Transport for London

SCOPE

APPENDIX J
Rotherhithe Tunnel Works

Contents

a) General 3
b) Lighting & Structural Support System 3
c) Other Lighting 4
d) Fire Main 4
e) Resilient Power Supply 4
f) Ventilation system 4
g) Wall Finishes 5
h) Linear Heat Detector 5
i) Emergency Wayfinding Signs 5
j) Drainage System, pipes, valves, pumps and control systems 5
k) Public Address, Emergency Roadside Telephone, Radio Systems and Maintenance Telephones. 6
l) Plant Room Heating, Ventilation and Air Conditioning 6
m) HV and LV supply systems 6
n) Communication Network 7
o) Flood gate 7
p) Variable Message Signs 8
q) CCTV Traffic System (in bore and approach roads) 8
r) Traffic Restrictions 8
s) Video Accident and Incident Detection (VAID) 8
t) Emergency Distribution Panel (EDP) 9
u) Plant and Equipment Rooms fire detection, suppression and monitoring system 9
v) Cable rack in the sub-tunnel 9
w) Carriageway 9
x) Traffic Signals 9

The Rotherhithe Tunnel Works

The scope of planned work is summarised as follows:

a) General

For all items in scope the appropriate design standards and specifications are to be agreed with all key stakeholders.

Changes to the emergency and operation strategies or minimum operating requirements due to introduction of new or revised equipment shall be determined and agreed with all key stakeholders.

All equipment will be equipped with internet protocol interfaces to the latest security standards to permit full control, maintenance and diagnosis to be carried out without needing access to the field equipment. It will all be integrated within the central tunnel control system HORUS with the relevant user interface updates.

All cabling of safety systems shall be capable of operating for the full duration of emergency incidents. They shall be installed on protected cable management systems (CMS). The CMS shall have 50% spare capacity to allow for future additional equipment.

All equipment and cabling for redundant and decommissioned systems are to be removed and disposed of. Any associated data storage devices are to have data removed before disposal.

b) Lighting & Structural Support System

Replace all tunnel bore and ventilation shaft lighting with LED lighting. Replace the current lighting support system throughout the tunnel.

The new system shall incorporate emergency evacuation lighting with consideration given to incorporating low-level lighting in conjunction with the emergency wayfinding signs

Improvements to the tunnel wall finishes need to considered as part of the overall concept design.

Provide transition lighting levels to allow drivers eyes to adapt as they enter and leave the tunnel. It shall ensure that the lighting system will enable Video Accident and Incident Detection (VAID).

Associated assets are in the scope of the replacement include emergency lighting, evacuation lighting, cable routes, changes to the UPS, photometers, switches, control systems

c) Other Lighting

The lighting on the approach ramps, sub-tunnel, ventilation shafts, portal staircases, switch rooms and the tunnel service buildings is to be replaced with LED lighting.

Provision of emergency lighting shall be included in all options. HORUS updates shall be included in this item.

During concept design it has become apparent that the carriageway approach lighting and lighting for the external staircases at the portals requires replacement ahead of the main works.

Consequently, included within the Stage 3 Concept Design is the detailed design and implementation of the replacement of this lighting. This includes all lighting from the tunnel entrance arches to the portals and staircases for both north and south approaches.

d) Fire Main

Replace the existing cast iron fire main with one that can be more easily accessed for maintenance. Increase the number of hydrants and isolation valves to ensure sufficient fire control measures. The new system must be capable of delivering water at flow and pressure rates that meet appropriate standards for road tunnels.

e) Resilient Power Supply

Provide an emergency power supply that supports all the assets that are used to operate the tunnel. Ensure that switchover from supplies is automatic or remotely operable from the control centre.

f) Ventilation system

The ventilation system is to be replaced with a system capable of controlling smoke from a minimum of a [redacted] vehicle fire in all areas of the tunnel. Through a value engineering exercise, lower capacity may be considered if it can be demonstrated to be ALARP in conjunction with other mitigation measures.

It is to be capable of managing incidents from all permitted vehicles with various types of fuel / energy sources and provide a tenable atmosphere for evacuation in emergency situations.

During normal traffic operation the ventilation system shall maintain the air quality to acceptable levels for all tunnel users including cyclists and pedestrians

The new system is to ensure that the expelled air at the ventilation shafts is to be effectively dispersed into the atmosphere under all weather conditions.

g) Wall Finishes

In conjunction with the lighting design as a minimum the wall finishes throughout the main bore shall be made uniform in appearance. The surfaces finishes need to be robust and easy to keep clean. The opportunity to incorporate passive fire protection shall be considered.

h) Linear Heat Detector

The linear heat detection cable is to be replaced. It will need to provide coverage within the main bore, sub-tunnel and ventilation shafts and be automatically linked to the CCTV, emergency wayfinding signs and evacuation lighting

i) Emergency Wayfinding Signs

The condition is known to be reasonable and the signs were installed in 2012/13. However the signs rely on internal batteries and this needs to change to be supported by a centralised UPS. They need to be connected to the Linier Heat Detector. Additional signs are required to achieve the 25m recommended spacing and consideration given to incorporate low-level evacuation lighting.

j) Drainage System, pipes, valves, pumps and control systems

Pumps and control systems have recently been refurbished in 2018 including replacement of the ventilation / gas detection and suppression therefore no works are required in the pump room unless the system needs to have greater capacity due to other system improvements.

All carriageway gully defects are to be addressed.

Pipes from the sump to the outfall will require addressing. All discharge is to be directed into suitable sewers and not to any watercourse.

k) Public Address, Emergency Roadside Telephone, Radio Systems and Maintenance Telephones.

The Public Address system shall be replaced. It must be able to broadcast a range of pre-set emergency messages as well as live direct voice broadcast by the tunnel control centre operator to specific zones within the tunnel and on approaches.

A new leaky feeder cable is to be installed. Sufficient capacity shall be provided to accommodate emergency response radio network, maintenance radios and any future requirements. The radio upgrade shall cover all areas including sub-tunnel and shafts.

Domestic radio re-broadcast with emergency voice break-in facility is to be provided

The emergency roadside telephones are in good condition however will need to be incorporated with any new EP or EDP.

The existing maintenance telephone network is redundant and is to be removed. Provision is to be made for a new ESN and MNO network to be installed by third parties including separate, secure equipment rooms

l) Plant Room Heating, Ventilation and Air Conditioning

The HVAC systems are approaching the end of their design life, which will lead to increased future maintenance costs and reliability. In extreme weather, failure could result in overheating of electrical systems and increased asset deterioration rates.

Review condition, life expectancy, performance and investigate the existing heat loads to recommend the correct sizing of air conditioning units.

Other associated items which affect HVAC shall be included in the review e.g. duct insulation, fire dampers and seals of the doors and ducting through walls.

m) HV and LV supply systems

The existing HV electrical supply network will be retained unless power demands for new systems cannot be met.

A new Low Voltage network is to be installed. The new network will provide EDPs and emergency points with nominal 50m spacing throughout the tunnel. These EDPs will be interleaved with regards to supply source to prevent a single failure disabling any two consecutive EDPs.

A new cable management system is to be installed that provides adequate capacity to ensure the 50% of the ultimate capacity remains unused as spare for future expansion. The CMS will be designed to ensure a long (more than 25 years) service life and will take measures in areas where the existing containment is damaged to prevent similar damage occurring to the new CMS. All cables to be used will be low smoke and fume and suitable for use in a tunnel.

The power supply to the critical systems is reliant upon manual switching operations.

Provide an automated system with appropriate back-up supply to maintain minimum operating requirements. Ensure the system (and backup) is able to deal with HV spikes, LV dips and a transformer failure.

The existing uninterruptible power supply (UPS) is to be replaced with a new UPS provided at Shaft 2 and at Shaft 4. Each UPS will be supplied by two incoming feeds.

The UPS batteries will be sized to provide a two-hour autonomy for all tunnel assets

n) Communication Network

The existing communications network is to be replaced with a fibre-optic based redundant ring system. It must be configured to avoid a single point failure. The network will operate using internet protocols. The system is to have 50% spare capacity to allow future expansion. It shall be protected to resist physical attack and cyber-attack and able to continue to function during any foreseeable emergency event.

The old system shall be decommissioned and removed.

o) Flood gate

The flood defence gate located at Shaft 1 is to be overhauled and kept operable. An operational procedure is being developed which will inform on how this will be activated and controlled in the future. Where there is a clash with the ventilation ducts, a method needs to be devised that allows the floodgate to operate or an alternative method of protection be provided.

Consideration needs to be made if a method of emergency egress is required through shaft 1 should the floodgate be operated.

The two wigwag signals either side of the gate are non-functioning and are to be removed.

p) Variable Message Signs

Variable Message Signs shall be installed within the tunnel to display standard lane control signs and messages. They shall be spaced at 200m intervals and interlocked.

In case of emergency they shall display appropriate messages. They must be capable of allowing the network management control centre operator to be able to write live messages.

The variable message signs at the entrance arches to the tunnel are to be retained and refurbished.

The six VMS for the tunnel closure and green wave facility located along the A13, Butcher Row NB and Branch Road NB shall be refurbished or replaced as appropriate.

q) CCTV Traffic System (in bore and approach roads)

The CCTV traffic system is to be replaced with a fully digital high definition system that provides 100% coverage of all the tunnel bore and approaches. Each camera shall be capable of pan-tilt-zoom and nominally spaced at 50m. The system shall be configured to allow for an adjacent camera failure and be connected to the wider TfL CCTV network as well as the network management control centre.

r) Traffic Restrictions

Suitable measures are present to ensure a high level of compliance with the traffic restrictions. After the refurbishment, commercial vehicles up to 3.5 tonnes gross weight are to allowed however to minimise the impact of pollution only ULEZ compliant vehicles are to be allowed.

A camera system is currently operational to ensure the current weight restriction is enforced and this is to be extended to cover ULEZ compliance.

s) Video Accident and Incident Detection (VAID)

A Vehicle Incident Detection System (VAID) with additional thermal imaging capability is to be installed in the tunnel.

It is to be capable of dealing with 2-way traffic, pedestrians and cyclists and provide 100% coverage of the tunnel bore and approaches.

t) Emergency Distribution Panel (EDP)

Install Emergency Distribution Panels (EDPs) in the bore to bring together the emergency points and electrical distribution panels. Items to be included (but not limited to) Emergency Roadside Telephones (ERT), Fire Extinguishers, fire hydrants, wayfinding and SOS 'toblerone' points.

u) Plant and Equipment Rooms fire detection, suppression and monitoring system

The existing plant and equipment room fire detection, suppression and monitoring systems are in good condition therefore do not require refurbishment, however this may need to be upgraded if new plant and equipment are installed in these rooms. If a new plant or equipment room is created, then this must have suitable fire detection and suppression systems added.

v) Cable rack in the sub-tunnel

The existing cable rack in the sub-tunnel is to be replaced. The opportunity is to be taken for third party cables and cable racks to be rationalised, separated from TfL cables and suitable protection added. This is to take into account ventilation flows through the sub-tunnel and will not increase frictional flow.

w) Carriageway

The carriageway throughout the tunnel and approaches will be resurfaced. The stone slabs on the footpaths on the approaches are to lifted and relaid.

x) Traffic Signals

The current wigwag signals at the entrances to the tunnel are to be replaced with standard three aspect traffic signals.