

**Date: 2 March 2016**

**Item: Jubilee Line Upgrade 2**

**This paper will be considered in public**

## 1 Summary

<b>UIP2260 Jubilee Line World Class Capacity</b>					<b>'JLU2'</b>
Existing Financial Authority	Estimated Final Cost (EFC)	Existing Project Authority	Additional Authority Requested	Less R&U 10% Efficiency Target	Total Project Authority
£255.3m	£255.3m	£35.6m	£76.7m	£69m	£104.6m

### **Authority Approval:**

The Committee is requested to recommend that the Board approves additional budgeted authority of £69m increasing total Project Authority to £104.6m.

### **Outputs and Schedule:**

The project will deliver all workstreams to support introduction of a 36tph peak service from April 2020, except for 10 additional trains which are provided via the separate Jubilee and Northern Line Additional Trains project. This project includes implementation of power, cooling, track, depot enabling and signalling works. The overall JLU2 business case is assessed as giving an 8.6 to 1 benefit to cost ratio.

- 1.1 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:

- (a) note the paper and the supplementary paper on Part 2 of the agenda; and
- (b) recommend that the Board approves additional budgeted Project Authority of £69m, increasing total Project Authority to £104.6m.

## 3 Background

- 3.1 Demand for the Jubilee line is continuing to grow with 249 million journeys in 2014/15 (up by 43 per cent since 2009/10). Even with the completion of Crossrail, the Railplan transport planning network model now forecasts passenger demand growing to 270 million journeys by 2031.

- 3.2 The Jubilee line was upgraded in 2012 with the Thales Transmission Based Train Control (TBTC) signalling system which enabled the train service to be increased from 24 trains per hour (tph) to 30 tph during the peaks through the central section of the line. Despite operating a 30 tph peak service, the Jubilee line continues to experience significant levels of overcrowding.
- 3.3 The upgraded signalling system has the capability to support a higher tph, thereby increasing the capacity to cater for the increased demand. However, the line is currently constrained to 30tph by the number of trains available and by infrastructure, such as stabling and train maintenance facilities, power supply and ventilation assets.
- 3.4 Jubilee Line Upgrade 2 ('JLU2') was therefore initiated in 2013 to increase this to up to 36tph by 2019. Initial Project Authority of £35.6m was approved on 5 November 2014 by the Board to progress:
- (a) Concept design for necessary signalling, track and depot works; and
  - (b) Implementation of power and cooling.
- 3.5 JLU2 requires 10 additional trains. Although they are included as part of the JLU2 Business Case, their funding is sought separately through the Jubilee and Northern Line Additional Trains project (JNAT) alongside the trains required for the Northern Line Extension and Northern Line Upgrade 2 projects.
- 3.6 The concept designs for signalling, track and depot works referred to in paragraph 3.4 above are now complete and approval is now sought for their detailed design and implementation. The £69m sought is fully budgeted (2014 Business Plan) and represents the balance of the project funding.

## **4 Proposal**

- 4.1 The deliverables of the project comprise completion of detailed design and implementation of:
- (a) power strengthening works at six substations by June 2018;
  - (b) four cooling ventilation fan upgrades by June 2018;
  - (c) conversion of a cleaning road at Stratford Market Depot into a general maintenance road by March 2017 and provision of two roads at Neasden depot for maintenance of Jubilee Line trains by August 2017;
  - (d) conversion of Temporary Fit Out Shed at Stratford Market Depot into three stabling roads by July 2020;
  - (e) renewal and upgrade of the crossover at West Hampstead by March 2017;
  - (f) five signalling workstreams by October 2019;
  - (g) necessary modifications to the existing fleet of 96TS for operational consistency; and
  - (h) all associated maintenance and operating changes.

## Benefits and Value

- 4.2 A business case appraisal has been undertaken based on the benefits of reduced average journey time, set against the net cost of the project (including capital costs, operations and maintenance costs and revenue). The benefit cost ratio (BCR) is 8.6:1.
- 4.3 No revenue abstraction from other TfL modes is assumed as the assessment identified that the additional capacity provided will be utilised by currently deterred demand, rather than diversion from other options.

## Delivery of the Preferred Option

- 4.4 Delivery will be by the LU Systems Programme team, who bring the prior experiences and lessons learned from the original Jubilee and Northern line Upgrades.
- 4.5 Key milestones for the project are as follows:

Milestone	Target Date
Use of West Hampstead for service reversing	May 2017
Potential early benefits (32tph service)	April 2018
Introduction of 36tph peak service	April 2020
Project Close	April 2021

- 4.6 The top 5 project risks for the project are as shown in the table below:

Risk no	Risk Description	Mitigation Actions
1	Additional complexity of technical solution for trains entering system at Neasden and Stratford Market Depots	Early working with signalling supplier to assess options
2	Scope and cost growth of signalling works	Continue to engage with signalling supplier.
3	As a result of working assets harder, JLU2 may cause short-term disruption to service leading to service affecting failures which result in additional project costs	Full assessment of the more intensive duty cycles of key assets
4	Terms and conditions in signalling contract less favourable than assumed.	Benchmark against existing signalling contracts
5	Changes to operational procedures are not accepted	Examine the potential for alternative operational strategies

## Alternative Options Considered

- 4.7 The JLU2 feasibility stage considered eight service strategy options. If funding was unconstrained, an option which provided more frequent services at the western end of the line towards Stanmore was the scheme which provided the highest overall level of passenger benefits. However, it was not selected as it required a further eight additional trains and an additional stabling scheme at Stanmore which were estimated at £170m more than the selected option.

- 4.8 Lower spend options requiring fewer trains were considered but all provided lower capacity levels through the core section of the line which would disproportionately erode passenger benefits.

## **5 Financial Implications**

- 5.1 The requested authority is fully budgeted
- 5.2 The cost estimate has been developed using a detailed resource profile for the internal costs. The implementation estimates have used actual costs incurred in similar past projects as a basis and an initial estimate from the signalling contractor.
- 5.3 The project will result in an increase in operating costs and revenue which are recognised in the Business Plan. These costs include an increase in power consumption, additional train operators and maintenance costs of new assets.

### **Commercial**

- 5.4 The funding approved by the Board in November 2014 allowed early infrastructure enabling works to progress. Power works are contractually committed and the cooling schemes have completed designs and issued Invitations to Tender.
- 5.5 There are a number of elements of scope covered by this funding application. The main ones are: signalling and the West Hampstead track works. In order to support delivery of the upgraded West Hampstead crossover using two planned line closures in early 2017, Thales will be instructed under the existing Jubilee & Northern Line contract with the further works under a new framework agreement.
- 5.6 In order to maintain the programme, key commitment dates are as follows:
- February 2016 - cooling contract, signal design and West Hampstead track works;
  - July 2016 - Stratford depot works; and
  - September 2016 - Willesden Green physical works.

## **6 Assurance**

- 6.1 The project has been subject to internal and external assurance reviews. Details of project assurance reviews are contained in the supplementary information in Part 2 of the agenda.

### **List of appendices to this paper:**

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

### **List of background papers:**

Board meeting paper and minutes - 5 November 2014

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