

Date: 8 March 2017

Item: Deep Tube Upgrade Programme: Update

This paper will be considered in public

1 Summary

- 1.1 This paper provides an update on the Deep Tube Programme (DTUP) with a focus on the proposed release of an Invitation to Negotiate for the procurement of a new Signalling and Train Control system in Spring 2017.
- 1.2 The TfL Business Plan has positioned DTUP as one of the major programmes being delivered by TfL during the plan period and beyond, delivering capacity-boosting works on the Piccadilly, Bakerloo, Central and Waterloo & City lines.
- 1.3 A paper is included on Part 2 of the agenda, which contains exempt supplementary information. The information is exempt by virtue of paragraph 3 of Schedule 12A of the Local Government Act 1972 in that it contains information relating to the business affairs of TfL.

2 Recommendation

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

3 Background

- 3.1 DTUP is a continuation of the London Underground (LU) line modernisation programme and aims to replace life-expired trains and signalling systems across the four 'Deep Tube' lines originally scheduled for modernisation under the PPP between 2014 and 2020 – the Piccadilly, Bakerloo, Central and Waterloo & City lines.
- 3.2 Responding to current and forecast increases in passenger demand, the modernisation of these four LU lines will enable a step change in capacity and deliver a reduction in customer journey times through higher frequency services with the introduction of modern, high performance trains.
- 3.3 A new generation of high capacity, walk-through and air-cooled Tube trains will transform the customer environment. The inclusion of modern signalling control systems and supporting infrastructure will allow high frequency automatic train operation on these lines.
- 3.4 A combined capacity uplift of 36 per cent across these four lines will drive increased revenue and reduce whole-life costs through operational and maintenance efficiencies. The replacement of ageing assets will also enable a

step change in customer service quality and the transformation of operating and maintenance models through the introduction of modern technology.

- 3.5 Of the DTUP lines to be upgraded, the Piccadilly line has the strongest business case and is first in the programme sequence in view of very high levels of demand, limited fleet size and the inherent capacity constraints of the existing signalling system. The Piccadilly line upgrade will achieve a 60 per cent increase in peak period capacity by uplifting the service frequency from 24 to 33 trains per hour.
- 3.6 The DTUP will contribute significantly to the following key goals in the current Mayor's Transport Strategy (MTS):

Mayor's Transport Strategy Policy Goals	DTUP Objectives & Goals
Enhance the quality of life for all Londoners	Enhanced customer experience: Improved customer satisfaction through a new generation of air-cooled trains, modern information systems and service volume and quality enhancements.
Improve the safety and security of all Londoners	Improved safety and reliability: Introducing new generation trains and modern signalling systems with improved security systems and automatic train control
Support economic development and population growth	<p>Increase capacity: deliver a 36% increase in capacity across 4 lines with reduced journey times through higher frequency services, higher performance trains and faster run-times.</p> <p>Reduced whole life costs: standardised systems with higher volume procurement enabling a programme-wide reduction in operating costs per passenger journey</p>
Improve transport opportunities for all Londoners	Enhanced customer experience: improved accessibility through a new generation of high-capacity walk-through trains with wider doorways, real-time information displays and multi-purpose seating
Reduce transport's contribution to climate change and improve its resilience	Asset Renewals: System design to minimise energy consumption, maximise energy recovery and maintain acceptable temperatures;

- 3.7 The DTUP will continue to be a priority in the new MTS, policy objectives for which are subject to approval by the TfL Board and public consultation later in 2017.
- 3.8 The programme is fully aligned with TfL priorities to improve safety and reliability through a reduction in "service affecting failures" from the introduction of highly reliable modern train systems.
- 3.9 By adopting a common specification for these asset renewals, optimised train and signalling solutions can be procured which maximise the benefits of

standardisation and consistency through a multi-line procurement. This will support reduced whole-life costs in procurement, maintenance and operation compared with a piecemeal approach to line-specific equipment renewals.

4 Procurement approach

- 4.1 The DTUP procurement principles are to establish an end-to-end, competitive process by which LU will award a contract which:
- (a) sets a scope that the market can deliver;
 - (b) delivers the business case benefits required;
 - (c) contributes to the wider LU railway system business benefits;
 - (d) establishes a long-term contractual relationship with suppliers for delivery and support at the point at which LU has the maximum commercial leverage;
 - (e) secures suppliers in which LU has a high levels of confidence in their product, delivery capacity and capability, and organisational commitment;
 - (f) is procured on a whole-life cost basis recognising capital (first cost), and long term operating and maintenance costs; and
 - (g) address the lessons learned from previous contracts.
- 4.2 Significant market engagement has been carried out in early feasibility to test the market's appetite for DTUP's proposed procurement approach. Subsequently, supplier consultation has been used extensively to review and test operational concepts, technical specifications and procurement packaging approaches.
- 4.3 A key principle has been to pursue aligned but separate procurements for the rolling stock and signalling system elements with co-ordination of design, testing and installation around the major interfaces.
- 4.4 Bids for the rolling stock contract were received in September 2016 and are currently being evaluated on their technical, delivery and whole life cost proposals. Following the identification of the preferred bidder, a contract award for the Piccadilly line trains, with options for subsequent line orders, is targeted following approval in Quarter 4, 2017.
- 4.5 In August 2016, three companies were shortlisted to be invited to tender for the DTUP Signalling & Train Control system contract. The Invitation to Negotiate is targeted to be issued to these companies in Spring 2017.

5 Signalling and Train Control Procurement

- 5.1 In line with the rolling stock procurement, DTUP is combining the renewal of Signalling and Control (S&TC) system on four lines to maximise market appetite and drive benefits in a standard system platform across the lines. A common signalling system across four lines will secure scale economies in design, more flexible operations and lower maintenance costs. A common system will also reduce the cost of associated railway control systems and enable a rationalisation of Operational Control Centre facilities.

- 5.2 The scope of the DTUP S&TC contract includes the provision of the primary signalling functions of supervision, regulation and train control, the supply of on-board train equipment, signalling control and back-up system and whole-life system support.
- 5.3 The procurement process for S&TC is in two stages:
- Stage 1: Conventional tender where bidders provide written cost, technical and delivery proposals to be evaluated by LU.
- Stage 2: Two shortlisted bidders are taken into a 'Tender Development Phase' where their Stage 1 proposals are verified to ensure LU has confidence that the system and approach to delivery are deliverable and will meet LU's requirements.
- 5.4 The Tender Development Phase has been incorporated as a direct result of lessons learnt from previous LU line upgrade projects and has been recognised as good practice by peer reviews.
- 5.5 Three signalling suppliers were shortlisted in August 2016 and are awaiting the issue of an Invitation to Negotiate in Spring 2017. The outline timescale for the S&TC procurement is:
- Spring 2017 - Issue Invitation to Negotiate
- Autumn 2017- Bids Received and tender evaluation commences
- Spring 2018 - Two bidders shortlisted for 'Tender Development Stage'
- Spring 2019 - S&TC contract awarded to successful supplier

6 Benchmarking and Lessons learned

- 6.1 The programme has worked closely with TfL's Benchmarking and Value team to access global lessons learned and best practice in delivery of metro signalling upgrades. This has informed DTUP strategy on the signalling procurement approach, sequencing and the successful delivery and operation of high frequency, automated metros.
- 6.2 Technical and commercial engagement is continuing with the Four Lines Modernisation (4LM) programme including the capture of relevant lessons learned from the 4LM signalling procurement, implementation and contract.

7 Conclusion

- 7.1 The DTUP aims to deliver significant customer benefits with a step change in capacity and reliability across the London Underground Deep Tube network through the co-ordinated renewal of rolling stock, signalling and supporting infrastructure across four lines.
- 7.2 The DTUP programme has undertaken extensive benchmarking, supplier engagement and peer review to ensure the robustness of its strategy and packaging scope for S&TC System procurement.

7.3 The release of the Invitation to Negotiate for the supply of the DTUP S&TC system in Spring 2017 will enable key schedule and technical interfaces to be controlled and co-ordinated to ensure successful delivery commencing with the new trains and signalling for the Piccadilly line upgrade.

List of appendices to this report:

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

List of Background Papers:

None

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