

TRANSPORT for LONDON

INDEPENDENT INVESTMENT PROGRAMME  
ADVISORY GROUP  
(IIPAG)

Annual Report 2014 – 2015

April 2015



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## EXECUTIVE SUMMARY

The Independent Investment Programme Advisory Group (IIPAG) was first set up in May 2010 and this is IIPAG's fifth Annual Report, based on nearly five years of experience of the development and delivery of TfL's Investment Programme. In this time IIPAG has participated in more than 200 project reviews, providing constructive criticism to TfL and challenging it to deliver ever better value for money to taxpayers.

In the past year IIPAG has participated in the review of over 60 projects at various stages in the project lifecycle, from initiation through design and delivery to the closure of completed projects. IIPAG has also reviewed areas of particular systemic importance to the delivery of this large capital programme.

Across its reviews in the last year IIPAG has noted distinct improvements in many of the key skills required in the delivery phases of projects, including the sponsorship of projects and the essential project management and planning tasks, and the number of recommendations that IIPAG has made to address sub-standard risk management has reduced significantly. IIPAG commends TfL for these improvements, which are the result of sustained efforts over a number of years.

While these delivery aspects have improved there remains work to be done to improve both the early and final phases of projects. Sponsorship is much improved in the delivery of projects but sometimes remains weaker during the initiation and option selection phases. Weak sponsorship early in a project results in its initiation from a weak base and IIPAG has noted that, particularly in the very early phases of projects, the fundamental importance of the separation of the role of Sponsor from Delivery is not consistently recognised across TfL. IIPAG considers that further work to improve these early phases is necessary.

IIPAG also believes that insufficient attention has been given to the closure of projects. IIPAG has reviewed the closure of only two projects in the last year and has noted that some projects that entered service nearly five years ago have yet to be closed. This closure of a project is an essential stage: it should enable lessons to be learned and the benefits of the project to be assessed, both of which are essential to an organisation learning, improving and delivering better value.

IIPAG has continued to have considerable involvement with the Subsurface Automatic Train Control (SUP ATC) programme this year. IIPAG has reviewed documentation and met with engineering and commercial teams, adding its experience and expertise to the lessons that London Underground has learned from the failed Bombardier contract. IIPAG has made many recommendations on technical, commercial and programme management issues, most of which have been acted on. The aim is that past mistakes are not repeated and that the programme delivers demonstrable value for money.

The technical specification is now much improved and there is reasonable certainty over the scale of adaptations needed to the proposed contractor's product. There is much still to do to negotiate a value-for-money contract whilst providing London Underground with appropriate protections and controls, and the outcome of this should become clear in the next few months. London Underground will retain significant scope to deliver and risk to manage, and good progress has been made in setting up an appropriate organisation and controls but, again, more remains to be done to improve confidence that this very complicated and extensive programme can

be delivered to time, specification and budget. IIPAG will continue to closely monitor developments and to offer its advice.

Over the past four years IIPAG has expressed its concern regarding delivery of the commercial aspects of TfL Investment Programme and the delivery of telecommunications services in TfL. In the last year there has not been the improvement in performance that could have been expected. IIPAG remains uncomfortable with the protracted contractual processes of the SUP ATC Project, as well as changes to contracts on some major station projects and highway schemes.

Around a quarter of IIPAG's recommendations, a similar proportion to previous years, address shortcomings in the commercial or contractual aspects of TfL's Investment Programme. Examples are an insufficiently clear or unsuitable procurement strategy or a proposed incentive mechanism of questionable value. IIPAG considers that this is an area where TfL could deliver significantly better value if contract and commercial performance across the whole of TfL were to match the levels now being delivered in project management. IIPAG believes that the culture of TfL will need to become ever more focussed on delivering better commercial outcomes and that this will require significant effort and leadership from TfL's Chief Officers.

TfL's Investment Programme is one of the most attractive and expansive in the country. Project management is improved, but the supporting commercial services have not demonstrated equivalent quality or the rate of improvement that IIPAG had anticipated and remain a major concern.

IIPAG is frustrated over the lack of progress in improving TfL's telecoms organisation and arrangements. IIPAG believes that TfL is delivering poor value and, with better organisation and leadership, could save many millions of pounds each year and deliver the necessary benefits of new digital technology to the organisation and to the travelling public. IIPAG has made recommendations to the business over the last three years but little progress has been delivered. This is a difficult subject and increased senior management commitment is necessary if TfL's performance is to materially improve.

The common factor in both commercial services and telecommunications is that both are dispersed across TfL and as a consequence there is not a single focus or vision, making them difficult to lead effectively. IIPAG has advocated a more consolidated approach for both sectors with strong leadership but TfL has been reluctant to change. IIPAG believes that, given the size of the Investment Programme and the scale of the overall business, there is real opportunity for TfL to be industry leaders in these areas.

IIPAG has recognised staff resources, from leadership to technical support, as a significant problem. This is particularly an issue on the larger projects and has IIPAG has noted that TfL has struggled to retain talented and proven staff with its current arrangements. There is generally a mix of in-house and agency staff on projects and performance can be variable. IIPAG considers that, with stronger commercial skills, TfL could look at differing models for delivery aimed at more timely completion and better value.

While IIPAG has highlighted a number of issues that need to be resolved this should not detract from the significant improvements that have been made in some areas. Benchmarking of the costs and reliability of the Tube, the DLR and London's buses

against other international comparators shows that there has been significant improvement in both costs and reliability, with the reduction of Tube maintenance unit costs in London being among the most impressive of all metros and equipment reliability now in the top quartile of European and North American metro systems. London's buses remain among the best in the world, with reliability and unit costs in the top quartile of international comparators.

In the next year IIPAG will continue to advise TfL on how to improve the delivery of its Investment Programme. IIPAG will increase its focus on commercial and contractual issues and in helping TfL to improve sponsorship in the early phases of projects. IIPAG will also work with the business on improvements to the provision of telecoms services across the business.

London's economy is vibrant and successful and is forecast to grow significantly over the coming decade. The provision of rapid and reliable transport is central to this growth and yet there are clear challenges to the funds that might be available to deliver effective transport infrastructure, whether from demands for improved transport in other parts of the UK or for central government spending on other priorities. It is therefore ever more important that TfL can demonstrate that it can spend the money entrusted to it wisely and effectively. TfL has many of the key capabilities to rise to this challenge and IIPAG will work to assist TfL as it endeavours to deliver ever better value and service.

# 1. INTRODUCTION

## 1.1. Background

The Mayor of London, Boris Johnson and the then Secretary of State for Transport, Lord Adonis originally established an Investment Programme Advisory Group in May 2010. It was renamed as the Independent Investment Programme Advisory Group (IIPAG) in November 2010, when its remit was increased.

IIPAG's Terms of Reference<sup>1</sup> include maintenance, renewals and line upgrades as well as major projects for both Rail and Surface businesses. They also include the direction of a team undertaking benchmarking across TfL and commentary upon the draft Asset Management Plans of London Underground, but they specifically exclude operational issues and the activities of Crossrail Limited.

Following the retirement of one member and recruitment in the summer of 2014, IIPAG currently comprises six members and an advisor, and is supported by a personal assistant. All of these positions are part time and commitments range from 2 to 8 days a month. Projects and systemic issues are typically reviewed by two people, with one individual nominated to lead a topic. IIPAG meets monthly to discuss its findings, identify topics or projects for further study and to set out its reviews for the coming months. It is supported in this by TfL Project Assurance<sup>2</sup>.

This is the fifth Annual Report presented by IIPAG. Earlier reports set out the history of IIPAG's appointment and its terms of Reference in more detail, as well as its progress.

## 1.2. Purpose and structure of this report

IIPAG's remit requires it to:

- Publish an annual report on TfL's delivery of its Investment Programme from its work during the year;
- Review the level of resource required to undertake the planned future activities; and
- Consult with the Mayor and the Secretary of State for Transport and propose a work plan for the year.

This report addresses the first of these requirements and draws out common themes, systemic issues and lessons learned.

Section 2 of the report describes the Project Reviews undertaken from April 2014 to March 2015. Examples of good practice within TfL are also identified.

Section 3 outlines the progress that has been made over the last year in addressing systemic issues that were identified across reviews of multiple projects.

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<sup>1</sup> <http://www.tfl.gov.uk/cdn/static/cms/documents/Item08-4-Nov-2010-Board-IIPAG-Terms-of-Reference.pdf>

<sup>2</sup> Project Assurance has been separated from TfL's Project Management Office in the last year, with TfL Project Assurance now reporting to TfL's Managing Director Finance, see section 3.3 for further detail

Section 4 addresses Asset Management and Benchmarking and Section 5 describes the process being undertaken to consult on IIPAG's workplan and to recommend the level of resource required.

### **1.3. Meetings and Communication with TfL**

The schedule of meetings and the arrangements for communication developed since IIPAG's inception is unchanged from previous years. The Chair of IIPAG and the Commissioner meet bi-monthly to discuss and agree topics that IIPAG and the business consider important and IIPAG meets the members of the Commissioner's Leadership Team twice each year to set out progress and to discuss issues. Members of the IIPAG Team attend the monthly Rail and Underground Board and the Surface Transport All Approvals Board meetings when projects that have been reviewed by IIPAG are discussed.

IIPAG continues to attend relevant Boards, Committees and panels within TfL in support of the corporate governance and approvals process for projects where it has reviewed progress. This is typically for projects with an Estimated Final Costs (EFC) in excess of £50m, but also recently for projects that IIPAG considers important for other reasons, such as novelty or complexity. IIPAG continues to chair the quarterly Benchmarking Steering Group.

IIPAG's formal output to the business is in the form of technical reports related to an Integrated Assurance Review (IAR) instigated by TfL Project Assurance, an Interim Review of projects instigated by IIPAG or a systemic issue. These are submitted to senior panels or Board committees within TfL to ensure that IIPAG's recommendations are considered at an appropriate level in TfL. IIPAG's reports set out its recommendations to TfL's Board on the specific project or systemic issue. IIPAG presents its views to the relevant panel or committee and the Management Response from the business, which outlines TfL's response to IIPAG's recommendations, is also discussed. IIPAG's reports are also forwarded to the Department for Transport (DfT).



## 2. PROJECT REVIEWS

### 2.1. Approach

TfL has a system of Integrated Assurance Reviews that establish the compliance and status of capital projects across TfL. TfL Project Assurance leads these reviews, taking into account the status of the project with regard to programme, cost, quality and commercial issues, as well as their governance and management. TfL usually commissions an External Expert (EE) to undertake an independent review but in around 18% of reviews in the last year TfL has appointed an internal peer reviewer. As noted last year IIPAG believes that this approach improves knowledge held in-house and helps spread best practice. TfL Project Assurance also arranges for IIPAG to be involved with reviews of major programmes and projects with a value greater than £50m, and discusses and agrees other projects where IIPAG wishes to be involved.

Through the review IIPAG aims to identify relevant issues, present constructive challenge and to make recommendations to help the project teams improve their performance. IIPAG will usually meet the EE at least once to suggest emphasis and to discuss findings. TfL Project Assurance chairs the formal Gate Review Meeting, which IIPAG attends, and IIPAG then prepares its own independent report.

A list of the Integrated Assurance Reviews in which IIPAG has participated, together with a description of themes apparent in its recommendations, forms section 2.2. Instances of best practice within TfL are also highlighted.

In addition to the Integrated Assurance Reviews, IIPAG has initiated a number of Interim Reviews to ensure that major projects are reviewed at appropriate intervals, typically during delivery of projects but also in other phases as necessary. IIPAG bases its schedule of interim reviews on:

- The time of the last Gate or Interim Review, typically aiming to review all projects at least annually;
- The current phase of activity and associated risks; and
- Known issues that might give rise to a cost increase or delayed delivery.

These Interim Reviews are undertaken by IIPAG alone, they focus on the major projects and they involve the minimum of project resources necessary to enable IIPAG to understand progress and issues. They are broadly based on the Office for Government Commerce approach to project review. The Interim reviews that IIPAG has undertaken are listed in section 2.3.

In addition to its involvement in the Reviews IIPAG receives quarterly “dashboards” that set out project progress. Progress on this is described in section 2.4.

## 2.2. Gateway Reviews

During the last year, members of the group have been involved with Corporate Gateway reviews as noted below:

<b>Integrated Assurance Reviews in which IIPAG has participated: April 2014-March 2015</b>	<b>Stage</b>
Communications below ground	Initiation
Northern Line World Class Capacity	Initiation
Jubilee Line World Class Capacity	Initiation
Brent Cross Regeneration	Initiation
Docklands New Trains	Initiation
Overground Extension to Barking	Initiation
Elephant & Castle Northern Roundabout	Concept
Central London Cycling Grid	Option
Wandsworth Gyrotory	Option
Quietways Cycle Routes	Option
Cycle Hire Transformation	Option
Piccadilly Line Upgrade	Option
Overground Station at Old Oak Common	Option
ONSIP Crossrail on Network Stations Improvement Programme	Option
Vauxhall Cross	Option
Camden Town Station Capacity Upgrade	Option
Holborn Station Capacity Upgrade	Option
Bus Priority Delivery Schedule	Option
Cycle Hire Transformation	Option +
Better Junctions Programme (Oval Triangle)	Design
Northern Line Extension to Battersea	Pre-Tender
LOTRAIN	Pre-Tender
Jubilee & Northern Additional Trains	Pre-Tender
Power SCADA	Pre-Tender
Bakerloo 72TS Life Extension	Pre-Tender
Croxley Rail Link	Pre-Tender
Northern Line Extension to Battersea (Report and Concluding Advice)	Contract Award
Plant & Depot Strategy (Cranes & Wagons)	Contract Award
Cycle Superhighways	Contract Award
Detection & Enforcement Infrastructure	Contract Award
Paddington Bakerloo Line Link	Contract Award
Mini Hollands	Contract Award
Victoria Line World Class Capacity	Contract Award
LOTRAIN	Contract Award
iBus Contract Extension	Contract Extension
Future Station Capacity Programme	Delivery (Additional

<b>Integrated Assurance Reviews in which IIPAG has participated: April 2014-March 2015</b>	<b>Stage</b>
	Funding)
Structures & Tunnels Investment Portfolio (Work Package 3)	Additional Authority
Piccadilly Line Upgrade	Delivery
Overground Station at Old Oak Common	Annual
Bank Station Capacity Upgrade	Annual
92TS Bearings Replacement (Tranche 2)	Annual
(STIP) Structures & Tunnels Investment Portfolio	Annual
Integrated Stations Programme	Annual
New Tube for London (Rolling Stock)	Annual
Surface Asset Capital Programme	Annual
London Underground Track Programme	Annual
Cycling Vision	Annual
London Road User Charging & Traffic Enforcement Notice Processing (LRUC & TENP)	Annual
Cycle Hire Implementation & CHEI	Close
Asset Stabilisation	Close

The number of Gateway Reviews in which IIPAG has participated has increased once more, rising from around 30 in IIPAG's first two years to nearly 50 in the past year. In addition, IIPAG has undertaken more interim reviews to examine specific issues or projects (see section 2.3) and has undertaken much more in depth work on the retendering of the Subsurface Upgrade Programme Automatic Train Control than on any previous project (see section 2.5). IIPAG has also undertaken reviews of the major projects involved in the Mayor's Cycling Vision (see section 2.6).

Most of the increase in the number of projects reviewed in the last year has been in examining projects in their early phases, with a 50% increase in "Option" reviews to ascertain whether an appropriate single option has been selected, and a further two of those identified as "Annual" reviews examining the early phases of long-running projects. IIPAG has also reviewed more projects that are being delivered and that have required changes to authorities or a contract extension.

IIPAG remains disappointed that there appears to be limited progress and a reluctance to sign off total completion of projects as defined within the TfL Pathway process. Very few of the projects that were expected to be Closed through 2013-14 have been presented for acceptance. In some cases infrastructure has now been in place and in use for nearly five years without the project achieving Close.

IIPAG believes this to be poor practice and it does not conform with TfL's requirements. A key part of the Close of a project is the assessment of the benefits delivered compared with those anticipated at the outset. Without this stage the very reasons for creating the projects in the first place are not being proven. Lessons learned are not generally well disseminated and so knowledge is often retained by individuals. As major project people they often leave the business, taking this knowledge with them.

IIPAG has made over 200 recommendations to TfL in the past year. In previous years recommendations have focussed on four distinct areas, which typically comprised about 90% of its recommendations. These areas were:

- Commercial and Contract, such as key considerations that should be included in an Invitation to Tender or addressing shortcomings in a Procurement Strategy;
- Project Management and Interfaces, where insufficient consideration has been given to the delivery of projects, particularly where there are interfaces with other stakeholders such as Network Rail;
- Requirements and Sponsorship, such as recommendations to better define requirements, to set out a clear business case and to ensure that suitable sponsorship is in place to deliver the business case; and
- Risk, where risks have not been properly identified, quantified or managed.

Many of IIPAG's recommendations continue to be in these four areas. However, the balance between these areas, and the proportion of IIPAG's recommendations covered by these areas, has changed since the previous year.

Area	Proportion of Recommendations <sup>3</sup>	
	2013/14	2014/15
Commercial and Contract	25%	25%
Project Management and Interfaces	25%	15%
Requirements and Sponsorship	20%	15%
Risk	20%	5%
<b>TOTAL</b>	<b>90%</b>	<b>60%</b>

Commercial and Contract issues remain the most common, and IIPAG's view on progress in this area is set out in Section 3.4. IIPAG has made fewer recommendations relating to Project Management and Interfaces in the last year, and this has been due to a large reduction in the number of recommendations made regarding the processes and approaches employed in managing the delivery of projects (i.e. the "Project Management" part of this category), indicating that performance in this area is improved.

In contrast to these improvements in project management, IIPAG has made recommendations for increased focus on TfL's relationship with Network Rail in a large proportion of projects where there is an interface between TfL and Network Rail. It appears to IIPAG that, while the relationship is considered in planning and delivery of a project, it is not given sufficient priority given the substantial impact that appropriate approvals or works on these interfaces can have on successful project delivery. For example, in the case of the Croyley Rail link, which involves both Network Rail and a Local Authority, TfL has now taken over responsibility for delivery of the project following considerable cost escalation and programme slippage. This was the solution advocated by IIPAG over four years ago. IIPAG considers that this is an area where increased focus would be valuable, delivering savings of both money and time, and recommends that TfL increase its efforts to improve its relationship and mutual understanding of priorities with Network Rail.

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<sup>3</sup> to nearest 5%

TfL's efforts to improve Sponsorship appear to be having an effect, with fewer recommendations addressing shortcomings in this area. IIPAG's view on progress in sponsorship is set out in Section 3.2. IIPAG's recommendations in this area have become more focussed on setting appropriate, clear and value driven project requirements rather than the process of delivering these requirements.

IIPAG has made far fewer recommendations on improvements to risk processes and management in the past year, again indicating that the improvements that TfL has put in place are now being consistently applied.

IIPAG has made more recommendations in two additional areas as other issues have become less common. The first of these is resources, where around 10% of IIPAG's recommendations relate to ensuring that there are sufficient personnel or expertise, typically technical or commercial, to ensure that a project is properly planned, designed and delivered.

IIPAG is concerned that, although TfL has a very appealing programme of work, it does not appear able to recruit and retain sufficient senior, high calibre and experienced staff. The reasons for this are complex and, while TfL might wish to provide most resources from within its organisation, it should utilise other models more strategically and effectively to successfully deliver the projects ahead. IIPAG understands that TfL already hires a considerable proportion of technical staff from agencies. These staff seldom come with Professional Indemnity, which remains a TfL liability.

It is imperative that TfL has a cadre of the best talent in the industry to fulfil the role of intelligent and informed client with delivery undertaken via the most appropriate mechanism, whether in-house or bought in from the market. IIPAG considers that TfL should agree a pan-TfL strategy for ensuring that it has sufficient high quality resource and leadership at these senior levels.

Some 15% of IIPAG's recommendations this year relate to lack of adherence to governance processes. IIPAG's recommendations on governance include ensuring that consideration of decisions is made at an appropriate level and that the source of and level of funding required (for example from a programme or departmental budget) is clarified. IIPAG has noted that compliance with TfL's governance processes ("TfL Pathway") is not consistent across the whole of TfL in the earlier phases of projects. While there has been a marked improvement in compliance within London Underground, full compliance with Pathway and TfL management process has not been consistently demonstrated elsewhere in TfL.

While IIPAG has made fewer direct recommendations regarding sponsorship, IIPAG considers that these governance issues are related to sponsorship. An increase in recommendations about governance and the fact that the number of IIPAG recommendations on project requirements has slightly increased indicates that, while sponsorship in the delivery phases of a project is improved, there remains scope for further improvement in the early stages of a project. This issue is examined in more detail in section 3.2.

IIPAG has noted the following examples of best practice in TfL in the past year:

- Bank Station: The Project Team extended the consultation period on the programme. This has proved to be very beneficial;

- Jubilee Line WCC: The separation of project management and engineering costs in the budget was useful and could be applied on other projects and programmes;
- Hammersmith Flyover: TfL and the contractor agreed to produce a full-scale mock up of the above ground works. This has proved to be very helpful and cost effective; and
- Hammersmith Flyover and Victoria Station Upgrade: IIPAG has been impressed with TfL's decision to undertake very challenging civil engineering.

### 2.3. Interim Reviews

IIPAG noted in its 2013/14 report that a number of large projects were underway or proposed, and has spent increased time examining these projects. The Northern Line Extension to Battersea and the New Tube for London have been examined via the normal corporate gateway mechanism. The other £1bn project in TfL's portfolio, the Silvertown Crossing, has been the subject of an IIPAG interim review. Other projects or issues on which IIPAG has advised or undertaken Interim Reviews in the past year are listed below:

<b>IIPAG Interim Reviews from April 2014 to March 2015</b>
Cycle Superhighways (April 2014 and September 2014)
Bond Street Station Upgrade (Incentivisation Proposals)
Tottenham Court Road
(STIP) Structures & Tunnels Investment Portfolio
Silvertown Crossing
Northern Line Upgrade
Tottenham Court Road (Contract Incentive Agreement)
Surface Upgrade Programme

IIPAG have instigated these interim reviews for a variety of reasons. On one occasion it was a result of known significant cost increase, in others it was as a follow up to previous recommendations of the need for organisational change. One particular theme has been the review of proposed changes to the terms of the contract during the delivery phase. The changed terms incorporate an additional process for dispute resolution and also the introduction of additional financial incentive schemes. IIPAG's reports following these reviews are then considered by the Rail and Underground Board or by the Surface Transport All Approvals Board. IIPAG believes the identification and review of topics in response to a perceived risk to be an important aspect of its remit.

### 2.4. Project Progress Dashboards

It is acknowledged by TfL that the monthly Project and Programme Dashboards reporting process is not working as well as it should. The dashboard is a fundamental management tool and should be a highlighted summary of the management information being used, day to day by the project managers, to control

the project/programme. Too often they are seen as a special report prepared specifically for senior management.

In the next twelve months IIPAG and TfL will work together to improve these reports.

## **2.5. Subsurface Upgrade Programme Automatic Train Control (SUP ATC)**

Since April 2014 IIPAG has continued to have considerable involvement with the SUP ATC programme team, through reviewing documentation produced, meeting with engineering and commercial teams and by participation in the ATC Procurement Steering Group. IIPAG's approach is to add its experience and expertise to the lessons that London Underground has learned from the failed Bombardier contract, with the aim that past mistakes are not repeated and that the programme delivers demonstrable value for money.

IIPAG's strategy, which is shared by London Underground, covers management, technical and contractual aspects:

- to ensure capability both of the proposed contractor and of the London Underground team;
- to seek proof of the proposed system and the feasibility of its adaptation to the needs of the SUP ATC;
- to clarify and ensure the adequacy of London Underground requirements, including reconciliation with contractor proposals;
- to ensure that the interface requirements are adequately understood;
- to resolve any other technical issues; and
- to establish a contractual framework which is clear, promotes and incentivises collaborative working and the provision of a satisfactory Automatic Train Control System within an acceptable time-frame and at an economical cost and that provides appropriate protections to London Underground.

Co-operation between London Underground and IIPAG has been good. IIPAG has made a large number of recommendations to the project team, most of which have been acted upon. IIPAG has also provided advice for Members of the Finance and Policy Committee.

The objective of appointing a contractor with adequate capability and a system demonstrably capable of adaptation to the needs of the SUP ATC has led London Underground to prequalify a single organisation as potential contractor. IIPAG agreed with this decision but, as expected, it has led to a protracted and challenging negotiation process. As IIPAG recommended, London Underground has strengthened its negotiating team through the year. IIPAG has not been involved in any discussions with the supplier.

A recurring feature over the year was the setting of unrealistic target dates for letting the main ATC contract: from May 2014, though July, September and December, and now June 2015. This slippage will affect the overall completion date, although London Underground has partially offset this delay by contracting the supplier to undertake preliminary design in advance of any main contract, at TfL's risk.

The composition of London Underground's SUP ATC team changed considerably through the year and IIPAG welcomed the move in November 2014 to better utilise the strengths of the successful Northern Line ATC team, something which IIPAG had suggested in the previous January.

London Underground's in-house management arrangements for delivery of the project have been improved by the greater influence of the Northern Line upgrade team. In particular the introduction of a pragmatic "one team" approach is expected to deliver efficiencies when compared with historically separate parties adopting an adversarial approach. However, the team has critical work to fulfil in order to enable the main contractor to perform, and the team is not yet fully resourced. Discussions about Programme support resources and suppliers are underway and IIPAG will continue to monitor the position carefully.

A key lesson learned from the failed Bombardier contract was that the contractor's management arrangements should be fully understood, prior to contract. London Underground must assure itself that the supplier has sufficient and adequate resources, sub-contracts and processes in place. IIPAG has not yet seen what is proposed for the new contract, but will be looking for comprehensive details.

One effect of setting and failing to meet successive target dates for letting the main ATC contract has been the necessity to make changes in the technical specification incrementally, rather than simplify it and make it easier to understand through a fundamental structural change, as IIPAG had recommended. However, London Underground held many workshops with the supplier and made detailed changes to the specification and this, together with the preliminary design work, has resulted in what IIPAG believes to be a higher level of understanding of the technical requirement pre-contract than had been the case after two years of the Bombardier contract. The amount of adaptation that is necessary to the proposed supplier's existing products is also far better understood than was the case with Bombardier.

London Underground decided to take on responsibility for establishing interface requirements and resolving interface issues, because they have the skills and knowledge to deliver these services most effectively. IIPAG agrees with this decision, but has stressed the need for London Underground to appreciate the critical need to discharge this responsibility in an effective and timely manner, since failure to do so will open up claims to compensation events, as well as increasing costs and causing delay. Signalling projects, whether in London or elsewhere, have often not been delivered to time or cost and London Underground has set itself a huge challenge over the coming years.

As regards other technical issues, IIPAG pressed for London Underground to consider the feasibility of providing for future telecommunications requirements, and is now satisfied that reasonable provision is being made.

The proposed contractual arrangements have changed significantly through the year, with several iterations, including a two-stage pricing mechanism proposed by London Underground that IIPAG recommended against. This has now been removed and London Underground now proposes to use a contract based on the current version of the NEC Northern Line Upgrade contract. IIPAG is currently reviewing the latest draft and will make observations and recommendations shortly.



IIPAG believes that the NEC Target Price arrangements can be made to deliver good value for TfL, if the contract is appropriately structured to motivate both the supplier and London Underground to work towards driving down the final Defined Cost expended by the Contractor. However, IIPAG remains concerned to ensure that the NEC3 form of contract (with London Underground amendments), which is more typically used for civil engineering and building work, is amended to be suitable for the ATC works. These are fundamentally about the provision of a software-based system. It is challenging to frame effectively a Contractor's obligations for software and system-based projects during interim stages, since there is little visible progress to monitor. IIPAG has also stressed the need to ensure that the Conditions of Contract are made consistent and integrated with the technical specification.

IIPAG has argued for over a year that early estimates of the cost of the system were lower than was likely to be delivered in London, and the overall estimated final cost (EFC) of the SUP ATC programme has increased significantly through the year. The proposed main supplier is now expected to make a Final Offer in the next month, but there is also significant enabling and interface scope to be delivered by London Underground. IIPAG has been pressing for a robust, detailed estimate but has so far not seen one. There is also the need to update the quantified risk assessment and for an independent review of the outcome. The relative impact of cost opportunity (through scope and delivery efficiencies) against prolongation costs is therefore unknown, which gives rise to obvious concerns about the likely final cost. IIPAG has raised questions about the possibility of reducing the geographic scope to suit the budget. A cost assurance review is underway and IIPAG will review the outcome.

As well as all of the above, shortcomings in resources and leadership have been encountered on this project. Currently the project is considering the means by which it will procure support from the market. Some resources are not yet in place and much remains to be done to set up appropriate performance measures during contract execution, to control design, product adaptation and system integration risks, and to define a detailed programme for installation, testing, commissioning and bringing into service.

Overall, there has been significant progress in the last year, particularly in clarifying technical requirements and responsibilities for interfaces. However, IIPAG remains uncomfortable with the current commercial position, as it is not yet clear whether it will be possible to achieve a contract that will deliver demonstrably good value. IIPAG is also still concerned about the delivery risks associated with the enabling and interface issues works that will have to be delivered in a timely fashion by London Underground.

Finally, IIPAG still believes that more must be done to investigate and better understand the circumstances surrounding the letting of the original contract to Bombardier in order to enable lessons learned from this procurement to be applied widely. IIPAG called for a forensic review and audit of the circumstances under which the Bombardier contract was let and this appears not to have been done. IIPAG also believes that the full scale of the considerable abortive cost has not yet been fully appreciated and that this should now be calculated.

## 2.6. Cycling Vision

During the year, IIPAG has carried out reviews on all the Cycling Vision major infrastructure projects. These are the Cycle Superhighways, Central London Cycling Grid, Mini-Hollands and the Quietways programmes, as well as a number of road junction projects where improvements for cyclists have been a significant consideration in the design of the layouts. In particular, IIPAG has helped to achieve a resolution of the design for the Cycling Superhighways in order to try to facilitate completion of the priority routes in the targeted timescales.

There are varying degrees of intervention and complexity in the different types of scheme, from intrusive measures to create dedicated cycle routes in the heart of the city to fairly light-touch works on lightly used secondary roads. IIPAG has been impressed by the quality of the engineering and project management work done through the planning stages of these programmes and now the focus is changing to construction and implementation. The timescales set to achieve completion of the early schemes are very challenging, and IIPAG will continue to monitor progress and ensure that lessons are learned from these early schemes.

IIPAG has also carried out a review during the year of the plans for updating the Cycle Hire scheme, which is presently in final stages of approval. IIPAG challenged the initial proposals and, as a result, a more affordable solution has been developed.

### 3. SYSTEMIC ISSUES

#### 3.1. Introduction

Through its project and Asset Management review work IIPAG has identified a number of issues that have a wide impact on the business performance of TfL. IIPAG is addressing these systemic issues with TfL separately in order to achieve the necessary focus, and some have been the subject of specific IIPAG reports.

IIPAG has pursued the following systemic issues in the last year:

- Sponsorship and Project Initiation;
- Organisational issues and External Expert Reviews;
- Procurement and Commercial;
- Research and Development;
- Commercial Development and Secondary Revenue;
- Telecommunications;
- Standards and Specifications;
- Project Overheads; and
- Carbon footprint.

#### 3.2. Sponsorship and Project Initiation

IIPAG considers that high quality sponsorship of projects is an essential component of a high performing Capital Delivery organisation. Without strong sponsorship of projects and programmes from the very earliest stages until projects are completed and closed it is difficult for any business to have confidence that the project will have met the objectives of the business in the most cost effective manner.

A structured Sponsorship Capability Programme was established by TfL in early 2014 and, as noted in section 2.2, IIPAG has made fewer recommendations that directly address shortcomings in sponsorship in the last year and so there is evidence that there is improvement in the execution of the role of the sponsor in TfL during the delivery of projects, in particular.

IIPAG remains of the view that the role of the sponsor across TfL should be an area of focus for TfL. There remain areas where IIPAG has made many recommendations in the past year where there would be significant benefit in further strengthening TfL's understanding of, and consistent application of, sponsorship.

The remaining weaknesses in sponsorship are most easily seen in the very early stages of a project, where significant decisions are made regarding the Project Requirements and the outline design. IIPAG has noted that some projects, particularly those that build entirely new infrastructure rather than replacing or upgrading existing assets, are allowed to be developed and to progress through the early stages of TfL's governance process without the involvement of a sponsor. The resulting absence of a properly documented set of Sponsor/Client Project Requirements results in the initiation of a project from a weak base. In addition, particularly in the very early stages of a project, the fundamental importance of the separation of the role of Sponsor from Delivery is not consistently recognised across TfL.

IIPAG recommends that:

- The Sponsorship Capability Programme should continue, but its effectiveness should be assessed and areas for improvement identified, particularly for projects in their early stages; and
- TfL's Governance process should insist upon the early separation of the roles of Sponsor from Delivery

IIPAG remains of the view that sponsorship is a key aspect of effective capital delivery and will continue to work with TfL to further strengthen its abilities in this area.

### **3.3. Organisational issues and External Expert Reviews**

In 2013 IIPAG conducted a review of the effectiveness of the TfL's Programme Management Office (PMO) and submitted a report in November 2013 making various recommendations. In IIPAG's 2013/14 Annual Report it was noted that TfL had only partially accepted these recommendations.

Following the decision to cancel the ATC signalling contract a review was undertaken by KPMG which identified the dual line of reporting for the TfL Assurance department did not provide true independence of the assurance process from Delivery. TfL Finance and Planning Committee (FPC) subsequently established a Special Purpose Sub-Committee to review the assurance and approval processes of TfL investment programme and to compare them with other similar organisations.

EC Harris were commissioned to review and their report noted that TfL's PMO, its second line of assurance, having two lines of reporting was not consistent with other organisations. This aspect, they noted, could give rise to the perception of a lack of true independence. Their recommendations generally concurred with those given in the 2013 IIPAG Report. IIPAG attended the Sub-Committee meetings and provided briefing papers. Subsequently, in December 2014, TfL decided to reorganise the PMO largely in line with the original IIPAG recommendations.

TfL's Assurance Manager has consulted with IIPAG, as plans are developed to strengthen the effectiveness of the Assurance team, to clarify its remit and to ensure that its report avoids duplication and overlap with IIPAG's activities. This will ensure that IIPAG remains an independent body providing a third line of Assurance to TfL.

The Special Purpose Sub-Committee has emphasised the need for three levels of change:

- Organisational reporting lines;
- Structural changes to the three lines of assurance defence (Project, TfL Assurance department and IIPAG) together with an improvement in skills and competencies; and
- A cultural change to ensure that within TfL there is recognition of the value of Assurance and to aspire to "world-class" project delivery.

The three topics are closely aligned with IIPAG's regularly expressed opinion that there is a need for greater rigour in the governance of projects to ensure decision

making is based on accurate and assured data. IIPAG welcomes this reorganisation, and is confident that the change to a single line of accountability to the Managing Director of Finance brings TfL in line with its peers in the provision of demonstrably independent assurance at level 2 and 3.

IIPAG looks forward to continuing to work closely with the Assurance department as it develops into the new role. IIPAG currently has not had visibility of the detail of reorganisation of the other two departments in the PMO, comprising the Centre of Excellence (COE) and Project Monitoring and Reporting. It had originally been IIPAG's opinion that there was an opportunity to reduce the cost of the CoE now that the management processes in support of Pathway had been established. With the reallocation of these activities to both the two business units of Rail and Underground and Surface Transport it is important that close liaison occurs to avoid duplication of new initiatives and effort.

It is important that within all parts of TfL there is compliance with the project management processes which have been approved for application. This requires individuals to be trained, to have the appropriate competencies and for senior management to insist that there is compliance.

### **3.4. Procurement and Commercial**

In recent Annual Reports IIPAG has questioned aspects of TfL's commercial capability. In the last twelve months TfL's Commercial units have been engaged in developing the processes they need to administer their tasks. Work remains to be done on embedding these processes and developing and/or recruiting sufficient talented resource to apply the processes consistently and successfully.

Issues discussed with the TfL's Commercial units, in the last year, include:

- Commercial organisation, roles and responsibilities;
- Recruitment and retention of commercial staff;
- Training of staff in commercial skills;
- Interfaces between TfL and its Supply Chain;
- Intellectual property;
- Cost estimating;
- Procurement; and
- Commercial Administration.

IIPAG's view of these issues is set out in the remainder of this section.

#### *3.4.1 Commercial organisation, roles and responsibilities*

IIPAG considers that there are two related organisational issues that should be addressed to assist TfL in delivering a high performing commercial function across its business. These are:

- The structure of the various Finance and Commercial units; and
- The responsibilities and management of Commercial aspects of projects.

TfL has two Commercial Directorates, one in Rail and Underground and one in TfL Corporate. The Commercial Function of Surface Transport is delivered through a matrix structure with teams reporting to the Corporate Director of Commercial, the Director of Projects and Programmes, Director of Asset Management and Director of Buses. Specific commercial roles are allocated according to the nature of the activity. There is no Surface Commercial Directorate but the commercial leads maintain strong links with the Corporate Director of Commercial. A significant number of the activities of both these Commercial and Finance units operate in parallel for both Finance and Commercial. The various units have worked together to establish their respective responsibilities and accountabilities, but while Finance is well led, corporately structured and organised across TfL, IIPAG does not believe that the same is the case for Commercial.

IIPAG considers that commercial services in TfL have become an uncoordinated discipline that is not led at a pan-TfL level and allows a variety of interpretations and conditions to be applied in an irregular fashion across the business. Significant issues have arisen on certain highway schemes as well as on major Tube station upgrades and, of course, the SUP ATC project. Once again IIPAG recommends that action be taken at pan-TfL level to address the continued under-performance of the discipline. IIPAG believes that this action should clarify corporate leadership, policy, practice and expectations for the project teams. The need for a pan-TfL standard is paramount and ad hoc actions by individual managers have to be discouraged.

Within TfL the Project Manager is responsible for the overall performance of the Project, including the final cost. However, in Rail & Underground the Project Commercial Manager's line manager is the Commercial Director. The Commercial Manager only has a "dotted line" responsibility to the Project Manager. Although this is not unusual IIPAG considers that extra effort will be required to develop and maintain a team working approach at project level.

In newly formed teams, this approach can be facilitated by performance indicators that are influenced by both parties. These may include:

- Compensation Events: For example number and value of outstanding/unresolved and average time for resolution;
- Number of specifications or Standards challenged or Number of specifications or Standards changed to achieve a cost or time saving;
- Value of savings from value engineering exercises; and
- Draw down of risk provision v % of EFC spent to date or yet to spend.<sup>4</sup>

These indicators can be aggregated for each Programme Manager or Director. IIPAG recommends that TfL set out the indicators that it uses to monitor its relationship between its Project and Commercial Managers.

IIPAG considers that the combination of TfL's structure of Finance and Commercial units and the matrix management of its commercial managers will make delivering a high performing commercial function across the whole of TfL a significant challenge.

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<sup>4</sup> EFC is a dynamic measure that should be used rather than the Project Authority which is often an over estimate made in the very early stages of the project process

IIPAG will work with the business in the next year to deliver a more appropriate organisation.

While these organisational issues are important, successfully addressing them alone will not deliver good commercial performance. IIPAG considers that the culture of TfL will need to become ever more focussed on delivering better commercial outcomes and that this will require significant focus and leadership from TfL's Chief Officers and the injection of highly experienced senior staff.

#### *3.4.2 Recruitment and retention of commercial staff*

The Rail & Underground Commercial Directorate, which is responsible for commercial aspects of capital works delivery in much of TfL, has approximately 400 employees; 300 are permanent positions and 100 are employed under some form of temporary contract. Of the 41 Chartered Surveyors employed 30 have been recruited in the last 3 years.

The scale and quality of the portfolio that TfL is committed to deliver provides an ideal opportunity to develop and retain a high calibre commercial team. This will only be achieved if TfL has clear leadership, an appropriate organisation and an effective reward and recognition policy. In the last year IIPAG has noted examples of some newly recruited staff who were recruited to provide very senior and experienced advice and leadership on high profile, complex and problematic projects. These staff, who had proven their capability in the wider market, did not "fit" in TfL and left after only a few months. IIPAG understands that a significant contributing factor to this situation was concern over the Commercial organisation and leadership within TfL. IIPAG maintains its view that these issues of commercial organisation and leadership will have to be addressed at the corporate level in order to deliver the significant change in Commercial performance that is required.

Any change in policy should lead to the differentiation of high performers and should show little tolerance of poor performers. Part of this will mean a broadening of the pay grades and their overlaps. At present there is only a 5% overlap between pay scales for staff in grades 2 and 3. The policy should also enable professional progression for people in the early years of their career. Outside of TfL high performing graduates expect fairly rapid career progression.

IIPAG recommends that TfL develop and implement an effective reward and recognition policy in order to attract and retain high quality commercial staff.

#### *3.4.3 Training of staff in commercial skills*

Following a training needs analysis, a series of new training courses have been developed and delivered. Feedback has been received and analysis undertaken regarding the relevance of the training. However, currently little is known about the benefits that have accrued to those who have been trained.

IIPAG recommends that a benefits measurement scheme be introduced. Possible indicators are:

- Monthly movements in EFC for each project and programme;
- Number of disputes and % resolved in favour of TfL;

- % of tenders issued on time, Number of queries received on tender documents, % of tenders awarded on time; and
- Number of lessons learned that have been captured and communicated.

These indicators can be aggregated for each Programme Commercial Manager or Director.

#### *3.4.4 Interfaces between TfL and its Supply Chain*

TfL has undertaken work to obtain feedback from the supply chain on TfL's performance as a customer. Seventy suppliers were approached and input was obtained from senior commercial and delivery managers. TfL are feeding responses back to the suppliers and discussing how to improve relationships with them.

An initiative is being developed under which more work would be executed in-house and in some instances TfL will employ and manage tier 2 contractors (and below) directly. This is underway for Rail and Underground's Integrated Stations Programme via what is known as its STAKE process, where Level 3 and 4 contractors are employed directly. Effectively TfL is performing the role of a Construction Manager.

This course of action is likely to increase the magnitude of risk that TfL is managing. It is important that TfL verify they have sufficient skilled and experienced resource available before this course of action becomes widespread.

IIPAG recommends that TfL review the numbers and levels of competence of its risk managers to ensure that it has sufficient competent resource to deliver this approach.

#### *3.4.5 Intellectual property*

IIPAG has noted a number of occasions in the last year where intellectual property rights (IPR) has been an issue, either constraining the solutions that could be considered, increasing the costs or both. IIPAG considers that, as TfL's business becomes more integrated and dependant on software, these issues will become more important to the business. IIPAG believes that TfL's approach to IPR should be consistent and clearly set out. While it is clear that lessons are being learned by individuals, and by groups that have encountered such problems, IIPAG has not seen evidence that IPR is appropriately considered for all projects.

#### *3.4.6 Cost estimating*

TfL has worked over the past year to increase the understanding it has of the costs it incurs for elements of works it undertakes regularly so that it is better able to anticipate the cost of future work and interrogate costs proposed by contractors and suppliers. IIPAG strongly supports such work and looks forward to seeing how TfL puts it to use over the coming year to produce better quality and more accurate estimates and to drive down the costs that it would otherwise incur.

#### *3.4.7 Procurement*

TfL have utilised a new form of procurement known as Innovative Contractor Engagement (ICE) for the procurement of the major Bank Station Upgrade project



and also for a relatively minor project for a pedestrian tunnel to link the new Crossrail Station at Paddington to the Bakerloo Line station platforms at Paddington. On both occasions the appointed contractor had proposed an alternative design to the Client's Reference Design, which was judged to be commercially advantageous.

Whilst ICE has delivered savings, at least when judged at the time of Contract Award, it is a longer and more costly procurement process. IIPAG supports the development of a procurement methodology which enables the contractors and their designers to effectively challenge TfL's existing concepts, Standards and design assumptions. However IIPAG wishes to see more effort in the timely production of an approved Procurement Plan tailored to the specific needs of each individual project, since ICE is not a panacea that will be suitable for all, or even most, projects and its overall benefit has yet to be demonstrated at delivery.

Prior to engaging with the suppliers to be invited to tender the principles of the terms of contract, and the objective of the Instruction to Tenderers should have been established to ensure that the Tender process is fully focused on the desired outcomes. On occasion IIPAG has noted that the preparation of the Invitation to Tender and all of the associated documents takes longer than planned and that this can result in a rushed process. This increases the risk that documentation is incomplete or inconsistent. Input by the Lawyers to the ITT and the form of Contract and its Z Clauses is also critical. The execution of the evaluation, once set out, appears to be faultless in all projects that IIPAG has reviewed.

IIPAG recommends that sufficient time and competent and experienced resource be built into projects to ensure that ITTs and their associated documents are timely and of high quality.

### *3.4.8 Commercial Administration*

In the past year IIPAG has witnessed several examples of TfL experiencing problems because it has been unable to agree with contractors the value of changes that have occurred. This has resulted in a perceived increase in TfL's risk profile, which it has addressed by entering into supplementary agreements with such contractors.

Those agreements have varied a number of the terms upon which the contractors had been engaged, including providing the opportunity for the contractor to receive considerable sums by way of incentive payments. IIPAG has expressed concerns with regard to such revised terms, including regarding whether the incentive payments represent value for money and the lack of time made available to those required to review the relevant documents before agreements are concluded.

IIPAG is aware that TfL is currently reviewing the standard terms it uses when employing contractors so that it can be more certain the value of changes in the works will be concluded within appropriate timescales. To the extent this alleviates TfL's concerns regarding the risk of unexpected increases in expenditure IIPAG welcomes this initiative and supports it. However, IIPAG remains concerned that fundamental revisions to contracts such as have occurred in the past year should not become the norm.

IIPAG recommends that incentive payments should only be introduced post-contract in exceptional circumstances where it can be unequivocally established that they represent good value and where sufficient time is made available for necessary levels of scrutiny to be applied to them.

IIPAG has also noted that a many contracts have experienced significant numbers of changes. Given the nature and scale of the projects undertaken, this is to be expected, at least in part. However, IIPAG considers that a review should be undertaken of the cause and effect of such changes to ensure that both pre and post tender periods have been properly managed to mitigate risks and maximize value. IIPAG will undertake this work over the next year.

### **3.5. Research and Development**

In March 2013 TfL launched the Innovation Portal which is geared towards stimulating innovative thinking within and outside the transport industry. The aim of the portal is to develop new technology and approaches to the challenges that occur across the Capital's transport network, including:

- Customers: Delivering faster, more frequent and reliable services to customers while improving information provided via frontline staff;
- Value and sustainability: Using technology to improve efficiency while reducing noise and environmental impact;
- Delivery: Finding new technologies and ways to achieve reliable and safe first-class delivery with minimal closures and costs;
- Reliability and dependability: Targeting the use of smart data and technology to help achieve improvements in reliability;
- Safety: Finding innovative solutions to improve customer safety and security; and
- People: Making sure TfL's workforce is skilled to the highest standard by developing the tools and processes that will encourage even greater performance.

In the next year IIPAG will work with TfL to assess the effectiveness of the portal and explore other ways of enhancing efficiency.

### **3.6. Commercial Development and Secondary Revenue**

IIPAG has previously commented on what appeared to be a lost commercial opportunity: the lack of exploitation of floorspace in major stations currently undergoing refurbishment and improvement. IIPAG is delighted that TfL has now consolidated the management of all non-fares income in a new Commercial Development (CD) directorate. The aim of this directorate is to increase non-fares revenue across all TfL's business units whilst enhancing the customer experience. This has required an investment in skills within the new directorate and a shift in culture and practices across the wider organisation similar to that recommended by IIPAG for the commercial aspects of TfL's Investment Programme.

TfL is one of London's largest landowners, with 5,700 acres of land and over 400 potential development sites. Apart from station commercialisation, the initiative has the ability to provide significant numbers of homes as well as additional employment, whilst also offering local improvements to stations through coordinated initiatives such as step-free access. It has been agreed that CD will liaise with IIPAG where appropriate and as required.

In addition to the Station Capacity Upgrade Programme and Integrated Stations Programme current activity in this area includes:

- Click and collect initiatives with major supermarkets;
- Pop-Up retail for household names;
- New retail space at existing stations such as Canary Wharf; and
- New kiosks at principal stations.

### **3.7. Telecommunications**

Telecommunications are vital to the operation of TfL. TfL depends upon telecoms services at: its control centres; at all of its railway, bus and tram stations and depots; at its railway signalling and electrical control locations; at all of its offices and data centres; at all of its traffic lights; congestion charging sites and cycle hire points, and on all of its buses, trams and trains. This costs in excess of £300m per year to operate, with many more millions spent each year within capital schemes.

However, TfL's management arrangements are fragmented and inefficient. Existing services are managed by too many people and are costing too much money. Not enough is being done to secure the development of the efficient telecoms network that is needed to help improve transport capacity and customer service.

IIPAG first highlighted these problems three years ago. Since then, TfL has done some work to assess the situation, and has confirmed that the sums spent on operating its telecoms are even greater than IIPAG had estimated. TfL has not yet worked out how much capital spend it makes on telecoms. TfL has set up various steering groups and made some modest organisational changes. However, despite the best efforts of some very good people progress has been painfully slow and the fundamental problems still remain.

IIPAG believes there is scope for saving in excess of £100m per year. IIPAG also believes that there is an opportunity to significantly reduce capex spending and to derive considerable third party revenue through commercial exploitation of telecoms at TfL.

During the last year the number of networks, suppliers and contracts for telecoms has not changed much and telecoms Opex has not reduced. This represents a missed opportunity. In this time authority has been provided to extend contracts and to authorise schemes containing discrete telecoms works. For example, over £200m of projects that specifically included or addressed communications have been approved at TfL's Finance & Policy Committee meeting in the past year. Many other projects that are dependent on communications contracts and infrastructure to deliver their requirements have also been authorised, such as stations upgrades, road signalling infrastructure and revenue collection. In the absence of a clear corporate strategy it is inevitable that some of these decisions will have been sub-optimal.

The historical reasons for the fragmented arrangements are well known, and the resulting inefficiency has been widely recognised within TfL for some time. However, it appears that the scale of the wastage of money and the loss of opportunity is still not considered to be large enough to get the senior management attention and priority that is necessary if these issues are to be resolved.

London Underground continues to insist that it needs separate networks for safety critical reasons, despite the long existence of a EuroNorm specifically to control the risks and despite the fact that many railways (including in UK) use telecommunications networks for both safety critical and other applications.

IIPAG has, over the last 3 years, made many recommendations for the improvement of TfL's telecoms arrangements, but most of these have not been delivered. The situation is largely unchanged and there is still:

- A lack of accountability and strategic direction in managing telecoms assets;
- A lack of clarity about what is telecoms and what is Information Management;
- A lack of overall network management and overview of performance and failures;
- Very limited flexibility and reduced resilience;
- An inconsistent approach to network security and uncertainty about what is delivered;
- An unknown, but certainly significant, extent of duplication of infrastructure and services;
- Duplication of design effort across programmes and lack of standardisation;
- Continued argument that LU has safety requirements that necessitate separate networks;
- Too many suppliers of similar things and some suppliers with multiple contracts; and
- Poor exploitation of the advantages of scale and commercial synergy.

In particular, IIPAG's suggestion that a single organisation should be created has resulted in plans to form *three* separate organisations: One of these, the "Single Delivery Unit" which Information Management is attempting to set up, is now expected to consist entirely of IM staff and new recruits. IIPAG believes that this arrangement is bound to fail. The other two are in Rail & Underground and in Commercial Development, where there are some very good people with good ideas, but largely because of the dysfunctional organisation for telecommunications and the associated lack of effective leadership they have had limited impact.

IIPAG still believes that a single organisation is necessary to manage operational and business telecoms across the business, to enable the existing distributed staff to be more effective and to facilitate the significant commercial and operational opportunities that exist. This organisation should be rooted in the operational business, be led by a dedicated Director with suitable authority, and should specifically not be in the Information Management Directorate.

IIPAG will produce a further report on TfL telecommunications in summer 2015 to address the problems in more detail, and to reiterate its earlier recommendations, most of which remain relevant.

### **3.8. Standards and Specifications**

IIPAG has started work to examine the Engineering Standards developed within TfL, initially looking at those owned by London Underground. Engineering Standards are needed for many reasons, primarily perhaps to facilitate the correct operation and effective life of assets which may have working lives measured in decades rather than years. IIPAG has undertaken initial work by understanding how the London

Underground S standard setters see the position. The next stage of the review will be to see how effective the S standards are perceived by users, both within and external to London Underground.

IIPAG understands that there has been a somewhat tortuous evolution of S standards during the last 10 or so years. During the implementation of London Underground's Public Private Partnership (PPP) high-level S standards were migrated into about 100 "Category 1" output-based S standards retained by London Underground. The remainder, generally "Category 2" S standards, migrated to Metronet and Tube Lines. These Infracos were able to modify and rationalise the S standards as they saw fit, with notification to London Underground. At the end of the PPP, some 1,350 and 750 Category 2 S standards transferred back to London Underground from Metronet and Tube Lines, respectively, and there has been an on-going process since then to rationalise them. There are presently 1,182 S standards listed on the externally accessible S standards database. Many of these are formatting revisions to earlier London Underground S standards with no technical updates carried out.

The aim of any S standards regime is to have sufficient, but not too many, up-to-date S standards. These should facilitate innovation whilst protecting those interface and performance characteristics that have to be maintained. London Underground tracks progress in reviewing these S standards, with each S standard being reviewed every three years, with the review taking into account any concessions sought against that S standard over that period. London Underground has also started work on rationalising the S standards for rolling stock, with the objective of having one Category 1 S standard supported by a small number of other documents.

In project reviews in which IIPAG has participated in the last year S standards are rarely raised as an issue, although IIPAG has not systematically enquired about this topic at reviews. However, during the review of the SSL project in preparation for the retendering carried out, there was a review of the telecommunications S standards. IIPAG found many of these were to be out-of-date, referencing obsolete technology or principles considered unsatisfactory for future use within the high level Category 1 S standard on telecommunications. There is anecdotal background information that many of the other standards are still considered to be too prescriptive and out-of-date but IIPAG has not yet examined this.

In the next year IIPAG will examine how the rationalisation of rolling stock S standards is progressing. This is particularly pertinent given the future procurement of New Tube for London rolling stock. IIPAG will also undertake more systematic questioning on S standards in project reviews.

### **3.9. Project Overheads**

IIPAG would argue that a fundamental requirement of commercial acumen within a business is an understanding of in-house costs. Within TfL such costs are seldom discussed or understood by project staff and there is an underlying assumption that in-house is more cost effective than buying in. However, in negotiations it is not unusual for TfL staff to enquire the make-up of suppliers overheads.

As TfL's business model changes, with more importance placed on secondary income and less on subsidy, then IIPAG believes that pressure will be need to be applied to make each of the businesses within TfL more aware of their costs.

Apportionment of the total overhead will not be acceptable and a more detailed breakdown of separate costs will be expected as the norm, placing more responsibility on each business to perform to budget targets.

IIPAG is convinced that there has to be a change in the commercial culture of TfL in relation to TfL's Investment Programme and future demands of TfL; it has proposed in the forthcoming Workplan to work with TfL to assist in achieving that goal and understanding overheads is a significant part of this.

### **3.10. Carbon footprint**

London Underground has signed up to the Infrastructure Carbon Review<sup>5</sup> and has been involved in developing a common tool and methodology for measurement of embodied/capital carbon emissions from UK rail projects. The tool has been launched and London Underground is now embarking on trials of its use.

Initial projects for study are Bank Station Upgrade and Camden Town station capacity upgrade. These projects are at different stages of their development, with Camden Town there is an opportunity to use the outcomes from the assessment to feed into the procurement process for the project.

Lessons learned from these trials will be used to develop changes to Pathway, to improve the whole-lifecycle carbon management of projects. IIPAG recommends that these changes be implemented as soon as possible.

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<sup>5</sup> <https://www.gov.uk/government/publications/infrastructure-carbon-review>

## **4. ASSET MANAGEMENT & BENCHMARKING**

### **4.1. Introduction**

Asset Management is widely recognised as the best approach to managing infrastructure and combines technical, financial and organisational approaches to minimise the “whole life” cost of assets. This includes the costs of acquisition, operation, maintenance, disposal and renewal of physical assets, together with the value of risks such as worse reliability and the resulting impact on the business. Done properly it allows limited financial and human resources to be prioritised optimally to deliver specific service levels at acceptable levels of risk.

Benchmarking is a subset of Asset Management. It allows businesses to understand how their practices, costs and performance relate to comparators elsewhere. Effort can then be prioritised on areas where it seems, based on these comparisons, that it can have maximum impact. In addition, quantitative comparisons enable businesses to demonstrate to what extent their costs and performance are in line with comparators elsewhere.

### **4.2. Asset Management**

IIPAG understands that TfL has progressed its knowledge and competence in Asset Management in the last year, and that there is a structured programme of training to give appropriate levels of expertise in this topic across the business. However, due to other demands, in particular the greatly increased workload of working with TfL on the retendering of the Subsurface ATC project and an increased number of project reviews, IIPAG has undertaken little work to review the application of Asset Management across TfL in 2014/15. In IIPAG’s workplan for 2015/16 increased focus on this area is anticipated.

### **4.3. 2013/14 IIPAG Annual Benchmarking Report**

TfL’s Finance & Policy Committee considered the Management Response to IIPAG’s 2013/14 Annual Benchmarking Report in October 2014<sup>6</sup>. It had not been possible to include IIPAG’s report as an appendix to IIPAG’s 2013/14 Annual Report, considered at the July 2014 Finance & Policy Committee, due to the previously agreed production timetable for the data and information required for the Benchmarking Report.

Within its report IIPAG considered that it was notable, and commendable, how benchmarking has become part of “business as usual” within much of TfL. IIPAG noted that the use of good practice benchmarking to identify better approaches and ways of working appears firmly embedded across much of the TfL.

IIPAG made recommendations to the business regarding investigation of the relative reliability of London Underground and the DLR, improved reporting of unit costs for repeatable items of capital works, greater use of planned extended working hours for stations works and incorporation of TfL’s knowledge of CBTC maintenance costs

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<sup>6</sup> <https://www.tfl.gov.uk/cdn/static/cms/documents/fpc-20141014-part-1-item-10-iipag-benchmarking-report-2013-14.pdf>

and reliability into the retendering of the Subsurface ATC contract. IIPAG also reiterated previous recommendations on reductions in train delays due to staff, and reducing track renewal and maintenance unit rates.

#### **4.4. Benchmarking in 2014/15**

IIPAG and TfL have now rescheduled the reporting and analysis of data such that its benchmarking report can be combined with its Annual Report. IIPAG's Annual Benchmarking Report is attached as Appendix A to this report.

This year's benchmarking shows that:

- Tube reliability and unit costs continue to improve, with total operating unit costs reducing. This is primarily due to reductions in the costs of maintenance, where London Underground's performance in reducing these unit costs is among the most impressive of all large international metros. Reliability is also improved, with equipment reliability now in the best quartile of international metros.
- Admin and other costs have not reduced as rapidly as maintenance and service operations costs, and now comprise over a quarter of London Underground's operating costs;
- Unit costs for most track renewals have reduced, but unit costs for Ballasted Track Renewals (BTRs) have increased. This is a result of changed ways of working, with some renewals undertaken in engineering hours rather than in weekend closures, and also in the relatively high difficulty of works undertaken in the last year. TfL will separate out unit costs of different approaches to BTRs in future.
- Increased knowledge of the costs of works at a detailed level are being used to improve early estimates of costs and, in some cases, to drive changes in approach. This knowledge will become even more valuable as delivered costs, rather than contract costs, are captured over the next year.
- Costs of maintaining the new Victoria and Subsurface fleets are currently, and forecast to remain, significantly higher than those of the Jubilee line.

IIPAG considers that econometric work undertaken to understand how unit costs in London compare to those internationally is robust enough to be applied in London Underground's business planning process. This will enable increased focus on areas where unit costs are higher than expected, when structural factors are removed. In addition, estimates of the impact of year on year improvements in efficiency elsewhere can be made.

IIPAG has noted that there are, in some cases, distinct differences between the costs and reliability delivered and forecast by maintenance operations delivered by Amey and those on the remainder of the Tube network. IIPAG considers that TfL is fortunate to have such an internal comparator for its maintenance costs and reliability and, while the amounts paid for this are material, they are likely to result in reduced unit costs for these and other lines as good practices are shared.

TfL has made good progress in acting on most of the recommendations that IIPAG made in its previous report. In particular, changes have been made to London Underground's "rulebook", which should enable increased working in traffic hours and in extended engineering hours. IIPAG looks forward to seeing the impact of this on unit rates in due course. In addition, reliability on the DLR has improved by 66%



following joint working between DLR and engineers from the Jubilee line to improve signalling software.

IIPAG has set out four new recommendations for further improvements to the business and reiterated five of its previous recommendations. IIPAG:

1. Recommends that TfL increases its focus on London Underground's "admin and other overheads" costs (i) clearly setting out its approach to reducing these costs (ii) setting itself challenging targets for reductions in costs and (iii) tracking and reporting on progress in cost reduction.
2. Recommends that a comparison of actual and expected unit costs and the frontier shift of unit costs delivered by international metros be explicitly set out in London Underground's Asset Management Plans.
3. Reiterates its previous recommendation TfL maintains its focus on delivering the anticipated reductions in track maintenance unit rates.
4. Reiterates its previous recommendation that TfL maintains its focus on delivering the anticipated reductions in train delays caused by staff.
5. Reiterates its previous recommendation that TfL maintains its focus on delivering the anticipated reductions in track renewals unit rate.
6. Recommends that TfL undertake a detailed comparison of the maintenance approaches used on the Jubilee Line and those employed on the Victoria and Subsurface Lines.
7. Recommends that TfL carefully consider the value for money of the Amey contract, taking into account the likely long term improvements in efficiency that such an internal comparator might deliver.
8. Reiterates its recommendation that Costs of delivering RWIs be consistently and regularly reported to the business, for example via Annual Independent Assurance Reviews (IARs).
9. Reiterates its recommendation that RWI unit rates are carefully tracked to ensure that anticipated changes in unit rates due to changes in access are delivered.

IIPAG has continued to chair TfL's Benchmarking Steering Group, for 2015/16 the key priorities are to focus on getting more and better comparisons of external costs and to build on work undertaken to date to set out the value of the comparisons undertaken, such that TfL can better focus its future work.

## **5. FUTURE WORK PLAN**

IIPAG has produced its workplan for 2015/16 and is currently consulting on its content with TfL and the Secretary of State for Transport prior to submission to the Mayor for approval. IIPAG has reviewed the resource required to deliver its remit and will recommend a budget to the Finance & Policy Committee in due course.

## APPENDIX A - IIPAG ANNUAL BENCHMARKING REPORT

### 1. BACKGROUND

This report is provided for the TfL Board and TfL's stakeholders. Following positive feedback from stakeholders regarding earlier benchmarking reports the focus on steps that can be made by the business to further improve reliability and reduce whole life costs has been maintained, though in this report greater emphasis has been placed on describing the trends in maintenance unit costs and reliability of London Underground.

63% of TfL's spending is benchmarked and coordinated via a Benchmarking Steering Group (BSG), chaired by IIPAG. This proportion<sup>7</sup> is slightly increased from the 61% reported last year as more items of Repeatable Works are captured for London Underground stations works.

This appendix draws on benchmarking work undertaken by TfL in the last twelve months, together with IIPAG's experience of costs and delivery at Gate Reviews. The report describes the key findings from benchmarking that have informed IIPAG's opinion. This report does not comment upon all benchmarking undertaken in the last twelve months but focuses on area where new work has been undertaken or where ongoing work has highlighted issues that are particularly relevant to TfL's Investment Programme.

Section 2 of the appendix describes IIPAG's view of the main benchmarking findings, and sets out recommendations for TfL.

Section 3 describes progress that has been made since October 2014 in addressing the areas for business improvement that were highlighted by IIPAG in its 2013/14 report.

Section 4 summarises IIPAG's recommendations to the business and Section 5 describes IIPAG's proposed focus for benchmarking in the next 12 months.

### 2. KEY FINDINGS FROM BENCHMARKING THIS YEAR

#### 2.1 Introduction

This section of IIPAG's report sets out key points that IIPAG draws out from benchmarking of:

- International comparisons of Rail and Underground unit costs;
- International comparisons of Rail and Underground reliability;
- Tube capital programme unit costs;
- Maintenance unit costs for rolling stock, signalling and track assets;
- International comparisons of Bus unit costs and reliability; and
- Trends of unit costs for surface asset management.

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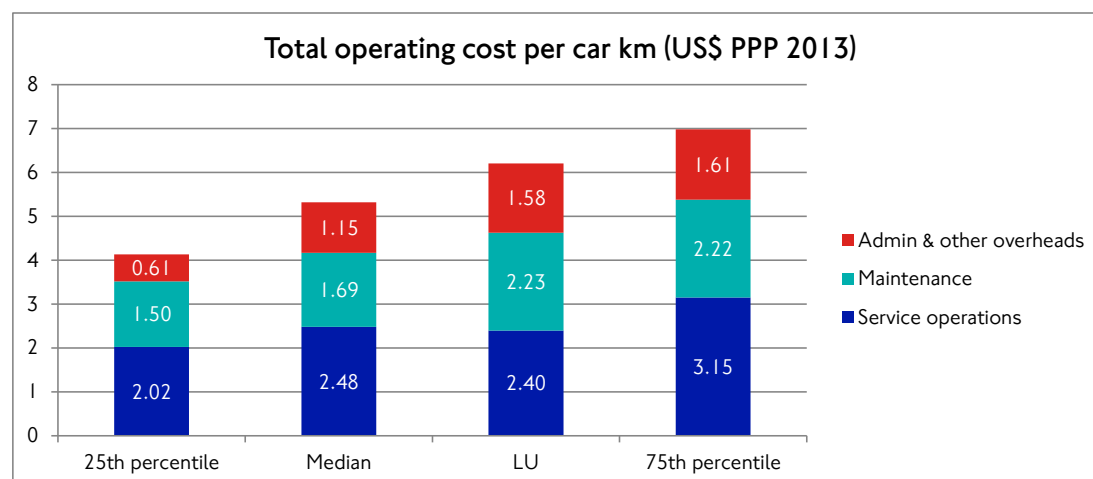
<sup>7</sup> spend in 2013/14 to 2020/21

IIPAG has highlighted where there are changes in performance or trends and has selected areas where it believes TfL should prioritise action to improve.

## 2.2 International comparisons of Rail and Underground unit costs

London Underground and the DLR are members of the CoMET and Nova<sup>8</sup> benchmarking groups, and the international comparisons in this section and the subsequent section on reliability are utilise data from 2013, the most recent year for which these comparisons are available.

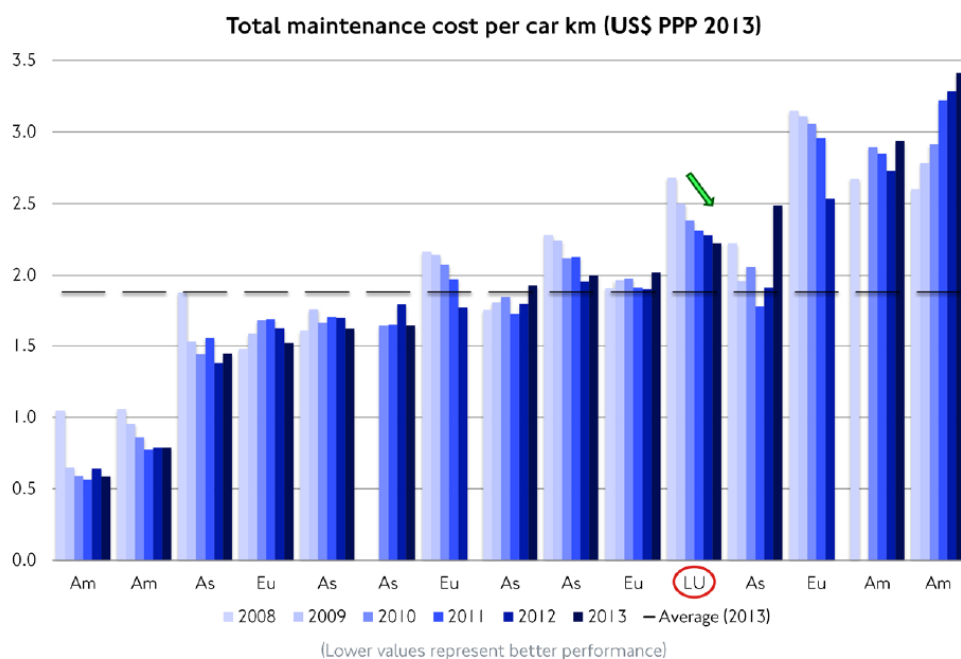
The high level breakdown of London Underground's operating costs per car km, compared with other international metros, are depicted in Figure 1, below.



**Figure 1: Total Operating Cost per Car km**

London Underground's service operations costs remain better than the median CoMET metro, but London Underground's maintenance costs remain high compared to other International Metros, being at the 75th percentile of international metros. However, London Underground's performance in reducing these unit maintenance costs is clearly among the most impressive of all the CoMET metros, as depicted in Figure 2, below.

<sup>8</sup> CoMET is a group of large metros including cities such as New York, Paris and Singapore and Nova contains slightly smaller metros such as Barcelona, Buenos Aires and Kuala Lumpur. Both groups are facilitated by RTSC at Imperial College, London



**Figure 2: CoMET Maintenance Unit Cost Trends**

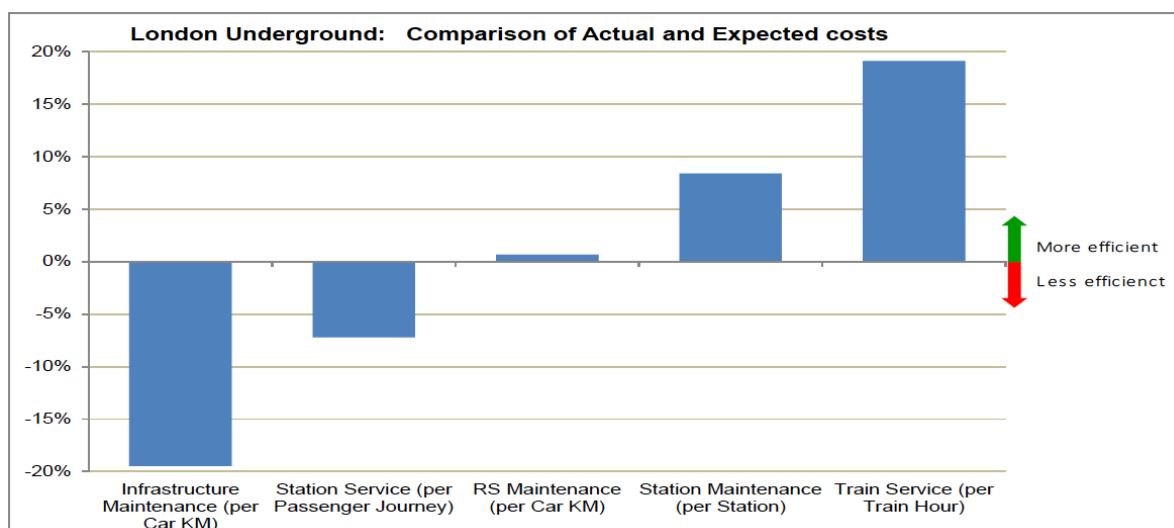
In contrast to London Underground’s maintenance unit costs, which have reduced by 17% since 2008, its “admin and other overheads” costs per car km have reduced by only 2% over the past five years with service operations costs reducing by 7% over this period. Admin and other overheads costs now comprise over a quarter of London Underground’s operating costs and are only slightly less than those of a 75th percentile metro.

IIPAG understands that TfL “specialist services” have regularly participated in CIPFA’s value for money benchmarking, and that some functions have decided to use specialist benchmarking organisations to provide specific benchmarking measures, commencing in 2015. IIPAG considers that this is an important step but that the key test of its effectiveness will be the impact that such work has on reducing costs while maintaining or improving the effectiveness of these functions.

***IIPAG recommends that TfL increases its focus on London Underground’s “admin and other overheads” costs (i) clearly setting out its approach to reducing these costs (ii) setting itself challenging targets for reductions in costs and (iii) tracking and reporting on progress in cost reduction.***

IIPAG has previously noted that the unit costs of infrastructure maintenance in London Underground are particularly high and the most recent international comparisons confirm that costs remain high compared to other metros.

To an extent these high unit costs are a result of London’s infrastructure and city context, where high wage costs and high network length, for example, drive increased costs. To understand this in more detail London Underground has commissioned Imperial College’s Railway and Transport Strategy Centre (RTSC) to undertake econometric analysis of the costs of operations and maintenance across the CoMET and Nova metros. An extract from this analysis is shown in Figure 3, below.



**Figure 3: Comparison of Actual and Expected Unit Costs**

This indicates that, even allowing for these known structural factors, the unit costs of infrastructure maintenance are almost 20% higher than would be expected. IIPAG considers that the use of such analysis to understand the extent to which operating costs are efficient compared to other metros is a valuable step. IIPAG understands that TfL's Rail & Underground is developing this analysis such that it can be incorporated into its next business planning round. IIPAG concurs with TfL's view that such benchmarking cannot be used mechanistically to set targets, but IIPAG considers that it is a very useful tool to identify areas for increased focus for unit cost reduction.

IIPAG considers that this analysis has also delivered a valuable way of assessing the speed of "frontier shift": year on year improvements in unit cost efficiency that international metros have been able to deliver. RTSC's analysis indicates that international metros have delivered efficiency improvements, once structural factors are controlled for, reducing unit costs per car km by 1.5% to 3.0% per year<sup>9</sup>. IIPAG considers that this analysis is sufficiently robust and applicable to London Underground and to be incorporated into TfL's business planning process. IIPAG understands that recent benchmarking work reported to TfL's Finance & Policy Committee<sup>10</sup> has incorporated this rate of frontier shift. The level of unit costs anticipated to be delivered by international metros in the future have been reduced by these amounts such that forecasts of TfL's unit costs can be compared with the likely level of those delivered elsewhere in the future. IIPAG concurs that this approach is appropriate.

IIPAG considers that these two factors: The comparison of actual and expected unit costs and the frontier shift of unit costs delivered by international metros should be explicitly set out in London Underground's Asset Management Plans such that levels of unit costs delivered by London Underground can be compared with those delivered internationally both now and in the future.

<sup>9</sup> The rates of reduction in unit costs per car km differ for different asset classes

<sup>10</sup> <http://www.tfl.gov.uk/cdn/static/cms/documents/fpc-20150311-part-1-item09-benchmarking-fin-plan.pdf>

***IIPAG recommends that a comparison of actual and expected unit costs and the frontier shift of unit costs delivered by international metros be explicitly set out in London Underground's Asset Management Plans.***

London Underground has plans in place to reduce its infrastructure maintenance costs, which utilise improvements to the track technology as obsolete and age-expired track is replaced with more modern track-form. This is combined with better understanding of the degradation of track via more intensive monitoring, utilising the Automatic Track Monitoring System (ATMS) that is currently being developed and rolled out over the network. IIPAG has commented upon this technology in previous years as a key enabler of increased efficiency of track maintenance in the long term, but notes that this project is now running 2½ years behind schedule.

IIPAG considers that the effective use of ATMS will require a cultural change in the management of track at London Underground, shifting from reactive maintenance and a reliance on patrolling to identify defects to proactive monitoring and focussing of resources (including access) on examination of specific defects.

IIPAG remains concerned that the technical issues that have delayed the project have resulted in an understandable focus on solving these technical difficulties. While it is clearly essential that these issues be addressed and resolved it is equally important that appropriate steps are put in place to use this new technology effectively. Without sustained and consistent effort the cultural change required will not be delivered and the impact of greatly improved monitoring will be dramatically reduced.

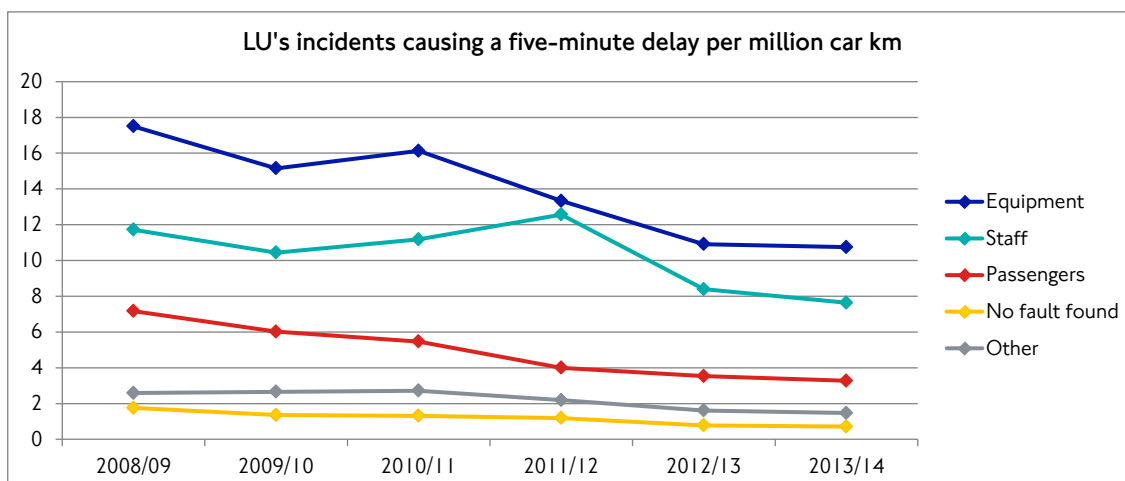
***IIPAG reiterates its previous recommendation TfL maintains its focus on delivering the anticipated reductions in track maintenance unit rates.***

## **2.3 International comparisons of Rail and Underground reliability**

London Underground's reliability, measured on the internationally comparable metric of the number of five minute delays per million car km, has improved by 41%<sup>11</sup> since 2008/09. Improvement is across all of the five high level categories into which delays are divided, as shown in Figure 4, below.

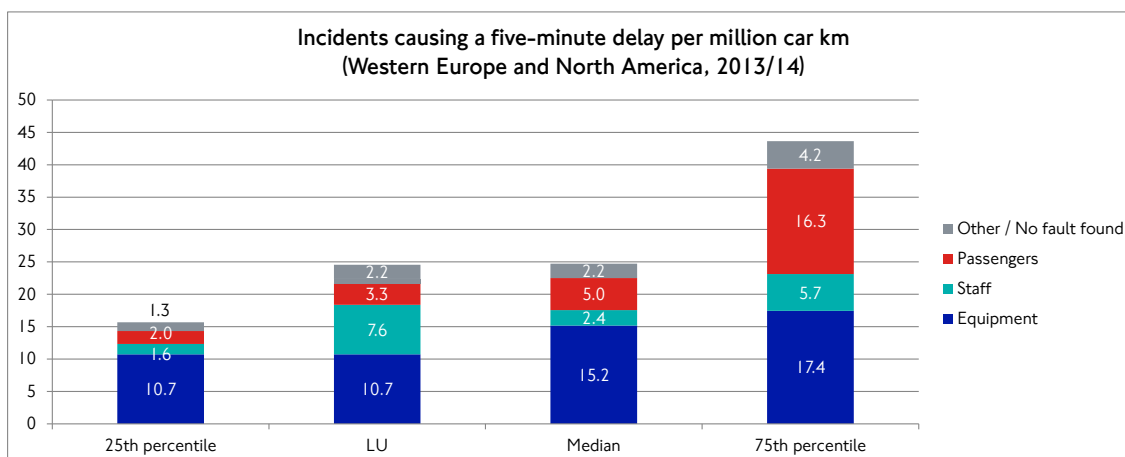
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<sup>11</sup> This is equivalent to a 71% increase in the car km travelled between 5 minute delays, an alternative formulation of this measure



**Figure 4: Number of Incidents causing a 5 minute delay per million car km**

London Underground's progress now puts reliability at better than the median level of North American and European metros, as depicted in Figure 5, below.



**Figure 5: Incidents causing a five-minute delay per million car km (2013/14)**

Excellent progress has been made in reducing equipment delays, which are now just within the top quartile of Western European and North American metros. This is a great achievement. However, as previously highlighted by IIPAG, staff delays remain unacceptably high, albeit around 30% lower than in 2008/09.

*IIPAG reiterates its previous recommendation that TfL maintains its focus on delivering the anticipated reductions in train delays caused by staff.*

## 2.4 Tube Capital Programme Unit Costs

The unit costs of delivering track drainage (2% reduction), points and crossings renewals (19% reduction) and deep tube reconditioning (8% reduction) all reduced compared to the previous year, while the cost of ballasted track renewals (BTRs) increased by 14%. This apparent increase in the aggregate rate for unit costs of BTRs masks a change in approach for such renewals.

IIPAG reported last year that London Underground had piloted overnight ballasted track renewals and had commenced undertaking significant amounts of renewals in "blockades" where this could reasonably be done. This has continued in 2014/15 with increased amounts of renewals undertaken in engineering hours during the week (i.e. eliminating the need for certain sections of the network to be closed at



weekends). London Underground has agreed to separate out the unit costs of these new types of approach from the more typical weekend renewals such that their impact on the aggregate rate is eliminated and the improvement in delivery of these different access approaches can be tracked.

London Underground continues to deliver ways of reducing track renewals unit rates, many of which relate to improved use of access. Examples are better planning, increased number of work-sites in a single “possession”, longer access times and more effective ways of gaining safe access to sites. IIPAG recognises that, as the track on the network is renewed, there will be fewer long runs of plain line track to be renewed on the surface<sup>12</sup>. This will limit some future reductions in unit rates. However, IIPAG considers that its previous recommendation to focus on unit rate reductions in this area remains valid.

***IIPAG reiterates its previous recommendation that TfL maintains its focus on delivering the anticipated reductions in track renewals unit rate.***

High-level external comparators of costs per peak time passenger indicate that the costs of London Underground’s stations capacity enhancements compare well with UK and international levels. IIPAG considers that such metrics are a good measure of the benefits delivered by such works, and clearly have a significant impact on the strength of the business case for undertaking the works and should therefore be tracked.

However, IIPAG does not consider that the simple comparisons of costs per peak time passenger of projects on London Underground and other stations works, either within the UK or internationally, are a robust way of assessing the efficiency of delivery. Outcomes will be dependent on a wide range of factors that are specific to each location, such as the topology of the station prior to works, anticipated directions and magnitudes of passenger flows and changing impact of interchanges, as well as the economy and efficiency of spending. In IIPAG’s view there are too many factors that are specific to each location to enable any single metric to demonstrate efficiency. IIPAG therefore considers that such analysis is most valuable for prompting questions to prompt deeper understanding rather than as evidence of efficiency.

There is now greater coverage of cost data capture, at greater levels of detail for London Underground’s Stations Capacity Programme. “Elemental” cost data, for example the costs per square metre for platform fit out or the proportion of Design & Survey costs as a proportion of total project cost, now cover 87% of the forecast current estimated final costs. This is a good first step, and allows comparisons between projects.

IIPAG has been shown examples of how this, and more detailed costs of works, have been used to change the approach used to generate earlier, and likely better, estimates of the costs of alternative options for stations capacity works and to challenge supplies on the rates charged for staff. The work is maturing as delivered, rather than contract, costs are captured and this will be an important step over the coming year that will enable TfL to better understand the reasons for changes in

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<sup>12</sup> For example, all track north of Wembley Park is now modern track form

costs and how to change its approaches to address these. IIPAG would suggest that good comparators for further analysis might also be the Crossrail stations currently being delivered.

Capture of the detailed costs of undertaking stations improvements in London Underground continues, and details of more items of repeatable work are now captured. IIPAG highlighted this work in its 2014 benchmarking report, and as noted above, considers that TfL should systematically track the trends of costs of works delivered to demonstrate improvements in the efficiency of undertaking works.

## **2.5 Maintenance unit costs and reliability for rolling stock, signalling and track assets**

### *2.5.1 Introduction*

Rolling stock, signalling and track assets are assets that are central to an efficient and reliable metro service. In London Underground, these three asset classes account for 53% of London Underground's total maintenance costs<sup>13</sup> and 97% of service affecting failures.

This section summarises the trends that have been delivered and are forecast for unit costs and reliability for these critical assets.

### *2.5.2 Aggregate unit costs and equipment reliability for rolling stock, signals and track*

The total unit costs per car km and reliability for rolling stock, signals and track from 2008/09 to those forecast in 2020/21 are set out in Figures 6 and 7, overleaf.

Unit costs have reduced steadily for most lines from 2008/09 to 2014/15<sup>14</sup>, with a total reduction in unit costs of 17% in this time. Over these six years the number of car km run has increased by 17% increase in car km run resulting in a 3% reduction in real costs. Improvements have been delivered for all of the three asset classes, but with the largest reductions for signalling maintenance.

Reliability<sup>15</sup> has improved even as unit costs have been reduced, with a 24% improvement from 2008/09 to 2014/15. The impact of investment in new assets and technologies is more pronounced for reliability than for unit costs, with clear step improvements apparent in the level of reliability for some lines, for example Victoria Line signalling and rolling stock. This has resulted in a 50% improvement in reliability on the Victoria Line since 2008/09 with a 42% improvement on the Jubilee Line.

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<sup>13</sup> Forecast out-turn costs 2014/15 to 2020/21, stations is the other large cost: 18%

<sup>14</sup> Unit costs for 2014/15 are based on London Underground's Q3 forecast, which combines actual costs in April to December 2014 with forecast costs for the remainder of the financial year

<sup>15</sup> Measured by number of incidents causing a 2 minute delay per million km

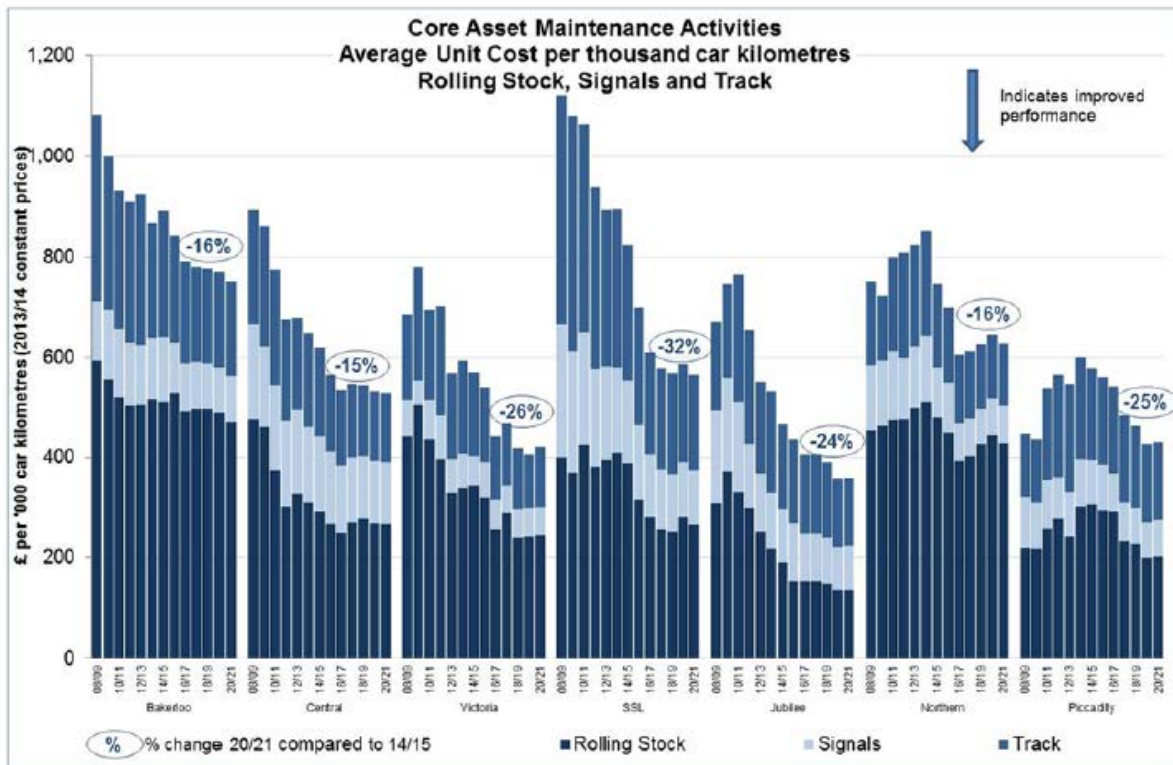


Figure 6: Aggregate unit costs per car km (2008/09 to 2020/21)

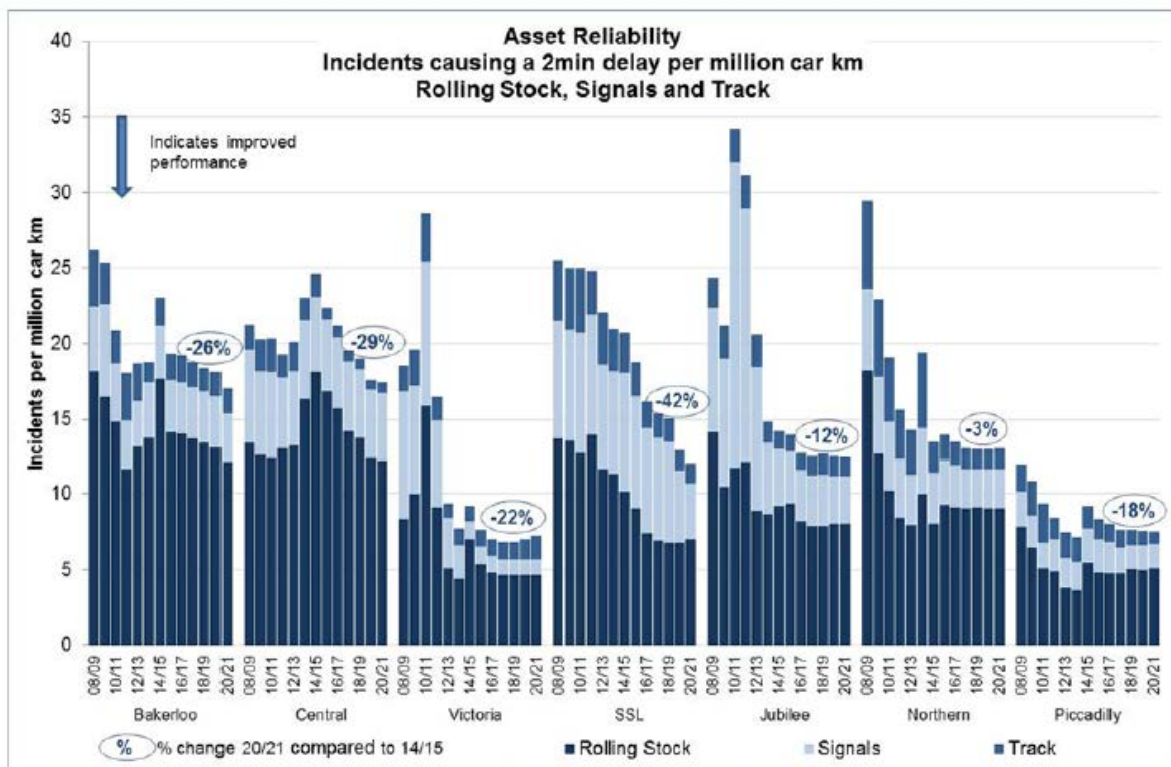


Figure 6: Asset Reliability for Rolling Stock, Signalling and Track (2008/09 to 2020/21)

A further overall reduction in unit costs of 22% is forecast from 2014/15 to 2020/12, while car km are forecast to increase by 16%. This indicates that (benchmarked) real maintenance costs will reduce by over 9% in this time, in contrast to the 3%

reduction in the past six years. Reliability is forecast to improve by 28% in this period to 2020/21.

### *2.5.3 Rolling stock unit costs and reliability*

Rolling stock unit costs per car km are lower than average international levels, and roughly in line with “expected” levels from econometric analysis (see Figure 3). Rolling stock reliability is slightly worse than the average level of Western European and North American metros, with London Underground having better reliability than six of twelve metros in this group.

Unit costs on the recently built Victoria line fleet are currently comparable to international levels but unit costs on the Jubilee line have continued to reduce from their already low levels due to increased car km and an improved asset performance system. Unit costs for the Jubilee Line fleet in 2014/15 are expected to be 41% lower than those on the Victoria Line.

While Victoria Line (and Subsurface S-S stock) unit costs are forecast to fall in future years they are forecast to remain substantially higher than those delivered on the Jubilee Line. IIPAG considers it surprising that such new fleets will not be maintained at comparable unit rates to those delivered on the Jubilee Line and recommends that a careful comparison of approaches used on the Jubilee Line to other more modern fleets be undertaken to ensure that good practices are shared and implemented across London<sup>16</sup>.

***IIPAG recommends that TfL undertake a detailed comparison of the maintenance approaches used on the Jubilee Line and those employed on the Victoria and Subsurface Lines.***

Rolling stock reliability has generally improved in recent years, with reliability<sup>17</sup> improving by 25% between 2008/09 and 2014/15. However, reliability of many fleets deteriorated in 2014/15 with six of London Underground’s eight fleets being less reliable than in the previous year. While there are well known causes of the reduced reliability for some fleets this is a concerning trend, especially given that rolling stock faults cause around 20% of customer delays<sup>18</sup>. IIPAG recognises that this reduction in reliability is being addressed by London Underground, but considers that it should be kept under regular review in 2015/16.

### *2.5.4 Signalling unit costs and reliability*

Signalling reliability is better than only three of twelve Western European and North American metros, but has improved by 44% since 2008/09. A further 77% of improvement is required to take London Underground to current median international levels of signalling reliability on this measure.

As set out in IIPAG’s 2013/14 benchmarking report, London Underground undertook to review forecast signalling costs for the Jubilee and Northern Lines in particular

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<sup>16</sup> IIPAG recognises that a detailed comparison of fleet maintenance approaches between the different fleets in 2011, but there is now more experience of the newer fleets and has been a substantial reduction in unit costs on some lines since that time

<sup>17</sup> Measured as Mean Distance Between Failures

<sup>18</sup> Measured as Lost Customer Hours, LCH

since these were forecast to remain in the most expensive quartile when compared internationally. Forecast costs have now been reduced for the Northern Line, which are now anticipated to be in the third quartile of international unit costs, but have been maintained on the Jubilee Line due to the high expenditure needed for rapid incident response.

Around half of London Underground's lines<sup>19</sup> have a trend of steadily reducing costs while costs are roughly constant or slightly higher on other lines. All three of the JNP lines have reducing unit costs<sup>20</sup>.

Costs of maintaining the new Victoria line signalling assets appear higher than the previous signalling system, but reliability is dramatically improved. Reliability of the Victoria Line signalling is now much better than any other system in London, and is roughly eight times as reliable as the previous system (i.e. 700% better). Jubilee line signalling maintenance unit costs have reduced and reliability has increased to around 2½ times that previously delivered (i.e. a 150% improvement).

#### *2.5.5 Track unit costs and reliability*

Track reliability is around the median level of Western European and North American metros, and has improved by 104% since 2008/09. As noted in section 2.2 of this Appendix, infrastructure costs are high compared to those delivered internationally.

Costs in 2014/15 are higher, and forecast to be higher in subsequent years, as a result of delays to efficiencies programmes and a better understanding of the impact of increased tonnage (due to increased services and new fleets) on track wear. IIPAG has previously focussed on one of these efficiency projects, the installation of Automated Track Monitoring System (ATMS) on London Underground trains. This technology enables the quality and degradation of the track to be monitored extremely regularly, since it is installed on trains that are in service, and so the degradation of track can be better monitored. This should enable better targeted interventions and greatly reduced patrolling of tracks.

IIPAG noted in its previous report that "As a result of these continued delays [to ATMS] IIPAG has reduced confidence in the forecast reduction in maintenance unit costs." In July 2010, when the project was authorised, London Underground intended to install ATMS on twelve trains across five fleets by June 2012. The project is now anticipated to install the system on nine trains across three fleets by September 2015.

Given the further slippage in ATMS and other efficiency programmes IIPAG would expect that TfL will scrutinise proposed improvements in efficiency for track maintenance in greater detail. IIPAG considers that sustained effort will be required to deliver these efficiencies, but that this effort is addressed by its previous recommendation to "... maintain its focus on delivering the anticipated reductions in track maintenance unit rates."

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<sup>19</sup> And line groupings, for example the subsurface lines are separated into "north" and "south" rather than the more familiar lines

<sup>20</sup> Two of these lines now have new signalling which may contribute to this.

The reliability of track has improved substantially, particularly on the Bakerloo and Northern Lines. Track has a relatively small impact on customer delays when compared to rolling stock and signalling<sup>21</sup>.

### 2.5.6 Network Comparisons

IIPAG has noted that there are, in some cases, distinct differences between the costs and reliability delivered and forecast by one part of the network (JNP) and the remainder. For example, signalling maintenance costs have reduced steadily on all lines maintained by JNP and maintenance unit costs for the Jubilee line fleet are now substantially lower than any other fleet and are forecast to reduce further in the future. IIPAG considers that TfL is fortunate to have such an internal comparator for its maintenance costs and reliability.

While all parts of the business are under London Underground's control the contract with Amey for maintenance of certain assets and locations remains in place. This introduces explicit incentives for Amey to reduce costs and to deliver reductions to customer delays, as measured by Lost Customer Hours, where it makes business sense. TfL therefore benefits from an internal "profit seeking" comparator while retaining control of its business.

IIPAG understands that TfL's contract with Amey is forecast to cost of the order of £300m from 2015/16 to 2020/21. While this is a substantial sum of money IIPAG notes that it is around 5% of London Undergrounds maintenance spend. For this sum TfL gains an internal comparator from which it can learn good practices, and in IIPAG's view the impact of this competitive pressure from another organisation is likely to reduce unit costs in other parts of the network. IIPAG considers that London Underground should ensure that it has in place mechanisms to ensure that improvements that are made as a result of this competition are evaluated to assess to what extent they can be applied to other parts of the London Underground network, such that it gains best value for this money.

***IIPAG recommends that TfL carefully consider the value for money of the Amey contract, taking into account the likely long term improvements in efficiency that such an internal comparator might deliver.***

## 2.6 International comparisons of Bus unit costs and reliability

Costs and reliability remain better than median for all main measures and top quartile for many. A relatively new measure of vehicle accidents remains worse than median, but as previously noted, cities with straight roads, grid layouts and one-way traffic have fewer accidents than cities that have grown organically such as London, which have narrower roads and tight corners.

London has the 4<sup>th</sup> highest growth in passenger boardings of 15 companies. This has steadily increased the utilisation of vehicles, and TfL is keeping a watch on this measure to ensure that increased utilisation does not become perceived as overcrowding at a level that reduces customer satisfaction.

## 2.7 Trends of unit costs for surface asset management

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<sup>21</sup> Track 7%, Signals 16%, Rolling Stock 20%

The unit costs of delivering carriageway resurfacing, footway resurfacing and the replacement of lighting columns are now tracked and the unit costs under the London Highways Alliance Contracts (LoHAC) has been compared to that delivered under the previous contracts. There has been a substantial reduction in unit costs for footway resurfacing and lighting column replacements, but unit rates for carriageway resurfacing have increased due to increased depth of surfacing treatments.

### 3. PROGRESS ON PREVIOUS RECOMMENDATIONS

In its 2014 Annual Benchmarking Report of October IIPAG identified four priorities for TfL. Progress on these is summarised briefly below:

*The apparent difference in reliability between London Underground and the DLR should be investigated in more detail, for example the MTBF of the signalling system and the structural factors that drive apparent differences should be examined. Best practices should be identified and be shared by April 2015.*

TfL undertook analysis of the failures on the Jubilee Line and the DLR following the delivery of the International Comparisons that prompted IIPAG's recommendation, which showed that equipment reliability on the DLR was worse than that on London Underground in 2012/13. Comparisons at component level confirmed that equipment reliability, particularly for signalling, was worse on DLR.

DLR's signalling reliability significantly improved in 2013/14, with signalling-related failures per car km reducing by 66%. The bulk of this was achieved as a result of software improvements derived from best-practices through joint working with the Jubilee line team, with teams working together to transfer learning and drive real improvements in reliability.

*Costs of delivering RWIs be consistently and regularly reported to the business, for example via Annual Independent Assurance Reviews (IARs).*

Reporting of RWIs has become more common, but reporting is not yet consistently a feature of IARs. IIPAG will work with the business to ensure that increased focus is given to these aspects.

***IIPAG reiterates its recommendation that Costs of delivering RWIs be consistently and regularly reported to the business, for example via Annual Independent Assurance Reviews (IARs).***

*TfL ensure that, where practicable, the planned extended working hours become the norm for station works by January 2015, and that RWI unit rates are carefully tracked to ensure that anticipated changes in unit rates are delivered.*

TfL's "Rulebook" was changed in January 2015 to enable greater use of extended engineering hours and to allow more works in traffic hours. IIPAG has seen the impact of this change to the rulebook on the access required to undertake works at a small number of sample sites but it is currently too soon to see whether this has had the desired impact on RWI unit rates.

***IIPAG reiterates its recommendation that RWI unit rates are carefully tracked to ensure that anticipated changes in unit rates due to changes in access are delivered.***

*Given the very different current and forecast costs and reliability of the signalling on the Victoria Line when compared to the Jubilee and Northern Lines, TfL ensures that it incorporates the knowledge that it has regarding reliability and maintenance costs into its Whole Life Cost models for upgraded signalling for the Subsurface signalling upgrade and finds ways of bringing costs down and reliability up so as to compare more favourably with international benchmarks.*

IIPAG has had considerable involvement in the reletting of the SUP ATC contract, as noted in section 2.5 of the main report.

*IIPAG recommends that TfL maintains its focus on delivering the anticipated reductions in train delays caused by staff.*

IIPAG has commented upon international comparisons of staff delays in section 2.3 of this Appendix. IIPAG understands that staff delays in 2014/15 are broadly similar to those experienced in the previous year, the year for which international comparisons are made. While this is substantially better than when IIPAG first made its recommendation sustained effort will be required to bring these delays in line with international norms. IIPAG therefore reiterates its recommendation.

*TfL maintains its focus on delivering the anticipated reductions in track renewals rates, and that the innovation programme be given challenging targets and robust programme management.*

This issue is addressed in section 2.4 of this Appendix, and IIPAG reiterates this recommendation.

*TfL maintains its focus on delivering the anticipated reductions in track maintenance unit rates.*

This issue is addressed in section 2.2 and 2.5.5 of this Appendix, and IIPAG reiterates this recommendation.

#### **4. SUMMARY OF RECOMMENDATIONS**

IIPAG has made a total of nine recommendations to TfL of areas to prioritise, of which five reiterate previous recommendations and four are new. IIPAG:

1. Recommends that TfL increases its focus on London Underground's "admin and other overheads" costs (i) clearly setting out its approach to reducing these costs (ii) setting itself challenging targets for reductions in costs and (iii) tracking and reporting on progress in cost reduction.
2. Recommends that a comparison of actual and expected unit costs and the frontier shift of unit costs delivered by international metros be explicitly set out in London Underground's Asset Management Plans.
3. Reiterates its previous recommendation TfL maintains its focus on delivering the anticipated reductions in track maintenance unit rates.
4. Reiterates its previous recommendation that TfL maintains its focus on delivering the anticipated reductions in train delays caused by staff.



5. Reiterates its previous recommendation that TfL maintains its focus on delivering the anticipated reductions in track renewals unit rate.
6. Recommends that TfL undertake a detailed comparison of the maintenance approaches used on the Jubilee Line and those employed on the Victoria and Subsurface Lines.
7. Recommends that TfL carefully consider the value for money of the Amey contract, taking into account the likely long term improvements in efficiency that such an internal comparator might deliver.
8. Reiterates its recommendation that Costs of delivering RWIs be consistently and regularly reported to the business, for example via Annual Independent Assurance Reviews (IARs).
9. Reiterates its recommendation that RWI unit rates are carefully tracked to ensure that anticipated changes in unit rates due to changes in access are delivered.

## **5. FOCUS OF BENCHMARKING IN 2015/16**

IIPAG considers that the benchmarking across TfL is progressing well, and that learning is often shared well within TfL. In the next year IIPAG would like to see:

1. Further focus on getting more and better external comparisons of costs;
2. TfL build on work undertaken to date to set out the value of the comparisons undertaken, such that TfL can better focus its future work. This might involve more alignment between benchmarking and Asset Management functions.