Programmes and Investment Committee

Date: **30 November 2016**

Item: **Structures and Tunnels Investment Programme (STIP) 2 - A40 Westway Structures Refurbishment**

This paper will be considered in public

1 Summary

1.1 The A40 Westway structures have been identified as a priority for refurbishment under the second tranche of TfL's Structures and Tunnels Investment Programme (STIP 2). The Westway structures carry the A40 dual carriageway for 4.6km from Wood Lane Flyover in the west to Marylebone Flyover in the east. Together these structures form the largest elevated section on the Transport for London Road Network (TLRN) and a key strategic route into and out of central London.

1.2 Key bridge elements have reached the end of their design life. The project will refurbish the A40 Westway Structures mitigating known risks to safety and network reliability, remove the cost burden this places on operational maintenance, eliminate the disruptions and delays caused by frequent planned and unplanned emergency maintenance, and deliver optimal whole life value.

1.3 The approval of this authority request will enable completion of Stage 2 (Feasibility) and Stage 3 (Concept Design) by the end of October 2018. The combination of Stages 2 and 3 as proposed will reduce the overall programme by an estimated 40 weeks. A submission for further Programme and Project Authority will be made following completion of Concept Design, to enable the award of the contract for the detailed design and implementation phases of the project.

1.4 A supplemental 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 and the supplemental paper on Part 2 of the agenda and approve additional budgeted Programme and Project Authority for the amount stated in the paper on Part 2 of the agenda to undertake Feasibility (Stage 2) and Concept Design (Stage 3) of the A40 Westway structures refurbishment, as described in this paper.

3 Background

3.1 In 2011, a study was undertaken by TfL to establish the safety and reliability risks posed by the deteriorating condition of major bridge and tunnel assets on the TLRN. These risks were a direct consequence of long term under investment in these major assets - the annual Asset Capital Renewals Programme budget (of c£90m per annum across all assets) was unable to accommodate investment spikes of this magnitude see Appendix 1.

3.2 To address these pressing needs, TfL established the Structures and Tunnels Investment Portfolio (STIP) in 2011. The purpose of this programme is to specifically address high priority and high cost asset risks that cannot be accommodated by the annual Asset Capital Renewals Programme. The eight highest priority structures formed the first tranche of projects (STIP 1), four of which, including Hammersmith flyover and Fore Street tunnel were completed in 2016, with the remaining four road over rail bridge replacements programmed for completion by December 2017.

3.3 The second tranche of projects, STIP 2, initially comprised 13 assets. Country Way Viaduct was re-appraised and removed from the programme in 2014 and Hogarth flyover was brought forward and completed in summer 2014. In April 2016 the remaining 11 assets were reprioritised to ensure maximum value for available budget which reduced the programme to the following six assets;

(a) Westway structures (this paper);

(b) Vauxhall bridge;

(c) Lambeth bridge;

(d) Brent Cross interchange structures;

(e) Blackwall tunnel, southbound; and

(f) Rotherhithe tunnel.

3.4 The Westway structures carry the A40 dual carriageway for 4.6km from Wood Lane Flyover in the west to Marylebone Flyover in the east and comprise 21 bridge spans, 19 retaining walls and 12 gantries (see Appendix 2). Together these structures form the largest elevated section on the TLRN and a key strategic route into and out of central London. The structures were constructed between 1964 and 1970 and are predominately reinforced concrete with a mixture of pre-stressed and post-tensioned decks. Westway structures are the highest asset risk of all the STIP 2 projects, driven by the number of known defects and high usage with 96,000 vehicles crossing the structure per day.

3.5 Key bridge elements, including waterproofing and expansion joints, have reached the end of their design life and are already defective, and this in turn is causing deterioration of the concrete decks, crossheads and piers. The structure is in poor condition and represents an increasing risk to safety and network reliability. Risks are currently being managed through increased maintenance interventions, interim measures and small scale capital interventions – collectively these often result in unplanned disruption, suboptimal repairs and increasing costs. This is compounded by the original structure having poor design and construction details that make it difficult to access some parts of the structure for maintenance.

3.6 Major repair and refurbishment is now required as the network and cost impact become increasingly unsustainable. These works will renew life-expired components and bring the structures up to a state of good repair that will mitigate safety, functionality and environment risks.

3.7 There are constraints in accessing parts of the structure where buildings and commercial premises occupy the space beneath the structures. In particular, the land beneath section 4 and part of section 1 (see Appendix 2) where land is leased to the Royal Borough of Kensington and Chelsea (RBKC), who sublet the majority of leases to the Westway Trust. Under the terms of the current lease, TfL has rights of entry but may be liable to compensate all parties for any disruption.

3.8 The investigations we need to undertake are designed to minimise disruption to the Westway Trust tenants and there are no anticipated compensation costs in relation to the investigatory works. An estimation of any potential compensation costs associated with the main works will be produced during the feasibility stage. TfL will continue to work with the Westway Trust to coordinate the Stage 2 investigations and any subsequent works, in order to minimise costs and disruption to tenants.

4 Proposal

Preferred Option

4.1 The refurbishment will reduce asset risks, reduce ongoing maintenance costs (and Whole Life Costs), reduce network disruption, and bring the structure back into a state of good repair. The key scope items identified at Stage 1 (Outcome Definition) are:

(a) renewal of the waterproofing and carriageway surfacing;

(b) replacement of expansion joints;

(c) repairs to the concrete bridge decks;

(d) renewal or replacement of the drainage system;

(e) targeted concrete repairs to the underside of decks and piers; and

(f) targeted refurbishment and / or replacement of bearings.

4.2 The scope for the main works will be finalised following the Stage 2 investigations and feasibility to identify the best value option. The key activities associated with this authority request are summarised in Appendix 3.

4.3 The Westway project team will adopt TfL's BIM (known in TfL as Better Information Management) standards and procedures which are 'BIM Level 2' compliant, as per central government requirements for infrastructure projects. A BIM compliant approach will deliver savings over the full lifecycle of the project, which will be maximised by early implementation during Stage 2.

Benefits (and Value)

4.4 The project supports the objectives of the Mayor's Transport Strategy through improving network reliability, addressing safety and environmental risks, reducing

operating costs and bringing assets up to a state of good repair. The project will deliver the following benefits and savings over the 50 year appraisal period, when compared to the base case, i.e. defer the works for 10 years, (figures presented as Net Present Value):

(a) reduction in safety risk - £58.7m;

(b) reduction in functional risk - £213.2m;

(c) reduction in environmental risk - £1.2m; and

(d) avoidance of additional maintenance costs - £9.1m.

4.5 Additional benefits not included in the economic appraisal are:

(a) a reduced number of customer complaints and claims for compensation; and

(b) a reduction in stakeholder impact, including the Westway Trust.

Options Analysis

4.6 Alternative options considered were:

(a) defer the project by six years, to 2022, and therefore beyond the current STIP 2 programme; or

(b) defer the project for 10 years to 2026 (Do minimum, Base Case). This is considered the maximum time that the works could be deferred before asset risks will become intolerable with high likelihood of weight restrictions, speed limits and lane / road closures being required and is therefore not recommended.

4.7 The project demonstrates good value for money being financially positive, with a payback period of 15 years. The robustness of the business case was tested with sensitivity cases that increased project costs and reduced benefits by up to 50 per cent.

4.8 Deferring the project by six years increases whole life costs by £24.7m compared to the preferred option. This option is not recommended.

4.9 The analysis currently excludes traffic impacts during the construction period, which will be included as part of the feasibility stage, when options for traffic management are fully explored.

Delivery of Preferred Option

4.10 The project will be managed by Surface Transport Projects and Programmes Directorate (PPD), with the future design and build phase delivered by a contractor appointed following a mini-competition under TfL's Major Projects Framework.

4.11 The works will be planned and implemented in a manner that minimises disruption to the TRLN by optimising road occupation and coordination of the works. Options for traffic management will be considered more fully during the feasibility stage, with full assessment of the balance between network impact and project cost.

4.12 Where required, the works will be coordinated with the following schemes:

(a) relocation of Victoria Coach Station;

(b) East-West Cycle Superhighway Phase 2;

(c) High Speed 2 and redevelopment works at Old Oak Common;

(d) TfL's proposal to install new advertising gantries along the Westway, to generate additional revenue; and

(e) redevelopment of Westway Trust sites.

4.13 Key project milestones are:

Milestone	Target Date
PAM: Pathway Gate 2 – completion of feasibility	15 April 2018
PAM: Pathway Gate 3 - completion of concept design	31 October 2018

4.14 The total risk value for this authority submission is included in the paper on Part 2 of the agenda.

4.15 Risk for future stages is based on standard percentages - 20 per cent for TfL staff and Early Contractor Involvement costs and 40 per cent for all other costs, including construction and design. A full Quantified Risk Assessment for future stages will be undertaken during feasibility.

4.16 A non-quantified risk assessment has identified the following top five project risks, related to the future stage five implementation works;

Risk Description	Mitigation Actions
Additional costs associated with accessing third-party land and property, including the Westway Trust tenancies	• Develop a robust Stakeholder engagement strategy, to ensure early liaison with tenants and land owners. • Establish appropriately resourced stakeholder management team • Work with tenants and seek early approval of consents.
Amount of concrete deck repairs is greater than planned	• Design remedial solutions in advance of works. • Flexible construction methods to accommodate increased number of repairs.
High number of bearings requiring replacement	• Assess structure to determine whether refurbishment is an option.

Unforeseen asset condition encountered during the works	• Robust site investigation works before design work commences. • Collaborative project team, to manage emerging risks and identify possible scope changes. • Minimise time between investigations and commencement of works, to reduce impact from asset deterioration.
Unexpected utilities are discovered during construction	• Early engagement with utilities companies. • Review of survey information, to identify possible information gaps.

5 Financial Implications

5.1 A summary of the project costs, their development, budget and funding status are included in the supplementary paper on Part 2 of the agenda.

5.2 The project will not deliver any cost savings against existing budgets but will avoid an increase in future maintenance costs.

5.3 Revenue impacts during the construction period will be considered during feasibility.

5.4 The project team will engage with Commercial Development during feasibility, to ensure any commercial opportunities are accounted for in the plans for future stages.

6 Commercial

6.1 Feasibility and concept design will be procured as a single package. A contractor will be procured using the Early Contractor Involvement and Construction Framework and will be subject to mini-competition between the four framework contractors. Technical consultant(s) will be appointed under the contractor as part of their supply chain. A separate contract would be let under the new Major Projects Framework for the Design & Build phases of the project.

6.2 It is estimated that this approach to combine stages two and three will reduce the overall programme duration by 40 weeks, ensuring these high priority works to reduce asset risk are progressed as soon as possible. The reduced programme duration would also deliver efficiencies.

7 Assurance

7.1 TfL Project Assurance completed an Integrated Assurance Review (IAR) on the 15 June 2016, with an Independent Investment Programme Advisory Group (IIPAG) review undertaken in parallel. The review concluded that the project was being managed effectively with no critical issues being identified and recommended approval of the Project Authority as requested. Copies of IIPAG and other assurance papers are available to Members on request.

7.2 The project team will be working with TfL Project Assurance to provide continuous assurance that costs, risks and programmes are effectively managed across all STIP 2 projects.

List of appendices to this paper:

Appendix 1: Investment in asset renewals on the TfL road network
Appendix 2: A40 Westway Structures Plan and Aeriel Photos
Appendix 3: Stage 2 and 3 Key Activities

A paper containing exempt supplementary information has been circulated to Members with part 2 of the agenda.

List of Background Papers:

IIPAG and TfL Project Assurance Reports and associated Management Response

Contact Officer: Dana Skelley, Director of Asset Management
Number: 020 3054 1413
Email: Dana.Skelley@tfl.gov.uk

Contact Officer: Nick Fairholme, Director of Projects & Programmes
Number: 020 3054 1576
Email: NickFairholme@tfl.gov.uk

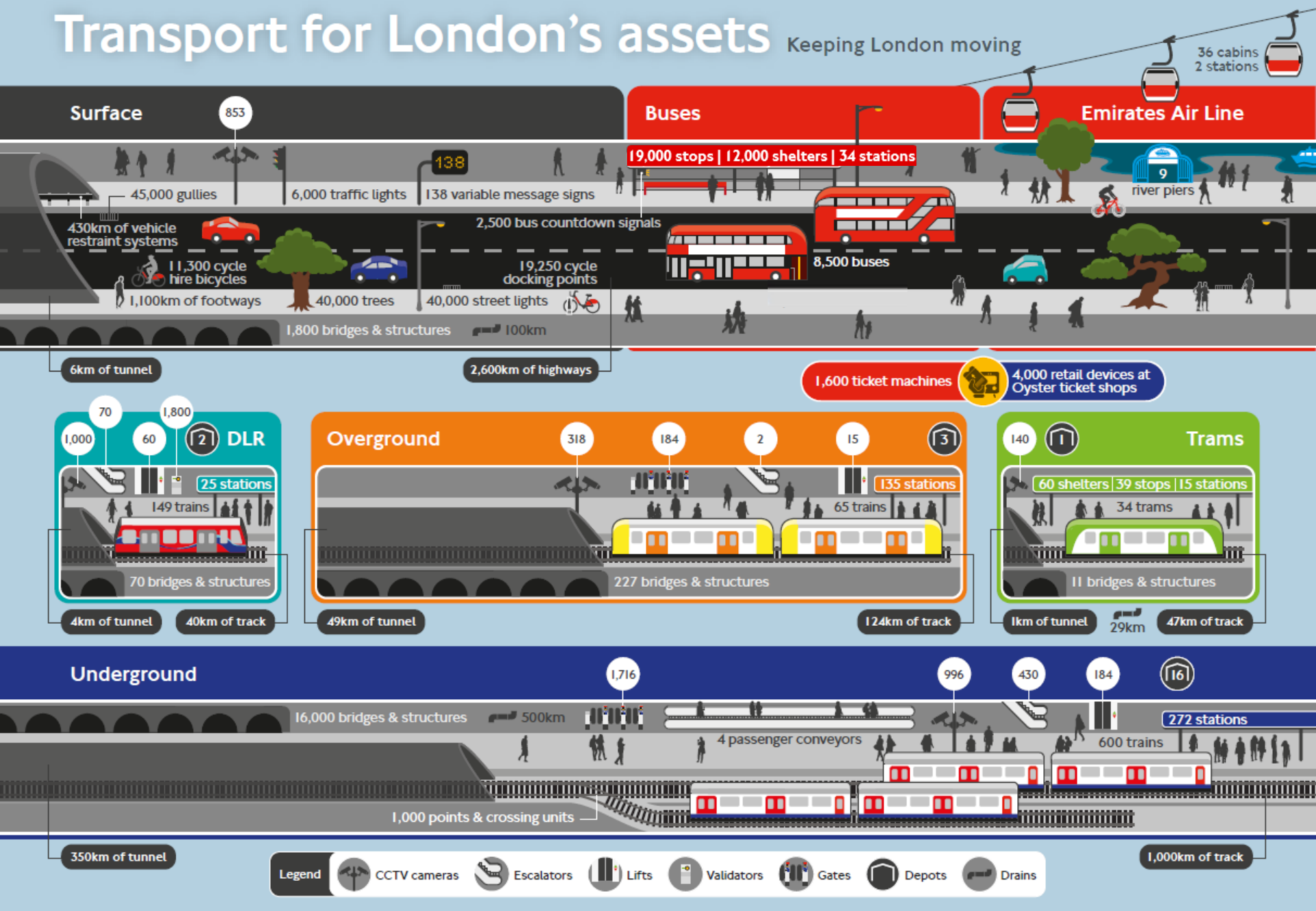
Appendix 1

Investment in asset renewals on the TfL road network

EVERY JOURNEY MATTERS

Transport for London's assets

Keeping London moving



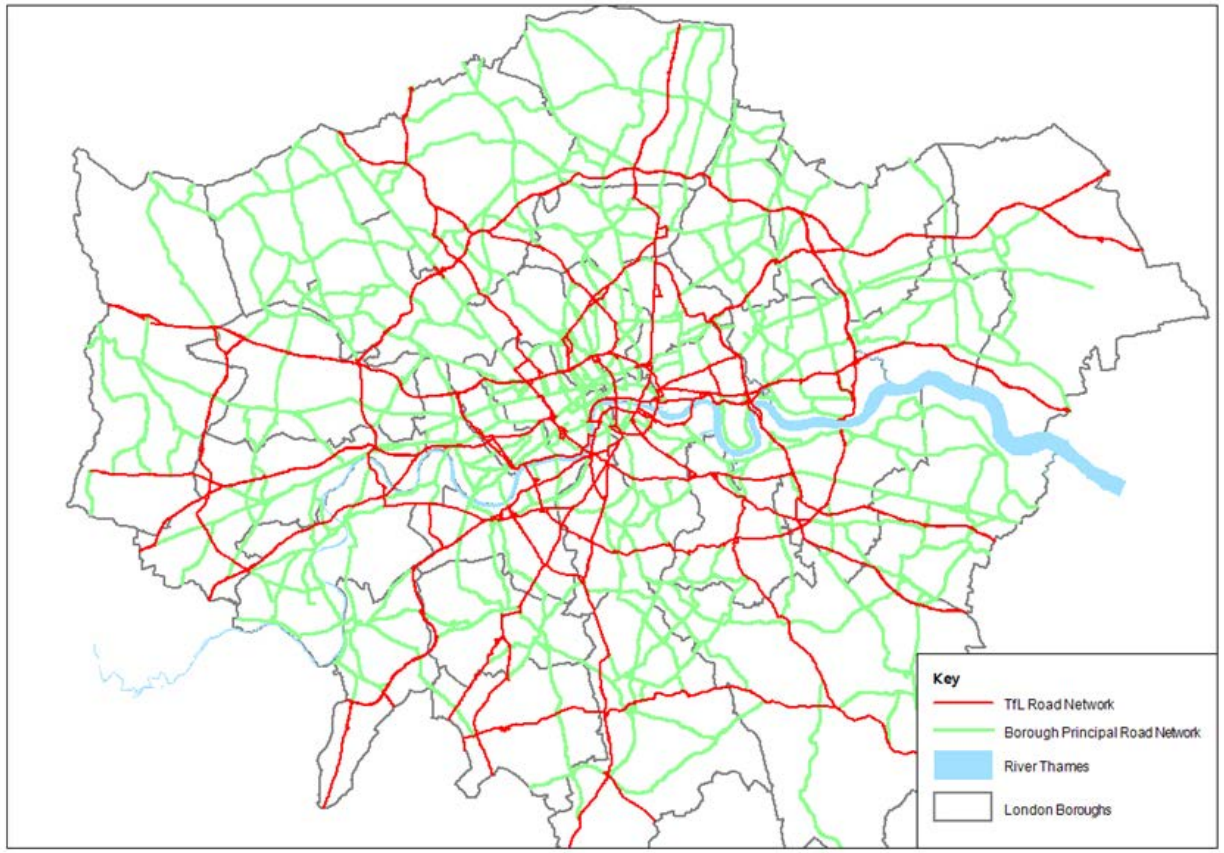
Investing in London's roads

- TfL has three programmes of work that cover the management and improvement of London's roads

Programmes	Scope
Assets	Investment in highway assets to maintain network safety and reliability, including major bridge and tunnel refurbishments
Healthy Streets	Road enhancements delivered by TfL and the Boroughs to encourage active travel, and enhancing our streets and public spaces
Air Quality and Environment	Aimed at reducing emissions from ground based transport and improving London's air quality

Transport for London Road Network – TLRN

- The TLRN is 580km of London's busiest roads
- TfL manages and maintains the assets on the TLRN



5% of London's roads
30% of London's traffic
100% of traffic signals and bus infrastructure
£15bn asset value
£100m Opex per annum
£120m Capex per annum steady state
£40-120M per annum on structures and tunnels to achieve steady state

Over £15bn worth of highway assets

Asset type	Quantity
Carriageway	2555 lane km
Drainage	Over 45,000 gullies
Vehicle Restraint Barriers	430km
Footways & cycle routes	1200km of footway 200km of cycle lanes
Structures	1779 bridges and structures
Tunnels	12 major tunnels
Bus stations, stands and shelters	130 stations and stands 12,000 shelters
Street Lighting	40,000 lights – and over 30% are LEDs and increasing
Traffic Signals	6,266 units
CCTV	2,471 units
Green Estate	Over 40,000 trees and 700 acres grass, hedges & verges

Annual maintenance & renewal activities

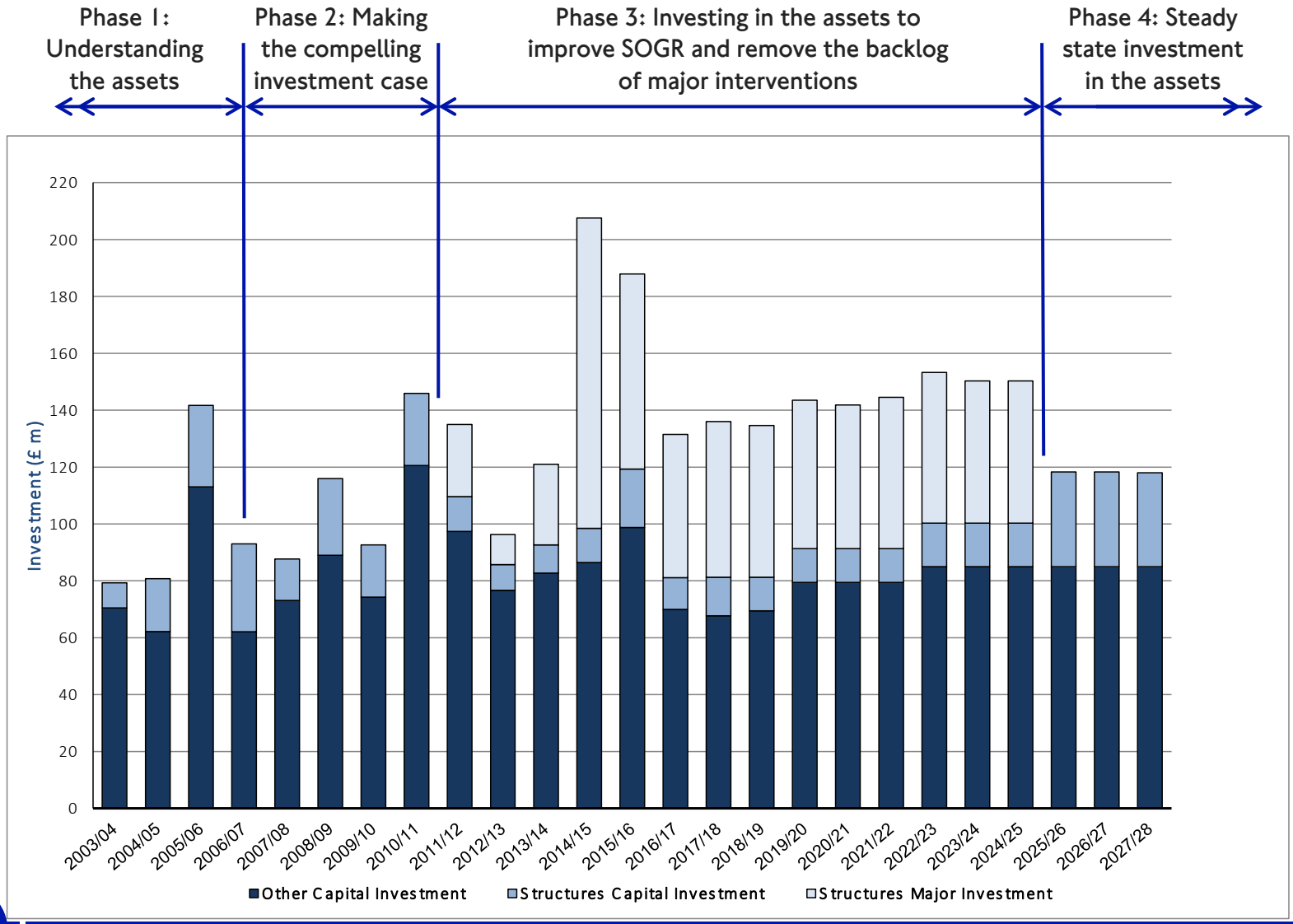
Managing network risks
- Regular asset inspections
- Understanding asset condition
- Evaluating asset risks
- Prioritising based on risk
- Investing in the right things

Typical activities

Each year our activities include...
- Repairing all highway defects - over 5000 road surface defects
- Resurfacing over 150km of carriageway
- Replacing over 1000 street lights with energy efficient units
- Modernising over 300 traffic signal sites
- Cleansing and graffiti removal
- Emergency response
- Gritting and snow clearance
- Flood prevention and treatment

Asset Management
- Applying industry leading asset management to achieve best value
- Delivering the optimum State of Good Repair (SOGR)
- SOGR balances risk, cost and customer satisfaction

Investing in TLRN assets - 2016/17 prices



Structures & Tunnels Investment Programme (STIP) Tranche 1 – 2012 to 2017 completed works

Before

After

Hammersmith Flyover – major refurbishment

Replace Woodlands - replaced retaining wall

Fore Street Tunnel - addressed water ingress and renewed damaged equipment

Structures & Tunnels Investment Programme (STIP) Tranche 1 – 2012 to 2017 – works in progress

Before

Now

Highbury Corner - replace the entire road-over-rail bridge

Ardleigh Green - replace the entire road-over-rail bridge

Upper Holloway - replace the deck of the road-over-rail bridge

STIP Tranche 2 Overview – 2017 to 2025

Vauxhall Bridge

- Structural waterproofing / resurfacing
- Renewal of expansion joints
- Full paint renewal
- Targeted steelwork repairs

Lambeth Bridge

- Structural waterproofing / resurfacing
- Renewal of expansion joints
- Targeted paint renewal
- Targeted steelwork repairs

Brent Cross Structures

- Structural waterproofing / resurfacing
- Concrete repairs
- Renewal of expansion joints
- Renewal of drainage system
- Replacement of sub-standard parapets

Westway Structures

- Structural waterproofing / resurfacing
- Renewal of expansion joints
- Renewal of drainage system
- Targeted concrete repairs
- Targeted bearing refurbishment and replacement

Rotherhithe Tunnel

- Install energy efficient lighting
- Renewal of lighting support system
- Upgrading of ventilation system
- Replacement of fire main
- Upgrading resilient power supply
- Renewal of CCTV system

Blackwall Southbound Tunnel

- Install energy efficient lighting
- Upgrading of ventilation system
- Renewal of CCTV system

Summary

- TLRN structures carry 30% of London's traffic and are vital to the movement of people and goods in London
- Asset Management principles applied to structures since 2006
- Low levels of investment resulted in significant deterioration leading to a backlog of major renewals
- Structures and Tunnels Investment Programme (STIP) - £600m across 10 years is required to remove the backlog of major works
- A steady state level of investment beyond STIP

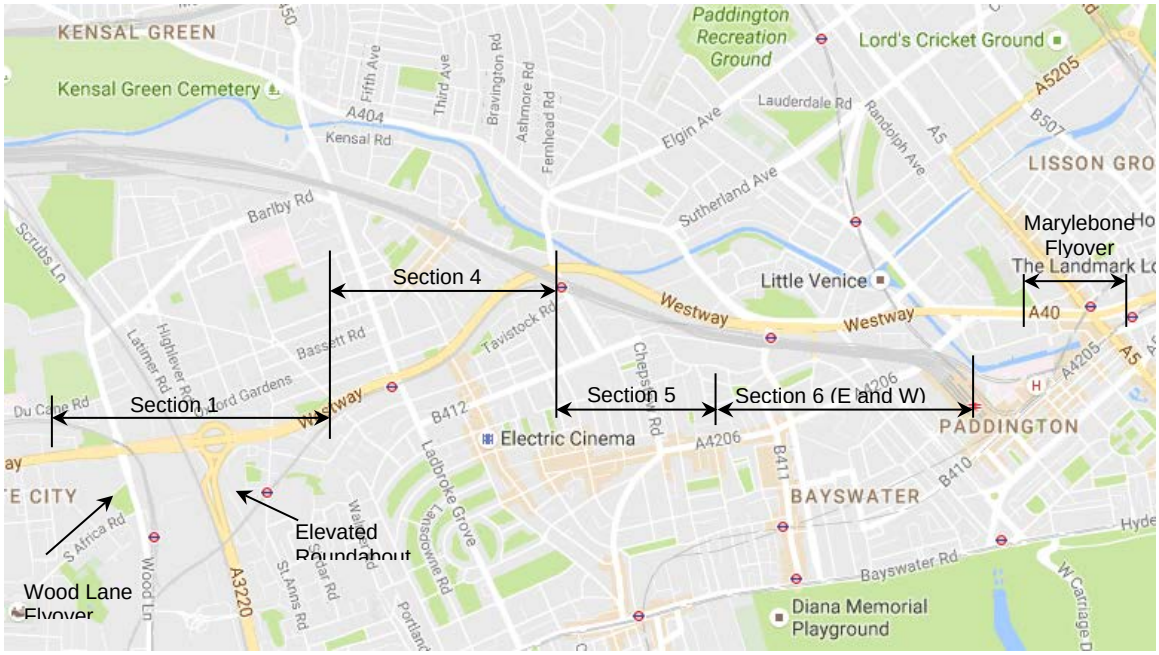
Dana Skelley

Director Asset Management

Tel: (020) 3054 1413

email: dana.skelley@tfl.gov.uk

Appendix 2: A40 Westway Structures Plan and Aeriel Photos



The Westway structures consist of five sections[1]; Section 1 (Wood Lane Flyover), Section 4, Section 5 and Sections 6E and 6W. The project also includes a short section at grade and the Marylebone Flyover.

[1] Sections 2 and 3 carry the A3220 West Cross Route south to Shepherds Bush Green and are not considered to be part of the Westway.

Wood Lane Flyover and the Elevated Roundabout

Section 5, looking eastwards from Westbourne Park Station

Appendix 3: Stage 2 and 3 Key Activities

Stage 2

1. Undertake the following inspections, surveys, testing in order to verify and add detail to the assumptions identified during Stage 1 and to inform feasibility option development;

    (a) 153 bearing investigations to identify which bearings need to be replaced and maintenance requirements where bearings can be retained.

    (b) 48 concrete tests over ten locations to determine nature and extent of repairs required.

    (c) Drainage survey over the entire site to determine functionality and capability of existing system and to inform feasibility study options for replacement or modification of existing system.

    (d) Pencil cores over 89 locations to verify surfacing thicknesses and determine options for the concrete deck repairs.

    (e) 29 trial holes to verify construction details at joint locations and to inform extent of concrete deck repairs required.

    (f) Topographical survey to confirm location of cell covers, gulleys, kerblines etc. over the full site, to inform scope of main works.

    (g) Ecological survey to identify possible wildlife on or around the site and constraints that this may have on the works.

    (h) Asbestos survey to inform main works.

2. Development of a BIM compliant engineering model to support the project throughout its entire lifecycle and the future operation and maintenance of the structures.

3. Produce factual reports detailing findings of all testing, inspections, investigations and surveys

4. Produce interpretive reports to provide options for remedial measures.

5. Feasibility option study to determine best value solution.

6. The option study will include options for traffic management options to assess impact on costs and balance this against journey-time dis-benefits.

7. Develop costs, programme and fully quantified risk assessment for the preferred option for Pathway Stages 3 to 6.

Stage 3

8. Development of Concept Design for preferred option and obtain technical approval.

9. Production of general arrangement drawings.