0.0	0.8	0.9

Activities and main deliverables in 2019/20 and 2020/21

- Self service telephony contracts retender: full procurement and transition of services completed in 2020.
- Lost Property Service review: we will complete procurement activities by Dec 2019 with work to identify, set up and transition to new site by March 2020.
- Re-tenders of existing outsourcing of contact handling and fulfilment for Oyster and Cycle Hire.

CYBER SECURITY (CSIRT)

Total authority (existing + requested)

FY19/20: £2.7m

FY20/21: £0.2m

Vision: To ensure TfL's resilience against Cyber-Attack, by delivering capabilities that; protect, detect, recover and response to cyber events, together with providing governance, guidance & policies to manage cyber risk.

Objectives: To establish a risk-based approach to cyber defence, to exploit technology to improve and simplify security and to focus on security throughout the lifecycle of our infrastructure.

Last year's submission: activities and main deliverables in 2018/19 and 2019/20

Improve and deliver the cyber security capabilities required to lower the strategic cyber risk to our target levels (by 2020/21) while achieving savings. The majority of the investment is for procuring replacement or new tools to meet the latest business requirements, such as Digital Forensics tool, Data Loss Prevention tool, and network security monitoring & modelling tool, etc.

Outcomes so far in FY18/19

- Network and Information Systems (NIS) regulations 2018 compliance – these regulations place legal obligations on operators of “Essential Services” (services supporting the economy and society) to protect and improve cyber-security. So far this year we have identified and reported to the DfT all of TfL's in-scope services and associated critical systems. We have also piloted and formally started an in-depth self assessment review to assess the state of in-scope systems to ensure we are compliant with the regulatory requirements.
- Penetration (“Pen”) testing: finalised framework to consolidate security testing through one framework

Changes to FY19/20 authority request

- More accurate phasing of investment

AUTHORITY

Existing 19/20 + 18/19 carryover	Existing FY20/21	New request FY19/20 Δ	New request FY20/21 Δ
3.3	0.0	-0.6	0.2

Activities and main deliverables in 2019/20 and 2020/21

By the end of FY19/20 we will deliver tools to improve our resiliency and the security of our cyber estate, including:

- A tool to generate and manage keys/certificates for endpoints, applications, systems and network devices
- A tool which allows modelling and visualisation of the network creating a baseline of usual activity to support the identification of unusual or malicious behaviour (Network Security Monitoring and Modelling)
- A tool to prevent sensitive data leaving the TfL estate (Data Loss Prevention)

We will also continue our annual testing of our cyber resilience whereby we develop technical and management scenarios to improve our ability to detect and respond to cyber security threats.

INFRASTRUCTURE & OPERATIONS - TECHNICAL SERVICE OPERATIONS (TSO)

New total authorities sought **FY19/20: £7.5m** **FY20/21: £1.6m**

Vision: To ensure the day to day provision of suitable IT services that deliver the required business outcomes cost effectively.

Objectives: Evolve how we operate across the following core foundations; Service Performance, Customer Experience, People, Compliance, Efficiencies and Lifecycle Management. In addition we will collaborate closely with both the Product Managers and Project Controls to help deliver both business requirements and product roadmaps.

Last year's submission: activities and main deliverables in 2018/19 and 2019/20

Continue to ensure the day-to-day provision of IT services that deliver the required business outcomes cost effectively by:

- Improving service resiliency across shared platforms
- Consolidation of outsourced IT services through Sourcing strategy
- Operating System & Database Upgrades – tech refresh (Now transferred to Hosting Transformation Portfolio)
- Completing Data Centre Rationalisation for remaining sites – migrate and/or decommission services from legacy data centres to target hosting solution where there is deemed to be operational risk or service no longer required.
- Migration and integration of JNP infrastructure and support
- Cloud/Hosting Target Operating Model – develop new operating model to support a hybrid hosting model (on premise and cloud)
- Review and deploy Licence Management strategy
- Infrastructure Monitoring Migration (Infrastructure & Service Operations).
- Upgrading the old and unsupported IT Service Management (ITSM) Tool, used to log, create, manage and escalate IT related incidents

Outcomes so far in FY18/19

- Service resiliency improvement – a list of TfL's mission critical systems has been created and ranked by priority to restore. Systems with the largest resiliency gap have been identified and an options paper is being written to address.
- IT Sourcing Strategy - We have published a contract notice to invite bidders to supply Service Desk, Deskside Support and hardware repair/build services. This tender seeks to combine services, provisioned through two existing contracts, which T&D provide to all departments in TfL under one contract with a single supplier. The new contract is expected to be awarded in Aug 2019.
- Cloud/Hosting Target Operating Model - review and refine processes to support our planned increase in cloud usage – problem statements and opportunities have been identified and a work backlog created. The project has closed, with work to be delivered within business as usual operations.
- Replacement of IT Service Management (ITSM) tool to manage service operations data (incidents, changes, service requests, CMD B etc), – market analysis was been undertaken to investigate options. Remedy has been chosen as the upgraded toolset and the project is now in delivery.
- Migration and integration of JNP services and support – we have scoped and planned the exit from the Global Switch data centre and began execution in July. We have also completed the scoping and planning of the service transition from Capgemini to Capita and T&D in-house teams, with execution starting in December 2018 to complete by June 2019.

Changes to FY19/20 authority request

- Deferring the Infrastructure Monitoring Migration project (replacing an ageing tool that monitors c11,000 servers) and extending the use of the existing tool to the latest possible date
- IT Sourcing Strategy – increase owing to better understanding of project's transition costs, particularly staff transition

AUTHORITY

Existing 19/20 + 18/19 carryover	Existing FY20/21	New request FY19/20 Δ	New request FY20/21 Δ
14.5	0.0	-7.0	1.6

Activities and main deliverables in 2019/20 and 2020/21

Service Resiliency Improvement:

- options paper with recommended course of action to address resiliency gaps due by December 2018, we will then draw down on funding set aside in Business Plan to deliver as many of the approved recommendations as feasible by FY20/21

IT Sourcing Strategy:

- project on track to award new contract in August 2019. Services are currently scheduled to start in February 2020

JNP T&D Service Integration:

- project on track to bring the services retained from the JNP Managed IT Services Contract in-house by June 2019.
- we plan to serve notice on the incumbent provider in December 2018 which will allow transition activities to start.

ITSM Toolset:

- delivery due to start imminently to implement selected tool (Remedy). Project will deliver core functionality by May 2019, and remaining functionality by October 2019.

BUSINESS INTELLIGENCE (DATA & ANALYTICS)

Total authority (existing + requested)

FY19/20: £4.2m

FY20/21: £0.3m

Vision: To provide TfL and our customers with transformative data tools and products to deliver insight-driven operations, enhanced intelligence for our future planning, and tailored information to our customers delivering on our promise that every journey matters.

Objectives: To provide TfL with data tools and services that enable insightful decision-making, supporting operational and planning teams; to provide information on customer travel patterns to support our customer information channels; and to deliver improvements and enhancements in TfL's data capabilities by making our data more accessible; by overseeing principles on data governance; and by innovating and developing new data science algorithms to solve TfL's most challenging problems.

Last year's submission: activities and main deliverables in 2018/19 and 2019/20

Continue to exploit and integrate our data to enable faster and better decision-making across the business by:

- Enhancing TfL self-service reporting capability. This directly impacts on financial and performance reporting across TfL (e.g. London Underground business objective reports)
- Delivering the Digital Marketing cloud – service to send emails to customers and for any enhancements in personalisation and alerting
- Delivering future enhancements to ODX to help better plan our bus network.
- Provision for General Data Protection Regulation (GDPR)
- Investment in Data Science – generating more efficiency in working, and improving our ability to run reports

Outcomes so far in FY18/19

- Self-service reporting capabilities – a new tool has been procured to allow teams across TfL to have more flexibility in accessing their data. This work is in the final stage of delivery with recent focus on ensuring the right data access controls are in place in time for full roll out, expected in January 2019.
- Stabilisation: making the processing and storing of data more efficient and stable – a new data warehouse design has been developed and is now live. The new design makes use of existing infrastructure and has simplified the transfer of data between on-premise and cloud-based hosting. The new design means that we have quicker recoveries from data outages and operational teams in TfL have improved access to live data.
- Digital Marketing cloud – this project has brought all of our customer insight data in house to drive our email communications. The system that has been developed has full integration with the Sales Force Marketing Cloud tool using Audience Builder to make email campaign setup much quicker and simpler.
- Future enhancements to the ODX (Origin Destination Interchange) tool to help better plan our bus network – we have undertaken stabilisation activity to get ODX to source data from a more stable platform, now in the final stages and awaiting deployment. We have raised a project to modernise the solution and the platform that it sits on.
- Provision for General Data Protection Regulation (GDPR) – The GDPR project has undertaken the analysis of T&D-owned systems and identified and allocated funding for required system improvements.
- Investment in Data Science: Investigation into new tools to support data science activity, whilst working closely with inflight projects.

Changes to FY19/20 authority request

- De-scoping from various enhancements projects, including ODX enhancement funding and data science investigations to identify new technologies and solutions.

AUTHORITY

Existing 19/20 + 18/19 carryover	Existing FY20/21	New request FY19/20 Δ	New request FY20/21 Δ
5.0	0.0	-0.8	0.3

Activities and main deliverables in 2019/20 and 2020/21

GDPR:

- We will continue delivering the identified technical changes on legacy systems as part of the GDPR programme.

Service Stability:

- The project will complete the move of all the products to CLEO, the new target data warehouse, ensuring higher resilience to failures, reduced duplication of data storage and reduced data warehouse support costs

Data Science:

- As the landscape of Data Science is evolving rapidly, we will continue to review and assess the analytic tooling available to support our data science capability. We will continue to work closely with TfL's key strategic projects to deliver algorithms and data analysis.

Data Catalogue and Metadata Management Tool:

- We will procure a tool to define and maintain data definitions, lineage and use. This central repository will be fully developed and implemented by the end of FY19/20.

CONTENT AND COLLABORATION

Total authority (existing + requested)

FY19/20: £2.1m

FY20/21: £0.4m

Vision: To give TfL workers the software they require to collaborate efficiently on documents and information so as to maximise their productivity and contribution to TfL's business plan and priorities.

Objectives: To consolidate and upgrade content and intranet platforms to enable Digital Workplace efficiencies.

Last year's submission: activities and main deliverables in 2018/19 and 2019/20

Consolidate and upgrade pan-TfL document management and collaborations systems to improve end user performance, reduce technical failures and provide better access to information.

Key deliveries include:

- Legacy SharePoint consolidation
- Essential upgrade to Livelink, the document collaboration tool for LUL
- Develop a strategy to clear the 'digital landfill' to improve efficiency and document management maturity

Outcomes so far in FY18/19

- Legacy SharePoint consolidation – migration away from SharePoint 2007 has begun and is due to be completed in late FY18/19
- Livelink upgrade – Livelink, our existing tool for storing and managing London Underground infrastructure documentation and large amounts of safety critical information, is currently out of support and incompatible with Windows 10. This project is an essential upgrade, the delivery plan for which has now been agreed.
- Document Management System Consolidation – project formally initiated to improve the efficiency of our current document management systems and processes
- TfL Intranets Consolidation – to ensure all TfL staff can access consistent information and resources they require to do their job, this work will merge the existing three intranets into one, making use of existing technologies (Office 365, SharePoint Online) and supporting an improved Digital Workplace offering. This financial year we have had requirements and a business case signed off by T&D and HR sponsors and defined the minimum viable product.

Changes to FY19/20 authority request

- Improved accuracy of project spend forecast

AUTHORITY

Existing 19/20 + 18/19 carryover	Existing FY20/21	New request FY19/20 Δ	New request FY20/21 Δ
1.8	0.0	0.3	0.4

Activities and main deliverables in 2019/20 and 2020/21

Legacy SharePoint consolidation:

- simplify and rationalise the SharePoint estate to a single, standardised and supported build. We will achieve this by rationalising the infrastructure, licensing and support services
- all future sites will be hosted on SharePoint Online in Office 365 to take advantage of the Microsoft Enterprise Licensing (which will also be retendered next year).

Document management strategy and consolidation –

- kick off project in late 2018 to address issues in unstructured data (hosted in data centres that are mainly shared drive content) and mature our document management approach by consolidating some of TfL's various document management system.
- expected completion in early 2022.

Project Server consolidation:

- consolidation of versions / configurations and migration of data of MS Project Services to support a coherent approach to programme and project management across TfL.
- kick-off in early 2019 and expected completion by late 2021.

TfL Intranet Replacement

- Our next step is to engage with the market and then consolidate the three intranets currently in existence, replacing them with a single solution that provides a common experience by late 2019. The intranet is a key component of the new Digital Workplace, which enables Office 365 and the Smart Working initiative (including 3Hub accommodation strategy).

Total authority (existing + requested) FY19/20: £6.2m FY20/21: £0.5m

Vision: Upskilling people, making people mobile, having impact in virtual meetings and increase building utilisation.

Objectives: (i) To make operable the 30% reduction in desks by December 2019 and (ii) To help embed more flexible, collaborative and autonomous ways of working across TfL
As well as providing financial and productivity benefits to TfL, the increased opportunities to work more flexibly and collaboratively should be a positive change for the c.13k staff in scope for Smart Working (SW).

Last year's submission: activities and main deliverables in 2018/19 and 2019/20

N/A

Outcomes so far in FY18/19

- The Project Board has approved £800k to conduct 3 x Smart Working (SW) Pilots to trial and learn from the working environments, technology and people processes. Est. of 910 staff across all three pilot areas (City Planning, Commercial Development and Surface PPD).
- Released 113 desks to date (47 City Planning and 66 Surface PPD desks released. 96 desk reduction planned for release in Commercial Development during December 2018)
- Deployed over 300 laptops across all pilot areas and 50 mobile phone devices in PPD. Portable video conferencing devices are currently being tested as a shared capability.
- Facilitated a range of culture change initiatives to manage the transition to Smart Working: SW Senior Manager Training, Facilitated discussion around developing Local Team Protocols, Smart Working talks- HR Policy, BYOD, Health & Wellbeing, SW without tech, SW Survey, Focus Groups, and facilitated SW Yammer Group, #BeSmart Comms Campaign, TED Talks at all-staff events, Hosted Conversations, Change Champions network.

Changes to FY19/20 authority request

- Better understanding of scope of project e.g. number of new devices required
- Scope of work is dependent on Transformation and Accommodation strategies which are still in progress

Page 174

AUTHORITY

Existing 19/20 + 18/19 carryover	Existing FY20/21	New request FY19/20 Δ	New request FY20/21 Δ
3.6	0.4	2.6	0.1

Activities and main deliverables in 2019/20 and 2020/21

The FY18/19 pilot will determine the recommended course of action to deliver the programme objectives.

TECHNOLOGY DEVELOPMENT

Total authority (existing + requested)

FY19/20: £1.8m

FY20/21: £0.0m

Vision: Deliver TfL specific, high quality, supportable and cost conscious software solutions for internal and external customers.

Objectives: deliver technology solutions that support TfL's strategic aims; complete the move of Technology Development to an agile delivery model; shift the wider Technology & Data division to an agile delivery model for projects delivered by internal teams

Last year's submission: activities and main deliverables in 2018/19 and 2019/20

N/A – note: the projects in this portfolio were submitted in the Hosting portfolio last year and have since been transferred to Technology Development

Outcomes so far in FY18/19

Data Centre Hardware Refresh - Moving services from a third party managed data centre provided under the Revenue Collection Contract (RCC) to a TfL Managed Data Centre, delivering cost reductions, increased market competition at RCC re-tender as a result of reduced transition costs for any new supplier.

Delivered this financial year:

- the build of the infrastructure in our data centre is now complete ready for service migrations to commence
- Services are being moved individually to minimise any disruption, the first services will be non service affecting to allow us to prove the process before moving on to more complex services
- By the end of this FY we will have moved the first few services

Migrating CASC from on-premise to cloud: we are migrating the account portal for contactless card customers to the cloud in order to reduce the cost of the release process for technical changes.

Delivered this financial year:

- the application has been successfully migrated to the cloud
- we are now planning the migration of the remaining components (such as the IVR and notifications engine)

Changes to FY19/20 authority request

The requested authority in FY19/20 will cover the deliverables detailed to the right.

AUTHORITY

Existing 19/20 + 18/19 carryover	Existing FY20/21	New request FY19/20 Δ	New request FY20/21 Δ
-0.6*	0.0	2.4	0.0

Activities and main deliverables in 2019/20 and 2020/21

- Data Centre Hardware Refresh: the remaining services will be moved to the TfL managed Data Centre in FY19/20, along with decommissions work of the Cubic Data centre.
- Migrating CASC from on-premise to cloud: migration of remaining components planned to be complete early FY19/20.

*The Technology Development portfolio was formed after the March 2018 T&D PIC submission i.e. in FY18/19

ACCESS NETWORKS MANAGEMENT – COMPUTERISED TRACK ACCESS CONTROL (CTAC)

Total authority (existing + requested)

FY19/20: £0.0m

FY20/21: £0.0m

Vision: Compliant, safe and secure technology to access track. The Computerised Track Access Control (CTAC) system is a booking system for the crews and contractors that carry out the maintenance of the LU rail network as well as engineering project works. The system is operated by the TAC Office, Network Planning and Operations, LUCC. It keeps track of workers as they carry out maintenance work overnight on the rail network. It also keeps a record of when they leave the area, so that power can be switched back on again.

Objectives: technology refresh aimed at recompiling code and bringing environments up to date, providing a like-for-like replacement of CTAC. Cognizant has been contracted to deliver this project on a fixed price basis. The T&D Senior management team have agreed a Change request which now adds to the scope ensuring continuity of support for the current CTAC application.

Last year's submission: activities and main deliverables in 2018/19 and 2019/20

Refresh of Computerised Track Access Control (CTAC) application. It is a safety-related, business critical application, which we are contractually committed with the supplier to provide them with safe and secure access to London Underground track for essentially maintenance.

Outcomes so far in FY18/19

- The application re-compilation by Cognizant has been completed
- Now in User Acceptance Testing phase with the London Underground staff and end users
- Computerised Track Access Control refresh is planned to be delivered this financial year
- CTAC Telephony Upgrade (Solidus) at Pelham Street (disaster recovery site) completed, awaiting connectivity to database
- Additional infrastructure deployed

Changes to FY19/20 authority request

N/A – the projects under this portfolio will be completed in FY18/19

AUTHORITY

Existing 19/20 + 18/19 carryover	Existing FY20/21	New request FY19/20 Δ	New request FY20/21 Δ
0.0	0.0	0.0	0.0

Activities and main deliverables in 2019/20 and 2020/21

N/A – the projects under this portfolio will be completed in FY18/19

DIGITAL – PLAN & TRAVEL

Total authority (existing + requested)

FY19/20: £0.0m

FY20/21: £0.0m

Vision: Connected, personally relevant, future proof & cost effective digital customer travel information

Objectives: To deliver a connected experience across all digital touchpoints; to engage with customers in a personally relevant way; to future-proof in readiness for a known, and unknown, technology landscape; to do all of the above in a cost-effective manner

Last year's submission: activities and main deliverables in 2018/19 and 2019/20

N/A

Outcomes so far in FY18/19

Digital Pocket Map: A map app that allows a user to explore the standard tube, Overground, DLR and Tram network, including live status information, journey planner, with a customisable view of the network to support travel access needs –

- high level concept, design and scope has been agreed and is now in development
- ethnographic research has been undertaken to gain insight into the travelling needs of customers with mobility impairments
- structure for unified accessibility data has been defined

Changes to FY19/20 authority request

N/A – the projects under this portfolio will be completed before FY19/20

AUTHORITY

Existing 19/20 + 18/19 carryover	Existing FY20/21	New request FY19/20 Δ	New request FY20/21 Δ
0.0	0.0	0.0	0.0

Activities and main deliverables in 2019/20 and 2020/21

N/A – the projects under this portfolio will be completed before FY19/20

[page left intentionally blank]

Programmes and Investment Committee

Date: 6 March 2019

Item: Surface Technology Programme 2019/20 and 2020/21

This paper will be considered in public

1 Summary

- 1.1 This paper presents the strategic case for the creation of the new Surface Technology Programme (STP) within Surface Transport and details the planned investment for this programme in 2019/20.
- 1.2 The STP will streamline existing technology project governance within Surface Transport and support the Technology and Data directorate (T&D) in providing a strategic and integrated approach to the utilisation of technology across the TfL estate.
- 1.3 Approval is sought for £77.7m of Programme and Project Authority for financial years 2019/20 and 2020/21, as well as £8.1m of committed spend, giving a total request of £85.2m. The Programme will return annually to the Committee to renew and validate a rolling two-year approval.
- 1.4 The total value of the STP is £176.5m within the five year business plan period. This is expected to increase year on year as the business plan is updated as the new STP will be responsible for all technology project delivery for Surface Transport going forward.
- 1.5 Therefore, this paper is only seeking authority for activities that are directly funded by Surface Transport. A further paper is being submitted to the Committee in March 2019 by T&D to cover technology projects funded by T&D.

Surface Technology Programme 2019/20 and 2020/21					
Existing Financial Authority 2019/20 – 2023/24	Estimated Final Cost 2019/20 – 2023/24	Existing Programme and Project Authority for this Programme	Additional Programme and Project Authority Requested 2019/20 – 2020/21	Additional Committed Spend for this Programme	Total Programme and Project Authority
£177m	£177m	£0.0m*	£77.7m	£8.1m	£85.2m

Table 1 Financial Approvals

2 Recommendations

- 2.1 The Committee is asked to note the paper, including the strategic case for the Surface Technology Programme, and:**
- (a) approve Programme and Project Authority of £41.1m for the financial year 2019/20;**
 - (b) approve Programme and Project Authority of £36m for the financial year 2020/21;**
 - (c) approve Programme and Project Authority of £8.1m for committed financial spend; and**
 - (d) note that Procurement Authority for the various initiatives in the Investment Programme described in this paper will be sought at the appropriate level.**

3 Surface Technology Programme (STP) Background

- 3.1** The STP is proposed to ensure a focus on outcomes for projects delivering for Surface Transport, which are currently governed in different areas of TfL. This will ensure there is a single consistent and integrated high-level view of all Surface technology projects.
- 3.2** Products will be common across Surface by default and common across the entire TfL estate where possible.
- 3.3** The STP will be responsible for overseeing the governance of the complex and strategically important technology projects currently being delivered for Surface Transport within the five year TfL Business Plan. From April 2019, the Programme will provide the governance structure for all future technology projects being delivered for Surface Transport.
- 3.4** The projects in scope specifically relate to Surface Transport's responsibility to operate some of London's key transport services including our roads, bus services, taxis and cycle hire. Taking advantage of the latest technology will help us deliver an even better and more efficient service to the public while improving TfL's overall efficiency.
- 3.5** The strategy for technology within TfL will continue to be led by T&D working across TfL and with a series of newly created Steering Groups and a Pipeline Working Group.
- 3.6** The majority of the projects in the Programme will be delivered by T&D, with a small proportion being delivered by the Projects and Programme Directorate (PPD) within Surface Transport or using specialist third party suppliers. This will be decided on an individual project-by-project basis through the Technology Pipeline Working Group.

4 Surface Technology Programme Investment Plan 2019/20

- 4.1** The STP contains a wide range of projects delivering renewals and enhancements across Surface Transport. The Programme will initially

comprise three sub-programmes which share common outcomes as detailed below and as shown in figure 1.

(a) Surface Intelligent Transport Systems (£64.0m)

The projects included in the Surface Intelligent Transport Systems (SITS) sub-programme deliver upgrades to multiple systems to support a multi-modal approach to transport management. They will deliver benefits to the road network through reducing delay, better ability to support mode shift away from car travel and through an increased ability to prioritise sustainable modes such as walking and cycling.

(b) Operations, Safety and Compliance (£24.9m)

The projects included in Operations, Safety and Compliance sub-programme maintain and develop technology for compliance-based regimes to ensure road safety and public transport safety standards.

(c) Public Transport Technology (£87.6m)

The projects included in Public Transport sub-programme maintain and develop technology to operate our public transport networks (including safety critical systems) and improve customer experience (e.g. information systems).



Figure 1 – Surface Technology Programme – Sub Programmes

4.2 There are four key investment projects which will be delivered in 2019/20; details of these projects are included in the following paragraphs. Appendix 1 provides further information on all projects within this Programme.

4.3 Direct Vision Standard (DVS) (£4.4m)

In The Mayor’s Transport Strategy (MTS) it states ‘The Mayor, through TfL, the boroughs and policing and enforcement partners, will seek to reduce danger posed by vehicles by working to ensure that vehicles driven on London’s streets adhere to the highest safety standards, starting with a new Direct Vision Standard for HGVs’.

Any vehicles over 12 tonnes (Class N3) will be required to hold a Safety Permit 1 star rating in order to operate in the Greater London area from October 2020. The minimum star ratings will then increase over the next few years to ensure we continually improve the safety of HGVs coming into London. We believe this will greatly reduce the number of incidents where people are killed and seriously injured on our roads especially for vulnerable road user groups.

The project has made good progress to date, with 27 member states of the European Union approving London’s plans to adopt this new standard earlier than in other European countries. Subject to further statutory consultation to be held later this year, the launch of this scheme for registration is scheduled to be launched in October 2019.

DVS - Safe System Proposals

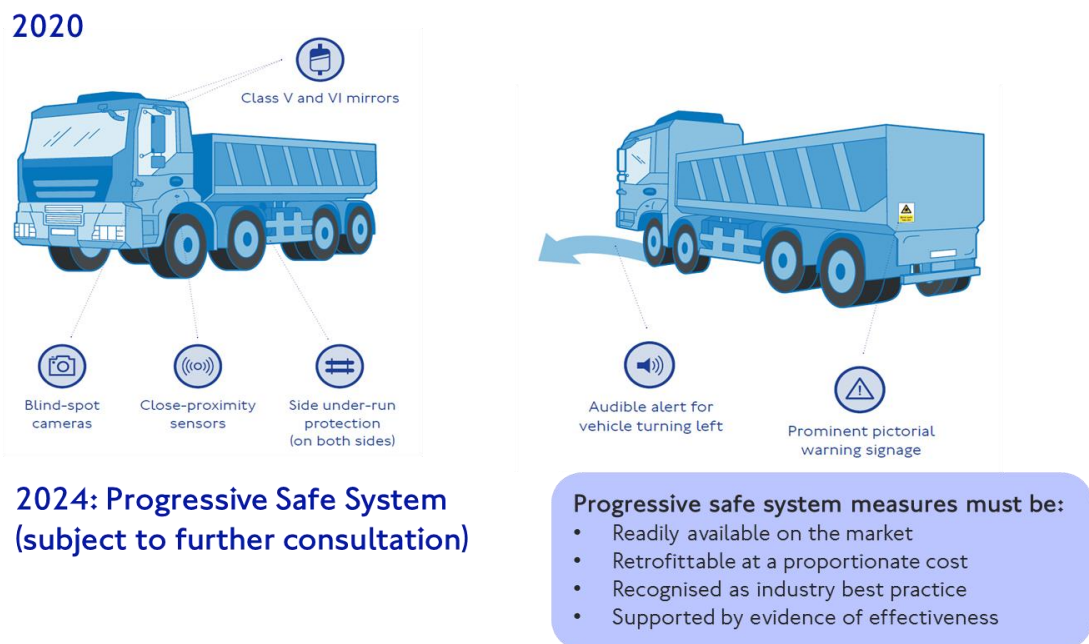


Figure 2 – DVS – Safe System Proposals

4.4 Cycle Hire Payment Systems (£11.2m)

Following on from record usage in January 2019 figures, we propose to keep up the momentum by upgrading the Cycle Hire software to make it more user friendly. This will be achieved through installing measures such as enabling

contactless payments whilst also upgrading our data protection procedures. These enhancements will also future proof the Cycle Hire scheme by ensuring it remains operationally affordable to TfL and aligns to the MTS and future strategies including e-Bikes.

4.5 **Emirates Air Line (EAL) (£0.7m)**

The first phase of this project will deliver an enhanced safety critical passenger communication system to provide a more resilient service. A second phase will include improvements to the on-board CCTV system, in-cabin monitoring (i.e. wind speed and temperature) and the exploitation of additional commercial opportunities to bring new revenue streams.



Figure 3 – Emirates Airline

4.6 **Surface Intelligent Transport Systems (SITS) (£73m)**

The SITS programme is the renewal and upgrade of TfL's traffic management systems to unlock additional capacity on the network by reducing journey times and delays.

It will also act as a very significant enabler towards the Mayor's Healthy Streets agenda through:

- (a) providing more signal green-time to sustainable transport modes including cyclists and pedestrians;
- (b) reducing emissions by improving traffic flow via signal optimisation;
- (c) making bus operations more efficient by improving journey time and headway reliability; and
- (d) a modest reduction in collisions through improved prioritisation for vulnerable modes.

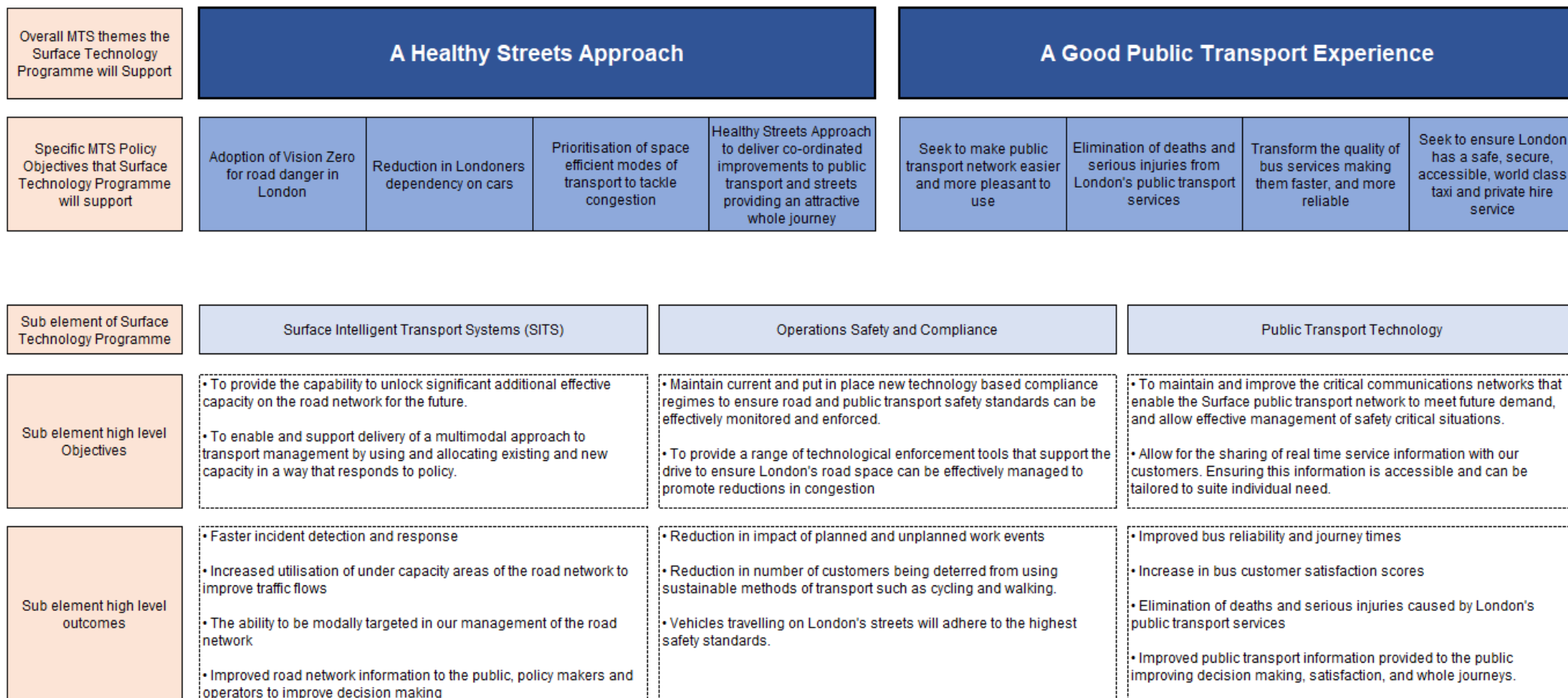
5 **Benefits Management**

5.1 The establishment of a specific STP will ensure that Surface related technology developments can be tracked and shaped in the context of six priorities set out by TfL in response to the MTS. These are:

- (a) to put customers and users at the core of all our decision making;

- (b) to drive improvement in reliability and safety across our network;
 - (c) to accelerate the growth and increase the capacity of our network ;
 - (d) to invest in our people & lead them to be the best they can be every day;
 - (e) to cost less and to generate more income; and
 - (f) to exploit technology to produce better and faster results.
- 5.2 Each of the sub-programmes has its own clear set of objectives and outcomes that can be directly linked back to the MTS policies and themes. Figure 4 provides an overview of these outcomes and charts their relationship back to the MTS themes.
- 5.3 The STP aligns to three key MTS themes:
- (a) **A Healthy Streets Approach** – The adoption of new technologies will support the following:
 - (i) a spatial approach to reduce car dependency. Technology will be used to provide a greater understanding of how road space is currently used, and then support approaches to that space use more intelligently and flexibly;
 - (ii) a reduction in danger posed by vehicles travelling on London’s road network; and
 - (iii) encourage behaviours on London’s streets that increase the use of sustainable travel modes and decrease congestion.
 - (b) **A good public transport experience** – Advances in technology provide an opportunity to interact better with our customers and respond to their changing travel habits. Technology will be used to move towards providing customers with more personalised travel updates and make our services more accessible, inclusive and better value for money.
 - (c) **Vision Zero** – Technology will also enable programmes of work that aim to make public transport more efficient and safer which will play a part in removing all deaths on our roads by 2041.
- 5.4 The approach illustrated in Figure 4 will be further expanded on in the Benefits Realisation Strategy for this Programme to show a clear link between its objectives and the policy objectives outlined in the MTS.

Figure 4 Surface Technology Benefits Map



Business Case / Pathway Compliance

- 5.5 To demonstrate their individual cases for investment, projects within the Programme with a £2.0m (budgeted) or £1.0m unbudgeted EFC are required to develop their own business case to demonstrate both their contribution to the programme and project outcomes and their standalone value for money.
- 5.6 All business cases for projects within the STP will be subject to TfL's existing standards and guidance for business case development, benefits management and project management.
- 5.7 The STP will be responsible for ensuring that project business cases are aligned to achieving objectives as set out under the MTS and that the investment is appropriately managed and prioritised to optimise the overall delivery of outcomes and benefits.
- 5.8 In 2015/16, TfL implemented and embedded a 'Three Lines of Defence' project assurance model, following a review of its approach to project assurance. The project assurance reports submitted to the Committee will following approved standard procedures.

6 Proposal

- 6.1 The full scope of the STP is set out in Table 2. This covers the life of the five year Business Plan and includes:
 - (a) five year Financial Authority of £177m;
 - (b) five year Estimated Final Cost (EFC) of £177m;
 - (c) two year Programme and Project Authority of £77.7m;
 - (d) additional committee Programme and Project Authority of £8.1m; and
 - (e) total Programme and Project Authority for 2019/20 and 2020/21 of £85.2m.

Table 2. Current Scope of Surface Technology Portfolio (All values in £ms)

Programme	Project	Financial Authority 2019/20 – 2023/24	EFC 2019/20 – 2023/24	Programme Authority Request					Future authority requests		
				2019/20	2020/21	2021/22	2022/23	2023/24	2021/22	2022/23	2023/24
Surface Intelligent Transport Systems Programme	Real Time Optimiser (RTO)	13.8	13.8	4.9	6.0	1.9	0.6	0.4	-	-	-
	Common Operational View-Incident Management System (COV-IMS)	17.9	17.9	7.0	8.8	2.1	-	-	-	-	-
	Data & Analytics (D&A)	11.3	11.3	3.1	3.4	2.2	-	-	-	1.2	1.4
	Predictive	11.8	11.8	0.8	3.3	-	-	-	3.3	2.4	2.0
	Highways Annualised Technology Programme	9.2	9.2	3.1	2.0	-	-	-	1.8	1.3	1.0
	Programme Total	64.0	64.0	18.9	23.5	6.2	0.6	0.4	5.1	4.9	4.4
Operation Safety & Compliance Programme	Direct Vision Standard (DVS)	4.4	4.4	3.6	0.8	-	-	-	-	-	-
	Fleet Operator Recognition Scheme (FORS)	-	-	-	-	-	-	-	-	-	-
	Traffic Management Order Systems	0.6	0.6	0.5	0.1	-	-	-	-	-	-
	Compliance, Policing and On-Street Services	2.5	2.5	1.7	0.5	-	-	-	-	0.3	-
	Taxi & Private Hire Re-let (TPH)	14.7	14.7	2.3	3.7	-	-	-	8.0	0.7	-
	Control Centre Rationalisation	2.5	2.5	0.5	0.5	-	-	-	1.0	0.5	-
	Accident Statistics 3 (ACCSTATS)	0.2	0.2	-	0.1	-	-	-	0.1	-	-
	Programme Total	24.9	24.9	8.6	5.7	-	-	-	9.1	1.5	-
Public Transport Technology Programme	iBus 2	59.3	59.3	-	-	-	-	-	22.5	24.3	12.5
	Countdown 3	9.5	9.5	0.1	3.8	-	-	-	5.6	-	-
	Future Bus Systems 2	1.2	1.2	-	0.2	-	-	-	0.5	-	0.5
	Future Bus Systems 3	2.0	2.0	0.6	0.5	-	-	-	-	-	0.9
	Airwave to Emergency Services Network	0.2	0.2	0.1	0.1	-	-	-	-	-	-
	Dial-a-Ride Booking System	4.1	4.1	1.0	2.2	0.9	-	-	-	-	-
	Emirate Airline (EAL)	0.6	0.6	0.6	-	-	-	-	-	-	-
	Cycle Hire Payments	11.2	11.2	11.2	-	-	-	-	-	-	-
	Programme Total	88.1	88.1	13.6	6.8	0.9	-	-	28.6	24.3	13.9
	Total	177.0	177.0	41.1	36.0	7.1	0.6	0.4	42.8	30.7	18.3
				Total authority request 85.2							

Governance Arrangements

6.2 Figure 5 shows the proposed governance structure for the Surface Technology Programme (STP).

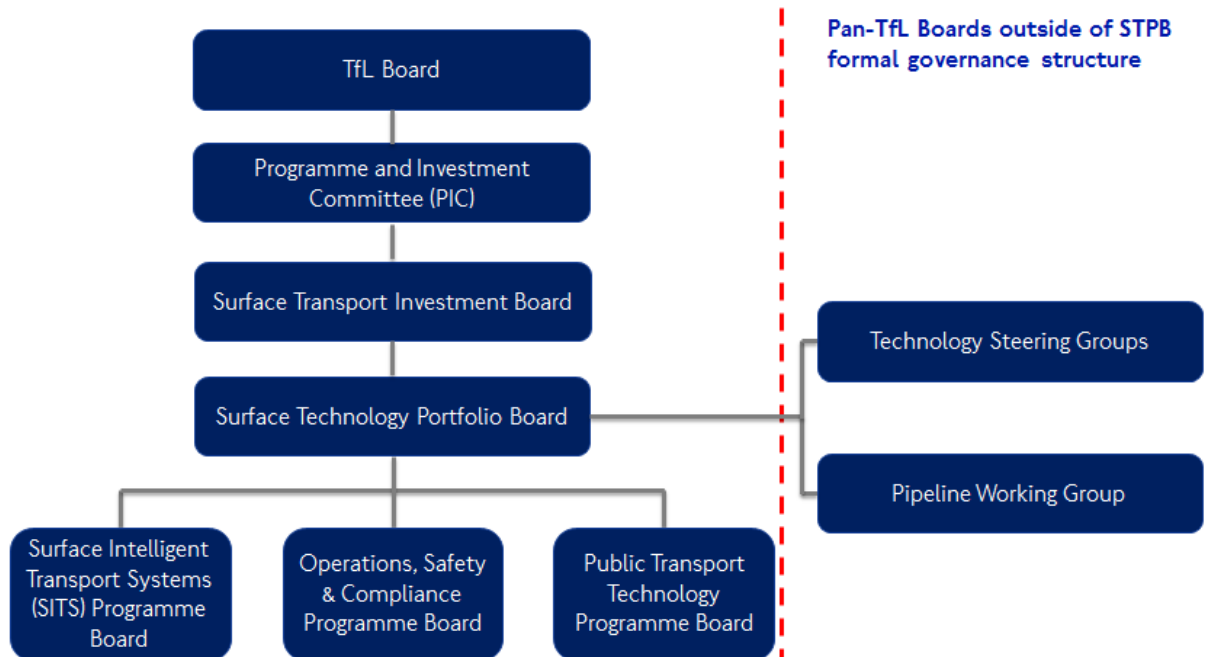


Figure 5. Overview of Governance Structure (the title of each meeting is subject to further review and will be included in finalised Terms of Reference).

- 6.3 STP will be governed at the programme and project level by a periodic Portfolio Board. Terms of Reference (ToR) for each layer of governance across the Programme are being developed which set out the full role and responsibility of the Portfolio, Programme and Project Boards.
- 6.4 The Pipeline Working Group (led by T&D) is responsible to STP for the ongoing prioritisation of future projects to ensure they contribute to (and consider their impacts on) a wide range of Surface Technology and other Programme outcomes.
- 6.5 Surface Technology Steering Groups will provide technical input influencing the Pipeline Board and STP's approach to delivering projects included in the current Business Plan. Resourcing, business needs, arising opportunities and risks are some of the key areas of advice to STP.
- 6.6 A visual representation of the Steering Groups and how the technology Pipeline Working Group will interact with the STP and its constituent elements are set out in Appendix 2.
- 6.7 Emerging technology projects not included in the current business plan will be prioritised by the Technology Pipeline Working Group and put forward to the STP for inclusion in future authority requests.
- 6.8 Projects prioritised for delivery in the current business plan are based on a structured method involving review of the benefits planned, delivery considerations, value for money and scoring of the relative contribution that projects make to a set of weighted priorities.

Equalities Impact Assessment

- 6.9 The Programme will be delivered in accordance with the Equality Act 2010. Equality Impact Assessments are considered on all strategies, policies, business plans, change programmes or projects, having regard to our obligations under the public sector equality duty throughout the delivery of the Programme.
- 6.10 As projects progress through feasibility and design, consideration will be given to the need for an Equality Impact Assessment for each one. Possible effects on people with protected characteristics under the Equality Act 2010 (such as age, race, sex and disability), and mitigations of and countervailing considerations in respect of any adverse effects, will be considered and recorded.

7 Legal implications

- 7.1 There may be elements of the Programme for which a delegation of the Mayor's general powers under the Greater London Authority Act 1999 are required, to enable TfL to progress those elements that are not strictly transport matters.

8 Assurance

- 8.1 TfL Project Assurance has conducted an Integrated Assurance Review (IAR) on the proposed STP in December 2018. No critical issues were recorded.
- 8.2 The objective of the IAR was to assess the STP's readiness to deliver its outcomes. The IAR followed set lines of inquiry to answer whether the Surface Technology Programme was sufficiently well managed for the Committee to award relevant Project & Programme Authorities.

List of appendices to this paper:

Appendix 1: Individual Project Details

Appendix 2: Surface Technology Proposed Supporting Technical Groups

Appendix 3: Previous Governance Arrangements

List of Background Papers:

Independent Assurance Review

Management Response to the December 2018 Sub-programme IARs

Contact Officer: Glynn Barton, Director of Network Management
Number: 020 3054 2661
Email: GlynnBarton@tfl.gov.uk

[page left intentionally blank]

Appendix 1 – Individual Project Details

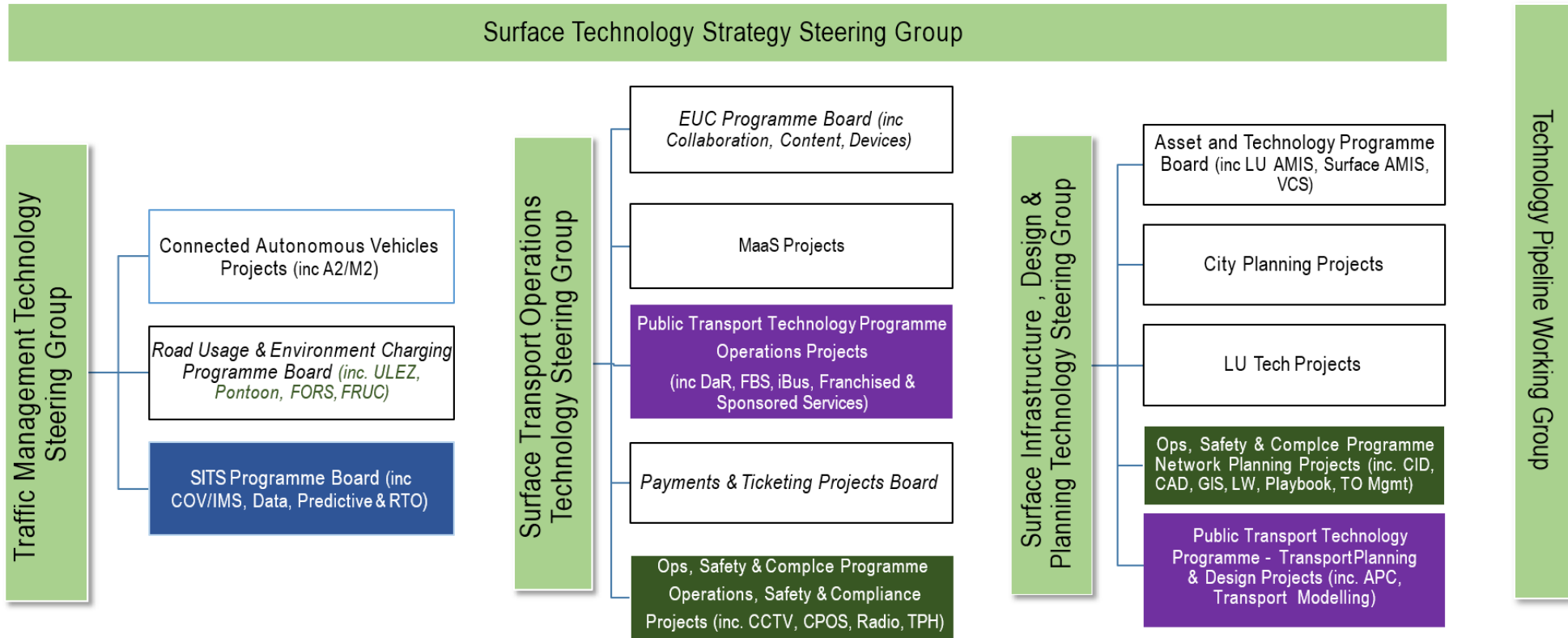
STP Sub-programme	Project and its activities and key deliverables in 2019/20 and 2020/21
Surface Intelligent Transport System (SITS)	Real Time Optimiser (RTO) This project facilitates the replacement and enhancement of the UTC SCOOT real-time optimiser used to automatically manage two-thirds of London's traffic signal infrastructure.
	Common Operational View Incident Management System (COV IMS) The Common Operational View Incident Management System will allow TfL to detect and respond to incidents on the road network faster and improve information dissemination to the public and policy makers. This is with a view to increasing road safety and overall congestion created by unplanned incidents.
	Data & Analytics Provision of data sources, analytical tools and skills to deliver and run SITS. The project will allow for the analysis of wider data sources to improve our understanding of the road network, allowing enhanced management and predictive capabilities.
	Predictive A new system that will complement the Real Time Optimiser; also being developed as part of SITS. This system will drive further substantial benefits through smoothing traffic flow over a greater geographical area.
	Highways Annualised Technology Programme A collection of minor projects all aimed at improving the efficiency and management of the road network through the implementation or upgrade of new and existing technology solutions. Projects include the A2 Connected Corridor (testing future connections between vehicles and infrastructure) and London Works Enhancements (improving the way in which TfL manages works occurring on its roads).
Operations Safety and Compliance	Direct Vision Standard (DVS) This project aims to implement a system that will ban or restrict HGVs with poor direct vision from all roads within the Greater London Authority boundary.
	Fleet Operator Recognition Scheme (FORS) The Fleet Operational Recognition Schemes (FORS) was created by TfL in 2007 to improve the safety and efficiency of the road freight

STP Sub-programme	Project and its activities and key deliverables in 2019/20 and 2020/21
	<p>sector. In 2014, following a competitive procurement exercise, AECOM was awarded a 5-year contract expiring in 2020 (with option to extend up to an additional two years). An extension is not preferred due to political pressure; the preferred option provides greater operational efficiency and generates a substantial surplus which TfL can reinvest back into the freight programme.</p>
	<p>Control Centre Rationalisation</p> <p>There are currently three operational control centres within TfL. To drive efficiencies and savings, this project aims to reduce this to one single control room.</p>
	<p>Traffic Management Order Systems</p> <p>The current METROS (Maintenance, Enforcement and Traffic Regulation Order System) is out of support and has been suffering from stability and data issues for some time. TfL relies on this system to ensure we are issuing PCNs correctly and to refer back to it in appeal situations. If this system 'collapsed' TfL would have no mechanism to cross-check the validity of PCNs issued and would be unable to successfully challenge appeals. A potential opportunity has been identified to consolidate systems as part of the Traffic Management Order Systems Replacement.</p>
	<p>Accstats 3</p> <p>Accstats 3 project is moving the current Accstats 2 system onto a supported platform for better working. Being able to better track numbers & types of accident on our network will reduce congestion and increase bus journey time reliability by designing safer junctions (90% of all accidents happen at junctions).</p>
	<p>Compliance, Policing & On-street Services (CPOS) Initiatives</p> <p>Replacement of the current Compliance, Policing & On-Street Services (CPOS) digital capability for on-street enforcement activities. The existing contracts expire in 2021.</p>
	<p>Taxi and Private Hire (TPH) Re-let</p> <p>Renewal of the Property, Systems and Operating Model for TPH's Contracted Services. The existing NSL contract expires in February 2021.</p>
<p>Public Transport Technology</p>	<p>iBUS 2</p> <p>Replacement of our bus tracking, performance management, and real time bus passenger information system. The contract for this cannot be extended past 2022.</p>

STP Sub-programme	Project and its activities and key deliverables in 2019/20 and 2020/21
	<p>Countdown 3</p> <p>The current Countdown 3 systems contract and the two-year supply, installation and maintenance contracts expire in August 2021. This project seeks to ensure the continued provision of live bus arrival information and the ability to supply, install and maintain the required infrastructure. The project will ensure that a high level of customer experience for bus passengers is maintained and cost-effective mechanisms are in place to supply, install and maintain Countdown infrastructure.</p>
	<p>Future Bus Systems 2</p> <p>Current bus routes and scheduling systems are life-expired and have already been extended through a Single Source Justification (SSJ). Loss of these systems would result in the inability to manage bus operator performance as well as out-of-date network (and therefore passenger) information. This would lead to increased costs due to higher contract payments to operators and significantly degraded customer information.</p>
	<p>Future Bus Systems 3</p> <p>To utilise a better planning tool that will allow the travel planning team to generate better and quicker analysis of any bus route, including its social and revenue impact.</p>
	<p>Airwave to Emergency Services Network (ESN)</p> <p>Narrow Band Radio Replacement – a safety critical project to replace the bus radio system. The current system and assets have reached end of life and the contract has been extended by derogation. The project is key to replacing and upgrading this system.</p>
	<p>Dial-a-Ride Booking System Replacement</p> <p>The Trapeze Dial-a-Ride booking and scheduling system expires in December 2020. The Dial-a-Ride Booking System Replacement will provided customers with self-service access to the most appropriate form of transport and source of funding to meet their travel needs, as well as streamline the in-house process to reduce operation costs.</p>
	<p>Emirates Airline Passenger Communication System (ELA PCS)</p> <p>There are operational issues with the current Emirates Airline Passenger Communications System, which is essential to the safe operation of the cable car.</p>
	<p>Cycle Hire Payments</p> <p>Operating costs are increasing for the current Cycle Hire payments back office system (DBOS) and there are additional requirements for the</p>

STP Sub-programme	Project and its activities and key deliverables in 2019/20 and 2020/21
	system to comply with GDPR requirements and contactless payments. This project will investigate and compare options, including remaining on the current system, purchasing the IP rights, and migrating to a new system (BSS).

Appendix 2 – Surface Technology Proposed Supporting Technical Groups



[page left intentionally blank]

Appendix 3 – Previous Governance Arrangements

New	Healthy Streets Programme	Public Transport Programme	T&D Programme	City Planning	Other
Control Centre Rationalisation	SITS*	Cycle Hire Payments*	<u>iBus 2</u> **	DVS	CPOS Initiatives
Traffic Management Order systems	Highway Annualised Programme*	EAL PCS*	Future Bus System 2	FORS	TPH Re-let
Airwave to ESN			Future Bus System 3		
Countdown 3					
<u>Accstats 3</u>					
Dial-a-Ride Booking System Replacement					

* These elements only form 3% of the total Financial Authority in each of the Healthy Streets and Public Transport Programmes (therefore not affecting the integrity of these existing programmes following the reallocation of funds to Surface Technology)

**iBus 2 to remain in T&D Sub-Programme for 2019/20 and 2020/21 before moving to Surface Technology Sub-Programme

[page left intentionally blank]

Programmes and Investment Committee



Date: 6 March 2019

Item: Air Quality Management

This paper will be considered in public

1 Summary

Air Quality Management Programme 2019/20				
Existing Financial Authority 2017/18-2021/22	Estimated Final Cost (EFC) 2017/18-2021/22	Existing Programme and Project Authority 2017/18-2021/22	Additional Programme and Project Authority Requested 2019/20-2021/22	Total Programme and Project Authority Requested 2017/18-2021/22
£121m	£151m	£5.3m	£30m	£35.3m

Authority Approval: The Programmes and Investment Committee is asked to note the paper and approve budgeted additional Programme and Project Authority of £30m and Procurement Authority of £10m to support the delivery of the Air Quality Management (AQM) Programme. The Committee is also asked to note the transfer of Programme and Project Authority of ULEZ Expansion 2021 into the new AQM Programme from the Air Quality and Environment portfolio.

Outputs and Schedule: The Air Quality Management Programme improves transport's impact on air quality and climate change through the delivery of ULEZ Expansion 2021, ensuring the integration of ULEZ Expansion scheme with new and existing charging schemes, and oversees the policy development and, customer research that will enable evolution in emissions charging. In the next stage of the project we will be developing the business operation solution and will return with an update and request for further authority in due course.

- 1.1 This paper provides an update on the delivery of the ULEZ expansion project and requests the necessary Programme and Project and Procurement Authority to take the project forward to concept design and detailed design.

2 Recommendations

2.1 The Committee is asked to note the paper and to:

- (a) approve an additional £30m of Programme and Project Authority to enable the Air Quality Management (AQM) Programme to progress to concept design and into detailed design;
- (b) approve the additional Procurement Authority request for £10m, giving a total Procurement Authority of £234m, to enable the AQM Programme to progress through concept design and into detailed design
- (c) approve the transfer of Programme and Project Authority of Ultra Low Emission Zone (ULEZ) Expansion 2021 into the new AQM Programme from the Air Quality and Environment portfolio;

3 Background

3.1 The Mayor has a legal responsibility under the Greater London Authority (GLA) Act 1999, to prepare an Air Quality Strategy for London (now part of the London Environment Strategy), and to lead on the implementation of measures in the city to achieve compliance with EU legal pollution emissions “limit values”. London is currently in breach of the legal limits for NO₂ concentrations. Improving air quality is one of the key objectives of the Healthy Streets Approach outlined in the new Mayor’s Transport Strategy (MTS) published in March 2018:

“The Mayor, through TfL, will seek to introduce the central London Ultra Low Emission Zone (ULEZ) standard and charges in 2019, tighter emissions standard London-wide for heavy vehicles in 2020, and an expanded ULEZ covering inner London in 2021.” (Proposal 24)

3.2 There are a number of road user charging schemes already in operation including the Congestion Charge (CC), T Charge and Low Emission Zone (LEZ). ULEZ Central will be provided from April 2019 (replacing T Charge); Low Emission Zone Tighter will be introduced in 2020 (LEZ 2020). In addition, it is intended the HGV Safety Permit Scheme for HGVs¹ will open in October 2019 (voluntary registration) and 2020 (enforcement), and will require a similar back-office operation.

3.3 The Mayor announced in June 2018 that the ULEZ will be expanded on 25 October 2021. Expanding the ULEZ up to the North and South Circular roads will add to the benefits delivered by ULEZ Central and contribute to London achieving NO₂ limit value compliance by 2025 or sooner.

¹ This is not a road user charging scheme but is to be implemented – subject to consultation and confirmation – by means of a pan-London traffic regulation order.

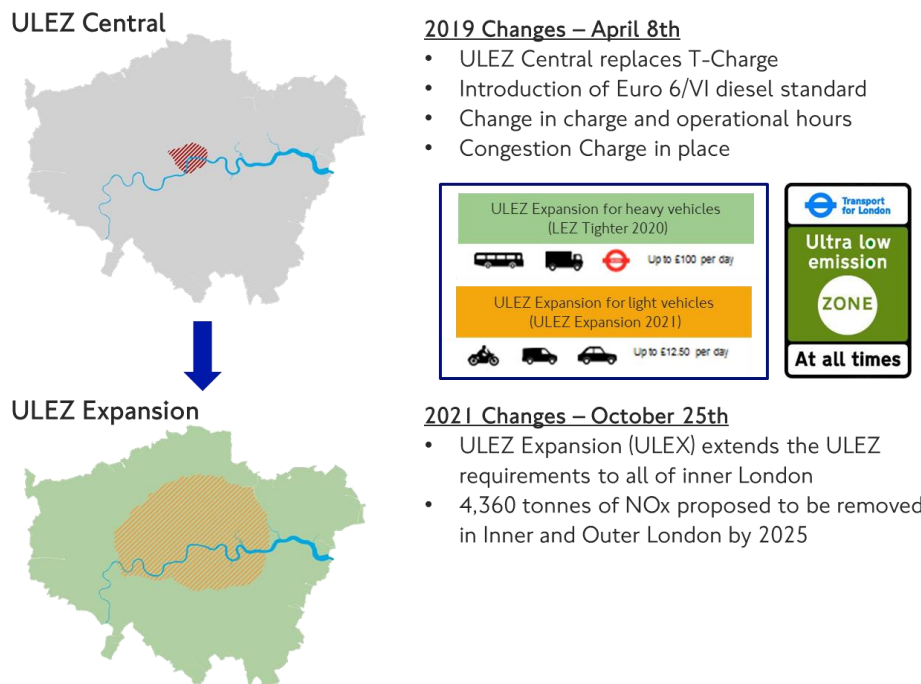


Figure 1 – ULEZ Expansion 2021

- 3.4 The introduction of ULEZ Expansion in 2021 will require the operating system to cater for around four times greater volumes than the current central London ULEZ. The system will need to be scaled to meet the expected demand in addition to the demand seen for the existing schemes (as described in point 3.2).
- 3.5 The Mayor also approved Proposal 21 in the MTS to develop the more sophisticated ‘Next Generation Charging’ systems which could more closely reflect the impacts of usage of roads, and contribute to the overall achievement of the MTS goals. There was general public and stakeholder support during the consultation on the draft MTS for the Mayor’s approach. During this period, two external and independent studies on congestion management² were published which recommended that work be undertaken to develop smarter pan-London road user charging schemes.
- 3.6 As outlined in the MTS, TfL is exploring a range of potential options for developing next generation charging schemes, which contribute to achieving the goals of the MTS. This includes consideration of new opportunities for implementation provided by new technology and the ongoing challenges that London faces in terms of reducing air pollution, reducing carbon emissions, tackling congestion and improving safety.

² Centre for London, October 2017, *Street Smarts: Report of the Commission on the Future of London’s Roads and Streets*; and Integrated Transport Planning (ITP), December 2017, *Understanding and Managing Road Congestion* (commissioned by TfL and GLA)

Current Road User Charging (RUC) Operating Model

3.7 The current operating model for RUC covering the CC, T Charge, LEZ and ULEZ Central schemes comprises three service contracts for the provision of the infrastructure, systems and operations:

- (a) Detection and Enforcement Infrastructure (D&EI);
- (b) Business Operations Services (BOps); and
- (c) Enforcement Operations Services (EOps).

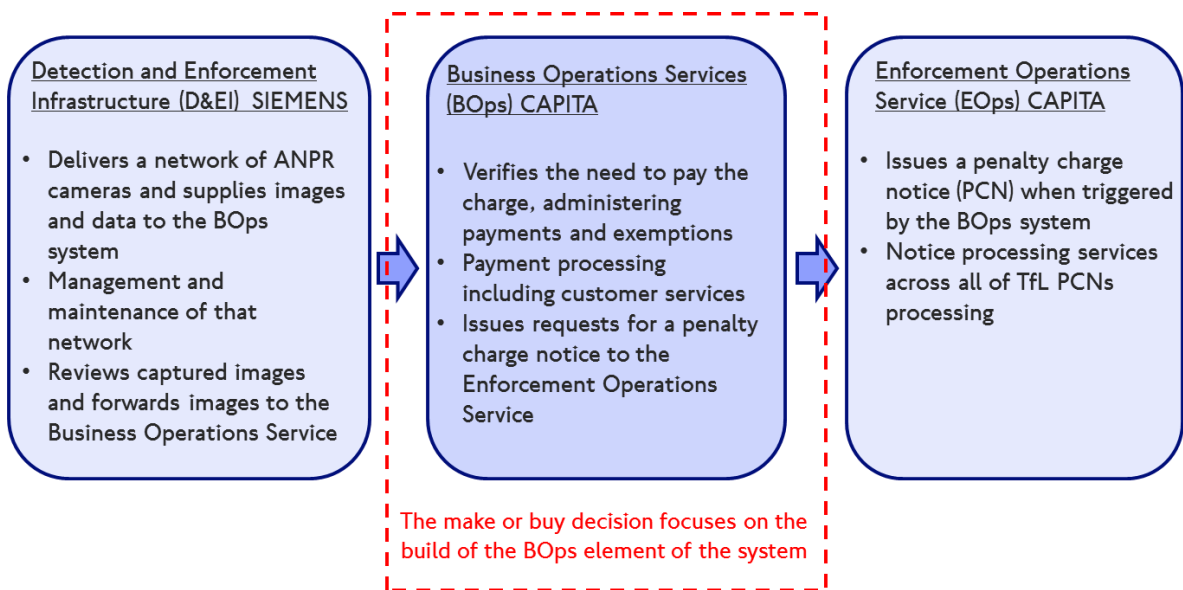


Figure 2 – Interaction between the ULEZ Expansion elements

3.8 The current Business Operations Services (BOps) are delivered under contract by Capita.

4 Project Update

4.1 The project has made good progress in key areas of feasibility including:

- (a) completed Gate 1 Review and handover from City Planning to Surface Sponsorship and established new programme governance structure as detailed in section 5;
- (b) completed project assurance activities including a wholesale production and sign off of Pathway Documentation including updated Business Case, Project Requirements, Delivery Strategy and Schedule;
- (c) completed commercial and procurement activities and produced a procurement strategy for the scheme;
- (d) undertaken Stage 2 Integrated Assurance Review and IIPAG Review in December 2018 and

- (e) feasibility study progressing for options to deliver the systems elements of ULEZ Expansion.

5 Financial Implications

- 5.1 £121m of capital costs for ULEZ Expansion 2021 have been included within the 2018/19 TfL Business Plan. The AQM Programme is at an early level of maturity and an updated cost estimate will be available following key delivery and commercial decisions.
- 5.2 Value engineering and risk management will be used to refine the costs to ensure an affordable EFC is achieved; any remaining cost pressure will be addressed in the 2019 Business Plan. Once the project progresses into concept design, the budget will be updated to reflect the latest EFC.
- 5.3 This paper notes the transfer of Programme and Project Authority of ULEZ Expansion 2021 into the new AQM Programme from the Air Quality and Environment portfolio.
- 5.4 In August 2018, the Committee approved £5.3m of Programme and Project Authority to progress with the feasibility study for ULEZ Expansion 2021.
- 5.5 The Committee is requested to approve £30m of Programme and Project Authority to enable the project to progress to concept design for BOps and EOps and into detailed design stages for BOps (refer to Figure 2 for system elements) through December 2019.
- 5.6 Further discussions are underway with the D&EI service provider to inform a decision on whether to extend the Services Agreement or to re-let it, this decision will be based on a value for money analysis. The D&EI service agreements provide for further charging schemes to be delivered within it and for a further five year extension; in accordance with the Procurement Regulations. A recommendation paper will be submitted to the Committee in due course for a decision.
- 5.7 In order to clarify project design a negotiation and discussion phase will be conducted with existing contractors, meaning further procurement authority is required. The Committee is therefore requested to approve £10m Procurement Authority, in addition to the existing contract authority of £224m with the core service provider for Bops and EOps. An update on progress will be provided to the Committee in due course.

6 Management Case

- 6.1 A Governance structure has been put in place for the AQM programme, which provides the strategic overview for road user charging schemes and visibility of project controls at a senior business level.

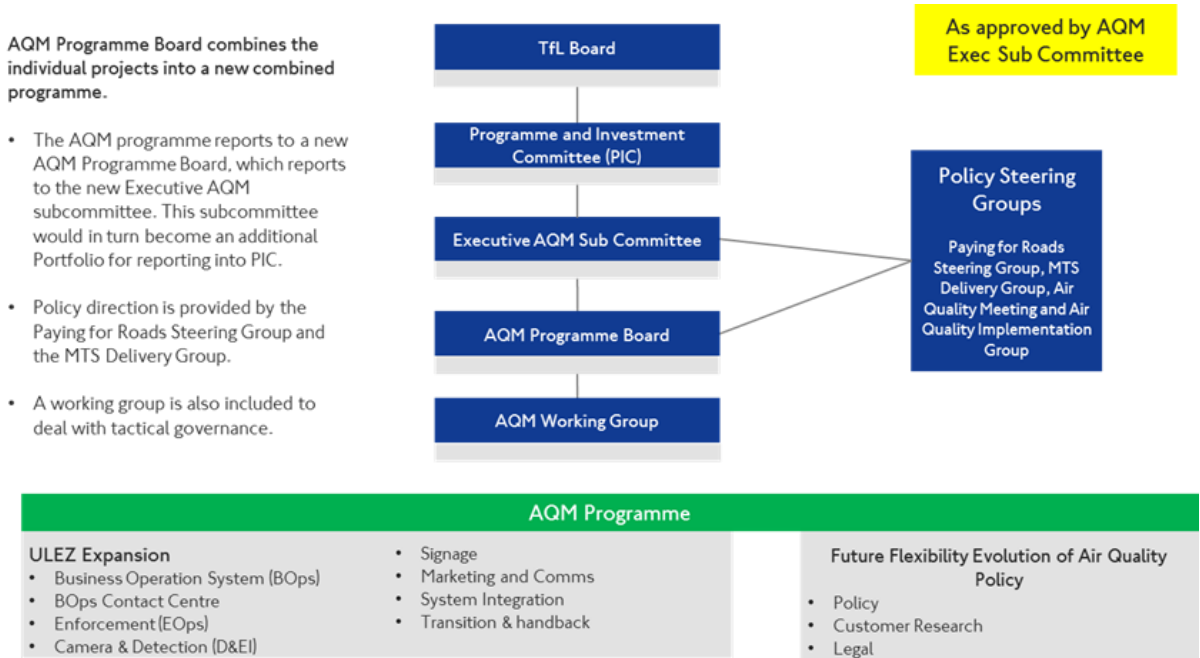


Figure 3 AQM Governance Structure

- 6.2 To achieve successful delivery, a robust governance and delivery model is essential. Tight control and visibility is required through Programme management oversight to ensure the project is on track whilst ensuring good decision making. All areas will report into the established governance process to ensure the project is controlled and being delivered against requirements, cost and time. An established series of meetings provides oversight of progress, risks and change requests. These include a weekly working group and periodic Project Board meetings.

7 Benefits and Value

7.1 The overall aim of this project is to reduce air pollutant levels by reducing emissions from road transport, which it will achieve through the objectives as detailed in Table 1 below:

Objectives	Main benefits
Promote the uptake of cleaner vehicles	<ul style="list-style-type: none"> Improvements in air quality for the benefit of the general public, including visitors and residents of Greater London, resulting in improved health and quality of life and increased life expectancy.³ Particularly beneficial for more vulnerable groups such as children, older people and those suffering from chronic respiratory conditions Reduced burden on the NHS and social care Increasing London's compliance with European limit values for NO₂ and with the WHO's PM recommendation.
Encourage a switch from private vehicles to cleaner, alternative modes of transport	
Successful and timely delivery of ULEZ Expansion by 2021 to meet TfL's obligations under the EU air quality directive and domestic law	
Reduce air pollutant emissions from road transport, particularly those with greatest health impacts, to support Mayoral strategies and contribute to achieving compliance with EU limit values	
Adaptability and flexibility within the system and its operation to support delivery of any schemes	
Improve the health and wellbeing of Londoners	

Table 1 – ULEZ Expansion key benefits

7.2 The Outcome Scoring contained in Appendix 1 summarises the current status of the scheme area based on the MTS Outcomes. This confirms how the scheme has the potential to increase active travel and improved public transport connectivity, whilst reducing air quality pollution.

Delivery Plan

7.3 TfL's Surface Directorate is sponsoring the ULEZ Expansion project with delivery through Projects & Programme Delivery. Operational delivery will be provided by Licensing, Regulation and Charging.

7.4 A high-level Programme plan covering the period 2019/20 to 2023/24 has been completed outlining delivery milestones. This can be viewed in Appendix 2.

7.5 The project has been working through option selection and the upcoming key milestones are detailed in Table 2.

³ In 2016, 6.4% of all deaths in London were attributable to particulate air pollution - substantially higher than England overall (5.3%) reflecting higher pollution levels in the Capital. [Public Health Outcomes Framework](#)

Decisions required		Date
1	Systems elements of Business Operations (BOps)	Q1 2019/20
2	Contact center element:	Q1 2019/20
3	Enforcement Operations (EOps)	Q1 2019/20
4	Detection and Enforcement Infrastructure (D&EI)	Q1 2019/20

Table 2 – Key decision dates for ULEZ Expansion 2021

8 Legal and Equalities Impacts

- 8.1 All relevant public bodies (including TfL) are under a legal duty to take appropriate action to achieve compliance with legal limit values for NO₂ concentrations, and reduce exposure to unlawful concentrations, as soon as feasibly possible. They must use those measures at their disposal that are most likely to succeed in this objective. This duty has been recognised by the courts as an imperative that outweighs other concerns not primarily concerned with securing the earliest feasible date, including the level of public expenditure, value for money and other normal operational considerations.
- 8.2 The Programme will be delivered in accordance with the Equality Act 2010. Equality Impact Assessments are considered on all strategies, policies, business plans, change programmes or projects, having regard to our obligations under the public sector equality duty throughout the delivery of the Programme.
- 8.3 As projects progress through feasibility and design, consideration will be given to the need for an Equality Impact Assessment for each one. Possible effects on people with protected characteristics under the Equality Act 2010 (such as age, race, sex and disability), and mitigations of and countervailing considerations in respect of any adverse effects, will be considered and recorded.

9 Assurance

- 9.1 An Integrated Assurance Review (IAR) and IIPAG Review of assessment criteria was carried out in October 2018 to agree the Make or Buy evaluation criteria, and another in December 2018 – January 2019 to assure the programme through Gate 2 on the basis of the controls, reporting and governance presently in place.
- 9.2 There are three outstanding actions from the projects previous IIPAG review and IAR in August 2018, relating to:
- (a) The risk management structure, which will be developed once a single option is chosen to progress;
 - (b) Gate 1 handover documentation to be completed and an update taken to the February 2019 Board; and
 - (c) Outlining the benefits and dis-benefits of T&D's in house option further.

9.3 A further Integrated Assurance Review (IAR) and IIPAG Review of the project will be undertaken in summer 2019, to support the continued development of options through concept and detailed design.

List of appendices to this report:

Appendix 1: MTS Outcome Scoring

Appendix 2: Air Quality Programme Time Line

Background papers:

None

Contact Officer: David Hughes, Director of Investment Delivery Planning Director
Number: 020 3054 8221
Email: hugheda03@tfl.gov.uk

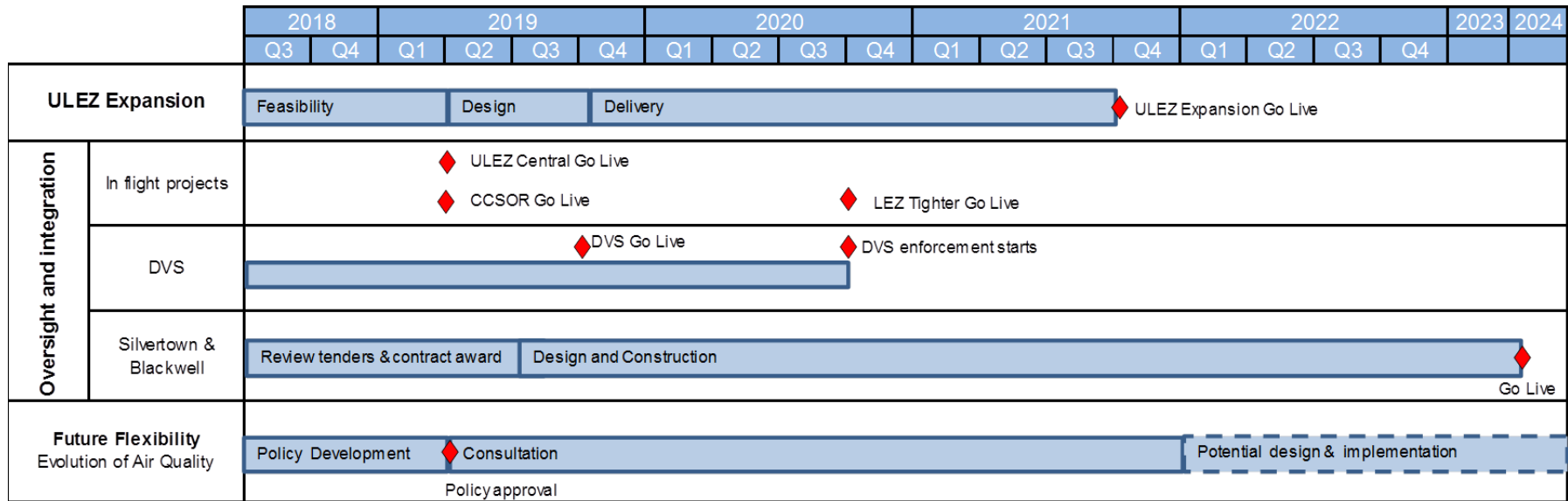
[page left intentionally blank]

Appendix 1 – MTS Outcome Scoring

AREA OUTCOME SCORING	Transport Outcomes		Score	Importance Description	V Low	Low	Medium	High	V High
	Active	Active travel, current & potential cycling & walking levels	+ High	High ped & cycling demand and/or potential	■	■	■	■	
	Safe	Road casualties & crime levels	+ Low	Low collision and/or crime incidence	■	■			
	Green	Air Quality (NO2, PM10)	+V High	Highest pollution level	■	■	■	■	
	Space Efficient	Freight flow levels & car dependency	+ Medium	Average vehicle flows and local car ownership	■	■	■		
	Connected Public Transport	Improved connectivity	+V Low	Highest PT accessibility index	■	■			
	Accessible Public Transport	Access Inequality	+ High	Poor accessibility	■	■	■	■	
	Quality Public Transport	Bus performance, demand and provision	+ High	Low perf. High demand & provision	■	■	■		
	Sustainable, Active Travel Developments	Car dependency & poor connectivity	+ Low	Low car dep. & high connectivity	■	■			
	Unlocking Development	Forecast popn. and employment growth	+ High	High popn. & emp. growth	■	■	■		

[page left intentionally blank]

Appendix 2 – Air Quality Programme Time Line



◆ Fixed contractual/project milestone

[page left intentionally blank]

Programmes and Investment Committee



Date: 6 March 2019

Title: Crossrail 2

This paper will be considered in public

1 Summary

Crossrail 2				
Existing Financial Authority (Since 01/04/2014)	Estimated Final Cost ¹	Existing Programme and Project Authority	Additional Authority Requested	Total Authority
£ 117.27 m	£ 116.30 m	£ 107.64 m	£ 9.63 m	£ 117.27 m

Authority Approval: The Committee is asked to approve budgeted Programme and Project Authority of £9.63 m to continue development activities.

Outputs and Schedule: The current phase of Crossrail 2 involves outline design and delivery planning, to facilitate agreement between the funders of an approach to take the scheme forward.

- 1.1 In March 2016, the Chancellor committed £80m to support the development of Crossrail 2, with the aim of submitting a draft Hybrid Bill to Parliament by May 2020. The Mayor provided a further £80m of match-funding which was approved as part of TfL's Business Plan. Combined with the sum of £19.7m spent on TfL-funded activities prior to 1 April 2016, this resulted in a cumulative Financial Authority of £179.7m at that time.
- 1.2 The Chancellor's decision was predicated on the Secretary of State for Transport joining the Mayor in committing to preparation of a Hybrid Bill, by endorsing an updated Strategic Outline Business Case (SOBC) to be submitted in March 2017.
- 1.3 After the Infrastructure & Projects Authority (IPA) reviewed the SOBC, the 2017 General Election delayed the Government's response to the document. Between May and October 2017, therefore, the Integrated Project Team (IPT) studied ways of further improving the scheme's affordability in response to a recommendation concerning fundability by the IPA. The IPT's conclusions were issued to the Department for Transport (DfT) in October 2017.

¹Includes cost of scheme development carried out by TfL prior to 1 April 2016 and the funded scheme development activities to the assumed date of the 2019 Budget Statement.

- 1.4 In response, however, the Chancellor endorsed an independent review of the funding and financing of the scheme, in his Budget Statement on 22 November 2017. The Independent Affordability Review (IAR), chaired by Mike Gerrard, concluded its initial phase of work in July 2018. The Budget published on 29 October 2018 confirmed that the Government was considering the IAR findings, but would decide on the case for the project at the planned 2019 Spending Review.
- 1.5 In light of the later Government decision with regard to the scheme, and the use of budget originally assigned for Hybrid Bill development in supporting affordability work, the DfT has reduced its contribution to support development of the scheme to £55.86m. The TfL business plan has therefore only made provision for the development work needed until the conclusion of the 2019 Spending Review. The revised cumulative Financial Authority is therefore £117.27m.
- 1.6 This paper describes the Crossrail 2 business plan for 2019/20. An increase in Programme and Project Authority of £9.63m, to the full possible £117.27m, is requested to support the work until the Spending Review outcomes are available.
- 1.7 Crossrail 2 supports the Mayor's strategic objective of 'new homes and jobs', most directly by supporting construction of up to 200,000 additional new homes.

2 Recommendation

- 2.1 **The Committee is asked to note the paper and approve a revised Programme and Project Authority of £117.27m for the Crossrail 2 Programme.**

3 Background

- 3.1 Crossrail 2 is a proposed new railway serving London and the wider South East. It will increase capacity on the most congested parts of Underground and mainline rail routes into London, improve the connectivity of the capital's network and enhance the customer experience for rail travellers. The scheme supports the Mayor's strategic objective of 'new homes and jobs', most directly by supporting construction of up to 200,000 additional new homes
- 3.2 Since February 2015, TfL's Managing Director of Crossrail 2 has led an integrated TfL and Network Rail project team in developing the scheme. Following the 2016 agreement between the Secretary of State and the Mayor to fund the development of the scheme on a 50:50 basis, two Senior Responsible Owners (SROs) were appointed; TfL's Chief Finance Officer, on behalf of the Mayor of London, and the DfT's Director-General of High-Speed and Major Rail Projects, on behalf of the Secretary of State.
- 3.3 As recommended by the National Infrastructure Commission, the IPT submitted an updated SOBC to the Government in March 2017, and requested to begin Development Phase activities, chiefly drafting the Hybrid Bill. The dissolution of Parliament and the urgent Government business following the 2017 General Election prevented the Secretary of State from issuing a response to the SOBC during the summer of that year.

- 3.4 In May 2017, the SROs agreed that the IPT should study ways in which the affordability of the scheme could be improved, as recommended by the Government's Project Assessment Review (PAR) of the SOBC. Affordability work outputs were submitted to the Government in October 2017.
- 3.5 In response to the submission, the Chancellor announced a review of the funding and financing of the scheme. The Secretary of State and the Mayor subsequently agreed to jointly sponsor an Independent Affordability Review (IAR) of Crossrail 2, examining ways in which the funding, financing and the costs and risks of the scheme could be improved. The independent panel was chaired by Mike Gerrard, former Managing Director of the Thames Tideway Tunnel project. The IPT conducted a significant amount of analysis in support of the IAR's deliberations, briefing the panel on the design and transport planning implications of options raised.
- 3.6 An IAR Interim Report was submitted to the Secretary of State and the Mayor in July 2018, and remains under consideration. At the request of the DfT, the IPT has prepared supplementary papers to clarify a number of issues raised in the IAR Interim Report. The supplementary papers are in a near-final state.
- 3.7 In the Budget published on 29 October 2018, the Government indicated that it would consider the case for the project as part of a Spending Review carried out during 2019. A subsequent statement by the Chancellor suggested that the results of that Spending Review will be announced in the autumn of 2019, potentially as part of the Budget Statement.

4 A Second Revision of the Strategic Outline Business Case

- 4.1 The IPT continues to engage with the DfT to understand the materials which could be put forward to aid consideration of the project as part of the Spending Review. A third version of the Crossrail 2 SOBC (or similar analysis) will be required, being an update of the document created in 2015 and revised in 2017. The third SOBC will reflect the work carried out during the IAR (as amended by the supplementary studies referenced above), the latest demand forecast assumptions and the impact of Crossrail on Crossrail 2's funding and financing assumptions.
- 4.2 The IPT is undertaking transport planning, engineering and cost estimating work needed to complete the third version of the SOBC by the end of April 2019. Doing so would allow for assurance and validation prior to the IPT's assumed start of the Spending Review in early summer.

5 The 2019/20 Business Plan

- 5.1 A Crossrail 2 Business Plan has been devised for 2019/20, to support the Government's decision-making and make efficient use of intervening time.
- 5.2 The baseline configuration of the scheme remains as at the second SOBC, in March 2017, though affordability challenges may require the scheme to be delivered in phases. The TfL Scheme Development team is working in collaboration with Network Rail to produce an updated configured design, upon

which a full re-estimate of capital cost can be performed. The new capital estimate will be available in the late spring of 2019.

- 5.3 In addition to pursuing value engineering opportunities, the IPT will also undertake reactive design work to continue engagement with major stakeholders, including the British Library, HS2, the Thames Tideway Tunnel, Network Rail (at Euston and Victoria) and the proposed redevelopment at Clapham Junction.
- 5.4 The IPT planned to re-consult on the scheme in, successively, autumn 2016, summer 2017, early 2018 and early 2019. On each occasion, TfL was asked to postpone the consultation by the DfT, pending the outcome of funding, financing and affordability work. The IPT hopes to undertake a full routewide consultation in early 2020, subject to a positive outcome from the Spending Review, and will prepare necessary materials during Quarter 3 and Quarter 4 of 2019.
- 5.5 In the meantime, risk to the land and property costs of the scheme persists, as the 2015 Safeguarding Directions do not reflect the current scheme alignment. The IPT continues to work with the DfT to consider ways to revise the Safeguarding Directions as soon as possible. The IPT continues to work with the DfT to minimise the risk of conflicting development, and consider the appropriate timing for revisions to the Safeguarding Directions.
- 5.6 Should the Government confirm a decision to move forward with the scheme following the 2019 Spending Review, rapid mobilisation will be required in order to also launch Hybrid Bill development at the start of 2020. The IPT will continue development planning, and, provided that there are no further changes in schedule, progressively reposition and resource the team over the second half of 2019 to support full Hybrid Bill development.

6 Financial Implications

- 6.1 The delayed start of the Development Phase has reduced 2018/2019 costs from the plan as presented to the Committee on 21 February 2018. Total spend to the end of 2018/19 is now estimated at £96.27m, compared to the previous estimate of £106.64m.
- 6.2 The Mayoral contribution of £80m was budgeted in the TfL Business Plan. The DfT contribution was initially front-loaded, in view of TfL's sole support of £19.7m early development costs. The DfT's ability to reprofile its per-year contributions to match the revised workplan has been limited, and it is not able to commit to further funding beyond £55.86m to the end of March 2019.
- 6.3 The 2019/20 TfL Business Plan has made provision for £20.0m, being sufficient to support the work described in Section 5 above until the 2019 Spending Review outcome is available. The revised Financial Authority is therefore £117.27m, and estimated final cost to the Spending Review outcome is £116.30m and is summarised in Table 1 below.

	Pre-2016	2016/17	2017/18	2018/19	2019/20	TOTAL
Total CR2 Cost	£19.70m	£25.34m	£24.68m	£26.57m (Current forecast)	£20.00m (Current forecast)	£116.30m
TfL Funding Budgeted	£19.70m	-	£9.0m	£12.71m	£20.00m	£61.41m
DfT Funding Budgeted	-	£26.00m	£16.0m	£13.86m	-	£55.86m

Table 1: Contributions to Crossrail 2 Development Costs

- 6.4 The Committee is requested to approve Project and Programme Authority to the full amount of Financial Authority.
- 6.5 It is assumed that once the decision is made to submit the Hybrid Bill, both the Sponsors will review the development contributions made to date, in light of the timescales agreed at that time and any development funding allocated by the Spending Review outcome.

7 Proposal

- 7.1 It is proposed that the current Programme and Project Authority is increased by £9.63m to £117.27m, in order to support the Spending Review deliberations and start preparations to mobilise Hybrid Bill development from late 2019.
- 7.2 A paper will be submitted to the first meeting of the Committee following the 2019 Budget Statement, advising of the Spending Review outcome and TfL's plans to move forward with the project. The paper will request Project and Programme Authority for any further planned work.

8 Assurance

- 8.1 Several rounds of assurance work were conducted in respect of the Crossrail 2 project over the course of 2018. Most noticeably, the programme was subject to a six-month independent review in the form of the IAR. An assurance plan in support of this exercise was agreed with a specialist member of the IAR panel, including a review of the IPT's cost estimating work by the consultancy AECOM, a financial consistency check of the IAR Interim Report by a senior consultant from Deloitte and a technical constancy check of the IAR Interim Report by a team from GHD Limited. The IAR assurance plan was implemented in full.
- 8.2 The introduction of supplementary assurance measures for Crossrail 2, including Expert Review Groups of subject matter experts and a senior Independent Assurance Panel, is being discussed with the DfT. Assurance planning is being conducted with a view to the potential separation of Crossrail 2 into a Special Purpose Vehicle, with arrangements informed by lessons learnt from Crossrail 1.

8.3 Prior to submission of this paper, a Targeted Assurance Review of the project was carried out by TfL Project Assurance, with support from Turner & Townsend as the External Expert.

List of appendices to this report:

None

List of Background Papers:

Targeted Assurance Report
IIPAG Report
Management Response to Assurance Reports

Contact Officer: Michèle Dix, Managing Director of Crossrail 2
Number: 020 3054 7108
Email: MicheleDix@tfl.gov.uk

Programmes and Investment Committee



Date: 6 March 2019

Item: London Underground Major Stations Programme

This paper will be considered in public

1 Summary

London Underground (LU) Major Stations Programme				
Existing Financial Authority	Estimated Final Cost (EFC)	Existing Programme and Project Authority	Additional Programme and Project Authority Requested	Total Programme and Project Authority
£2,217.35m	£2,963.04m*	£2,267.42m	£0m	£2,267.42m

*The programme EFC is higher than financial authority because it includes costs to completion of Holborn and Camden Town that fall outside this current business plan period (N.B. Financial Authority does not extend beyond the current business plan period). Provision for the full EFC will be addressed as part of our future business planning.

- 1.1 This paper provides an update on the progress of the LU Major Stations Programme (the Programme) and requests an increase in Procurement Authority for the Bank Station Capacity Upgrade.
- 1.2 A paper is included on Part 2 of the agenda, which contains exempt supplementary information. The information is exempt by virtue of paragraph 3 of Schedule 3 12A of the Local Government Act 1972 in that it contains information relating to the business affairs of TfL.

2 Recommendations

- 2.1 **The Committee is asked to:**
 - (a) **note the paper and the supplementary paper on Part 2 of the agenda; and**
 - (b) **approve additional Procurement Authority for the Bank Station Capacity Upgrade as detailed in the paper on Part 2 of the agenda.**

3 Background

- 3.1 The Programme has been running for over 10 years and has successfully delivered Major Station Upgrades at Tottenham Court Road, Bond Street, Victoria, Vauxhall and Bank Bloomberg. It is also continuing to deliver the Bank Station Capacity Upgrade and includes future upgrades at Holborn and Camden

Town. These major upgrades have been delivered on time, on or under budget and, whilst Bank has seen some cost pressures resulting in an increased Estimated Final Cost (EFC), overall the Programme is on course to be delivered for £77m under its Programme and Project Authority. This has all been achieved whilst keeping trains running, and keeping London moving.

- 3.2 In the Mayor's Transport Strategy, the Mayor states his intent to improve the transport system to ensure a world-class experience. The Programme has been established to effectively deliver major enhancements to stations in order to:
- (a) provide much needed step-change in capacity;
 - (b) ensure that operational resilience is maintained at key interchange stations in the medium to long term;
 - (c) safeguard access to and benefits from upgraded lines; and
 - (d) to support local area regeneration, housing and job creation.
- 3.3 The projects contained within the Programme are at various stages of delivery and, with the exception of Holborn and Camden Town, are fully authorised.

4 Strategic Case

- 4.1 As London grows, the capacity of our stations must keep pace. Major station upgrades are critical to the efficient operation of the current network as well as for planned growth. Planned increases in capacity of train services, such as the uplift in service to the Piccadilly line as part of the Deep Tube Upgrade Programme (DTUP), must be accompanied by increases in station capacity at some locations, for example Holborn. Without sufficient capacity, stations can become bottlenecks, reducing the ability of the system to run smoothly, and result in unplanned closures or extensive operational control measures to ensure the safety of our staff and customers. In turn, this can compromise and delay the benefits of other programmes, such as from line upgrades, new lines and extensions.
- 4.2 In addition to capacity, the Programme enables improvements to be made to station safety, accessibility, easing interchange, with inclusive designs providing lifts and step-free access (SFA). Where appropriate, the Programme also enables commercial opportunities including over-station development (OSD), retail and other increased revenue. These measures benefit all users of the station and optimise value from TfL's investment.
- 4.3 The planning, design and delivery of the individual projects in the Programme take many years and often span multiple business plans. The inclusion as a Major Project reflects not only the quantified value of the project but its strategic importance. These projects can have significant third party interface implications including complex planning permissions, developer agreements and external funding sources.
- 4.4 The individual projects in the Programme contribute to wider TfL objectives listed in the table below. In more recent projects under the Programme, we have embedded the business case and customer benefits within the contract with the delivery partner to ensure these are captured and monitored throughout the project life cycle. The grouping of these projects in a programme enables greater

sharing of best practices, lessons learned and opportunities to aggregate delivery efficiencies.

Major Projects Station Objectives
Increase Capacity
Reduce Journey Times and congestion
Improving the quality of access, interchange and ambience
Improving emergency fire and evacuation protection measures

- 4.5 The Programme comprises of the projects in the table below. An update on the progress of these projects is described in Section 5. Project progress photographs are shown in Appendix 1.

Major Projects Stations include:
Bank Station Capacity Upgrade (BSCU) – to be completed in 2022
Bank Bloomberg Place (BBP) – completed in 2018
Bank Station Systems Integration and Upgrade (BSSIU) – completed in 2018
Bond Street Station Upgrade (BSSU) – completed in 2018
Tottenham Court Road Station Upgrade (TCRSU) – completed in 2018
Victoria Station Upgrade (VSU) – to be completed in 2019
Vauxhall Station Capacity Upgrade (VSCU) – completed in 2018
Camden Town Station Capacity Upgrade (CTSCU) – subject to future funding
Holborn Station Capacity Upgrade (HSCU) – subject to future funding

5 Progress

- 5.1 This section summarises progress made since the last update to the Committee in February 2018.

Victoria

- 5.2 In October, Victoria station became the 75th station on the network to be completely step-free. The new lifts will help ensure the station is accessible to all customers, including disabled or older customers, parents or carers with buggies and people with heavy luggage. The new lifts are part of an upgrade project that has almost doubled the size of the station, with the final work on the Underground station to be completed in summer 2019. Seven new lifts have been installed at the Underground station, making journeys step-free between the street and Victoria line trains and the District and Circle line platforms. Customers from the mainline station can now also travel step-free from trains to the Underground station and interchange more easily between the three Tube lines.

Holborn

- 5.3 Our 2018 Business Plan confirmed our intention to progress the Holborn capacity upgrade, albeit later than originally intended. This is crucial to supporting our upgrade of the Piccadilly line. Holborn station is a key interchange on the Central and Piccadilly lines and suffers from serious congestion in both peak periods. The proposed upgrade includes a new station entrance and enhanced access and interchange including SFA to all platforms as outlined in more detail in axonometric in Appendix 1.
- 5.4 We will shortly start a process to drive innovation and savings on the current proposed design for the station, which will take approximately 12 months. This will support the preparation for the Transport and Works Act Order (TWAO) application process in 2022 (subject to future funding).
- 5.5 TfL has worked closely with the London Borough of Camden on the proposals and are also working with Bee Midtown (the local Business Improvement District) who are a long-term supporter of the scheme and have facilitated stakeholder engagement from the local business community.

Camden Town

- 5.6 Camden Town is a key interchange that serves both branches of the Northern line and approximately 29.6 million passenger journeys each year. Weekday passenger demand has risen by 45 per cent over the last ten years.
- 5.7 A station capacity upgrade design has been developed that proposes to deliver a new, accessible, station entrance at a site to the north of the existing station. However, due to the financial constraints facing TfL, the decision was taken in the 2018 Business Plan to remove funding for scheme implementation from the plan period. Whilst this was disappointing given the good progress made on the project, TfL will be pursuing alternative methods to deliver the project benefits and engaging with potential development partners to support plans for improving the station. This approach has been taken before with the new Bank Bloomberg Place (BBP) entrance to the Waterloo & City line (WCL) and currently being developed at Elephant & Castle.

Bank

- 5.8 At Bank, the new dedicated entrance to the WCL, delivered by the Bank Bloomberg Place project, has now opened to customers, increasing the capacity at Bank and reducing the severe overcrowding that was experienced in the morning peak at platform level. Four new escalators and two passageways connect the entrance to the existing station, as well as two lifts for SFA to the platforms.
- 5.9 Elsewhere at the station, the Bank Station Capacity Upgrade (BSCU) project is progressing well with the new tunnelling nearing completion, and the waterproofing of the new tunnels has commenced ahead of schedule. Over the past year a number of risks have materialised including commercial contractual risks, commitments with building owners and prolongation events. This has resulted in the EFC increasing to £655.7m from £607m (as previously reported in

our Quarterly Investment Programme reports). It is reflected in our business plan and this increase has been accommodated within the existing Programme and Project Authority, given the headroom we have within the Programme as a result of other projects having been delivered under budget. However, in order to manage TfL's obligations under the delivery contract, an increase in Procurement Authority is required, as detailed in the paper on Part 2 of the agenda.

- 5.10 The station will be transformed on completion of the works in 2022. As well as increasing capacity and minimising journey times at the station, new lifts will provide SFA to the WCL platform. SFA will also be introduced to the Northern line and there will be improved SFA to the Docklands Light Railway.
- 5.11 SFA to the Central line was not included in the original scope of the BSCU project due to concerns at the time over the degree of technical and engineering challenges that would need to be overcome, and the likely cost impact to the overall project budget. There was also concern that even if SFA to platforms were feasible, the acute curvature of the Central line platforms and the rolling stock would still make SFA between train and platform difficult without manual boarding ramps. Finally, it was also recognised that by the time BSCU completed, the Elizabeth line would be in service, and providing SFA at Moorgate and Liverpool Street stations, allowing customers to interchange between the Northern, Circle, Hammersmith & City and Elizabeth lines services in the City of London and thus improving accessibility and customer journeys in the area. Therefore, SFA to the Central line was not included in the TWAO powers or the delivery contract.
- 5.12 Notwithstanding, following discussions with London TravelWatch, City of London and Transport for All, we commissioned a feasibility study to explore options for providing SFA to the Central line at Bank. This study considered both the enhanced design and physical changes the BSCU project will bring to the existing layout of the station to identify what new opportunities could be examined. The study identified a viable technical option from street to platform level, but with an estimated cost of £30m. We will consider the merits of progressing the option in the context of the overall SFA programme. However, in terms of prioritisation, the cost of this enhancement would 'crowd out' many smaller SFA schemes.

6 Assurance

- 6.1 A TfL Project Assurance (PA) and Independent Investment Programme Advisory Group (IIPAG) Assurance Review of the Programme was held in October 2018. Nine recommendations were made and are being addressed as detailed in the management response. In addition, project-level IARs were carried out on a number of projects within the Portfolio as set out in the Portfolio's Integrated Assurance Plan.
- 6.2 The Integrated Assurance Plan for the Programme has been agreed with TfL PA and this plan details the project-level reviews that will take place over the course of the year.

List of appendices to this paper:

Appendix 1 Project Progress Photos

List of background papers:

IIPAG and Project Assurance Reports

Management response to IIPAG and Project Assurance Reports

Contact Officer: David Hughes, Director of Investment Delivery Planning

Number: 020 3054 8221

Email: davidhughes03@tfl.gov.uk

Appendix 1 – Project Progress Photos

1. Victoria Station Upgrade (VSU)



Figure 1: New escalators installed as part of VSU.



Figure 2: 1 of 7 new lifts that have made Victoria station completely step-free.

2. Bank Bloomberg Place (BBP)

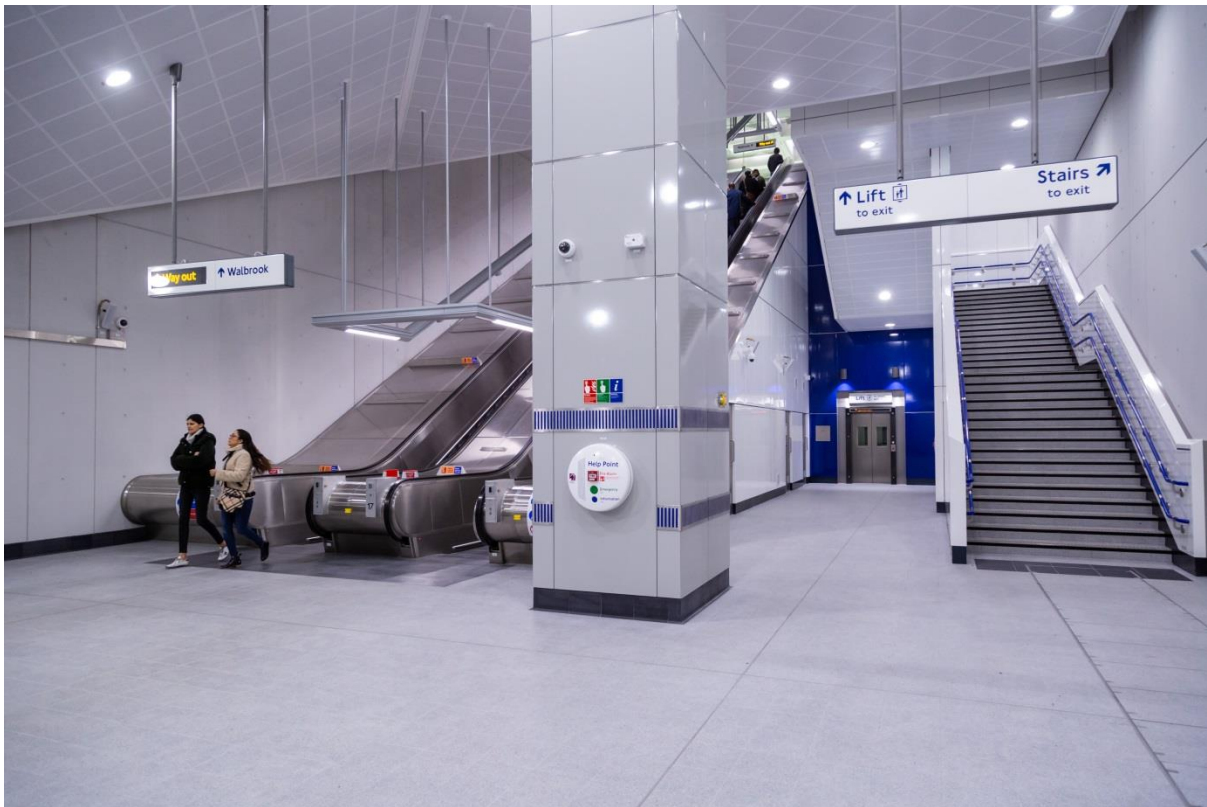


Figure 3: New escalators and lift within the lower concourse of the new station box.

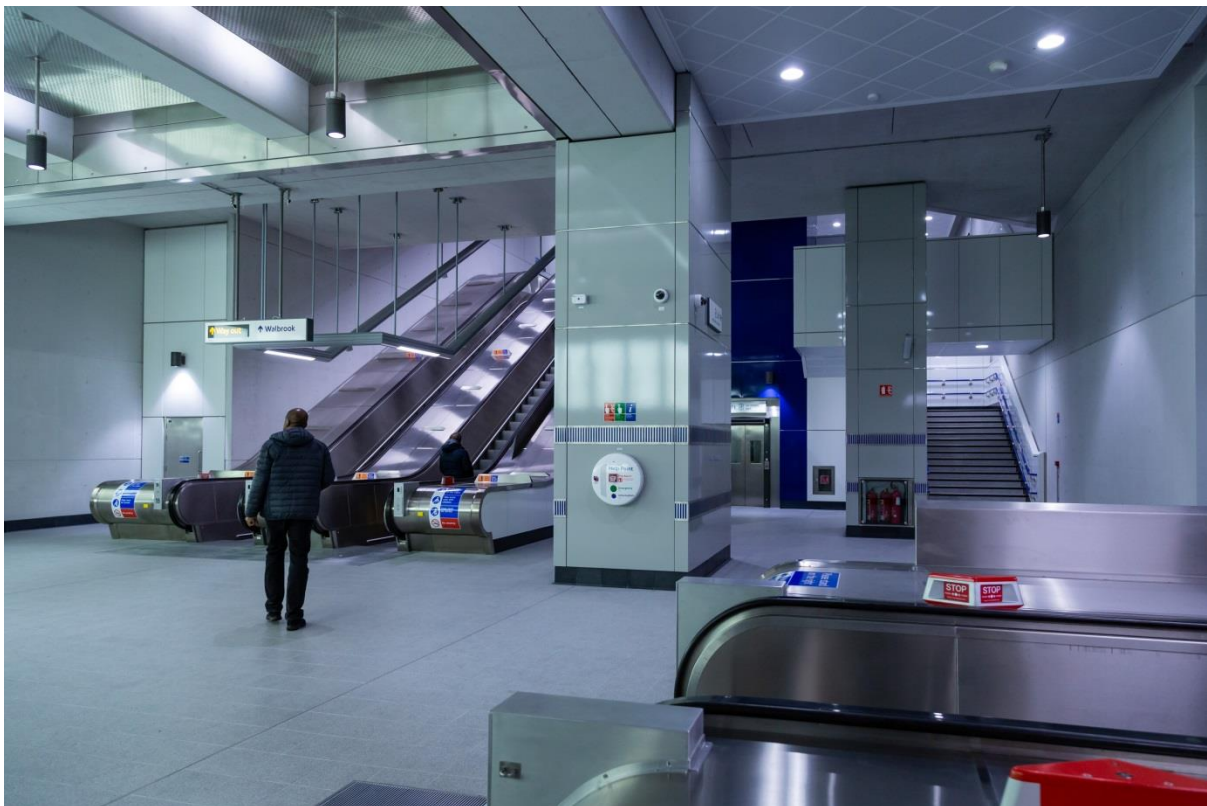


Figure 4: New mid concourse area within the station box

3. Bank Station Capacity Upgrade (BSCU)



Figure 5: Tunnelling the new southbound Northern line and cross passageways (excavated 1000m of a total of 1,300m of tunnels).



Figure 6: Whole Block Site where the new entrance onto Cannon Street will be.

4. Holborn Station Capacity Upgrade (BSCU)



Figure 7: Public consultation image of new station entrance on Proctor Street.



Figure 8: Proposed new entrance.

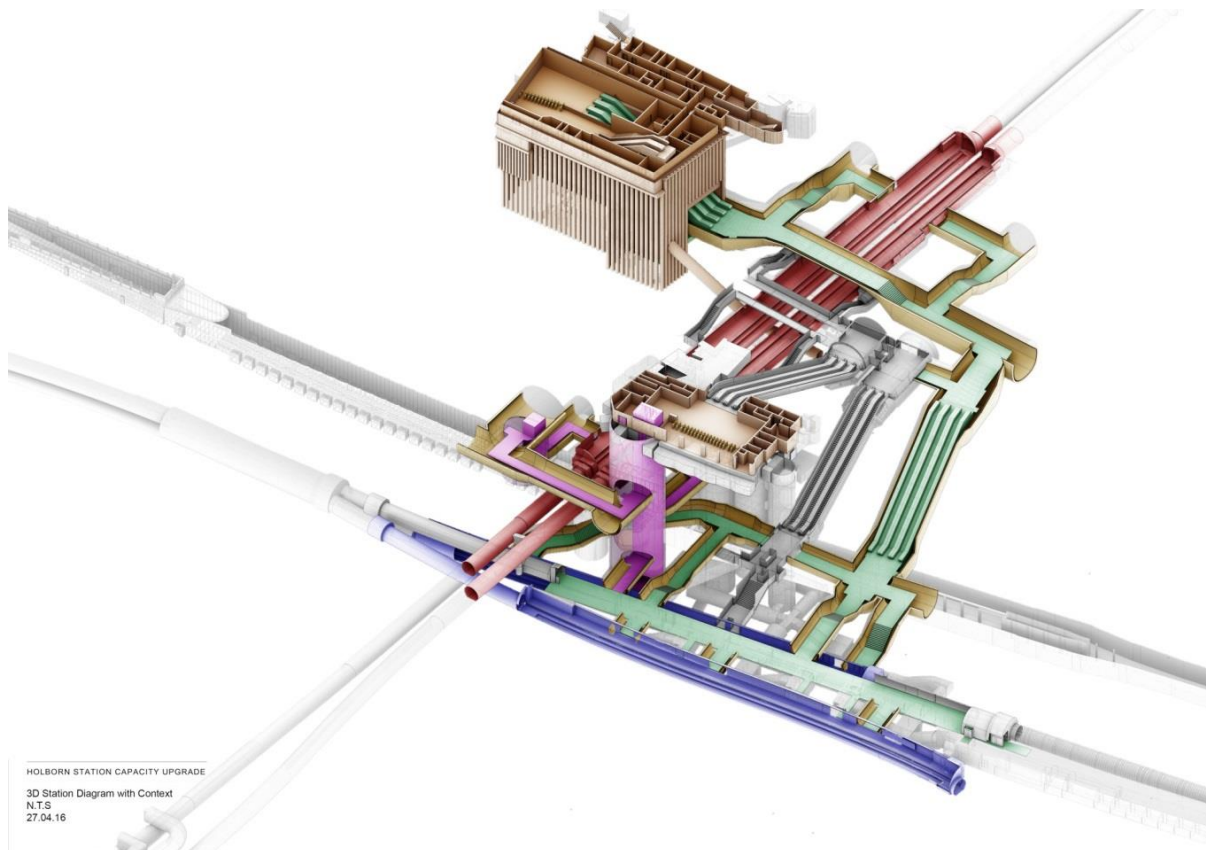


Figure 9: Proposed Station Axonometric (proposed new elements in green and pink)

5. Camden Town Station Capacity Upgrade (CTSCU)

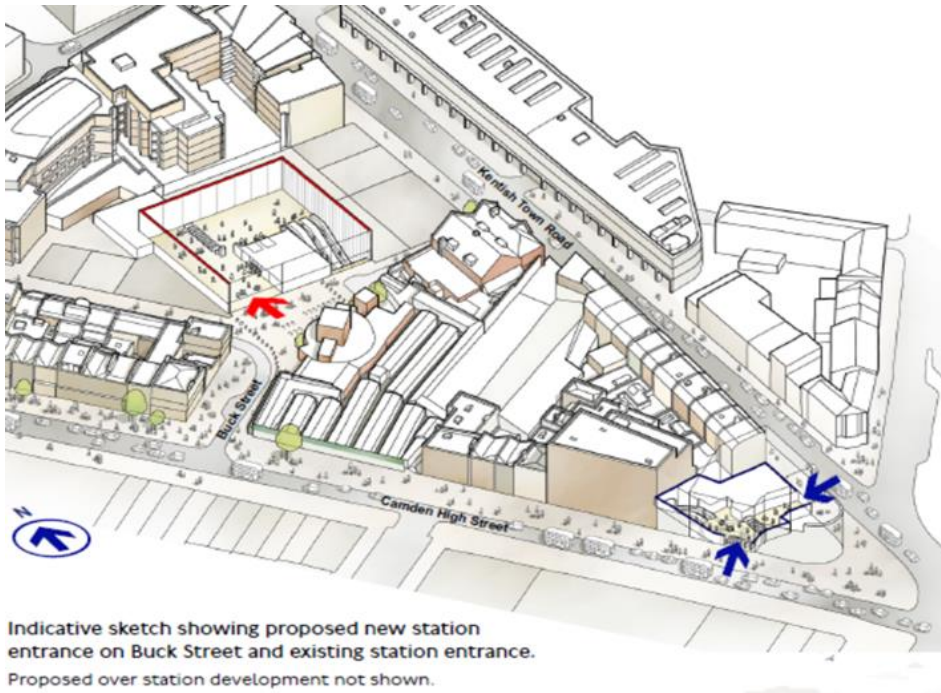


Figure 10: Proposed new entrance location.

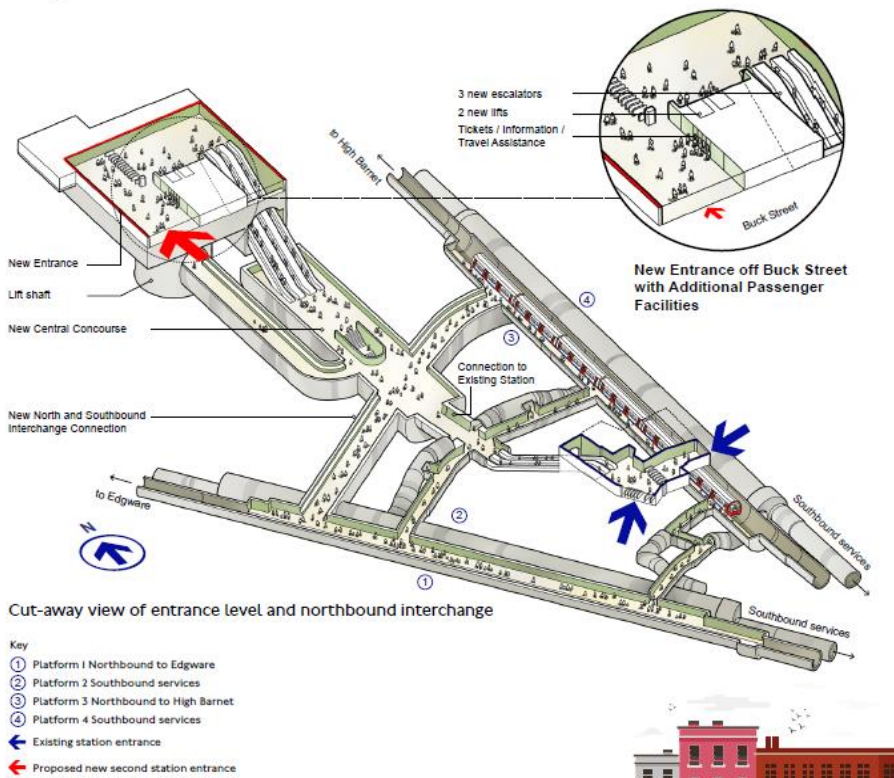


Figure 11: Proposed new connections.

Programmes and Investment Committee



Date: 6 March 2019

Item: London Underground Renewals and Enhancements Signalling and Control

This paper will be considered in public

1 Summary

- 1.1 This paper sets out the request for the 2019/20 Programme and Project Authority for the London Underground (LU) Renewals and Enhancements (R&E) Signalling and Control Programme. It is the third annual submission to the Committee.
- 1.2 With the Programme now established, the focus of this year’s paper is to:
 - (a) present the Programme’s key achievements since the last submission;
 - (b) summarise planned delivery in 2019/20; and
 - (c) give assurance to the Committee on the progress of the Programme.
- 1.3 The paper requests approval of Programme and Project Authority for £2.3m (Outturn including risk), bringing the total authority to £145.6m. Table 1 provides a summary of the request.
- 1.4 The Programme will return annually to the Committee to renew and validate approval for future years.

Table 1 Summary of the Programme and Project Authority request

LU R&E Signalling and Control Programme				
Existing Financial Authority	Estimated Final Cost (EFC)	Existing Programme and Project Authority	Additional Authority Requested	Total Programme and Project Authority
£292.8m	£290.6m	£142.7m	£2.3m	£145.6m

2 Recommendation

- 2.1 **The Committee is asked to note the paper and approve additional Programme and Project Authority of £2.3m (Outturn including risk) for the London Underground Renewals and Enhancements Signalling and Control Programme in order to further improve safety and reliability.**

3 Background

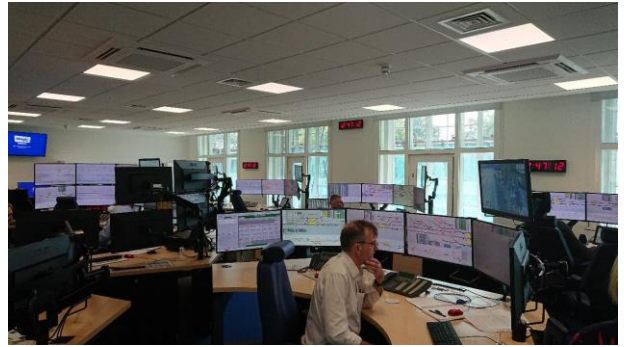
- 3.1 Signalling and control systems are essential for the safe and efficient operation of train services. Some of LU's current signalling and control systems date to the early 1960s, are obsolete and difficult to maintain. This R&E programme was originally established to extend the life of the current systems until upgraded under the Four Lines Modernisation (4LM) Programme or the Deep Tube Upgrade Programme (DTUP) and to ensure obsolescence risk is minimised.
- 3.2 The 4LM Programme is currently replacing signalling and control systems on the District, Metropolitan, Hammersmith and City and Circle lines with a single system. This will be progressively commissioned between 2019 and 2023 supporting incremental service uplifts to 32 tph (trains per hour) in Central London with faster journey times.
- 3.3 The signalling and control systems on the Central and Bakerloo lines are being scoped for life extension work, whilst the Waterloo and City and Piccadilly lines already have enhancement work underway. Since the last submission to the Committee, in May 2018, the decision was taken in the TfL Business Plan 2018 to discontinue the DTUP signalling and control procurement. Consequently, the strategy for the affected systems on the Piccadilly, Central, Waterloo & City and Bakerloo lines is currently being revisited; and includes assessing life extension priorities, so that a safe and reliable train service can continue.
- 3.4 The Victoria, Jubilee and Northern line signalling and control systems currently have no significant interventions planned as these have been upgraded in recent years. Development of obsolescence management strategies are the primary focus for these three lines.
- 3.5 The Programme supports the Mayor's Transport Strategy (MTS) strategic objective of 'providing a good public transport experience', and contributes to the aim within the MTS for 80 per cent of trips in London to be made on foot, by cycle or using public transport by 2041. The Programme also supports TfL's Scorecard measure of 'improving public transport services'.

4 Delivery since May 2018 Submission to the Committee

- 4.1 The **Piccadilly line Interim Control system Upgrade (PICU)** project has successfully installed and commissioned the interim control system across half of the line, with the first migration in June 2018. The second migration is due to take place in late February 2019. This project progressively transfers control of the line from the old system at Earls Court to a purpose refurbished TfL owned building (Griffin Rooms) near South Kensington station, selected for its strategic location close to the Piccadilly line.
- 4.2 There were many challenges converting this building from office accommodation into a fit for purpose control room. The Griffin Rooms include a lift making it LU's first fully accessible control room, providing opportunity for any operator with mobility impairment to work in the building. The design and build of the control system has been carried out internally and will deliver improved operational capability until such time as a full upgrade takes place. Successful completion of

the migration in February 2019 will have migrated control between Cockfosters and South Harrow (around two thirds of the line) to the Griffin Rooms as planned.

Figure 1 – Earls Court Control Centre (left); Griffin Rooms (right)



- 4.3 **Piccadilly line signalling life extension** works have seen the start of signal lamps being replaced with LED units which use less energy and require less maintenance than the current filament lamps. Completion in March 2019 reduces the need for staff to access the track providing both safety for our personnel and improved reliability.
- 4.4 Additionally, ageing Piccadilly line signalling assets containing material now controlled by legislation (i.e. PolyChlorinated Biphenyls (PCBs)) are being replaced with modern, compliant equivalents. This ensures LU meets obligations made with the Environment Agency and the Stockholm Convention for the removal of such materials. This follows on from the removal of redundant trackside assets known to contain PCBs on the Jubilee and Northern lines this year.
- 4.5 Following the outcome of feasibility works, the **Depot signalling** team are currently procuring design of a new signalling control system for the single train depot serving the Victoria line. Replacing the original (1960's) system, this will cater for the 36 train per hour peak service provided by the Victoria Line Upgrade. Depot control staff will be relocated to join colleagues controlling the Victoria line at Osborne House Service Control Centre (SCC), providing them with an improved working environment.

Figure 2 – 1960's Depot Shunters panel (left); Osborne House SCC (right)



- 4.6 For the **Central line signalling and control life extension**, September 2018 saw a framework contract entered into with the Original Equipment Manufacturer (OEM). The first call off gained scope and cost-certainty for a series of work-packages identified to maintain safety and reliability until DTUP install an

upgraded system. However, as a result of DTUP re-signalling being postponed (paragraph 3.3), only the work-packages considered critical for near term line operation are being taken forward to design stage via the second call off which is planned to commence in March 2019. Simultaneously, the medium and long term strategy for the Central line signalling and control is being revisited.

- 4.7 As part of the **Bakerloo line signalling and control life extension**, a pilot trial to modernise train detection equipment has commenced. Separately, an opportunity to deliver externally illuminated 'Permanent Speed Restriction' safety signs was realised. These have been replaced with retro-reflective signs, reducing ongoing maintenance costs and removing 73 filament lamps from the network reducing energy usage on the line. Additionally, LU has procured new computer hardware which is undergoing testing in advance of software integration. This will replace 1980s equipment still in use. Software is being converted from an obsolete to a modern programming language to run on the new computers.

5 Planned Delivery

Additional Authority for Delivery in 2019/20

PICU

- 5.1 Following the largest section (Acton Town to South Harrow) commissioning at the end of the 2018/19 financial year, the additional authority requested in this paper will enable commissioning of the remaining sections of the line. The remaining two sections are planned to be commissioned in July and September 2019, after which the whole line will be controlled from the new facility.
- 5.2 The additional authority will also secure further customer facing changes, as each commissioned section allows information displays on platforms and in ticket halls that have been inoperable for a number of years to be brought back into use.

Figure 3 – Piccadilly line Customer Information



Delivery in 2019/20 under existing Authority

Depots Signalling Upgrades

- 5.3 The contract to be awarded in spring 2019 will produce a concept design for the depot control system. This multi-depot concept is intended to encourage commonality in depot operation, both equipment, and ways of working. Detailed

design and installation will then be progressed in 2020 to develop the design and implementation for Northumberland Park depot.

Central line life extension

- 5.4 As described in paragraph 4.6, in conjunction with the OEM, work will commence on the concept design of the control system renewal, ultimately replacing the central computer platforms and communications interface to the site computers situated in the Central line Signalling Equipment Rooms.
- 5.5 For some signalling work packages, concept design will progress to installation of equipment at pilot sites, with the aim of thoroughly testing solutions before full roll out. These packages cover the critical equipment (e.g. code generators, track circuits and Diverse Monitor programmable logic controllers) which are considered obsolete and at risk of performance degradation.

Bakerloo line life extension

- 5.6 Once testing is complete, the control system will have new hardware installed to replace ageing and obsolete computers. As well as power enabling works, software currently being ported to a modern computer code will continue to be verified and installed on the new hardware. This will ensure the system can be maintained and operated reliably, and remove dependence on a scarce maintenance resource. The signal lamps will be upgraded to LED units following successful roll out on the Piccadilly line.

Northern and Jubilee line obsolescence

- 5.7 Obsolescence management studies are taking place on the Jubilee and Northern lines for the recently commissioned signalling system in order to ensure technologies and skillsets can keep pace for the design life of these systems. As the contractor is also installing the same product family on the Sub Surface lines, there is opportunity to map the lifecycle of products to these other lines, ultimately ensuring signalling components can be refreshed as required with proven and supported hardware and associated skillsets.
- 5.8 The LU R&E Signalling and Control Programme currently comprises the following projects (all cost figures include risk and inflation, these figures show the plan up to 2028/29):

Table 2 Summary of the LU R&E Signalling and Control Programme

Description	Financial Authority (£m)	Estimated Final Cost (EFC) (£m)	Existing Programme and Project Authority (£m)	This Authority Request (£m)	Future Authority Requests (£m)
Central line signalling and control life extension Replacement of obsolete and failing components with modern equivalents.	60.4	60.1	60.1	-	-
Bakerloo line signalling and control life extension Replacement of obsolete and high risk equipment including transferring software to an up-to-date programming language and replacement of depot control panel.	19.7	19.7	9.8	-	9.9
Piccadilly line signalling and control life extension Delivery of a new control system in a secure building, and future asset stabilisation of signalling equipment.	53.9	56.2	50.1	2.3	3.8
Depot signalling and control upgrades. New signalling and control for Northumberland Park depot.	14.2	14.2	12.5	-	1.7
Northern and Jubilee lines signalling and control obsolescence management Audit of components and production of an obsolescence management plan. The implementation of this plan will be the subject of a future authority request.	20.9	20.9	0.9	-	20.0
Point machine conversion Conversion of a large number of machines to a single type has taken place across the network.	13.5	9.3	9.3	-	-
Future Projects Beyond the five year Business Plan, future work streams include further life extension projects, obsolescence management and integrated condition monitoring.	110.2	110.2	-	-	110.2
Totals (£m)	292.8	290.6	142.7	2.3	145.6

6 Financial Implications

- 6.1 The 2019/20 TfL Business Plan provides the financial authority required to deliver the scope described in this paper. A summary of the Business Plan and the requested Programme and Project Authority by financial year is shown in Table 3 Signals and Controls Programme Business Plan Costs.

Table 3 Signals and Controls Programme Business Plan Costs

Costs and Funding (£m Outturn)	Prior Years	2019/20	2020/21	2021/22	2022/23 to 2028/29	Total
Existing Programme and Project Authority	67.7	15.2	20.0	18.2	21.6	142.7
This Authority Request	–	2.3	-	-	-	2.3
Future Authority Requests	–	–	–	4.7	140.9	145.6
Financial Authority (Business Plan)	67.7	17.7	20.0	23.8	163.6	292.8
Programme EFC	67.7	17.5	20.2	22.9	162.3	290.6

- 6.2 The rationale behind the Programme and Project Authority requested in this paper is to ensure the PICU project has sufficient authority in financial year 2019/20 to complete migration of the final sections of the Piccadilly line, and commission customer information where it is not available today.

7 Challenges, Opportunities and Lessons Learnt

- 7.1 The Central line presents an immediate signalling and control system challenge, as originally, works were intended to ensure safety and reliability until the delivery of an upgrade under DTUP in 2033. However with recent changes to the DTUP signalling timescales in the latest Business Plan, only identified critical life extension works, as per this paper, are currently being progressed whilst the medium to long term strategy is being revised. This will also look to deliver the best value to customers, building upon the delivery of enhancements work on the rolling stock under the Central Line Improvement Programme (CLIP) delivered by R&E Fleet.
- 7.2 Further investment is required on the Bakerloo, Piccadilly and Waterloo and City lines to ensure they remain safe and operable until eventually replaced by DTUP. Although the development of life extension scope will have been more complex for the Central line, lessons and opportunities will be transferred to these deep tube lines.

Lessons Learnt

- 7.3 To secure best value in large contracts with a single supplier, a 'two phase' strategy has been implemented. The approach uses the first phase to gain scope and cost certainty for delivery in the second phase. In implementing this on the Central line and Northumberland Park Depot re-signalling contracts, the risk level on the detailed design and delivery stages (phase two), which are both delivered under a fixed price contract, has been reduced. This approach also ensures that the scope of the works is clearly understood by both LU and the contractor, reducing the likelihood of project prolongation and unforeseen cost pressures.
- 7.4 Lessons learnt from the implementation of the PICU project have been shared with DTUP. The project has interfaced with a number of older signalling assets and has re-purposed an old building to deliver a control centre. This experience and the challenges which have been faced are of value to the implementation of the full Piccadilly line upgrade which DTUP will deliver.

8 Assurance

- 8.1 TfL Project Assurance and Independent Investment Programme Advisory Group (IIPAG) assurance review of the Programme took place in January 2019, where no critical issues were identified.
- 8.2 A number of recommendations were made in the TfL Programme assurance and IIPAG reviews, which have been accepted as detailed in the management response.
- 8.3 An Integrated Assurance Plan (IAP) for the Programme has been agreed with TfL Project Assurance over the following 12 months and this plan details the project-level reviews that will take place over the course of the year.

List of appendices to this paper:

None

List of background papers:

IIPAG and TfL Assurance Reports

Management response to IIPAG and TfL Assurance Reports

Contact Officer: David Hughes, Director of Investment Delivery Planning
Number: 020 3054 8221
Email: HugheDa03@tfl.gov.uk

Programmes and Investment Committee



Date: 6 March 2019

Item: London Underground Renewals and Enhancements Fleet

This paper will be considered in public

1 Summary

- 1.1 This paper sets out the request for the 2019/20 Programme and Project Authority for the London Underground (LU) Renewals and Enhancements (R&E) Fleet Programme (the Programme). This is the third annual submission to the Committee.
- 1.2 With the Programme now established, the focus of this year's paper is to:
 - (a) present the Programme's achievements since the last submission;
 - (b) summarise planned delivery in 2019/20 – 2020/21; and
 - (c) assure the Committee on the progress of the Programme.
- 1.3 The paper requests approval for Programme and Project Authority of £118.5m (outturn including risk), bringing the total authority to £671.6m. Table 1 provides a summary of the request.
- 1.4 The Programme will return annually to the Committee to renew and validate approval for future years.

Table 1: Summary of the Programme and Project Authority request

LU R&E Fleet Programme				
Existing Financial Authority	Estimated Final Cost (EFC)	Existing Programme and Project Authority	Additional Authority Requested	Total Programme and Project Authority
£1,011.6m	£1,022.6m	£553.1m	£118.5m	£671.6m

2 Recommendation

- 2.1 **The Committee is asked to:**
 - (a) note the paper; and
 - (b) approve additional Programme and Project Authority of £118.5m (Outturn including risk) for the LU Renewals and Enhancement Fleet Programme in order to further improve safety, reliability and accessibility.

3 Background

- 3.1 The R&E Fleet Programme aims to deliver projects across LU's existing fleet of passenger rolling stock, engineering vehicles and specialist trains such as to provide a safe, reliable and assured service offering to the travelling public, whilst simultaneously reducing the cost of track maintenance.
- 3.2 The Programme supports the Mayor's Transport Strategy (MTS) strategic objective of 'providing a good public transport experience', and contributes to the aim within the MTS for 80 per cent of trips in London to be made on foot, by cycle or using public transport by 2041. The Programme also supports TfL's Scorecard measure of 'improving public transport services'.
- 3.3 LU's objective is to improve safety, reliability, capacity and customer satisfaction, whilst reducing whole life cost. Regarding fleet, this has been part achieved in recent years by the introduction of new trains on the Victoria line, and through the Four Lines Modernisation (4LM) Upgrade with a single fleet of new trains on the Metropolitan, District, Hammersmith & City and Circle lines.
- 3.4 More recently, in May 2018, the Committee approved the award of a contract (placed in November 2018) for new rolling stock on the Piccadilly Line (part of the Deep Tube Upgrade Programme (DTUP)) along with options to procure new rolling stock on the Bakerloo, Central and Waterloo & City lines. Until the new trains arrive, the delivery of the R&E Fleet Programme is essential to keep existing trains on the Central, Waterloo & City and Bakerloo lines in service by investing in targeted renewals and upgrades to ensure performance and regulatory compliance.
- 3.5 Additionally, the Programme is improving the reliability of existing engineering and specialist vehicles, whilst procuring more modern capability to ensure track condition is maintained to the high levels of safety required.
- 3.6 Engineering vehicles (EV) are core to the delivery of LU's track maintenance and renewals programme. LU's fleet of EVs comprises locomotives (used for haulage), wagons of various designs for different activities and plant equipment e.g. cranes. LU also rely upon specialist vehicles e.g. Track Recording Vehicle (TRV) for specific mandatory duties. Due to a sustained lack of investment, the EV fleet is operating beyond its design life with overhaul and frequent reactive intervention required to ensure availability and to reduce the risk of impacting timetabled service.
- 3.7 The authority being sought in this submission supports a continuous programme to maintain fleet performance and EV's to support track renewal works. Specifically, further authority is sought for the Train Modification Unit (TMU) workshop, for passenger rolling stock as part of the Central Line Improvement Programme (CLIP) and to develop early stage propositions for EV.

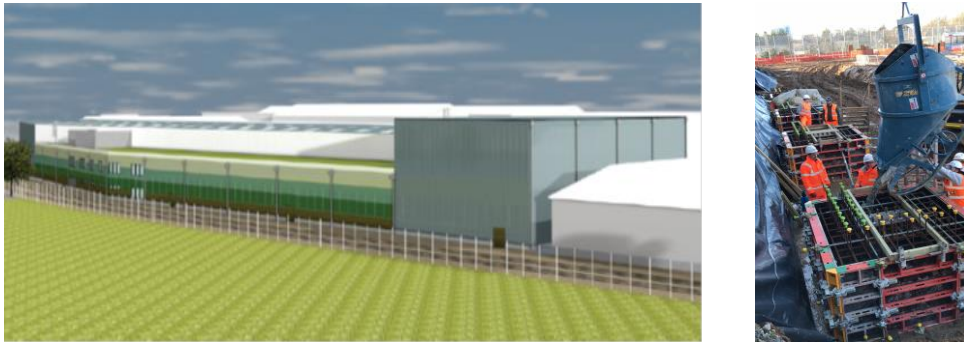
4 Delivery since February 2018 Submission to the Committee

Passenger Rolling stock

- 4.1 The Central Line Improvement Programme (CLIP) commenced in December 2015 and has now awarded all major contracts. The integrated design which includes a new traction system, on-board computers and accessibility improvements is now emerging. Production works are due to commence in late

Spring 2020, and are dependent upon delivery of a new Train Maintenance Unit (TMU) workshop in Acton. This will also support subsequent maintenance and project work on all passenger trains including those planned via the Deep Tube Upgrade Programme (DTUP). Works on the TMU have commenced on-site. However, a hidden structure which was uncovered in addition to late design issues that have had to be rectified have impacted the schedule and cost.

Figure 1: Workshop Design and Foundations Being Poured



4.2 A project has been initiated to improve cab security providing train operators control over unauthorised entry into their cab from the saloon.

4.3 Progress has been made on the design of improvements to passenger accessibility on the Bakerloo line fleet. The installation of wheelchair bays and a passenger information system is scheduled to start in 2019, completing in 2021. Additionally, rectification of age related structural integrity issues to this fleet will complete in Spring 2019. The Jubilee line Mid-Life Refurbishment is approaching 70 per cent complete, this will improve saloon cars and make modifications to comply with accessibility regulations. Completion is forecast in early 2020.

Figure 2: Pre and Post Refurbished Jubilee Line Saloon Car



Engineering Vehicles

4.4 Remote Track Monitoring (RTM) Works to overhaul the Track (geometry) Recording Vehicle (TRV) have extended its operational life for a further five years. A feasibility study on replacing this capability has also been completed and is currently progressing to design stage with a view to being delivered within five years. Additionally, a project to provide an Automatic Track Monitoring System (ATMS) on nominated Victoria, Bakerloo and Sub-surface trains is now in use, increasing track monitoring and enabling 'predict and prevent' track maintenance planning.

- 4.5 Mechanised Renewals Vehicle (MRV) Procurement activities to appoint a contractor for the design and build of a prototype has commenced and is expected to be awarded in 2019. The MRV will mechanise the current manual practice of breaking out and replacing concrete in deep tube tunnels to improve safety of our staff and improve productivity.
- 4.6 Modular Points & Crossings System (Mod P&C) Significant progress has been made to simplify and de-risk the delivery of the Mod P&C suite of vehicles planned to be used to mechanise major points and crossing renewals. Design issues with some equipment has been found and rectified, but has increased programme schedule and cost. Feasibility studies are now complete, focused on modifications to Ruislip Depot to accommodate the new vehicles. An area within the depot is being prepared for training purposes prior to equipment arriving in early 2020.
- 4.7 Engineering Vehicles Overhaul Contracts for the overhaul of four battery locomotives and 107 wagons have been awarded. LU's Transplant has completed the overhauls of existing spoil and ballast wagons to support track renewal works in 2019, before the arrival of replacement wagons in 2020.

Figure 3: Battery Locomotive at Ruislip Depot



- 4.8 Life Extension of Battery Locomotives The last locomotive overhaul was completed ahead of time, in May 2018, and was able to return £4m savings to the business. The overhauls ensure availability of locomotives for essential maintenance and renewal activities critical for a safe railway and included a 750V power upgrade and making the driver cab compliant to latest standards.

5 Proposal: Programme Delivery in 2019/20 – 2020/21

- 5.1 Central Line Improvement Programme (CLIP) and Train Modification Unit (TMU) Workshop: The additional authority requested integrates Central Line train routine heavy maintenance into CLIP, which was scheduled to overlap the CLIP delivery programme. By including these works, CLIP will maximise resource utilisation and negate the need to remove additional trains from service, therefore avoiding passenger disbenefit. Additional authority will also ensure alignment with CLIPs Quantitative Risk Assessment.
- 5.2 The new TMU Workshop supports CLIP production. Authority is requested to address schedule prolongation costs and installation of solar panels, intended to

reduce operational energy consumption contributing towards the Mayor's environmental goals.

- 5.3 **Train Cab J-Door Security Improvements:** The authority requested will improve the current safety-level of train operators by installing a mechanism in all passenger train cab doors that will reduce the likelihood of unauthorised access into the train operator's cab.
- 5.4 **Engineering Vehicles:** the authority requested will modernise LU's outdated track geometry data recording methods, mechanise track renewal, and enhance current practices. Projects such as modularisation of points and crossings renewals, remote track monitoring, locomotive capability, rail adhesion management systems and mechanisation of ballasted track life extensions are all planned to be progressed in 2019/20 and subsequent years.

5.5 The LU R&E Fleet Programme currently comprises the following projects (all cost figures include risk and inflation, these figures show the plan up to 2028/29). Figures in **bold** indicate where authority requests are being made in this paper.

Table 2: Summary of the LU R&E Fleet Programme

Description	Financial Authority (£m)	Estimated Final Cost (EFC) (£m)	Existing Programme and Project Authority (£m)	This Authority Request (£m)	Future Authority Requests (£m)
CLIP & Train Modification Unit Workshop Ensures trains on the Central and Waterloo & City lines remain safe and fit for purpose until replaced by DTUP. The TMU Workshop facilitates rolling stock project and heavy maintenance delivery.	469.6	485.0	379.4	105.6	-
Train Cab J-Door Security Improvements Project will reduce the risk of unauthorised access into passenger train operator cabins from the train saloon.	9.4	9.4	0.5	8.9	-
Bakerloo line passenger fleet life Extension and RVAR Structural repairs, accessibility modifications and reliability improvement works to extend the life of the Bakerloo line trains until they are replaced.	109.2	103.2	97.4	-	5.8
Jubilee line passenger fleet mid-life refurbishment Refurbishment of saloon cars and modifications to comply with accessibility regulations.	25.4	25.6	25.6	-	-
Victoria line passenger fleet Refurbishment works including repair of flooring as well as reducing dust inside the saloon.	4.6	4.2	4.7	-	-
Modularisation of Points & Crossings Renewal Design and manufacture of specialised vehicles for P&C renewals. (The difference between the EFC and Financial Authority will be addressed in the next Business Planning Review)	6.8	8.4	5.9	2.5	-
Remote Track Monitoring A series of work packages to deliver LU's track condition monitoring requirements.	24.5	23.6	1.8	0.9	20.9
Locomotive Capability Commence outcome definition work on heavy haulage capability to support EVs.	187.7	187.7	-	0.2	187.5

Description	Financial Authority (£m)	Estimated Final Cost (EFC) (£m)	Existing Programme and Project Authority (£m)	This Authority Request (£m)	Future Authority Requests (£m)
Rail Adhesion Management Systems Investigate low adhesion management systems to mitigate the effect of leaf-fall on the LU network. Includes future funding to support life extension of the Central line solution	14.4	14.4	7.1	0.2	7.1
Mechanisation of Ballasted Track life Extensions to allow greater productivity.	55.5	55.5	1.9	0.2	53.4
EV Overhauls Life extension and overhaul of engineering vehicles to enable them to remain in service until their planned replacement date.	34.7	33.3	13.6	-	19.7
New Wagons Procurement of 71 wagons to support track renewal and maintenance activities.	11.2	11.7	11.5	-	-
MRV The design and manufacture of specialised vehicles to mechanise deep tube track renewal.	24.9	24.6	3.7	-	20.9
Future Projects Funding budgeted outside of the current five year Business Plan for future work streams including remote condition monitoring on the Jubilee line fleet, rolling stock underframe scanning system to improve maintenance capability as well as Northern, Jubilee and Victoria line life extension and Railhead Profiling.	57.5	57.5	-	-	57.5
Efficiencies					-21.5
TfL Business Plan 2018	-23.8				
Draft Budget 2019/20*		-21.5			
Totals	1,011.6	1,022.6	553.1	118.5	351.3

*There is a difference in efficiencies between TfL Business Plan 2018 and the Draft Budget 2019/20, this £2.3m reduction reflects efficiencies identified and embedded in project EFCs since the Business Plan was set. The Budget is to be approved before the start of FY2019/20.

6 Financial Implications

- 6.1 The TfL Business Plan 2018 provides Financial Authority required to deliver the scope described in this paper. A summary of the Business Plan and the requested Programme and Project Authority by financial year is shown in Table 3. There is a relatively small variance between the Programme EFC and Financial Authority; this will be addressed in the TfL Business Plan 2019.

Table 3: R&E Fleet Programme Costs and funding to 31 March 2029

Costs and Funding (£m)	Prior Years	2018/19	2019/20	2020/21	2021/22	2022/23 to 2028/29	Total
Cost (Outturn)							
Existing Programme and Project Authority	84.8	66.0	73.1	98.8	101.3	129.1	553.1
This Authority Request			12.5	27.1	20.6	58.3	118.5
Future Authority Requests				4.5	17.3	329.5	351.3
Financial Authority (Business Plan)	84.8	76.0	82.4	140.1	139.8	488.5	1,011.6
Programme EFC	84.8	63.5	78.6	130.3	139.2	526.2	1,022.6

7 Challenges, Opportunities and Lessons Learnt

- 7.1 Key challenges and opportunities facing R&E (Fleet) are:
- Ensuring delivery against a realistic schedule.** R&E Fleet delivery has underspent in 2018/19. Quantified Risk Schedule Analysis will be used to improve the schedules and future cost forecast accuracy; and
 - Optimise equipment utilisation.** An opportunity exists for specialist EV equipment, such as cranes, to be made available across other TfL programmes, for example Step-Free Access, civils or station building works. To enable this approach, processes to improve utilisation of vehicles will need to be developed as part of the EV Strategy.

Lessons Learnt

- 7.2 Previous EV projects have attempted to deliver complex and innovative systems in a single step. The consequences were increased costs and protracted programmes. This often resulted in failure to achieve forecast benefits from the end product. We are now taking an “agile” approach to such delivery. For example, the MRV project is producing prototypes from which requirements will mature prior to going to production.
- 7.3 Utilising LU ‘Internal’ delivery resource for rolling stock refurbishment and structural repair has been successful on the Jubilee and Bakerloo line fleets. The internal team have been able to improve productivity by continuously making the process more efficient, allowing savings to be returned to TfL. This has also

enabled the teams to manage condition issues on ageing trains by using internal experience with minimal cost impact. As there are many synergies, lessons learnt will be built into the CLIP production process.

8 Assurance

Progress on IAR recommendations

- 8.1 TfL Project Assurance and the Independent Investment Programme Advisory Group (IIPAG) undertook an assurance review of the Programme in January 2019, where no critical issues were identified.
- 8.2 A number of recommendations were made in the TfL Programme Assurance and IIPAG reviews, which have been addressed as detailed in the management response.
- 8.3 An Integrated Assurance Plan for the Programme has been agreed with TfL Project Assurance for the following 12 months including the project level reviews that will take place over the course of the year.

List of appendices to this paper:

None

List of background papers:

IIPAG and TfL Assurance Reports

Management response to IIPAG and TfL Assurance Reports

Contact Officer: David Hughes, Director of Investment Delivery Planning
Number: 020 3054 8221
Email: HugheDa03@tfl.gov.uk

[page left intentionally blank]

Programmes and Investment Committee



Date: 6 March 2019

Item: Northern Line Extension

This paper will be considered in public

1 Summary

- 1.1 The purpose of this paper is to seek approval from the Committee to enter into a Deed of Variation (DOV2) to the Land and Works Agreement (LWA) and Common Terms Agreement (CTA) relating to the Northern Line Extension (NLE) project between TfL and Battersea Project Holding Company Limited (BPS) recording the parties' agreement to:
- (a) make variations to the LWA in respect of the configuration of the principal worksites and temporary and permanent rights to be occupied and enjoyed by TfL at the Battersea Power Station site, together with variations to the triggers and handover dates for such principal worksites and temporary and permanent rights; and
 - (b) amend the CTA so that it is aligned with the revised handover regime under the revised LWA and to record those matters that are still to be discussed between the parties at a further date.
- 1.2 It is proposed that the relevant obligations and impacts on London Underground's design and build contract arising from DOV2 will be backed off into the design and build contract in order for LU's contractor to discharge those obligations on TfL's behalf.
- 1.3 LU is also undertaking commercially sensitive and confidential negotiations with its design and build contractor. Further details are provided in the Part 2 paper.
- 1.4 A related paper is included on Part 2 of the agenda, which contains exempt information that is exempt from publication by virtue of paragraphs 3 and 5 of Schedule 12A of the Local Government Act 1972 (a) in that it contains information relating to the business affairs of TfL; and (b) in respect of which a claim to legal professional privilege could be made. Any discussion of that exempt information must take place after the press and public have been excluded from the meeting.

2 Recommendation

- 2.1 **The Committee is asked to note the paper and the related paper on Part 2 of the agenda and:**
- (a) **approve the entry into of the Deed of Variation to the Common Terms Agreement and Land and Works Agreement with the developer of the Battersea Power Station (and/or its associated companies), substantially as described in the related paper on Part 2 of the agenda;**

(b) approve the entry into an agreement with LUL's contractor to back-off the relevant obligations and impacts of the Deed of Variation under its Design and Build Contract;

(together the "Revised Arrangements")

(c) subject to the above approvals:

- (i) delegate to the TfL Officers and the Subsidiaries (as described below) the authority to agree and finalise the terms of the Revised Arrangements;**
- (ii) authorise the agreement and execution (whether by deed or otherwise on behalf of TfL or any Subsidiary (as appropriate)) of any documentation to be entered into in connection with the completion and implementation of the Revised Arrangements; and**
- (iii) authorise TfL Officers and Subsidiaries to do all such other things as they consider necessary or desirable to facilitate the execution and implementation of the Revised Arrangements and the matters referred to therein.**

2.2 The following Officers and Subsidiaries shall have delegated authority:

- (a) TfL Officers: the Commissioner, Chief Finance Officer, Managing Director London Underground and General Counsel; and**
- (b) Subsidiaries: Subsidiaries of TfL including Transport Trading Limited and any other subsidiary (whether existing presently or to be formed) of Transport Trading Limited and any of the directors of the relevant company shall be authorised to act for and on behalf of that company.**

3 Background

- 3.1 The NLE provides a twin tunnelled extension of the Northern line from Kennington to a terminus station at Battersea Power Station via an intermediate station at Nine Elms. There are over-site developments (OSD) at both Battersea and Nine Elms Stations. The Battersea OSD is being developed by BPS. The Battersea Station construction site is shared between TfL and BPS.**
- 3.2 TfL entered into a suite of agreements with BPS and its associated companies on 4 April 2014 (the BPS Agreements), including the LWA. The LWA governs the interaction between BPS's and TfL's works in relation to Battersea Station and BPS's OSD. The LWA sets out TfL's rights to access and occupy the BPS site to deliver the station and tunnel infrastructure. In addition to granting TfL interim rights over the BPS site for the construction period, the LWA also sets out TfL's 999 year lease rights for the station and freehold rights for the running tunnels on the BPS land for the operation of the NLE.**
- 3.3 The LWA provides for TfL to have a principal worksite on the BPS site, and this worksite reduces on a stage by stage basis as various elements of the TfL works complete, and land is handed back to BPS at each stage. Land which is handed back to BPS then forms part of the BPS worksite which will be used by BPS in delivering its own works.**

- 3.4 The BPS Agreements were based on the OSD scheme approved by Wandsworth Council in December 2012.
- 3.5 Since 2014, the designs for both the BPS OSD scheme and the Tube station underneath it have evolved. This has required re-work of the Battersea designs tendered by TfL's contractor. TfL and BPS have been in discussions relating to revising the worksites and associated temporary and permanent rights to enable the revised designs to be delivered.
- 3.6 Further details are provided in the Part 2 paper.

List of appendices to this report:

A paper containing exempt supplemental information is included on Part 2 of the agenda

Background papers:

None

Contact Officer: David Hughes, Investment Delivery Planning Director
Number: 020 3054 8221
Email: HugeDa03@tfl.gov.uk

Contact Officer: Stuart Harvey, Director of Major Projects
Number: 020 7126 2909
Email: StuartHarvey@tfl.gov.uk

[page left intentionally blank]

Programmes and Investment Committee



Date: 6 March 2019

Item: Members' Suggestions for Future Discussion Items

This paper will be considered in public

1 Summary

- 1.1 This paper presents the current forward programme for the Committee and explains how this is put together. Members are invited to suggest additional future discussion items for the forward plan. Members are also invited to suggest items for the Committee's induction session and for future informal briefings.

2 Recommendation

- 2.1 **The Committee is asked to note the forward programme and is invited to raise any suggestions for future discussion items for the forward programme and for informal briefings.**

3 Forward Plan Development

- 3.1 The Board and its Committees and Panels have forward plans. The content of the plans arise from a number of sources:
- (a) Standing items for each meeting: Minutes; Matters Arising and Actions List; and any regular quarterly reports. For this Committee these are the quarterly Investment Programme Report, the regular Project Monitoring Report and the regular report on the Crossrail project.
 - (b) Programmes and Projects at a level requiring Committee approval. These include the annual review of the 20 sub-programmes in the Investment Programme and other approvals sought following advice from the operating businesses.
 - (c) Items requested by Members: The Deputy Chair of TfL and the Chairs of all of the Committees and Panels will regularly review the forward plan and may suggest items. Other items will arise out of actions from previous meetings (including meetings of the Board or other Committees and Panels) and any issues suggested under this agenda item.

4 Current Plan

- 4.1 The current plan is attached as Appendix 1. Like all plans, it is a snapshot in time and items may be added, removed or deferred to a later date.

List of appendices to this report:

Appendix 1: Programmes and Investment Committee Forward Plan.

List of Background Papers:

None

Contact Officer: Howard Carter, General Counsel
Number: 020 3054 7832
Email: HowardCarter@tfl.gov.uk

Programmes and Investment Committee Forward Planner 2019/20

Membership: Prof Greg Clarke CBE (Chair), Dr Nelson Ogunshakin OBE (Vice Chair), Heidi Alexander, Ron Kalifa, Dr Alice Maynard CBE, Mark Phillips, Dr Nina Skorupska CBE, Dr Lynn Sloman and Ben Story

15 May 2019		
Quarterly Programmes and Investment Report	Finance	To note high-level progress update against the 20 grouped Investment Programme and Major Project items and any specific approvals required in relation to programmes not on the deep-dive list for that meeting.
Use of Delegated Authority	General Counsel	Standing item
Silvertown Tunnel	MD ST	To note.
LU Lifts & Escalators	MD LU	Annual approval
LU Stations (SFA, LU Crossrail)	MD LU	Regular update on progress
HS2	MD LU	Authority to delegate entry into agreements
Crossrail update	MD LU	Regular update on progress

17 July 2019		
Quarterly Programmes and Investment Report	Finance	To note high-level progress update against the 20 grouped Investment Programme and Major Project items and any specific approvals required in relation to programmes not on the deep-dive list for that meeting.
Use of Delegated Authority	General Counsel	Standing item
Power, Cooling & Energy	MD LU	Annual Approval
LU Track and Drainage	MD LU	Annual Approval
Deep Tube Programme	MD LU	To note.
Crossrail update	MD LU	Regular update on progress

Programmes and Investment Committee Forward Planner 2019/20

23 October 2019		
Quarterly Programmes and Investment Report	Finance	To note high-level progress update against the 20 grouped Investment Programme and Major Project items and any specific approvals required in relation to programmes not on the deep-dive list for that meeting.
Use of Delegated Authority	General Counsel	Standing item
Four Lines Modernisation	MD LU	
World Class Capacity Programme	MD LU	
Crossrail update	MD LU	Regular update on progress

18 December 2019		
Quarterly Programmes and Investment Report	Finance	To note high-level progress update against the 20 grouped Investment Programme and Major Project items and any specific approvals required in relation to programmes not on the deep-dive list for that meeting.
Use of Delegated Authority	General Counsel	Standing item
Crossrail update	MD LU	Regular update on progress

Regular items:

- Quarterly Monitoring Report – to include:
 - high-level progress update against the 20 grouped Investment Programme and Major Project items;
 - specific approvals required in relation to programmes not on the deep-dive list for that meeting;
 - identification of programmes about to issue tenders so Members can input;
- Use of delegated authority by Chair, Commissioner and CFO.
- 4/5 deep dive papers each meeting from the rolling programme of Investment Programme / Major Project items. Papers to seek annual approval for the programme.
- Crossrail 2 – updates and authorities (if kept separate from the Major Project list).
- IIPAG Quarterly Reports Work Plan and Budget (current year).
- Crossrail updates