

Maintenance

Master Specification

M12D Electrical and Mechanical O’Bahn Bus Tunnel

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M12D O-Bahn Bus Tunnel

1 Description of Works and Work Requirements

General

- 1.1 O-Bahn Bus Tunnel (“the Bus Tunnel”) maintenance encompasses a broad range of Electrical and Mechanical Systems which requires regular statutory inspections, calibration, and preventive maintenance:
 - a) Supervisory Control and Data Acquisition (SCADA) System including integration with PLC and STREAMS, communications network, Video Incident Detection (VID) System, unauthorised vehicle detection and warning system, Bus Tunnel air quality and flow instrumentation, Bus Tunnel closure system, Closed Circuit Television (CCTV) surveillance system, advanced warning signs, public address System, radio rebroadcast system, vehicle detection systems, jet fan vibration and motor condition monitoring etc;
 - b) Fire Safety Systems – predominantly comprising water supply, automatic fire sprinkler system, fire hydrant system, automatic smoke / fire detection system, smoke / fire hazard management, occupant warning system, portable fire extinguishers etc;
 - c) Mechanical Systems – predominantly Bus Tunnel Jet Fans systems, Heating Ventilation and Air-conditioning (HVAC) & Plumbing services;
 - d) Electrical Systems – predominantly Low Voltage (LV) Reticulation within Bus Tunnel and Tunnel Service Building (TSB), UPS, switchboards, distribution boards, and cabling;
 - e) Lighting Control Systems – predominantly the Bus Tunnel lighting, Hackney Rd ramp lighting, Bus Tunnel service corridor and emergency egress corridor lighting, and Tunnel Service Building (TSB) lighting; and
 - f) Hydraulic Systems within the Bus Tunnel and Tunnel Service Building.
- 1.2 Services to be provided include the provision of routine preventive maintenance for:
 - a) all electrical and mechanical systems for the Bus Tunnel and the Tunnel Service Building (building excluded) in accordance with manufacturer’s warranties; and
 - b) cleaning of Bus Tunnel walls and drainage system.
- 1.3 In addition the Contractor shall:
 - a) provide assistance in undertaking desktop / real-life Emergency Services response exercises as required by the Principal;
 - b) communicate and coordinate with other Contractors engaged by the Principal to undertake other works during the same tunnel maintenance closure;
 - c) perform corrective maintenance, replacement of non-critical components which are permitted to run to failure (e.g. lamps). It also includes repair of defects through wear and tear in the various components of the tunnel infrastructure;
 - d) perform SMS as requested by the Superintendent in accordance with the specifications;
 - e) develop inspection / test sheets as required; and
 - f) facilitate effective 24/7/365 fault response to system malfunction, rectification of equipment damaged by incidents or unexpected failure and minimise interruption to tunnel operation.
- 1.4 Programmed Routine Maintenance activities are to be inclusive of required consumables. No additional payment will be made for consumables such as oil, grease, fuel etc.

Site Requirements

- 1.5 The Traffic Management Centre (TMC) is responsible for the overall operation of the Bus Tunnel. The Contractor shall report to the TMC prior to work being undertaken and maintain constant communication.

- 1.6 Any visitor or subcontractor shall be inducted by the Contractor prior to any site attendance.

Bus Tunnel Closure

- 1.7 The O-Bahn Bus Tunnel is closed between 1:00 am – 4:00 am every night with the exception of Saturday night / Sunday morning when DIT operates “After Midnight” services.
- 1.8 The Principal conditionally approves a planned 3 monthly Bus Tunnel closure from 9:00 pm to 4:30 am, subject to detailed planning processes and appropriate approvals from the Principal to minimise impacts to passengers and bus operations. Where possible, any maintenance activities should be scheduled to occur during normal Bus Tunnel closure hours (1:00 am to 4:00 am except Sunday morning), however in the event that extended closures are necessary, then minimum lead times will be required to ensure appropriate communications can be put in place to advise affected stakeholders and customers.
- 1.9 The Contractor shall not undertake any planned work during peak hours or any planned work that may trigger the Bus Tunnel closure without the prior approval of the Superintendent.
- 1.10 The Contractor shall obtain TMC and Public Transport Operations’ approval before undertaking any emergency repair work outside of the approved Bus Tunnel closure hours.

2 Contractors Nominated Representative

- 2.1 The Contractor shall nominate a Site Representative for routine inspections and maintenance who shall have the authority to make decisions on behalf of the Contractor.
- 2.2 The Contractor shall nominate an Emergency Response Representative to respond to emergency and fault breakdowns, who shall be competent to make recommendations to the Superintendent to return the tunnel to a safe operational condition.
- 2.3 The Contractor shall provide a highly responsive and complete 24 hour, 7 days a week emergency break-down repair service for the Bus Tunnel. The Contractor must meet the required response times as detailed in O-Bahn Bus Tunnel Fault Response timetable (Appendix 2 – O-Bahn Fault and Repair Response Times).
- 2.4 The Site Representative shall attend desktop or real-life emergency response exercises as requested by the Superintendent and the TMC.
- 2.5 The Contractor shall advise the Superintendent of any changes to the Contractor’s nominated Site Representative or Emergency Response Representative immediately.

3 Drawings / Systems Operation & Maintenance Manual

- 3.1 Electrical / Mechanical systems and maintenance manuals (Volumes 1 – 7) are provided in Appendix 3 – O-Bahn Bus Tunnel Operational and Maintenance Manuals.
- 3.2 The accuracy and completeness of the drawings is not guaranteed. The Contractor must maintain a current and accurate set of drawings and manuals for all Assets under the Contract and must provide to the Superintendent within 28 days a copy of any document updated as a result of the Works, or discovery of an error or omission.

4 Asset Constraints

- 4.1 The Contractor must get approval for any planned Bus Tunnel closure in advance.
- 4.2 Bus Tunnel closures must be minimised as far as reasonably practical. If any works cannot be undertaken within an approved Bus Tunnel maintenance closure, the Superintendent and TMC must be notified as early as possible to discuss alternatives or additional closures.

5 Risk Analysis and Hazards

- 5.1 The Contractor shall conduct and document a site specific risk and safe work analysis prior to any Works taking place. Where required, equipment lock-out procedures shall be documented including the removal of lock outs left in place by others. The initial analysis should cover inspections and routine maintenance (minor repairs).
- 5.2 The Contractor shall report in writing any observed issues on site which are outside the scope of works, but which may present a risk to maintenance personnel or the public.
- 5.3 The Contractor shall immediately advise the Superintendent and provide a proposal to replace any parts that are showing wear or damage that could be expected to fail before the next closure.

6 Inspection Requirements

Programmed Inspections and Maintenance

- 6.1 The O-Bahn Bus Tunnel Maintenance Schedule (refer “the Schedule”) was derived from Manufacturers’ Operation and Maintenance manuals highlighting the known planned or routine maintenance activities for the Bus Tunnel. The Contractor shall plan, conduct, and co-ordinate all inspection and programmed maintenance activities to all equipment / systems as listed in the Schedule (Appendix 1 – O-Bahn Bus Tunnel Inspection Schedule).
- 6.2 The Contractor shall submit a schedule of inspections to the Superintendent during the Mobilisation Period. The Contractor shall update the schedule when new systems are installed and commissioned or if the required timing of tasks change.
- 6.3 The Superintendent reserves the right to be present for inspections. The Contractor must provide a minimum of 48 hours’ notice to the Superintendent for any change to scheduled inspection dates or planned maintenance works.
- 6.4 Inspections must be undertaken in accordance with all relevant Australian Standards, Austroads Guidelines, and the provided Operation Manuals, User Manuals, drawings, and maintenance procedures.

7 Emergency Breakdown Services

- 7.1 In the event of the Contractor being notified and requested to attend site to rectify emergency breakdown the Contractor shall ensure that the Superintendent and the TMC are advised of the event.
- 7.2 This will allow for notifications to be given to other stakeholders of the structure and enable the on call program to be cancelled during the period of any emergency repair works.
- 7.3 The Contractor shall provide a highly responsive and complete 24 hour, 7 days a week mechanical and electrical / electronic emergency break-down repair service for the O-Bahn operations. Response times are critical and following notification the Contractor must respond within the times given in Appendix 2 – O-Bahn Fault and Repair Response Times.
- 7.4 If a temporary repair has been undertaken to restore service, future permanent repairs to equipment may need to be approved and authorised by the Superintendent in writing prior to proceeding with the Works.

8 Reporting Requirements

Programmed Inspection Reports

- 8.1 The Contractor shall submit a report to the Superintendent within 14 days of completing each scheduled inspection.
- 8.2 The reports shall include the following:

- a) summary of any visible signs of damage, loss, corrosion, and excessive wear to the items / components listed to be inspected / maintained;
 - b) listing of Works completed and required repairs, including recommendations and methodologies to retain operational service of the O-Bahn, for all associated items / components inspected;
 - c) estimates for any required repairs or maintenance, including the timeframe to repair and any materials, components, and labour to return listed items back to operational service;
 - d) the risk profile and criticality of any Asset that requires maintenance; and
 - e) Inspection and Test Sheets recording the inspections, test results, lubrication, adjustments, and any repairs undertaken for each of the items / components listed to be inspected / maintained.
- 8.3 The Superintendent has no obligation to award any additional works from inspections undertaken by the Contractor. Any additional Works may be instructed through a Work Order.

Programmed Maintenance Reports

- 8.4 The Contractor shall submit a report to the Superintendent within 14 days of completing any maintenance works. The reports shall be inclusive of the following:
- a) summary of any works undertaken to repair / replace items / components / equipment that required servicing / replacement, including dates and times spent making them good;
 - b) any findings or conclusions associated with failure of items / components / equipment required to be serviced or replaced;
 - c) any operations and maintenance manuals relevant to replaced items / components / equipment; and
 - d) any certifications required in accordance with statutory and regulatory requirements.

Emergency Breakdown Reports

- 8.5 The Contractor shall submit a report to the Superintendent within 14 days of completing emergency repair work that had been undertaken to make the Bus Tunnel operational. The reports shall be inclusive of the following:
- a) summary of any works undertaken to repair / replace items / components / equipment that required servicing / replacement, including dates and times spent making them good;
 - b) any findings or conclusions associated with failure of items / components / equipment required to be serviced or replaced;
 - c) any operational and maintenance operational manuals and drawings that would be relevant to replaced items / components / equipment; and
 - d) any certifications required in accordance with statutory and Regulatory requirements.

9 Equipment Rendered Idle

- 9.1 Equipment rendered isolated / inoperative during the inspection for any reason shall be locked off and safety information warning tagged, with information clearly printed stating the following:
- a) detailed reason for the isolation;
 - b) the full name of person responsible for rendering the isolation;
 - c) the name of the company the person represents;
 - d) the date of the isolation; and
 - e) the date of estimated return to service.
- 9.2 The Contractor shall have a documented procedure for isolating/locking off of equipment and for the removal off the isolation.
- 9.3 TMC and the Superintendent must be notified immediately and in writing of any such isolation and the possible effect it may have on the Bus Tunnel operation and their safety.

10 Appendix 1 – O-Bahn Bus Tunnel Inspection Schedule

10.1 Refer separate file.

11 Appendix 2 – O-Bahn Fault and Repair Response Times

Table M12D 11-1 O-Bahn Tunnel Response Times

Device Failure	Response time required A/H	Response time required during normal working hours	Time for fault to be permanently repaired
Unauthorised Vehicle detection or barrier system fault resulting in denial of multiple valid vehicle access and/or tunnel closure	90 minutes	90 Minutes	6 hours
Unauthorised Vehicle detection or barrier system fault not resulting in denial of access or tunnel closure (eg red/amber disc, illuminated pavement marking, single approach VMS)	No	Same Day	Next Working Day
Door alarm indicating possible unauthorised access (TMC to check CCTV, and call SAPOL)	90 minutes (TMC operator judgement)	90 minutes (TMC operator judgement)	Depends if any fault
Tunnel roller gate fault – won't close	90 Minutes	90 Minutes	12 hours (may require manual operation in the interim)
Tunnel roller gate fault – won't open	90 Minutes	90 Minutes	12 hours (may require manual operation in the interim)
CCTV fault – single camera	No	Same Day	48 hours
CCTV fault – multiple cameras	90 Minutes	90 minutes	24 hours
VIDS fault with no redundant VIDS or CCTV coverage of area	90 Minutes	90 Minutes	12 hours
VIDS fault with redundant VIDS or CCTV coverage of area	No	Same Day	48 hours
VIDS alarm while tunnel closed and sealed – single alarm. TMC to increase lighting levels and check VIDS, CCTV coverage. No cause for single alarm seen.	No	N/A	Depends on cause
VIDS alarm while tunnel closed and sealed – multiple alarms. TMC to increase lighting levels and check VIDS, CCTV coverage. TMC to alert SAPOL if human unauthorised access is suspected.	On TMC operator Judgement	N/A	Depends on cause
Jet Fan – fault resulting in loss of use of single jet fan	No	Same Day	24 hours (unless catastrophic fault, and / or no spares available)
Jet Fan – fault resulting in loss of use of more than one jet fan	90 minutes	90 minutes	12 hours (unless catastrophic fault, and / or no spares available)
Corridor ventilation fan – fault resulting in loss of use of single fan	No	Same Day	24 hours (unless catastrophic fault, and / or no spares available)
Corridor ventilation fan – fault resulting in loss of use of more than one fan	90 minutes	90 minutes	12 hours (unless catastrophic fault, and / or no spares available)
Tunnel supply power failure – ATS has operated ensuring continuity of power	No	90 minutes	12 hours to restore redundancy, 48 hours for permanent repairs
Main power failure – ATS has failed as well (operating on UPS)	90 minutes	90 minutes	2 hours to restore power, 48 hours for permanent repairs
PLC / SCADA fault, negligible impact on Tunnel operation, Tunnel remains open	No	Same Day	48 hours
PLC / SCADA fault, significant impact on Tunnel operation requiring tunnel closure	90 Minutes	90 Minutes	6 hours
RRB / PA system failure	90 Minutes	90 Minutes	24 hours (unless catastrophic fault, and / or no spares available)

Device Failure	Response time required A/H	Response time required during normal working hours	Time for fault to be permanently repaired
Fire Safety System including deluge	90 Minutes	90 Minutes	24 hours (unless catastrophic fault, and / or no spares available)
Pumps	No	Same Day	24 hours (unless catastrophic fault, and / or no spares available)
Minor lighting fault within the Tunnel	No	Same Day	72 hours
Major lighting fault within the Tunnel – significant areas unlit	90 minutes	90 minutes	6 hours
Over height detection failure	No	90 minutes	Next working day
Single UPS Failure	No	Same Day	Next Working Day
Both UPS Failure	90 minutes	90 minutes	2 hours to restore power, 48 hours for permanent repairs
Communications backbone failure – redundant path OK	No	Same Day	48 hours
Communications backbone failure – redundant path failure as well	90 Minutes	90 Minutes	6 hours
Traffic Signals fault which affects operation of Tunnel	90 Minutes	90 Minutes	6 hours
Any accident damage affecting tunnel operation	90 Minutes	90 Minutes	6 hours (unless catastrophic fault, and / or no spares available)
General Public Safety Issue (confirmed)	90 Minutes	90 Minutes	2 hours to make safe

- 11.1 For faults not listed in Table M12D 11-1 which result in a tunnel closure / lane restriction, 90 minutes response time is required 24/7/365.
- 11.2 For faults not listed above which do not result in a tunnel closure / lane restriction, same working day attendance or first working day attendance during working hours.

12 Appendix 3 – O-Bahn Bus Tunnel Operational and Maintenance Manuals

12.1 Refer separate file.

13 Appendix 4 – O-Bahn Bus Tunnel City Access – ITS Asset Register

13.1 Refer separate file.
