

Date: 19 July 2023

Title: Technology Programme 2023/24 and 2024/25

This paper will be considered in public

1 Summary

	Technology Programme				
	Existing Financial Authority (to 2024/25)	Forecast to 2024/25	Existing Programme and Project Authority	Additional Authority Requested including commitments beyond 2024/25	Total Authority
Gross Cost	885	860	915	96	1,011
Gross Income	-29	-29	-29	0	-29
Net Cost	856	831	886	96	981

Table 1: Summary of Programme and Project Authority (All figures in £m)

- 1.1 This paper is the first annual submission to the Committee of the newly combined Technology Programme (the Programme) which brings together the former three technology-focussed Programmes – Surface Technology (ST), London Underground (LU) Technology and Technology and Data (T&D) – along with a small number of Rail and Sponsored Services technology projects from the former Public Transport Programme.
- 1.2 The Programme aims to renew and enhance our technology estate to effectively support our operations, ensure compliance with relevant legislation and continually improve our customer experience.
- 1.3 This paper requests £95.7m additional Programme and Project Authority to fund planned budget and business plan investment priorities in 2023/24 (£107.2m) and 2024/25 (£85.9m), as well as commitments that span into future years (from 2025/26) that need to be made before the next planned submission to the Committee in March 2024. This request includes £29m Programme and Project Authority for income which was referenced in the approval given for T&D matters by the Committee in March 2023. There is a related paper on Part 2 of the agenda that provides a breakdown of forecast expenditure, commitments and income. The Committee approved authority for the 2023/24 and 2024/25 T&D aspects of the Programme (including income) in March 2023, meaning no further authority is requested at this time.

1.4 The focus of this paper is to:

- (a) set out the background and context for the Technology Programme;
- (b) provide an update on the progress of project delivery and successes since the previous Surface Technology (July 2022) and London Underground Technology (May 2022) submissions;
- (c) summarise the planned delivery from July 2023 to the next annual submission to the Committee, planned for March 2024, as well as key challenges and opportunities for the year ahead; and
- (d) request an additional £95.7m Programme and Project Authority as outlined in Table 1.

1.5 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 and contractors. Any discussion of that exempt information must take place after the press and public have been excluded from this meeting.

1.6 Appendix 2 sets out the background and progress to date for the iBus2 project. As the procurement process will conclude after the next meeting of the Committee, it is proposed to request approval of Procurement Authority to enable contract award by Chair's Action.

2 Recommendations

2.1 The Committee is asked to note the paper and the exempt supplementary paper on Part 2 of the agenda and:

- (a) approve additional Programme and Project Authority of £95.7m for the Technology Programme, bringing the total Programme and Project Authority to £981.4m;**
- (b) note that matters for which Programme and Project Authority is sought above include commitments that extend beyond the period of the 2023/24 Budget and provision will, therefore, need to be made for those commitments in future Budgets;**
- (c) note that Procurement Authority for the various initiatives will be sought at officer level in accordance with Standing Orders; and**
- (d) note the background and progress to date for the iBus2 project set out in Appendix 2, and that it is proposed to seek approval of Procurement Authority, to enable contract award, by Chair's Action in October 2023.**

3 Background

- 3.1 The Mayor's Transport Strategy (MTS) sets out a vision that TfL "will work to ensure its information systems and payment platforms take account of technological advances and evolve to remain fit for purpose". (Proposal 102). TfL's response to the MTS sets six priorities, including "to exploit technology to produce better and faster results".
- 3.2 The former ST and LU Programmes were established in March 2019 and October 2020 respectively. They consisted of renewals projects to ensure transport operations retain the technology capabilities required to operate safely and efficiently and to ensure our core assets and systems operate in a co-ordinated manner. They also contained a smaller number of enhancements projects which support these aims and help ensure our technology estate capability remains fit for the future while exploring new opportunities to improve network safety and customer security.
- 3.3 Together, they provided a robust structure to support increased levels of investment in technology which have enabled many pillars of the MTS including Healthy Streets, Vision Zero and enhancing customer experience. For example, we are now providing body worn video cameras to deter violence and aggression towards our front-line colleagues; renewing and improving the systems used to operate London's road network so that our colleagues can keep people moving safely and reliably, securing the future of real-time bus journey information and trialling e-bikes in our cycle hire offer. We are also upgrading the critical communication networks that keep trains moving, improving station security and implementing systems to help our compliance teams tackle fare evasion in more innovative ways.
- 3.4 The newly combined Technology Programme will continue to deliver a wide range of benefits. Through technology system renewal and enhancement projects comes reduced network disruption and improved system availability and data across roads, public transport and transport back-office systems. This in turn leads to enhanced customer and staff satisfaction and improved safety and wellbeing. The Programme also aims to deliver financial benefits with income and revenue that can be reinvested into further initiatives, as well as green benefits to reduce our carbon footprint.
- 3.5 In 2022, the Committee approved £154.1m Programme and Project Authority in July for the former ST Programme and £225.9m Programme and Project Authority in May for the former LU Technology Programme. Up to the end of 2022/23, £64.9m had been spent against the former ST Programme with £30.2m in 2021/22 and £34.7m in 2022/23 and £147.9m had been spent against the former LU Programme with £112.9m in 2020/21 and 2021/22 and £35m in 2022/23.

Combining the Technology Programmes

- 3.6 During the previous Integrated Assurance Reviews (IAR) for both former programmes, the Independent Investment Programme Advisory Group (IIPAG) recommended that consideration should be given to combining the programmes

into one, business-wide, technology investment portfolio to enable greater efficiency and co-ordination of planning and delivery.



- 3.7 Further to this, a paper was approved by the Committee in May 2023 which approved the merger of the three technology-focussed Programmes – LU, ST and
- 3.8 The Programme will return to the Committee with a single annual request from March 2024.

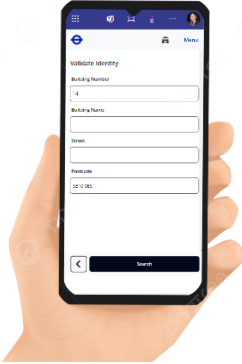
4 Programme Delivery 2022/23

Key Achievements

- 4.1 In the 2022 annual submissions to the Committee, the ST and LU former programmes set out key project deliverables for the financial year. Table 2 sets out progress against these and highlights the achievements and benefits that have been realised.
- 4.2 A more detailed list of achievements and associated benefits realised following project delivery in 2022/23 for the projects within the two programmes is provided in Appendix 1 and a breakdown of the forecast expenditure, commitments and income is provided in the related paper on Part 2 of the agenda.

Table 2: Achievements against key deliverables in 2022/23

Project	Key milestones for 2022/23	What we achieved and key benefits
<p>iBus2</p> 	<p>Releasing the Invitation to Submit Final Tender (ISFT) for iBus2 back-office system procurement in winter 2022/23; to ensure buses continue to operate effectively in London.</p>	<p>Achieved – the ISFT was released in February 2023.</p> <p>We are on track to deliver improvements for our customers with new features including real-time information during diversions; and linking virtually to more traffic lights to help prioritise buses at junctions enabling them to travel more quickly, prioritising sustainable transport.</p> <p>Evaluation of bids is underway with contract award for a three-to-four-year design, development and roll out with contract award scheduled for autumn/winter 2023/24.</p>
<p>Cycle Hire: ‘Modernise and Electrify’ and ‘Expansion’</p> 	<p>Launching 500 Santander Cycle e-bikes in summer 2022, to offer more flexibility for customers and support future financial sustainability.</p> <p>Delivering new Cycle Hire docking stations in Southwark.</p>	<p>Achieved – 500 e-bikes were successfully delivered into operation on 6 October 2022.</p> <p>Although slightly delayed due to supplier delivery, systems integration taking longer than expected and Operation London Bridge, our e-bikes are proving popular with our customers; with total hires exceeding 250k and daily utilisation twice as much as classic bikes.</p> <p>E-bikes are completely carbon neutral and have “assisted peddling” with 15mph maximum speed making them a quick and sustainable way for customers to travel. We aim for e-bikes to help break down the barriers that stop some people from cycling, including fitness, age and journey length.</p>

		<p>The Cycle Hire Southwark Expansion (funded by Southwark Council) was completed at the end of 2022, providing seven new docking stations for people to use in Bermondsey and Walworth. The expansion has allowed more people in Southwark to explore the Capital in an affordable way that supports their physical and mental wellbeing, while helping to cut air pollution and protecting the local environment. They also enable people from across London to end their journeys in Bermondsey and Walworth.</p>
<p>Enforcement, Compliance and Operational Safety (ECOS)</p> 	<p>System renewal to provide front line colleagues the tools to deliver enforcement and compliance across London, including a mobile app which officers use to ensure taxis are operating safely, in line with TfL and national standards.</p> <p>Development of new capabilities to commence mid 2022/23 onwards, with incremental software releases until 2023/24.</p>	<p>Achieved – Taxi and Private Hire mobile app developed in November 2022. The app is developed to work with new Taxi Operating Licence Application software which is scheduled to be released in June 2023 and provide on street access to key licensing information.</p> <p>During 2023/24, mobile access will be rolled out to operational officers across other various operational systems and areas.</p> <p>Integrated technology within the new app means that our officers will no longer need to call in each time they report an incident on the network or retrieve key compliance information, enabling a more efficient operation.</p>

Deployable Enforcement Cameras (DEC) – Phase 2



Installation of 42 additional DEC sites across London's network by March 2023.

DECs are mounted on a lamp column and are moveable from location to location. They automatically capture a video of any traffic contravention which, once validated, are processed for issuing of penalty charge notices. This has direct benefits for our customers including reducing road danger, increasing bus lane compliance, and reducing congestion at junctions. Revenues generated are reinvested back into the business to further benefit customers.

Partially achieved – By the end of March 2023, 26 sites were installed.

Delivery on site fell short of target owing to more lamp columns than anticipated failing structural surveys which resulted in additional structural work or alternative sites needing to be located to ensure the structural support is sufficient for mounting cameras onto.

The delay to installation has meant a delay in realising the safety benefits and in turn, a loss of expected revenue during that period. Lessons are being learnt regarding the structural aspects and acceleration of delivery on site is planned through 2023/24 as a result.

Body Worn Video Cameras (BWV)



Deliver approximately 300 additional BWV cameras in 2022/23

Achieved – By March 2023, 300 additional BWV cameras were delivered to operational staff.

Following increased unacceptable incidents of Work-related Violence and Aggression (WVA) against our staff, this project aimed to roll out BWV cameras to all TfL staff at risk of WVA.

A key commitment from our Workplace Violence Strategy, the cameras capture video and audio that may be, and have been, used by the Police for potential prosecutions of individuals and have proven useful in de-escalating situations and preventing staff assaults, therefore improving staff satisfaction and wellbeing.

Surface Intelligent Transport System (SITS)



Complete final release of Phase 1 of the Common Operating View Incident Management System (COV IMS) by February 2023

Achieved – COV IMS completed all the code required for the final release of Phase 1 in February 2023, achieving a Tier 2 Milestone.

COV IMS is replacing our existing incident management system and enables us to detect incidents faster by using a live feed of on-street traffic conditions and flagging issues directly to our Control Centre. Our colleagues continue to provide positive feedback on the new system.

The SITS programme is a collection of new tools and systems used by our Network Management team and are aimed at making our roads safer and more efficient.

Passenger Incident Management Systems (PIMS)



Mobilisation in summer 2022 to ensure a system is in place to manage incidents in the Network Management Control Centre (NMCC).

The project aims to renew the capability for Control Centre colleagues to manage passenger incidents effectively, sharing information with third parties including emergency services and bus operators ahead of the existing system expiring in 2025.

Achieved – The project was mobilised in August 2022, conducted early market engagement from March to May 2023, and is currently evaluating Build vs Buy Options to determine the approach with best value.

PIMS will facilitate continuation of ability of operational staff to log, view and manage incidents, as well as enable staff to plan solutions for incidents and events using historical data from previous incidents and events.

Remote Monitoring to Next Generation Remote Monitoring (NGRM)



Complete feasibility and confirm a solution by September 2022.

Achieved – Gate 2 passed in September 2022.

The project will deliver new traffic signals hardware and capability to ensure we are able to continue monitoring traffic signal faults remotely once the BT communication lines are switched off in 2025. Without this system, we would be unaware of faults or problems with traffic signals which would cause disruption and congestion as well as increasing road safety risk.

Countdown 3



Procurement of new support contract for the supply, installation and maintenance of countdown signs to start in autumn 2022.

Partially Achieved

Commencement of procurement took place in April 2023, delayed from autumn 2022 due to a revised procurement approach being taken forward. While this does represent a delay to the contract award, some of this time has been recovered through procurement as only one supplier is being sought meaning it will take less time to review.

We also decided to delay procurement to take advantage of emerging industry standards for real time information across public passenger transport. We have taken a leading role on the board for these standards – helping to shape the way forward with the joint aim to make it cheaper and easier use open-source real time information through a common standard approach. This adoption of standards has enables us to reduce (forecast) data traffic costs and will allow us to open the market to a wider range of bidders to improve future commercial opportunities.

The new support contract will enable countdown signs to receive data directly from iBus2 in future and will support providing Real Time Information to third party assets. This will help to maintain and enhance customer information, delivering an overall improved customer experience.

Connect



Replacement of 100 Connect radio units by March 2023

Achieved

By November 2022, 100 radio units were replaced, ahead of target. The units provide communication between LU trains, stations and operational control rooms.

Connect radio is fundamental to the operation of London Underground and the radio upgrade delivers a supportable system that provides many more years of service and exploits the significant investments the business has already made. The upgrade has been delivered without any customer impact.

Station Security Technology Integration Programme (SSTIP)



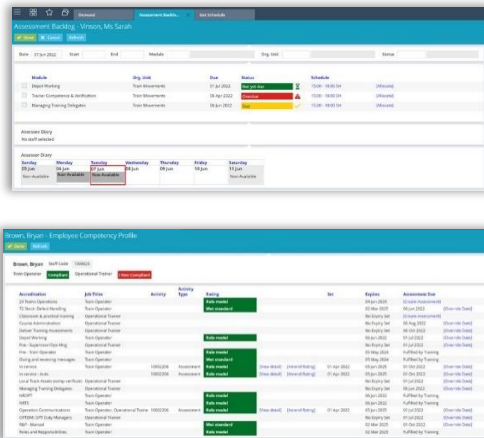
Delivery of Critical Incident Management (CIM) functionality at 100 LU stations by March 2023 in response to the Lord Harris Report (2022)¹.

Achieved

CIM was successfully installed and operationally ready at 101 sites by March 2023, improving our remote response capability.

This functionality provides us with the ability to remotely control and evacuate a station in the event of a critical incident. These measures are supported by the Department for Transport and the Centre for the Protection of National Infrastructure.

Competency Management System (CMS)



Complete design and implementation of new CMS for train operators including trial by March 2023

Achieved

Completed design and implementation of a new competency management system for train operators by January 2023 and rolled-out new system to Piccadilly Line operations. The system will now be rolled-out to other lines over coming years (as part of Business-As-Usual (BAU)), whilst we investigate the feasibility of a broader business-wide application of the same CMS tool. Early indications suggest that the new CMS is having a positive effect upon training attendance. A more detailed review of the benefits achieved is underway and will be used to inform the feasibility of any further roll-out across the organisation.

¹ Harris, T (2022). London Prepared: A City-Wide Endeavour – An Independent Review of London’s Preparedness to Respond to a Major Terrorist Incident.

Asset Management Information Systems (AMIS)



Complete project mid 2023

Delayed

Project completion is delayed due to a culmination of several issues including poor supplier performance, gaps in solution capability and missed business dependencies) and now due to be completed by the end of 2023/24.

AMIS underpins our ambition to become one operational organisation by consolidating two legacy Asset Management Systems onto a single solution. The project will save us £21m over 10 years by reducing our spend on supporting and upgrading two systems. It also enables organisational change in some areas such as the Asset Control Centre, removes boundaries to operating as a single asset organisation and enables a new standard way of managing our maintenance service providers.

So far, the project has delivered to over 2,800 users (70 per cent of total users in scope) and migrated the following asset areas into a single system: Asset Control Centre, Fire, Mechanical, Premises, Pumps, Lifts, Escalators, Electrical, Cables, Signals and Fleet.

The remaining areas to migrate are Track, High Voltage Power, Civils, Communications and Trams (multiple asset types).

Delays to project completion means we need to retain project resources for the remainder of 2023/24, increasing overall project costs, reflected in increased EFC.

Financial Performance and changes to EFC

- 4.3 At the last submission to the Committee in July 2022, £42.7m Programme and Project Authority was granted for the former ST Programme for financial year 2022/23 and £34.6m was spent. The financial year budget was reset in Period 7 of 2022/23 to £36.3m due to changes in government funding agreements. Key causes of the £1.7m underspend in 2022/23 include issues with supply chain resourcing impacting the number of projects and pace at which they could be delivered; particularly commercial resources that were required for projects with contractual elements. Efficiencies of £2.2m were also realised within the financial year. In May 2022, Programme and Project Authority was granted to the former LU Programme for a forecast spend of £32.9m for 2022/23 and £35m was spent. This is due to a deliberate acceleration of planned spend from future years to 2022/23, which enabled us to purchase critical radio hardware at discounted costs and to mitigate the impact of long lead-in times within the supply chain.
- 4.4 Since the last submissions to the Committee, there have been some changes to EFCs, details of which are included in the related paper on Part 2 of the agenda.

5 Investment Plan 2023/24 – 2024/25

- 5.1 The 2023/24 Programme consists of 80 projects, with 59 renewals and 21 enhancements; of which 57 projects are continuing from last year and 23 are new for 2023/24 or 2024/25 (see Appendix 1 for details). Sixty-two projects are expected to continue in to 2024/25 with 18 due to close in 2023/24.
- 5.2 An overview of the financial plan for 2023/24 and 2024/25 is set out in Table 3, and a separate Part 2 of this paper provides the breakdown of forecast expenditure, commitments and income. See Appendix 1 for further information on deliverables planned during 2023/24 and 2024/25.
- 5.3 Notable milestones for 2023/24 are:
- (a) **iBus 2** – Contract award for iBus2 system renewal by winter 2023/2024;
 - (b) **Deployable Enforcement Cameras (DEC) Phase 2** – Installation of DEC at 265 sites across London by end of March 2024;
 - (c) **Cycle Hire Re Let** – Publish Contract Notice by summer 2023;
 - (d) **SITS RTO (Real Time Optimiser)** – Ready to commence migration to live operations by autumn 2023;
 - (e) **TfL's Video Management System (TVMS)** – Commencement of procurement by summer 2023;
 - (f) **Connect** - Complete roll out of new radio hardware base stations at all 293 locations by March 2024; and
 - (g) **AMIS** - Complete delivery of AMIS migrations for LU assets by February 2024.

6 Financial Plan

- 6.1 Of the £981.4m total Programme and Project Authority sought in this request, £107.2m is to fund investment planned for 2023/24 and £85.9m is for 2024/25. The Programme will return to the Committee on an annual basis to request Authority for a rolling two-year approval with the next submission planned for March 2024.
- 6.2 Additionally, £97.1m for future financial years is included, to cover existing or planned commitments made before the Programme returns to the Committee in March 2024, notably for iBus2.
- 6.3 A paper is planned to be submitted in October 2023 requesting approval for contract award recommendation – see Appendix 2 briefing paper which sets out background and progress to date for iBus2. It is anticipated that the procurement process will be concluded during October 2023 and the contract award announced in November 2023. As the next meeting of the Committee is scheduled for December 2023, it is proposed that a Chair's Action request will be submitted to Committee in mid-October 2023 summarising the outcome of the process and requesting approval of Procurement Authority.
- 6.4 Further details on commitments are shown in Appendix 1 and the related paper on Part 2 of the agenda. In some cases, this extends beyond the period of the Business Plan and Budget (Financial Authority is to 2025/26). Appropriate provision will, therefore, need to be made for those commitments in future Business Plans and Budgets.
- 6.5 This authority request aligns with budgeted expenditure spend for 2023/24 and our approved business plan for 2024/25, also including allowances for efficiencies. Opportunities to deliver savings include reduced risk exposure through careful risk management, close management of scope and requirements, and working with suppliers to deliver projects more efficiently. Our forecast expenditure is currently higher than our budget for 2023/24. This is primarily due to the adoption of a work-bank management approach enabling us to accelerate further priority schemes should other projects take longer than forecast or if additional funding were to become available in year. The work-bank will be managed closely throughout the year to ensure our programme-level budget is not exceeded.
- 6.6 All projects within the Programme currently sit within one of four reporting categories in SAP (one for LU and three for ST), which were set up when the former ST and LU Programmes were initiated. Appendix 1 shows how the Technology projects are expected to map across into a new reporting structure that is currently being created within SAP.
- 6.7 The projects are grouped into reporting categories to aid delivery, governance and financial reporting. These categories are based on delivery areas with common modes, strategies, end users and / or stakeholders.

Table 3 – Overview of financial request (all values in £m)

	Existing Authority	Prior Years Spend	Planned Expenditure 2023/24 (Budget)	Planned Expenditure 2024/25 (Business Plan)	Future Commitments (25/26 and beyond)	Authority Requested	Total Authority
Surface Tech	157.7*	64.9	66.7	49.9	96.7	120.5	278.2
LU Tech	225.9	147.9	40.5	36.0	0.4	-24.8**	201.2
T&D***	502.2	-	-	-	-	-	502.2
Total	885.8	212.8	107.2	85.9	97.1	95.7	981.4

*Existing Programme and Project Authority for Surface Technology includes £3.6m for the Ticket Vending Machine (TVM) project, which has been transferred from the Public Transport programme. This will be formally removed from the Public Transport programme as part of their submission to the Committee in July 2023.

** Authority for the Connectivity Asset Renewal (CAR) Programme is not being sought as part of this request. Due to the size and complexity of this programme, a further submission will be made to the Committee in late 2023 seeking additional authorities to proceed. Combined with re-allocations and cost savings across the programme, this has resulted in a negative-value Programme and Project Authority request for the LU Technology sub-section.

***T&D is not considered as part of this paper – details provided for context.

7 Key Challenges and Opportunities

7.1 The joining of the three Technology Programmes presents a key challenge in terms of the resources and planning required to implement such a change. It also presents a key opportunity in terms of bringing efficiencies into the Programme including across governance and delivery. The joining of Surface and LU Technology sub-sections, as an initial step, is in progress and relevant teams are engaged in the requirements. This will include standardisation of governance and mapping of appropriate value chain representatives to ensure robust reporting and decision making is in place at all levels. Existing best practice opportunities are being investigated to enable the optimal solution to coordinate across operational and delivery areas

7.2 Available resourcing and cost forecast accuracy are also key challenges to delivery. The current Programme plans reflect resource requirements and existing availability and there will continue to be a focus on forecast accuracy to ensure the Programme identifies internal and external resource gaps where possible. The related paper on Part 2 of the agenda includes details of changes to project EFCs since the last submission along with rationales. In addition to a focus on more accurate early forecast accuracy, we will also carry out a series of project focussed deliverability reviews throughout 2023/24 and will review and update project level Business Cases as required to ensure the Programme continues to deliver value for money.

8 Programme Benefits and Value for Money

- 8.1 Each of the projects within the Programme will deliver against several core benefits, as outlined in Table 4 on the next page. These cumulatively contribute towards Strategic Outcomes such as those set out in the MTS. The core benefits form part of a new 'framework' for benefits management which sets out a structure and process to enable the Programme to track and report on contribution to Strategic Outcomes over time.
- 8.2 In addition to the core benefits in Table 4, each project will also deliver project level benefits specific to a modal area or end users, for example, providing improved real time bus information for customers as part of iBus2 and Countdown 3 will deliver the benefit of an enhanced customer experience which in turn will contribute to a safe, attractive and reliable bus network.
- 8.3 We are continuing to work with Asset Strategy colleagues to develop appropriate plans for the long-term strategic view of the future Programme which involves participation from relevant business areas to define and prioritise future investment. This includes applying established best practice approaches across the Programme and adopting an annualised workbank, whereby projects are added to the Programme each year via a 'Long Term Capital Plan' with a strong focus on addressing obsolescence and maintaining core assets / systems. Consistent with the wider Investment Programme, this approach ensures that projects are prioritised according to operational impact and tangible customer benefits and means that projects addressing safety and compliance are progressed with appropriate urgency.
- 8.4 Further detail on planned project level achievements and benefits are included in Appendix 1.

Table 4 – Core Benefits for the Technology Programme

Core Programme Benefits	Project examples See Appendix 1 for project details	Description	Strategic Outcomes from TfL Roadmaps / MTS / other Mayoral or TfL policies / plans
Increased staff satisfaction	SSTIP, AMIS, LU Cyber Security (NIS), CMS, RailSys, Performance Data Warehousing (PDW), Electronic Incident Reporting Form (EIRF) (Replacement) / Customer Performance Information Database (CUPID), Revenue Protection, NACHS 5G, Bus and Coach Service Delivery Technology Improvement Programme (BCSD TIP) – Network Renewal, Staff Devices, Operational Staff Safety (OSS)	Providing colleagues with high-quality tools to do their jobs and equipment, training and enforcement to ensure they are safe while doing so.	Colleague, Quality Public Transport, Safe
Increased staff safety	SSTIP, Staff Devices, CMS, OSS, EIRF / CUPID		
Improved customer satisfaction	SSTIP, Staff Devices, CMS, iBus2, EIRF / CUPID, Cycle Hire, SITS, Countdown 3, Tunnels Controls Systems, BCSD TIP – Network Renewal, ATS Dial-a-Ride (DaR) Booking and Scheduling, E Scooters, Bus Customer Action Plan (BCAP) Bus Busyness, Micro-mobility management, London Cable Car Passenger Communication Systems (LCC PCS)	Encouraging mode shift to sustainable modes with public transport and customer information improvements and greater support for micromobility	Customer, Safe, Quality Public Transport, Vision Zero
Increased customer safety	SSTIP, Staff Devices, CMS, EIRF / CUPID, Tunnels Controls Systems, DEC, LCC Passenger Communication Systems, PIMS, ECOS	Reduced perception of safety and reduced risk to customers through delivery of physical assets such as cameras, training, enforcement and data gathering	
Reduced transport network disruption	Connect, CAR, SSTIP, AMIS, Staff Devices, CMS, RailSys, EIRF / CUPID, NMCC Support Systems, iBus2, SITS, DEC, ECOS, Tunnels Controls Systems, Bus Integrated Command	Maintaining and optimising network performance for road vehicles (including public transport) - notably through the Surface Intelligent	Network Performance, Efficient use of road space, Improved bus speeds / journey times

	and Control System (BICCS), BCSD TIP Asset Fault Reporting, Micro-mobility management, Highways Annualised Programme (HAP), Bus Business Intelligence Reporting (BBIR), PIMS	Transport Systems (SITS) Programme	
Reduced carbon use in running our transport / technology systems	Cycle Hire, Micro-mobility management, E-Scooters	Reduced carbon emissions from transport because of mode shift to sustainable modes and / or improvements to technology systems that encourage efficient use of materials and energy	Green roadmap, Corporate Environment Plan 2021
Reduced TfL costs	AMIS, LU Cyber Security (NIS), RailSys, PDW, Cycle Hire, Future Bus Systems (FBS), ATS DaR Booking and Scheduling, E Scooters, BCSD TIP – Station Security	Minimising the cost of providing and operating TfL's technology estate; supporting operational efficiencies and supporting opportunities to generate income / revenue	Finance roadmap
Increased TfL income / revenue	Revenue Protection, DEC, Cycle Hire, SITS		
Increased system availability	Connect, FON, SSTIP, AMIS, Staff Devices, LU Cyber Security (NIS), CMS, RailSys, PDW, EIRF / CUPID, Revenue Protection, NACHS 5G, NMCC Support Systems, iBus 2, Cycle Hire, SITS, ECOS, Remote Monitoring NGRM, TVMS, Countdown3, Tunnels Controls Systems, BCSD TIP – Network Renewal, FBS, ATS DaR Booking and Scheduling, Compliance, Policing, Operations and Security (CPOS) Data Futures, Traffic Order Management Enforcement Solution (TOME), E Scooters, BCSD TIP – Asset Fault Reporting, Micro-mobility management, NMCC Support Systems, LCC PCS, HAP, PIMS, BBIR	Maintaining and improving the quality and performance of TfL's technology estate; reducing cyber risk, achieving compliance with legal / industry standards and rationalising TfL's technology estate	Our Foundation roadmap
Increased system compliance	SSTIP, LU Cyber Security (NIS), CMS, PDW, Cycle Hire, NIS Compliance,		

	BBIR, PIMS, TOME, Device Refresh		
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9 Equality and Inclusion

- 9.1 Section 149 of the Equality Act 2010 (the Public Sector Equality Duty) provides that, in the exercise of their functions, public authorities must have due regard to the need to:
- (a) eliminate discrimination, harassment, victimisation and any other conduct that is prohibited by or under the Equality Act 2010;
 - (b) advance equality of opportunity between persons who share a relevant protected characteristic and persons who do not share it; and
 - (c) foster good relations between persons who share a relevant protected characteristic and persons who do not share it.
- 9.2 In delivering schemes, TfL will comply with the Public Sector Equality Duty and Equality Impact Assessments will be undertaken and considered as appropriate.

10 Assurance

- 10.1 An Integrated Assurance Review on the Technology Programme was carried out in May 2023 by the TfL Assurance Team and IIPAG. No critical issues were raised (by IIPAG / Project Assurance).
- 10.2 First line assurance will be carried out on the Programme and its constituent projects. The next Programme level assurance review will be undertaken in advance of the next annual submission to the Committee in March 2024.

List of appendices to this report:

Appendix 1: Overview of 2022/23 Delivery and 2023/23 and 2024/25 planned Delivery
Appendix 2: iBus2 Briefing

List of Background Papers:

Programme and Investment Committee papers:
Surface Technology: March 2019; October 2020; March 2021; October 2021; July 2022
London Underground Technology: October 2020; May 2022
Programme Structure: May 2023

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Appendix 1 – Overview of 2022/23 Delivery and 2023/24 and 2024/25 planned Delivery

Annualised Programmes

The Annualised Programmes reporting category contains four renewal projects known as the Highways Annualised Programme. This includes planned delivery on annual cycles to ensure there are robust and reliable systems in place to support the Network Management and LU Control Centres (NMCC and LUCC).

Projects Included	Lifecycle Stage	Output	2022/23 Deliverables	Key Activities for 2023/24 to 2024/25 and commitments in future years
Lane Rental Redevelopment	N/A - Annualised	Ongoing upkeep and updates to TfL's Lane Rental system	Continued annualised spend for internal staff time on a unique dedicated system which records lane rental charges / income and usage for utility companies and enabling the ability to offer discounts if there is a performance and Vision Zero target.	2023/24 deliverables include ensuring cloud compatibility to work with third parties, improving Metropolitan Police / CPOS inspection on the Transport for London Road Network (TLRN); and enhancing reporting and safety inspection capabilities. Commitments: None.
LondonWorks - Upkeep and Development	N/A - Annualised	Ongoing upkeep and development of London Works system	Continued annualised spend for ongoing development and upkeep of the London Works (LW) system which enables collaborative street works planning and improved coordination processes for TfL, London's 33 Boroughs and works promoters; whilst enabling TfL and others to fulfil Highway Authority statutory obligations to coordinate street works. It also minimises congestion caused by street work activities and public events; plus supports safety-related on-street inspections that contribute to the MTS and Vision Zero.	The key 2023/24 deliverables are alignment with Department for Transport (DfT) Street Manager API (Application Programming Interface), creation of new Forward Planning Functionality in LondonWorks, supporting SWAP (Supplementary Works Approval Portal) and LondonWorks Enhancements projects and the creation of new NOS (Network Operating Strategy) Bus web application. Contract will be extended / another supplier found if required Commitments: £0.07m for commitments within current contract.
Traffic Systems	N/A - Annualised	Ongoing updates to integrate TfL / DfT services for managing roadworks in England	Continued annualised spend on Traffic Systems initiative in the fulfilment of its statutory duties under the New Roads and Street Works Act 1991 (NRSWA) and the Traffic Management Act 2004 (TMA), as well as compliance with the DfT's "Street Manager" service for coordinating roadworks in England.	The 2023/24 deliverables include compliance with DfT Street Manager, Public Register and Traffic Order Management Systems (TOMS). The key features are ongoing development of the LondonWorks TOMS application, bug fixing and stabilisation and supporting Traffic Order Management Enforcement Solution (TOME) integration. Contract will be extended / another supplier found if required Commitments: £0.07m for commitments within current contract.
Operational Traffic Data Analysis	N/A - Annualised	Ongoing updates to ensure traffic movement data system held by TfL is secure and fit for purpose	Continued annualised spend on the Geographical Information Systems (GIS) based tool to deliver key traffic movement data information with internal and external stakeholders in a user-friendly geographical map-based format. This upgrade is also a vital part of supporting the GIS component for SITS by providing a scalable infrastructure that can adapt to the requirements of its stakeholders quickly.	The 2023/24 deliverables include delivering playbook GIS upgrade, integrating with SITS requirement and improving the user interface to incorporate new infrastructure requirements. Commitments: None.

Assets

The assets reporting category contains 15 projects of 12 renewals and three enhancements; where the primary purpose is the management of any (fixed and mobile) asset data or the installation or replacement of technology assets.

Projects Included	Lifecycle Stage	Output	2022/23 Deliverables	Key Activities for 2023/24 to 2024/25 and commitments in future years
Bus and Coach Service Delivery Technology Improvement Programme (BCSD TIP) - Asset Fault Reporting	Option Selection	New and improved process for reporting asset faults	The project was initiated in September 2022, and once the team was successfully mobilised, the functional and non-functional requirements were gathered.	Detailed design and delivery of a new asset fault reporting mechanism for Bus and Coach Service Delivery staff. Commitments: £0.02m for anticipated delivery commitments in 2024/25.
BCSD TIP - Device Refresh	Option Selection	New devices for Bus Operations colleagues and an improved support model	70 tablets and phone replacements were purchased prior to reaching their end of support. InTune migration was also delivered, which eliminates all OPEX costs for BCSD devices.	Delivery of a strategic support model for BCSD staff devices and the purchase of additional devices for BCSD on-street staff. Commitments: £0.2m for delivery commitments in 2023/24.
BCSD TIP - Network Renewal	Detailed Design	Improved Network connectivity/Wi-Fi across Bus Stations and Victoria Coach Station	Completion of Stage Gate 1 and 2. Initiation of detailed design for five trial Bus stations (Shepherds Bush, Canada Water, Stratford Regional, Vauxhall and Addington Village).	The 2023/24 deliverables include: completion of detailed design and delivery of the network connectivity upgrade at five trial bus station sites; Surveys and initiation of detailed design and delivery of the network upgrade for the remaining 31 sites. Delivery for the remaining stations will occur in 2024/25; whilst ensuring integration of the One London, operational and Body worn camera networks. Commitments: £1.8m for delivery commitments in 2023/24 and £1.1m for anticipated delivery commitments in 2024/25.
CPOS Device Refresh	Option Selection	New devices for operational staff including associated support	Device procurement and agreement of transfer of Intune data; with option selection being made in December 2022.	Delivery and 'Go-Live' of the integrated Intune system as well as device distribution, and project closure. Commitments: £1m for delivery commitments in 2023/24.
CPOS Printer Refresh	Pre-Initiation	Printer hardware refresh	N/A – This is a new project to initiate in 2024/25	New project due to be initiated in 2024/25. Further details will be set out in next annual submission to the committee.
Surface Body Worn Video Tech Refresh	Pre-Initiation	Refreshing Body Worn Video Camera estate	N/A – This is a new project to initiate in 2024/25	New project due to be initiated in 2024/25 to commence re-let of the current short-term contract that is due to expire in May 2026.
Asset Management Information System (AMIS)	Delivery	Upgraded software and integration of data	Continued with delivery of project and migrated majority of asset information onto new consolidated asset management system.	Complete delivery of project in 2023/24. Commitments: None.
Connect	Delivery	Addressing Obsolescence; Upgraded software and hardware with associated maintenance and operations	The Connect system is an operational network which provides communication services between LU control centres, stations, train drivers and station staff and links a wide range of applications critical to the operation of the network. To address obsolescence and risk of asset failure, planned delivery included completing 100 radio hardware unit replacements at LU stations by March 2023. This was achieved ahead of target in November 2022; ensuring we can continue to run a secure and supported operational network.	Completion of next state of Connect Programme, radio unit delivery and other hardware and software updates. Commitments: £8.5m for delivery commitments in 2024/25

Connectivity - Wi-Fi: LU Stations, Assets Train Crew)	Pre-Initiation	Improve connectivity across the LU Operational estate.	N/A – This is a new project for 2023/24	The 2023/24 and 2024/25 deliverables include scope definition, option selection and agreement on a delivery approach to ensure improved connectivity (Wi-Fi / 5G etc) at Train Crew Accommodations, Stations and Depots. Commitments: None.
Digital Programme (Data and Digital)	Outcome Definition	Delivery of projects to support the programme	N/A – This is a new project for 2023/24	Issue a tender pack for a new Decision Support system in September 2023, and procurement of specialist consultant resources to support design and delivery of the long-term digital strategy. In 2024/25 the initial stages of the digital programme will be initiated, to improve our asset datasets condition. Commitments: None.
Connectivity Asset Renewal (CAR) Programme	Option Selection	A new operational network to replace the Connect network and address obsolesce.	Initial scoping works and early market engagement were undertaken.	No Authority request is sought as part of this paper. The project will seek Authority separately following an IAR at the end of 2023. Commitments: None.
Staff Devices - Phase 2	Option Selection	Addressing obsolescence. 4,000 new devices and software updates	This was a new project that was initiated in 2022/23.	Delivering approximately 4,000 replacement devices to operational staff. Commitments: None.
Maximo Mobile Upgrade/Replacement	Pre-Initiation	Mobile functionality to support our new Asset Management system, allowing our staff to remotely assess, record and act upon asset data	This is a new project that has been initiated for 2023/24.	The 2023/24 and 2024/25 deliverables will include scope definition, agreement of a delivery approach and undertaking procurement activities. Commitments: None.
Performance Data Warehousing (PDW)	Option Selection	Replacement data warehouse	This was a new project that was initiated in 2022/23.	In 2023/24, there will be a three-month pause until Performance, Administration and Continuous Improvement (PACI) resource is available; following which key deliverables will include business case/technical requirements gathering and validation, option selection, design requirements and solution agreement. In 2024/25 the deliverables will cover: development and testing of the new PDW system with data migration from other platforms, Reporting creation testing and User Acceptance testing and validation, and early life support of the new PDW system. Commitments: None.
RailSys	Concept Design	Software upgrade and automation of some manual processes	Awarded a contract for the delivery of key renewals work on TfL's access planning system. Delivery is now underway and due to be complete in 2024.	Delivery of the new access planning system which will improve our ability to plan and co-ordinate works on the LU network - and improve reporting. Delivery and project close will conclude in March 2025. Commitments: £0.73m delivery commitments for 2024/25 within current contract.

Enforcement and Security

The enforcement and security category contains 14 projects of five renewals and nine enhancements; where the primary purpose is the enforcement of regulations e.g., fares and traffic orders or the security of our passengers, people or property.

Projects	Life Cycle Stage	Output	2022/23 Deliverables	Key Activities for 2023/24 to 2024/25 and commitments in future years
CPOS ECOS	Delivery	New mobile application and support model	Taxi and Private Hire mobile app developed in November 2022. The app is developed to work with new Taxi Operating Licence Application software which is scheduled to be released in June 2023 and provide on street access to key licensing information.	The 2023/24 deliverables include development and Go-live for CPOS operational officers to have mobile access to the following areas by February 2024: TPH appeals, Rail revenue inspection, Transport safety enforcement, and Prosecutions & Penalty fare processes. Throughout 2024/25 the app will cover Service Request Gates and Workforce Management. Commitments: None.
CPOS Data Futures	Option Selection	New software system	In January 2023, agreement was made to change and reprioritise the data sources within the CPOS Data Hub; and in March a new interim CPOS Data Strategy, plus the list of data sources were approved.	Deliverables include development of the CPOS Data Hub by adding data feeds throughout 2023/24 and 2024/25 and commence development of (2023/24) and implement (2024/25) a replacement reporting solution for internal /external stakeholders in by December 2024. Commitments: None.
OSS - Body Worn Video camera (BWV) - Phase 2	Delivery	Additional body cameras rolled out to staff	Risk-based analysis was undertaken to inform which teams are at risk of work-related violence and aggression (WVA) and should be in scope of the roll out. These staff have all been consulted with regarding the use of BWV; and cameras provided to those where it was thought the camera would help to reduce this risk (approx. 270 BWVs were delivered which provided 11 teams across the business with access).	The 2023/24 deliverables will include: 1) options analysis for the alternative camera check-out to establish a method for 'checking out' a body worn video camera that does not require the use of their staff Oyster card (in case they do not have it with them). The project is not required to deliver the solution but provide to BAU team. 2) delivery of a system that can automatically process and label video footage (Auto-tagging) which is currently done manually and is very time consuming. Commitments: None.
OSS Pan TfL - WVA Case Management and OSS Pan TfL - WVA Reporting	Outcome Definition	New Case Management system and method for staff to report incidents of WVA.	Outcome requirements drafted and signed off, As-is requirements gathered and awaiting sign off (WVA Reporting) / signed off (Case Management) however the projects were paused in September 2022 in line with TfL's managed decline financial situation.	The 2023/24 deliverables include sign-off of the 'as-is' and 'to-be' requirements to agree the scope of project and what is required. The Case Management options will also be assessed, and the business case developed before proceeding through option selection. In 2024/25 there will be vital Commercial activity depending on the option chosen; to amend an existing contract or go to market, before purchasing and bringing the systems into use. Commitments: None.
OSS Emergency Communication Devices (ECD) Phase 1	Delivery	Roll out of devices to all staff at risk of WVA.	A contract was signed with the chosen supplier in 2022/23 under the G-Cloud Framework. The project also completed concept design and has delivered 192 ECDs to all areas of the Business within the Phase 1 scope.	The 2023/24 deliverables will include delivery of the remaining 300 ECDs before closing the project. Commitments: None.

OSS Emergency Communication Devices Phase 2	Outcome Definition	Future proofed solution at TfL for emergency communications for all staff at risk of WVA.	Requirements gathering workshops with key stakeholders were held and outcome requirements successfully signed off. Collection of user requirements has also now commenced.	The 2023/24 deliverables will include finalising the Requirements gathering, development of solution options, business case and options development and 2024/25 will involve the option selection, procurement and delivery of this. Commitments: None.
Deployable Enforcement Cameras (DEC) - Phase 1	Delivery	Camera assets and operational use	42 Deployable enforcement cameras were introduced during 2022/23.	Project is closing but will be spending £0.01m to cover remaining licensing and support costs in 2023/24. Commitments: £0.01m for delivery commitments in 2023/24.
Deployable Enforcement Cameras (DEC) - Phase 2	Delivery	Camera assets, operational use and support model	By the end of March 2023, 26 sites were installed. Delivery on site fell short of target owing to more lamp columns than anticipated failing structural surveys which resulted in additional structural work or alternative sites needing to be located to ensure the structural support is sufficient for mounting cameras onto. A new provider for column structural surveys was sourced, additionally benefitting TfL more widely.	DEC cameras to be installed at 300 sites throughout 2023/24 which will include compliance, site and structural surveys. The spend scheduled for 2024/25 is mainly for the support, maintenance and any remedial work for previously installed cameras. Commitments: £3.4m committed spend in 2024/25 and £0.7m in 2025/26.
Surface Workforce Management (SWFM)	Option Selection	Workforce management tool / solution	The project was transferred from the former Surface Technology programme to T&D Enterprise Resource Planning (ERP)	Future delivery and Authority request was included within the T&D annual submission in March 2023.
BCSD TIP - Station Security	Outcome Definition	New Tool to provide visibility of on-street staff activities	The project was restarted in April 2023 - issues and prioritisation were completed, along with a revision of scope and objectives setting.	The 2023/24 deliverables include Phase 1 option selection and detailed design for a new station security check process and incident reporting system. The delivery of which will be undertaken in 2024/25; as well as starting delivery for an E-Log Book and initiating Phase 2 - which will focus on Customer safety and security. Commitments: None
BCSD TIP - Workforce Implementation	Pre-Initiation	Workforce management tool / solution	New project to initiate in 2024/25	New project due to be initiated in 2024/25. Further details will be set out in next annual submission to the committee.
BCSD TIP - Workforce Demand Planning	Pre-Initiation	A new tool to enable resource deployment and service delivery oversight	New project to initiate in 2024/25	New project due to be initiated in 2024/25. Further details will be set out in next annual submission to the committee.
Revenue Protection ATU, Card Clash, Code 80 and ITAP	ITAP 4 – Pre-Initiation	System changes and upgrades	Completed delivery of ITAP3 and several changes were made to revenue protection tools across back-office systems.	The 2023/24 deliverables will include delivery of the next stage of the ITAP platform, including design and implementation, with completion of ITAP 4 works due in March 2025. Commitments: None.
LU Cyber Security Improvement Project (NIS)	Option Selection	Roadmap	A tender was issued, evaluated and a preferred supplier for project was appointed.	The 2023/24 deliverables include development of detailed plans for meeting cyber security requirements across relevant LU assets and implementing options towards achieving Cyber Security Compliance. Commitments: £0.8m committed spend in 2023/24.
SSTIP	Delivery	Safety and Security	Delivered critical incident management capability at 100 stations and continued to upgrade CCTV estate across our network,	In 2023/24 critical connectivity upgrades to TfL's CCTV estate will be delivered to improve our GDPR compliance and our ability to respond to

			resolving obsolescence and improving data transfer with our strategic partners, such as the British Transport Police.	major incidents. The critical incident management installations will continue, and all CCTV work will be complete in 2024/25. Commitments: None.
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Micromobility

The micromobility category contains five projects of three renewals and two enhancements that support the delivery of the TfL Micro-Mobility Rental Strategy (bikes, scooters and last-mile transit).

Projects	Life Cycle Stage	Output	2022/23 Deliverables	Key Activities for 2023/24 to 2024/25 and commitments in future years
E-Scooter Phase 2	Concept Design	New contracts for e-scooter rental operators	Procurement began for the E-scooter phase 2 contracts, to extend the E-scooter trial until May 2024 in line with current legislation.	The 2023/24 deliverables include contract award and mobilisation of the E-scooter Phase 2 contracts. Commitments: None. As this is an OPEX only contract, there will be no capex commitments after the award.
Cycle Hire Re-let - 2025	Concept Design	New assets, new operating contract, new back-office technology solution	The requirements, business case and procurement strategy were all developed throughout 2022/23.	The 2023/24 deliverables include undertaking the competitive dialogue process with shortlisted bidders as part of the procurement process; followed by contract award and transitioning Cycle Hire services to new supplier in 2024/25. Commitments: None. As this is an OPEX only contract, there will be no capex commitments after the award.
Micro-Mobility Data Management Solution Phase 1 and 2	Concept Design (Phase 1) Outcome Definition (Phase 2)	Supporting data for E-scooter trial	Phase 1 (a short-term solution to support E-Scooter trial) was successfully delivered, and Phase 2 was commenced.	The 2023/24 deliverables include exploring options, finalising a recommendation and commencing design. The delivery will begin and continue throughout 2024/25. Commitments: £0.1m committed spend in 2024/25 and £0.1m in 2025/26.
Cycle Hire Expansion	Delivery	Additional cycle hire docking stations across London	The Cycle Hire Southwark Expansion element of the project (which was fully funded by Southwark Council) was completed, providing seven new docking stations in Bermondsey and Walworth.	The 2023/24 deliverables include setting up a project to provide investment into the existing Cycle Hire scheme ahead of the Cycle Hire Re-let in 2025 (options include carrying out an in-dock charging trial or purchasing more e-bikes in coordination with the Streets, Bus and RSS Renewals portfolio). This includes resourcing, gathering requirements, developing the business case, deciding on a route to market, and starting delivery, which will continue into 2024/25. Commitments: £1.0m committed spend in 2023/24 for delivery of e-bikes.
Cycle Hire Modernise and Electrify	Delivery	500 e-bikes and a new back-office system	Launched the new back-office system and delivered 500 e-bikes into the Cycle Hire scheme.	The project will be completing delivery of the back-office upgrade and e-bikes within 2023/24. Commitments: Approx. £2.2m is committed for 2023/24.
Non-Docked Procurement	Outcome Definition	Coordinated approach to managing non-docked ('dockless') micromobility rental, such as e-bikes and e-scooters	This is a new project that was initiated at the start of 2023/24.	The 2023/24 deliverables will initially focus on gathering outcome requirements, engaging with boroughs and third parties, market research analysis, and development and appraisal of complex business case options to inform the preferred option for the project. Late 2023/24 and 2024/25 deliverables will focus on implementing the preferred option. Commitments: None.

Network Management

The Network Management category contains 16 projects of 13 renewals and three enhancements where the primary purpose is the management of our road network.

Projects	Life Cycle Stage	Output	2022/23 Deliverables	Key Activities for 2023/24 to 2024/25 and commitments in future years
Tunnels Controls System	Outcome Definition	New system for Tunnel incident management to replace expiring contract	This was a new project that was initiated in 2022/23.	The deliverables throughout 2023/24 and 2024/25 include development of outcome and technical requirements, options, business case, procurement strategy and preparation for tender. Commitments: None.
TOME (Traffic Order Management Enforcement Solution)	Outcome Definition	New software solution, support model and training	Completion of the Traffic Order Landscape paper which provides details for the key stakeholders on the high-level processes and current solutions and infrastructure; prior to determining the scope of the project and the subsequent options analysis.	The key activities in 2023/24 include completion of scope and options selection, the requirements build and procurement activities by December 2023. 2024/25 will cover launch of the new solution and project closure. Commitments: None.
UTC Storage Refresh	Delivery	Hardware update replacing critical storage servers to ensure continuation of system	A prototype was completed in December 2022 and migration of the data storage to the new solution started in February 2023, completion planned for August 2023.	The 2023/24 deliverables include completion of the platform migration and project closure by September 2023. Commitments: None.
Passenger Incident Management Systems	Outcome Definition	Renewing the capability for our control centres to manage passenger incidents effectively, including sharing information with third parties	This was a new project that was initiated in 2022/23, and a Market Survey Questionnaire was issued in March 2023.	The 2023/24 deliverables include agreement of requirements, development of the procurement strategy and completion of the option selection stage. In 2024/25 expected activity includes completing concept design and award a contract to commence delivery. Commitments: None.
BICCS (Bus Integrated Command and Control System) - Minor Capital Interventions (MCI)	Delivery	Replacing bus incident communications system	The BICCS system was successfully delivered to the NMCC in November 2022.	There is one outstanding feature to be delivered in 2023/24 ahead of project close. Commitments: None.
Remote Monitoring to NGRM	Option Selection (2A)	New traffic signals hardware and connectivity	Option Selection was completed in August 2022. Since then, two contracts have been awarded for software development of the fault monitoring system.	The 2023/24 and 2024/25 deliverables include software development and procurement activities to award contracts for equipment purchase and to deliver connectivity to 881 traffic signal sites. The delivery of both will occur in 2024/25. Commitments: £5.5m committed spend in 2024/25 and £0.4m in 2025/26.
NMCC Support Systems - Java replacement Discovery	Pre-Initiation	Migration and upgrade of assets	N/A Project not yet started.	The 2023/24 deliverables include: resource allocation, project Initiation, options analysis and recommendation, development of project documentation and commencement of delivery. The project is due to complete delivery in 2024/25. Commitments: None.

NMCC Support Systems - London Works Stabilisation	Concept Design	Upgrade assets and implementation of monitoring capability	This was a new project that was initiated in 2022/23 and the scoping and design was commenced.	In 2023/24 it is expected that the project will be delivered and completed before the system goes out of support; with deliverables including: requirements, designs, delivery, testing, migration of users to the new system and decommissioning the legacy system and infrastructure. Commitments: None.
NMCC Support Systems - Windows 10 Discovery feasibility	Pre-Initiation	Migration and upgrade assets	N/A Project not yet started.	The 2023/24 deliverables include: resource allocation, project Initiation, requirements setting, options analysis and recommendation, development of project documentation and commencement of delivery. It is expected that the project will complete delivery in 2024/25. Commitments: None.
NIS Compliance	Delivery	Improving cyber security resilience of the critical systems needed to operate the road network, to meet the NIS regulations.	The project released efficiency savings of £2.5m in October 2022, captured requirements and procured penetration tests which were completed in March 2023.	The 2023/24 deliverables include: reviewing the penetration test results, providing cyber training for users, upgrading the system firewalls, undertaking cyber security assessment and completion of the project by summer 2023. Commitments: £0.2m committed spend in 2023/24.
TfL's Video Management System (TVMS)	Concept Design	Renewal of contract for software system used in NMCC and more widely across TfL to view and operate CCTV cameras owned by TfL and our partner organisations	In September 2022/23 the business case was approved in line with completion of option selection and the procurement strategy; followed by the evaluation strategy approval in January 2023, and a successful assurance review in March 2023.	The market readiness gate and publication of an Invitation to Tender (ITT) were achieved in April 2023; activities for the remainder of 2023/24 will cover the procurement, including suppliers' questions and dialogue. In 2024/25 the activities will include: completion of the concept design stage, contract award governance, drafting and agreement of the contract, supplier mobilisation and completion of the detailed design stage by October 2024. Commitments: None.
ESRI	Pre-Initiation	Replacement of existing contract for ESRI software, applications and services	This is a new project that is to be initiated in 2023/24.	The 2023/24 deliverables will include project initiation and options analysis to determine the requirements, before a decision is made on the procurement route, and a solution is due to be implemented in 2024/25. Commitments: None.
SAFE Phase 2 Bulletin Board	Option Selection	Updated software to improve cyber security of Surface Transport Incident Management System	The project successfully passed the Gate 1 in August 2022.	The 2023/24 deliverables include the contract award, completion of option selection, and delivery before the project is closed by the end of the financial year. Commitments: None.
Digital Images Video Analytical Technology (DIVAT)	Option Selection	Development of strategy and PoC for a pan-TfL CCTV solution	In 2022/23 delivery of the customer portal commenced, enabling works for the Proof of Concept were completed, the DIVAT strategy was developed, and the business case was approved.	In 2023/24 several suppliers will be working in collaboration to develop and deliver a trial technical solution to overcome CCTV issues. Commitments: £0.6m committed spend in 2023/24.

Public Transport

The Public Transport category contains 11 projects of nine renewals and two enhancements where the primary purpose is to ensure continued safety, operation and reliability of our public transport network.

Projects	Life Cycle Stage	Output	2022/23 Deliverables	Key Activities for 2023/24 to 2024/25 and commitments in future years
Future Bus Systems 2 and 3	Option Selection	Renewal of existing bus contracts management system	The project successfully completed requirements gathering and began option analysis.	The 2023/24 deliverables include option selection, supplier engagement and issuing an Invitation to Tender, evaluating the bids and awarding a contract by March 2024. In 2024/25 the detailed design will be carried out with project go-live planned for spring 2025. Commitments: £1.4m committed spend in 2024/25 and £0.7m in 2025/26.
BCSD TIP - Financial & Commercial	Pre-Initiation	A system to enable financial efficiencies and provide commercial opportunities	This is a new project that is to be initiated in 2023/24.	The 2023/24 deliverables include project initiation, feasibility and option selection by November 2023 and commencing detailed design by March 2023. Completion of which, will occur in 2024/25 prior to implementation. Commitments: None
London Cable Car Passenger Communication Systems (LCC PCS)	Delivery	Updated Passenger Communications System to replace end of life, unsupported system	In December 2022, a contract variation was awarded to Mace to deliver the Passenger Communication System and the detailed design stage was also completed.	The 2023/24 deliverables will include the third-party supplier (Mace) milestone payment for handover of the Passenger Communications System as per the agreement in the contract. Commitments: £0.54m committed spend in 2023/24.
Common Data Repository (CDR) Removal	Outcome Definition	Decommission of obsolete database	This is a new project that is to be initiated in 2023/24	Key deliverables for 2024/25 will include initiating CDR removal which will decommission an obsolete database from Surface Technology systems. Commitments: None.
ATS DaR Booking and Scheduling solution	Delivery	New booking and scheduling system to replace old system	In November 2022 a contract was awarded to a new supplier 'Via' and the concept design stage was also completed. Milestone 1 ('Via' drafting documentation for new system) was achieved in early 2023.	The 2023/24 deliverables include design and delivery being undertaken by supplier 'Via' (Milestones 2 – 7 which cover delivery-based activities) prior to project closure in 2024/25. Commitments: £0.9m committed spend in 2023/24 and £0.2m in 2024/25.
Pan-TfL Booking System and LCC Retail Solution	Pre-Initiation	Feasibility report of consolidating the booking systems for the London Transport Museum, Cable Car and River services once the current services expire.	Feasibility work began in 2022/23 however the project was then paused in summer 2022 in line with TfL's managed decline financial situation.	This project will be restarted in 2023/24. Commitments: None.
Countdown 3	Concept Design	Procure new support contract for supply, installation	In 2022/23 initial supplier engagement was undertaken, the procurement strategy was revised to enhance value for money, the evaluation strategy and other tender documents were	The 2023/24 deliverables include evaluating the bids and awarding the contract by December 2023, with mobilisation and detailed design being

		and maintenance of countdown signs and communications upgrade to existing signs	developed. The project successfully passed the Market Readiness gate, and a supplier questionnaire was issued in March 2023.	carried out by the end of the financial year. In 2024/25 the project will assess service readiness and commence operations. Commitments: £3.1m committed spend in 2024/25 and £0.4m in 2025/26 for delivery.
iBus2	Concept Design	Upgrade to current iBus system including assets and continuation of service	The procurement process continued throughout 2022/23 with a competitive dialogue ahead of the Invitation to Submit a Final Tender being released in February 2023.	The 2023/24 deliverables include evaluating the bids, carrying out an IAR and governance activities and awarding a contract award. In 2024/25, the supplier will be mobilised, and detailed design and testing will be completed ahead of operational commencement in autumn 2025. Commitments: £19.4m committed spend in 2024/25, £35.8m in 2025/26, £39.1m in 2026/27, and £0.6m in 2027/28.
Bus Business Intelligence Reporting (BBIR)	Outcome Definition / Option Selection	New asset and replacement of existing reporting tool for extracting bus data	The project was initiated in November 2022 with an options development report produced for workstream 1 in March 2023. Stakeholders then agreed options to take forward to the supplier, the commercial engagement strategy was endorsed, and initial engagement began with the incumbent supplier.	The 2023/24 deliverables include payment to the existing supplier to stabilise the system, develop options for the future (following iBus 2 delivery). A contract variation is due to be completed in July 2023 to provide an interim solution and enhancement of the current provision until iBus 2 is completed in 2027. In 2024/25 a proof of concept will be developed and will begin working in parallel to provide the seamless transition from iBus to iBus 2. Commitments: £0.5m committed spend in 2024/25.
Ticket Vending Machine (TVM) Replacement	Option Selection	Replacement of the DLR TVM Fleet	This is a new project that is to be transferred from the Public Transport Programme and was initiated in 2019 and is being transferred to the Technology Portfolio in 2023/24. Technical Requirements were finalised in 2022, and surveys were completed to allow for the Technical Requirements and core Pathway documentation initiated ready for Option selection.	The 2023/24 deliverables include development of the procurement strategy, a competitive tender for the equipment supplier and supplier selection; with installation works to begin in 2023/24 and continuing throughout 2024/25. Commitments: £0.9m in 2023/24, £2.5m in 2024/25, and £0.4m in 2025/26.
Digital Tram Radio Implementation	Feasibility	Replacement of tram cab radios to meet new licence conditions	This is a new project that was initiated in 2022/23 within the Public Transport Programme and is being delivered in collaboration with T&D. The main driver for the project is ensure tram radio equipment complies with Ofcom's new radio licence conditions regarding electromagnetic field (EMF) exposure, but also to replace the existing radio system which is nearing its life expiry. Project requirements were established in 2022/23 and a study initiated to consider whether the digital mobile radio system used on TfL buses could be adapted for tram use.	The 2023/24 deliverables include completing feasibility studies on utilising the Surface Digital Mobile Radio Network (the upgraded system used on London Buses) for the trams (Phase 1) and undertaking a proof-of-concept trial (Phase 2). Detailed design and delivery are anticipated in 2024/25 provided that the proposed system is deemed workable; if not, the project will need to return to earlier stages and consider alternative options for meeting the licence conditions. Commitments: None.

SITS

The SITS category contains seven projects of five renewals and two enhancements which support the delivery of Surface Intelligent Transport Systems programme; and aims to renew and enhance systems used by Network Management, delivering faster incident detection and response, which will increase highway capacity and provide the tools to take a multi modal approach to managing the road network. This forms a separate category from Network Management to allow for specific reporting on combined SITS projects.

Projects	Life Cycle Stage	Output	2022/23 Deliverables	Key Activities for 2023/24 to 2024/25 and commitments in future years
Real Time Optimiser (RTO)	Delivery	Replacement of assets to enhance the automatic management of London's traffic signals using real time data	80 percent of the RTO system development backlog was completed and software updates to the NMCC 'living lab' (test sites) were delivered.	Core development of the RTO system will complete by December 2023 and the Go-Live and migration to the new system will commence by March 2024. Further enhancements to the system are planned for 2024/25. Commitments: £1.3m committed spend in 2024/25, £0.7m in 2025/26, £0.6m in 2026/27 and £0.5m in 2027/28.
Outcast Decommissioning (RTO)	Pre-Initiation	Decommission of Outcast	New project to initiate in 2024/25	New project due to be initiated in 2024/25. Further details will be set out in next annual submission to the committee.
Common Operational View (COV) Incident Management System (IMS).	Delivery	Replacement of our existing incident management system	Successfully completed all coding required for the final release of Phase 1 in February 2023, achieving Tier 2 Milestone.	The 2023/24 deliverables include completing the build of COV IMS and the final features (RTO and Video Management System (VMS) interfaces plus the Decision Support Service (DSS) feature. The old system is due to be decommissioned by June 2023 following the Go-Live on the 16 April 2023. Commitments: £3.9m committed spend in 2023/24.
Data Service Hub (DSH)	Delivery	Centralisation of data required by SITS into one data storage hub	Urban Traffic Controller (UTC) data was successfully transferred to the new platform; and Traffic signal data reports can now be provided to the NMCC to report faults on network.	In 2023/24 Automatic Number Plate Recognition (ANPR) and iBus data will be transferred from the existing platform to DSH. Other deliverables include retendering for a Data as a Service feed to support real time demand. In 2024/25 data for iBus and Inrix (journey time data) will be transferred from one platform to another, to support the traffic demand data that the SITS service relies on; and retendering the contract for Data as a Service to become a live feed. Commitments: None.
Functional Changes MCI	Pre-Initiation	SITS system updates as required	New project to initiate in 2024/25	New project due to be initiated in 2024/25. Further details will be set out in next annual submission to the committee.
Data Roadmap	Option Selection	Providing real-time data to NMCC on all road users with new sensors	Project passed outcome definition stage to develop a short list of options.	The 2023/24 deliverables include completing the option selection stage and awarding a contract. In 2024/25 the project is due to start the commercial procurement process and project delivery. Commitments: £8.0m committed spend in 2024/25 and £3.6m in 2025/26.
Predictive	Option Selection	New system for NMCC to predict impact of incidents and recommended mitigation	The project was paused in summer 2022 in line with TfL's managed decline financial situation.	The 2023/24 deliverables include re-starting the project, completing the option selection stage and commencing a tender process, before delivery begins in 2024/25. Commitments: £9.7m committed spend in 2024/25 and £13.0m in 2025/26.

General Operations and Pipeline

The general operations category contains six renewals projects where the aim is to ensure that TfL's service is up to date, and they are not included in the other categories. The Pipeline category includes a work bank of potential future projects which are currently split by LU Technology and Surface Technology Renewals / Enhancements.

Project /Programme and Output	Lifecycle Stage	Output	Key 2022/23 deliverables	Key Activities for 2023/24 to 2024/25 and commitments in future years
Electronic Incident Reporting Form (EIRF) (Replacement) / Customer Performance Information Database (CUPID)	Option Selection	Power Apps for EIRF and CUPID systems	This was a new project that was initiated in 2022/23 and scoping was commenced.	<p>The 2023/24 deliverables include analysis and requirements setting for the EIRF/CUPID model whilst identifying integration methods to use with PDW, NACHS and AMIS, and completion of option selection and concept design ahead of undertaking detailed design in 2024/25.</p> <p>In 2024/25 there will also be the implementation of a new risk reporting application and completion of the EIRF project; delivering it to all systems and devices across the network with approval from key stakeholders.</p> <p>Commitments: None.</p>
Sentinel	Pre-Initiation	Renewal of track working competence systems to maintenance staff	This is a new project that is to be initiated in 2023/24.	<p>The 2023/24 deliverables include project initiation and commencing procurement activity to align with Network Rail's replacement of Sentinel system; prior to supporting the delivery in 2024/25.</p> <p>Commitments: None.</p>
LU Skills Development (LUSD) Digital Learning Strategy – Tech Enablers	Outcome Definition	Streamlining of remote learning and training tools to improve staff skills and capability	This was a new project that was initiated in 2022/23.	<p>The 2023/24 deliverables include implementing tools for operational staff to complete digital assessments and online learning; and improve efficiency by reducing travel requirements. In 2024/25 the project will build an optimal operating environment for Live Online learning and for digital tools in the classroom, whilst carrying out a review and refresh of products.</p> <p>Commitments: None.</p>
Nominal Accumulated Customer Hours (NACHS) 5G	Delivery	Revised TfL scorecard tables to inform Mayor / Public etc.	The majority of the NACHS upgrade was delivered in 2022/23.	The project was completed in Q1 of 2023/24.
Competency Management System (CMS)	Delivery	New system for train operators	Completed design and implementation of a new competency management system for train operators and rolled-out the new system to the Piccadilly Line operations.	<p>The project has been delivered and will be rolled-out to other lines in future years.</p> <p>Commitments: £0.2m committed spend in 2024/25, £0.2m in 2025/26 and £0.2m in 2026/27 for licensing support costs.</p>
Operations CMS – Phase 3	Pre-Initiation	Roll out of new system for train operators	This is a new project that is to be initiated in 2023/24.	<p>The 2023/24 deliverables will include a feasibility study into the roll out of the CMS to other operational areas within the organisation and the first stage of a roll out if appropriate.</p> <p>Commitments: None.</p>
Pipeline work bank– Surface Renewals	Pre-Initiation	Early-stage development of pipeline renewals	N/A – Work bank was initiated in April 2023.	<p>Initiate the development of Surface technology renewals projects. The current renewals work bank for 2023/24 includes Digital Evidence Sharing, DTES/PES Options Analysis, Pan-TfL Body worn Cameras Phase 3, Rail Control Centre Technology Review, Minor Capital Interventions, DaR Depots Network Renewal, Cycle Hire App Fixes, Digital Signs Redevelopment, Keypoints Replacement, Left Luggage Re-Procurement, DLR Passenger Demand Hub and Journey Time Metrics, DAISY Screen Replacement, DLR Cyber Security 2022/23, Track</p>

				<p>Condition Monitoring using instrumented tram, Resilience Systems and Data (Asset and Ops Review).</p> <p>Commitments: None.</p>
Pipeline work bank – Surface Enhancements	Pre-Initiation	Early-stage development of pipeline enhancements	N/A – Work bank was initiated in April 2023.	<p>Initiate the development of Surface technology enhancements projects. The current enhancements work bank for 2023/24 includes TPH Assessment Centre Expansion, Pan- London CCTV (POC and full project), Integrated Freight Management Feasibility, DIVAT Extension, Digital Sentiment Analysis, Women's Safety Innovation Scale Up, Micro-Mobility Digital Customer Experience, London Cable Car (LCC) Gateline Removal, LCC Passenger Comms Phase 2 (Infotainment), Pan-TfL Retail System, Bus Disruptions and Diversions, Bus Passenger Demand (Future of BODS).</p> <p>Commitments: None.</p>
Pipeline work bank - LU	Pre-Initiation	Early-stage development of London Underground Technology projects	N/A – Projects within the work bank not yet initiated.	<p>Initiate the development of London Underground technology projects. The current work bank for 2023/24 and 2024/25 includes: Planning Process Optimisation, Post-AMIS Eco-System Alignment, Hardware Replacement for BWV cameras, Asset Lifecycle Information Automation.</p>

Appendix 2

iBus2 Contract Award Briefing Paper

1 Summary

- 1.1 The purpose of this paper is to brief the Committee on the iBus2 project (EFC £141m) and the procurement process for contract award, which includes the development, supply, installation, and maintenance of an Automatic Vehicle Location (AVL) system for the London bus network consisting of a back-office system, on-vehicle equipment and performance management system.
- 1.2 It is anticipated that approval of Procurement Authority to enter into the contracts will be required after the 5 October 2023 meeting of the Committee and will therefore be sought under Chair's Action.

2 Background

- 2.1 The existing iBus system provides real time passenger information, vehicle location (supporting selected bus priority at junctions and low bridge alarms), service control functionality, an emergency response service via the Network Management Control Centre (NMCC), voice radio integration, an interface for ticketing and the performance management system for London's buses.
- 2.2 The iBus system is the data collection and calculation engine behind the mileage and reliability performance payments to the bus operating companies (BOCs) of approximately £2bn annually. From a passenger facing perspective, the iBus system delivers on-bus next stop and destination real time information and calculates all of the live bus arrival predictions that are sent through the Countdown feed to TfL's website, approximately 3,000 on-street signs, digital screens and via a public feed to third parties to support over 60 smartphone apps.
- 2.3 The iBus system supports:
 - (a) 8,770 buses fitted with iBus equipment, running approximately 700 bus routes and serving over 19,000 bus stops across Greater London;
 - (b) 78 bus garages; operated by 19 bus operators, responsible for running and maintaining the bus service schedule;
 - (c) Over 40 bus operator service control centres, with workstations featuring the ability to track buses in real time and contact buses by voice radio; and
 - (d) iBus vehicle location functionality for London River Services and London Trams (around 50 boats/trams combined).
- 2.4 iBus2 will ensure that the reliability improvements associated with iBus performance management and the reduction in Excess Wait Time scores are maintained. iBus2 will also enable the maintenance of real-time passenger information which has a high willingness to pay value and is a key measure in the Mayor's Transport Strategy. Furthermore, iBus2 will enable enhanced information to be delivered to passengers on bus, making the network more accessible and increasing customer satisfaction.
- 2.5 The original iBus contract expired in May 2010, with extensions taking the contract to May 2022 when a final extension was put in place until May 2025, with two optional one-year extensions beyond that point to allow the new iBus2 system to be developed, tested and rolled-out.

3 Procurement Strategy

- 3.1 The iBus2 Services procurement is separated into lots:
 - Lot 1: On-bus Services, which is further separated into:
 - Lot 1A: On-bus Services; and
 - Lot 1B: On-bus Services; and
 - Lot 2: Back Office Services.
- 3.2 Lot 1 (On-bus Services) will cover the provision of services (including supply, installation and maintenance) for the on-board hardware element of iBus2 Services and their integration with the Back Office Services.
- 3.3 Each of Lot 1A (On-bus Services) and Lot 1B (On-bus Services) will account for approximately fifty per cent of the total volume of Vehicles on which TfL requires the On-bus Services to be installed and maintained (which TfL considers will equate to approximately 4,350 Vehicles for Lot 1A (On-bus Services) and 4,500 Vehicles for Lot 1B (On-bus Services)). Lot 1A (On-bus Services) will include Trams while Lot 1B (On-bus Services) will not.
- 3.4 Lot 2 (Back Office Services) will cover the provision of Service Components which have been grouped into logical functions within the Service Requirements and the iBus2 Concept Architecture.
- 3.5 Combined bids are accepted subject to submission requirements. At Invitation to Submit Final Tender (ISFT) Evaluation, TfL will evaluate bidders' individual ISFT Submissions for each lot and any combined bids, and determine the winning Bidder(s), as described in the evaluation methodology.
- 3.6 The iBus2 contract term for all lots is for an initial term of ten years with options to extend for up to ten additional years.
- 3.7 TfL's overall objectives in relation to the iBus2 procurement are:

Financial	Affordability	Deliver the iBus2 Services at or below the Affordability Ceiling to ensure the Services are delivered within TfL's budgetary constraints.
	Performance	Ensure that an appropriate level of performance is contracted for and that the iBus2 Suppliers are sufficiently incentivised to deliver performance.
	Transition and Rollout	Effectively manage the risk and minimise the financial impact of Transition and Rollout, including dual running of the current iBus services.
	Flexibility and Efficiency	Ensure that the Services can grow and constrict with changes in customer demand and that Operational Changes are commissioned in a timely and efficient manner at an appropriate price.
	Value for Money and Savings	Deliver the iBus2 Services in a way that provides value for money to TfL and achieves cost reductions against current costs of running the current iBus services, including via continued identification and realisation of cost reductions during the life of the Contract(s).
Non-Financial	Service Continuity	Deliver the iBus2 Services that secure continuity of service and maintain the major benefits of the current iBus services.
	Performance	Ensure that the Availability of the iBus2 Services can be effectively measured and pro-actively managed to minimise any possible impacts on the delivery and maximise the reliability of bus services.
	Accuracy	Provide accurate information in a timely fashion to TfL and BOCs to ensure that bus services operated by the BOCs can be managed and reported effectively.
	Transition and Rollout	Successfully migrate from the current iBus services to the iBus2 Services whilst minimising disruption to TfL, BOCs and customers.
	Flexibility and Efficiency	Utilise new technology to provide solutions that deliver efficiency, meet the latest business and customer needs and have the flexibility to support changes as requirements and expectations evolve during the life of the Contract(s).
	Customers	Deliver iBus2 Services which enable safe and reliable bus journeys for passengers and provides a common customer experience for Real Time Passenger Information.

3.8 Existing Programme and Project Authority for the iBus2 project was granted in July 2022 by Programmes and Investment Committee and additional Programme and Project Authority is requested within the paper to which this is appended.

4 Assurance

- 4.1 An Integrated Assurance Review (IAR) was carried out on the procurement in November 2020 and all recommendations were addressed.
- 4.2 A further IAR will take place before Procurement Authority is sought. This is scheduled for September 2023.

5 Timescales for approval

- 5.1 It is anticipated that the procurement process will be concluded during October 2023 and the announcement to the market made in November 2023.
- 5.2 As the next scheduled meetings of the Committee are on 5 October and 6 December 2023, it is proposed that a Chair's Action request will be submitted to Committee in mid-October 2023 that will summarise the outcome of the process and request approval of Procurement Authority.