SILVERTOWN TUNNEL

Volume 3: Project Agreement – Schedules 2 to 31

Schedule 10 – Design and Construction Requirements

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MAYOR OF LONDON

TRANSPORT FOR LONDON
EVERY JOURNEY MATTERS

Contents

SCHEDULE 10

DESIGN AND CONSTRUCTION REQUIREMENTS

Part 1 - Design and Construction Requirements

1. General

1.1 Project Co shall design and construct the Works in accordance with clause 13 (*Design and Construction*) and the other provisions of this Agreement, including the requirements of this Part 1 (*Design and Construction Requirements*) and its Annexes, being:

1.1.1 Annex 1 - Highway and General Requirements;

1.1.2 Annex 2 - Requirements for Tunnel ME&P Systems;

1.1.3 Annex 3 - Structures Requirements;

1.1.4 Annex 4 - Existing Structures;

1.1.5 Annex 5 - Working in the River Thames;

1.1.6 Annex 6 - Traffic Safety and Control Requirements (Outside Tunnel);

1.1.7 Annex 7 - Additional Assets 8, 9 and 10; and

1.1.8 Annex 8 - Asset Management System.

1.2 Project Co shall design and construct the Works in accordance with the standards and specifications as described in Part 2 (*Design Standards and Specifications*).

1.3 Project Co shall design and construct the Works in accordance with all relevant drawings on the CD Rom referred to in clause 1.2(o). Any references to drawings in this Schedule 10 (*Design and Construction Requirements*) shall be references to the drawings on the CD Rom referred to in clause 1.2(o).

1.4 Project Co shall develop detailed designs:

1.4.1 from and so as to be consistent with the Project Co Works Proposals in Part 3 (*Project Co Works Proposals*); and

1.4.2 in accordance with the D&C Requirements,

and submit them to TfL under the Review Procedure in accordance with the requirements of Schedule 9 (*Certification and Review Procedure*).

1.5 Unless otherwise expressly stated in this Agreement, Project Co shall undertake all installation, inspection, testing and commissioning necessary to demonstrate to the Independent Certifier that the Works have been designed and constructed in accordance with the provisions of this Agreement and for the purposes of obtaining the Permit to Use which shall include, but not be limited to, the following planned stages of testing:

1.5.1 factory acceptance testing;

1.5.2 preliminary inspection and testing;

1.5.3 site acceptance testing and stand alone testing of discrete parts of the Works;

1.5.4 subsystem level testing;

1.5.5 system level testing; and

1.5.6 overall project performance and systems integration testing;

1.5.7 testing of the Project Co TCS and secondary tunnel control system; and

1.5.8 testing of the interface between the Project Co TCS and TfL TCS Interface in accordance with the Project Co Test Plan,

and Project Co shall detail how they intend to undertake any required installation, inspection, testing and commissioning in the inspection and test plans which shall be submitted to TfL under the Review Procedure (the **"Inspection and Test Plans"**).

1.6 Project Co shall ensure that the Inspection and Test Plan includes any sampling, testing, calibration, trials and certification requirements applicable to the design and construction of the Works and sufficient hold points for inspections, receipt of test results and approvals.

1.7 Project Co shall ensure that all sampling and testing undertaken in connection with the Works is in accordance with Specification Appendix 1/5 (*Testing to be Carried out by Project Co*) developed in accordance with the requirements of Annex 5 (*Specification Appendices*) of Part 2 (*Design Standards and Specifications*).

1.8 Project Co shall ensure that all on-site and off-site sampling, testing, calibration, trials and certification carried out in connection with the Works are carried out by laboratories accredited by UKAS for such calibrations, samples, trials and tests and such accreditation shall be:

1.8.1 UKAS Category 0 for an off-site laboratory; and

1.8.2 UKAS Category II for an on-site laboratory.

1.9 Project Co shall be responsible, without limitation, and at its own expense, for any remedial work required as a result of any failure to pass any test, calibration or trial required in accordance with this Agreement or as a result of any laboratory not being accredited as required by this Agreement.

1.10 Project Co shall build and utilise a virtual construction model to aid design and construction planning for the Works.

1.11 Project Co shall, prior to the Permit to Use Date, prepare and summit to TfL a full set of 'as-built drawings' in relation to the Works and any other records related to the Works as required by Part 1 (*Records*) of Schedule 16 (*Records and Reporting*).

1.12 When carrying out the Works, Project Co shall at all times comply with the Design Principles in accordance with the Transferred DCO Functions.

1.13 When designing and constructing the Works, Project Co shall take account of its responsibility for carrying out the Services following the Permit to Use Date and shall ensure that the Works are designed and constructed for maintainability, to provide resilience against damage to, or failure of any element or part of the Project Facilities and with consideration of whole life costs.

1.14 When designing and constructing the Works, Project Co shall take account of the responsibilities of others for the operation and maintenance of the Additional Assets and the Supplementary Works following handover and shall ensure that the Additional Assets and the Supplementary Works are designed and constructed for maintainability, to provide resilience against damage and failure, and with consideration of whole life costs.

1.15 Project Co shall:

1.15.1 agree with the TDSCG any facilities to be provided for the Emergency Services in relation to the Project, including staging areas, welfare facilities, turning heads and vehicle parking; and

1.15.2 design and construct the facilities agreed pursuant to paragraph 1.15.1 as part of the Works.

1.16 Project Co shall carry out and complete the Works in accordance with the cyber security requirements set out in Annex 2 (*Information Security*) of Part 5 (*Information Management*) of Schedule 8 (*Management Systems*).

1.17 Project Co shall plan any Works so that any employees of Project Co or Project Co Related Parties that are engaged in tunnel boring and associated supporting activities (as set out in paragraph 2.3.4 of the Code of Construction Practice) which are safety critical in nature shall undertake such activities on an eight (8) hour shift basis.

1.18 Project Co shall ensure that no employee of Project Co or any Project Co Related Party spends in excess of eight (8) consecutive hours at the tunnel face in any one shift.

2. Dual Carriageway Road and Tunnel Link

2.1 Project Co shall design and construct a new dual carriageway road and tunnel link beneath the River Thames to connect the existing A102 Blackwall Tunnel Southern Approach on the Greenwich Peninsular in Greenwich with the existing Tidal Basin roundabout in the Royal Docks area in Silvertown, Newham.

3. Highway Alignment and Geometry

3.1 Project Co shall design and construct the Works in accordance with the following requirements:

3.1.1 each carriageway of the dual carriageway road and tunnel link shall have a minimum of two (2) lanes in each direction;

3.1.2 one (1) lane on each carriageway in the tunnel shall be designated for use by buses, taxis and heavy goods vehicles (being vehicles over three point five (3.5) tonnes);

3.1.3 the minimum lane width in the tunnel shall be three point five (3.5) metres; and

3.1.4 the tunnel shall include emergency evacuation paths which shall have a minimum width of one point two (1.2) metres on each side of each carriageway.

3.2 Subject to paragraph 3.3, Project Co shall design and construct alignments and layouts, including visibility requirements, for a minimum design speed of fifty (50) kph.

3.3 Project Co shall design and construct the tie-in to the existing Blackwall Tunnel Southern Approach dual carriageway as a transition section to ensure that all alignments and

visibility within the existing fifty (50) mph speed limit conform to the requirements for a eighty five (85) kph design speed.

3.4 Project Co shall design and construct the Works to ensure that:

3.4.1 the southern terminus/tie-in incorporates free flow grade separation between the Blackwall Tunnel Southern Approach and the Project Roads; and

3.4.2 the northern terminus/tie-in incorporates a modified and extended traffic signal controlled junction at the Tidal Basin Roundabout.

4. Utilities

4.1 Project Co shall be fully responsible for all utilities work required in connection with the Works in accordance with the requirements of clause 13.17 (*Utilities*).

4.2 Project Co shall design and construct metering equipment in accordance with all relevant codes of practice for the purposes of recording electricity consumption in relation to the Project Facilities.

5. Additional Assets

5.1 Project Co shall design and construct the following Additional Assets in the relevant locations identified on the Construction Land Drawings (where applicable) and in accordance with the requirements of this Schedule 10 (*Design and Construction Requirements*):

5.1.1 Additional Asset 1 – Tidal Basin Roundabout;

5.1.2 Additional Asset 2 – Dock Road;

5.1.3 Additional Asset 3 – Tie-ins to existing A102 Blackwall Southern Approach, Gantries and Tunnel Avenue;

5.1.4 Additional Asset 4 – New Boord Street Foot And Cycle Bridge;

5.1.5 Additional Asset 5 – Boord Street;

5.1.6 Additional Asset 6 – Millennium Way;

5.1.7 Additional Asset 7 – Pavilion Lane;

5.1.8 Additional Asset 8 –TfL Station Car Park;

5.1.9 Additional Asset 9 - Vehicular access to Blackwall Tunnel Southbound Floodgate Head House; and

5.1.10 Additional Asset 10 - Relocation of DVSA/Metropolitan Police vehicle assessment facility.

6. Tunnel

6.1 Without prejudice to any other provision of this Agreement, Project Co shall design and construct the tunnel in accordance with the requirements of Annex 2 (*Requirements for Tunnel ME&P Systems*) and Annex 3 (*Structures Requirements*).

6.2 Project Co shall design and construct the tunnel to operate as a category E tunnel in accordance with the Carriage of Dangerous Goods Regulations.

6.3 Project Co shall design and construct a fixed fire-fighting system in accordance with the requirements of paragraph 11 (*Tunnel fixed fire fighting system*) of Annex 2 (*Requirements for Tunnel ME&P Systems*).

6.4 Project Co shall design and construct the tunnel in accordance with DMRB document BD 78/99 (*Design of Road Tunnels*) as further described in Part 2 (*Design Standards and Specifications*).

6.5 Project Co shall design and construct the tunnel ME&P Systems such that they are fully compatible and interface with TfL's systems in accordance with the requirements of Annex 2 (*Requirements for Tunnel ME&P Systems*) and Schedule 11 (*TfL Technology Requirements*).

7. Structures

7.1 Project Co shall:

7.1.1 design and construct all Structures required for the Works, including but not limited to the Structures listed in Annex 3 (*Structures Requirements*), in accordance with the requirements of Annex 3 (*Structures Requirements*);

7.1.2 design and construct all works in relation to existing Structures in accordance with the requirements of Annex 4 (*Existing Structures*); and

7.1.3 design and construct all plant rooms and tunnel service buildings to accommodate the systems required for the Works, and to allow Project Co to perform the Services, in accordance with the requirements of Annex 3 (*Structures Requirements*).

8. Works in the River Thames

8.1 Without prejudice to any other provisions of this Agreement, Project Co shall design and construct works in the River Thames, including any temporary works required to comply with the Transferred DCO Functions in relation to transport of materials by river and in accordance with the requirements of Annex 5 (*Working in the River Thames*).

9. Traffic Safety and Control

9.1 Project Co shall design and construct traffic safety and control systems in accordance with the requirements of Annex 2 (*Requirements for Tunnel ME&P Systems*) and Annex 6 (*Traffic Safety and Control Requirements (Outside Tunnel)*).

10. Tunnel Control System

10.1 Project Co shall design and construct the Project Co TCS in accordance with the requirements of paragraph 9 (*Tunnel Control System*) of Annex 2 (*Requirements for Tunnel ME&P Systems*).

10.2 Project Co shall design and construct a secondary tunnel control system in accordance with the requirements of paragraph 9 (*Tunnel Control System*) of Annex 2 (*Requirements for Tunnel ME&P Systems*).

11. Not Used

12. Asset Management System

12.1 Project Co shall design and construct the Asset Management System in accordance with the requirements of Annex 8 (*Asset Management System*).

13. Miscellaneous

13.1 Not used

13.2 The Parties acknowledge and agree that:

13.2.1 the requirements of this Part 1 (*Design and Construction Requirements*) including Annex 1 (*Highway and General Requirements*), Annex 2 (*Requirements for Tunnel ME&P Systems*), Annex 3 (*Structures Requirements*), Annex 4 (*Existing Structures*), Annex 5 (*Working in the River Thames*) and Annex 6 (*Traffic Safety and Control Requirements (Outside Tunnel)*) shall not apply in relation to any Supplementary Works; and

13.2.2 the requirements of Part 2 (*Design Standards and Specifications*) and Part 3 (*Project Co's Works Proposals*) (as relevant) shall apply in relation to any Supplementary Works.

Annex 1 of Part 1 – Highways and General Requirements

1. Preliminaries

1.1 Temporary Accommodation and Equipment for TfL

1.1.1 Project Co shall provide open-plan site offices for exclusive use by TfL and TfL Related Parties for the duration of the Works with a primary site office on the north side of the River Thames and a secondary site office on the south side.

1.1.2 Project Co shall ensure that the TfL site offices are located within Project Co site offices with the location and layout of site offices for TfL subject to TfL's prior written consent (such consent not to be unreasonably withheld or delayed).

1.1.3 Project Co shall ensure that:

a. each TfL site office shall include a suitably equipped kitchen and WC facilities (male and female) and Project Co shall supply all consumables for the offices, WCs and kitchens including, but not limited to, coffee, tea, milk and sugar;

b. two (2) meeting rooms, capable of accommodating six (6) people each are provided at each site office;

c. the primary site office includes a conference room which can accommodate twenty (20) people with large screen projection facilities;

d. all meeting and conference rooms shall have whiteboards and wireless internet connectivity;

e. all accommodation and equipment shall be new or if previously used, it shall be in first class condition;

f. all accommodation is freshly decorated in colours which are subject to TfL's prior written consent (such consent not to be unreasonably withheld or delayed);

g. offices shall be connected by a level corridor, fully waterproof and lit;

h. the minimum window area of each site office shall be one-quarter floor area, half of this to be opening;

i. windows are fitted with venetian blinds and that all windows have strong shutters, hinged at the bottom of the window frame and securable in the closed position from inside the office, unless within a guarded compound;

j. all offices are capable of sustaining an internal temperature between eighteen degrees celsius (18°C) and twenty two degrees celsius (22°C)at all times;

k. all partitions are lined on both sides with fifteen (15) millimetres minimum thickness sound insulating board;

l. all internal doors are provided with mortice locks and five (5) keys each;

m. all external doors are provided with locks to BS 3621 and twenty (20) keys;

n. liquefied petroleum gas (bottled gas) is not used as a power/heat source;

o. adequate arrangements are made to dispose of waste from sinks, wash basins and WCs in accordance with all Applicable Requirements;

p. appropriate direction signs and name boards are provided, erected and maintained for the site offices and that the area of the name boards is approximately 1.8m^2 and the wording of each name board, size and location shall be subject to TfL's prior written consent (such consent not to be unreasonably withheld or delayed);

q. boot scraper, stable yard brush and heavy duty mats are provided at each site office entrance;

r. all site offices including their contents and accesses are regularly cleaned for so long as they are in use, including but not limited to, daily sweeping and washing of all floors, emptying bins, dusting and cleaning furniture and fittings and cleaning windows inside and out at least once a month;

s. ten (10) cycling racks are provided at the primary site office and six (6) cycling racks are provided at the secondary site office; and

t. colour A3 laser printing, copying and scanning facilities are provided at each site office for the exclusive use of TfL.

1.1.4 Project Co shall ensure that the primary site office for TfL shall include:

a. workspaces and desks with internet access and storage (including but not limited to, desk pedestals, cupboards and shelves) for seven (7) staff;

b. seven (7) Windows desktop computers; and

c. two (2) Windows laptop computers.

1.1.5 Project Co shall ensure that the secondary site office for TfL shall include:

a. workspace and desks with internet access and storage (including but not limited to, desk pedestals, cupboards and shelves) for three (3) staff ;

b. three (3) Windows desktop computers; and

c. three (3) Windows laptop computers.

1.1.6 Project Co shall ensure that all TfL site offices shall include:

a. high speed wireless internet access (20Mb/s minimum speed);

b. any required Windows computers connected via a private network;

c. any required Windows computers installed with all software, hardware and licences required for TfL to be able to review any information provided by Project Co in accordance with this Agreement, which shall be compatible with the use of Citrix;

d. any required computers with the latest versions of the relevant operating systems;

e. any required Windows computers with the latest version of "Microsoft Office 365" and internet security software installed; and

f. one (1) copy or licence for project planning software compatible with Project Co's construction programme software.

1.1.7 Project Co shall ensure that TfL and TfL Related Parties are provided with access to the offices and facilities referred to in this paragraph 1.1 (*Temporary Accommodation and Equipment for TfL*) at all times.

1.1.8 Project Co shall ensure that the site office and facilities, fittings and equipment shall comply with all Applicable Requirements including, without limitation, those Applicable Requirements in relation to building regulations, planning and environmental health, the Office Shops and Railway Premises Act 1963 and the Health and Safety at Work Act 1974.

1.1.9 Project Co shall provide TfL with certificates of inspection for the presence of asbestos and Legionnaires Disease in the site offices within three (3) days of erection of the site offices.

1.1.10 Project Co shall supply TfL with personal protective equipment as follows:

a. fifteen (15) high visibility breathable waterproof safety jackets with lining and hood complying with BS EN ISO 20471 (*High visibility clothing - Test methods and requirements*) Class 3;

b. fifteen (15) high visibility long sleeved vests complying with BS EN ISO 20471 (*High visibility clothing - Test methods and requirements*) Class 3;

c. fifteen (15) high visibility breathable waterproof safety trousers complying with BS EN ISO 20471 (*High visibility clothing - Test methods and requirements*) Class 3;

d. fifteen (15) thermal fleece jackets;

e. fifteen (15) white safety helmets;

f. fifteen (15) safety glasses or goggles;

g. fifteen (15) sets of noise reducing ear defenders suitable for wearing with safety helmets;

h. fifteen (15) pairs of PVC knit wrist gloves; and

i. fifteen (15) pairs of protective footwear (ankle boots) complying with BS EN ISO 20345 (*Personal Protective equipment. Safety footwear*) (two hundred (200) Joules) with penetration resistant safety mid soles and safety toe caps.

1.1.11 Project Co shall ensure that all jackets, sleeved vests and helmets supplied in accordance with paragraph 1.1.10 shall bear the TfL logo.

1.1.12 Project Co shall arrange to have items of clothing supplied in accordance with paragraph 1.1.10 cleaned as and when required by TfL.

1.1.13 Project Co shall supply TfL with the following office equipment in the site offices:

a. five (5) thirty (30) metre steel tapes;

b. twenty (20) five (5) metre steel pocket tapes;

c. two (2) tablet computers each with a camera with a minimum specification of five (5) megapixels;

d. two (2) max/min thermometers; and

e. ten (10) high intensity torches.

1.1.14 Project Co shall supply survey and measuring equipment to TfL and TfL Related Parties for use when requested and shall ensure that the survey and measuring equipment shall include those tools ordinarily required to check compliance of the Works with the D&C Requirements.

1.1.15 Project Co shall install site office telephone systems with private and exclusive lines and handsets for each workstation connected to a fixed telephone network (BT or cable) solely for the use of TfL.

1.2 Communications system for TfL

1.2.1 Project Co shall provide for TfL's use ten (10) pairs of handheld two way radios complete with mains powered chargers which shall be rugged weatherproof devices suitable for use on a construction site and capable of transmitting messages securely such that they cannot be intercepted.

1.2.2 Project Co shall ensure that the radios are capable of achieving two way communication between locations within the tunnels to all other locations across the Project Land.

1.2.3 All elements of the communication systems required to be provided by Project Co to TfL pursuant to this paragraph 1.2 (*Communications system for TfL*) shall be subject to TfL's prior consent (such consent not to be unreasonably withheld or delayed).

1.3 Information Boards

1.3.1 Project Co shall provide four (4) information boards in accordance with the requirements of Specification Appendix 1/10 developed in accordance with the requirements of Annex 5 (*Specification Appendices*) of Part 2 (*Design Standards and Specifications*) on the main road approaches to the Site, during the design and construction of the Works.

1.3.2 Project Co shall remove all information boards within twenty (20) Working Days of the Permit to Use Date.

1.3.3 Project Co shall provide and display six (6) variable message signs (**"VMS"**) for the duration of the Works to advise road users in advance of planned road works, with the locations of the VMS shall be subject to TfL's prior consent (such consent not to be unreasonably withheld or delayed).

1.3.4 Project Co shall ensure that the VMS shall have the capability to be remotely operated by LSTCC, who shall be entitled to set the required messages to be displayed.

1.4 Setting Out and Existing Ground Levels

1.4.1 Project Co shall be responsible for all setting out of the Works including the responsibility for the confirmation of ground levels and carrying out of any further surveys necessary in relation to design and construction.

1.5 Temporary Highways for Traffic

1.5.1 Project Co shall design and construct all temporary highways for traffic, including routes for non-motorised users, necessary to maintain routes and accesses in accordance with the requirements of Schedule 13 (*Network Occupancy*).

1.6 Progress Photographs

1.6.1 Project Co shall provide TfL with one (1) set of aerial progress photographs two (2) weeks prior to the commencement of construction of the Works and thereafter at six (6) monthly intervals until the Permit to Use Date.

1.6.2 Project Co shall ensure that each set of photographs provided pursuant to paragraph 1.6.1 shall comprise sufficient photographs to ensure full coverage of the Project Land at a resolution such that the impact and progress of the Works can be seen.

1.6.3 Project Co shall provide TfL with one set of ground progress photographs two (2) weeks prior to the commencement of construction of the Works and thereafter:

a. upon TfL taking possession of a particular Section of the Site; and

b. at monthly intervals, or such shorter period as is necessary to record significant progress, until the Permit to Use Date.

1.6.4 Project Co shall ensure that each set of photographs provided pursuant to paragraph 1.6.3 shall comprise sufficient photographs of Project Land to adequately record the pre-construction condition of the land, to monitor and record progress of the Works and enable comparison between sets.

1.6.5 Project Co shall ensure that all progress photographs referred to in paragraph 1.6.1 and paragraph 1.6.3 are supplied to TfL in a digital format.

1.6.6 The Parties acknowledge and agree that all copyright and intellectual property rights relating to the photographs required pursuant this paragraph 1.6 (*Progress Photographs*) shall vest in TfL.

1.6.7 Project Co shall maintain a register of all photographs taken or provided pursuant to this paragraph 1.6 (*Progress Photographs*) with locations, dates and descriptions and shall provide TfL with access to such register.

1.7 Temporary accesses to highways

1.7.1 Project Co shall ensure that all temporary accesses to/from public highways shall be surfaced in bituminous or concrete materials for a minimum distance of ten (10) metres from the highway.

2. Roadworks

2.1 Project Co shall ensure that all roadworks designed and constructed as part of the Works shall meet the following requirements:

2.1.1 alignments and visibility shall be designed for a design speed of fifty (50) kilometres per hour with appropriate transitions to the existing fifty (50) miles per hour (eighty five (85) kilometres per hour) speed limit on the A102 at Blackwall Lane Junction;

2.1.2 carriageway crossovers shall be provided near the north and south portals of the tunnel to allow movement between the northbound and southbound carriageways by emergency services and/or removal or turnaround of traffic including reserve-flow;

2.1.3 a new carriageway crossover shall be provided south of the south portal of the Blackwall Tunnel to allow movement between the northbound and southbound carriageways;

2.1.4 contra-flow will not be permitted in the tunnels;

2.1.5 the design of crossovers shall prevent unauthorised use during normal operations but allow prompt opening for emergency use when required; and

2.1.6 new and upgraded footways and footway/cycleways shall be designed in accordance with the London Cycling Design Standards and the relevant details in TfL's Streetscape Guidance.

2.2 Project Co shall design and construct the junctions listed in Table 1 (*Junction Requirements*) in accordance with the specific requirements set out in Table 1 (*Junction Requirements*).

2.3 Project Co shall ensure that the junctions are designed and constructed to accommodate the higher of the traffic flows in 2031 predicted by TfL's Traffic Model and those predicted by Project Co's traffic model.

Table 1: Junction Requirements

Location	Specific Requirements
Southern Junction with the existing A102 Blackwall Tunnel Approach. (Free flow grade separated junction between the tunnels (Blackwall and Silvertown) and the A102).	1. Realignment and widening of Blackwall Tunnel Approach northbound carriageway to four lanes north of entry slip from Blackwall Lane Junction. Two left hand lanes to lead to Blackwall Tunnel. Two right hand lanes to diverge and form the northbound approach road to Silvertown Tunnel. 2. Realignment of Blackwall Tunnel Approach southbound carriageway to pass over the northbound approach to Silvertown Tunnel on a new bridge. 3. Realignment and widening of Blackwall Tunnel Approach southbound carriageway to join new two lane egress road from Silvertown Tunnel, leading to diverge at Blackwall Lane Junction. Tie into three lane southbound

Location	Specific Requirements
	A102 and two lane southbound off slip road at Blackwall Lane Junction. 4. Provision of crossover between northbound and southbound carriageways of the Blackwall Tunnel Southern Approach. 5. Reconnection of Tunnel Avenue to provide two-way local access road between Blackwall Lane and Ordnance Crescent. 6. Realignment of Pavilion Lane to provide dedicated bus only exit slip from southbound Blackwall Tunnel to Millennium Way and bus / emergency service link from Millennium Way to Silvertown Tunnel northbound approach. 7. Stopping Up of Dreadnought Street. 8. Stopping Up of Boord Street at the A102 Blackwall Tunnel Approach. 9. Replacement of Boord Street footbridge with new foot and cycle bridge over the A102.
Northern Junction at Tidal Basin Roundabout. (Signalised, at grade junction).	1. Modification and extension of existing Tidal Basin roundabout to accommodate three lane entry from Silvertown tunnel northbound egress road and two lane entry to Silvertown tunnel southbound approach road. 2. Incorporation of 'hamburger' link for traffic approaching from A1020 Lower Lea Crossing to pass directly across the roundabout junction to the Silvertown tunnel southbound approach. 3. Incorporation of dedicated link from Silvertown Way northbound off slip to Silvertown tunnel southbound approach road. 4. Realignment of A1020 Lower Lea Crossing carriageways to join extended roundabout layout. 5. Realignment of Dock Road. 6. Provision of pedestrian and cycle routes in accordance with Drawings ST150030-ATK-ZZZ-ZZ-DRG-ZZ-4021, ST150030-ATK-ZZZ-ZZ-DRG-ZZ-4019 and ST150030-ATK-ZZZ-ZZ-DRG-ZZ-4020. 7. Signalisation of roundabout junction to accommodate all traffic movements including pedestrian and cycle phases. Signal phasing to optimise traffic flows between the tunnel and connecting roads. Signal system to have

Location	Specific Requirements
	the ability to hold traffic under emergency conditions to prevent lock up of the roundabout.

2.4 Project Co shall ensure that the design and construction of all roads required in relation to the Works shall be in accordance with the following requirements:

2.4.1 minimum lane width in the tunnel shall be as set out in paragraph 3.1.3 of Part 1 (*Design and Construction Requirements*);

2.4.2 minimum width of emergency evacuation paths in the tunnel shall be as set out in paragraph 3.1.4 of Part 1 (*Design and Construction Requirements*);

2.4.3 minimum highway carriageway and footway widths shall be of the same widths as the existing highway carriageways and footways to which they connect, except as expressly set out in paragraph 2.4.4 and paragraph 2.5; and

2.4.4 minimum highway carriageway widths shall be increased where necessary to accommodate widening at junctions, including the development of additional lanes.

2.5 Project Co shall ensure that the design and construction of the following roads, including the widths of carriageways and associated footways and cycleways, is in accordance with the requirements of Appendix C of the Design Principles, including but not limited to, the street design guidance and the indicative minimum carriageway, footway and cycleway widths set out below:

2.5.1 realigned Dock Road (carriageway seven point three (7.3) metres minimum, with two (2) metres minimum footpaths each side plus three (3) metres minimum off carriageway bi-directional cycleway on the west side);

2.5.2 realigned Tunnel Avenue (carriageway six (6) metres minimum with three (3) metres minimum shared pedestrian/cycle path on west side, except at the Brenntag Building pinch point); and

2.5.3 extended tidal basin roundabout (carriageway nine point five (9.5) metres minimum with two (2) metres minimum footway around the outer perimeter, three (3) metres minimum off carriageway bi-directional cycleway on north and west side, three (3) metres minimum shared pedestrian/cycle path on south and east side and new ten (10) metres minimum tidal basin roundabout shared foot/cycle pathway).

3. Fencing and Noise Barriers

3.1 Project Co shall ensure that temporary fencing and/or hoardings are erected to secure the Active Site against unauthorised entry.

3.2 Project Co shall ensure that the above-ground Project Facilities are protected by permanent fencing or walling, except to the extent that such fencing or walling would restrict access to any right of way or the Project Road.

3.3 Project Co shall ensure that where an existing fence or wall is to be retained and will form part of the Works, any existing gaps shall be filled with a similar style fence, wall or

boundary treatment to provide a continuous boundary and all defects in the existing fence or wall shall be rectified.

3.4 Project Co shall ensure that all fencing or walling around those elements of the Works which will form part of the Project Facilities shall be designed and constructed to take account of the sensitive asset status of the Project Facilities.

3.5 Project Co shall ensure that it complies with the following noise barrier requirements:

3.5.1 one point eight (1.8) metres high noise barriers shall be designed and constructed at the locations shown on drawing 14.6 (*Road Traffic Noise Mitigation*) in chapter 6.2 of the Environmental Statement;

3.5.2 Project Co's design for the noise barriers shall satisfy the requirements of HA65/94 and HA66/95;

3.5.3 where noise barriers are located on Structures, the noise barriers shall be incorporated into the design of the supporting Structure; and

3.5.4 the appearance and finishes of noise barriers shall be designed and constructed in accordance with the requirements of the Design Principles.

4. Road Restraint Systems

4.1 Project Co shall assess the design and construction requirements for provision of road restraint systems in accordance with the UK Roads Liaison Group document, "Provision of Road Restraint Systems on Local Authority Roads".

4.2 Project Co shall ensure that the design and construction of road restraint systems in relation to the Works shall comply with the requirements of DMRB document TD19/06 (*Requirements for Road Restraint Systems*).

4.3 Project Co shall ensure that all elements of road restraint systems designed and constructed in relation to the Works, including but not limited to barriers, parapets, transitions, terminals and crash cushion shall comply with BS EN1317 (*Road Restraint Systems*) requirements.

4.4 Project Co shall not use rope/wire systems, rectangular hollow section systems, tensioned corrugated beam systems and open box beam systems in relation to any road restraint systems designed and constructed in relation to the Works.

4.5 Project Co shall ensure that all posts for road restraint systems shall be designed and constructed with socketed foundations or be surface mounted.

4.6 Project Co shall ensure that surface mounted posts shall be in male/female connector bolts.

4.7 Project Co shall not use any driven posts in relation to road restraint systems.

4.8 Project Co shall carry out loading tests on post foundations used in road restraint systems to ensure compliance with the manufacturer's specification.

4.9 Project Co shall continue any works to existing parapets to a point of suitable transition to adjacent road restraint systems.

4.10 Project Co shall ensure that the Design Data submitted in accordance with the Review Procedure for the design of the road restraint systems required pursuant to this paragraph 4 (*Road Restraint Systems*) submitted to TfL under the Review Procedure includes the following information:

4.10.1 Project Co's assessment of road restraint systems requirements in accordance with the requirements of paragraph 4.1;

4.10.2 BS EN1317 compliance documentation for the road restraint system to be inclusive of:

a. manufacturer videos of testing undertaken in accordance with BS EN1317-5 (*Road restraint systems. Product requirements and evaluation of conformity for vehicle restraint systems*) requirements; and

b. installation specification from manufacturer.

5. Drainage Systems

5.1 General Drainage Requirements

5.1.1 Project Co shall design and construct drainage systems in accordance with the requirements of this paragraph 5 (*Drainage Systems*) and in respect of the following locations:

a. inside the tunnel;

b. "Highways Zone 1", being the Project Roads outside of the tunnel; and

c. "Highways Zone 2", being other roads and areas outside of the tunnel.

5.1.2 Project Co shall additionally design and construct drainage systems inside the tunnel in accordance with the requirements of paragraph 5 (*Tunnel pumped drainage system*) of Annex 2 (*Requirements for Tunnel ME&P Systems*).

5.1.3 Project Co shall inspect all existing drainage structures that it proposes to retain as part of the Works within the Order Limits and assess the structural adequacy of each in accordance with Annex 4 (*Existing Structures*)and Project Co shall either remedy any inadequacies in the assessed structural capacity or provide a replacement structure.

5.1.4 Project Co shall:

a. where technically feasible, design and construct the drainage systems in Highways Zone 2 to discharge to separate outfalls to that for the tunnel and Highways Zone 1;

b. where it is not technically feasible, Project Co shall design and construct the drainage systems in the tunnel and Highways Zone 1 with capacity to accept flows from areas in Highways Zone 2 that do not drain to separate outfalls.

5.1.5 Project Co shall carry out a hydraulic modelling analysis of Project Co's drainage systems including any proposed continued use of existing drainage. Project Co shall ensure that the design for hydraulics is undertaken using industry standard hydraulic software capable of carrying out full hydrodynamic unsteady flow analysis.

5.1.6 Project Co shall produce modelling information in tabular and visual format relating to the following for events that are modelled:

a. flooding volume m^3;

b. flooding area m^2;

c. average depth m; and

d. maximum depth m.

5.1.7 Where the hydraulic modelling analysis indicates there is potential for surface water run-off to build up, Project Co shall ensure that appropriate road alignment geometry, including cambers and cross falls are co-ordinated with suitable positioning of receptor points to minimise and mitigate the undesired surface water run-off.

5.1.8 Project Co shall ensure that the proposed carriageway surface does not introduce dangerous conditions to traffic and should provide safe passage to Users on the approaches and within the tunnel to reduce the likelihood of accidents related to skid resistance and aquaplaning.

5.1.9 Project Co shall ensure that the Design Data submitted in accordance with the Review Procedure for the design of the drainage systems required pursuant to this paragraph 5 (*Drainage Systems*), includes but is not limited to:

a. documentation of all drainage assets in the area and asset ownership;

b. the result of an inspection of existing asset and condition reporting in line with IAN 147/12 (*Drainage Surveys and Data*);

c. hydraulic modelling in accordance with the requirements of paragraph 5.1.5 and paragraph 5.1.6;

d. drainage layouts including collection, carrier systems, storage/attenuation and outfalls; and

e. standard details.

5.1.10 Project Co shall ensure that all drainage systems required pursuant to this Agreement shall be designed and constructed in accordance with the following criteria:

a. inside the tunnel: one (1) in two hundred (200) year event run-off, with no flooding due to surcharge occurring within the tunnel for a one (1) in one hundred and fifty (150) year event;

b. highways zone 1: one (1) in one hundred (100) year event with no flooding due to surcharge occurring in a one (1) in one hundred (100) year event; and

c. highways zone 2: one (1) in thirty (30) year event with no flooding due to surcharge occurring in a one (1) in thirty (30) year event.

5.1.11 Project Co shall ensure that the Design Data submitted in accordance with the Review Procedure for the design of the drainage systems shall include

allowances for climate change so that the tunnel and ME&P equipment is protected against the risk of inundation from pluvial flood events with a return period of one (1) in two hundred (200) years, assuming an additional thirty per cent (30%) for climate change through to the year 2115 applied in line with Annex B of the Planning Policy Statement 25, published by HMSO 2010.

5.1.12 Project Co shall ensure that the Design Data submitted in accordance with the Review Procedure relating to pluvial flooding for the drainage systems shall be prepared in conjunction with Project Co's flood risk assessment against fluvial and tidal flooding required to be undertaken pursuant to the Transferred DCO Functions.

5.1.13 Project Co shall ensure that within the piped systems designed and constructed in relation to the Works a minimum velocity of one (1) metre per second shall be maintained and that the maximum velocity at peak flow shall be limited to three (3) metres per second or six (6) metres per second where a continuous, smooth, durable, and abrasion resistant pipe, such as ductile iron, is installed and all junctions, bends and manholes are designed with erosion protection against the higher velocity.

5.1.14 Project Co shall ensure that all new drainage systems in Highways Zone 1 shall be designed and constructed to have hydraulic capacity such that the system is flowing at no more than seventy per cent (70%) of the full depth when conveying the total design peak flow rate.

5.1.15 Project Co shall ensure that pipes with less than one point two (1.2) metres cover in Highways Zone 1 have strengthened bed and surround to mitigate the risk of failure and that in these instances the minimum criterion for the pipe installation shall be able to withstand a point load 50KN.

5.1.16 Project Co shall ensure that any manholes located in road carriageways are positioned to avoid wheel paths.

5.2 Retention, Attenuation and Storage

5.2.1 Project Co shall design and construct retention, attenuation, storage and pumping facilities to ensure the operation of the drainage systems in all flood events.

5.2.2 Should the design proposed by and/or constraints imposed on Project Co require drainage attenuation to manage the discharge of storm flows generated by the relevant critical design storms, Project Co shall design and construct storage solutions to adoptable standards under section 104 of the Water Industry Act 1991.

5.2.3 Project Co shall design and construct storage tanks so as to have a one hundred and twenty (120) year design life and to facilitate safe and efficient access for inspection and cleaning with effective treatment and sediment removal located upstream of the tanks to minimise cleaning requirements.

5.3 Pipes

5.3.1 Project Co shall design and construct intervention trap inceptors to contain spillages of up to 20 m^3.

5.3.2 Project Co shall ensure that all kerb drainage systems designed and constructed in relation to the Works shall have inspection and maintenance access points at a frequency no greater than twenty five (25) metres.

5.3.3 Project Co shall ensure that slots in kerbs drainage systems designed and constructed in relation to the Works shall be less than fifty (50) millimetres width and one hundred (100) millimetres height.

5.3.4 Project Co shall ensure that a two hundred and fifty (250) millimetre wide warning mesh (Plyage HR 40D warning mesh or similar) is installed above new drainage assets designed and constructed in relation to the Works.

5.3.5 Project Co shall ensure that all pipes designed and constructed in relation to the Works shall comply with the materials and standards set out in Table 2 (*Standard for the material selection through the various zones*):

Table 2: Standard for the material selection through the various zones

Zone	Drainage pipe Material	Standard
Inside the tunnel	Ductile Iron	BS EN 598:2007 (*Ductile iron pipes, fittings, accessories and their joints for sewerage applications. Requirement's and test methods*)
Highways Zone 1	Ductile Iron	BS EN 598:2007 (*Ductile iron pipes, fittings, accessories and their joints for sewerage applications. Requirement's and test methods*)
Highways Zone 2	Vitrified clay (VC)	BS EN 295-1:2013 (Vitrified clay pipe systems for pipes, fittings and joints) and BS 65 (*Specification for vitrified clay pipes, fittings, joints and ducts*)
Highways Zone 2	Vitrified clay jacking	BS EN 295-7:2013 (*Vitrified clay pipe systems for drains and sewers. Requirements for pipes and joints for pipe jacking*)
Highways Zone 2	Concrete (with Portland Cement Sulphate- Resisting. Super-sulphated cement shall not be used).	BS 5911-1:2002+A2:2010 (*Concrete pipes and ancillary concrete products. Specification for unreinforced and reinforced concrete pipes and fittings with flexible joints*), BS EN 1916:2002 (*Concrete pipes and fittings, unreinforced, steel fibre and reinforced*) and BS 5911-5: 2004+A1:2010 (*Concrete pipes and ancillary concrete products. Specification for prestressed non-pressure pipes and fittings with flexible joints*)

5.4 Chambers, Manholes and Catchpits

5.4.1 Chambers, Manholes and Catchpits

a. Project Co shall ensure that all chambers, manholes and catchpits designed and constructed in relation to the Works shall be in precast concrete and compliant with BS EN 1917:2002 (*Concrete manholes and inspection chambers, unreinforced, steel fibre and reinforced*) and BS 5911-3:2010+A1:2014 (*concrete pipes and ancillary concrete products. Specification for unreinforced and reinforced concrete manholes and soakaways*) or brick in accordance with paragraph 5.4.10 and paragraph 5.4.11.

b. Project Co shall size access type chambers to take account of adequate working room for maintenance activities.

5.4.2 Backdrops

a. Project Co shall ensure that where backdrops are required in relation to the Works they will be located within the chamber referred to in paragraph 5.4.1.

5.4.3 Break Tanks

a. Project Co shall ensure that any break tanks designed and constructed in relation to the Works shall be of a closed vessel type with a tightly fitting access cover over the chamber, and positioned to permit routine maintenance for inspection and regular cleaning.

5.4.4 Chamber, Manhole and Catchpit Covers

a. Project Co shall ensure that all access covers and frames designed and constructed in relation to the Works shall:

i. be made of non-malleable spheroidal graphite cast iron (ductile iron) grade 500/7 in accordance with BS EN 1563:2011;

ii. have a minimum classification of E600 in the wheel path and D400 for all other installations in the carriageway;

iii. have product conformity certificates to BS EN 124 that are issued by a UKAS accredited certification body;

iv. be tested by a UKAS accredited or UKAS accepted third-party organisation that has BS EN 124 within its scope;

v. bear visible, durable and integral markings required by Chapter 9 of BS EN 124;

vi. achieve silence in operation performance by means of a double triangular covers system, based on the three point suspension principle;

vii. have frames for gully grates tops and chamber tops a minimum of one hundred and fifty (150) millimetres deep;

viii. have bedding flanges with a minimum thickness of five (5) mm at any point along its horizontal surface;

ix. have stiffening webs/gussets located adjacent to seating;

x. have an increased flange width by the load bearing, seating areas on all four corners to assist with the distribution of stress into the bedding mortar and Project Co shall ensure that FEA data is supplied to TfL, showing the distribution of stress around the flange, along with maximum stress levels and areas of high stress;

xi. for systems that do not have a load distribution system the nominal bearing pressure in relation to the test load described in BS EN 124 should not exceed 1.3 N/mm² when assuming a D400 load. Project Co shall ensure that the bearing pressure in relation to the test load described in BS EN 124 for systems with load distribution flange designs must not exceed 1.9N/mm2;

xii. calculate the bearing pressure with the assumption that the chamber is 610x610mm (24"²);

xiii. have a raised pattern no less than four (4) millimetres and with an independently tested and verified ≥PSRV68 when tested in accordance with BS 9124;

xiv. have an upper surface with a defined raised pattern comprising a surface area of no less than ten per cent (10%) of the total surface area of the combined covers;

xv. not have single level raised surface such as lettering, logos or linear features and patterns greater than seventy two (72) millimetres in length. In addition the cover shall have no area ≥23mmx85mm without a minimum of two (2) vertical (±5°) edges, leading to a change in height of ≥4mm perpendicular (±45°) to the eighty five (85) millimetre length. The Parties acknowledge and agree that an area twenty three (23) millimetres inside the periphery of the frame shall be excluded from this test;

xvi. have bedding material selected in accordance with the requirements of paragraph 6.1 of the "Chapter 6 Bedding Materials" of the Highway England Guidance Note HA104/09 "Chamber Tops and Gully Tops For Road Drainage & Services: Installation & Maintenance" and exhibiting the following properties:

(a) the material should have a minimum workable life of fifteen (15) minutes;

(b) the compressive strength of the material should exceed thirty (30) MPa in one (1) hour;

(c) the tensile strength of the material should exceed five (5) MPa in three (3) hours ; and

(d) the material must be capable of being used in all weather conditions with the above results;

xvii. have anti-skid performance compliant with the requirements of Paragraph 3.4 of Chapter 3 of HA104/09, and more particularly:

(a) achieve a >PSRV70 when tested and third party verified in accordance with the method described in BS 9124;

(b) have an independently proven in service >PSRV70; and

(c) comprise of a factory applied anti-skid treatment, in which the process is audited and compliant with the requirements of ISO 9001 Quality Management Systems;

xviii. for hinged solutions include features as standard that allow safe and efficient man entry to below ground assets for inspection and maintenance purposes. Project Co shall ensure that each cover section shall be independently hinged and will be one (1) man-operable, by means of single standard heavy duty lifting key and that all keyways shall be compliant to BS 7903;

xix. for hinged covers be fitted with a system to prevent them from opening not less than ninety degrees (90°) and beyond one hundred and ten (110°) with a blocking feature to prevent accidental closure;

xx. have hinged cover sections designed according to the master/slave principle, where the master cover is operated prior to the slave covers when opening; and

xxi. for water ingress sealed units, be compliant with Class 3 of the Thames water leak tightness test. Evidence is required to show that infiltration rate does not exceed 0.4l/m² per thirty (30) minutes.

5.4.5 Project Co shall design and construct anti-terrorist lockable tamper proof covers inside the tunnel and highways zone 1 which shall not be capable of being opened using objects readily available to the general public.

5.4.6 Project Co shall ensure that such anti-terrorist systems are fully compliant and certified in accordance with SR3 of the Loss Prevention Certification Board standard LPS 1175 issue 7 (*Loss Prevention Standard*) and are independently audited and verified by the Physical Security Certification Team of the Building Research Establishment.

5.4.7 Project Co shall ensure that all gully pots designed and constructed in relation to the Works shall be in precast concrete compliant with BS EN 1917:2002 (*Concrete manholes and inspection chambers, unreinforced, steel fibre and reinforced*) and BS 5911-3:2010 +A1:2014 (*concrete pipes and ancillary concrete products. Specification for unreinforced and reinforced concrete manholes and soakaways*).

5.4.8 Project Co shall ensure that gully grates and frames designed and constructed in relation to the Works are fully compliant with the requirements of HA 104/09 (Chamber Tops and Gully Tops for Road Drainage & Services: Installation and Maintenance.

5.4.9 Project Co shall ensure that debris gaskets are installed at chambers, manholes and catchpits to prevent stones and foreign matter preventing the normal operation of the cover.

5.4.10 Project Co shall ensure that where bricks are utilised for chambers in accordance with paragraph 5.4.1, they shall be constructed of double-skinned two hundred and fifteen (215) millimetres wide class A solid engineering brick and that:

a. the bond is staggered between stretchers and headers in each row to reduce the risk of ingress/egress of flows and subsequent premature structural failure;

b. pointing shall be properly filled with mortar and flush type to prevent build up of debris and ensure water tightness; and

c. mortar shall be class 1 with non-shrink properties, water tight and not subject to deterioration from the effects of frost.

5.4.11 Project Co shall ensure that any brickwork used pursuant to the provisions of this paragraph 5.4 (*Chambers, Manholes and Catchpits*) is corbelled to a maximum of fifteen (15) millimetres per courses, limited to four courses, except for chambers located within the tunnel, approaches, junctions or heavily traffic wheel tracked areas.

5.4.12 Project Co shall ensure that the minimum chamber opening for any chambers designed and constructed in relation to the Works shall be six hundred and seventy five (675) millimetres and rocker pipes/joints shall be installed at inlet and outlets.

5.5 Pumping Stations and Pumping Mains

5.5.1 Project Co shall ensure that pollutants from spills are not pumped into the water quality basins and shall be collected and taken to appropriate off-site disposal depots.

5.5.2 Project Co shall ensure that all pumping stations, including but not limited to those designed and constructed in accordance with the requirements of Annex 2 (*Requirements for Tunnel ME&P Systems*), are fitted with hydrocarbon gas detectors and an analyser system to provide an automatic alarm when flammable or explosive gases are present in the drainage system.

5.5.3 Project Co shall ensure that adequate space is provided at pumping stations for the parking of maintenance staff vehicles and service vehicles and to allow for the turning of vehicles.

5.6 Thrust Blocks

5.6.1 Project Co shall ensure that concrete thrust blocks are designed and constructed at locations where pipes need to be restrained against movement under pressure.

5.6.2 Project Co shall design and construct all thrust blocks in relation to the Works in accordance with Construction Industry Research and Information Association (CIRIA) Report 128 (*Guide to the design of thrust blocks for buried pressure*

pipelines) having regard to pipeline thrusts developed during pipeline testing, operation and surge pressures.

5.6.3 Project Co shall ensure that thrust blocks are designed and constructed at each tee-junction, bend, end cap, at both ends of a sluice valve chamber, abrupt change in vertical or horizontal alignment and duck foot fittings.

5.6.4 Project Co shall ensure that support blocks are designed and constructed where pipes are laid above ground in relation to the Works.

5.6.5 Project Co shall ensure that the design of supports and joints should allow for longitudinal movements due to thermal effects and thrusts due to internal pressure.

5.7 Valves and hydrants

5.7.1 Project Co shall ensure that all valves designed and constructed in relation to the Works are right hand (clockwise) close only and compliant with BS 750:2012 (*Specification for underground fire hydrants and surface box frames and covers*).

5.7.2 Project Co shall ensure that all hydrants designed and constructed in relation to the Works are to the required standard in BS EN 1074-6:2008 (*Valves for water supply, Fitness for purpose requirements and appropriate verification tests. Hydrants*) and have stainless steel outlets and an automatic frost valve.

5.7.3 Project Co shall ensure that all valves and hydrants designed and constructed in relation to the Works are capable of operating such that no water shall escape during their operation and the body shall fully drain afterwards.

5.7.4 Project Co shall ensure that valve and hydrant joints can withstand a 1.5 factor of safety against the maximum design pressure.

6. Earthworks

6.1 General

6.1.1 Project Co shall ensure that any earthworks designed and constructed in relation to the Works shall:

a. comply with DMRB Volume 4 "Geotechnics and Drainage";

b. demonstrate durable, sustainable and ethically sourced materials; and

c. use materials which comply with Specification Appendix 6/1 (*Requirements for Acceptability and Testing etc of Earthworks Materials*) developed in accordance with the requirements of Annex 5 (*Specification Appendices*) of Part 2 (*Design Standards and Specifications*).

6.2 Recycled Aggregate

6.2.1 Project Co shall ensure that any use of recycled aggregate in relation to the Works shall comply with BS EN 13242 (*Aggregates for unbound and hydraulically bound materials for use in civil engineering work and road construction*).

6.2.2 Project Co shall ensure that any recycled aggregate used in relation to the Works is tested in accordance with SHW Clause 710 (*Testing for constituent materials in recycled coarse aggregate and recycled concrete aggregate*) and shall not contain more than one per cent (1%) other materials (Class X), fifty per cent (50%) in Class Ra (bituminous materials) and twenty five per cent (25%) in Class Rg (crushed glass).

6.2.3 Project Co shall ensure that recycled aggregate used in relation to the Works (except recycled asphalt) is tested in accordance with SHW Clause 710 and shall not contain more than one per cent (1%) other materials (Class X), one per cent (1%) in Class Ra (bituminous materials) and five per cent (5%) in Class Rg (crushed glass).

6.3 Sulfate Requirements

6.3.1 Project Co shall ensure that any fill used adjacent to concrete, cement bound materials, other cementitious mixtures or stabilised capping used in relation to the Works shall comply with the following requirements:

a. water-soluble sulfate (WS) content, BS EN 1744-1 (*Tests for chemical properties of aggregates. Chemical analysis*) clause 10, ≤ 1500 mg of sulfate (as SO4) per litre;

b. total sulfur (TS) content, BS EN 1744-1 (*Tests for chemical properties of aggregates. Chemical analysis*) clause 11, ≤ one per cent (1%) for aggregates other than air cooled blast furnace slag or two per cent (2%) for air cooled blast furnace slag; and

c. either:

i. when described in accordance with BS EN 932-3 (*Tests for general properties of aggregates. Procedure and terminology for simplified petrographic description*) and BS EN 13242 (*Aggregates for unbound and hydraulically bound materials for use in civil engineering work and road construction*) Annex A, limestone, chalk, dolomite, blast furnace slag, steel slag or crushed concrete are predominant; or

ii. the sulfide content, BS EN 1744-1 (*Tests for chemical properties of aggregates. Chemical analysis*) Clause 13, < 0.5% (as SO4).

6.3.2 Project Co shall ensure that any fill used adjacent to metallic structural elements in relation to the Works shall comply with the following requirements:

a. water-soluble sulfate (WS) content, BS EN 1744-1 (*Tests for chemical properties of aggregates. Chemical analysis*) Clause 10, ≤ three hundred (300) mg of Sulfate (as SO4) per litre;

b. total sulfur (TS) content, BS EN 1744-1 (*Tests for chemical properties of aggregates. Chemical analysis*) Clause 11, expressed as (S) ≤ one per cent (1%) for aggregates other than air cooled blast furnace slag or two per cent (2%) for air cooled blast furnace slag; and

c. either:

i. when described in accordance with BS EN 932-3 (*Tests for general properties of aggregates. Procedure and terminology for simplified petrographic description*) and BS EN 13242 (*Aggregates for unbound and hydraulically bound materials for use in civil engineering work and road construction*) Annex A, limestone, chalk, dolomite, blast furnace slag, steel slag or crushed concrete are predominant; or

ii. the sulfide content, BS EN 1744-1 (*Tests for chemical properties of aggregates. Chemical analysis*) Clause 13, < 0.06% (as SO4).

6.4 Other Requirements

6.4.1 Project Co shall ensure that where pulverised-fuel ash is used in relation to the Works, for each consignment, Project Co shall promptly make available to TfL a record of the type and source from which it was obtained and a certificate of results of tests showing that the material complies with the requirements of Table 6/1 of Specification Appendix 6/1 developed in accordance with the requirements of Annex 5 (*Specification Appendices*) of Part 2 (*Design Standards and Specifications*).

6.4.2 Project Co shall comply with the environmental requirements for the processing of Class U1B material in relation to the Works, as set out in Specification Appendix 6/1 developed in accordance with the requirements of Annex 5 (*Specification Appendices*) of Part 2 (*Design Standards and Specifications*) in the earthworks Class for which the processed material is to be used.

6.4.3 Project Co shall ensure that in the case of unacceptable material (Class U1B and Class U2) used in relation to the Works, Project Co shall comply with any specific requirements for disposal described in Specification Appendix 6/2 developed in accordance with the requirements of Annex 5 (*Specification Appendices*) of Part 2 (*Design Standards and Specifications*).

6.4.4 Project Co shall ensure that all capping in relation to the Works shall be designed and constructed with Class 6F1, 6F2, 6F3, 6F4, 6F5, 6S, 9A, 9B, 9C, 9D, 9E or 9F material as required or permitted in Specification Appendix 6/7 developed in accordance with the requirements of Annex 5 (*Specification Appendices*) of Part 2 (*Design Standards and Specifications*) and complying with Table 6/1 of Specification Appendix 6/1 developed in accordance with the requirements of Annex 5 (*Specification Appendices*) of Part 2 (*Design Standards and Specifications*).

6.4.5 Project Co shall ensure that imported topsoil (Class 5B material) shall only be imported when required in Specification Appendix 6/8 developed in accordance with the requirements of Annex 5 (*Specification Appendices*) of Part 2 (*Design Standards and Specifications*) or Specification Appendix 30/6 developed in accordance with the requirements of Annex 5 (*Specification Appendices*) of Part 2 (*Design Standards and Specifications*).

6.4.6 Project Co shall ensure that fill for reinforced soil structures used in relation to the Works shall, except for their associated drainage layers, be of Class 6I, 6J, 7B, 7C or 7D selected materials complying with Table 6/1 of Specification Appendix 6/1 developed in accordance with the requirements of Annex 5 (*Specification Appendices*) of Part 2 (*Design Standards and Specifications*).

6.4.7 Project Co shall ensure that fill for anchored earth structures used in relation to the Works shall, except for their associated drainage layers, be of 6I or 6J selected material complying with Specification Appendix 6/1 developed in accordance with the requirements of Annex 5 (*Specification Appendices*) of Part 2 (*Design Standards and Specifications*).

6.5 Testing

6.5.1 Unless otherwise set out in this Agreement, Project Co shall ensure that any sampling and testing of earthworks materials used in relation to the Works is carried out in accordance with BS 1377: Part 1 to Part 9 inclusive (*Methods of test for soils for civil engineering*).

7. Road Pavements

7.1 Road Pavements

7.1.1 Project Co shall, as a minimum, design and construct road pavements for the Project Roads in accordance with the provisions of this paragraph 7 (*Road Pavements*) and taking into account the Residual Life requirements in Schedule 19 (*Handback Requirements*).

7.1.2 Project Co shall ensure that Project Co's forecasts for traffic loading for design and construction of road pavements are, as a minimum, based on assessments carried out in accordance with the requirements of DMRB document HD 24/06 (*Traffic Assessment*).

7.1.3 Project Co's assessment of traffic loading growth required pursuant to paragraph 7.1.2 shall, as a minimum, be based on forecasts from the TfL Traffic Model.

7.1.4 Project Co's forecasts for traffic loading required pursuant to paragraph 7.1.2 shall, as a minimum, be based on TfL's average annual daily traffic (**"AADT"**) for heavy goods vehicles (**"HGV"**) in the year 2021 set out in Table 3 (AADT for HGV in 2021) (the classification of vehicle types in the TfL traffic counts does not correspond exactly with the classification of vehicle types in HD24/06. For the design of pavements in relation to the Additional Assets, all commercial vehicles classified by TfL as Heavy Goods or HGVs are OGV2, and OGV2s comprise forty per cent (40%) of the total commercial vehicle flows):

Table 3: AADT for HGV in 2021

Key Surrounding Roads	Northbound	Southbound
A102 (north of Blackwall / Silvertown split)	1258	1255
A102 (south of Blackwall / Silvertown split)	1439	1685
Silvertown Tunnel (north of Blackwall / Silvertown split)	344	479
Lower Lea Crossing	232	251
Leamouth Road	513	406

7.1.5 Project Co shall ensure that the Design Data submitted to TfL in accordance with the Review Procedure in relation to the design of the road pavements for Project Roads required pursuant to this paragraph 7.1 (*Road Pavements*) shall include:

a. Project Co's forecast of traffic loading and growth calculated in accordance with paragraph 7.1.1 to paragraph 7.1.4;

b. Project Co's initial pavement construction details, including materials and layer thickness; and

c. Project Co's proposed strategy and programme of major pavement maintenance and renewal.

7.1.6 Project Co shall investigate all existing road pavements forming part of the TLRN or Local Borough networks within the Order Limits that are intended to remain as trafficked road pavements, including those to be overlaid and/or resurfaced, in accordance with DMRB document HD 29/08 (*Pavement Maintenance Assessment*) and HD 30/08 (*Maintenance Assessment Procedure*).

7.1.7 Following the investigation required pursuant to paragraph 7.1.6, Project Co shall identify and evaluate the following in order to inform Project Co's road pavement designs:

a. existing construction details (depths, layers, materials);

b. the condition of each layer;

c. foundation stiffness and California Bearing Ratio percentage; and

d. areas of differing construction.

7.1.8 Project Co shall design any areas of new pavement construction in the Additional Asset Areas with a design life of forty (40) years.

7.1.9 Project Co shall design areas of pavement in the Additional Asset Areas that involve overlaying or resurfacing of existing road pavements for a minimum design life of twenty (20) years.

7.1.10 Project Co shall design surface courses for pavements in the Additional Asset Areas for a minimum life of ten (10) years.

7.1.11 The following vehicle wear factors are to be used in the calculation of Design Traffic:

a. for new highway pavements the New Wn from HD 24/06 Table 2.3 should be used;

b. for existing highway pavements the Maintenance Wm from HD 24/06 Table 2.3 should be used.

7.2 Foundations

7.2.1 Project Co shall design and construct road pavement foundations in relation to the Works in accordance with Interim Advice Note 73/06 (*Design Guidance for Road Pavement Foundations*).

7.2.2 Project Co shall ensure that all road pavement foundations are designed and constructed to a minimum of Class 3 and Project Co shall not use restricted foundation designs as defined in IAN 73/06 (*Design guidance for road pavement foundations*). The parties acknowledge and agree that the use of unbound sub-base (or Class 2 foundation) is acceptable for pavement construction in relation to the Additional Assets to enable continuity of sub-surface drainage when tie-ing up with existing pavement.

7.2.3 Project Co shall ensure that for all new road pavement construction in relation to the Works the engineering fill to subgrade shall achieve a California Bearing Ratio value of at least fifteen per cent (15%).

7.3 Pavement Design

7.3.1 Project Co shall design and construct road pavements in relation to the Works in accordance with DMRB document HD 26/06 (*Pavement Design*).

7.3.2 In relation to road pavements that are Additional Assets or Supplementary Works, Project Co shall not use jointed reinforced/unreinforced concrete (JRC/URC) construction or flexible composite construction.

7.3.3 In relation to road pavements that are not Additional Assets or Supplementary Works, Project Co shall be entitled to use:

a. JRC/URC construction;

b. flexible composite construction; and/or

c. fully flexible and fully rigid construction,

but Project Co shall not be entitled to use Roller Compacted Concrete (RCC).

7.3.4 Project Co shall ensure that road pavement materials used in relation to the Works conform to the requirements of Specification for Highway Works clause series 800, 900 and 1000.

7.3.5 Project Co shall only use cement bound granular material (CBGM) to Specification for Highway Works clauses 821, 822 and 823 as a sub-base material for any pavements designed and constructed in relation to the Works.

7.3.6 Project Co shall only use hot rolled asphalt as a binder course (pursuant to Specification for Highway Works clause 943) for any pavements designed and constructed that are Additional Assets or Supplementary Works, in accordance with the requirement for IAN96/07r1. Project Co shall be entitled to use hot rolled asphalt as a base course or a binder course (pursuant to Specification for Highway Works clause 904 and 943) for any pavements designed and constructed that are not Additional Assets or Supplementary Works.

7.3.7 Project Co shall ensure that asphalt mixtures used in relation to the Works conform to the requirements of BS EN 13108 (*Bituminous mixtures. Material specifications. Asphalt concrete*) and are constructed in accordance with the requirements of BS EN 594 987 (*Asphalt for roads and other paved areas - Specification for transport, laying, compaction and product-type testing protocols*).

7.4 Pavement Design - Surface Courses

7.4.1 Project Co shall ensure that any surface courses used in relation to the Works are designed and constructed in accordance with the requirements of DMRB Volume 7 Section 5 HD 36/06 (*Surfacing materials for new and maintenance construction*), HD 37/99 (*Bituminous surfacing materials and techniques*), HD 38/16 (*Concrete surfacing and materials*), IAN 154/12 (*Revision of SHW Clause 903, Clause 921 and Clause 942*), IAN 156/16R1 (*Revision of permitted surface course options and aggregate specification for pavement surfacing*) and IAN 157/11 (*Thin surface course systems - installation and maintenance*).

7.4.2 Project Co shall ensure that any new surface courses designed and constructed in relation to the Works shall comply with DMRB document HD 28/15 (*Skidding Resistance*), IAN156/16R1 and have adequate skid resistance for the relevant site category and characteristic skid coefficient investigatory level. The minimum polished stone value for the investigatory level shall be derived from IAN156/16R1.

7.4.3 Project Co shall ensure that any high friction surfacing used in relation to the Works shall be cold applied.

7.4.4 Project Co shall ensure that surfacing materials used in relation to the Works achieve high fuel resistance in accordance with the requirements of BS EN 12697-43 (*Bituminous mixtures. Test methods for hot mix asphalt. Resistance to fuel*).

7.4.5 Project Co shall ensure that the asphalt layers used in relation to the Works where a waterproofing system is implemented shall have a maximum void content of four per cent (4%) and all other asphalt mixtures used in relation to the Works shall be in accordance with SHW Series 900, BS EN 594987 and PD 6691.

7.4.6 Project Co shall not use porous asphalt but may use grouted macadam as surface course in relation to the Works.

7.4.7 Project Co shall ensure that the surfacing materials used in relation to the Works are low noise in service and perform to the following requirements of IAN 154/12:

a. Noise Level 2 for pavements designed and constructed that are Additional Assets or Supplementary Works; and

b. Noise Level 1 for pavements designed and constructed that are not Additional Assets or Supplementary Works

7.4.8 Not used.

7.4.9 Project Co shall design and construct longitudinal and transverse tie-ins between existing and new pavements to ensure that:

a. longitudinal joints are not located in wheel paths for any pavement layers;

b. drainage paths between the existing and new pavement are maintained; and

c. the thickness of the bound layers of the new pavement shall match the existing.

7.4.10 Project Co ensure the Design Data submitted in accordance with the Review Procedure in relation to the design for road pavement longitudinal and transverse tie-ins required pursuant to this paragraph 7.4 (*Pavement Design – Surface Courses*) includes cross-section details at twenty five (25) metre intervals to indicate tie-in details.

8. Street Lighting

8.1 Lighting Columns

8.1.1 Project Co shall ensure that the fixing of lighting columns in relation to the Works into the ground shall be undertaken by planting the column or, if Project Co can demonstrate to TfL's reasonable satisfaction that this is technically unfeasible, retention sockets or flanges shall be used.

8.1.2 Project Co shall ensure that columns used pursuant to paragraph 8.1.1 are capable of supporting a standard traffic sign with a surface area no greater than 0.5m2 (in accordance with TfL's Streetscape Guidance) and additionally capable of supporting a double arm bracket with a total luminaire weight of no more than forty five (45) kg.

8.1.3 Project Co shall ensure that columns used pursuant to paragraph 8.1.1 shall be designed and constructed to withstand environmental factors to the standards required by BS EN 40-3 (*Lighting columns. Design and verification. Verification by testing.*), PD 6547 (*Guidance on the use of BS EN 40-3-1 (Lighting columns. Design and verification. Specification for characteristic loads.*) and BS EN 40-3-3 (*Lighting columns. Design and verification. Verification by calculation.*).

8.1.4 Where any element of Project Co's design requires lighting columns to carry higher loading, such as where traffic signals are to be mounted or where large banners/hanging baskets are to be mounted, Project Co shall ensure the Design Data submitted in accordance with the Review Procedure in relation to the lighting design submissions includes such specification proposals.

8.1.5 Project Co shall ensure that the standard corrosion protection system for steel lighting columns shall be in accordance with Specification for Highway Works Series 1900 Protection of Steelwork against Corrosion system G2a and the surface appearance and thickness shall be in accordance with BS EN ISO 1461 (*Hot dip galvanized coatings on fabricated iron and steel articles. Specifications and test methods*).

8.1.6 Project Co shall ensure that all lighting columns designed and constructed in relation to the Works shall comply with the following requirements:

a. be stepped tubular and of seamless construction;

i. for steel columns, this shall be achieved from columns being manufactured using the roll forming process (BS EN 40-5:2002 (*Lighting columns. Requirements for steel lighting columns*)); and

ii. for aluminium columns, this shall be achieved by using the single piece extrusion method (BS EN 40-6:2002 (*Lighting columns. Requirements for aluminium lighting columns*));

b. be supplied with flush-fitting doors;

c. all flush-fitting doors shall be earthed with a minimum of 4mm2 flexible or similar earth cable;

d. all standard or bespoke lighting columns shall be either galvanised steel or aluminium and be in accordance with TfL's Streetscape Guidance;

e. all steel columns shall be coloured black (RAL 9005) or signal grey (RAL 7004) unless otherwise agreed with TfL's prior consent (such consent not to be unreasonably withheld or delayed);

f. all steel columns shall be either painted or thermoplastic coated using a performance polymer coating "PPA 571 ES" or equivalent to the internal/external surface of the column and door including rear and to a minimum dry film thickness of four hundred (400) microns;

g. aluminium columns shall be left bare or anodised;

h. columns mounted on bridge parapets or in any locations where if the door could cause harm or be lost if dropped are to be fitted with a door-retaining device;

i. any steel wire or chain shall be galvanised;

j. the bottom of the door opening shall not be less than four hundred (400) mm above ground level;

k. all door locks to have a retaining nut to prevent the loss of locking mechanism;

l. all lighting columns shall carry an identification label that shall be displayed within the base compartment on a durable label affixed to the column backboard and the information shown shall be in accordance with BS EN 40-5:2002 (*Lighting columns. Requirements for street lighting columns.*) which shall include:

i. manufacturer;

ii. part number/product code;

iii. year of manufacture; and

iv. reference to BS EN 40-5:2002;

m. lighting columns shall be painted or coated as appropriate before leaving the manufacturer. If during transit and installation the columns are damaged,

irrespective of severity, a repair should be made to the coating matching the factory type and colour of paint to ensure compatibility.

8.2 Luminaires

8.2.1 Project Co shall ensure that all luminaires designed and constructed in relation to the Works shall:

a. comply with the Institution of Lighting Professional's 'A Guide to the Specification of Light Emitting Diode Lighting Products';

b. be Conformité Européene marked (including all components);

c. meet the requirements of BS EN 13201-2-2015 (*Road lighting. Performance requirements*) Tables 1, 2 and 3 in relation to the luminaires photometry and depending on the required lighting class;

d. have an Elexon Code;

e. have a modular design so that components are replaceable upon failure, becoming life expired or becoming redundant. Modular design components shall include, as a minimum:

i. drivers;

ii. LED panel/module;

iii. diffuser;

iv. reflectors/refractors; and

v. surge protection;

f. be designed to maintain their IP Rating throughout their lifecycle and not degrade due to maintenance and periodic testing;

g. not have its IP Rating compromised by its cable connection;

h. include glands to maintain the IP Rating of the fitting during installation including glands for both single and multicore cables;

i. determine IP Rating when the luminaire is free standing and not mounted during testing;

j. have diffusers and lids with captive fixings;

k. have a body available in different colours upon request;

l. where lids are removable have provision for additional fixings through the use of chains or lanyards;

m. be rated at IP66 and IK08;

n. have adaptable mounting options side-entry or post top adjustable in 50 increments between +10O and -10O;

o. not have heat sink arrangement which are a natural trap for rainwater, bird droppings or other material;

p. have input terminals which are large enough to accommodate two conductors of 4mm2 cross-sectional area;

q. include diffusers which shall be coated with polymeric resin or equivalent technology to reduce the accumulation of dirt and grime; and

r. be supplied with a 7-pin nema socket and a suitable photocell with a switching of 35/18 Lux.

8.2.2 Project Co shall, for any luminaires designed and constructed as part of any Additional Assets, include a guarantee enforceable by TfL or its nominees for the internal components including the driver for at least five (5) years.

8.2.3 Project Co shall demonstrate full compliance with the Conformité Européene in the form of a certificate backed up with test results demonstrating full compliance to all standards and criteria.

8.3 Electrical Supply for Lighting

8.3.1 Project Co shall ensure that in respect of all luminaires designed and constructed in relation to the Works:

a. the primary nominal supply voltage (U_o) shall be 230v AC;

b. leakage currents shall comply with BS EN 60598-1 (*Luminaires. General requirements and tests*) Section 10;

c. the power factor shall be greater than or equal to zero point nine (0.9);

d. such luminaires and all associated internal components shall be protected from electrical faults and surges without causing disruption to other luminaries on the same circuit;

e. such luminaires shall conform to Class B requirements for conducted and radiated emissions in compliance to BS EN 55011:2009 (*Industrial, scientific and medical equipment. Radio-frequency disturbance characteristics. Limits and methods of measurement*);

f. such luminaires shall be resilient to fast transient bursts with the following characteristics and in accordance to BS EN 61000-4-4 (*Electromagnetic compatibility (EMC). Testing and measurement techniques. Electrical fast transient/burst immunity test*):

i. peak voltage ±4kV;

ii. rise time 5ns; and

iii. pulse width 50ns;

g. such luminaires shall be resilient to electrical surges with the following characteristics and in accordance to BS EN 61000-4-5 (*Electromagnetic compatibility (EMC). Testing and measurement techniques. Surge immunity test*):

i. ±4kV common mode;

ii. ±2kV differential mode;

iii. rise time 1.2µs; and

iv. pulse width 50µs.

h. such luminaires shall be resilient to electrostatic discharges with the following characteristics and in accordance to BS EN 61000-4-2 (*Electromagnetic compatibility (EMC). Testing and measurement techniques. Electrostatic discharge immunity test*):

i. ±6kV contact discharge; and

ii. ±8kV air discharge; and

8.3.2 Project Co shall ensure the Design Data submitted in accordance with the Review Procedure for the design of the luminaires includes:

a. the range in voltage under which the luminaire can operate; and

b. the total power consumption in watts.

8.4 Drivers and Controllers

8.4.1 Project Co shall ensure that any drivers and controllers designed and constructed in relation to the Works shall be fully compatible with the Harvard Engineering LeafNut Central Management System.

8.4.2 Project Co shall ensure that drivers designed and constructed in relation to the Works shall be able to support digital addressable lighting interface control systems.

8.4.3 Project Co shall ensure that all addressable drivers designed and constructed in relation to the Works shall be cable of being cloned to enable ease of future replacement.

8.4.4 Project Co shall ensure that any individual control gear designed and constructed in relation to the Works shall have a stand-by power not exceeding 0.5W when the lighting unit incorporates an electronically addressed dimming or switching circuit.

8.4.5 Project Co shall ensure that if the product is not fitted with an automatic switching or dimming circuit the product shall not consume power when it is switched off.

8.5 Photometry

8.5.1 Project Co shall ensure that luminaires designed and constructed in relation to the Works shall be suitable for achieving the M Lighting Classes in Table 1 and C Lighting Classes in Table 2 of BS EN 13201-2:2015 (*Road lighting. Calculation of performance*) for very high speed traffic routes being both dual carriageway with up to three running lanes and single carriageway configurations.

8.5.2 Project Co shall ensure that the light output of the luminaires designed and constructed in relation to the Works shall have a minimum colour rendering index (CRI) of eighty (80).

8.5.3 Project Co shall ensure that the colour temperature range of the luminaires designed and constructed in relation to the Works shall be between three thousand (3000)K and four thousand five hundred (4500)K.

8.5.4 Project Co shall ensure that the initial and maintained chromaticity coordinate values of the luminaires designed and constructed in relation to the Works shall not exceed a 3-step macAdam ellipse.

8.5.5 Project Co shall use Type C Gonio measurement to provide IES/LDT files for lighting design.

8.5.6 Project Co shall ensure that the S/P ratio of the luminaires designed and constructed in relation to the Works shall not be less than one (1).

8.5.7 Project Co shall ensure that the luminous intensity class (glare rating) of the luminaires designed and constructed in relation to the Works shall be a G4 as a minimum in accordance with Annex A of BS EN 13201-2.

8.6 Performance of luminaires

8.6.1 Project Co shall ensure that the Design Data submitted under the Review Procedure in relation to the design for the luminaires required pursuant to this paragraph 8.6 (*Performance of luminaires*) includes a calculation of the luminous output by taking the total amount of light emitted from the whole unit including any optical components.

8.6.2 Project Co shall ensure that the minimum luminous efficacy of the luminaires designed and constructed in relation to the Works shall be no less than eighty (80) lumens per circuit watt.

8.6.3 Project Co shall ensure that luminaires designed and constructed in relation to the Works have a light output ratio greater than or equal to zero point eight (0.8) over the life of the product.

8.6.4 Project Co shall ensure that testing of efficacy minimum light output power factor and standby power shall be conducted on the complete product (i.e. solid state LED device(s) luminaire and associated electronic control gear) and under normal operating conditions.

8.6.5 Project Co shall ensure that measurements of the products light output and electrical power consumption at different drive currents shall be taken after the junction temperature has stabilised to a constant level after selecting the particular drive current.

8.7 Environmental Conditions

8.7.1 Project Co shall ensure that the luminaires designed and constructed in relation to the Works shall be capable of operating at ambient temperatures of – ten (10) to fifty degrees celsius (50 ^{o}C).

8.8 Reliability

8.8.1 Project Co shall ensure that the abrupt failure value (AFV) of the luminaires designed and constructed in relation to the Works at fifty thousand (50,000) hours shall be less than or equal to ten per cent (10%).

8.8.2 Project Co shall ensure that all components of the luminaires designed and constructed in relation to the Works including the driver shall have a minimum rated life of fifty thousand (50,000) hours.

8.8.3 Project Co shall ensure that a failure fraction B50 or fifty per cent (50%) shall be used for all lumen maintenance values reported in accordance with this Agreement.

8.8.4 Project Co shall ensure that all lumen maintenance values shall be calculated in respect to L70.

8.8.5 Project Co shall ensure that the luminaires provide a minimum of fifty thousand (50,000) hours of L70 performance verified for a ninety per cent (90%) level of confidence that the fifty thousand (50,000) hour success probability is zero point five (0.5) or fifty per cent (50%) when subjected to a maximum operating temperature of fifty per cent (50%) and mean operating current.

8.8.6 Project Co shall ensure that testing of efficacy minimum light output power factor and stand-by power is conducted on the complete product (i.e. solid state LED device(s) luminaire and associated electronic control gear).

8.8.7 Project Co shall ensure that luminaires provide six thousand (6,000) hours of L90 performance verified for a ninety per cent (90%) level of confidence that the six thousand (6,000) hours success probability is zero point nine (0.9) or ninety per cent (90%) when subjected to a maximum operating temperature of fifty degrees celsius (50 ^{o}C) and mean operating current.

8.9 Safety

8.9.1 Project Co shall ensure that the luminaires designed and constructed in relation to the Works are assessed and assigned a risk group category RG0 or RG1 in accordance with BS EN 62471 (*Photobiological safety of lamp and lamp systems*) and Project Co shall ensure that such assessment is confirmed by the supplier.

8.9.2 Project Co shall ensure that the ultraviolet hazard efficacy of luminous radiation of any LEDs used in relation to the Works shall not exceed 2mW/klm.

8.9.3 Project Co shall ensure that flicker is calculated in accordance with the illuminating engineering society of North America IESNA system of measurement and that the percent flicker of the luminaires designed and constructed in relation to the Works shall be less than two per cent (2%).

8.9.4 Project Co shall ensure that the flicker acceptability rating of the luminaires designed and constructed in relation to the Works shall be greater than or equal to two (2) (very acceptable) as defined by the Alliance for Solid-State Illumination Systems and Technologies.

Annex 2 of Part 1 - Requirements for Tunnel ME&P Systems

1. General Requirements

1.1 Project Co shall design and construct a:

1.1.1 tunnel ventilation system;

1.1.2 tunnel lighting system;

1.1.3 tunnel pumped drainage system;

1.1.4 tunnel communications system;

1.1.5 tunnel traffic and other signage system;

1.1.6 tunnel incident detection and monitoring system;

1.1.7 tunnel control system;

1.1.8 tunnel electrical power supply and distribution system; and

1.1.9 tunnel fixed fire-fighting system,

together the **"ME&P Systems"** in accordance with the requirements specified in this Annex 2 (*Requirements for Tunnel ME&P Systems*).

1.2 Project Co shall ensure that all systems listed in paragraph 1.1 are capable of functioning together as a complete system to satisfy the requirements of this Annex 2 (*Requirements for Tunnel ME&P Systems*) and the requirements of paragraph 7 (*Tunnel Safety Management*) of Part 2 (*Operation Requirements*) of Schedule 18 (*O&M Requirements*) and Annex 5 (*Tunnel Safety Management System*) of Part 5 (*Project Co O&M Proposals*) of Schedule 18 (*Operation and Maintenance Requirements*).

1.3 Project Co shall design and construct the ME&P Systems to include all necessary secondary structures and fittings as may be required for anchorage or fixing, any part, component or equipment to the tunnel structure or other structural elements.

1.4 Project Co shall develop MEAFs for the ME&P Systems, which shall be:

1.4.1 based on and consistent with the details contained in the MEAFs for the tunnel ME&P Systems located in Part 3 (*Project Co Proposals*); and

1.4.2 in accordance with the D&C Requirements,

and submit such MEAFs to TfL under the Review Procedure in accordance with the requirements of Schedule 9 (*Certification and Review Procedure*).

1.5 Project Co shall design and construct emergency panels at spacing of fifty (50) metres.

1.6 Project Co shall design and construct the ME&P Systems to have the same level of functionality in accordance with the requirements of this Agreement when traffic is travelling in the reverse direction to its normal direction in each tunnel bore.

1.7 Project Co shall ensure that the ME&P Systems are capable of functioning in all reasonably expected environmental conditions in the tunnel and in all tunnel operating conditions including, but not limited to, normal, emergency, maintenance and cleaning.

1.8 Project Co shall ensure that the ME&P Systems:

1.8.1 comply with the requirements of Schedule 11 (*TfL Technology Requirements*) (where relevant);

1.8.2 reduce safety risk to as low as reasonably practicable (**"ALARP"**); and

1.8.3 have the functionality to achieve any relevant monitoring and reporting requirements set out in Schedule 16 (*Records and Reporting*), Schedule 18 (*Operation and Maintenance Requirements*) and Schedule 20 (*Payment Mechanism*).

1.9 Project Co shall, prior to the Permit to Use Date, prepare and submit to TfL under the Review Procedure two (2) copies of each of the operational and training manuals for each component of the ME&P Systems as well as an integrated manual for the combined ME&P Systems.

1.10 Project Co shall comply with the requirements for the design and construction of the mechanical electrical and plumbing systems in the tunnel service buildings and plant rooms as described in Annex 3 (*Structures Requirements*).

2. Tunnel Safety Design

2.1 Tunnel safety case

2.1.1 Project Co shall prepare and submit to TfL under the Review Procedure a tunnel safety case report (the **"Tunnel Safety Case Report"**), which shall:

a. be based on and developed from the outline tunnel safety case report included in Part 3 (*Project Co's Works Proposals*);

b. demonstrate how the fire and life safety requirements will be met by the ME&P Systems;

c. be developed using a risk-based approach based on the principles of ALARP;

d. include reliability, availability and maintainability analysis to identify and define hazards associated with tunnel operations, and such analysis shall include both preliminary and detailed hazard analyses; and

e. identify and include the safety integrity level for all safety critical elements of the ME&P Systems.

2.2 ME&P Systems performance objectives

2.2.1 Project Co shall design and construct the ME&P Systems to be capable of achieving the following performance objectives for the whole of the Availability Period:

a. to continuously monitor the Project Facilities to detect and respond to incidents;

b. to enable immediate response to incidents to control and minimise risk;

c. to instigate and manage self-rescue evacuation;

d. to control smoke and provide a tenable route for evacuation;

e. to facilitate effective intervention by emergency and services and other relevant incident responders; and

f. to minimise damage to and minimise risk to the long term availability of the Project Facilities.

2.2.2 Project Co shall ensure that the Design Data relating to the ME&P Systems submitted to TfL under the Review Procedure describes Project Co's proposed means to achieve the performance objectives set out in paragraph 2.2.1:

a. by each relevant element of the ME&P Systems with reference to the design for performance, availability and resilience of the relevant element of the ME&P Systems; and

b. in accordance with the Tunnel Safety Case Report which has been endorsed as "received" or "received with comments" by TfL in accordance with the Review Procedure.

3. Tunnel Ventilation System

3.1 Project Co shall design and construct the tunnel ventilation system to:

3.1.1 control the smoke from a minimum Design Fire size of thirty (30) MW convective peak heat release rate;

3.1.2 be capable of controlling the emission levels in the tunnel expected to be generated by traffic in the first year immediately after the Permit to Use Date;

3.1.3 ensure emissions control ventilation can continuously control and maintain the tunnel (including, for the avoidance of doubt, all cross passages) at or below the levels of air quality specified in Table 3.1 (*Pollution and visibility thresholds*) for Users under all traffic and operating conditions;

3.1.4 ensure that emergency ventilation can be activated with a manual override facility when required for the control of smoke and hot gases in the event of fire;

3.1.5 include pollution and visibility monitoring systems that enable continuous monitoring and recording of pollutant concentrations;

3.1.6 continuously and automatically monitor the status of all elements of the tunnel ventilation system and enable any tunnel operator to be aware of the status of and control all such elements, with audio and/or visual alarms triggered in the event of faults being detected;

3.1.7 ensure that it is capable of diluting pollutant concentrations inside the tunnel such that they do not exceed the maximum permitted concentration levels set out in Table 3.1 (*Pollution and visibility thresholds*) at any time;

3.1.8 control the direction and spread of smoke and hot gases in the event of a fire inside the tunnel or immediately outside of a portal, to enable Users in the tunnel to self-rescue in safety and to facilitate the operations of emergency services;

3.1.9 ensure a safe and healthy working environment for personnel engaging in maintenance and repair works in the tunnel;

3.1.10 operate to the same standards in cases of reversed traffic flow and under all traffic flow conditions;

3.1.11 adapt to adverse meteorological conditions;

3.1.12 create a bulk flow of air in either direction in the event of a fire to prevent the back-layering of smoke and hot gases;

3.1.13 operate satisfactorily in the event of a fire, notwithstanding any reasonably expected level of equipment unavailability arising due to maintenance or fault, or being damaged by the fire or its cause;

3.1.14 be fully controllable under all emergency fire scenarios to ensure optimum performance during all and any stages of a fire and its development;

3.1.15 operate in temperatures up to two hundred and fifty degrees Celsius (250°C) for a minimum period of two (2) hours;

3.1.16 minimise energy consumption at all times; and

3.1.17 automatically activate in the event of a fire being detected in the tunnel or immediately outside of a portal, but with such activation being capable of manual override.

Table 3.1: Pollution and visibility thresholds

Environmental element/condition	**Maximum permitted concentration levels for tunnel ventilation system design**
Carbon monoxide (CO)	70 ppm
Nitrogen dioxide (NO2)	1 ppm
Visibility	0.005 m-1 (extinction coefficient)

3.2 Project Co shall ensure that the tunnel ventilation system and the tunnel fixed fire fighting system required in paragraph 11 (*Tunnel Fixed Fire Fighting System*) are designed and constructed to effectively function together to achieve the required conditions in the tunnel specified in Table 11.1 (*Performance Criteria*).

3.3 Project Co shall ensure that the Design Data relating to the tunnel ventilation system submitted to TfL under the Review Procedure includes assumptions applied in calculating expected emissions (pollution levels), including but not be limited to, assumptions in relation to the following:

3.3.1 a description and validation for the approach used in calculating the vehicle exhaust emissions;

3.3.2 details of fleet composition, vehicle speed and traffic density;

3.3.3 validation/verification and confirmation of the proposed Design Fire size value on the basis of:

a. the output of the Tunnel Safety Case Report and risk assessments undertaken in accordance with the requirements of paragraph 2.1 (*Tunnel Safety Case*), which have been endorsed as "received" or "received with comments" by TfL in accordance with the Review Procedure; and

b. Project Co's integrated design for tunnel ventilation as required in paragraph 3.2 and the tunnel fixed fire fighting system as required in paragraph 11 (*Tunnel Fixed Fire Fighting System*).

4. Tunnel Lighting System

4.1 Project Co shall design and construct a lighting system for the tunnel which complies with the requirements of the document entitled "TfL LED Lighting Designers' Guide" with document reference ST150030-PPD-TUN-ZZ-GDL-ST-0353 in the Data Room Information and incorporates:

4.1.1 continuous lighting, which shall be automatically controlled and monitored (with a manual override capability) with lighting level based on and determined by external natural light levels to ensure safe entry to and exit from the tunnel for Users;

4.1.2 emergency lighting that shall automatically activate in the event of a loss of the continuous lighting for any reason, including due to an incident; and

4.1.3 evacuation lighting to assist Users in the event of an incident in the tunnel and cross passages.

4.2 Project Co shall design and construct the tunnel lighting system such that it:

4.2.1 provides safe visibility in the tunnel under all conditions and at all times;

4.2.2 illuminates the interior of the tunnel and the carriageway as required in relation to prevailing external conditions;

4.2.3 provides a safe transition between external luminance and the tunnel at entry, including transition in luminance as appropriate from the threshold zone into the interior zones of the tunnel;

4.2.4 provides safe evacuation lighting in the event of an emergency in the tunnel and cross passages;

4.2.5 is capable of facilitating reverse flow traffic;

4.2.6 minimises energy consumption;

4.2.7 provides a uniform light level across the full width of the carriageway, including walkways and cross passages;

4.2.8 automatically controls the luminance levels in each lighting zone in the tunnel;

4.2.9 has the facility to be overridden and controlled remotely;

4.2.10 controls the level of boost lighting for the threshold and transition zones;

4.2.11 controls the luminance level L20 at the entry portals to maintain an appropriate balance between external lighting levels and the level of artificial light; and

4.2.12 monitors the status of each luminaire, including usage details.

5. Tunnel Pumped Drainage System

5.1 Project Co acknowledges and agrees that the requirements of this paragraph 5 (*Tunnel Pumped Drainage System*) are in addition to the requirements for the drainage system inside the tunnel described in paragraph 5 (*Drainage System*) of Annex 1 (*Highways and General Requirements*) of this Part 1 (*Design and Construction Requirements*) of Schedule 10 (*Design and Construction Requirements*).

5.2 Project Co shall ensure that the tunnel pumped drainage system to be designed and constructed pursuant to this paragraph 5 (*Tunnel Pumped Drainage System*) is integrated into the drainage system infrastructure for surface water run-off as specified in Annex 1 (*Highway and General Requirements*).

5.3 Project Co shall design and construct a pumped drainage system for the tunnel (including cross passages) which shall, in addition to the collection and discharge of surface water run-off:

5.3.1 collect and discharge, amongst other things, water ingress/seepage, condensation, spillages, overspill from washing/cleaning and overflows from the fire suppression system/hydrants/fire brigade hoses as well as incidents, including but not limited to burst water mains; and

5.3.2 discharge water to outfall, making provision for storage or attenuation as necessary and in compliance with the requirements of paragraph 5.4.

5.4 Project Co shall ensure that the tunnel pumped drainage system is designed and constructed to enable the containment, treatment and handling of contaminants and chemicals such as those arising from a chemical, oil or petroleum spillage prior to discharge.

5.5 Project Co shall ensure that the tunnel pumped drainage system includes, without limitation:

5.5.1 effluent discharge;

5.5.2 attenuation facilities, such as holding tanks and/or ponds, including assessments for capacity and flows;

5.5.3 rising main;

5.5.4 duty and standby pumps;

5.5.5 sump;

5.5.6 sump suppression system for protection against risk associated with a build-up of combustible gases and/or hydrocarbons;

5.5.7 interceptors for contaminants; and

5.5.8 integration with the drainage system for Highways Zones 1 and 2.

5.6 Project Co shall design and construct the tunnel pumped drainage system to enable the continuous monitoring of the status of all pumps and critical components of the system by tunnel operators, and to enable tunnel operators to control all pumps and critical components of such system, with audio and/or visual alarms triggered in the event of faults being detected.

6. Tunnel Communications System

6.1 Project Co shall design and construct a communications system for the tunnel (including cross passages) to enable a Project Co tunnel operator in the Project Co Tunnel Control Centre to provide guidance and assistance for the safety and evacuation of Users in the tunnel in the event of an incident.

6.2 Project Co shall design and construct the tunnel communications system to:

6.2.1 make provision for Users in the tunnel to communicate with the tunnel operators and emergency services;

6.2.2 allow the tunnel operator to communicate with Users in the tunnel;

6.2.3 allow Users and the tunnel operator to communicate with emergency services;

6.2.4 allow emergency services to communicate with the tunnel operator and Users in the tunnel including a dedicated facility for the fire services; and

6.2.5 including, but not be limited to:

a. emergency telephones in telephone cabinets at each emergency panel and in each cross passage;

b. radio rebroadcast for the emergency services;

c. a voice alarm/public address system;

d. public radio coverage in the tunnel and the facility for radio/voice break-in and broadcast announcements via radios in vehicles; and

e. mobile telephone facility coverage in all parts of the tunnel.

6.3 Project Co shall design and construct the tunnel communications system to ensure that the emergency telephone cabinets are connected to the control system such that an alarm is triggered when the cabinet is opened.

6.4 Project Co shall design and construct the tunnel communications system to ensure that the voice alarm/public address system shall be available in all areas of the tunnel including the cross passages and on the immediate approaches, with the coverage to be zone specific with pre-recorded and live audio emergency announcements to Users in the tunnel who have exited their vehicles.

6.5 Project Co shall agree the pre-recorded audio emergency announcements for the radio re-broadcast system and the associated procedures for their use with the TDSCG.

6.6 Project Co shall ensure that the Design Data in relation to the tunnel communications system design submitted to TfL under the Review Procedure includes:

6.6.1 radio frequencies to be used;

6.6.2 radio stations/multiplexes to be covered;

6.6.3 agreements to be entered into by Project Co with emergency services;

6.6.4 content and wording of pre-recorded announcements; and

6.6.5 voice alarm/public address system zone details.

7. Tunnel Traffic and Other Signage System

7.1 Project Co shall design and construct a traffic and other signage system which shall include barriers to enable safe use of the tunnel as an integral part of the Project Roads and the adjacent road network at all times.

7.2 Project Co shall ensure that the traffic and other signage system includes:

7.2.1 tunnel lane control signals above each traffic lane and located at a maximum distance of one hundred (100) metres apart within the tunnel bores and on both portals of each bore which shall:

a. indicate whether each lane is open or closed through the display of a green arrow or red cross respectively or a variable speed limit; and

b. provide information to drivers with respect to expected action through the use of left and right arrows;

7.2.2 variable message signs at both portals of each bore, on approaches to each bore and at two hundred (200) metre intervals inside the tunnel bores;

7.2.3 evacuation signs inside the tunnel;

7.2.4 tunnel entry control signals and barriers; and

7.2.5 connection to TfL's traffic signal system to provide a green wave interface.

7.3 Project Co shall ensure a clearly visible unique number is displayed at each cross passage to assist with locating Users in the tunnel in the event of an incident in the tunnel.

7.4 Project Co shall ensure that TfL are able to operate the traffic signals on the approach roads so as to activate a 'green wave' in any direction as may be required.

7.5 Project Co shall ensure that the status of the communications interface between the Project TCS and the TfL TCS can be continuously monitored by the Project Co TCS.

8. Tunnel Incident Detection and Monitoring System

8.1 Project Co shall design and construct an integrated incident detection and monitoring system such that it is able to:

8.1.1 provide real time visual coverage on monitors in the Project Co Tunnel Control Centre of all areas of the tunnel, including but not limited to, cross passage doors and cross passages, with the ability to control the view at a targeted area from the Project Co Tunnel Control Centre;

8.1.2 automatically detect abnormal activities and/or incidents and trigger alerts;

8.1.3 detect smoke or fire in any area of the tunnel, including cross passages; and

8.1.4 monitor hydrocarbon levels in the sump.

8.2 Project Co shall ensure that the incident detection and monitoring system includes:

8.2.1 a CCTV system;

8.2.2 an automatic incident detection system (**"AID System"**);

8.2.3 air quality and visibility sensors;

8.2.4 anemometers;

8.2.5 a smoke and fire detection system; and

8.2.6 a sump hydrocarbon detection system.

8.3 Project Co shall ensure that the AID System is designed and configured to be capable of detecting incidents in all areas of the tunnel including:

8.3.1 stopped and slow moving vehicles;

8.3.2 increases in the speed flow of vehicles;

8.3.3 vehicles travelling in the wrong direction;

8.3.4 objects or debris on the tunnel carriageway or walkway;

8.3.5 changes in visibility levels;

8.3.6 pedestrians or cyclists in the tunnel; and

8.3.7 any other abnormal occurrences.

8.4 Project Co shall ensure that the CCTV system provides coverage of all areas and zones of each tunnel bore and cross passages with pan, tilt and zoom capability and that the CCTV system shall:

8.4.1 have a minimum resolution of D1 and use a 4:3 aspect ratio;

8.4.2 have video end to end latency, including camera control, less than two hundred and fifty (250) ms;

8.4.3 be capable of providing control and real time video and feed to third parties via a system to system interface specified in the digital television network protocol (**"DVNP"**) interface specification;

8.4.4 integrate with the existing TfL CCTV system using the system to system interface specified in the DVNP interface specification;

8.4.5 record images from the AID System and the CCTV system referred to in paragraph 8.2;

8.4.6 have the ability to provide digital video recording functionality to pause and rewind live CCTV images;

8.4.7 provide a rolling pre-record buffer for all cameras in the tunnels and store the most recent twenty-four (24) hours of CCTV data for every camera in a standard format that does not require special software or codecs for playback;

8.4.8 be compatible with and playable in the latest version of FF play; and

8.4.9 be capable of supporting a minimum of twenty four (24) simultaneous cameras streams.

8.5 Project Co shall ensure that each CCTV camera used in relation to the CCTV system is either duplicated with a thermal imaging camera or is switchable between thermal and visual modes.

8.6 Project Co shall ensure that the smoke and fire detection system shall be integrated with the tunnel ventilation system and the tunnel fixed fire fighting system.

8.7 Project Co shall ensure that the incident detection and monitoring system shall have automatic configuration capability to enable pre-setting or modification of threshold levels for detection and alerts such that:

8.7.1 an alarm and/or flashing light is triggered to alert the tunnel operator upon detection of an incident;

8.7.2 the tunnel ventilation system is activated upon detection of pollution levels above acceptable levels, smoke or fire;

8.7.3 the AID System is activated and raises an alert upon detection of an incident;

8.7.4 the fixed fire fighting system is activated upon detection of a fire; and

8.7.5 the sump suppression system is activated upon detection of hydrocarbon levels above safe levels.

9. Tunnel Control System

9.1 Project Co shall design and construct an integrated tunnel control system (the **"Project Co TCS"**), the components of which shall interface with and be compatible with each other such that it is a single integrated system and which shall:

9.1.1 include a plant monitoring and control system (the **"PMCS"**), as described in paragraph 9.3;

9.1.2 include the Asset Management System required pursuant to Annex 8 (*Asset Management System*);

9.1.3 be programmed to incorporate the tunnel safety management system (the **"TSMS"**), as described in paragraph 9.4;

9.1.4 interface with the TfL TCS, as described in Schedule 11 (*TfL Technology Requirements*) and be capable of continuously providing the information referred to in paragraph 9.3.1 in real time to TfL via the interface;

9.1.5 comply with the requirements of paragraph 4.2 of Part 2 (*Operation Requirements*) of Schedule 18 (*Operation and Maintenance Requirements*); and

9.1.6 capture and record all data relating to the status of all elements of the Project Facilities to allow the creation of performance reports.

9.2 Secondary tunnel control system

9.2.1 Project Co shall design and construct a secondary tunnel control system which shall:

a. be a full back up system that is capable of performing the functions described in paragraph 9.1 should the Project Co TCS be unavailable or not operational for any reason;

b. be located within one of the tunnel service buildings;

c. be located in a separate location to the Project Co TCS; and

d. meet all of the requirements of paragraph 9.1 (other than paragraph 9.1.2).

9.3 PMCS

9.3.1 Project Co shall design and construct the PMCS to control and enable real time monitoring of the functional and operational status of all individual system elements and components of the ME&P Systems, and configure it to raise an alarm and or alert the tunnel operator via the Project Co TCS.

9.3.2 Project Co shall ensure that the PMCS is configured and calibrated such that the alarm or alert to the tunnel operator is triggered:

a. as required by any relevant Applicable Requirements; and

b. when any individual system element or component of the M&EP Systems is not functional in accordance with the guidelines and instructions of the manufacturer of such relevant element or component.

9.3.3 Project Co shall ensure that the PMCS is a SCADA-based system based upon the use of programmable logic controllers.

9.4 TSMS

9.4.1 Project Co shall provide the necessary systems and technology required to enable the TSMS to monitor in real time the current safety status of the relevant assets within the Project Facilities, and report this to the tunnel operator and TfL via the Project Co TCS and the TfL TCS. Project Co shall ensure that the TSMS:

a. incorporates the details, contents and form of the table included in Annex 1 (*Tunnel Safety Management System*) of Part 2 (*Operation Requirements*) of Schedule 18 (*Operation and Maintenance Requirements*), which shall include,

for the avoidance of doubt, the headings, cells, columns, rows and contents including formulae set out in such table;

b. is capable of providing at all times the Level of Safety Score and the Mitigated Level of Safety Score for each Safety Sub-Function;

c. is capable of providing at all times a global report to TfL indicating whether the Project Roads are safe to open to traffic or whether any Level of Safety Score relating to any tunnel bore is below one hundred per cent (100%);

d. is capable of providing at all times an alert and trigger for the commencement of the incident response procedures required by paragraph 6 (*Incident Response*) of Part 2 (*Operation Requirements*) of Schedule 18 (*Operation and Maintenance Requirements*);

e. outputs from the PMCS that provide real-time functional status of all individual system elements and components of the ME&P Systems, and Project Co shall ensure that that the PMCS is configured to raise alarms to alert the tunnel operator via the Project Co TCS in the event of the occurrence of a Failure or a Service Failure; and

f. includes as its inputs, outputs from records of inspections and Project Co shall ensure that the PMCS shall trigger an alarm to alert the tunnel operator via the Project Co TCS and the TfL TCS in the event of the occurrence of a Failure or Service Failure.

10. Tunnel Electrical Power Supply and Distribution System

10.1 Primary supply

10.1.1 Project Co shall design and construct two independent electrical supplies for the ME&P Systems, each of which shall be capable of delivering the total tunnel service load.

10.2 Secondary supply

10.2.1 Project Co shall design and construct uninterrupted power supplies (**"UPS"**) for a minimum of two (2) hours in the event of loss of the main power supplies.

10.2.2 Project Co shall ensure that the Design Data in relation to the electrical power supply and distribution system (including for both the primary and secondary supply) submitted to TfL under the Review Procedure shall include details of, without limitation:

a. the estimated full tunnel electrical load;

b. proposed HV and LV supplies and routes;

c. supply distribution, distribution panels, switchboards and substations;

d. proposals for dealing with partial single losses;

e. UPS and emergency arrangements;

f. temporary generator supply, if applicable; and

g. cable, ducting, containment, insulation details as may be required.

11. Tunnel Fixed Fire Fighting System

11.1 Project Co shall design and construct a tunnel fixed fire fighting system (**"FFFS"**) that is able to, in the event of a fire:

11.1.1 control fire and limit peak heat release rate and smoke production in the tunnel;

11.1.2 reduce temperatures and radiation in the vicinity of a fire to aid self-rescue operations and reduce the likelihood of fire spread; and

11.1.3 maintain tenability conditions for fire service intervention for a minimum of sixty (60) minutes.

11.2 Project Co shall ensure that the FFFS and the tunnel ventilation system are capable of functioning together to achieve the required conditions in the tunnel specified in Table 11.1 (*Performance Criteria*).

11.3 Project Co shall:

11.3.1 ensure that two (2) aqueous film forming foam six (6) kilogram fire extinguishers are provided at each emergency panel;

11.3.2 design and construct fire mains and fire hydrants, with a minimum water supply pressure in accordance with BS EN 671-1;

11.3.3 locate a fire hydrant approximately ten (10) metres downstream from each cross passage, at intermediate points not exceeding one hundred (100) metres and on the same side of the tunnel as the cross passages;

11.3.4 locate a double inlet/outlet dry cross connectors on each side of each cross passage; and

11.3.5 as part of the relevant Design Data, submit to TfL under the Review Procedure details of any break tanks and/or pumps included in the design of the FFFS.

11.4 Project Co shall ensure that the Design Data in relation to the FFFS submitted to TfL under the Review Procedure includes:

11.4.1 a report that verifies the performance capability of the proposed FFFS system demonstrated by relevant full scale tunnel fire test data for a comparable system, supplemented by Project Co's specific analysis;

11.4.2 verification that the proposed FFFS design meets the performance criteria for the control of fire growth and for maintaining tenable conditions for evacuation including:

a. details of how the FFFS will operate in conjunction with the tunnel ventilation system;

b. confirmation that the performance criteria set out in Table 11.1 (*Performance Criteria*) will be met for the case of 'early' and 'late' activation of the FFFS as described in paragraph 11.4.3;

11.4.3 verification that the proposed FFFS system meets the following performance objectives by demonstrating the performance of the system:

a. for 'early' activation at two (2) MW with ventilation velocity controlled dynamically by the tunnel ventilation system to control smoke and hot gases;

b. for 'late' activation at twenty (20) MW with ventilation velocity controlled dynamically by the tunnel ventilation system to control smoke and hot gases; and

c. for 'late' activation at twenty (20) MW in the event of the tunnel ventilation system not working.

11.5 Project Co shall ensure that the FFFS is able to maintain the peak heat release rate at 50MW or less throughout full system deployment; and thirty five (35) MW or less after thirty (30) minutes of full system deployment.

11.6 Project Co shall ensure that the FFFS is able to sufficiently suppress a fire such that the convective heat release rate is limited to that which can be controlled by the tunnel ventilation system.

11.7 Project Co shall ensure that the FFFS is able to adequately control the heat release rate such that the tunnel ventilation system is able to prevent the spread of smoke and hot gases as required by item 6 in Table 11.1 (*Performance Criteria*).

11.8 Project Co shall ensure that the FFFS meets the performance criteria for temperature, radiation and toxicity as specified in Table 11.1 (*Performance Criteria*) for a minimum of sixty (60) minutes.

Table 11.1 Performance Criteria

	Performance item	Upper Limit	Location in the tunnel	Comments
1	Air temperature upstream of the fire within spray zone	(60^{0}C	Five (5) metres from the fuel load from floor level to a height of two (2) metres above road level.	For self-rescue and fire service intervention (time-averaged over one minute during a period of thirty (30) minutes of full system deployment to minimize the effect of transient fluctuations or peaks)
2	Air temperature upstream / downstream of the fire within spray zone	250^{0}C	Five (5) metres from both ends of the fuel load from two (2) metres above floor level to a height of four point three (4.3) metres above road level.	For limiting fire spread (time-averaged over one (1) minute during a period of full system deployment to minimize the effect of transient fluctuations or peaks)
3	Air temperature upstream of the fire outside the	Ambient+ 10 ^{0}C	Upstream of the spray zone from floor level to a height of two (2) metres	For self-rescue (time-averaged over one (1) minute during a period of full system deployment to

	Performance item	Upper Limit	Location in the tunnel	Comments
	spray zone		above road level.	minimize the effect of transient fluctuations or peaks)
4	Heat flux radiation	2.5 kW/m2	Five (5) metres upstream of the fuel load from floor level to a height of two (2) metres above road level.	For self-rescue (time-averaged over one (1) minute during a period of full system deployment to minimize the effect of transient fluctuations or peaks)
5	Carbon Monoxide (CO)concentration	1200 ppm	Five (5) metres upstream of the fuel load from floor level to a height of two (2) metres above road level.	For self-rescue (time-averaged over one (1) minute during a period of thirty (30) minutes of full system deployment to minimize the effect of transient fluctuations or peaks) based on five (5) minutes exposure time
6	Control of smoke and hot gases	Combustion Products (smoke) presence upstream the fire	Ventilation/suppression combination should be sufficient to prevent smoke migration upstream from fire site (localised effects due to buoyancy forces at the immediate fire site accepted)	Smoke-free ten (10) metres from the fire, upstream if a longitudinal ventilation concept is proposed

Annex 3 of Part 1 - Structures Requirements

1. General Structures Requirements

1.1 Project Co shall design and construct the Structures listed in Table A3.1 (*Mandated Structures*) and any additional Structures required in order to carry out the Works in accordance with the requirements of the Transferred DCO Functions and the locations as shown on the works plans contained in DCO document reference 2.5 (revision 2).

Table A3.1 Mandated Structures

	Name of Structure	Type of Structure
Road Tunnels		
	Silvertown Tunnel	Road tunnel, comprising cut-and-cover and twin-bored sections, cross-passages, TBM chambers, portal structures and anti-recirculation walls.
Footbridges		
	New Boord Street Foot And Cycle Bridge	Single span foot and cycle bridge with approach ramps and stairs.
Road Bridges		
	Silvertown Tunnel Southern Approach Northbound Overbridge	Integral, single span road bridge.
Gantries		
	Various	Portal gantries, cantilever gantries.
Noise Barrier		
	Various	Noise / environmental barrier.
Retaining Walls		
	Various	Earth retaining structures - standalone and including ground slabs, reinforced/strengthened soil/fill structure.
Buildings		
	Various	Buildings.

1.2 Project Co shall design and construct all Structures and carry out all modifications to existing Structures in accordance with this Annex 3 (*Structures Requirements*), the

Transferred DCO Functions and in accordance with the relevant standards and specifications set out in Part 2 (*Design Standards and Specifications*).

2. Tunnel Structures

2.1 Project Co shall manage risks associated with the design and construction of tunnels and associated underground structures in compliance with the Joint Code of Practice for Risk Management of Tunnel Works in the UK.

2.2 Project Co shall continuously and appropriately manage risks associated with tunnelling activities. Project Co shall consider all risk reduction options and implement such measures that aim to reduce risks to a broadly acceptable level. Project Co's Tunnelling Risk Management Plan, contained in Part 3 (*Project Co's Works Proposals*) shall form the initial baseline requirements for tunnelling risk management.

2.3 Project Co shall design, construct and test the bored tunnel and cut-and-cover tunnel to ensure that the leakage criteria achieved in accordance with Clause 508.2 (Leakage criteria and classes of tunnel) of The British Tunnelling Society and The Institution of Civil Engineers Specification for Tunnelling, 3rd edition is:

2.3.1 Tunnel Class 2, above adjacent road formation level; and

2.3.2 Tunnel Class 3, below adjacent road formation level.

2.4 Project Co shall design and construct the bored tunnel and cut-and-cover tunnel to include a continuous water barrier separating the soil from the internal environment of the tunnel.

2.5 Project Co shall design and construct any tunnel lining to be resistant to and transmit vehicular impact loads to the surrounding ground, the analysis of which should take into account the three dimensional resistance of the structure at the location of impact.

2.6 Project Co shall undertake an assessment of the tunnel structure giving consideration to natural, accidental and criminal threats (which, for the avoidance of doubt, shall not include terrorism). Project Co shall design and construct the bored tunnel and cut-and-cover tunnel such that the structure is resilient to the perceived threats (which, for the avoidance of doubt, shall not include terrorism).

2.7 Project Co shall not post-install drip trays in the crown of the bored tunnel and cut-and-cover tunnel as a means to deal with any residual water seepage that may emerge post-construction.

2.8 Project Co shall ensure that the design and construction of the tunnel considers the environments both within and through which the bored tunnel and cut-and-cover tunnel are to be placed and takes account of durability over the tunnel design life, by:

2.8.1 ensuring watertightness;

2.8.2 ensuring durability of any measures and fixings, especially subject to chemical attack and biological degradation; and

2.8.3 addressing gas permeability and hazards associated with such ingress.

2.9 Project Co shall, every three (3) months from the Effective Date until the Permit to Use Date, update the Durability Report contained within Part 3 (*Project Co's Works Proposals*)

to reflect any required changes following the progression of the design and construction of the Works. Project Co shall use the information within the Durability Report, including but not limited to, anticipated degradation modes on the durability objectives, to inform the Operation and Maintenance Strategy, prepared in accordance with Schedule 18 (*Operation and Maintenance Requirements*).

2.10 Project Co shall include in the design action envelope of the bored tunnel and cut-and-cover tunnel a loadcase combining a minimum additional surcharge of 75kN/m2 with overburden and hydrostatic loads in accordance with LUL Standard S1055 (*Civil Engineering – Deep Tube Tunnels and Shafts*) 2016. Project Co shall ensure the additional surcharge action is:

2.10.1 to be applied globally at ground level, unless Project Co deems this not conservative;

2.10.2 considered a permanent action;

2.10.3 the characteristic value; and

2.10.4 to be combined using partial factors as per standard.

2.11 Project Co shall design and construct each cross-passage to incorporate emergency exit doors which:

2.11.1 are to be set back in a recessed area;

2.11.2 provide protection against fire;

2.11.3 ensure safety and preservation of escape route environment;

2.11.4 shall be appropriately signed for operation;

2.11.5 shall be capable of operation by Users and default to a closed position;

2.11.6 form part of an overall assembly with a two (2) hour fire rating; and

2.11.7 withstand all operational loading conditions.

2.12 Project Co shall ensure that deviations in surface continuity of the bored tunnel and cut-and-cover tunnel are designed and constructed in order to minimise the health and safety risks associated with vehicular impact by Users.

2.13 Project Co shall design and construct a smooth transition in and out of the bored tunnel to ease the tunnel ventilation.

2.14 Project Co shall design and construct the internal face of the bored tunnel and cut-and-cover tunnel, in accordance with BD 78 (*Design of Road Tunnels*) as amended by Part 2 (*Design Standards and Specifications*), using a high reflectivity matt/satin coating. Project Co shall ensure that its chosen paint system facilitates easy cleaning on a regular basis and does not introduce risks to Users in a fire situation. Project Co shall ensure that the wall finish is uniform along the entire length of the bored tunnel and cut-and-cover tunnel and shall ensure Users' aesthetic perception of the tunnel interior is maintained throughout.

2.15 Project Co shall design and construct the bored and cut-and-cover tunnel to have the following capability in a fire scenario:

2.15.1 prevent progressive collapse of primary structural elements;

2.15.2 support the functioning of the ME&P Systems; and

2.15.3 support the emergency services functions.

2.16 Project Co shall design and construct, in accordance with the European Directive 2004/54/EC and RWS report no. 2008-Efectis-R0695, the bored and cut-and-cover tunnel to:

2.16.1 withstand the temperature exposure represented by the Rijkswaterstaat (RWS) time-temperature curve; and

2.16.2 during a one hundred and twenty (120) minute period of fire exposure, prevent irreversible damage, including fire-induced spalling of concrete structural elements and deformation of the primary structural element leading to progressive structural collapse.

2.17 Project Co shall design and construct any structural fire protection material within the bored and cut-and-cover tunnel such that it:

2.17.1 is non-combustible when tested in accordance with the testing standards in Part 2 (*Design Standards and Specifications*);

2.17.2 has a minimum melting temperature consistent with the temperature-time curve; and

2.17.3 meets the fire protection requirements with the range of moisture contents representative of the expected operational environment, including the effects of fire fighting operations, in accordance with the time-temperature curve.

2.18 Project Co shall design and construct structural anchorage within the bored and cut-and-cover tunnel such that it does not adversely affect the thermal performance of any passive fire protection system.

2.19 Project Co shall design and construct any passive fire protection systems within the bored and cut-and-cover tunnel such that it does not adversely affect the integrity of attachments to the structure.

2.20 Project Co shall design and construct the bored tunnel and cut-and-cover tunnel with a mean construction tolerance of +/- eighty (80) millimetres.

2.21 Project Co shall design and construct the tunnel to allow for monitoring systems to be installed and operated with the least possible impact on Users for the in-service monitoring of tunnel structure deformations and displacements. Project Co shall establish a permanent control network including markers, targets and reflectors to facilitate monitoring.

2.22 Project Co shall design and construct anti-re-circulation walls at each portal to prevent vitiated air and fire smoke from entering the parallel tunnel. Where unprotected by a vehicle restraint system, Project Co shall design and construct the anti-re-circulation walls for vehicular impact loading and to ensure an equivalent level of safety of Users.

2.23 Within one (1) month of the Effective Date, Project Co shall submit to TfL under the Review Procedure a composite specification for the bored tunnel which shall:

2.23.1 be in accordance with the relevant parts of Part 3 (Project Co's Works Proposals);

2.23.2 adopt and amend The British Tunnelling Society and the institution of Civil Engineers Specification for Tunnelling (3rd edition) by way of inclusion of the project specific Particular Specification (as defined in the The British Tunnelling Society and the institution of Civil Engineers Specification for Tunnelling (3rd edition)); and

2.23.3 be in accordance (where relevant) with LUL T0006 (Deep Tube Tunnels Materials and Workmanship).

2.24 Project Co shall ensure that the base slab of tunnel (including any open-cut approach roads carrying traffic) are waterproofed and surfaced as a bridge deck in accordance with clause 2.3 of BD 47/99.

3. New Boord Street Foot and Cycle Bridge

3.1 Project Co shall design and construct a two-way cycle and pedestrian bridge together with step and step-free access that:

3.1.1 minimises whole life costs;

3.1.2 is a fully integral structure;

3.1.3 has a minimum four (4) metres clear width between parapets and handrails;

3.1.4 is integrated with the surrounding urban areas and which guides pedestrians and cyclists towards the crossing when approaching from The O2 and wider peninsula locations;

3.1.5 together with the existing bridge, ensures continuous step free access across the A102 and Tunnel Avenue corridor throughout the Works;

3.1.6 can be maintained with the least possible impact on the corridor between the Blackwall Tunnel and the Project Roads;

3.1.7 features approaches that are structurally independent from the main span to allow for future modification or replacement with wider and more direct stepped-access;

3.1.8 has no intermediate supports on the main span across the A102 and Tunnel Avenue corridor;

3.1.9 is designed to have the least possible impact on non-motorised users of the bridge and users of the corridor between the Blackwall Tunnel and the Project Roads from inspections and maintenance interventions; and

3.1.10 incorporates barriers, bollards or other measures to prevent unauthorised vehicle access to the bridge.

4. Silvertown Tunnel Southern Approach Northbound Overbridge

4.1 Project Co shall design and construct a road bridge Structure to allow the two lane single carriageway Blackwall Tunnel southbound southern approach to cross the two lane single carriageway Silvertown Tunnel northbound southern approach that:

4.1.1 minimises whole life costs;

4.1.2 is a fully integral structure;

4.1.3 together with the adjacent retaining walls and ground slabs forms a continuous groundwater exclusion zone; and

4.1.4 is designed to have the least possible impact on users of the highways over and under the bridge from inspections and maintenance interventions.

5. Gantries

5.1 Project Co shall design and construct all required gantry Structures and permanent fixings to accommodate overhead signage in accordance with the requirements of Annex 6 (*Traffic Safety and Control Requirements (Outside Tunnel)*) and Schedule 14 (*User Charging Interface*) so that they:

5.1.1 have a superstructure design working life of fifty (50) years and a foundation design working life of one hundred and twenty (120) years;

5.1.2 minimise whole life costs;

5.1.3 are appropriate for all proposed gantry equipment and any future maintenance regime described in or required to comply with Schedule 18 (*Operation and Maintenance Requirements*);

5.1.4 have the least possible impact on users of the adjacent highway from inspections and maintenance interventions;

5.1.5 are in accordance with BD 51/14 (as described in Part 2 (*Design Standards and Specifications*);

5.1.6 include fixed means of access to have the least possible disruption during future inspection, maintenance and repairs. Gantries shall include but not be limited to fixing points and hard points to facilitate this access;

5.1.7 prohibit unauthorised access;

5.1.8 do not include the use of passively safe gantry systems;

5.1.9 do not include un-painted weathering grades of steel;

5.1.10 use only stainless steel fasteners for attachment to sign gantries;

5.1.11 are designed to prevent electrolytic corrosion of dissimilar metals;

5.1.12 have sealed hollow sections to prevent the ingress of water;

5.1.13 allows for future signage re-configuration and re-sizing; and

5.1.14 are designed to resist fatigue effects from wind gusting.

6. Noise Barriers

6.1 Project Co shall design and construct noise barrier Structures in accordance with Annex 1 (*Highways and General Requirements*) of Part 1 (*Design and Construction Requirements*).

7. Retaining Walls – Standalone and including Ground Slabs

7.1 Project Co shall design and construct retaining wall Structures that:

7.1.1 minimises whole life costs;

7.1.2 are designed for vehicular impact loading and ensure an equivalent level of safety for Users where unprotected by a vehicle restraint system;

7.1.3 prevent the high groundwater from entering the road drainage system;

7.1.4 together with adjacent Structures forms a continuous groundwater exclusion zone;

7.1.5 have the least possible impact on users of the adjacent highway from inspections and maintenance interventions;

7.1.6 found the noise barriers, in accordance with Annex 1 (*Highways and General Requirements*) of Part 1 (*Design and Construction Requirements*); and

7.1.7 provide suitable parapet containment.

7.2 Project Co shall design and construct an expansion joint at any location where a retaining wall crosses the boundary of the O&M Area.

7.3 Project Co shall ensure that adjacent structurally independent retaining walls shall be designed and constructed to minimise differential settlement.

7.4 Project Co shall ensure that any items attached to the retaining walls referred to in paragraph 7.2, including, but not limited to, noise barriers and guardrails shall be designed and constructed to allow for the safe and easy means of replacement of any adjacent items by any party responsible for the maintenance of such items.

8. Highway Structures General Requirements

8.1 Asset Management

8.1.1 Project Co shall obtain from TfL, for each independent highway Structure, a TfL structure reference number. Project Co shall install discrete signage on all independent highway Structures to identify such structure reference numbers.

8.2 Materials and Finishes

8.2.1 In relation to any highway Structures:

a. Project Co shall ensure that all materials used for concrete production for any one particular Structure and for any adjacent Structures shall be obtained from a single source.

b. Project Co shall select materials to ensure that the as-struck concrete colour is in accordance with the Design Principles including making allowance for the effects of formwork types, in particular controlled permeability formwork.

c. Where the use of hydrophobic materials is permitted by Relevant Authorities including, without limitation, the Environment Agency, Defra and the Port of London Authority, Project Co shall carry out silane impregnation in

accordance with the guidance contained in BD 43 (The Impregnation of Reinforced and Prestressed Concrete Highway Structures Using Hydrophobic Pore-Lining Impregnants) and shall ensure that impregnation of surfaces extend one hundred and fifty (150) mm below the adjacent finished ground level.

d. Project Co shall ensure that the impregnation material used pursuant to paragraph 8.2.1c does not come into contact with any other material that would suffer damage as a result of such contact.

e. Where permission is not granted by Relevant Authorities for the use of hydrophobic materials, Project Co shall incorporate alternative measures to enhance the durability of the concrete into the design as agreed with TfL's prior written consent (such consent not to be unreasonably withheld or delayed).

f. Project Co shall not use exposed weathering steel for the design and construction of Structures.

g. Project Co shall ensure that any steelwork is protected with a high-durability paint system, appropriate to the surrounding environment and allowing for 'difficult access' as defined in Series 1900 of the SHW, that shall meet as a minimum the following durability requirements:

   i. no maintenance required prior to twelve (12) years from the Permit to Use Date;

   ii. life to first major maintenance of twenty (20) years from the Permit to Use Date; and

   iii. only minor maintenance only required between twelve (12) years and twenty (20) years from the Permit to Use Date;

h. Project Co shall select the colour of the final coat of paint of each Structure as agreed with TfL's prior written consent (such consent not to be unreasonably withheld or delayed) from the BS 4800 range.

i. Unless stated otherwise in paragraph 2 (*Tunnel Structures*), Project Co shall not use painted concrete.

j. Project Co shall not provide plain concrete finishes unless agreed with TfL's prior written consent (such consent not to be unreasonably withheld or delayed).

k. Project Co shall provide all exposed faces to precast concrete beams with an F3 finish.

l. Project Co shall provide all exposed arises of structural concrete with a chamfer.

8.2.2 Project Co shall finish retaining walls, abutments, headwalls and wingwalls with a form and finish that is consistent with the overall design quality required by the Design Principles.

8.2.3 Project Co shall design and implement measures to prevent the use of Structures by pigeons and other birds.

8.2.4 Project Co shall not use gabions as part of a Structure, unless agreed with TfL's prior written consent (such consent not to be unreasonably withheld or delayed).

8.2.5 Project Co shall ensure that metal vehicular parapets are constructed from aluminium or steel with any steelwork protected against corrosion in accordance with the Notes for Guidance on the Specification Series NG 1900 and have anti-theft fixings.

8.2.6 Project Co shall ensure that mesh panels used in the metal parapets are not cropped after galvanising.

8.3 Drainage of Structures

8.3.1 Project Co shall ensure that:

a. no pipes, ducts, cables or other equipment are visible on the outside of Structures;

b. Structure designs incorporate, for ease of maintenance, practical details for the interception, collection and removal of surface water to piped drainage systems;

c. sub-surface drainage is provided in accordance with the guidance in BA 47 and BD 33 and that direct discharge through bridge decks is not permitted; and

d. except where otherwise agreed with TfL's prior written consent (such consent not to be unreasonably withheld or delayed), roadworks drainage is not continued across bridges.

8.4 Detailing

8.4.1 Project Co shall limit the positioning of external stiffeners, where required in steel Structures, to support locations only.

8.4.2 Project Co shall ensure that there are no visible bolted splices between steel sections on the outside of Structures. Where disguised or covered splices are proposed, detailing shall have due consideration for ease of maintenance. Visible bolted connections may be used for elements such as bracing connections within the structure.

8.4.3 Project Co shall base the design detailing for bridge Structures on the recommended details and basic principles set out in the CIRIA document C543 'Bridge Detailing Guide 2001' other than where inconsistent with these D&C Requirements, in which circumstance these D&C Requirements shall take precedence (unless otherwise agreed to in writing in advance by TfL).

8.4.4 Project Co shall pave all verges over highway Structures (excluding buried Structures) but shall not be entitled to use paving slabs to pave such verges.

8.4.5 Project Co shall ensure that deck cantilevers shall be a constant dimension not less than '0.8d' where 'd' is the depth of the adjacent beam/slab over the length

of the superstructure. The proposed design shall take into consideration the structural resilience of the cantilever.

8.4.6 Project Co shall eliminate hidden details in accordance with CIRIA guide 'Hidden defects in bridges. Guidance on detection and management' (C764).

9. Building Requirements

9.1 Project Co shall design and construct the following Buildings:

9.1.1 portal structures;

9.1.2 tunnel services buildings and/or plant rooms to house the ME&P Systems;

9.1.3 a primary control centre for operating the tunnel systems and services (the **"Project Co Tunnel Control Centre"**);

9.1.4 a secondary back up facility in accordance with paragraph 9.2 (*Secondary Tunnel Control System*) of Annex 2 (*Requirements for Tunnel ME&P Systems*); and

9.1.5 any other buildings required by Project Co to carry out the Services.

9.2 Project Co shall design and construct the Buildings required pursuant to this paragraph 9 (*Building Requirements*) in accordance with the Transferred DCO Functions and the requirements of the Design Principles.

9.3 Project Co shall ensure that the water tanks for the FFFS and drainage attenuation systems are situated underground.

9.4 Project Co shall ensure that the design and construction of the Buildings follows the RIBA Plan of Work 2013.

9.5 Project Co shall design and construct the Buildings to house TfL Equipment Spaces and any facilities required to enable the inter-connecting of the Project Co TCS with the TfL TCS in accordance with Schedule 11 (*TfL Technology Requirements*).

9.6 Project Co shall ensure that the Buildings conform to the same sustainability rating as the wider civil engineering works in accordance with Schedule 12 (*Environmental Requirements*).

9.7 Not used.

9.8 Project Co shall ensure that above ground Buildings are contained within tunnel services compounds, secured by perimeter fences, where buildings do not edge the compound.

9.9 Project Co shall ensure that the design of the Buildings is developed to comply with the Police 'Secured by Design' high level security standards, including without limitation the section describing 'Resilient Design For Counter Terrorism', and is protected from hostile vehicles.

9.10 Project Co shall develop the detailed design of the portal and ancillary buildings such that all routine maintenance of the buildings can be undertaken from ground level and without the need to close the Project Roads or any other part of the road network.

9.11 Project Co shall produce a "tunnel safe-guarding" report to enable TfL to inform all stakeholders of requirements of the specified principles and zones of exclusion and protection surrounding the Silvertown Tunnel, including but not limited to the safeguarding requirements, to ensure:

9.11.1 tunnel structural integrity;

9.11.2 emergency management capability; and

9.11.3 safety and free flow of Users of the Project Roads is safeguarded throughout the design life, including:

a. ensuring it can be safely and adequately maintained at all times; and

b. how the facilitating of a future environmental canopy at the north tunnel portal can be provided whilst maintaining a sufficient smoke and vent exclusion zone.

9.12 Project Co shall design and construct an architecturally intelligent lighting system to make the Buildings more attractive and legible at night.

9.13 Project Co shall design and construct the compounds referred to in paragraph 9.8 to, so far as possible:

9.13.1 limit the impact on existing and potential future development;

9.13.2 minimise visual impact and maximise architectural coherence;

9.13.3 optimise the size and shape of the adjacent potential future development plots;

9.13.4 minimise the overall permanent land take required for the Works; and

9.13.5 be flexible to accommodate changing requirements without major alterations and adaptable to allow for convenient alteration or extension.

9.14 Project Co shall design and construct compounds, Buildings and Structures located along Millennium Way to integrate so far as possible with the 2015 Greenwich Peninsula Masterplan.

9.15 Project Co shall design and construct Buildings to have a minimum design life of fifty (50) years.

9.16 Project Co shall design and construct Buildings in accordance with Part 2 (*Design Standards and Specifications*) and any other relevant British Standards.

9.17 Project Co shall design and construct the Buildings in such a way to ensure clear and safe access to services and utilities installed within and around the curtilage of the Buildings, taking into consideration all requirements regarding suitable ergonomics.

9.18 Project Co shall ensure that services and utilities have the ability to be removed and replaced with the least of operational impact on the Buildings.

9.19 Project Co shall design and construct foundations for Buildings and all other construction above foundation level in a way that ensures interfaces have no impact on maintenance and provision is made by identifying routes and providing structural protection for future installations of services and utilities.

9.20 Project Co shall design roofs, guttering and drain pipes such that there is no retention of rainwater on the Buildings and rainwater falling against the sides of Buildings is collected by a system of perimeter drains.

9.21 Project Co shall provide sustainable urban drainage systems with suitable attenuation systems where necessary so as not to overload existing connecting drainage systems.

9.22 Project Co shall ensure that external finishes minimise the requirement for cleaning and maintenance, are durable under all weather conditions, and can be suitably maintained.

9.23 Project Co shall ensure that Building finishes are architecturally sympathetic and consistent with the whole of the portal development.

9.24 Project Co shall ensure that it uses internal finishes which minimise the requirement for cleaning and are durable under normal use and wear and tear, and can be suitably maintained.

9.25 Project Co shall ensure that the fittings and fixtures are uniform throughout the Buildings and have a durability which results in a maintenance period cycle which matches as efficiently as possible the overall building maintenance programme.

9.26 Project Co shall ensure that Building access complies with the Building Regulations and TfL policies as set out in Part 2 (*Design Standards and Specifications*), including, without limitation, access for the disabled, emergency exits and entry points for emergency services.

9.27 Project Co shall design and construct the building services to provide a facility that is fit for purpose with regards the internal environment conditions including but not limited to temperature, humidity, lighting levels and noise levels suitable for the operators and equipment contained within the building.

9.28 Project Co shall design and construct plant rooms to accommodate the required plant and switchgear. Project Co shall ensure fire safety equipment, intruder alarm systems, Public Announcement systems and CCTV surveillance for security shall also be provided throughout.

Annex 4 of Part 1- Existing Structures

1. Incorporation of Existing Structures

1.1 General Requirements

1.1.1 Without prejudice to any other provisions of this Agreement, Project Co shall comply with the requirements of:

a. this Annex 4 (*Existing Structures*);

b. the relevant standards and specifications set out in Part 2 (*Design Standards and Specifications*); and

c. paragraph 2.5 (*Existing Structures*) of Part 1 (*Certification Procedure*) of Schedule 9 (*Certification and Review Procedure*),

in relation to any existing Structures which Project Co incorporates, retains, modifies, upgrades, renews, remedies or strengthens as part of the Works.

1.1.2 Project Co shall undertake a Structural Review in accordance with the provisions of paragraph 2.5 (*Existing Structures*) of Part 1 (*Certification Procedure*) of Schedule 9 (*Certification and Review Procedure*) for any existing Structure that it proposes to incorporate, retain, modify, upgrade, renew, remedy or strengthen as part of the Works.

1.1.3 If TfL has endorsed as "received" or "received with comments" an Assessment Report carried out in accordance with paragraph 2.5.8 of Part 1 (*Certification Procedure*) of Schedule 9 (*Certification and Review Procedure*) and such Assessment Report recommends that any deficiencies in an existing Structure (or parts thereof) should be remedied, Project Co shall:

a. design and construct any necessary modifying, remediating, strengthening or upgrading Works to ensure compliance of such existing Structure (or parts thereof) with the current assessment standards set out in Part 2 (*Design Standards and Specifications*); and

b. develop and implement interim measures in accordance with paragraph 2.5.10 of Schedule 9 (*Certification and Review Procedure*) and ensure that the existing Structure is managed in accordance with such interim measures, until such time as the Construction Certificate for the Works carried out pursuant to paragraph 1.1.3a has been endorsed by TfL as "received" or "received with comments".

1.1.4 In respect of any Works which may affect the structural integrity of existing Structures, Project Co shall, undertake a resilience inspection and shall submit the findings of such inspection using the form of a TfL structural resilience inspection spreadsheet provided by TfL, to TfL under the Review Procedure.

1.1.5 Project Co shall ensure that the resilience assessment report includes, as a minimum, the mitigation measures required to ensure the operational resilience of the existing Structure.

1.1.6 In the event Project Co categorises an existing support of an existing Structure as either Group 1a, Group 1b or Group 2, in accordance with IAN 91/07

(Interim Advice on the Identification of 'Particularly at Risk' Supports) (**"IAN 91"**) as described in, and except as expressly specified otherwise by TfL in, Part 2 (*Design Standards and Specifications*), Project Co shall either:

a. design and construct strengthening works in accordance with the standards and specifications set out in Part 2 (*Design Standards and Specifications*); or

b. design and construct protection to the supports in accordance with Annex B of IAN 91.

1.2 Residual Life of Existing Structures

1.2.1 Project Co shall ensure that any existing Structures (or parts thereof) incorporated, retained, modified, upgraded, renewed, remedied or strengthened as part of the Works shall have a condition of 3C or better in accordance with the Inspection Manual for Highway Structures Volumes 1 and 2 at the Permit to Use Date.

1.2.2 Project Co shall ensure the Design Data submitted to TfL pursuant to the Review Procedure supports the condition required by paragraph 1.2.1 and includes, as a minimum:

a. an inspection-based appraisal of the present condition;

b. estimates of future deterioration including rates of corrosion, likely carbonation rates and other factors affecting deterioration; and

c. future maintenance costs.

1.2.3 Project Co shall undertake any further investigatory work requested by TfL to support the residual life required by paragraph 1.2.1, and shall carry out all surveys, investigations and testing to provide all factual and interpretative information required to support such residual life.

1.2.4 Where destructive testing is required, Project Co shall obtain all Necessary Consents required in relation to such destructive testing.

1.3 Materials and Finishes of Existing Structures

1.3.1 Project Co shall review and where necessary, upgrade, the finishes of any existing Structures to be incorporated, retained, modified, upgraded, renewed, remedied or strengthened as part of the Works in order to maintain a consistent appearance throughout the Project Facilities and Additional Assets.

1.3.2 Project Co shall, for all existing Structures and parts thereof that are to be incorporated, retained, modified, upgraded, renewed, remedied or strengthened as part of the Works:

a. provide a waterproofing system that is HAPAS approved and in accordance with Part 2 (*Design Standards and Specifications*); and

b. where an existing Structure already has a waterproofing system with a residual life of less than twenty five (25) years, remove the existing system and replace it with a new system in accordance with the requirements in paragraph 1.3.2a.

1.4 Existing Gantry Structures

1.4.1 Project Co shall not incorporate, retain, modify, upgrade, renew, remedy or strengthen any existing gantries or parts thereof as part of the Works.

2. Abandonment and Demolition of Existing Structures

2.1 Where any existing surface Structure within the Order Limits is not proposed by Project Co to be incorporated, retained, modified, upgraded, renewed, remedied or strengthened as part of the Works, Project Co may demolish and remove any materials of such existing surface Structure to the higher of the top of pile cap level or one (1) metre below formation level.

2.2 Project Co shall identify the locations along the tunnelling route where demolition or abandonment of existing structures has taken place.

2.3 Project Co shall survey the sites identified in accordance with paragraph 2.2 to determine whether any buried structures, or parts thereof (including any foundation screws and deep foundation piles), which may obstruct the tunnelling operation on the chosen route alignment have been removed.

2.4 Project Co shall develop an obstruction extraction plan prior to commencing any tunnelling operation in order to reduce the likelihood of disruption associated with encountering obstructions during the tunnelling operation. Project Co shall ensure that the obstruction extraction plan shall include, but not be limited to, details in relation to the following key areas related to obstruction extraction:

2.4.1 roles and responsibilities;

2.4.2 the decision making process;

2.4.3 management and control systems;

2.4.4 land access arrangements;

2.4.5 risk mitigation;

2.4.6 extraction methodologies;

2.4.7 plant and equipment; and

2.4.8 temporary works,

and Project Co shall submit such obstruction extraction plan to TfL under the Review Procedure.

2.5 Project Co shall ensure that extraction activities shall be designed and carried out to mitigate any risks associated with contamination.

2.6 Where working in contaminated ground, Project Co shall reinstate any existing warning barriers where removed for the Works.

2.7 Project Co shall record any abandonment, demolition or extraction activities in the Health & Safety File, in accordance with CDM Regulations, specifically noting the existing structure removed and what residual elements and associated risks remain, including their form and material on as-built drawings.

2.8 Project Co shall submit to TfL under the Review Procedure a Technical Appraisal Form in relation to the demolition of the existing Boord St pedestrian bridge, in accordance with the requirements of Schedule 9 (*Certification and Review Procedure*) indicating how Project Co intends to ensure that:

2.8.1 the Boord St pedestrian bridge is maintained in a stable condition during all stages of demolition;

2.8.2 all necessary measures to ensure the safe demolition of the Boord St pedestrian bridge are taken; and

2.8.3 all necessary measures to ensure the safe disposal of all arisings are taken.

2.9 Project Co shall demolish the existing Boord St pedestrian bridge ensuring that continuous step free access across the Blackwall Tunnel and Silvertown Tunnel corridor is maintained at all times throughout construction in accordance with paragraph 3 (*New Boord Street Foot and Cycle Bridge*) of Annex 3 (*Structure Requirements*).

3. Damage Mitigation Resulting From Ground Movement

3.1 General Requirements

3.1.1 Where the construction of the Works may result in ground-induced movement of buildings, Structures, river walls and Utilities, Project Co shall undertake all such design and construction activities in accordance with the requirements of the Transferred DCO Functions and this Annex 4 (*Existing Structures*).

3.1.2 Project Co shall update the settlement assessment mitigation process phases I and II contained in Part 3 (*Project Co's Works Proposals*) and submit them to TfL under the Review Procedure in accordance with the requirements of Schedule 9 (*Certification and Review Procedure*).

3.1.3 Project co shall analyse the ground as multilayer strata where assets requiring phase III assessments are concerned.

3.1.4 Project Co shall identify to TfL those buildings, Structures and river walls requiring settlement mitigation design such that following any mitigation works, such buildings, Structures and river walls shall not be subject to damage risk greater than class 2 ('Slight') in accordance with the building damage classification set out in the Code of Construction Practice.

3.1.5 Project Co shall establish the acceptable methodology to be used to assess the potential for damage to near-surface Utilities resulting from excavation induced ground movements in consultation with utility companies and Project Co shall agree the risk-based approach and acceptance criteria with each asset owner of the Utilities.

3.1.6 Project Co shall design and construct any such mitigation pursuant to paragraph 3.1.4 and paragraph 3.1.5.

3.1.7 Project Co shall implement proposals for adopting and supplementing the existing structural health monitoring systems.

3.1.8 Project Co shall at all time during the Works monitor movements for each asset until, for any specific asset:

a. movement rate in the zone of influence of that particular asset are reported as two (2) millimetres per annum or less;

b. ground movements in the zone of influence of that particular asset are reported as stable for three (3) months post-construction; or

c. TfL agrees otherwise in writing.

3.1.9 Project Co shall design and construct a web-based system for sharing all monitoring data within two (2) hours of the raw-data having been collected and Project Co shall provide full access to the web-based system for TfL.

3.1.10 Project Co shall attend and make representations at any meetings called by TfL to address ground settlement and its effects whilst tunnelling construction processes are taking place.

3.2 River Walls

3.2.1 Project Co shall ensure that any impacts on the river walls from its construction activities are managed in accordance with the Transferred DCO Functions and the Transferred Third Party Functions.

Annex 5 of Part 1 - Working in the River Thames

1. Material Movement & Temporary Jetty

1.1 Project Co shall undertake all marine activities in accordance with the requirements of this Annex 5 (*Working in the River Thames*), the Transferred DCO Functions and Part 4 (*Environmental Management Requirements*) of Schedule 8 (*Management Systems*).

1.2 Project Co shall design and construct any parts of the Works built on or by the river to withstand wash.

1.3 Where Project Co designs and constructs a berthing area of riverbed adjacent to the river wall, it shall undertake its levelling and dredging activities in accordance with the Transferred DCO Functions.

1.4 Project Co shall ensure that all temporary works in the river, or parts thereof, including any temporary jetty, is removed or decommissioned in accordance with the Transferred DCO Functions and Part 4 (*Environmental Management Requirements*) of Schedule 8 (*Management Systems*).

1.5 Project Co shall undertake remedial works to any ground disturbed by any works undertaken by Project Co pursuant to paragraph 1.2 to ensure no preferential path of weakness exists that may affect the tunnel structure and its intended operational performance.

2. Marine Safety Standards

2.1 Project Co shall ensure that all Boat Masters Licence holders undertaking towing or pushing as part of the Works have their competency validated by:

2.1.1 an assessment of the entire syllabus of the Boat Masters Licence and associated endorsements for the masters; and

2.1.2 an assessment of the masters knowledge of their employer's International Safety Management Code system.

2.2 The validation required in accordance with paragraph 2.1 shall be carried out at the HR Wallingford ship simulation centre.

2.3 Project Co shall ensure that each Sub-Contractor undertaking marine transport appoints a dedicated training officer to ensure consistency in the training of operatives and to provide accountability for the management and assurance of the training record book of all operatives.

2.4 Project Co shall ensure that anyone involved in delivering training or overseeing trainees referred to in paragraph 2.3 shall attend a 'train the trainer' course.

2.5 The training required in accordance with paragraph 2.4 shall, as a minimum, meet the 'train the trainer' course requirements developed for the Thames Tideway Tunnel project and delivered by Nova College, a Dutch marine academy.

Annex 6 of Part 1 - Traffic Safety and Control Requirements (Outside Tunnel)

1. Traffic Signage

1.1 Project Co shall design a signage system to cover all aspects of traffic direction, warning, regulation, management, and control for the combined Silvertown Tunnel and Blackwall Tunnel road corridor which complies with the requirements of this Annex 6 (*Traffic Safety and Control Requirements (Outside Tunnel)*) (excluding the traffic and other signage system required to be designed and constructed pursuant to paragraph 7 (*Traffic and Other Signage System*) of Annex 2 (*Requirements for Tunnel ME&P Systems*)).

1.2 Project Co shall ensure that the signage system design:

1.2.1 minimises sign clutter to avoid the dilution of important messages to drivers; and

1.2.2 minimises the impact on the environment and the street scene.

1.3 Project Co shall construct the elements of the signage system required pursuant to paragraph 1.17 which shall comply with the requirements set out therein.

1.4 Project Co shall ensure that the signage system design required pursuant to paragraph 1.1 shall include, but not be limited to:

1.4.1 direction and destination signage, including the re-designation of route numbers;

1.4.2 speed signage;

1.4.3 diversion signage, including variable signage to direct traffic according to the operational status of the Blackwall Tunnel and the Project Roads;

1.4.4 warning and regulatory signage including signage relating to the prohibition of certain vehicles, users and goods from the Blackwall Tunnel and/or the Project Roads;

1.4.5 a method of notifying Users of the operational status of the Blackwall Tunnel and the Project Roads, including, but not limited to:

a. normal operation – both tunnels open;

b. maintenance closures – one or both bores closed in one or both tunnels; and

c. emergency closures – one or both bores closed in one or both tunnels.

1.4.6 signage of tunnel category and restricted goods in accordance with the Carriage of Dangerous Goods Regulations;

1.4.7 direction of high vehicles, to cover normal, maintenance and emergency situations, due to restricted headroom at Blackwall Tunnel;

1.4.8 designation of the bus, coach and HGV lane in tunnel;

1.4.9 signage relating to waiting and loading restrictions;

1.4.10 wayfinding signage for non-motorised users; and

1.4.11 lane/destination confirmation signage compatible with the traffic and other signage system required to be designed and constructed in accordance with paragraph 7 (*Traffic and Other Signage System*) of Annex 2 (*Requirements for Tunnel ME&P Systems*).

1.5 Project Co shall ensure that the signage system design required pursuant to paragraph 1.1 shall include, but not be limited to:

1.5.1 new signs to be displayed on new posts or new gantries;

1.5.2 new signs to be displayed on existing gantries for any parts of the signage system located outside of the Order Limits;

1.5.3 the incorporation and continued use of existing signs;

1.5.4 the alteration or replacement of existing signs, including posts if necessary;

1.5.5 fixed and variable message signs; and

1.5.6 road markings and studs.

1.6 Project Co shall carry out photographic surveys of existing signage, extending outside the Order Limits as far as necessary, including signs on the M25 in relation to the Blackwall Tunnel and the Dartford Crossing to establish the extent of any required incorporation, alteration or replacement of existing signage in relation to the signage system.

1.7 Project Co shall arrange a meeting with TfL within thirty (30) Working Days of the Effective Date to receive confirmation of any TfL signage projects that TfL intends to develop and /or implement between the Effective Date and Permit to Use Date.

1.8 Project Co shall ensure that the signage system design required pursuant to paragraph 1.1 is co-ordinated with any signage projects notified by TfL pursuant to paragraph 1.7.

1.9 Project Co shall ensure that the signage system design required pursuant to paragraph 1.1 includes variable message signage at approaches to junctions on the combined Silvertown Tunnel and Blackwall Tunnel road corridor that are capable of displaying information to users (such information to be specified by TfL), including but not limited to:

1.9.1 average journey times through the tunnels for each approach;

1.9.2 the tunnel operational status in accordance with paragraph 1.4.5;

1.9.3 delays;

1.9.4 incidents; and

1.9.5 planned events and/or planned closures.

1.10 Project Co shall ensure that the design of all variable message signage is fully compatible with LSTCC requirements and Project Co shall ensure that the designs include details of any work required to connect to LSTCC and LSTOC communications infrastructure to allow operation by LSTCC and LSTOC.

1.11 Project Co shall ensure that:

1.11.1 the signage system design required pursuant to paragraph 1.1 complies with the requirements of the Traffic Signs Manual;

1.11.2 the design of any directional signage for the signage system complies with the requirements of chapter 7 of the Traffic Signs Manual and Local Transport Note 1/94 (*Design and Use of Directional Informatory Signs*);

1.11.3 the signage system design required pursuant to paragraph 1.1 complies with the UK Annex of BS EN 12899-1:2007 with the exception of wind load which shall be derived from the UK National Annex of BS EN 1991-1-4:2005;

1.11.4 any traffic bollards included in the signage system design required pursuant to paragraph 1.1 are retroreflective self-righting (Type A to BS 8442:2015);

1.11.5 retroreflectivity is specified on a sign by sign basis, to be either Class RS2/R2 or R3B for signs intended for vehicle drivers; and

1.11.6 all gantry mounted signs included in the signage system design required pursuant to paragraph 1.1 are directly illuminated.

1.12 Project Co shall not be responsible for the design of signage related to user charging.

1.13 Project Co shall provide TfL with all assistance reasonably required to ensure compatibility of user charging signage with all other signage Project Co is required to design and/or construct pursuant to this Agreement.

1.14 Project Co shall ensure that the signage system design required pursuant to paragraph 1.1 includes all elements required to support the functionality of signage, including, but not limited to, all required posts, foundations, lighting, power and communications.

1.15 Project Co shall develop the signage system design required pursuant to paragraph 1.1 in the following stages:

1.15.1 stage 1 - identification of destinations, which shall include:

a. a list of proposed destinations that are to be signed in association with the Project;

b. the methodology for determining when destinations begin to be signed from each approach; and

c. proposed messages and destinations for variable message signs.

1.15.2 stage 2 - identification of locations, which shall include:

a. the location and types of new signs ; and

b. the locations and types of existing signs to be incorporated, altered or replaced.

1.15.3 stage 3 - indicative schematic layouts of proposed signs, which shall include:

a. design drawings of each sign which shall comply with the design rules in Chapter 7 of the Traffic Signs Manual which shall include the x-height and overall sign dimensions of each sign;

b. a check against available width to ensure suitability of proposed sign;

c. whether each proposed sign is to be a new sign or an incorporated, altered or replaced existing sign;

d. a statement of risk related to the presence of underground services at any proposed foundation locations for any signage; and

e. any required Departures from Standard.

1.16 Project Co shall ensure that the Design Data in relation to the signage system design is submitted to the Review Procedure in the stages required pursuant to paragraph 1.15. Project Co shall not be entitled to submit a subsequent stage of design until the submissions relating to the previous stage have been endorsed by TfL as "received" or "received with comments" in accordance with the Review Procedure.

1.17 Once all stages of the signage system design required pursuant to paragraph 1.15 have been endorsed by TfL as "received" or "received with comments" in accordance with the Review Procedure, Project Co shall:

1.17.1 construct all elements of the signage system design located within the Project Land;

1.17.2 construct all signage related to user charging within the Project Land in accordance with Drawings ST150030-ATK-ZZZ-ZZ-DRG-ZZ-4201, ST150030-ATK-ZZZ-ZZ-DRG-ZZ-4202 and ST150030-ATK-ZZZ-ZZ-DRG-ZZ-4211; and

1.17.3 provide TfL with construction issue drawings and specifications to enable TfL to construct the elements of the signage system located outside of the Project Land.

1.18 Project Co shall ensure that for the elements of signage system to be constructed by Project Co pursuant to paragraph 1.17.1:

1.18.1 any manufacturer of signs engaged in relation to the Works by Project Co or any Project Co Related Party is certified to National Highways Sector Scheme 9A;

1.18.2 any manufacturer of supports/posts engaged in relation to the Works by Project Co or any Project Co Related Party is certified to National Highways Sector Scheme 6;

1.18.3 any installer of signs engaged in relation to the Works by Project Co or any Project Co Related Party is certified to National Highways Sector Scheme 9B;

1.18.4 all signs are provided with a CE marking;

1.18.5 all sign substrate is either traffic grade composite sheet or aluminium alloy;

1.18.6 all red road markings are to BS 381C Colour No 537 (Signal Red). The initial red colour shall lie within the polygon defined by the following coordinates according to the CIE colour measuring system:

X	Y
0.570	0.340
0.650	0.340
0.690	0.300
0.520	0.300
0.510	0.320
0.570	0.340

1.18.7 all passively safe posts are accompanied by a recommended performance class aligned to UK National Annex of BS EN 12767:2007 and specific to the location. Project Co acknowledges and agrees that it is not appropriate to specify one class for all passively safe posts.

1.18.8 Project Co shall prepare and submit to TfL under the Review Procedure a signage system implementation plan which shall detail how Project Co intends to ensure that the installation, testing, and commissioning of the signage system (including uncovering of signs) is carried out in a safe manner, is clear to Users and is co-ordinated with the coming into force of permanent Traffic Regulation Orders (the **"Signage System Implementation Plan"**).

2. Traffic Signalling Works

2.1 Project Co shall design and construct Traffic Signalling Systems at the following locations in accordance with the requirements of this Annex 6 (*Traffic Safety and Control Requirements (Outside Tunnel)*) and clause 13.7 (*Traffic Signalling Works*):

2.1.1 the extended Tidal basin roundabout;

2.1.2 Dock Road pedestrian and cycle crossing; and

2.1.3 Tunnel Avenue Pear Island junction.

2.2 Project Co shall ensure that the design and construction of the Traffic Signalling System for the extended Tidal Basin Roundabout is in accordance with the layout shown on Drawing ST150030-ATK-ZZZ-ZZ-DRG-ZZ-4024 and shall, as a minimum, provide an equivalent level of equipment and functionality as indicated on Drawing ST150030-ATK-ZZZ-ZZ-DRG-ZZ 4024.

2.3 Project Co shall ensure that the design and construction of the Traffic Signalling System at the Dock Road pedestrian and cycle crossing is based on the layout shown on Drawing ST150030-ATK-ZZZ-ZZ-DRG-ZZ-4025 and shall, as a minimum, provide an equivalent level of equipment and functionality as indicated on Drawing ST150030-ATK-ZZZ-ZZ-DRG-ZZ-4025.

2.4 Project Co shall ensure that the design and construction of the Traffic Signalling System at the Tunnel Avenue Pear Island junction is based on the layout shown on Drawing ST150030-ATK-ZZZ-ZZ-DRG-ZZ-4026 and shall, as a minimum, provide an equivalent level of equipment and functionality as indicated on Drawing ST150030-ATK-ZZZ-ZZ-DRG-ZZ-4026.

2.5 Project Co shall comply with the following TfL procedures in relation to the design of the Traffic Signalling Systems required pursuant to paragraph 2.1:

2.5.1 TfL Traffic Directorate six stage model auditing process; and

2.5.2 TfL Surface Transport four step modelling process.

2.6 The Parties acknowledge and agree that some of the stages and/or steps of the procedures set out in paragraph 2.5 have been completed prior to the Effective Date. Project Co shall be required to complete the remaining stages and/or steps identified by TfL.

2.7 Project co shall submit reports and required data to TfL for each confirmed stage and/or step required pursuant to paragraph 2.6 and shall and obtain the prior written approval of TfL before progressing to the next required stage or step of design in accordance with paragraph 2.6. TfL shall take into account feedback from TfL's operational modelling and visualisation team when considering whether to provide their written approval pursuant to this paragraph 2.7.

2.8 Project Co shall ensure that all reports and data required to be submitted pursuant to paragraph 2.7 in relation to the Traffic Signalling System at the Tidal Basin Roundabout show that such Traffic Signalling System will achieve the following:

2.8.1 the Traffic Signalling System will operate with at least fifteen per cent (15%) practical reserve capacity;

2.8.2 queues will be managed within the designed highway stacking capacity;

2.8.3 queues should clear each cycle and not regularly block upstream junctions or pedestrian crossing facilities; and

2.8.4 delays to buses will be neutral or improved on affected routes.

2.9 Project Co shall ensure that the Design Data relating to the Traffic Signalling Systems to be submitted to TfL under the Review Procedure includes, but is not limited to:

2.9.1 detailed site layout drawings for each new or amended traffic signal junction or crossing;

2.9.2 evidence of equipment approvals required in accordance with the TCMS2 process for traffic control equipment;

2.9.3 a schedule of equipment to be installed, which has received written approval from the traffic signals maintenance contractor nominated by TfL;

2.9.4 an audited controller specification written to TOPAS 2500A; and

2.9.5 electrical design calculations demonstrating compliance with Institution of Electrical Engineers regulations and BS7671.

2.10 Project Co shall design and construct power supplies to separate feeder pillars for each Traffic Signalling System required pursuant to paragraph 2.1 and, unless otherwise agreed with TfL, Project Co shall ensure that the power supply is provided by the power supplier nominated by TfL and notified to Project Co within ninety (90) Working Days of the Effective Date.

2.11 Project Co shall design and construct telecommunication connections to separate controller cabinets for each Traffic Signalling System required pursuant to paragraph 2.1 and, unless otherwise agreed with TfL, Project Co shall ensure that the telecommunication connections are provided by the telecommunications connection provider nominated by TfL and notified to Project Co within ninety (90) Working Days of the Effective Date.

2.12 Project Co shall design and construct all electrical and telecommunication links between feeder pillars, controller cabinets and all other Traffic Signalling System equipment in relation to each Traffic Signalling System.

2.13 Project Co shall design and construct a fully ducted network for power and telecommunications cabling for each Traffic Signalling System, including ducting, draw pit chambers, controller base units and pole retention sockets, in accordance with TfL standard detail drawings for traffic signal installations.

2.14 Project Co shall design and construct the Traffic Signalling Systems required pursuant to paragraph 2.1 in accordance with the standards and specifications in Part 2 (*Design Standards and Specifications*), including:

2.14.1 the DMRB;

2.14.2 the TfL SQA- 0640 series documents;

2.14.3 the Traffic Open Product and Specifications (TOPAS) technical specifications; and

2.14.4 the TfL standard detail drawings.

2.15 Project Co shall ensure that the Traffic Signalling Systems required pursuant to paragraph 2.1 are capable of being operated with:

2.15.1 TfL's Urban Traffic Management and Control system;

2.15.2 split, cycle and offset optimisation technique (**"SCOOT"**) adaptive vehicle control;

2.15.3 selective vehicle detection bus priority via TfL's iBus system within SCOOT;

2.15.4 the TfL TCS; and

2.15.5 the tunnel entry control signals and barriers required pursuant to paragraph 7.2 of Annex 2 (*Requirements for Tunnel ME&P Systems*).

2.16 Project Co shall ensure that any pedestrian and shared cycle crossings included as part of a Traffic Signalling System are designed and constructed as Toucan crossings with pedestrian countdown facilities.

2.17 Project Co shall ensure that any traffic signalling equipment in any Traffic Signalling System required to be designed and constructed pursuant to paragraph 2.1 is:

2.17.1 provided in accordance with the Traffic Signs Regulations and General Directions;

2.17.2 'plug and play' to reduce the need for work at height;

2.17.3 provided in accordance with Traffic Open Products and Specifications (TOPAS) technical specifications;

2.17.4 registered with TOPAS Ltd where equipment falls within the scope of TOPAS;

2.17.5 on an equipment list which has received written approval from the traffic signals maintenance contractor nominated by TfL; and

2.17.6 provided with the 13 digit charge code (ELEXON Code) for unmetered electrical equipment.

3. CCTV

3.1 Project Co shall design and construct a CCTV system with pan-tilt-zoom capable of being controlled by LSTCC and/or LSTOC with complete and continuous visual coverage for:

3.1.1 all approaches to the Tidal Basin Roundabout;

3.1.2 the Tidal Basin Roundabout; and

3.1.3 all merge / diverge, interchanges and junctions.

3.2 Project Co shall ensure that the design and construction of the Works shall not in any way affect TfL's ability to operate and maintain existing CCTV systems at any time.

3.3 Where any part of an existing CCTV system could potentially be affected by the Works, Project Co shall:

3.3.1 inform TfL of the impact or potential impact of the Works; and

3.3.2 obtain TfL's prior written consent (such consent not to be unreasonably withheld or delayed) to any required works to enable CCTV coverage of existing trafficked roads to remain operable at all times.

4. Blackwall High Vehicle Detection System

4.1 Project Co shall ensure that it shall not in any way affect TfL's ability to operate and maintain the existing high vehicle detection system for the Blackwall Tunnel at any time.

4.2 Where any part of the existing high vehicle detection system for the Blackwall Tunnel could potentially be affected by the Works, Project Co shall:

4.2.1 inform TfL of the impact or potential impact of the Works; and

4.2.2 obtain TfL's prior written consent (such consent not to be unreasonably withheld or delayed) to any required works to enable the existing high vehicle detection system for the Blackwall Tunnel to remain operable at all times.

Annex 7 of Part 1 – Additional Assets 8, 9 and 10

1. Design and Planning Permission

1.1 TfL will:

1.1.1 provide Project Co with a copy of the detailed design developed in relation to Additional Asset 8, Additional Asset 9 and Additional Asset 10; and

1.1.2 obtain and provide Project Co with copies of any planning permission required to enable Project Co to construct Additional Asset 8, Additional Asset 9 and Additional Asset 10 in accordance with the detailed design provided pursuant to paragraph 1.1.2,

by 1 January 2020.

2. Additional Asset 8 -TfL Station Car Park

2.1 Project Co shall design and construct the following works in relation to the TfL station car park located off Edmund Halley Way which is formed of the NCP car park and LUL staff car park as shown on preliminary drawings STWTN-ATK-GEN-XXXX-DR-Z-3521 STT-TFL-MAC-A001_Z-DR-T-0200:

2.1.1 alterations to the car parking provision to enable the continued use of the NCP and LUL staff car parking provision during the Works in accordance with the requirements of paragraph 2.2 and paragraph 2.3; and

2.1.2 in the event that the design and construction of the Works by Project Co results in spaces currently available to LUL staff in the LUL staff car park becoming unavailable, a new car park to replace any unavailable spaces to be designed and constructed on the area of land bounded by Millennium Way and Pavilion Lane as shown on drawing STT-TFL-MAC-A000_Z-DR-T-0109 in accordance with the requirements of paragraph 2.4.

2.2 Project Co shall ensure that the alterations to the NCP car park are designed constructed to meet the following requirements:

2.2.1 the number of car parking spaces are maximised;

2.2.2 there is no change in service or functionality of the NCP car park, which shall include but not be limited to, the use of raising arm barriers, ticket booths, pay stations or ANPR cameras;

2.2.3 all parking bays shall have a minimum dimension of 2.4m x 4.8m and shall be marked on the surface with paint to BS 3262 parts 1 to 3;

2.2.4 aisles shall have a minimum width of 6.0m for parking bays configured at ninety (90) degrees to the aisles;

2.2.5 swept path analysis shall be carried out to ensure that all access routes and parking bays are accessible without impacting adjacent bays, kerb lines or road furniture;

2.2.6 access to and from the NCP car park shall be maintained at all times during the Works;

2.2.7 all pavements shall be designed in accordance with HD 26/06 (DMRB 7.2.3) and IAN 73/06 rev 1 for traffic level of 1msa;

2.2.8 all lighting shall be provided in accordance with BS 5489-1:2013 and BS EN 12464-2:2014 and such lighting should at least match the existing level of lighting for the NCP car park and existing columns and lanterns shall be re-used by Project Co where possible;

2.2.9 CCTV shall be provided to at least the same level of provision on the existing NCP car park with fixed cameras monitoring entry and exit points and PTZ cameras covering all other areas;

2.2.10 fencing shall be provided to at least the same standard as the existing provision of fencing at the NCP car park and the interface between LUL and public car parking shall be marked by fencing and/or bollards to prevent public use of LUL car parking spaces; and

2.2.11 the original NCP car park layout, entrance, exit and boundary fencing shall be reinstated following the completion of the reinstatement of Edmund Halley Way and Millennium Way.

2.3 Project Co shall ensure that the alterations to the LUL staff car park are designed and constructed to meet the following requirements:

2.3.1 the number of car parking spaces retained within the footprint of the LUL staff car park is maximised;

2.3.2 there is no change in service or functionality of the LUL staff car park, which shall include but not be limited to, the use of the rising arm barrier and the coordinated entry system with the Pavilion Lane car park;

2.3.3 all parking bays shall have a minimum dimension of 2.4m x 4.8m and shall be marked on the surface with paint to BS 3262 parts 1 to 3;

2.3.4 aisles shall have a minimum width of 6.0m for parking bays configured at ninety (90) degrees to the aisles;

2.3.5 swept path analysis shall be carried out by Project Co to ensure that all access routes and parking bays are accessible without impacting adjacent bays, kerb lines or road furniture;

2.3.6 access to and from the LUL staff car park shall be maintained at all times during the Works;

2.3.7 all pavements shall be designed in accordance with HD 26/06 (DMRB 7.2.3) and IAN 73/06 rev 1 for traffic level of 1msa;

2.3.8 all lighting shall be provided in accordance with BS 5489-1:2013 and BS EN 12464-2:2014 and such lighting should at least match the existing level of lighting for the LUL staff car park and existing columns and lanterns shall be re-used by Project Co where possible;

2.3.9 CCTV shall be provided to at least the same level of provision on the existing LUL staff car park with fixed cameras monitoring entry and exit points and PTZ cameras covering all other areas;

2.3.10 fencing shall be provided to at least the same standard as the existing provision of fencing at the LUL staff car park and the interface between LUL and public car parking shall be marked by fencing and/or bollards to prevent public use of LUL car parking spaces; and

2.3.11 the original LUL staff car park layout, entrance, exit and boundary fencing shall be reinstated following the completion of the reinstatement of Edmund Halley Way and Millennium Way.

2.4 Project Co shall ensure that any new car park to be designed and constructed pursuant to paragraph 2.1.2 shall meet the following requirements:

2.4.1 fifty eight (58) LUL parking spaces are available at all times during the Works;

2.4.2 all parking bays shall have a minimum dimension of 2.4m x 4.8m and shall be marked on the surface with paint to BS 3262 parts 1 to 3;

2.4.3 aisles shall have a minimum width of 6.0m for parking bays configured at ninety (90) degrees to the aisles;

2.4.4 all designated pedestrian walkways shall be clearly defined and high volume routes shall be separated from the path of vehicles;

2.4.5 swept path analysis shall be carried out by Project Co to ensure that all access routes and parking bays are accessible without impacting adjacent bays, kerb lines or road furniture;

2.4.6 following construction, access to and from the new car park shall to be maintained at all times during the Works;

2.4.7 all pavements shall be designed in accordance with HD 26/06 (DMRB 7.2.3) and IAN 73/06 rev 1 for traffic level of 1msa;

2.4.8 all lighting shall be provided in accordance with BS 5489-1:2013 and BS EN 12464-2:2014 and such lighting should at least match the existing level of lighting for the LUL staff car park;

2.4.9 the entry and exit to the car park shall include a rising arm barrier and a coordinated entry system with the LUL staff car park;

2.4.10 CCTV shall be provided to at least the same level of provision on the existing LUL staff car park with fixed cameras monitoring entry and exit points and PTZ cameras covering all other areas;

2.4.11 fencing shall be provided to at least the same standard as the existing provision of fencing on the LUL staff car park;

2.4.12 the new car park shall be reinstated to its original state following the reinstatement of the TfL station car park required pursuant to this paragraph 2.

3. Additional Asset 9 - Vehicular access to Blackwall Tunnel Southbound Floodgate Head House

3.1 Project Co shall design and construct alterations to the vehicular access to the Blackwall Tunnel Southbound Floodgate Head House from Millennium Way as shown on the preliminary drawing STT-TFL-MAC-A000_Z-DR-T-0109.

3.2 Project Co shall ensure that access to the Blackwall Tunnel Southbound Floodgate Head House is maintained at all times during the construction of Additional Asset 8 and Additional Asset 9, for the purposes of operating, maintaining, improving, decommissioning or demolishing the Blackwall Tunnel Southbound Floodgate Head House.

3.3 Project Co shall ensure that the sequencing for the alterations to the vehicular access is agreed with TfL (acting reasonably) prior to undertaking such alterations to enable continued use of Pavilion Lane for TfL operational purposes.

3.4 As part of either the design and construction of Additional Asset 9 pursuant to this paragraph 3 or Additional Asset 10 pursuant to paragraph 4 (Additional Asset 10 - Relocation of DVSA/Metropolitan Police vehicle assessment facility), Project Co shall ensure that a Tunnel maintenance staging area shall be made available throughout the Works with space for two (2) low loaders, three (3) scissor lifts and four (4) maintenance vans.

3.5 As part of Project Co's obligations pursuant to paragraph 1.15.1 of Part 1 (*Design and Construction Reequirements*), Project Co shall:

3.5.1 agree an emergency plan with the TDSCG which shall be specific to the operation of the Blackwall Tunnel Southbound Floodgate Head House, and shall detail the emergency vehicle access to the Floodgate Head House in the event of an emergency in the Blackwall tunnel; and

3.5.2 provide TfL with up to date site access information, to the extent such information may impact on TfL's emergency planning for the Blackwall Tunnel.

4. Additional Asset 10 - Relocation of DVSA/Metropolitan Police vehicle assessment facility

4.1 Project Co shall design and construct a relocated vehicle assessment facility for the DVSA/Metropolitan Police in the area between the realigned Pavilion Lane and Millennium Way as indicated on Drawing no STT-TFL-MAC-A000-Z-DR-T-0109.

4.2 Project Co shall ensure that the relocated vehicle assessment facility is designed and constructed to meet the following requirements:

4.2.1 the modular office building is replaced like for like with the same provision of utilities, drainage and IT services or is relocated;

4.2.2 inclusion of a like for like weightbridge;

4.2.3 the vehicle assessment facility is out of use for as short a period as is reasonably practicable;

4.2.4 seven (7) parking spaces shall be provided within the security fence for the DVSA/MPS compound with minimum dimensions of 2.4m x 4.8m and such spaces shall be marked on the surface with paint in accordance with BS 3262 Parts 1 to 3;

4.2.5 three (3) additional parking spaces shall be provided outside of the DVSA compound on Pavillion Lane for DVSA use with a minimum dimension of 2.4m x 4.8m and shall be marked on the surface with paint to BS 3262 parts 1 to 3;

4.2.6 two (2) parking spaces (hard standing) shall be provided for 19m articulated lorries;

4.2.7 all earthworks, drainage and paving required for relocation of the vehicle assessment facility is undertaken;

4.2.8 3m high security fencing and gates shall be provided for the DVSA/MPS compound; and

4.2.9 the proposed layout shall negate the need for vehicle reversing (other than reversing onto the weighbridge).

Annex 8 of Part 1 – Asset Management System

1. General

1.1 Project Co shall design and construct an asset management system, which shall be capable of recording and reporting the real-time status of all assets of the Project Facilities as described in this Annex 8 (the **"Asset Management System"**).

2. Electronic Database

2.1 Project Co shall ensure that the Asset Management System is an electronic database utilising relevant software and hardware that is capable of being maintained and upgraded as may be necessary in line with any technology changes during the Availability Period.

2.2 Project Co shall ensure that the Asset Management System is capable of recording and reporting the following:

2.2.1 the identification, classification and location of each asset to the lowest maintainable unit or fault capture level;

2.2.2 the condition of each asset, including whether it meets the Performance Requirement as specified in Annex 1 (*Tunnel ME&P Systems Performance Requirements*) and Annex 2 (*Structures (including Buildings) and Highway Assets – Performance Requirements*) of Part 3 (*Asset Management*) of Schedule 18 (*Operation and Maintenance Requirements*);

2.2.3 the condition of each asset, including whether it meets the Safety Requirement as specified in Annex 1 (*Tunnel Safety Management System*) of Part 2 (*Operation Requirements*) of Schedule 18 (*Operation and Maintenance Requirements*);

2.2.4 details of planned inspections or surveys for every asset for the next two (2) Agreement Years;

2.2.5 records of inspections or surveys completed during the Availability Period for every asset, including dates, results, inspection or survey type, inspection / survey result, report on any maintenance or repair work required;

2.2.6 details of planned maintenance for every asset for the next two (2) Agreement years;

2.2.7 records of maintenance or repair work carried out during the Availability Period for every asset, including dates, details of work undertaken, parts or components replaced (if applicable); and

2.2.8 the remaining Residual Life of assets that are defined as Elements in accordance with Annex 1 (*Handback Elements*) of Schedule 19 (*Handback Requirements*);

3. Interfaces

3.1 Project Co shall design and construct the Asset Management System such that it is compatible with the TSMS designed and constructed pursuant to Annex 2 (*Requirements for Tunnel ME&P Systems*).

4. Manual

4.1 Project Co shall develop and provide to TfL an operating manual for the Asset Management System which shall include:

4.1.1 a list of all assets of the Project Facilities that are recorded in the Asset Management System;

4.1.2 general instructions for using the Asset Management System;

4.1.3 the methodology for inputting and updating records and data; and

4.1.4 instructions for the reporting of data recorded in the Asset Management System and other outputs.

5. TfL Access

5.1 Project Co acknowledges and agrees that TfL is entitled to access the Asset Management System for the purposes of carrying out audits of Project Co's performance in relation to the implementation and maintenance of the Asset Management System.

SCHEDULE 10

DESIGN AND CONSTRUCTION REQUIREMENTS

Part 2 - Design Standards and Specifications

1. General

1.1 Project Co shall design and construct the Works in accordance with the standards and specifications specified in this Part 2 (*Design Standards and Specifications*), including the following documents:

1.1.1 the documents that form part of the DMRB referred to in paragraph 1.1 of Annex 1 (*Standards and Specifications*) as amended by:

a. the general principles set out in paragraph 1 (*General Principles*) of Annex 2 (*Amendments to Standards and Specifications*); and

b. the specific amendments set out in paragraph 2 (*Amendments to the DMRB*) of Annex 2 (*Amendments to Standards and Specifications*),

but excluding those documents listed in paragraph 1.2 of Annex 1 (*Standards and Specifications*);

1.1.2 the TfL standards listed in paragraph 2 (*TfL Standards*) of Annex 1 (*Standards and Specifications*) as amended by paragraph 3 (*Amendments to TfL Standards*) of Annex 2 (*Amendments to Standards and Specifications*);

1.1.3 the Interim Advice Notes listed in paragraph 3 (*Interim Advice Notices*) of Annex 1 (*Standards and Specifications*) as amended by the general principles set out in paragraph 1 (*General Principles*) of Annex 2 (*Amendments to Standards and Specifications*) and the specific amendments set out in paragraph 4 (*Amendments to Interim Advice Notes*) of Annex 2 (*Amendments to Standards and Specifications*);

1.1.4 the documents that form part of the MCHW listed in paragraph 4.1 of Annex 1 (*Standards and Specifications*), but excluding those documents listed in paragraph 4.2 of Annex 1 (*Standards and Specifications*), as amended by the general principles set out in paragraph 1 (*General Principles*) of Annex 2 (*Amendments to Standards and Specifications*) and the specific amendments set out in paragraph 5 (*Amendments to the MCHW*) of Annex 2 (*Amendments to Standards and Specifications*);

1.1.5 the other documents listed in Annex 3 (*Other Documents*) as amended by Annex 4 (*Amendments to Other Documents*); and

1.1.6 the Specification Appendices listed in Annex 5 (*Specification Appendices*) which TfL has endorsed as "received" or "received with comments" pursuant to the Review Procedure.

1.2 In resolving discrepancies between the other provisions of this Agreement and documents referred to in this Part 2 (*Design Standards and Specification*) or between one or more documents referred to in this Part 2 (*Design Standards and Specification*), Project Co shall comply with the following discrepancy principles:

1.2.1 where any requirements of Part 1 (*Design and Construction Requirements*) conflict with this Part 2 (*Design Standards and Specification*), the requirements of Part 1 (*Design and Construction Requirements*) shall prevail;

1.2.2 where TfL standards conflict with DMRB documents or MCHW documents listed in this Part 2 (*Design Standards and Specification*), the TfL Standards shall prevail;

1.2.3 where the MCHW documents listed in this Part 2 (*Design Standards and Specification*) conflicts with the other provisions of this Agreement, the other provisions of this Agreement shall prevail;

1.2.4 where the Specification Appendices conflict or are inconsistent with any provision of the SHW, the Specification Appendices shall prevail;

1.2.5 where a clause in the SHW is altered, any original table or figure referred to in that clause shall apply unless the table or figure is altered pursuant to this Agreement. Where a table or figure is altered pursuant to this Agreement, any reference in a clause of the SHW to the original table or figure shall be deemed to refer to the altered table or figure; and

1.2.6 where conflicts are otherwise unresolved by paragraphs 1.2.1 to 1.2.5 Project Co shall inform TfL of the discrepancy and TfL shall resolve such discrepancy in its absolute discretion.

1.3 Any reference to a requirement in this paragraph 1 shall be deemed to be a reference to the edition or version of that requirement which was current as at the Bid Date, including any updates and/or revisions implemented prior to the Bid Date, except where expressly stated otherwise.

1.4 Except as otherwise defined in this Agreement, capitalised terms used in this Part 2 (*Design Standards and Specification*) shall have the meanings given to them in the relevant documents referred to in this Part 2 (*Design Standards and Specification*).

Annex 1 of Part 2 – Standards and Specifications

1. DMRB

1.1 Subject to paragraph 1.2, the documents listed in Volume 0, Section 1, Part 1 of the DMRB (DMRB: Volume Contents Pages and Alpha - Numeric Index) as amended by paragraph 2 (*Amendments to the DMRB*) of Annex 2 (*Amendments to Standards and Specifications*).

1.2 Project Co shall not be required to comply with the following documents referred to in paragraph 1.1:

DMRB Volume 1	BD 2/12	Technical Approval of Highway Structures
	BD 60/04	Design of Highway Bridges for Vehicle Collision
	BD 31/01	Design of Buried Concrete Box and Portal Structure
	BD 60/04	Design of Highway Bridges for Vehicle Collision Loads
	BD 9/81	Implementation of BS 5400: Part 10: 1980 – Code of Practice for Fatigue
	BD 16/82	Design of Composite Bridges. Use of BS 5400: Part 5: 1979 (Incorporating Amendment No.1 dated December 1987)
	BD 37/01	Loads for Highway Bridges
	BA 9/81	The Use of BS 5400 Part 10: 1980 – Code of Practice for Fatigue (Incorporating Amendment No.1 dated November 1983)
	BA 19/85	The Use of BS 5400: Part 3: 1982
	BD 15/92	General Principles for the Design and Construction of Bridges. Use of BS 5400: Part 1: 1988
	BD 49/01	Design Rules for Aerodynamic Effects on Bridges
	BA 59/94	Design of Highway Bridges for Hydraulic Action
	BD 58/94	Design of Bridges and Concrete Structures with External and Unbonded Prestressing
	BA 42/96	The Design of Integral Bridges (Incorporating Amendment No.1 dated May 2003)
	BA 53/94	Bracing Systems and the Use of U-Frames in Steel Highway Bridges
	BD 13/06	Design of Steel Bridges. Use of BS 5400-3:2000
	BD 84/02	Strengthening of Concrete Bridge Supports for Vehicle Impact Using Fibre Reinforced Polymers
	BE 23	Shear Key Decks (Incorporating Amendment No.1 to Annex dated June 1971)
	BE 5/75	Rules for the Design and Use of Freyssinet Concrete Hinges in Highway Structures Scottish Addendum applicable for use in Scotland
DMRB Volume 2	BD 68/97	Crib Retaining Walls
	BD 41/97	Reinforced Clay Brickwork Retaining Walls of Pocket-Type and Grouted-Cavity Type Construction Use of BS 5628: Part 2: 1995
	BD 70/03	Strengthened/Reinforced Soils and other Fills for Retaining Walls and Bridge Abutments Use of BS 8006: 1995, incorporating Amendment No.1 (Issue 2 March 1999)
	BD 30/87	Backfilled Retaining Walls and Bridge Abutments

	BA 80/99	Use of Rock Bolts
	BD 74/00	Foundations
	BE 7/04	Departmental Standard (Interim) Motorway Sign/Signal Gantries
	BD 91/04	Unreinforced Masonry Arch Bridges
	BA 26/94	Expansion Joints for Use in Highway Bridge Decks
	BD 31/01	The Design of Buried Concrete Box and Portal Frame Structures
	BD 20/92	Bridge Bearings. Use of BS 5400: Part 9: 1983
	BA 37/92	Priority Ranking of Existing Parapets
	BA 36/90	The Use of Permanent Formwork
DMRB Volume 3	BA 93/09	Structural Assessment of Bridges with Deck Hinges
	BA 52/94	The Assessment of Concrete Structures Affected by Alkali Silica Reaction
	BE 13	Fatigue Risk in Bailey Bridges
	BD 81/02	Use of Compressive Membrane Action in Bridge Decks
	BD 101/11	Structural Review and Assessment of Highway Structures
DMRB Volume 4	HD 43/04	Drainage Data Management System for Highways
	HA 44/91	Design and Preparation of Contract Documents
	HA 78/96	Design of Outfalls for Surface Water Channels
	HD 50/16	The Certification of Drainage Design
	HA 105/04	Sumpless Gullies
	HA 41/90	A Permeameter for Road Drainage Layers
	HA 73/95	Site Investigation for Highway Works on Contaminated Land
	HA 43/91	Geotechnical Considerations and Techniques for Widening Highway Earthworks
DMRB Volume 5	TD 37/93	Scheme Assessment Reporting
	TA 46/97	Traffic Flow Ranges for Use in the Assessment of New Rural Roads
	TA 79/99	Traffic Capacity of Urban Roads
	TA 11/09	Traffic Surveys by Roadside Interview
	TA 22/81	Vehicle Speed Measurement on All Purpose Roads
	TD 11/82	Use of Certain Departmental Standards in the Design and Assessment of Trunk Road Schemes
	TA 30/82	Choice between Options for Trunk Road Schemes
	HA 12/81	Management of Contractual Claims
	HA 19/82	Engineer/Contractor Relationship on Trunk Road Contracts
	HD 34/03	Implementation and Use of the Standards Improvement System
DMRB Volume 7	HD 24/06	Traffic Assessment
	HD 32/16	Maintenance of Concrete Roads
DMRB Volume 8	TD 89/08	Use of Passively Safe Signposts, Lighting Columns and Traffic Signal Posts to BS EN 12767
	TA 49/07	Appraisal of New and Replacement Lighting on the Strategic Motorway and All Purpose Trunk Road Network
	TA 68/96	The Assessment and Design of Pedestrian Crossings
DMRB Volume 9	TD 71/16	Technology Overview and General Requirements
	TD 72/17	Transmission Infrastructure
DMRB Volume 10	HA 86/01	Principles and Guidance
	HA 87/01	Environmental Functions

	HA 88/01	Landscape Elements
	HA 89/01	Environmental Elements
	HA 90/01	Planning and Policy Features
	HA 91/01	Environmental Database System
	HA 92/01	Scheme Development, Implementation and Management
	HA 93/01	Contract Performance Requirements
	HA 94/01	Glossary of Terms
	HA 57/92	New Roads Integration with Rural Landscapes
	HA 60/92	New Roads Heritage
	HA 116/05	Nature Conservation Advice in Relation to Reptiles and Roads
	HA 99/01	Policy and Guidance
DMRB Volume 11	HA 200/08	Aims and Objectives of Environmental Assessment
	HA 201/08	General Principles and Guidance of Environmental Impact Assessment
	HA 202/08	Environmental Impact Assessment
	HD 47/08	Screening of Projects for Environmental Impact Assessment
	HA 204/08	Scoping of Environmental Impact Assessments
	HA 205/08	Assessment and Management of Environmental Effects
	HD 48/08	Reporting of Environmental Impact Assessments
	HA 218/08	Glossary of Terms Used in The Design Manual for Roads and Bridges Volume 11 Sections 1 and 2
	HA 207/07	Air Quality
	HA 208/07	Cultural Heritage
		Disruption Due to Construction
		Ecology and Nature Conservation
		Landscape Effects
		Land Use
	HD 213/11	Noise and Vibration
		Pedestrians, Cyclists, Equestrians and Community Effects
		Vehicle Travellers
	HD 44/09	Assessment of Implications (of Highways and/or Roads Projects) on European Sites
DMRB Volume 12		Traffic Appraisal of Road Schemes
DMRB Volume 13		Economic Assessment of Road Schemes
DMRB Volume 14		Economic Assessment of Road Maintenance
DMRB Volume 15		Economic Assessment of Road Schemes in Scotland

2. TfL Standards

2.1 The following TfL standards, as amended by paragraph 3 (*Amendments to TfL Standards*) of Annex 2 (*Amendments to Standards and Specifications*):

2.1.1 SQA Documents:

Reference	Description
SQA-0170	Road Safety Audit Document
SQA-0170	Road Safety Audit Procedure 2
SQA-0189	Streets Traffic Order Team Manual
SQA-0202	Winter Maintenance on the TLRN
SQA-0253	Traffic Order Models Admin Control
SQA-0254	Section 6, 83, or 84 Permanent Traffic Orders
SQA-0255	Section 9 Experimental Orders - Making Them Permanent
SQA-0256	Section 9 Experimental Traffic Orders
SQA-0257	Section 10(2) Modifications to Experimental
SQA-0258	Section 14(1) Temporary Traffic Orders
SQA-0259	Section 14(2) Temporary Traffic Notices
SQA-0260	Continuing a Temporary 14(2) Traffic Restriction by means of a 14(1) Order
SQA-0261	Section 16A Special Event Traffic Orders
SQA-0262	Pedestrian Crossing Traffic Notices
SQA-0457	Traffic Orders Team Quality Manual
SQA-0463	Beginners Guide to Traffic Order Types
SQA-0532	Electrical Disconnection and Removal of Redundant Equipment - Mains Supply
SQA-0573	Works Process Integration
SQA-0599	TfL Street Lighting - Palette of Materials
SQA-0609	Temporary Consolidated Suspension Request
SQA-0610	Process for TCMS Contractors to Organise In-Station UTC Commissioning for ATS Works
SQA-0625	Design, Installation, Commissioning and De-Commissioning of Portable Light Signals at Permanent Traffic Signal Sites
SQA-0640	Policy, Standards and Guidance to Procedures for the Design of Traffic Signal
SQA-0641	High Level Process for the Design of Traffic Signals
SQA-0643	Design for Signalised Junctions
SQA-0642	Traffic Signals Client Requirements
SQA-0644	Design for Standalone Crossings
SQA-0645	Traffic Signal Timings
SQA-0647	Justification for traffic signals
SQA-0648	Documentation for the Design File
SQA-0651	Design of traffic signal control for pedal cycles
SQA-0660	Traffic Signals Electrical Design Procedure
SQA-1900	Technical Approval of TfL Sponsored Highway Schemes
SQA-1902	Equality Act - Accessible Crossings Procedure
SQA-1902	Equality Act - Accessible Crossings
SQA-1903	Equality Act – Bus Stop Accessibility Procedure
SQA-1903	Equality Act – Bus Stop Accessibility

Reference	Description
SQA-1921	Drainage Investigation Specification
SQA-1928	Access Covers and other Ironworks on the TLRN
SQA-2034	Tunnels TOMS (Outstations) Maintenance Process
SQA-2101.1	Roadside Advertising Planning Process
SQA-2101.2	Roadside Advertising Delivery Process
SQA-8140	Temporary Traffic Signs on the Highway Application
SQA-8189	Traffic Signal Safety & Quality Check Lists 1 & 2

2.1.2 Other TfL Standards

LED Tunnel Lighting Designers' Guidance Notes, TFL_LED TUN GUIDE03, Feb 2017
Accessible Bus Stop Design Guidance
Kerbside Loading Guidance
London Cycling Design Standards (LCDS), 2014: • Chapter 1: Design requirements • Chapter 2: Tools and techniques • Chapter 3: Cycle-friendly streets and spaces • Chapter 4: Cycle lanes and tracks • Chapter 5: Junctions and crossings • Chapter 6: Sogms and markings • Chapter 7: Construction, including surfacing • Chapter 8: Cycle parking
London Permit Scheme (LoPS), September 2015
Londonwide Asphalt Specification
Modelling Audit Process (MAP), Traffic Schemes in London Urban Networks, Design Engineer Guide. Version 3.0, 2011.
Modelling Audit Process (MAP), Traffic Schemes in London Urban Networks, Overview. Version 3.0, 2011.
Pedestrian Countdown at Traffic Signals (PCaTS)
Traffic Modelling Guidelines, TfL Traffic Manager and Network Performance Best Practice. Version 3.0, 2010.
Urban Motorcycle Design Handbook
Streetscape Guidance
Streetworks Prosecution Policy
Pedestrian Environment Review System (PERS): • Interchange Assessment Form • Link Assessment Form • Public Space Assessment Form • Public Transport Waiting Area Assessment Form • Route Assessment Form
SUDs in London - a guide

3. Interim Advice Notes

3.1 The following Interim Advice Notes, as amended by paragraph 4 (*Amendments to Interim Advice Notes*) of Annex 2 (*Amendments to Standards and Specifications*):

No.	Title	DMRB Ref.

No.	Title	DMRB Ref.
IAN 73/06 Rev 1	Design of Pavement Foundations	HD 25/xx
IAN 97/07	Assessment and upgrading of existing parapets	
IAN 104/15	The Anchorage of Reinforcement & Fixings in Hardened Concrete	
IAN 109/08	Advice Regarding the Motorway Signal Mark 4 (MS4)	
IAN 116/08	Nature conservation advice in relation to bats	
IAN 117/08 Rev. 2	Certification of combined kerb and drainage products	
IAN 124/11	Eurocodes: Implementation of Eurocodes for the design of new and existing highway structures.	DMRB 1
IAN 127/10 Rev. 1	The use of foamed concrete	
IAN 130/10	Ecology and Nature Conservation: Criteria for Impact Assessment	DMRB 11
IAN 131/11	Deflection of Permanent Formwork	BD 36/90
IAN 132/10	Selection of the appropriate Electricity Supplier for new and upgraded electricity connections (Exit Points) for roadside equipment	
IAN 142/11	Temporary Barrier Decision Tool (TBDT)	
IAN 144/16	Directional signs on Motorway and all-purpose Trunk roads Grade separated junctions	
IAN 145/16	Directional signs on Motorway and all-purpose Trunk roads At grade and compact Grade separated junctions	
IAN 150/16	Guidance on Alternative Temporary Traffic Management Techniques for Relaxation Works on Dual Carriageways	TSM Chpt 8
IAN 153/11	Guidance on the Environmental Impact Assessment of Materials	
IAN 154/12	Revision of Clause 903, Clause 921 and Clause 942	MCHW 0900
IAN 155/12	The use of Ultra Thin Surfacing on the HA Network - Amendment to Appendix 7/1 requirements	MCHW 0700
IAN 156/16R1	Revision of Aggregate Specification for Pavement Surfacing	HD 36
IAN 157/11	Thin Surface Course Systems - Installation And Maintenance	HD 37
IAN 177/13	Introduction of the Construction Products Regulation (EU) 305/2011	
IAN 179/14	Guidance on the Use of Vehicle Mounted High Level Variable Message Signs to provide advance warning of lane closures for Relaxation Works on Dual Carriageways with a Hard Shoulder	
IAN 181/14	Guidance on the Use of Impact Protection Vehicles for Temporary Traffic Management.	
IAN 183/14	Environmental Management Plans	
IAN 193/16	Requirements for the provision of access arrangements on gantries	BD 51
IAN 194/16	Guidance on the management of risk when permitting traffic on planed asphalt surfaces	HD 27
IAN 196/17	Schemes in Design or Construction: Handling of chamber access covers that may be located in running lanes	

4. MCHW

4.1 Subject to paragraph 4.2, the MCHW as amended by paragraph 5 (*Amendments to the MCHW*) of Annex 2 (*Amendments to Standards and Specifications*).

4.2 Project Co shall not be required to comply with the following Volumes (or Parts thereof) referred to in paragraph 4.1:

4.2.1 Volume 0 Section 1;

4.2.2 Volume 5 Section 1 Part 4;

4.2.3 Volume 5 Section 7 Part 4;

4.2.4 Volume 5 Section 9 Part 4;

4.2.5 Volume 4;

4.2.6 Volume 5 Section 3 Part 1, 3 and 6;

4.2.7 Volume 5 Section 8 Part 4; and

4.2.8 Volume 6 Section 2 Part 2 and 3.

Annex 2 of Part 2 – Amendments to Standards and Specifications

1. General Principles

1.1 Unless stated otherwise in this Agreement, the following principles shall apply as described in paragraph 1 (*General*) of this Part 2 (*Design Standards and Specifications*):

1.1.1 all references to "Departures from Standard" and submission to the "Overseeing Department" or "Overseeing Organisation" or other equivalent terms for approval (or Approval) shall be deemed to be references to the Relaxations and Departures from Standard Procedure and their submissions for review in accordance with Schedule 9 (*Certification and Review Procedure*);

1.1.2 where in any document referred to in Annex 1 (*Standards and Specifications*) any reference is made to any other standard, specification, advice note or document which may have been superseded, such reference shall be deemed to be a reference to the latest appropriate standard or advice note current at the Bid Date;

1.1.3 all references to the "Contractor" shall be deemed to be references to "Project Co";

1.1.4 any requirement for "Approval" or "approval" by and/or "agreement" with/of the "TAA", "Overseeing Department" or "Overseeing Organisation" and any requirement for "Technical Approval" or "technical approval" shall be deemed to be an obligation for Project Co to obtain the endorsement from TfL as "received" or "received with comments" in accordance with the Review Procedure;

1.1.5 "Technical Approval Authority" or "TAA" shall be deemed to be references to the "Technical Appraisal Authority", and "Approval in Principle" or "AIP" shall be deemed to be references to the "Technical Appraisal Form" or "TAF" as specified in Schedule 9 (*Certification and Review Procedure*);

1.1.6 all references to "Design Organisation(s), (D.O.)", "Design Agent(s)", "Designer(s)" or "designer(s)", shall be deemed to be references to the "Designer" and there shall be no distinction between "the Designer" and "the designer" for the purposes of this Agreement;

1.1.7 all references to "Managing Agent(s)", "Maintaining Agent(s)", "Maintenance Agent(s)", "Maintaining Organisation" or "MA(s)" shall be deemed to be references to "Project Co";

1.1.8 all references to the "TRMM Manual Volume 3" shall be deemed to be references to the "Routine and Winter Service Code and the Network Management Manual";

1.1.9 all references to "Dep fr stan", "dep fr stan", "Departure from Mandatory Standards" and "departure from standard(s)" shall be deemed to be a Departure from Standard in accordance with Annex 4 (*Relaxations and Departures from Standard Procedure*) of Schedule 9 (*Certification and Review Procedure*);

1.1.10 unless otherwise required by TfL, all references to costs or economics of any kind, including financial justification, consideration or assessment, matters relating to whole life cost or value for money, shall not be deemed to be

requirements under this Agreement or recommendations or endorsements by TfL. Such paragraphs and the implementation of appropriate solutions relating to such paragraphs shall therefore be at the discretion of Project Co, except in relation to the Additional Assets and the Supplementary Works.;

1.1.11 all references in the DMRB to the "Overseeing Department", "Overseeing Organisation"; "Relevant" or "appropriate" Overseeing Department(s) or Overseeing Organisation or "OO" shall be deemed to be references to "TfL" unless stated otherwise;

1.1.12 unless otherwise stated, all references to the "Department of Transport" or "Department of Environment, Transport and the Regions" or any successor shall be deemed to be references to the "Department for Transport" except when referring to a document previously produced under such title;

1.1.13 all references to the "Engineer" shall be deemed to be reference to the "Designer" unless stated otherwise;

1.1.14 the heading and all paragraphs of any "implementation" clause shall be deemed to be deleted and replaced with "Not used" unless otherwise stated by TfL;

1.1.15 all references to the "Transport and Road Research Laboratory (TRRL)" shall be deemed to be references to its successor, the "Transport Research Laboratory (TRL)";

1.1.16 all references to the "Site" shall be deemed to be references to lands and other places on, under, in, or through which the Works are to be carried out by Project Co;

1.1.17 all references to "Accommodation Works" shall be deemed to be references to "Additional Assets" or "Supplementary Works" (as applicable);

1.1.18 unless expressly stated otherwise the "Project Roads", "Additional Assets" and "Supplementary Works" constituting highways shall be deemed to be an "All Purpose Trunk Road" or "Trunk Road" as that term is defined in the DMRB;

1.1.19 any provisions of the MCHW which relate to goods or materials which are not required for the Works shall be deemed not to apply; and

1.1.20 any Appendices in the MCHW which are "not used" shall not apply.

2. Amendments to the DMRB

2.1 Summary of DMRB documents amended:

VOLUME 0 – Introduction and General Requirements		
Section 1 – Publication Procedure		
Part 2	GD 01/15	Introduction to the Design Manual for Roads and Bridges (DMRB)
VOLUME 1 – Highway Structures: Approval Procedures and General Design		
Section 2 – Other Procedural Documents		
Part 1	BD 36/92	Evaluation of Maintenance Costs in Comparing Alternative Designs for Highway Structures

Part 2	BA 28/92	Evaluation of Maintenance Costs in Comparing Alternative Designs for Highway Structures
Part 3	BD 95/07	Treatment of Existing Structures on Highway Widening Schemes
Section 3 – General Design		
Part 4	BA 40/93	Tack Welding of Reinforcing Bars
Part 8	BA 57/01	Design for Durability
Part 11	BA 41/98	The Design and Appearance of Bridges
Part 14	BD 10/97	Design of Highway Structures in Areas of Mining Subsidence
Part 17	BD 90/05	Design of FRP Bridges and Highway Structures
Part 18	BD 85/08	Strengthening Highway Structures Using Externally Bonded Fibre Reinforced Polymer
Part 19	BD 100/16	The Use of Eurocodes for the Design of Highway Structures
VOLUME 2 – Highway Structures: Design (Substructures and Special Structures), Materials		
Part 2 – Special Structures		
Part 1	BD 94/17	Design of Minor Structures
Part 4	BD 51/14	Portal and Cantilever Signs/Signal Gantries
Part 5	BD 65/14	Design Criteria for Collision Protection Beams
Part 6	BD 12/01	Design of Corrugated Steel Buried Structures with Spans Greater than 0.9 Metres and up to 8.0 Metres
Part 7	BD 67/96	Enclosure of Bridges
Part 8	BD 29/17	Design Criteria for Footbridges
	TD 19/06	Requirement for Road Restraint Systems
Part 9	BD 78/99	Design of Road Tunnels
Part 10	BD 82/00	Design of Buried Rigid Pipes
Section 3 – Materials and Components		
Part 4	BD 47/99	Waterproofing and Surfacing of Concrete Bridge Decks
Part 6	BD 33/94	Expansion Joints for Use in Highway Bridge Decks
	BA 82/00	Formation of Continuity Joints in Bridge Decks
Part 8	BD 7/01	Weathering Steel for Highway Structures
Part 9	BA 92/07	The Use of Recycled Concrete Aggregates in Structural Concrete
Section 4 – Paints and Other Protective Coatings		
Part 1	BD 35/14	Quality Assurance Scheme for Paints and Similar Protective Coatings
Part 2	BD 43/03	The Impregnation of Reinforced and Prestressed Concrete Highway Structures using Hydrophobic Pore-Lining Impregnants
Part 3	BA 85/04	Coatings for Concrete Highway Structures and Ancillary Structures
VOLUME 3 – Highway Structures: Inspection and Maintenance		
Section 1 – Inspection		
Part 1	BD 45/93	Identification Marking of Highway Structures
Part 4	BD 63/17	Inspection of Highway Structures
Part 6	BD 53/95	Inspection and Records for Road Tunnels
Part 7	BA 86/06	Advice Notes on the Non-destructive Testing of Highway Structures

Section 2 – Maintenance		
Part 1	BD 62/07	As Built, Operational and Maintenance Records for Highway Structures
Part 2	BD 87/05	Maintenance Painting of Steelwork
Part 3	BA 72/03	Maintenance of Road Tunnels
Part 4	BD 89/03	The Conservation of Highway Structures
Section 3 – Repair		
Part 2	BD 27/86	Inspection and Repair of Concrete Highway Structures
	BA 35/90	Inspection and Repair of Concrete Highway Structures
Part 3	BA 83/02	Cathodic Protection for Use in Reinforced Concrete Highway Structures
Part 4	BA 87/04	Management of Corrugated Steel Buried Structures
Section 4 – Assessment		
Part 3	BD 21/01	The Assessment of Highway Bridges and Structures
Part 4	BA 16/97	The Assessment of Highway Bridges and Structures
Part 5	BA 38/93	Assessment of the Fatigue Life of Corroded or Damaged Reinforcing Bars
Part 6	BA 39/93	Assessment of Reinforced Concrete Half-joints
Part 7	BD 48/93	The Assessment and Strengthening of Highway Bridge Supports
Part 8	BA 54/94	Load Testing for Bridge Assessment
Part 9	BA 55/06	The Assessment of Bridge Substructures and Foundations, Retaining Walls and Buried Structures
Part 11	BD 56/10	The Assessment of Steel Highway Bridges and Structures
Part 13	BA 51/95	The Assessment of Concrete Structures Affected by Steel Corrosion
Part 14	BD 44/15	The Assessment of Concrete Highway Bridges and Structures Incorporating Amendment August 2016
Part 18	BD 79/13	The Management of Sub-standard Highway Structures
Part 19	BD 86/11	The Assessment of Highway Bridges and Structures For The Effects of Special Types General Order (STGO) and Special Order (SO) Vehicles
VOLUME 4 – Geotechnics and Drainage		
Section 1 – Earthworks		
Part 2	HD 22/08	Managing Geotechnical Risk
Part 5	HA 70/94	Construction of Highway Earthworks
Part 6	HA 74/07	Treatment of Fill and Capping Materials Using Either Lime or Cement or Both
Part 8	HA 120/08	Guidance on the Trenchless Installation of Services Beneath Motorways and Trunk Road
Section 2 – Drainage		
Part 1	HA 39/98	Edge of Pavement Details
	HD 49/16	Highway Drainage Design Principal Requirements
	HA 103/06	Vegetative Treatment Systems for Highway Runoff
Part 3	HD 33/16	Design of Highway Drainage Systems
	HA 102/00	Spacing of Road Gullies
Part 4	HA 79/97	Edge of Pavement Details for Porous Asphalt Surface Courses
	HA 83/99	Safety Aspects of Road Edge Drainage Features
	HA 217/08	Alternative Filter Media and Surface Stabilisation Techniques

		for Combined Surface and Sub-Surface Drains
Part 5	HA 40/01	Determination of Pipe and Bedding Combination for Drainage Works
	HA 104/09	Chamber Tops and Gully Tops for Road Drainage and Services: Installation and Maintenance
Part 6	HA 113/05	Combined Channel and Pipe System for Surface Water Drainage
Part 7	HA 107/04	Design of Outfall and Culvert Details
Part 8	HA 118/06	Design of Soakaways
Part 9	HA 119/06	Grassed Surface Water Channels for Highway Runoff
VOLUME 5 – Assessment and Preparation of Road Schemes		
Section 2 – Preparation and Implementation		
Part 3	HA 13/81	The Planting of Trees and Shrubs
	TA 91/05	Provision for Non-Motorised Users
Part 5	HD 42/05	Non-Motorised User Audits
VOLUME 6 – Road Geometry		
Section 1 – Links		
Part 1	TD 9/93	Highway Link Design
Part 3	TA 85/01	Guidance on Minor Improvements to Existing Roads
Section 2 – Junctions		
Part 1	TD 22/06	Layout of Grade Separated Junctions
Part 2	TD 54/07	Design of Mini Roundabouts
Part 3	TD 16/07	Geometric Design of Roundabouts
Part 4	TD 39/94	The Design of Major Interchanges
Part 5	TD 40/94	Layout of Compact Grade Separated Junctions
Part 6	TD 42/95	Geometric Design of Major/Minor Priority Junctions
Part 7	TD 41/95	Vehicular Access to All Purpose Trunk Roads
	TA 23/81	Junctions and Accesses: Determination of Size of Roundabouts and Major/Minor Junctions
Part 8	TA 86/03	Layout of Large Signal Controlled Junctions
Section 3 – Highway Features		
Part 1	TD 36/93	Subways for Pedestrians and Pedal Cyclists. Layout and Dimensions
Part 2	TA 66/95	Police Observation Platforms on Motorways
Part 3	TD 69/07	The Location and Layout of Lay-bys and Rest Areas
	TA 57/87	Roadside Features
Part 4	TA 81/16	Coloured Surfacing in Road Layout (Excluding Traffic Calming)
Part 5	TD 51/17	Segregated Left Turn Lanes and Subsidiary Deflection Islands at Roundabouts
	TA 87/04	Trunk Road Traffic Calming
VOLUME 7 – Pavement Design and Maintenance		
Section 1 – Preamble		
Part 1	HD 23/99	General Information
Part 2	HD 35/04	Conservation and The Use of Secondary and Recycled Materials
Section 2 – Pavement Design and Construction		
Part 3	HD 26/06	Pavement Design
Part 4	HD 27/15	Pavement Construction Methods

Section 3 – Pavement Maintenance Assessment		
Part 1	HD 28/15	Skidding Resistance
Part 2	HD 29/08	Data for Pavement Assessment
Part 3	HD 30/08	Maintenance Assessment Procedure
Section 4 – Pavement Maintenance Methods		
Part 1	HD 31/94	Maintenance of Bituminous Roads
Part 3	HD 40/01	Footway Maintenance
Section 5 – Surfacing and Surfacing Materials		
Part 1	HD 36/06	Surfacing Materials for New and Maintenance Construction
Part 2	HD 37/99	Bituminous Surfacing Materials and Techniques
VOLUME 8 – Traffic Signs and Lighting		
Section 1 – Traffic Signals and Control Equipment		
Part 1	TA 12/07	Traffic Signals on High Speed Roads
	TA 16/07	General Principles of Control by Traffic Signals
	TD 24/97	All-Purpose Trunk Roads Inspection and Maintenance of Traffic Signals and Associated Equipment
	TD 07/07	Statutory Approval of Traffic Control Equipment
Part 2	TA 84/06	Code of Practice for Traffic Control and Information Systems for All-Purpose Roads
Section 2 – Traffic Signs and Road Markings		
Part 1	TA 58/92	Traffic Signs and Road Markings for Lane Gains and Lane Drops on All Purpose Dual Carriageways and Motorway Trunk Roads
Part 2	TA 61/94	Currency of the Traffic Signs Manual
	TA 19/81	Reflectorisation of Traffic Signs
	TD 33/05	The Use of Variable Message Signs on All-Purpose and Motorway Trunk Roads
	TA 56/87	Hazardous Cattle Crossings: Use of Flashing Amber Lamps
	TA 60/90	The Use of Variable Message Signs on All-Purpose and Motorway Trunk Roads
Part 3	TA 93/04	Traffic Signs to Tourist Attractions in England: Guidance for Tourist Signing – General Introduction
Part 5	TA 94/04	Traffic Signs to Tourist Attractions in England: Guidance for Tourist Signing – Local Roads
Part 6	TD 53/05	Traffic Signs to Retail Destinations and Exhibition Centres in England & Wales – Trunk Roads
Section 3 – Lighting		
	TD 23/99	Trunk Roads and Trunk Road Motorways Inspection and Maintenance of Road Lighting
	TD 34/07	Design of Road Lighting for the Strategic Motorway and Trunk Road Network
	TD 34/91	Design and Road Lighting for Motorway Trunk Roads
Section 4 – Traffic Management at Road Works		
Part 3	TA 64/94	Narrow Lane and Tidal Flow Operations at Roads Works on Motorways and Dual Carriageway Trunk Roads with Full Width Hard Shoulders
Part 6	TA 92/03	Crossover and Changeover Design
Part 7	TD 49/07	Requirements for Lorry Mounted Crash Cushions
VOLUME 9 – Network – Traffic Control and Communications		

Section 1 – Communications – Standards of Provision		
Part 1	TD 46/05	Motorway Signalling
Part 2	TD 45/94	Motorway Incident Detection and Automatic Signalling (MIDAS)
	TD 18/85	Criteria for the Use of Gantries for Traffic Signs and Matrix Traffic Signals on Trunk Roads and Trunk Road Motorways
Section 2 – Communications – Design Guide		
Part 1	TA 73/16	Emergency Roadside Telephones (ERT)
Section 4 – Systems Design		
Part 3	TA 74/05	Motorway Signalling
Part 6	TA 83/05	Guide to the Use of Variable Message Signs for Strategic Traffic Management on Trunk Roads and Trunk Road Motorways
VOLUME 10 – Environmental Design and Management		
Section 1 – New Roads		
Part 1	HA 55/92	New Roads Landform and Alignment
Part 2	HA 56/92	New Roads Planting, Vegetation and Soils
Part 4	HA 58/92	New Roads The Road Corridor
	HA 85/01	Roads Improvement with Limited Land Take
Section 3 – Landscape Management		
Part 1	HA 67/93	The Wildflower Handbook
Part 2	HA 108/04	The Landscape Management Handbook
Part 3	HA 115/05	The Establishment of An Herbaceous Plant Layer In Roadside Woodland
Section 4 – Nature Conservation		
Part 1	HA 84/01	Nature Conservation and Biodiversity
Part 2	HA 59/92	Mitigating Against Effects on Badgers
Part 3	HA 80/99	Nature Conservation Advice in Relation to Bats
Part 4	HA 81/99	Nature Conservation Advice in Relation to Otters
Part 5	HA 97/01	Nature Conservation Management Advice in Relation to Dormice
Part 6	HA 98/01	Nature Conservation Management Advice in Relation to Amphibians
Section 5 – Environmental Barriers		
Part 1	HA 65/94	Design Guide for Environmental Barriers
Part 2	HA 66/95	Environmental Barriers Technical Requirements
Section 6 – Archaeology		
Part 1	HA 75/01	Trunk Roads and Archaeological Mitigation

2.2 Specific DMRB amendments

VOLUME 0	
DOCUMENT: GD 01/15 Introduction to the Design Manual for Roads and Bridges (DMRB)	
1.2	Delete paragraph and insert "Not used"
1.9	Delete the last sentence "It is recommended that any … from particular requirement"
1.19 to 1.26	Delete the heading and all paragraphs, from 1.19 to 1.26 under "Departures" and insert "Not used"

1.27 to 1.30	Delete the heading and all paragraphs, from 1.27 to 1.30 under "Relaxations" and insert "Not used"
1.31	Delete "the DMRB and/or MCHW documents" in the first sentence and insert "the standards listed in the agreement"
1.33	Delete the second sentence starting with "Where approved for use by …"
1.34 d)	Insert after and "impact on DCO consents"
1.36 to 1.38	Delete the heading and all paragraphs 1.36 to 1.38 under "Non-Compliance with Requirements" and insert "Not used"
1.40	Delete paragraph and insert "Not used"
1.42	Delete "these" and insert "Schedule 9 (*Certification and Review Procedure*)"
VOLUME 1	
DOCUMENT: BD 36/92 Evaluation of Maintenance Costs in Comparing Alternative Designs for Highway Structures	
3.1	Delete "agreed as Departures from Standard in accordance with Technical Approval procedures"
3.4	Delete "agreed as Departures from Standard"
3.9	Delete "Bridges Division of the Overseeing Department" and insert "TfL"
DOCUMENT: BA 28/92 Evaluation of Maintenance Costs in Comparing Alternative Designs for Highway Structures	
2.5	Delete paragraph and insert "Not used"
5.1	Delete "Bridges Division of the Overseeing Department" and insert "TfL"
DOCUMENT: BD 95/07 Treatment of Existing Structures on Highway Widening Schemes	
Definitions 1.9	Delete "Approval in Principle (AIP)" and insert "Technical Appraisal Form (TAF)" In the definition of "Departure from Standards" delete "Technical Approval Schedule" and insert "Technical Appraisal Schedule" Delete "Overseeing Organisation" and its definition In the definition of "Structure Options Report (SOR)" delete "A report which … for a structure" and insert "The Initial Structure Options Report and the Second Structure Options Report" In the definition of "Structure Review Process Documents" delete "AIPs" and insert "TAFs"
2.3	Delete the first sentence and insert "The applicable standards for the schemes shall be included within the Design Data when submitted for review in accordance with the Review Procedure."
2.5	Delete "consultation …. for congestion" and insert "proposals submitted for review in accordance with the Review Procedure".
2.10	In the first sentence, delete "if sufficient funds are available". In the second sentence delete "Overseeing Organisation" and insert "Project Co".
2.11	Delete "liaise with the …. seek the agreement of" and insert "submit their proposals for review to". Delete the second and last bullet points.
2.12	Delete "tender … detailed design" and insert "Design Data".
2.13	Delete the first sentence and insert "Records of current non-compliance at existing structures may be available in the Data Room."

2.22	Delete the paragraph and insert "Requirements for Departure from Standard are as set out in Annex 4 (*Relaxations and Departures from Standard Procedure*) of Part 1 (*Certification Procedure*) of Schedule 9 (*Certification and Review Procedure*)"
2.26	Delete the paragraph and insert " Requirements for Departure from Standard are as set out in Annex 4 (*Relaxations and Departures from Standard Procedure*) of Part 1 (*Certification Procedure*) of Schedule 9 (*Certification and Review Procedure*)"
2.31	Delete the paragraph and insert "The certification of modified structures shall be undertaken in accordance with the Certification Procedure in Part 1 (*Certification Procedure*) of Schedule 9 (*Certification and Review Procedure*)."
2.34	Delete the last sentence and insert "Structure capacity recording shall be compatible with the Department's asset databases."
3.1	From the second bullet point, delete "(specific project … Organisation)".
3.4	Delete the first two sentences.
3.13	Delete "in consultation with" and insert "and submitted for review to".
3.18	Delete the paragraph and insert "Not Used".
Chapter 4	Delete the whole of Chapter 4 and its title and insert "Not Used".
5.8	Delete the second sentence.
5.15	Delete the last sentence.
5.16	Delete the second sentence.
5.17	Delete paragraph and insert "Not Used".
5.22	Delete paragraph and insert "Not Used".
5.26	Delete paragraph and insert "Not Used".
5.34	Delete AIP and insert TAF.
Annex A A.1	In the first paragraph, second sentence delete "for tenderers in helping them" and insert "in helping to"
Annex A 2.15	Delete the second sentence
Annex B B.1 Introduction	In the second paragraph delete ", subject to Overseeing Organisation agreement,". Delete the third paragraph
Annex B B.2	In the second paragraph delete ", using the methodologies … of retention" In the third paragraph, delete "cost effective" and insert "beneficial".
Annex B Table B.2	In the heading of the third column, delete "Proposed" and insert "Suggested".
DOCUMENT: BA 40/93 Tack Welding of Reinforcing Bars	
Chapter 2	Delete "ENGINEER'S" from the title.
2.1	Delete existing text and insert, "The Specification for Highway Works allows the use of tack welding provided that the fatigue life, durability and other properties of the concrete member are not adversely affected by the welding."
DOCUMENT: BD 57/01 Design for Durability	
5.24	Delete from the last sentence ", as part of technical approval procedures".
DOCUMENT: BA 41/98 The Design and Appearance of Bridges	
4.9	Delete "or lay down……contractor's designer".
9.2	Delete first sentence.
DOCUMENT: BD 10/97 Design of Highway Structures in Areas of Mining Subsidence	
Mandatory Sections	Delete "Design Organisation" and insert "Project Co"

4.1	Delete the first and second sentence replacing them with "Structures liable to move during mining activity shall be monitored by Project Co for changes in levels, dimensions, tilts and crack development. "
5.1	Delete all but the first sentence.
DOCUMENT: BD 90/05 Design of FRP Bridges and Highway Structures	
1.1	First sentence delete "by Engineers".
1.11	Delete "Overseeing Organisation shall decide" and insert "Project Co shall propose".
1.12	Delete "Careful attention…….of a contractor" and insert "The contractor must be"
Fig 1	First box delete "Owner" and insert "Project Co"
2.6 d)	Fourth sentence delete "Overseeing Organisation…with the".
6.6	First sentence delete "bridge owner or his agent" and insert "Project Co"
Annex A	C2 – Delete "Overseeing Organisation as part of technical approval" and insert "Project Co".
DOCUMENT: BD 85/08 Strengthening Highway Structures Using Externally Bonded Fibre Reinforced Polymer	
6.1	Delete "Overseeing Organisation" and insert "Project Co"
7.14	Delete "Following installation a survey shall be undertaken" and insert "Following installation Project Co shall undertake a survey" Delete second sentence
DOCUMENT: BD 100/16 The Use of Eurocodes for Design of Highways Structures	
1.10	In the table below the paragraph 1.10: In the definition of "Approval in Principle (AIP)" in the second row, delete "BD2 (DMRB 1.1.1)" and insert "Not used" In the definition of "Category" in the third row, delete "BD2 (DMRB 1.1.1)" and insert "Not used" In the definition of "Departure from Standards" delete "Technical Approval Schedule" and insert "Technical Appraisal Schedule" Delete the thirteenth row, "Technical Approval Authority (TAA)" and its definition and insert "Not used" In the definition of "Third Party" in the fourteenth row, delete "Overseeing Organisation" and insert "Project Co"
A.10	Delete "Overseeing Organisation" and insert "Project Co"
A.12	Delete "Overseeing Organisation" and insert "Project Co"
VOLUME 2	
DOCUMENT: BD94/17 Design of Minor Structures	
1.4	Delete "Design Organisation" and insert "Project Co".
4.3	Delete.
4.4	Replace "BD2" with "the Agreement".
5.10	Delete "agreed between… 4.2 above" and insert "determined by Project Co".
DOCUMENT: BD 65/14 Design Criteria for Collision Protection Beams	
1.16	Delete "Approval Procedure." and insert "Appraisal Procedure."

1.16	Delete "The structure Category (see BD2 (DMRB 1.1.1)) must be agreed with the Technical Approval Authority." and insert " Project Co shall submit the proposed category to TfL in accordance with the Review Procedure."
2.8	Delete "Overseeing Organisation" and insert "Designer".
4.2	Delete "as implemented by the Overseeing Organisation,".
4.3	Delete first sentence and insert "Materials other than steel and concrete shall be subject to review in accordance with the Agreement".
5	Delete "BD 2/12 Technical Approval of Highway Structures (DMRB 1.1.1).".
DOCUMENT : BD51/14 Portal and Cantilever Sign / Signal Gantries	
1.2	Delete "the Overseeing Organisation requirements" and replace with "the requirement of the Agreement".
41.7	Delete "the Overseeing Organisation" and insert "TfL".
3.1	Replace BD2 with "the Agreement".
5.10	Delete "the Technical Approval requirements in accordance with BD2" and insert "Technical Appraisal requirements in accordance with the Agreement".
DOCUMENT: BD 12/01 Design of Corrugated Steel Buried Structures with Spans Greater than 0.9 metres and up to 8.0 metres	
1.7	Delete "Prior to being offered on a Contract" and insert "Prior to submission under Schedule 9 (*Certification and Review Procedure*)".
1.8	Also delete "Schedule of Employer's ……. Principle" and insert "Agreement".
1.9	Delete "Schedule of Employer's Requirements" and insert "Agreement".
1.11	Delete paragraph.
Fig 1.1,	Delete Fig 1.1.
8.3	Delete "Highways Agency".
8.8.1	Delete "in the Schedule of Employer's requirements, ".
8.9.1	Delete "in the Schedule of Employer's Requirements".
9.17	Delete "except that in some… (See Table 5.1.) ".
11.7	Delete "the Contract drawings" and insert "relevant documents".
16.2, 16.4, 16.5	Delete these paragraphs and insert "Not used".
16.3	Delete paragraph and insert "The designer shall submit the TAF and Design and Check Certificates in accordance with the Agreement".
DOCUMENT: BD 67/96 Enclosure of Bridges	
3.7	Delete "existing" and insert "existing".
4.3	Delete "in contract …. Design Organisation" and insert "which the Designer".
4.4	Delete the whole paragraph and insert "Not used".
5.11	Delete "Bridges Engineering Division" and insert "TfL".
5.18	Delete "It will be necessary ... (AIP)" and insert "The category of structure will be determined in accordance with Schedule 9 (*Certification and Review Procedure*)".
5.19	Delete, and insert "A TAF should be submitted for the enclosure alone".
5.20	Delete, and insert "It will be necessary to identify in the TAF any documents specific to the materials/systems proposed".
DOCUMENT: BD 29/17 Design Criteria for Footbridges	
4.2	Delete "Authority" and insert "authority".
5.2	Last sentence, delete "agreed with Overseeing Organisation" and insert "in accordance with the requirements of the Agreement".
6.1	Delete "Appropriate Authority" and insert "appropriate authority".

8.2	Delete "Consideration should be given" and insert "Provision shall be made". Delete the last sentence.
8.3	Delete the last sentence.
10.1	First sentence, delete "agreed with …… Covered by Standards" and insert "submitted in accordance with the requirements of the Agreement".
10.5	Delete ", or for existing structures the Maintaining Agent, ". Also delete "Maintenance Manual" and insert "maintenance manual"
DOCUMENT: TD 19/06 Requirement for Road Restraint Systems	
1.13	Delete "other Overseeing Organisation" and insert "TfL"
1.18	Retain Header and text
1.32	Delete "and submitted to the Overseeing Organisation"
1.38	Delete "It is recommended that the" and insert "The" Delete "prior to incorporation into the Works" and insert "for review"
1.39	Delete "Each Overseeing Organisation" and insert "TfL"
1.42	Delete entries for "Overseeing Organisation" and "Design Organisation/Designer"
6.3	Delete "Contractor" and insert "contractor"
DOCUMENT: BD 78/99 Design of Road Tunnels	
General	Throughout this Advice Note, unless otherwise stated, the role and responsibilities of the Tunnel Operating Authority (TOA) shall be undertaken by Project Co.
General	Project Co shall request clarification from TfL where Project Co considers there is doubt or uncertainty, including currency with the latest best industry practice, as to the applicability of specific clauses.
General	Where more recent version of PIARC guidance referred to in this standard exists, Project Co shall use the latest published version as at the Bid Date.
General	The design requirements, including loading must comply with the Eurocodes.
1.10	Delete "('the client')". Delete "Design Organisation ('the designer')" and insert "Project Co".
1.12	Fourth sentence, delete "Project Manager of Overseeing Organisation (Design …… schemes)" and insert "Project Co". Fifth sentence, delete "For DBFO schemes,……..reference" and insert "Project Co shall submit such terms of reference to TfL for review in accordance with the Review Procedure". Last sentence, delete "Project……..DBFO schemes)" and insert "Project Co".
2.10	Delete "Overseeing Organisation's" and insert "Project Co's". Delete the last sentence.
2.12	Delete "Project Manager". Delete the last sentence.
2.26	Delete "Design Organisation when appointed" and insert "Designer".
2.63	First sentence, delete "Overseeing Organisation responsible for commissioning highway projects" and insert "Project Co" and also delete "in consultation with" and insert "by". Second sentence, delete "The specialists" and insert "The Designer".

2.78	Delete "to BD 2 (DMRB 1.1)" and insert "in accordance with Schedule 9". Second sentence, delete "Design Organisation" and insert "Project Co". Delete "BS5400" and insert "BD 100 (DMRB 1.3.19)". Delete last sentence.
Table 5.2	Update limits with reference to the latest HSE EH40, Table 1: List of approved workplace exposure limits.
Table 5.4	TfL to provide design traffic data
Table 5.5	TfL to provide design traffic data
Table 5.6	Delete table and insert "Not used"
Table 5.7	Delete table and insert "Not used"
Table 5.8	Delete table and insert "Not used"
Section 6 All occurrences	"BS5489 Pt. 7" or "BS5489-7" to be replaced by "BS 5489-2:2016"
6.6	After "and Underpasses)" insert "LED Tunnel Lighting Designers' Guidance Notes".
7.7	Delete "HA71 (DMRB 4.2.1)" and insert "HD 45 (DMRB 11.3.10)"
7.45	Delete "BS5345: Part 2" and insert "BS EN 60079-10-1:2015" Delete "BS5345: Part 1" and insert "BS EN 60079-14:2014"
8.31	Delete "BS EN 3 Part 1" and insert "BS EN 3-7:2004+A1:2007"
8.35	Delete "BS 3169" and insert "BS EN 694:2014"
8.55	Delete paragraph and insert "Not used"
8.63	Delete "BS 6853: 1987" and insert "BS EN 45545 parts 1-7"
9.1	Delete "the Design Organisation," Delete "authorities responsible for maintenance and operation" and insert "Project Co".
9.5	Delete second sentence.
9.27	Delete paragraph and insert "Not used"
9.31	Delete paragraph and insert "Not used"
9.33	Delete paragraph and insert "Not used"
9.37	Delete paragraph and insert "Not used"
9.38	Delete paragraph and insert "Not used"
9.40	Delete paragraph and insert "Not used"
9.45	Delete paragraph and insert "Not used"
9.52	Last sentence delete "Overseeing Organisation for confirmation of its use" and insert "Project Co for use".
9.56	Delete "Highways Agency" and insert "TfL". Delete item "v." and its contents.
9.57	Delete paragraph and insert "Not used"
9.79	Delete paragraph and insert "Not used"
9.82	Delete paragraph and insert "Not used"
9.83	Delete paragraph and insert "Not used"
9.90	In the first sentence delete "will be decided by the Overseeing Organisation" and insert "is identified in the Agreement".
9.92	Delete "will be decided by the Overseeing Organisation" and insert "is identified in the Agreement".
9.103	Delete paragraph and insert "Not used"
9.104	Delete whole paragraph and insert "The radio re-broadcast system for the fire brigade shall be provided by Project Co."

9.105	Delete whole paragraph and insert "The radio re-broadcast system for the ambulance service shall be provided by Project Co".
9.106	Delete paragraph and insert "The Tunnel Operating Authority shall provide one speech channel for its use in its normal work and when assisting the emergency services".
9.110	Delete paragraph and insert "Not used"
9.111	Delete paragraph and insert "Not used"
9.112	Delete paragraph and insert "Not used"
10.11	Delete "Design Organisation" and insert "Project Co"
10.30	Delete paragraph and insert "Not used"
10.35	Delete items "i" to "iv" inclusive and insert, "i) TOA / Project Co, ii) the Police iii) TTC."
10.42	Delete paragraph and insert "Not used"
10.45	Delete paragraph and insert "Not used"
12.16	Delete "BS 6651:1992" and insert "BS EN 62305 parts 1-4"
13.4	Second sentence, delete ", but consideration…….format which would" and insert "and drawings prepared to an agreed electronic format to". Last sentence delete "may be particularly convenient" and insert "shall be utilised".
13.6	Delete "the Contractor and signed……Design Organisation" and insert "Project Co in accordance with the requirements of the Agreement".
13.8	(iv) Delete "Operator's Guide" and insert "Tunnel Operator's Guide".
13.12	Delete first and the second sentence and insert: "Project Co carries out the outline and detailed design of M&E functions and selection of plant and materials in accordance with the requirements of the Agreement". In the third sentence, delete "handover" and insert "handback".
13.19	Delete the title to this paragraph and insert "Tunnel Operator's Guide". Delete "Operator's Guide" and insert "Tunnel Operator's Guide".
13.20	Delete "the Tunnel Operator" and insert "Project Co".
13.25	Delete "the Tunnel Manager" and insert "a responsible person of Project Co".
13.26	Delete "Approval in Principal (AIP) ……. See Chapter 1" and insert "Technical Appraisal Form (TAF) as required by Schedule 9 (*Certification and Review Procedure*)".
14.1	First sentence, delete "Road tunnels …… made to optimise their" and insert "Every effort needs to be made to optimise road tunnel".
14.3	Delete "Tunnel Operating ……providing" and insert "Project Co shall provide".
14.10	Delete "The police Traffic Division" and insert "Unless stated otherwise in the Agreement the Traffic Officers".
14.36	Delete the paragraph and insert "Not used".
14.41	Delete "under the ……Authority" and insert "in accordance with the Agreement".
14.43	First sentence delete "Whether maintenance……or term contractors" and insert "Prior to maintenance work being undertaken" and delete "term contractors," from the last sentence.
14.46	Item ii. delete "Term contractors" and insert "Project Co staff" Item iii. delete "planned and funded" and insert "plan" and also from the last sentence delete "term contractors" and insert "its staff".
14.54	Add after "Local Highway Authorities"," the police and other emergency services,".
14.60	Delete "and contractors involved".

14.61	Delete "Staff" and insert "staff" also delete "appointed Tunnel Controller" and insert "responsible person of the TOA".
14.63	Delete "the Tunnel Controller" and insert "a responsible person of Project Co".
App. F 8(i)	Delete "of the Maintaining Agent".
DOCUMENT: BD 82/00 Design of Buried Rigid Pipes	
3.2.1	At (a), delete "(Trunk Roads and Motorways)". At both first and second sentences delete "Trunk Roads and Motorways" and insert "Main Roads".
7.6	Delete "and before……completed works".
DOCUMENT: BD 47/99 Waterproofing and Surfacing of Concrete Bridge Decks	
1.5	Delete whole paragraph.
1.7	Delete last sentence.
9.4	In Line 5, delete "the requirement for the APL…to cover this non-standard aspect" and insert "any Proposal for the APL to be relaxed shall be submitted to TfL as an Departure from Standard and is subject to review in accordance with Schedule 9 (*Certification and Review Procedure*)".
Appendices A, B, and C	Whilst these appendices do not directly address Project Co, the systems procured for this Agreement shall comply with the requirements of these appendices.
4.6	Delete the second sentence.
DOCUMENT: BD 33/94 Expansion Joints for Use in Highway Bridge Decks	
1.5	Delete last sentence.
8.2	Under heading "Sub-surface Drainage" renumber paragraph to 8.3.
Annex A	Annex A is addressed to manufacturers and suppliers of expansion joints. It is thus not directly applicable to Project Co but is retained for its information.
DOCUMENT: BA 82/00 Formation of Continuity Joints in Bridge Decks	
2.1	In the last sentence, delete "stated in …….documentation" and insert "identified".
2.5	Delete "the contract documents……the requirement, and"
DOCUMENT: BD 7/01 Weathering Steel for Highway Structures	
1.1	Delete "Design Organisations" and insert "Project Co" at each occurrence.
6.8	Delete "by low ……. Overseeing Organisation".
DOCUMENT: BA 92/07 The Use of Recycled Concrete Aggregate in Structural Concrete	
7.1	Delete "through the Overseeing Organisation's departures processes, as part of technical approval arrangements and in compliance with BD2" and insert "as a Project Co Works Change"
DOCUMENT: BD 35/14 Quality Assurance Scheme for Paints and Similar Protective Coatings	
1.4	Final sentence, delete "the Overseeing Organisation's".
2.1	Delete "the Overseeing Organisation's" and insert "Project Co".
2.2 (ii)	Delete "Overseeing Organisation" and insert "Project Co".
DOCUMENT: BD 43/03 The Impregnation of Reinforced and Prestressed Concrete Highway Structures using Hydrophobic Pore-Lining Impregnants	
3.2	In this paragraph and throughout this standard delete "Maintenance Organisation" and insert "Project Co" at each occurrence. In second sentence, delete "Contract" and insert "works" at each occurrence In third sentence, delete "On Contracts where" and insert "Where".
3.3	Second sentence, delete "included in Contract documents" and insert "complied with".
5.4	Delete "Overseeing Organisation, in consultation with the".

5.7	Delete second sentence. In the last sentence, delete ", though separate contracts…….structures".
6.3	Last sentence, delete "BA62 …….and to".
8.6	Delete "Overseeing Organisation" and insert "Project Co".
8.11	Delete "approval from the Maintenance Organisation" and insert "approvals".
8.17	First sentence, delete "in the Contract" and in the last sentence delete "Contract" and insert "Agreement's".
Appendix 1	Delete "Highways Agency" and insert "TfL" at every occurrence.
Appendix 1 (g)	Delete "to the satisfaction of the Maintenance Organisation".
Appendix 2	Delete "Highways Agency" at both occurrences.
DOCUMENT: BA 85/04 Coatings for Concrete Highway Structures and Ancillary Structures	
2.1	Delete "Overseeing Organisations receive" and insert "TfL receives".
2.5	Delete "(Although detailed policies on graffiti will vary between Overseeing Organisations" and insert "(Although a detailed policy on graffiti may be provided by TfL
VOLUME 3	
DOCUMENT: BD 45/93 Identification Marking of Highway Structures	
1.2	In the second sentence delete "Maintenance Agents and".
Appendix A 9	Delete the paragraph and insert "Not used".
Appendix A10	Delete the paragraph and insert "Not used".
DOCUMENT: BD 63/17 Inspection of Highway Structures	
3.4.8	Delete "highway Structures team" and insert "Project Co's highway Structures team"
5	Delete section and title and insert "Not used"
10.1.1	Delete "Overseeing Organisations" and insert "Project Co"
DOCUMENT: BD 53/95 Inspection and Records for Road Tunnels	
General	Throughout this Advice Note, unless otherwise stated, the role and responsibilities of the Tunnel Operating Authority (TOA) shall be undertaken by Project Co.
1.5	Delete paragraph and insert "Not used".
1.6	Delete first sentence.
3.3	Delete "MA and tunnel owner" and insert "TfL".
3.11	Delete "agreed with the OO but will normally" and insert "which will". (i) Delete ", but exceptionally up to ten years,"; and (ii) Delete ", but exceptionally up to five years,".
3.14	Delete "MA".
3.17	Under "Note", delete "MA and OO" and insert "TfL".
4	Delete Chapter 4 and insert "Not used".
6.3	Delete sub-paragraph 6.3 (i) and renumber sub-paragraph 6.3 (ii) to 6.3 (i).
6.4	Delete "MA and OO" and insert "TfL".
6.8	Delete "OO" and insert "TfL".
6.10	Delete "respective OOs" and insert "TfL". Delete "OO" and insert "TfL".
Appendix B	Delete "OO" and insert "TfL" and also delete the column titled "MA". Under "Note", delete "through the MA".
Appendix C	Delete Appendix C.

DOCUMENT: BA 86/06 Advice Notes on the Non-destructive Testing of Highway Structures	
Advice Note 1 General Guidance	
5	In all cases replace "tenderer" with "prospective testing organisation"
5.6	Delete heading and paragraph and insert "Not used"
5.8	Delete paragraph and title and insert "Not Used"
5.9	Delete "Commissioning Engineer" and insert "Project Co"
5.15	Delete "specifying Engineer" and insert "Project Co"
5.16	Delete "Contractor" and insert "testing organisation"
Advice Note 2.1 Assessing the Conditions in Grouted Ducts in Post-tensioned Concrete	
2.1	Delete "Highways Agency" and insert "TfL"
3.41	Delete "An economical" and insert "A"
Advice Note 2.3 Testing and Monitoring the Condition of Concrete Structures	
2.8	Delete "Highways Agency" and insert "TfL" at both occurrences
2.12	Delete "Highways Agency" and insert "TfL's"
2.13	In heading delete "HA" and insert "TfL's"
2.14	Delete "Highways Agency" and insert "TfL's"
Advice Note 2.4 Testing and Monitoring the Condition of Metal Structures	
2.4	Delete "bridge engineer" and insert "Project Co"
Advice Note 3.1 Impact-Echo (I-E)	
3	In all cases replace "tenderer" with "prospective testing organisation"
3.2	Delete "tender"
Advice Note 3.2 Sonic Transmission and Tomography for Masonry Bridges.	
5	In all cases replace "tenderer" with "prospective testing organisation"
5.2	Delete "tender"
Advice Note 3.3 Ultrasonic Transmission and Tomography for Post-Tensioned Concrete Bridges.	
5	In all cases replace "tenderer" with "prospective testing organisation"
5.2	Delete "tender"
Advice Note 3.4 Electrical Conductivity	
4	In all cases replace "tenderer" with "prospective testing organisation"
4.2	Delete "tender"
Advice Note 3.5 Ground Penetrating Radar (GPR)	
3	In all cases replace "tenderer" with "prospective testing organisation"
3.2	Delete "tender"
Advice Note 3.6 Acoustic Emission (AE)	
6	In all cases replace "tenderer" with "prospective testing organisation"
6.2	Delete "tender"
DOCUMENT: BD 62/07 As Built, Operational and Maintenance Records for Highway Structures	
4.27	Delete "Certificates and test records" and insert "Certificates and/or test records"
4.33	Delete "Acceptance"
4.34	Delete "Acceptance"
Notes for Table 3	Delete the note 1 and insert "Not used"
A12	Delete "relevant Highways Agency Technical Approval contact" and insert "TfL"
A13	Delete "an HA contract" and insert "this Agreement"
A14	Delete "HA officer responsible for the transfer" and insert "TfL"
A15	Delete "responsible HA officer" and insert "TfL"
A16	Delete "HA officer" and insert "TfL"
DOCUMENT: BD 87/05 Maintenance Painting of Steelwork	
1.1	Delete "Design Organisations" and insert "Project Co" at each occurrence.

1.5	Delete "inspection firms" and insert "inspectors".
2.6	Delete "pre-contract".
2.10	Delete the first sentence.
2.13	First sentence, delete "contract".
2.17	Delete the last two sentences.
Section 3	Delete "inspection firm" and insert "inspector" at each occurrence. Delete "inspection firms" and insert "inspector". Delete "firm" and insert "inspector" at each occurrence.
3.6	Delete the paragraph and insert, "Project Co shall produce a quality plan for inspection work. The quality plan shall include the method of working on site and the role of the inspector."
3.8	Delete the first sentence and insert "The painting inspectors must carry out the requirements identified in Annex B".
Annex B	
B1.1	Delete the paragraph and insert "The inspectors must comply with the relevant requirements of the Health and Safety at Work etc Act".
B1.2	Delete "Inspector" and insert "inspector".
B3.1	Delete "Painting Inspectors" and insert "Project Co's painting inspector, hereafter called "the Inspector".
B4	Change the title to "Specific Requirements".
B4.2	Delete the paragraph and insert "Project Co ensures that a satisfactory quality plan is in place prior to commencement of the work."
B4.3	Delete "Maintaining Agent any requirement of the Contractor" and insert "Project Co any requirement".
B4.4	Delete paragraph and insert "Verify with Project Co the programme of work and method of working proposed and any limitations e.g. times of access to carriageways."
B4.5	Delete paragraph and insert "Verify with Project Co the proposed access arrangements and the suitability of such arrangements with respect to method of working and inspection."
B4.6 & B4.7	Delete "Verify …. Contractor" and insert "Project Co ensures that the Inspector".
B5.4	Delete "check that … technique" and insert "ensure that correct techniques are used".
B5.5	Delete "Check that the Contractor is capable of detecting and removing unsound coatings" and insert "Ensure that unsound coatings are detected and removed".
B5.6	Delete "Check that the Contractor is able to identify" and insert "Identify" and also delete "that he is able to ".
B5.7	First sentence, delete "Check that the Contractor is capable of applying" and insert "Ensure that" and add "are" after "coatings". Delete the last sentence.
B5.8	Delete "by the …..applies all the paints" and insert ", check that all the paints are applied".
B5.9	Note: delete "Inspector …..Agent that". Also replace "are registered" with "must be registered".
B7.1 (i)	Delete "verify ….. available" and insert "ensure that". Also insert "is available" after "store".
B7.1 (iv)	Delete "Verify …. Paint data sheets" and insert "Ensure that the paint manufacturer's data sheets".

B7.1 (v)	Delete "Verify …… Contractor's paint" and insert "Ensure that the paint".
B7.2 (vi)	Delete "reported ….. Agent" and insert "confirmed".
B7.3 (iii)	Delete "Highways …… Organisation" and insert "TfL ".
B7.3 (vii)	Delete "Highways …… Manchester M1 4BE" and insert "TfL".
B8.12	Delete "Highways …… Organisation" and insert "TfL".
B9	Delete "Inspection Firm" or "inspection firm" and insert "Project Co" in all occurrences and delete "Inspector" and insert "inspector" in all occurrences.
Annex C Form HA/P5	Delete ": Highways Agency …… …… Overseeing Organisation" and insert "TfL".
DOCUMENT: BA 72/03 Maintenance of Road Tunnels	
General	Throughout this Advice Note, unless otherwise stated, the role and responsibilities of the Tunnel Operating Authority (TOA) shall be undertaken by Project Co.
1.3 ii	Delete "Managing Agent (MA) and Tunnel Operating Authority (TOA)" and insert "Project Co"
1.5	Delete "Highways Agency" and insert "TfL" Delete the second sentence.
1.18	Delete paragraph and insert "Not used".
1.19	Delete paragraph and insert "Not used".
1.21	Delete paragraph and insert "Not used".
1.22	Delete "is defined in BD78 (DMRB 2.2.9) and" .
1.23	Delete whole paragraph and insert "Not Used"
1.24	Delete whole paragraph and insert "Not Used"
2.2	Delete the title "Overseeing Organisation" and in paragraph 2.2 "Overseeing Organisation" and insert "Project Co".
2.2 ii	Delete sub paragraph and insert "maintenance of the tunnel".
2.4 ii	Delete "the effective handover of the tunnel to".
2.6	Delete title and insert "Project Co".
2.6 ii	Delete and insert "Not Used".
2.6 iii	Delete the first sentence and insert "tunnel maintenance to Standards". Second sentence, delete "standards" and insert "Standards".
2.7	Delete "prospective MA/TOA" and insert "Project Co". Delete the last sentence.
2.8	Delete "MA/TOA" and insert "Project Co".
2.8 i	Delete whole paragraph and insert "Not Used".
2.8 iv	Delete "of the TMC".
2.8 vi	Delete "Overseeing Organisation, TMC" and insert "TfL".
2.14	Delete heading "Term Maintenance Contractor (TMC)" and insert "Project Co". Delete "TMC" and insert "Project Co".
2.14 i	Delete "as instructed by the MA/TOA,".
2.14 iii	Delete "HA standards……..best practice)" and insert "Standards".
2.14 vi	Delete "by the MA/TOA or emergency services" and insert "including those required by the emergency services".
2.15	Delete title and paragraph.
3.9	Delete paragraph and insert "Not Used".
3.24-3.28	Delete paragraphs and insert "Not used".
3.33	Delete first sentence. In the second sentence, delete "They should" and insert "maintenance standards should" and also delete "prospective".
3.67	Delete first sentence. In the second sentence, delete "In addition……the TMC" and insert "The TOA may consider using" Final sentence, delete "will also apply to" and insert "could also be considered for".

3.70	Delete "and to make……funds".
3.74–3.75	Delete title and paragraphs and insert "Not used"
DOCUMENT: BD 89/03 The Conservation of Highway Structures	
1.7	Delete "managed by ……their Agents".
4.3	Delete last sentence.
DOCUMENT: BD 27/86 Materials for the Repair of Concrete Highway Structures	
General	Throughout this standard, delete "formulator" and insert "designer".
4.4(a)	Delete "supply" and insert "obtain" Also delete "formulation" and insert "supplier".
4.4 (a)	(i) delete "formulator's and insert "manufacturer".
4.4 (a)	(ii) delete "formulator's and insert "supplier".
4.4 (c)	(iii) delete "formulator's and insert "manufacturer's".
4.6 (a)	Delete "Contractor ……..representative" and insert "Project Co" and also delete "Where required in the Contract procedure" and insert "Procedure".
6.1(a)	Add the following text to the end of the existing paragraph. "Other materials recommended by the manufacturer may also be acceptable to treat minor repairs."
6.2(a)	Delete "supply" and insert "obtain".
DOCUMENT: BA 35/90 Inspection and Repair of Concrete Highway Structures	
2.1	Delete "the Engineer" and insert "those".
3.2	Delete "The Engineer should consult" and insert "Consultations should be held with."
6.1	Delete "Engineer" and insert "Project Co".
7.2.1	Last sentence, delete "under the……to ensure that" and insert "in a manner that ensures".
8.1	Delete "Technical ….. Part 1" and insert "provisions of Schedule 9 (*Certification and Review Procedure*)".
8.3	Delete "The Engineer should ensure that concrete removal is programmed" and insert "Concrete removal should be programmed".
8.5.2	Delete "A separate item ..... Bill of Quantities."
8.5.3	Delete "Contractor's" and insert "contractor's".
10.5, 10.6	Delete "Contract Drawings" and insert "drawings".
DOCUMENT: BA 83/02 Cathodic Protection For Use In Reinforced Concrete Highway Structures	
5.1	Delete the paragraph and insert "Not used".
5.3	Delete "Consultant and Contractor" and insert "contractor".
6.27	Delete first sentence and insert "Arrangements should be made by Project Co to train staff in the ongoing management of the cathodic protection system".
7.6	Delete last paragraph.
DOCUMENT: BA 87/04 Management of Corrugated Steel Buried Structures	
1.11	Delete "Maintaining Agent (MA) and the".
DOCUMENT: BD 21/01 The Assessment of Highway Bridges and Structures	
1.3	Delete "then the following actions … Bridges (DMRB 3.4))" and insert "the procedure in the Agreement shall be followed"
1.4	Delete the second and third sentences.
3.1	Delete "property on or near" and insert "property on, beneath or near".
5.36 & 5.37	Delete the last sentence.
6.18	Delete "assessing engineer" and insert "Designer".
6.29	Delete "assessing engineer" and insert "Designer".

DOCUMENT: BA 16/97 The Assessment of Highway Bridges and Structures (Incorporating Amendment No. 1 dated November 1997 and Amendment No. 2 dated November 2001)	
1.6	Delete "the engineer" and insert "designer" in this instance and at every occurrence throughout this Advice Note.
3.23	Delete second paragraph.
Annex H	First sentence, delete "Highways Agency" and insert "TfL".
H4	Add at the end of the sentence, "detailing the proposed course of action".
DOCUMENT: BA 38/93 Assessment of the Fatigue Life of Corroded or Damaged Reinforcing Bars	
3.12	Delete "advice of the……criteria to be adopted" and insert "Project Co shall determine the appropriate criteria".
DOCUMENT: BA 39/93 Assessment of Reinforced Concrete Half-Joints	
2.1	Delete the third sentence.
DOCUMENT: BD 48/93 The Assessment and Strengthening of Highway Bridge Supports	
1.5	Retain this paragraph but delete the last sentence.
4.8	Delete the last sentence.
DOCUMENT: BA 54/94 Load Testing for Bridge Assessment	
All occurrences	Delete "assessing engineer" and insert "Designer".
3.4	Delete "Highway authorities have" and insert "Project Co has".
3.16	Delete "Design Organisations" and insert "Project Co"
DOCUMENT: BA 55/06 The Assessment of Bridge Substructures and Foundations, Retaining Walls and Buried Structures	
2.8	Delete "the last sentence".
4.1	Delete "who will be ….option"
DOCUMENT: BD 56/10 The Assessment of Steel Highway Bridges and Structures	
2.1	Delete "an assessing engineer" and insert "the Designer".
DOCUMENT: BA 51/95 The Assessment of Concrete Structures Affected by Steel Corrosion	
1.8	Retain this paragraph.
DOCUMENT: BD 44/15 The Assessment of Concrete Highway Bridges and Structures	
2.1	Delete "an assessor" and insert "the Designer".
All occurrences	Delete "assessor" and insert "Designer".
Appendix A	
All occurrences	Delete "assessor" and insert "Designer".
5.8.10A	Delete "assessing engineer" and insert "Designer"
DOCUMENT: BD 79/13 The Management of Sub-standard Highway Structures	
All occurrences	Delete "Structure Owner" and insert "Project Co"
1.3	Delete first and second sentences
2.14(i)	Delete entry and insert "Not used"
2.14(ii)	Delete entry and insert "Not used"
2.14(iv)	Delete second sentence.
5.25	Delete the paragraph and insert "If Project Co wishes to use other forms of barrier to reduce the level of risk as an interim measure then such design shall be submitted as a Proposal under the Review Procedure".
Appendix B B1.15	Delete second sentence
DOCUMENT: BD 86/11 The Assessment of Highway Bridges and Structures for the Effects of Special Types General Order (STGO) and Special Order (SO) Vehicles	
1.1	Delete "BD 101 (DMRB 3.4.22)" and insert "this Agreement".

1.12	Delete "of the Overseeing Organisations"
Annex D D1 first Paragraph	Delete "highway authority or its appointed agent" and insert "Project Co" Delete "from a haulier".
Annex D D1 fourth Paragraph	Delete "Highway authorities and their appointed agents" and insert "Project Co".
Annex D D7	Delete "Highway authorities" and insert "Project Co".
VOLUME 4	
DOCUMENT: HD 22/08 Managing Geotechnical Risk	
1.1	Delete paragraph and insert "Not used"
1.2	Delete "Certification is applied" and insert "Documentation is required"
1.5	Delete paragraph and insert "Not used"
1.7	Delete first two sentences
1.10	Delete the following definitions: Designer, Earthworks, Geotechnical Activities, Geotechnical Works, Strengthened Earthworks, Overseeing Organisation Site Nominee (OOSN), SEAF.
1.12	Delete "on Overseeing …..Organisation's asset"
1.13	Delete paragraph and insert "Not used"
1.17	Delete heading and paragraph and insert "The Designer shall nominate a chartered engineer or chartered geologist with appropriate geotechnical experience and with the experience and qualifications of a Designers Geotechnical Advisor (DGA)"
1.19	Delete "as part of the Geotechnical Certification procedure"
1.20	Delete heading and paragraph
2.4	Delete "in the Geotechnical certification procedure"
2.4 Key Stage 1	Delete "thus the requirements for Geotechnical Certification" and insert "the geotechnical reporting requirements"
2.4 Key Stage 2	Delete "Certification" and insert "reporting requirements"
2.4 Key Stage 3	Delete "Certification" and insert "reporting requirements" Delete "contractor" and insert "Project Co"
2.5	Delete last sentence
3	Delete paragraphs and insert "For the Geotechnical Certification Procedure see Part 1 (Certification Procedure) of Schedule 9 (Certification and Review Procedure)"
4.1	Delete paragraph and insert "Not used"
4.3	Delete "appointment of the Design Organisation, the Designer's Geotechnical Advisor shall submit a "Statement of Intent" to the Overseeing Organisation." and insert "the Designer's Geotechnical Adviser shall prepare a "Statement of Intent"" Delete "estimated programme and cost" and insert "and estimated programme" Delete "to Preliminary Certification"
4.4	Delete paragraph and insert "Not used"
4.5	Delete "on appointment" Delete last sentence

4.6	Delete "the Design Organisation"
5 title	Delete "Certification" and insert "Assessment"
5.1	Delete "Overseeing Organisation" and insert "Project Co"
5.3	Delete "Overseeing Organisation" and insert "Project Co"
5.4	Delete "reported" and insert "included" Delete "acceptance" and insert "review" Delete "agreed" and insert "proposed"
5.9	Delete "and the Overseeing Organisation's …… for further Geotechnical Certification"
5.11	Delete "submit" and insert "prepare" Delete "produced by the specialist contractor" Delete "for consideration for the preparation" and insert "for review and for the preparation"
6 title	Delete "Certification" and insert "Reporting Requirements"
6.2	Delete the first sentence and insert "The GDR shall be submitted to TfL under the Review Procedure as Design Data." Delete "cover of a new Geotechnical Certificate" and insert "the Review Procedure as Design Data."
6.3	Delete ", to suite the design and construction programme as agreed with the Overseeing Organisation's Geotechnical Advisor" Delete "Relevant sections of the GDR shall be submitted 28 days prior to the programmed start date of the work covered by the submission. (This time limit may be amended by contract documentation or in agreement with the Overseeing Organisation.)" Delete "by the Contractor before the relevant Certification for that part of the Works has been completed" and insert "the submission has been Received or Received with comments"
6.4	Delete "the certification at"
6.5	Delete "Contract Documentation" and insert "Disclosed Data" Delete "Contractor" and insert "Project Co" at all occasions
6.6	Delete the first sentence. Delete "Appendix E" and insert "Annex 2 (*Technical Appraisal Forms*) of Part 1 (*Certification Procedure*) of Schedule 9 (*Certification and Review Procedure*)"
6.7 & 6.8	Delete heading and paragraphs and insert "Not used"
6.9	Delete paragraph and insert "Not used"
6.10	Delete ", together with a Geotechnical Certificate (Appendix)," Delete "via the OOSN" Delete "under cover of a fresh Geotechnical Certificate" and insert " under the Review Procedure"
6.11	Delete "based on the model form set out in Appendix E"
6.12	Delete paragraph and insert "Not used"

7.2	Delete "Designer's Site Staff" and insert "Designer". Delete "Project Completion" and insert "Permit to Use"
7.6	Delete "but once accepted" and insert "and"
Appendix A	Delete appendix and insert "Not used"
DOCUMENT HA 70/94 Construction of Highway Earthworks	
1.4	Delete and insert "Not used".
1.5	Delete "Hard Material, as defined in MMHW" and insert "hard material".
2.1	Delete and insert "Project Co is responsible for the classification of site won materials".
2.2	Delete and insert "Project Co is responsible for all testing and shall prepare Appendix 1/5 and submit it in accordance with the Review Procedure".
2.3 and 2.4	Delete and insert "Not used".
2.9	Delete whole paragraph and insert "Not used".
3.1	Delete "Both strengthening and repair ... Engineer".
3.3	Delete "need to be agreed by the Overseeing Organisation" and insert "shall be submitted in accordance with the requirements of the Agreement".
3.4	Delete "Contractors" and insert "Project Co".
3.5	Delete "Contractor" and insert "contractor".
3.6	Delete first sentence and insert "Project Co shall prepare and submit Appendix 6/3 in accordance with the Review Procedure. It shall include the arrangements for monitoring of property off-site which shall in turn include any particular requirements in the Agreement".
4.5	In the last sentence, delete "In approving the" and insert "The".
4.8	First sentence, delete "the Engineer's inspectors……..compactor" and insert " the speed of travel of the compactor should be noted".
4.13	Last sentence delete "Engineer" and insert "Designer and submitted in accordance with the Review Procedure."
4.17	Delete "Engineer to carry out" and insert "carrying out of".
5.3	Delete "when required ……. the Engineer" and insert "if listed in Appendix 6/3 and submitted in accordance with the Review Procedure".
5.4	Delete "SHW Sub clause ……. the Contractor" and insert "Project Co keeps record of the sources and is required".
7.4	Delete "the Engineer ….. requirement" and insert "this requirement may be reduced with the agreement of the Designer".
8.1	Third sentence, delete "Contractor's" and insert "Project Co's".
8.4	Delete "Resident Engineer" and insert "Project Co" also delete "specified in the Contract".
9.1	Delete "The Engineer" and insert "Project Co". Delete last paragraph and insert "Project Co shall take note of any particular requirements in the Agreement".
9.2	Delete "Engineer" and insert "Project Co"
10.1	Delete "specifically included in a Contract".
11.2	Delete "Engineer's Representative" and insert "Designer". Delete "Appendix H of HD 22" and insert "Appendix F of Part 2 of HD 22/08 as amended by Annex 2 (*Amendments to Standards and Specifications*) of Part 2 (*Design Standards and Specifications*) of Schedule 10 (*Design & Construction Requirements*)".
App. B, B1	Delete second sentence.

C1	(c) Delete "Contractor's" and insert "Project Co's". (e) Delete "Contractor's……approved" and insert "Project Co's proposed method should be acceptable".
DOCUMENT: HA 74/07 Treatment of Fill and Capping Materials Using Either Lime or Cement or Both	
1.22	Delete "HD 22 (DMRB 4.1.2)" and insert the "Agreement".
3.86	Delete "in the Contract"
3.89	Delete "Contract" and insert "design"
5.4	Delete "HA and its Agents" and insert "TfL and in the Data room"
6.4	Delete "projects" and insert "areas" at all occurrences
DOCUMENT: HA 120/08 Guidance on the Trenchless Installation of Services Beneath Motorways and Trunk Roads	
All occurrences	Delete "Installer" and insert "Project Co"
3.1	Delete "Overseeing Organisation" and insert "Project Co"
3.2	Delete "Overseeing Organisation" and insert "Project Co"
3.19	Delete "Overseeing Organisation" and insert "Project Co"
3.20, 3.21	Delete paragraphs and insert "Not used"
3.22	Delete first and second sentences and insert "It is recommended that the following documentation be produced:"
4.15	Delete "Overseeing Organisation" and insert "Highways Agency"
4.16	Delete "Agency" and insert "Highways Agency"
7.2	Delete paragraph and insert "Project Co must liaise with the street works coordinator to ensure that any necessary requirements are included in the Design Data submitted to TfL under the Review Procedure"
7.9	Delete the heading and paragraph
Section 9	Delete whole section and insert "Not used"
DOCUMENT: HA 39/98 Edge of Pavement Details	
1.2	First sentence, delete "an Overseeing Organisation" and insert "TfL". Delete last sentence.
3.9	Delete and insert: "Responsibility for the design of the drainage system rests with Project Co. Project Co may choose from full range of pipe types and materials given in the Specification for Highway Works and all the drain types 5, 6, 7, 8 and 9 shown on Highway Construction Details F18 unless otherwise stated in the Construction Requirements."
4.1	Delete paragraph and insert "Not used".
4.3	Delete paragraph and insert "Not used".
5.4	At b. delete "and specified in the Contract".
5.6	In the first sentence, delete "for contract purposes where" and insert "Where" Delete last sentence.
6.4	Delete "contractor" and insert "Project Co".
11.2	Delete "The Contractor…. the system" and insert "The system shall be designed".
11.3	Delete "the Contract Documents should" and insert "relevant drawings shall".
12.2	Delete "The Contractor …..channels" and insert "The channels shall be designed".
12.3	Delete "the Contract Documents should" and insert "relevant drawings shall".
12.4	Delete the last sentence.
13.1	Delete "Contract" and also delete "Contract Documents" and insert "relevant documents"

App A	Delete "TO BE SHOWN IN THE CONTRACT" and also delete, "IN CONTRACT" in the heading for column three of the table.
DOCUMENT: HD 49/16 Highway Drainage Design Principal Requirements	
All occurrences	Delete "EIA" and insert "EqIA"
2.3	Delete "relevant maintenance and management contract" and insert "agreement"
2.5	Delete paragraph and insert "Not used".
Certification	Delete heading "Certification"
3.4	Delete paragraph and insert "Not used".
DOCUMENT: HA 103/06 Vegetated Drainage Systems for Highway Runoff	
All occurrences	Delete "or Specifiers" and "and Specifiers"
1.3	Delete "Overseeing Organisation have a duty under" and insert "Project Co shall comply with the". Delete the second "Overseeing Organisation" and insert "Project Co".
5.25	Delete "highway authority" and insert "Project Co".
5.45	Delete "Contractor's" and insert "Project Co's".
6.6	First sentence, add at the end "and water quality thereof" Delete third sentence.
DOCUMENT: HD 33/16 Design of Highway Drainage Systems	
Figure 2.1	Delete "Upload documents to Drainage Data Management System described in Chapter 10" and insert "Upload documents to TfL's asset management system"
2.2	Delete "1. Ground" and insert "Not used"
2.3	Delete all paragraph and bullet points and insert "Not used"
2.8	Delete "drainage certificate described in HD 50 (DMRB 4.2.1)" in the last sentence and insert "Design Certificate as described in Schedule 9 (Certification and Review Procedure)"
6.3	Delete "Geotechnical Engineer" and insert "designer" Delete "draft Compulsory Purchase Order (CPO)" and insert "Development Consent Order (DCO)"
7.4	Delete "20%" and insert "30%"
7.9	In the last sentence delete "the Contract specific".
7.15	Delete fifth sentence.
8.31	Delete "contractors" and insert "personnel"
Section 10	Delete section and insert "Not used".
Section 11	Delete 'HD 43 Drainage Data Management System for Highways (DMRB 4.2)'
DOCUMENT: HA 102/00 Spacing of Road Gullies	
1.9	Delete "or Specifier" throughout this standard.
DOCUMENT: HA 79/97 Edge of Pavement Details for Porous Asphalt Surface Courses	
1.1	First sentence, delete "an Overseeing Organisation" and insert "TfL".
2.7	Third sentence, delete ", but detailed advice should be sought" and insert "but advice may be available".
4.11	Last sentence delete, "should be sought" and insert "may be available".
4.17	Delete "Design Organisation" and insert "Project Co".
4.19	Delete "Design Organisation" and insert "Project Co".
4.23	Delete the last sentence.
Annex A	Sk 1 and 2 Note 5 and Sk 7 Note 9, delete, "should be sought" and insert "may be available".
DOCUMENT: HA 83/99 Safety Aspects of Road Edge Drainage Features	
1.7	Delete "the designer…….seek advice" and insert "guidance may be available".

3.1	Delete "should be sought" and insert "may be available".
6.2	Delete "should be sought" and insert "may be sought".
7.3	Delete "seek advice" and insert "advice may be sought".
10.15	In last sentence, delete "obtained" and insert "sought".
DOCUMENT: HA 217/08 Alternative Filter Media and Surface Stabilisation Techniques for Combined Surface and Sub-surface Drains	
6.7	Delete last sentence
6.18	Delete last sentence
7.23	Delete last sentence
Appendix A	Paragraphs 5.1 to 5.3 of Annex 2 (*Amendments to Standards and Specifications*) of Part 2 (*Design Standards and Specifications*) of Schedule 10 (*Design & Construction Requirements*) shall apply to Appendix A.
DOCUMENT: HA 40/01 Determination of Pipe and Bedding Combinations for Drainage Works	
1.1	Delete "for each contract".
DOCUMENT: HA 104/09 Chamber Tops and Gully Tops for Road Drainage and Services: Installation and Maintenance	
1.1	Delete second sentence and insert "Chambers should not normally be located in carriageways, hard strips, hard shoulders and central reservation crossovers of trunk roads and motorways". Delete third sentence.
1.4	Delete "will provide" and insert "may provide".
8.2	Delete "an appropriate training body" and insert "a competent training body".
9.1	(e) Delete the entry and insert "The Designer must approve the re-use of frames and covers."
10.1	First sentence, delete "Contract". Second sentence delete "Appendix A" and insert "Annex A" and delete "and where……..Documents".
Annex A	First paragraph, delete "in the Contract".
DOCUMENT: HA 113/05 Combined Channel and Pipe System for Surface Water Drainage	
2.3	Delete last sentence.
4.3	Delete "and guidance in this regard should be sought from the Overseeing Organisation".
DOCUMENT: HA 107/04 Design of Outfall and Culvert Details	
3.6	Delete "the advice of the Overseeing Organisation should be sought" and insert "proposals should be submitted to TfL as part of the Design Data".
DOCUMENT: HA 118/06 Design of Soakaways	
1.2.2	Delete "Overseeing Organisations" and insert "Project Co"
4.2.1	Delete "and Specifiers"
DOCUMENT: HA 119/06 Grassed Surface Water Channels for Highway Runoff	
2.2	Delete "permitted" and insert "approved"
3.2	Delete "Regulating Authority (RA)" and insert "TfL"
3.4	Delete "with the RA"
VOLUME 5	
DOCUMENT: HA 13/81 The Planting of Trees and Shrubs	
Add New Preamble	"Notwithstanding any advice given herein Project Co shall comply with the Agreement with regard to the landscape and ecological requirements therein where such requirements differ from any advice in this document".
3.1.1	Delete the last two sentences.

4	Revise the title to "Storage and Handling".
4.1	Delete the whole paragraph and insert "Not used".
4.3	Second sentence, delete "Under the ……. contract". Delete the last sentence.
DOCUMENT: TA 91/05 Provision for Non-Motorised Users	
3.2	Delete title and insert "Design and NMU Audit" Delete "In the Design Brief, reference should be made to the need to cater for" and insert "There is a need to refer to".
4.5	Delete "Overseeing Organisation" and insert "Project Co" in both cases.
6.52	Delete "Overseeing Organisation" and insert "Project Co".
8.35	Delete "Overseeing Organisation" and insert "Project Co".
10.3	Delete "Design Brief and NMU Audit" and insert "Design and NMU Audit".
A1.2	Delete "Overseeing Organisation" and insert "Project Co".
DOCUMENT: HD 42/05 Non-Motorised User Audits	
1.11	Delete ",for which the highways Agency, …….highway authority".
VOLUME 6	
DOCUMENT: TD 9/93 Highway Link Design (Incorporating Amendment No 1 dated February 2002)	
0.11	Delete "shall be used at all stages to test the economic performance of alternative scheme designs" and insert "may be used at the discretion of Project Co".
0.16	Delete "would" and insert "may".
1.1	Delete paragraph and insert: "Design Speed" "The Design Speed for the horizontal and vertical alignment shall be as stated in the Construction Requirements. The minimum geometric parameters consistent with that Design Speed shall be provided except where the use of Relaxations and Departures from Standard has been justified in accordance with Paragraphs 1.15 to 1.28 (as amended)."
1.2-1.8	Delete paragraphs 1.2 – 1.8 and insert "Not Used". Also delete Tables 1, 2.and Fig, 1.
2.6	Delete "which shall…….COBA (Scotland – NESA)" and insert "which may be tested by COBA at the discretion of Project Co".
5.3	Delete last sentence.
7.24	Second paragraph, delete "should be…….COBA (Scotland – NESA)" and insert "may be tested by COBA at the discretion of Project Co".
DOCUMENT: TA 85/01 Guidance on Minor Improvements to Existing Roads	
1.2	Delete the last sentence.
1.9	Replace "DTLR" with "TfL" at every occurrence in this document.
2.1	Delete the paragraph and insert "Not Used".
3.18	Delete "The cost of an" and insert "An".
DOCUMENT: TD 22/06 Layout of Grade Separated Junctions	
1.38	Delete "discuss" and insert "submit" Delete "with" and insert "to the"
3.2	Delete paragraph and insert "For traffic flows see the Agreement"

DOCUMENT: TD 54/07 Design of Mini-Roundabouts	
1.18	From the third sentence, delete "and monetary".
2.6	Delete the last sentence.
DOCUMENT: TD 16/07 Geometric Design of Roundabouts	
1.12	Delete "and monetary" from the third sentence.
8.37	Delete the third and fourth sentences.
8.47	From the last sentence, delete "Overseeing Organisation" and insert "Project Co".
DOCUMENT: TD 39/94 The Design of Major Interchanges	
2.11	Delete fourth sentence.
2.31	Delete first two sentences and insert "When comparing several options, consideration must be given to:".
6.6	(iii) Delete "will have" and insert "may have".
DOCUMENT: TD 40/94 Layout of Compact Grade Separated Junctions	
6.8	Second sentence, delete "at the discretion of the Design Organisation" and insert "subject to review in accordance with the Agreement".
DOCUMENT: TD 42/95 Geometric Design of Major/Minor Priority Junctions	
7.74	Last sentence, delete "which offers ……. not as strong".
Annex 1 Para 6	Delete whole paragraph and insert: "The Designer shall in the first instance attempt to achieve an RFC value which does not exceed 85% for an urban junction and 75% for a suburban or rural junction based on a flow for 15 year high growth after opening. Where it is not possible to achieve the above RFC values at the 15 years high growth flows, the RFC values shall be achieved based on the maximum possible post opening high growth traffic flows. The Designer shall in all circumstances aim to achieve a reasonably balanced design in respect of achieving the same RFC value on all approaches."
DOCUMENT: TD 41/95 Vehicular Access to All-Purpose Trunk Roads	
2.3	Delete the last two sentences.
4.3	Delete the last sentence.
DOCUMENT: TA 23/81 Junctions and Accesses: Determination of Size of Roundabouts and Major/Minor Junctions	
1.1	Fourth sentence, delete "The economic …. use either" and insert "Operational assessments are then carried out using".
4.2.3	Delete last sentence, (in parenthesis.)
DOCUMENT: TA 86/03 Layout of Large Signal Controlled Junctions	
1.3	Delete "Highway Engineer" and insert "designer"
DOCUMENT: TD 36/93 Subways for Pedestrians and Pedal Cyclists Layout and Dimensions	
4.5	Delete "may" and insert "shall".
DOCUMENT: TA 66/95 Police Observation Platforms on Motorways	
3.2 (i)	Delete "Cost" and insert "Location".
DOCUMENT: TD 69/07 The Location and Layout of Lay-Bys and Rest Areas	
1.8	Delete "Design Organisations faced by such situations …….. with the Overseeing Organisation."
4.22	Delete ", and advice should be obtained from the Overseeing Organisation".
7.2	Delete "both the Overseeing Organisation and"

7.10	Delete "both the Overseeing and" and insert "the" Delete the last sentence.
8.3	Delete the second sentence.
8.8	Delete the second sentence.
8.9	Delete paragraph and insert "Proposals shall be submitted to TfL under the Review Procedure."
DOCUMENT: TA 57/87 Roadside Features	
1.8.1	First sentence, delete "Highway authorities are required" and insert "It is a requirement".
3.1.2	(a) Delete the second sentence. (b) Delete the third sentence.
Section 3.2 & 3.3	Delete paragraphs 3.2.1 to 3.2.3 and 3.3.1 to 3.3.5 and insert "The siting and frequency of rest areas shall be in accordance with the Agreement".
3.4.6	Delete paragraph and insert "Unless stated otherwise in the Agreement, overnight stopping areas for caravaners or campers shall not be incorporated in the design of picnic area sites".
3.4.8	Third sentence, delete "delegated" and insert "subcontracted" and add at the end "by agreement".
Sections 9 & 10	Delete whole Sections 9 and 10 and insert "Not Used".
12.2.2 to 12.2.4	Delete paragraphs 12.2.2 to 12.2.4 and insert "Railway level crossings shall conform to the standards stated in the Agreement".
12.3.1	Last sentence, delete "Highway authorities have" and insert "Project Co has".
DOCUMENT: TA 81/16 Coloured Surfacing in Road Layout (Excluding Traffic Calming)	
3.25	Delete the paragraph and insert "Not used".
3.31	Delete "beneficial" and insert "necessary".
DOCUMENT: TD 51/17 Segregated Left Turn Lanes and Subsidiary Deflection Islands at Roundabouts.	
2.5.1	Delete "and in Northern Ireland designers shall read this standard in conjunction with the TSRNI or contact the Overseeing Organisation" in the third sentence.
3.3.1	Delete "and in Northern Ireland designers shall read this standard in conjunction with the TSRNI or contact the Overseeing Organisation (see Annex A)" in the second sentence.
4.1.1	Delete " HD 19 Road Safety Audit (DMRB 5.2.2) (Ref 12)" and insert "Road Safety Audit Document (SQA-0170)"
DOCUMENT: TA 87/04 Traffic Calming on Trunk Roads A Practical Guide	
1.16	Delete "Overseeing Organisations" and insert "Project Co".
2.21	Delete "as defined by ……Organisation".
2.23	Delete "Overseeing Organisation" and insert "Project Co"
2.58	Delete "as required by the Overseeing Organisation".
VOLUME 7	
DOCUMENT: HD 23/99 General Information	
1.6	Delete last two sentences.
2.12	Delete "and the Overseeing Organisation's intention".
2.13	Delete last sentence.
DOCUMENT: HD 35/04 Conservation and the Use of Secondary and Recycled Materials	
1.2	Delete "design organisations" and insert "Project Co".
1.3	Delete "Design organisations" and insert "Project Co".
DOCUMENT: HD 26/06 Pavement Design	

2.26	Delete first and second sentence Delete "each" and insert "the".
DOCUMENT: HD 27/15 Pavement Construction Methods	
2.20	Delete last sentence.
2.22	Delete "whole life.....analysis period" and insert "the life of a pavement". Delete last sentence.
3.20	Delete ", unless the use of……..Engineer".
DOCUMENT: HD 28/15 Skidding Resistance	
4.3	Delete "Overseeing Organisation or its Managing Organisation" and insert "Project Co".
4.14	Delete "Overseeing Organisation or its Managing Organisation" and insert "Project Co".
5.7	Delete " Managing Organisation" and insert "Project Co".
Annex 6	Delete " Managing Organisation" and insert "Project Co".
A8.6	Delete " Managing Organisation" and insert "Project Co".
A8.16	Delete " Managing Organisation" and insert "Project Co".
DOCUMENT: HD 29/08 Data for Pavement Assessment	
All occurrences	Requirements by Overseeing Organisations other than the HA are to be ignored. This means that PANDEF is not to be used.
1.5	Delete last sentence
2.19	Delete paragraph and insert "Not used"
3.12	Delete "in support of bids for HA maintenance schemes"
4.39	Delete paragraph and insert "A summary of all input parameters affecting the final design solution is to be provided for use as an audit trail."
5.4	Delete "so they cannot be input to the Overseeing Organisation's design method"
5.11	Delete paragraph and insert "Not used"
4A.4	Delete "by the Overseeing Organisation"
6A.12	Delete "Highway Engineers" and insert "Project Co"
DOCUMENT: HD 30/08 Maintenance Assessment Procedure	
1.6	Delete "Network Maintenance Manual" and insert "Network Management Manual"
7.5	Delete the last sentence
7.19	Delete "or with a treatment ……existing pavement"
7.35	Delete "Further advice…….. Overseeing Organisation."
DOCUMENT: HD 31/94 Maintenance of Bituminous Roads (Incorporating Amendment No.1 dated March 1995 and Amendment No. 2 dated February 1998)	
1.2	Delete the last sentence.
3.5	Delete "PA" and insert "Porous Asphalt (PA)".
4.14	Delete "often becomes ……. attractive" and insert "may be acceptable as an".
4.15	Delete the last sentence.
4.24	Delete fifth sentence.
5.2	First sentence, delete "resulting in ……. contracts". At the beginning of second sentence, delete "Savings" and insert "Potential savings".
5.26	Delete last sentence.

5.28	Delete paragraph and insert "To obtain data for resurfacing schemes where recycled materials have been used, Project Co shall send to TfL the information listed in Figure 5.2.".
Figure 5.2	Change the addressee to: "TfL" Delete "Cost of Work" from the heading "CONSTRUCTION:". Delete "for the Highway Authority/Consulting Engineer" and insert "on behalf of Project Co".
6.35	Delete the whole paragraph and insert "Not used".
6.39 (i)(a)	Delete last sentence.
6.39 (ii)(b)	Delete the last sentence.
6.42	Delete whole paragraph and insert "Not used".
6.52	Delete "After the contract has been let the" and insert "The". Delete the last sentence.
6.58	Delete the second sentence.
DOCUMENT: HD 40/01 Footway Maintenance	
2.1	Delete the third sentence.
2.3	Delete "authority" and insert "Project Co".
4.2	Delete "A maintaining authority will normally" and insert "Project Co shall".
4.11	Delete the first sentence.
5.14	Delete "A maintaining authority should" and insert "Project Co shall".
5.68	Delete "maintaining authorities" and insert "areas".
Annex D	Page D9, under heading "Further considerations:", delete the first sentence.
DOCUMENT: HD 36/06 Surfacing Materials for New and Maintenance Construction	
2.8	Delete "the Highways Agency's".
DOCUMENT: HD 37/99 Bituminous Surfacing Materials and Techniques (Incorporating Amendment No. 1 dated May 1999)	
2.28	Delete "Overseeing Organisation" and insert "relevant organisation".
3.27	Delete the paragraph and insert "Not used".
3.29	Delete the last sentence and insert "It is the responsibility of Project Co to ensure that the material has been laid consistently".
4.17	Delete the last sentence.
5.12	Delete "DMRB 3.2.4" and insert "DMRB 4.2.4".
5.17 (d)	Delete ", without advice from the Overseeing Organisation".
5. 17 (k)	Delete ", without approval from the Overseeing Organisation".
5.19 & 5.21	Delete "DMRB 3.2.4" and insert "DMRB 4.2.4".
5.35	First sentence, delete "the Overseeing Organisation" and insert "TfL" Delete "submitted" and insert "submitted as part of the Design Data"
5.45	Delete last sentence.
5.56	Delete last sentence.
5.67	Delete third sentence.
6.3	Delete "in England……Overseeing Organisation"
6.7	Delete first sentence.
6.27	Delete last sentence.
7.9	Delete last sentence
8.5	Delete title and paragraph and insert "Not used".
8.33	Delete last three sentences.
8.34	Delete last sentence.

8.41	Delete last two sentences.
8.44	Delete paragraph and insert "Not used".
8.45 and 8.46	Delete paragraphs and insert "Not used".
8.47	Delete paragraph and insert "Not Used".
8.49	Delete the last sentence.
8.51	Delete paragraph and insert "The system of surface dressing proposed shall be deemed to be Design Data and submitted for review in accordance with the Review Procedure."
8.52	Delete last sentence.
8.72 & 8.74	Delete "Overseeing Organisation" and insert "Project Co".
8.85 & 8.86	Delete "for the contract".
8.89	Delete paragraph and insert "Not Used".
9.6	Delete "a Contractor" and insert "contractor".
9.8	Delete last sentence.
9.11	Delete paragraph and insert "Not used".
10.20	Delete "Contractor" and insert "contractor".
10.39	Delete "with a two year guarantee requirement, normally of two years duration".
10.40	Second sentence: delete "during the guarantee period". Third sentence: delete "over the second year of the guarantee period".
11.13	Delete "from the contractors".
VOLUME 8	
DOCUMENT: TA 12/07 Traffic Signals on High Speed Roads	
For the incorporated document: TAL 2/03 Signal-control at Junctions High-Speed Roads	
Fifth page MOVA	In the eighth paragraph delete "overseeing authority" and insert "Project Co"
DOCUMENT: TA 16/07 General Principles of Control by Traffic Signals	
For the incorporated document: TAL 1/06 General Principles of Control by Light Signals	
Part 1 of 4	
Page 4 1st column, second paragraph	Delete "contact the Department" and insert "submit a Project Co Change" Delete "Site authorisation for …. Be needed" and insert "An Alternative Proposal will be required for the use of amber arrows"
Page 4 1st column, last paragraph	Delete "will need authorisation" and insert "should be submitted as a Project Co Change" Delete last sentence
Page 4 2nd column, penultimate paragraph	Delete "will need authorisation" and insert "should be submitted as a Project Co Change"
Part 2 of 4	
Page 3 MOVA	In the second paragraph delete "traffic engineers" and insert "designers"
Part 3 of 4	
Page 4 Drawing Symbols	Delete the last sentence
DOCUMENT: TD 24/97 All-Purpose Trunk Roads Inspection and Maintenance of Traffic Signals and Associated Equipment	

2.3.4	Delete "submitted to the Engineer following each inspection" and insert "prepared by Project Co following each inspection. Such report shall be made available to TfL".
3.2.1	Delete the first two sentences and insert "Project Co shall categorise and arrange to repair all defects as follows:"
3.3.2	Delete "Engineer ... contractor(s)" and insert "by Project Co".
3.3.5	Delete ", and delivered to the supervising engineer".
4.2.3	Delete "submitted to the supervising engineer" and insert "retained by Project Co".
4.2.6	Second sentence, delete "The works …..Contractor" and insert "Project Co shall be required".
DOCUMENT: TD 07/07 Statutory Approval of Traffic Control Equipment	
1.5 & 1.6	Do not delete paragraphs 1.5 & 1.6
DOCUMENT: TA 84/06 Code of Practice for Traffic Control and Information Systems for All Purpose Roads	
1.1.5	First bullet, delete "in highway authorities and consultancies"
1.2.2	Insert "Project Co's and" after "operated by".
1.3.3	Delete "organisation responsible for the system" and insert "Project Co".
2.1.1.1	Delete "Although not an essential requirement, it" and insert "It".
2.2.5.2	Delete "for Transport (for England," and insert "("
2.5.3.4	Delete "(before commitment to the procurement process, e.g. invitation to tender)"
2.5.4.3	Delete "clients" and insert "Project Co". Delete "contractors" and insert "Sub-Contractors".
2.5.4.5	Third sentence, delete "before the tender stage" and insert "and the Designer during the design stage". Delete "Contractor" and insert "Project Co".
2.5.4.6	First sentence, delete "handed over to the client following the construction phase" and insert "retained by Project Co and handed over to TfL after the Contract Period".
2.7.1.1	Delete paragraph and insert "Not Used".
2.7.1.2	Delete paragraph and insert "Not Used".
2.7.1.4	Delete "Client" and insert "Project Co".
2.9.3.4	Delete paragraph and insert "Not Used".
3.2.4	Delete "Design authorities" and insert "Designers"
3.7.3	Delete "Design Authority" and insert "Designer"
3.7.5	Delete "Design authority" and insert "Designer"
3.7.6	Delete "Design Authority" and insert "Designer" at both occurrences
3.7.7	Delete "Approval Authority" and insert "TfL"
3.7.8	Delete "Design Authority" and insert "Designer"
4.1.7	Delete "Organisations and Certification"
4.2.2	Delete "principal contractor" and insert "Project Co".
4.3.12	Delete "Contractor" and insert "contractor" at both occurrences Delete "design authority" and insert "designer"
4.6.10	Delete "Overseeing Organisation or a representative" and insert "Project Co". Delete "contract" and insert "Agreement" Delete "passes from …… over certificate" and insert "shall continue with Project Co".
5.1.1	Delete last sentence.
5.1.3	Delete and insert "not used"

5.2.1	Delete last sentence and insert "Project Co shall adopt the same requirements for all classes of roads".
5.2.3	Delete "in contracts"
5.2.8	Delete last sentence.
5.5.2	Last sentence, delete "Authorities" and insert "Project Co".
5.5.3	Delete the second and third sentences.
5.5.4	Delete "Highway Authorities should" and insert "Project Co shall". Delete ", possible……independent checks" Delete "The authority may" and insert "Project Co shall".
5.7.2	Last sentence, delete "but response …….and procedures".
5.8.1 to 5.8.6	Delete paragraphs and insert "Not Used"
5.8.7	Delete ", unless agreed otherwise….. full Departmental approval". Delete last sentence.
5.8.8	Delete paragraph and insert "Not used".
5.8.9	Delete paragraph and insert "Not used".
5.9.2	Delete "supervising engineer ……. contractor's depots" and insert "Project Co".
5.9.4	Delete last sentence.
5.10.1	Delete "maintenance authority's" and insert "Project Co's".
Appendix B 1	Add to paragraph "The definitions are to be used with this standard only."
Appendix B 4	Purchaser: - Delete second sentence.
Appendix C 3.5	Delete paragraph.
DOCUMENT: TA 58/92 Traffic Signs and Road Markings for Lane Gains and Lane Drops on All-Purpose Dual Carriageway and Motorway Trunk Roads (Incorporating Amendment No.1 dated April 1994)	
2.5.ix	Delete second paragraph.
3.3	Delete "may also" in last sentence and insert "should".
4.11	Delete "at the address in Chapter 7"
DOCUMENT: TA 61/94 Currency of the Traffic Signs Manual	
Annex A	Page A/2, under heading "In England" - delete whole paragraph and insert "TfL".
DOCUMENT: TA 19/81 Reflectorisation of Traffic Signs	
7.6 and 7.7	These paragraphs are superseded by Chapter 8 of the Traffic Signs Manual
DOCUMENT: TD 33/05 The Use of Variable Message Signs on All-Purpose and Motorway Trunk Roads	
3.3	Delete paragraph and insert "Not used".
4.2	Delete "shall be…….on any road" and insert "shall be submitted to TfL as an Departure from Standard for review in accordance Schedule 9 (*Certification and Review Procedure*)".
6.2	Delete "Highway Authority's" and insert "Project Co's".
6.7	Delete "Any departure from this requirement shall be referred to……for approval" and insert "Any change to this requirement shall be treated as a Departure from Standard and submitted to TfL for review in accordance with Schedule 9 (*Certification and Review Procedure*)".
8.3	Delete paragraph and insert "If Project Co wishes to use flashing lamps to accompany any signs for which the use of such lamps is not prescribed, it shall submit an Departure from Standard to TfL for review in accordance with Schedule 9 (*Certification and Review Procedure*)".

9.2.2	Delete "Overseeing Organisation for authorisation." and insert "TfL as an Departure from Standard for review in accordance with Schedule 9 (*Certification and Review Procedure*)".
9.3.5	Delete "agreed with the Overseeing Organisation." and insert "submitted to TfL as Design Data."
9.3.6	Delete "referred to the Overseeing Organisation for approval" and insert "submitted to TfL as Design Data".
9.4.1	Delete "If a sign……be obtained" and insert "The proposal to use this type of sign shall be submitted to TfL as Design Data".
10.5	Delete "Overseeing Organisation for authorisation." and insert "as an Departure from Standard to TfL for review in accordance with Schedule 9 (*Certification and Review Procedure*)".
12.1	Delete last sentence, and insert "Changes to computer software shall be submitted to TfL as Design Data".
DOCUMENT: TA 56/87 Hazardous Cattle Crossings: Use of Flashing Amber Lamps	
9.4 & 9.5	Delete "Highway Authority" and insert "Project Co".
11.4	Delete "in the first … GLRT Division" and insert "be carried out in accordance with the relevant requirements".
DOCUMENT: TA 60/90 The Use of Variable Message Signs on All-Purpose and Motorway Trunk Roads	
4.2.4	Delete "reference should ….. advice." and insert "further advice may be available through TfL".
DOCUMENT: TA 93/04 Traffic Signs to Tourist Attractions and Facilities in England: Guidance for Tourist Signing – General Introduction	
2.5	Delete "HA and local authority boundaries" and insert "Project Road and Local Facilities".
3.4	Delete the second sentence and insert "It is nevertheless important for Project Co to liaise with the adjoining authorities and TfL to maintain consistency of signing across the trunk and local road networks."
4.3	Second sentence, delete "policies be developed whereby only comprehensive signing schemes are implemented and". Also delete "considered" and insert "submitted".
DOCUMENT: TA 94/04 Traffic Signs to Tourist Attractions and Facilities in England: Guidance for Tourist Signing – Local Roads	
1.3	Second sentence, delete "Local authorities are advised to ensure" and insert "Project Co ensures". Third sentence, delete "It is recommended …. guidance for" and insert "Project Co obtains the relevant tourist signing policies and guidance from the relevant authorities and advise the".
1.5	Delete the second sentence.
1.6	Delete "traffic authority ….. 16.1)" and insert "Project Co".
3.1	Delete "the Highways Agency" and insert "other". Delete "HA Route Managers for trunk roads" and insert "TfL".
9.10	Delete "Local Traffic Authorities" and insert "Project Co". Also delete "local road network" and insert "Project Road". Delete "Local Authority" and insert "Project Co".
15.1	Delete "traffic authority" and insert "TfL".
16.2	First sentence, delete "(including the Highways Agency)". Second sentence in brackets, delete "trunk road, then the Highways Agency is the HTA" and insert "Project Road, then Project Co is the HTA".

16.4	Delete the last sentence.
16.6	Delete "the authority" and insert "Project Co".
17.1	First sentence, delete ", so ….. their roads". Delete the rest of the Paragraph.
17.2	Delete the paragraph and insert "Not Used".
17.4	Delete "between the HA and the applicant".
17.5	Delete the paragraph.
18.1	Delete "local road network need replacing, LTAs" and insert "Project Road need replacing, Project Co". In the second sentence delete "Highways Agency will" and insert "Project Co should" and delete "trunk roads" and insert "the Project Road". Delete "the HA will require a new application" and insert "a new application will be required". Also delete "to the HTA".
18.2	Delete "the Highways Agency and other Traffic Authorities" and insert "relevant authorities".
DOCUMENT: TD 53/05 Traffic Signs to Retail Destinations and Exhibition Centres in England and Wales – Trunk Roads	
1.2	Delete "Route Managers" and insert "Project Co"
DOCUMENT: TD 23/99 Trunk Roads and Trunk Road Motorways: Inspection and Maintenance of Road Lighting.	
2.8	Delete whole paragraph.
3.2	Here and at every occurrence in this standard, delete "Agent" and insert "Project Co" unless stated otherwise.
Table 3	Delete "the times quoted…….being completed". Category 2 (Low Priority), delete "reported to Overseeing Organisation" and insert subject to a planned programme of replacement".
5.5	Delete "as follows" and insert ", but not limited to, the following".
5.6	Delete paragraph and insert "Not used".
5.9	Delete the paragraph and insert "Night time bulk lamp replacement shall be in accordance with an agreed method statement.".
5.28	Delete last sentence.
5.29	Delete "and is subject to approval by the Overseeing Organisation".
5.30	Delete "Overseeing Organisation" and insert "Project Co".
5.35	(g) Delete last sentence. (h) Delete "and is subject to…... Organisation".
5.40	Delete "for prior agreement by the Overseeing Organisation".
5.43	Delete "and agreed by the Overseeing Organisation".
5.51	Delete "arboricultural officer of the Agent" and insert "Project Co's Environmental Team".
7.3	Delete "for a minimum of seven years" and insert "in accordance with the Agreement". Delete " or their agent".
7.4	Delete paragraph and insert "Not Used".
DOCUMENT: TD 34/07 Design of Road Lighting for the Strategic Motorway and All Purpose Trunk Road Network.	
4.6	From the first sentence, delete "Overseeing Organisation's design agent" and insert "Designer". Also delete "by the Overseeing Organisation's representative".
DOCUMENT: TD 34/91 Design of Road Lighting for Motorway Trunk Roads	

7.1.1	Delete "Department's design agent" and insert "Designer" and also delete "for inspection by the Department" and insert "by Project Co".
DOCUMENT: TA 64/94 Narrow Lane and Tidal Flow Operations at Road Works on Motorways and Dual Carriageway Trunk Roads with Full Width Hard Shoulders	
5.4	Delete "Resident Engineer's" insert "other relevant".
DOCUMENT: TA 92/03 Crossover and Changeover Design	
1.10	Delete last sentence.
2.3	Delete last 2 sentences.
3.2	Delete "Overseeing Organisation and their Agents" and insert "Project Co".
3.14	Delete "pre-contract" and insert "pre-construction".
DOCUMENT: TD 49/07 Requirements for Lorry Mounted Crash Cushions	
1.11 to 1.14	Do not delete the heading and paragraphs as required in paragraph 1.1.15 of Annex 2 (*Amendments to Standards and Specifications*) of Part 2 (*Design Standards and Specifications*) of Schedule 10 (*Design and Construction Requirements*).
1.15	Delete entry for Overseeing Organisation
VOLUME 9	
DOCUMENT: TD 46/05 Motorway Signalling	
3.20	Delete "Special site approval…..such a gantry"
DOCUMENT: TD 45/94 Motorway Incident Detection and Automatic Signalling (MIDAS)	
2.3.1	Delete last sentence.
2.4.2	Delete paragraph.
DOCUMENT: TD 18/85 Criteria for the use of Gantries for Traffic Signs and Matrix Traffic Signals on Trunk Roads and Trunk Road Motorways.	
1.2	Delete this paragraph and insert "For information on Matrix Signals reference should be made to TD 46."
2.1	Delete all "or matrix traffic signal or both".
4, 6, 9 & 10.2	Delete paragraphs and insert "Refer to TD 46 for the requirements".
7.1	Delete "when it is economical to do so".
DOCUMENT: TA 73/16 Emergency Roadside Telephones (ERT)	
1.2.4	Delete the paragraph.
DOCUMENT: TA 74/05 Motorway Signalling	
1.2 para 2	Delete paragraph and insert "The requirements for motorway signalling are contained in Annex A to this Advice Note."
1.2 para 3	Delete paragraph and insert "Not Used"
A2.6 para 1	Delete "Post Mounted" Delete "bulk purchased by the Highways Agency (HA)"
A2.6 para 2	Delete "are bulk" and insert "can be" Delete "by the HA"
A2.6 para 3	Delete "2x12 Message Signs are bulk purchased complete with mounting brackets by the HA"
A3.7 para 2	Delete "Special site approval…such a gantry"
A5.3 para 2	Delete paragraph and insert "Not Used"
A6.2 table A6.1a	Delete "- see Note 1" at all occasions Delete "Notes – Installed……..Systems Contractor."

A6.2 table A6.1b	Delete "- see Note 1" at all occasions Delete "Notes – Installed……..Systems Contractor."
A6.2 table A6.1c	Delete "- see Note 1" at all occasions Delete "Notes – Installed……..MS3 Contractor."
A6.2 table A6.1d	Delete "(*)" at all occasions Delete "Notes – (*)=Installed……..Sign Contractor."
DOCUMENT: TA 83/05 Guide to the Use of Variable Message Signs for Strategic Traffic Management on Trunk Roads and Trunk Road Motorways	
1.2 para 1	Delete paragraph and insert "The requirements for STMS using VMS are contained in Annex A to this Advice Note."
1.2 para 2	Delete paragraph and insert "Not Used"
A1 all occurrences	Delete "Clause not used" and insert "Paragraph not used"
A2.2 para 15	Delete "Divisions of the Overseeing Organisation" and insert "TfL" Delete "Project Concessionaires"
A2.2 para 20	Delete "must be authorised by the Overseeing Organisation" and insert "shall be submitted to TfL as an Departure from Standard for review in accordance with Schedule 9 (Design and Certification Procedure)"
A2.2 para 33	Delete "Designers should……Overseeing Organisation"
A2.2 para 36	Delete "Designers should……Overseeing Organisation"
A2.2 para 41	Delete "Any sign…Organisation" and insert "A sign is deemed to be authorised if it has been submitted in accordance with the Review Procedure and there has been no objection".
A2.2 para 43	Delete "considered as…….including pedestrians" and insert "undertaken by Project Co". Delete "therefore".
A2.3 para 46	Delete "to be agreed with the Overseeing Organisation"
A2.3 para 48	Delete paragraph and insert "Not Used"
A2.3 para 50	Delete "The designer should consult the Overseeing Organisation before placing contracts for VMS procurement as existing contracts may offer benefits in terms of cost savings and approved designs."
A2.3 para 53	Delete "and any modifications…….Organisation"
A2.3 para 54	Delete "the Overseeing Organisation" and insert "the National Roads Telecommunications Services (NRTS)"
A2.3 para 57	Delete "a contract for an" Delete Designers should……..timescale."
A2.3 para 64	Delete "must be authorised by the Overseeing Organisation as described in Chapter A2.2" and insert "must be treated as described in Chapter A2.2"
A2.3 para 65	Delete "Highway Authority" and insert "relevant Highway Authorities"
A3.2 para 9	Delete "specially authorised by the Overseeing Organisation" and insert "it has been submitted in accordance with the Review Procedure and there has been no objection."
A5.3 para 18	Delete paragraph and insert "Not Used"
A5.3 para 22	Delete paragraph and insert "Not Used"
Annex B, C & D	Delete annexes
VOLUME 10	
DOCUMENT: HA 55/92 The Good Roads Guide New Roads Landform and Alignment	

1.5	Delete second bullet.
14.1	Delete "contactor" and insert "Project Co".
20.2	First bullet, delete "provided to the contractor" and insert "produced".
DOCUMENT: HA 56/92 The Good Roads Guide New Roads Planting, Vegetation and Soils	
3.2	Delete first bullet.
4.4	Delete "Department of Transport" and insert "Project Co".
13.2	First bullet, delete "before the contractor moves onto a site" and insert "by Project Co before moving onto the Site". In the fourth bullet delete "available …. engineer" and insert "sought by Project Co".
13.6	Last sentence of first paragraph, delete "The contract should specify that soils" and insert "Soils".
DOCUMENT: HA 58/92 The Good Roads Guide New Roads The Road Corridor (Incorporating Amendment No. 1 Retaining Walls (Chapter 3) dated February 1997)	
7.2	Delete fifth bullet.
DOCUMENT: HA 85/01 Roads Improvement within Limited Land Take	
1.6	Delete last paragraph.
A10	6. Delete "a document which……..developer's" and insert "an".
DOCUMENT: HA 67/93 The Wildflower Handbook	
3.20	Delete last sentence.
6.15	Delete last sentence and insert "Correct management of the wildflower areas must be carried out during the long-term maintenance of the Project Facilities.".
DOCUMENT: HA 108/04 The Landscape Management Handbook	
1.10	Delete paragraph and insert "not used"
6.10.2 third bullet	Delete "In England …… Highway Authority" and insert " Project Co" Delete "The Authority" and insert "The Highways Authority"
7.1 first bullet	Delete "It is the intention ……..System Management Plan(EMP)" and insert "Project Co will record environmental aspects as part of an Environmental Management Plan"
Table 8.1 page 8/1	Delete first row starting with "Overseeing Organisation" Fourth row second column Delete "Motorways…….Authority" and insert "Project Co"
DOCUMENT: HA 115/05 The Establishment of an Herbaceous Plant Layer in Roadside Woodland	
5.9 METHODS	Delete "Highway Authority" and insert "Highways Agency".
DOCUMENT: HA 84/01 Nature Conservation and Biodiversity	
1.1	Delete second paragraph. Delete third paragraph and insert "The guidance below should be used to assist in meeting the commitments and targets in Management Strategies, Environmental Action Plans and Biodiversity Action Plans where appropriate."
1.2	Delete last bullet point.
1.4	Second paragraph, delete "Overseeing Organisations" and insert "Project Co". Delete third paragraph. Delete "Government and Overseeing Organisations".
3.3	Second bullet, delete "Overseeing Organisations" and insert "Project Co".

3.5	Delete last bullet point.
4.2	Delete second bullet.
4.3	Delete "period from tender…… defect liabilities" and insert "entire Contract Period". Delete the first and the third bullets.
DOCUMENT: HA 59/92 Mitigating Against Effect on Badgers February 1997	
9.4	Delete "highway authority……the scheme" and insert "Project Co".
11.5	Third sentence, delete "the Contractor should ….. contract to preclude" and insert "contractors must be precluded from". Last sentence, delete "It should be made" and insert "Project Co must make".
14.2	Delete last sentence.
DOCUMENT: HA 80/99 Nature Conservation Advice in Relation to Bats	
10.1	Delete "Project Managers are satisfied that".
10.3	Delete "Clerks of Works" and insert "supervisory staff".
DOCUMENT: HA 81/99 Nature Conservation Advice in Relation to Otters	
Page 18 (Figure 9 text)	Delete "The advice and approval…..of culverts and ledges."
DOCUMENT: HA 97/01 Nature Conservation Management Advice in Relation to Dormice	
3.6	Delete ", as agreed with Overseeing Organisations".
12.1	Delete "Each contractor should be informed" and insert "Project Co shall inform each contractor".
13.1	Delete first sentence.
14.1	Delete entire paragraph and insert "Not used".
15.1	Delete "in order to provide feedback to the relevant design authority".
DOCUMENT: HA 98/01 Nature Conservation Advice in Relation to Amphibians	
11.1	Second paragraph, delete the second sentence.
DOCUMENT: HA 65/94 Design Guide for Environmental Barriers	
2.10	Delete "Highway Authority" and insert "Secretary of State".
4.8	Delete "Gabion wall designs should be submitted for geotechnical certification or technical approval as indicated in HA 66 (DMRB 10.5.2)."
4.16 & 5.16	Delete last sentences.
7.1	Delete last sentence.
7.3	Last sentence, delete "- advice on approved systems should be sought from the Overseeing Organisation".
DOCUMENT: HA 66/95 Environmental Barriers: Technical Requirements	
4.3	Delete the penultimate sentence.
5.3	Last sentence, delete "on the fitness for purpose……..systems".
7.5 & 7.11	Delete "on grounds of fitness for purpose……cost effectiveness".
7.16	Delete "by the Engineer". Also delete "are to be supplied in Appendix 3/3 of the contract documents" and insert "shall be determined by the Designer".
App C.	Design Moments, last sentence, delete "and should be approved by the Engineer".
DOCUMENT: HA 75/01 Trunk Roads and Archaeological Mitigation	
General	In this Advice Note, "the contract" means "the Agreement", "the contractor" means "Project Co" and "Design Organisation's Consultant" means "Designer" unless stated otherwise.
1.5	First sentence, delete "as approved…….Project Manager".

1.10	Archaeological Contractor: delete "(in England) …….or consortium". Design Organisation: delete entry. Foreseeable Finds: delete "by the Design Organisation…….tender documents" and insert "within tender information". Delete the last sentence. Overseeing Organisation: delete entry. Overseeing Organisation's Project Manager (Project Director in Wales): delete entry. Project Design: delete "and forms the basis of a tender bid" Recording Action: delete last sentence. Unforeseeable Finds: means Unforeseeable Fossils and Antiquities
2	Summary sixth paragraph, delete the last sentence. seventh paragraph., delete "(References below …….for heritage matters.)".
2.10	Except where stated otherwise, delete "Overseeing Organisation's Project Manager" and insert "TfL" at every occurrence in this Advice Note.
2.15	At d) Delete fourth sentence and insert "The Designer should ensure that any sensitive archaeological sites should be avoided or treated with care when planning temporary works."
2.23	Sixth sentence, delete "of a competitive tender for the appointment of" and insert "upon which" and also delete ", who will produce" and insert "produces".
2.24	Delete "Overseeing Organisation's Project Manager" and insert "Project Co".
2.27	Delete last sentence and figure 1.
2.28	Delete last sentence.
2.30	Delete "If archaeological evaluation work shows.….the Overseeing Organisation's Project Manager."
2.33	Delete paragraph and insert "Not Used".
2.35	Delete "the Overseeing Organisation has issued the Notice to Enter" and insert "a notice to enter has been issued". Delete "Overseeing Organisation's Project Manager" and insert "Project Co".
Figure 2	Delete "Contract stage and" from the header and delete boxes containing "Tenders Invited" and "Contract Awarded". Delete "(Contract Complete)" from the bottom centre box. Delete from the figure title "and their Relationship……..Arrangement".
2.39	Delete "by" and insert "and". Delete "with the tender documents".
2.40	Delete "with the tender by" and insert "to".
2.41	Delete paragraph and insert "Not used".

Chapter 3 Summary	Delete "Overseeing Organisation's Project Manager" and insert "Project Co". Also delete the following "Project Manager" and insert "Project Co". Second bullet, delete "following a ….. Project Design" From the fifth bullet, delete "when the Updated …… Project Manager".
3.3	Delete paragraph and insert "Not used".
3.4	Delete first sentence and insert "Project Co should ensure that the scope of the Project Brief is in accordance with the Agreement".
3.5	Delete first sentence.
3.9 – 3.12	Delete paragraphs and insert "Not used".
3.15	Delete "Design Organisation's" and insert "TfL's". Also delete the last sentence.
3.16	Delete first sentence.
3.18	Delete "archaeological contractor" and insert "Archaeological Contractor". Delete the last 2 sentences.
3.19	Delete "As part of the archaeological recording contract…..Organisation will" and insert "The Secretary of State may".
3.23	Seventh bullet, delete ", or above the agreed the ……. of the Project Manager".
3.24	From fourth bullet, delete "or beyond the …… Project Manager"
3.32	Delete last sentence.
3.34	Delete "archaeological contractor" and insert "Archaeological Contractor".
3.36	Delete last 2 sentences.
3.42	Delete paragraph and insert "Not Used"
3.45,3.46, 3.47 &3.48	Delete paragraphs and insert "Not used".
3.49	Delete "DB/".
Annex III AIII	Delete "Engineer's representative" and insert "TfL" and also delete "Engineer's Representative" and insert "TfL". Delete "watching brief" and insert "Watching Brief" at every occurrence. Delete "the contractor" and insert "Project Co" at every occurrence.

3. Amendments to TfL Standards

SQA-0170 Road Safety Audit	
Part No.	**Description**
General	Replace "Overseeing Organisation" with "TfL"
General	Replace "Design Organisation" with "Designer"
General	Replace "Road Safety Audit Team(s)" with "Audit Team"
General	Replace "Client" with "Project Co"
General	Replace "Client Organisation" with "Project Co"
General	Replace "TfL's Road Safety Audit Managers" with "TfL"
General	Replace "Road Safety Audit Team(s)" or "RSA Team" with "Audit Team"
General	Replace "Design Teams" with "Designer".
2	Delete "The mandatory workflow process for Road Safety Audits undertaken internally by Transport for London is shown in Section 3."
2	Delete "This Procedure will be subject to frequent revision to ensure it reflects current best practice. Users of this Procedure should ensure they are using the most recent version, a copy of which will be available on TfL's website. Notifications of updates will be sent to registered interested parties. If you wish to be included on this distribution list please notify

	TfLSafetyAudit@tfl.gov.uk."
2	Delete "Overseeing Organisation Project Clients, Sponsors and Directors" and replace with "Project Co".
2 (c)	Delete "The Client may also deem it prudent to" and replace with " In respect of the Project Road, Project Co shall"
2 (d)	Delete "Stage 4a RSA will be prepared using 12 months of collision data from the first full month after the scheme became operational and 36 full months of collision data from prior to the commencement of construction works. A Stage 4b RSA is prepared using 36 months of collision data from the first full month after the scheme became operational and 36 full months of collision data prior to the commencement of construction works. The Client Organisation must decide if a Stage 4b RSA needs to be prepared. This decision may be led by the results of the Stage 4a report, the scale of the changes instigated by the original scheme, TADS outputs and any issues highlighted since the completion of the scheme." and replace with "Stage 4 Road Safety Audit's shall be carried out 12 months and 36 months after the Project Road is opened to traffic".
2 (e)	Delete "Combined Stage 1 & 2 RSAs can be carried out on the overall design of smaller and simpler schemes. Combined Stage 1 & 2 RSAs may have the disadvantage of identifying potential safety issues late in a scheme's development when corrective action may be more difficult. It is envisaged that schemes such as road marking alterations, traffic signing schemes and small footway modifications would fall under this category. Stage 1 and Stage 2 Road Safety Audits must not be combined as purely a cost and/or programme saving measure."
2 (Retention of Records)	Delete "any Client Organisation's external to TfL" and replace with "Project Co".
3	Delete whole section.
4	Delete whole section.

4. Amendments to Interim Advice Notes

IAN 73/06 Rev 1 – Design Guidance for Road Pavement Foundations (Draft HD 25)	
Section 3	In the second sentence, delete "may be used by designers without reference to the Overseeing Organisation." and insert "and" Delete "under the Departure from Standards procedure" and insert "in accordance with Schedule 9 (*Certification and Review Procedure*)". Delete the last sentence, starting with "It is the intention that this will be required for "
Section 4	
4.45	Delete "The Overseeing Organisation may permit the contractor to" and insert "Project Co may" Delete "Departure application" and insert " Relaxation and Departure from Standard Submission Form"
6.2	Delete ",of the contractor" and insert "during construction"
7.16	Delete "pavement engineer" and insert "designer"
7.19	Delete " it may be permitted at the discretion of the Overseeing Organisation" and insert "Project Co may use it"

Sections 5 and 6	The principles set out in paragraphs 5.1 to 5.3 of Annex 2 (*Amendment to Standards and Specifications*) of Part 2 (*Design Standards and Specifications*) of Schedule 10 (*Design and Construction Requirements*) apply to these sections.
Section 5, Clause 891 paragraph 2	Delete "in an electronic spreadsheet format" and insert "in the test recording system in accordance with Schedule 9 (*Certification and Review Procedure*)".
Section 5, Clause 892 paragraph 1	Delete " in an electronic spreadsheet format" and insert "in the test recording system in accordance with Schedule 9 (*Certification and Review Procedure*)".
IAN 97/07 – Assessment and Upgrading of Existing Vehicle Parapets	
7.2	Delete "the Technical Approval … early stage" and insert "an Departure from Standard shall be submitted"
IAN 104/07 – The Anchorage of Reinforcement and Fixing in Hardened Concrete	
Section 1 Introduction Implementation	Do not delete the heading and paragraphs as required in paragraph 1.1.15 of Annex 2 (*Amendment to Standards and Specifications*) of Part 2 (*Design Standards and Specifications*) of Schedule 10 (*Design and Construction Requirements*) Delete "(or in a Category 0 Design and Check certificate)"
Section 7 Reinstatement	Delete last sentence
Section 10 Further Information	Delete last sentence
IAN 109/08 – Advice Regarding the Motorway Signal Mark 4 (MS4)	
1.4	Delete "project Sponsor's" and insert "TfL's" After "and the views of the relevant Regional Control Centre Manager and Traffic Operations Regional Director", insert: "Project Co shall approach TfL to obtain these views if MS4 signs are being considered."
6.4	In the first sentence delete, "both SSR, ID and TO to assess their availability and feasibility" and insert "TfL"
IAN 116/08 – Nature Conservation in Relation to Bats	
5.4.1	Delete "overseeing organisation's or other Service Provider's" and insert "TfL or other service providers' "
8.1 final paragraph	Delete "The strategy for dealing ……..agreed with the Highways Agency"
8.3.2 fifth paragraph	Delete "approved by the Highways Agency" and insert "proposed"
8.3.3 (c) fifth paragraph	Delete "and advice sought from the Highways Agency"
9.1 first paragraph	Delete ", any monitoring strategy should be agreed with the Highways Agency" Delete "The extent of monitoring should be" and insert "Project Co shall carry out monitoring as"
9.1 second paragraph	Delete "It is essential that monitoring is included within contract requirements."
IAN 117/08 – Certification of Combined Kerb and Drainage Products	
2 second paragraph	Delete "Designers and Contractors" and insert "designers and contractors"

5	Delete "Highways Agency" and insert "project"
6 last paragraph	Delete "on Highways Agency projects" Delete "on Highways Agency schemes"

5. Amendments to the MCHW

5.1 The following amendments shall apply to the parts of the MCHW listed in paragraph 4 (*MCHW*) of Annex 1 (*Standards and Specifications*):

5.1.1 all references in the MCHW to the "Contractor" shall be deemed to be references to "Project Co";

5.1.2 all references to the "Contract" or "Conditions of Contract" shall be deemed to be references to "this Agreement";

5.1.3 all references to the "Site" shall be deemed to be references to lands and other places on, under, in, or through which the Works are to be carried out by Project Co;

5.1.4 all references to "Employer" shall be deemed to be references to "TfL";

5.1.5 all references to Appendices 0/1 and 0/2 shall be deemed to be references to this paragraph 5 (*Amendments to the MCHW*) of Annex 2 (*Amendments to Standards and Specifications*);

5.1.6 references to the "Overseeing Organisation" in the MCHW shall be deemed to be references to the "Designer" or "TfL" in accordance with the following principles:

a. where the agreement/consent/approval etc. of the Overseeing Organisation is required for the use of any method or materials or to proceed with any operation, Project Co shall seek such approval from TfL if the agreement/consent/approval etc. impacts on the health and safety of the general public, the environment, or any property or equipment not owned or operated by Project Co;

b. in all other cases where the agreement/consent/approval etc. of the Overseeing Organisation is required for the use of any method or materials or to proceed with any operation, this shall be given by the Designer;

c. where the MCHW gives scope for the Overseeing Organisation to require a test or waive the requirement for a test or to alter testing frequency, this decision shall be made by the Designer in accordance with the D&C Requirements;

d. where the MCHW requires the "Contractor" to provide documentation to the Overseeing Organisation for statutory or Departmental approval, such documentation shall be provided by Project Co to TfL; and

e. where the MCHW requires the "Contractor" to provide facilities and personnel for the Overseeing Organisation such facilities and personnel shall be provided by Project Co to TfL; and

5.1.7 all references to "Accommodation Works" shall be deemed to be references to "Supplementary Works".

5.2 MCHW Vol 1 shall be amended as follows:

5.2.1 the "Contract Reference Document Date" referred to in SHW clause 004.2 is deemed to be the Effective Date;

5.2.2 where a clause in the SHW is altered by this Annex 2 (*Amendments to Standards and Specifications*) any reference in the SHW to a clause number shall be deemed to refer to any substitute paragraph of that number in this Annex 2 (Amendments to Standards and Specifications); and

5.2.3 where a clause in the SHW is altered by this Annex 2 (*Amendments to Standards and Specifications*) any original table or figure referred to in that clause shall apply unless the table or figure is altered pursuant to this Agreement, in which case any reference in a clause of the SHW to the original table or figure shall be deemed to refer to the altered table or figure.

5.3 The following contract-specific additional, substitute and cancelled clauses, tables and figures shall apply to the parts of the MCHW listed in paragraph 4 (*MCHW*) of Annex 1 (*Standards and Specifications*):

PART A – SPECIFICATION FOR HIGHWAY WORKS		
Clause No.	**Title**	**Page No.**
List of Additional Clauses, Tables and Figures		
403.5BAR	Installation of Safety Barriers, Terminals, Transitions and Crash Cushions - Overall Requirements	
403.28AR	Installation of Safety Barriers, Terminals, Transitions and Crash Cushions - Overall Requirements	
404.9AR	Site Testing	
List of Substitute Clauses, Tables and Figures		
401.2SR	General	
401.5SR	General	
401.6SR	General	
403.1SR	Installation of Safety Barriers, Terminals, Transitions and Crash Cushions - Overall Requirements	
403.11SR	Installation of Safety Barriers, Terminals, Transitions and Crash Cushions - Overall Requirements	
404.6SR	Site Testing	
810.1SR	General Requirements for Cement and Other Hydraulically Bound Mixtures	
811.2SR	Binder Constituents	
812.2SR	Storage of Constituents	
813.1SR	General Requirements for Production and Layer Construction	
813.11SR	General Requirements for Production and Layer Construction	
813.13SR	General Requirements for Production and Layer Construction	
813.17SR	General Requirements for Production and Layer Construction	
813.18SR	General Requirements for Production and Layer Construction	

813.19SR	General Requirements for Production and Layer Construction	
813.2SR	General Requirements for Production and Layer Construction	
813.7SR	General Requirements for Production and Layer Construction	
817.1SR	Method Statement and Demonstration Area	
817.3SR	Method Statement and Demonstration Area	
818.1SR	Induced Cracking of HBM	
820.1SR	Aggregates	
TABLE 8/12SR	Aggregate Requirements for CBGM	
821.1SR	Cement Bound Granular Mixtures A (CBGM A)	
821.2SR	Cement Bound Granular Mixtures A (CBGM A)	
821.4SR	Cement Bound Granular Mixtures A (CBGM A)	
822.1SR	Cement Bound Granular Mixtures B (CBGM B)	
822.2SR	Cement Bound Granular Mixtures B (CBGM B)	
822.4SR	Cement Bound Granular Mixtures B (CBGM B)	
870.1SR	Testing, Control and Checking of HBM	
List of Cancelled Clauses, Tables and Figures		
404.5CR	Site Testing	
810.2CR	General Requirements for Cement and Other Hydraulically Bound Mixtures	
810.3CR	General Requirements for Cement and Other Hydraulically Bound Mixtures	
812.3CR	Storage of Constituents	
812.4CR	Storage of Constituents	
813.16CR	General Requirements for Production and Layer Construction	
813.5CR	General Requirements for Production and Layer Construction	
817.5CR	Method Statement and Demonstration Area	
817.6CR	Method Statement and Demonstration Area	
817.7CR	Method Statement and Demonstration Area	
817.8CR	Method Statement and Demonstration Area	
870.3CR	Testing, Control and Checking of HBM	
870.4CR	Testing, Control and Checking of HBM	
Additional Clauses, Tables and Figures		
Installation of Safety Barriers, Terminals, Transitions and Crash Cushions – Overall Requirements		
403.5BAR	Remedial work to verges and hardstanding adjacent to concrete foundations must be carried out. Topsoil must be in accordance with Table 6/1. Verges shall be clear of all 20mm+ stone/aggregate	
403.28AR	Where accident damage has occurred, an Inventory check must be carried out to ascertain the exact EN1317 system is installed. The replacement shall be on a 'like for like' basis, installed in sockets.	
Site Testing		

404.9AR	A Stage 1-2 Road Safety Audit shall be undertaken prior to detailed design to ensure that the desired outcomes of the VRS will be achieved. Following on from the installation of Vehicle Restraint Systems, A Stage 3 Road Safety Audits must be undertaken to assess the output of the design. Finally, a Stage 4 Road Safety Audit shall be undertaken once the scheme is operational to ensure the ongoing safety of the scheme.	
Substitute Clauses, Tables and Figures		
General		
401.2SR	Unless otherwise described in Appendix 4/1 and as amended in the relevant Clauses of this Series, Performance Criteria for Safety barriers shall conform to the requirements of BS EN 1317-1 and BS EN 1317-2.	
401.5SR	All road restraint systems specified in the design must be compliant to EN1317. TfL approved EN1317 systems comprise of the following: • Hill and Smith - Flexbeam • Hill and Smith - Flexbeam Plus • Tata Steel – Vetex Safety Barrier System • Tata Steel - Protect 365 • Britpave – BBS Barriers • DeltaBloc – DB and EP series For any additional system to be considered to be used in design, a minimum of the following must be provided to the TfL Client • EN1317 documentation of the system to be inclusive of: ◦ Manufacturer videos of testing undertaken in accordance with EN1317-2 ◦ Installation Specification from manufacturer e.g. Lengths, mountings and other parts. • Appendix 4/1 document to show beam deflection figures of the system. Rope/wire systems, Rectangular Hollow Section Systems, Tensioned Corrugated Beam systems, Open Box Beam Systems as well as any systems that do not comply with EN 1317 shall be deemed a departure from standards.	
401.6SR	Safety Barriers shall conform to the following: (i) All components shall be designed to achieve a serviceable life of not less than 20 years for metal safety barrier systems. (ii) All components shall be designed to achieve a serviceable life of not less than 50 years for concrete safety barrier systems.	

Installation of Safety Barriers, Terminals, Transitions and Crash Cushions - Overall Requirements		
403.1SR	All Designs must include an Appendix 4/1 which shall include the manufacturer's specification for installation giving Lengths, mounting requirements and parts etc.	
403.11SR	Driven posts shall not be permitted. All posts shall be installed in sockets to facilitate easy and cost effective maintenance following accident damage to posts.	
Site Testing		
404.6SR	The contractor shall install test posts and foundations prior to carrying out installation.	
General Requirements for Cement and Other Hydraulically Bound Mixtures		
810.1SR	Cement Bound Granular Mixtures (CBGM) shall be made and constructed to conform to BS EN 14227-1 and Clauses 811 to 822. The permitted alternatives for each part of the Permanent Works shall be as described in Appendix 7/1.	
Binder Constituents		
811.2SR	The binder content shall be a minimum of 3% by dry mass of mixture unless otherwise agreed by the Overseeing Organisation. The mixture proportions used for production shall be based on a laboratory mixture design procedure in accordance with Clause 880.	
Storage of Constituents		
812.2SR	Cement shall be stored in silos	
General Requirements for Production and Layer Construction		
813.1SR	CBGM shall be produced and laid using mix-in plant method of construction using batching by mass, in accordance with Clause 814.	
813.2SR	construction layers, including multiple lift layers, and any reworking and reuse, shall be completed within a construction period of 35oC hours from the addition of cement to the mixture. This period may be extended by the use of a retarder, only with advance approval from the overseeing organisation.	
813.7SR	Material up to 200mm compacted thickness shall be spread in one layer so that after compaction the total thickness is as specified. Material of compacted thickness greater than 200mm shall be laid in two or more layers and the minimum compacted thickness of any such layer shall be 100mm. Where the layers are of unequal thickness, the lowest layer shall be the thickest layer.	
813.11SR	Compaction of CBGM shall be carried out by vibrating roller and//or pneumatic-tyre roller (PTR).	
813.13SR	During cold weather:	
813.17SR	(i) the temperature of the CBGM shall not be less than 5oC at the time of laying	
813.18SR	(ii) CBGM shall not be laid onto a frozen surface.	

813.19SR	(iii) Laying of CBGM shall cease if the air temperature falls below 3oC. Laying shall not resume until the rising air temperature reaches 3OC.	
Method Statement and Demonstration Area		
817.1SR	CBGM shall not be trafficked for 7 days unless the layer complies with the following:	
817.3SR	(i) The layer is compacted by both vibrating roller and PTR in accordance with sub-Clause 813.11 to comply with the requirements of sub-Clause 813.12.	
Induced Cracking of HBM		
818.1SR	(ii) The mixture contains at least 50% by mass of coarse aggregate complying with BS EN 13242, Category C90/3 for 'crushed or broken particles'	
Aggregates		
820.1SR	(iii) Test specimens made at the same time as the specimens required in Clause 870 but cured under the same conditions as the in-situ CBGM have achieved an average strength of at least Class C3/4.	
Cement Bound Granular Mixtures A (CBGM A)		
821.1SR	Cement bound granular mixtures 5 (CBGM 5) shall comply with BS EN 14227-1 and have binder constituent proportions complying with the requirements of Clause 811.	
821.2SR	Aggregates shall comply with the requirements of clause 820 and shall have a combined total mixture grading that complies with Table 3 of BS EN 14227-1.	
821.4SR	The method of construction shall be in accordance with Clause 813 and Clause 814.	
Cement Bound Granular Mixtures B (CBGM B)		
822.1SR	Cement bound granular mixtures 1 (CBGM 1) shall comply with BS EN 14227-1, and have binder constituent proportions complying with the requirements of Clause 811.	
822.2SR	Aggregates shall comply with the requirements of Clause 820. The total mixture grading shall comply with the grading envelope Category G2 from BS EN 14227-1, Table 7 for 0/31.5mm size mixtures and Table 8 for 0/20mm size mixtures.	
822.4SR	The method of construction shall be in accordance with Clause 813 and Clause 814.	
Testing, Control and Checking of HBM		
870.1SR	Tests, controls and checks shall be carried out in accordance with the requirements in Table 8/B and the following sub-clauses at locations determined by the overseeing organisation, unless otherwise stated in Appendix 1/5. Where the overseeing organisation is satisfied that a consistent quality of work is being achieved it may order the frequency of testing to be reduced to half the required in Table 8/B.	
Table 8/12SR		

Clause Reference	821	822
CBGM designation	CBGM 5	CBGM 1
Categories for aggregate properties, BS EN 13242		
Crushed or broken particles and totally rounded particles in coarse aggregate	C_{NR} (Note 1)	C_{NR} unless otherwise specified in Appendix 7/1
Resistance to fragmentation of coarse aggregate	LA_{NR}	LA_{50} or LA_{60} as specified in Appendix 7/1
Acid-soluble sulfate content (Note 2)	Air-cooled blast-furnace slag - $AS_{1,0}$	
	Other aggregates - $AS_{0,2}$	
Total sulfur content (Note 2)	Air-cooled blast-furnace slag - S_2	
	Other aggregates - S_1	
Other requirements, BS 1377-2		
Fines quality (Note 3)	NR (Note 1)	Non-plastic
Proportion of components, Clause 710		
Maximum asphalt content (Class R_a)	NR	10
Maximum glass content (Class R_g)	40	40
Maximum impurities content (Class X)	5	3

Notes:
1. The suffix $_{NR}$ denotes that the 'No requirement' category applies.
2. Where the Contractor is able to provide evidence of mixture stability over an extended period then the Overseeing Organisation may consider the use of higher limits.
3. Where required, the size fraction of the aggregate passing the 0.425 mm size test sieve shall be non-plastic as defined by and tested in compliance with BS 1377-2.

PART B – NOTES FOR GUIDANCE ON THE SPECIFICATION FOR HIGHWAY WORKS

Clause No.	Title	Page No.
List of Additional Clauses, Tables and Figures		
NONE		
List of Substitute Clauses, Tables and Figures		
NONE		
List of Cancelled Clauses, Tables and Figures		
NONE		
Additional Clauses, Tables and Figures		
NONE		
Substitute Clauses, Tables and Figures		
NONE		

5.4 The following contract specific minor alterations to existing clauses, tables and figures shall apply to the parts of the MCHW listed in paragraph 4 (*MCHW*) of Annex 1 (*Standards and Specifications*):

Clause No.	**Alterations to be Made**
Part A Volume 1 – Specification for Highway Works	
NONE	
Part B Volume 2 – Notes for Guidance	
NONE	

Annex 3 of Part 2 - Other Documents

1. LoHAC Contracts

1.1 The following LoHAC Contracts:

1.1.1 London Highways Alliance (North East Area), Volume 2 (Service Information (Common));

1.1.2 London Highways Alliance (Central Area), Volume 2 (Service Information (Common)); and

1.1.3 London Highways Alliance (South Area), Volume 2 (Service Information (Common)).

2. TfL and London-based Organisations – Strategies and Plans

2.1 The following documents:

2.1.1 TfL Streetscape Guidance;

2.1.2 LoBEG Good Practice Guide Creating Consistent Element Inventories for Highway Structures – Version 2.0 – August 2011;

2.1.3 Business Ethics Policy;

2.1.4 Facilities Operations strategy for Inclusive Accessibility during normal operating conditions and emergency events;

2.1.5 Information Access Policy;

2.1.6 Information and Records Management Policy;

2.1.7 Information Re-use Policy;

2.1.8 Information Security Policy;

2.1.9 Privacy and Data Protection Policy;

2.1.10 Social Media Policy; and

2.1.11 TfL Code of Conduct.

3. Circular Roads: (CRs) (DfT) & DfT Circulars

3.1 The following Circular Roads (CRs) (DfT) & DfT Circulars:

Title	Description
CR 61/72	Routes for heavy and abnormal loads
Circular 02/2006	The quiet lanes and home zones (England) regulations 2006
Circular 5/99 (replaced Circular 4/90)	20 mph speed limits
Circular 1/97	Zebra- pelican and puffin pedestrian crossings regulations
Circular 4/9	Road humps

Title	Description
Circular 2/95	Control of dogs on roads regulations
Circular 4/94	Revision of traffic signs regulations and general directions
Circular 3/93	Street name plates and the numbering of premises
Circular 2/93	The Highways (Traffic Calming) Regulations 1993
Circular 2/92	Road Traffic Act 1991: road humps and variable speed limits
Circular 1/92	Use of technology for traffic enforcement: advice on deployment
Circular 2/91	Assessment and strengthening of highway bridges and structures
Circular 3/90	The Highways (Road Humps) Regulations 1990
Circular 1/90	Technical approval of highway structures on local authority roads
Circular 6/86	Local Transport Notes 1/86 and 2/86
Circular 1/86	Cycle Tracks Act 1984: Cycle Tracks Regulations 1984
Circular 6/84	Road Traffic Regulation Act 1984: parking for disabled people
Circular 7/79	Vehicle crossings over footways and verges
Circular 6/79	Bus shelters and bus stop signs on trunk roads
Circular 12/78	Vehicle crossings over footways and verges
Circular 37/77	Erection of traffic signs on or near railway land
Circular 24/77	Grants for road works in development and intermediate areas
Circular 22/77	Road improvements/maintenance: signs and carriageway markings
Circular 18/77	Winter maintenance: snow clearing
Circular 7/76	Certification of amounts due to contractors
Circular 4/75	Claims for damages on trunk roads- including motorways
Circular 24/75	Highway works contracts: contract price fluctuations clause
Circular 20/75	Trunk roads and motorways: damage to Crown property
Circular 13/75	Preservation of mileposts
Circular 12/75	Duty of local authorities to promote road safety
Circular 9/74	Works on trunk and principal roads: charges
Circular 52/74	Inspection of highway trees
Circular 46/74	Road Traffic Act 1974- Section 6: traffic surveys
Circular 42/74	Warning signs on slippery roads
Circular 61/72	Routes for heavy and high abnormal loads
Circular 57/72	Accidents arising from alleged defects in the highway
Circular 630/1	Trunk Roads Act, 1936 and 1946: claims for damages
Circular 630	Trunk Roads Act, 1936 and 1946: claims for damages

4. Local Transport Notes (LTNs):

4.1 The following Local Transport Notes (LTNs):

Title	Description
5LTN 1/12	Shared use routes for pedestrians and cyclists. 2012. ISBN 978 0 11 553243 6
LTN 1/11	Shared space, 2011. ISBN 9780115532092
LTN 2/09	Pedestrian guardrailing. HMSO, 2009. ISBN 978 0 11 553065 4
LTN 1/09	Signal controlled roundabouts. HMSO, 2009. ISBN 978 0 11 553054 8
LTN 3/08	Mixed priority routes: practitioners' guide. HMSO, 2008 .ISBN 978 0 11 553027 2
LTN 2/08	Cycle infrastructure design. HMSO, 2008. ISBN 978 0 11 553024 1
LTN 1/08	Traffic management and streetscape, HMSO, 2008. ISBN 978 0 11 552942 9
LTN 1/07	Traffic calming. HMSO, 2007. ISBN 978 011 552795 1

Title	Description
LTN 1/98	The installation of traffic signals and associated equipment. HMSO, 1998. ISBN 0 11 552008 2
LTN 1/97	Keeping buses moving. HMSO, 1997. ISBN 0 11 551914 9
LTN 2/95	The design of pedestrian crossings. HMSO, 1995. ISBN 0 11 551626 3
LTN 1/95	The assessment of pedestrian crossings. HMSO, 1995. ISBN 0 11 551625 5
LTN 1/94	Design and use of directional informatory signs, 1994

5. Traffic Advice Leaflets (TALs)

5.1 The following Traffic Advice Leaflets:

Title	Description
TAL 01/16	Influence of bollards on pedestrian evacuation flow. 2016
	Traffic advisory leaflets 1989 to 2009. 2009
TAL 1/15	Variable message signs. 2015
TAL 8/14	Implementing extended working hours. 2014
TAL 7/14	Mapping underground assets. 2014
TAL 6/14	Using road plates. 2014
TAL 5/14	Using temporary backfill. 2014
TAL 4/14	Cementitious mixtures use. 2014
TAL 3/14	Hydraulically bound mixtures use. 2014
TAL 2/14	Coring and vacuum extraction technique. 2014
TAL 01/14	Temporary white on red signs at road works. 2014
TAL 03/13	Traffic bollards and low level traffic signs. 2013
TAL 01/13	Reducing sign clutter. 2013
TAL 01/12	The Traffic Signs (Amendment) (No. 2) Regulations and General Directions 2011. 2012
TAL 05/11	Quality audit in the street design process. 2012
TAL 04/11	Temporary traffic signs for special events. 2011
TAL 03/11	Signal-controlled pedestrian facilities at portable traffic signals. 2012
TAL 02/11	Portable traffic signals for the control of vehicular traffic. 2011
TAL 01/11	Vehicle security barriers within the streetscape. 2011
TAL 1/07	Emergency services traffic calming schemes: a code of practice. 2007

6. Traffic Signs Manual (DfT)

6.1 The following traffic signs manuals:

Description
Traffic signs manual chapter 1 introduction (1982). ISBN 9780115505591.
Traffic signs manual chapter 2 determination of x-height
Traffic signs manual chapter 2 primary route destinations in England by region
Traffic signs manual chapter 3 regulatory signs (2008). ISBN 9780115529252
Traffic signs manual chapter 4 warning signs (2013). ISBN 9780115532245
Traffic signs manual chapter 5 road markings (2003). ISBN 9780115524790
Traffic signs manual chapter 7 the design of traffic signs (2013). ISBN 9780115532221
Traffic signs manual chapter 8 (part 1) road works and temporary situations - design (2009). ISBN 9780115532412
Traffic signs manual chapter 8 (part 2) road works and temporary situations - operations (2009).

ISBN 9780115532429
Traffic signs manual chapter 8 (part 3) road works and temporary situations. ISBN 9780115535109

7. Department of Transport Codes of Practice

7.1 The following Department of Transport codes of practice:

Description
Safety at Street Works and Road Works: a code of practice 2013. ISBN 9780115531453
Specification for the Reinstatement of Openings in Highways , 2010.ISBN: 97801155314115
Coordination of Street Works and Works for Road Purposes and Related Matters, 2012. ISBN 978 0 11 553251 1
Code of Practice for Inspections, 2002. HMSO, ISBN 0 11 552541 6
Measures necessary where apparatus is affected by Major Works (Diversionary Works) A Code of Practice, 1992. ISBN 0 11 551149 0.

8. Building Regulations

8.1 The following Building Regulations:

Title	Description
Structure	Approved Document A, 2013. ISBN 978 1 85946 508 0
Fire safety	Approved Document B, 2010. ISBN 978 1 85946 488 5, ISBN 978 1 85946 489 2 and ISBN 978 1 85946 290 4
Site preparation and resistance to contaminates and moisture	Approved Document C, 2013. ISBN 978 1 85946 509 7
Toxic substances	Approved Document D, 2010. ISBN 978 1 85946 679 7
Resistance to sound	Approved Document E, 2015. ISBN 978 1 85946 616 2
Ventilation	Approved Document F, 2010. ISBN 978 1 85946 679 7
Sanitation, hot water safety and water efficiency	Approved Document G, 2016. ISBN 9781859466001
Drainage and waste disposal	Approved Document H, 2010. ISBN 9781859466001
Combustion appliances and fuel storage systems	Approved Document J, 2010. ISBN 978 1 85946 680 3
Protection from falling, collision and impact	Approved Document K, 2013. ISBN 978 1 85946 484 7
Conservation of fuel and power	Approved Document L, 2016. ISBN 978 1 85946 743 5, ISBN 978 1 85946 744 2, and ISBN 978 1 85946 746 6.
Access to and use of buildings	Approved Document M, 2016. ISBN 978 1 85946 747 3 and ISBN 978 1 85946 609 4.
Electrical safety	Approved Document P, 2013. ISBN 978 1 85946 485 4
Security in dwellings	Approved Document Q, 2015. ISBN 978 1 85946 601 8
High speed electronic communications networks	Approved Document R, 2016. ISBN 978 1 85946 714 5

Title	Description
Material and workmanship	Approved Document 7, 2013. ISBN 978 1 85946 486 1

9. Traffic Open Products and Specifications (TOPAS) Specifications:

9.1 The following Traffic Open Products and Specifications (TOPAS) specifications:

Title	Description
TOPAS 2500A	Specification for Traffic Signal Controller
TOPAS 2502B	Performance Specification for Portable Traffic Signal Control Equipment for use at Roadworks
TOPAS 2503B	Performance Specification for Pedestrian Facilities at Temporary Standalone Traffic Signals
TOPAS 2504A	Performance Specification for Vehicle Detection Equipment for Vehicle Actuated Portable Traffic Signals
TOPAS 2505A	Performance Specification for Above Ground Vehicle Detector Systems for use at Permanent Traffic Signal Installations
TOPAS 2506A	Performance Specification for Above Ground On- Crossing Pedestrian
TOPAS 2507A	Performance Specification for Kerbside Detection Systems for use with Nearside Signals and Demand Units
TOPAS 2508A	Performance Specification For Tactile Equipment for use at Pedestrian Crossings
TOPAS 2509A	Performance Specification for Audible Equipment for use at Pedestrian Crossings
TOPAS 2510A	Performance Specification for Rising Bollards Control Systems
TOPAS 2511A	Performance Specification for Nearside Signal and Demand Unit
TOPAS 2512A	Performance Specification for Below Ground Vehicle Detection Equipment
TOPAS 2513A	Performance Specification for Wig Wag Signal Control Equipment
TOPAS 2514A	Performance Specification for Light Control of Tramcars
TOPAS 2515A	Performance Specification for Equipment to Detect High and Overheight Vehicles at Low Structures
TOPAS 2516B	Performance Specification for Discontinuous Variable Message Signs
TOPAS 2517A	Performance Specification for Electromechanical Variable Message Signs
TOPAS 2520A	Performance Specification for Uni-directional Logic Equipment
TOPAS 2522A	Remote Monitoring and Control of Traffic Control Equipment via a Telecommunications Network
TOPAS 2523A	Traffic Control Equipment Interfacing Specification
TOPAS 2537A	Performance Specification for Portable Traffic Signal Control Equipment with Pedestrian Facilities for use at Roadworks
TOPAS 2538A	Performance Specification for Portable Traffic Signal Control Equipment for a Stand-alone Pedestrian Facility
TOPAS 2581A	Performance Specification for Pedestrian Countdown Units for use at Traffic Signals
TOPAS 0600A	Self-Certification Procedures for Statutory Approval of Traffic Control Equipment

10. Miscellaneous Documents:

10.1 The following miscellaneous documents:

Description
Primary Documents and Secondary Documents recorded in the DfT / CIHT "Transport Advice Portal", available at http://tap.iht.org/
Inclusive Mobility Best Practice on Access to Pedestrian and Transport Infrastructure, available at https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/3695/inclusive-mobility.pdf
Guidance on the Use of Tactile Paving Surfaces, available at https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/289245/tactile-paving-surfaces.pdf
Safety At Street Works And Road Works: A Code Of Practice 2013
OHSAS Health and Safety Electronic Toolkit
BS OHSAS 18001
Good Practice in the Selection of Construction Materials
Safety at Street Works and Road Works Code of Practice
Fleet Operator Recognition Scheme Standard
Work Related Road Risk compliance, available at https://tfl.gov.uk/info-for/deliveries-in-london/delivering-safely/work-related-road-risk WRRR contractual requirements WRRR for suppliers to TfL WRRR for subcontractors with TfL WRRR self-certification form WRRR driver training information
Guidance for sustainable construction
Guidance for sustainable construction
Regulatory Reform (Fire Safety Order)
Fire Safety on Construction Sites (HSG168)
Fire Safety Guidance Note 29: Access for Fire Appliances
UK Air Quality Strategy, 2000
Mayor's Air Quality Strategy
The Control of Dust and Emissions from Construction and Demolition
CIRIA C741 Environmental Good Practice on Site
The Traffic Signs Regulations and General Directions 2016, available at https://www.gov.uk/government/collections/traffic-signs-signals-and-road-markings
Traffic Signs Manual and Notes for Guidance on Safety at Roadworks, available at https://www.gov.uk/government/publications/traffic-signs-manual Chapter 1 Introduction Chapter 2 Directional Informatory Signs on Motorways and All-Purpose Roads Chapter 3 Regulatory Signs Chapter 4 Warning Signs Chapter 5 Road Markings Chapter 6 Illumination of Traffic Signs Chapter 7 The Design of Traffic Signs Chapter 8 Traffic Safety Measures and Signs for Road Works and Temporary Situations Part 1 Road works and temporary situations – design Part 2 Road works and temporary situations – operations Part 3 Road works and temporary situations
Traffic Signs Image and Traffic Signs Working Drawings
Traffic Signs Authorisation Database, available at http://www.dft.gov.uk/traffic-auths/

Know Your Traffic Signs, available at https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/519129/know-your-traffic-signs.pdf
BS EN 12899 Fixed, vertical road traffic signs
BS 8442 Miscellaneous road traffic signs and devices - requirements and test methods, 2015
BS EN 12767 Passive safety of support structures for road equipment. Requirements, classification and test methods
An Introduction to the Use of Portable Vehicular Signals
TfL Traffic Directorate's model audit process (MAP) (for traffic signals)
TfL Surface Transport's 4 step modelling process (for traffic signals)
TfL's Urban Traffic management and Control (UTMC) system
Split Cycle Offset Optimisation Technique (SCOOT)
BS7671 Electrical design
Manual for Streets, 2007, available at https://www.gov.uk/government/publications/manual-for-streets
Manual for Streets 2 - Wider Application of the Principles, 2007, available at http://www.ciht.org.uk/en/document-summary/index.cfm/docid/055693F6-8DB0-4BBE-AA9FF1B5BC5E9412
UK Roads Liaison Group - Design & Maintenance Guidance for Local Authority Roads - Provision of Road Restraint Systems on Local Authority Roads
EN1317 Road Restraint Systems
BS EN 13242 Aggregates for unbound and hydraulically bound materials for use in civil engineering work and road construction
BS EN 1744 Tests for chemical properties of aggregates
BS EN 932 Tests for general properties of aggregates
BS 1377 Methods of test for soils for civil engineering
Department of Transport Road Traffic Forecasts 2015
BS EN 13108 Bituminous mixtures, material specifications, asphaltic concrete
BS EN 12697 Bituminous mixtures. Tests for hot mix asphalt. Resistance to fuel
EN 13501 Fire classification of construction produces and building elements
BS EN 40 Lighting columns
PD 6547 Guidance on use of BS EN 40-3
BS EN ISO 1461 Hot dip galvanised coatings(…)
BS EN 13201 Road lighting performance requirements
BS EN 60598 Luminaires
BS EN 55011 Industrial scientific and medical equipment. Radio frequency disturbance characteristics. Limits and methods of measurement.
BS EN 61000 Electromagnetic compatibility
Harvard Engineering LeafNut Central management System
BS EN 62471 Photobiological safety of lamp and lamp system(s)
Illuminating Engineering Society of North America (IESNA) system of measurement
Highways Agency: The Appearance of Bridges and Other Highway Structures. The Stationery Office, 1996. ISBN 011 551804 5
TfL Structural Resilience Assessment (Version 1.2)
BRE Special Digest 1: 2005: Third Edition Concrete in aggressive ground
CIRIA C660 Early-age thermal crack control in concrete
CIRIA C543 Bridge detailing guide
CIRIA C686 Safe access for maintenance and repair
CIRIA R155 Bridges design for improved buildability
CIRIA C580 Embedded Retaining Walls –Guidance for Economic Design
CIRIA C764D Hidden Defects in Bridge. Guidance on Detection and Management

Prevention of Bridge Strikes: Good Practice Guide, available at https://www.gov.uk/government/publications/prevention-of-bridge-strikes-good-practice-guide
Environment Agency's PPS 25
ICP SuDS method
TRL Laboratory Report 602 The design of gullies on level or nearly level roads
BS EN 124:1994 Gully tops and manhole tops for vehicular and pedestrian areas. Design requirements, type testing, marking, quality control
BS EN 752-3:1997 Drain and sewer systems outside buildings
CIRIA report C609 Sustainable Drainage Systems – Hydraulic Structural and Water Quality Advice (selected aspects only, DMRB has preference)
PPG 3 Use and Design of Oil Separators in Surface Water Drainage Systems
Planning Policy Statement 25 (PPS 25) Development and Flood Risk
Section 104 of the Water Industry Act 1991
BS EN 598 Ductile iron pipes
BS EN 295 and BS65 Vitrified clay pipes
BS 5911 Concrete pipes and ancillary concrete products
BS EN 1916 Concrete pipes and fittings
BS EN 1917 Concrete Manholes …
LPCB LBS 1175 Loss prevention standard
CIRIA Report 128 Guide to design of thrust blocks for buried pressure pipelines
BS 750 Spec for underground fire hydrants etc
BS EN 1074 Valves for water supply
Civil Engineering Specification for the Water Industry (CESWI) 7th Edition
Measures necessary where apparatus is affected by Major Works (Diversionary Works) The Stationery Office, ISBN 0 11 551149 0
New Roads and Street Works Act 1991 Code of Practice for Inspections The Stationery Office, Second Edition ISBN 0 11 552541 6
New Roads and Street Works Act 1991 Code of Practice for the Co-ordination of Street Works and Works for Road Purposes and Related Matters. The Stationery Office, Second Edition issued April 2001 ISBN 0 11 552310 3
National Joint Utilities Group (NJUG) – 'Recommended Positioning of Utilities Apparatus 1997
British Tunnelling Society (BTS) and the Institution of Civil Engineers(ICE) Specification for Tunnelling
LUL T0006 (Deep Tube Tunnels Materials and Workmanship)
ICE Specification for Piling and Embedded Retaining Walls, 3rd Edition
Association of British Insurers/International Tunnelling Association – The Joint Code of Practice for Risk Management of Tunnel Works in the UK
Monitoring underground construction (ICE/BTS)
Closed face tunnelling machines and ground stability (ICE/BTS)
PAS8810:2016 Tunnel design – Design of concrete segmental tunnel linings – Code of Practice
CIRIA C760 Guidance on embedded retaining wall design
BS 6164 2011 Code of practice for safety in tunnelling in the construction industry
Occupational exposure to nitrogen monoxide in a tunnel environment: Best Practice Guide (BTS)
Tunnelling and Pipejacking: Guidance for Designers Internal dimensions for pipejacks and tunnels below 3.m diameter and indicative drive lengths (BTS and agreed by The Health and Safety Executive and The Pipejacking Association)
The management of hand-arm vibration in tunnelling: Guide to Good Practice (BTS)
Tunnel Lining Design Guide (BTS)
Safety of New Austrian Tunnelling Method (NATM) tunnels (Health and Safety Executive)
Sprayed Concrete Linings (NATM) for Tunnels in Soft Ground, an ICE Design and Practice Guide
CIRIA C699 Guidance on catastrophic events in construction

Mair, R.J., Taylor, R.N. and Burland, J.B. (1996). Prediction of ground movements and assessment of building damage due to bored tunnelling. International Symposium on Geotechnical Aspects of Underground Construction in Soft Ground. Rotterdam, The Netherlands, pp. 713-18
O'Reilly, M.P. and New, B.M. (1982) Settlements above tunnels in the United Kingdom – their magnitude and prediction; Proceedings of Tunnelling 82, Institution of mining and metallurgy, London pp 173-181
New and Bowers (1994) Ground movement model validation at the Heathrow Express trial tunnel 74. Transport Research Laboratory, Crowthorne, England
CIRIA Project Report 30, 1996 (CIRIA 30) Prediction and effects of ground movement caused by tunnelling in soft ground beneath urban areas
Burland, J.B., Broms, B.B., and de Mello, V.F. (1977)
Boscardin & Cording (1989). Building damage risk categories
Attewell, P. B., Yeates, J. & Selby, A. R. (1986). Soil movements induced by tunnelling and their effects on pipelines and structures. Balckie, Glasgow.
Bracegirdle, A., Mair, R. J., Nyren, R. J., and Taylor, R. N. (1996). A methodology for evaluating potential damage to cast iron pipes induced by tunnelling. Proc. Int. Symp. on Geotechnical Aspects of Underground Construction in Soft Ground, Mair & Taylor (eds), Balkema, London, April 1996, pp 659-664
World Road Association (PIARC) Cross Section Geometry in Uni-directional Tunnels, 2002
World Road Association (PIARC) Road Tunnels Manual
BSI BS EN 13501-1 + A1 Fire classification of construction products and building elements - Part 1: Classification using data from reaction to fire tests BSI BS 476-4 Fire tests on building materials and structures - Part 4: Non-combustibility test for materials
The Road Tunnel Safety Regulations (2007) (European Directive 2004/54/EC - minimum safety requirements for tunnels in the trans-European road network)
BS 6164:2011 Code of practice for health and safety in tunnelling in the construction industry
TR215X standards (cable standards)
ISO/IEC 11801-1 Generic cabling for customer premises – General requirements
ISO/IEC 11801-3 Generic cabling for customer premises – Industrial premises
ISO/IEC CD 14763-3 Testing of optical fibre cabling
Recommendation ITU-T G.652 (2016) Characteristics of a single-mode optical fibre and cable
BS1363 13 A plugs, socket-outlets, adaptors and connection units
Digital TVNP Interface Specification - TEC4502/A/28.09.2016 – Issued 2017 (Costain)
HORUS: External Integration Interface - IDR-120526-MS10-HOI-SW- Issued 2016 (Indra Sistemas S.A.)
Relevant British or European Standards including Eurocodes, National Annexes, Published Documents, Product Standards and Non Contradictory Complementary Information (NCCI)
Execution Standards related to EN Eurocodes
BS 5950 Structural use of steelwork in building
BS 4800 2011 Schedule of paint colours for building purposes
SCI AD346 Design actions during concreting for beams and decking in composite floors, 2010
SCI P359 Composite Design of Steel Framed Buildings, 2011
SCI P361 Steel Building Design: Introduction to the Eurocodes, 2009
SCI P362 Steel Building Design: Concise Eurocodes, 2009
SCI P363 Steel Building Design: Design Data, 2013
SCI P213 Joints in steel construction: Composite connections, 1998
SCI P358 Joints in Steel Construction - Simple Joints to Eurocode 3, 2014
SCI P398 Joints in Steel Construction - Moment-resisting Joints to Eurocode 3, 2013
SCI P394 Wind Actions to BS EN 1991-1-4, SCI, 2013

Chartered Institution of Building Services Engineers (CIBSE) Technical Memorandum (TM 22) : Energy Assessment and Reporting Methodology
Chartered Institution of Building Services Engineers (CIBSE) Technical Memorandum (TM) 39 : Building Energy Metering Methodology
Secured by Design
Guidance on Designing for Counter Terrorism - The Royal Institute of British Architects (RIBA)
National Structural Steelwork Specification for Building Construction (BCSA Publication)
RIBA Plan of Work 2013
2011 Green Overlay to the RIBA Outline Plan of Work 2007
2012 BIM Overlay to the RIBA Plan of Work
British Standard 9999:2008 Code of practice for fire safety in the design, management and use of buildings
TfL - Facilities Operations strategy for Inclusive Accessibility during normal operating conditions and emergency events
BS 5975:2008 + A1:2011 code of practice for temporary works procedures and the permissible stress design of falsework
PAS 8811:2017 Temporary works – Major infrastructure client procedures – Code of practice

Annex 4 of Part 2 - Amendments to Other Documents

1. Amendments to LoHAC Contracts

None

2. Amendments to TfL and London-based Organisations – Strategies and Plans

None

3. Amendments to Circular Roads: (CRs) (DfT) & DfT Circulars

None

4. Amendments to Local Transport Notes (LTNs)

None

5. Amendments to Traffic Advice Leaflets (TALs)

None

6. Amendments to Traffic Signs Manual (DfT)

None

7. Amendments to Department of Transport Codes of Practice

None

8. Amendments to Building Regulations

None

9. Amendments to Traffic Open Products and Specifications (TOPAS) Specifications

None

10. Amendments to Miscellaneous Documents

None

Annex 5 of Part 2 - Specification Appendices

1. General

1.1 Project Co shall complete and submit to TfL under the Review Procedure:

1.1.1 those Specification Appendices marked "T/C" in the left hand column of Table A5.1 in final form, based on and developed from the Specification Appendices of the same name set out in Part 3 (*Project Co's Works Proposals*); and

1.1.2 the Specification Appendices not marked "T/C" in the left hand column of Table A5.1, in accordance with the SHW and based on and developed from the form of Specification Appendix of the same name included in the Data Room Information (where applicable).

Table A5.1

	Appendix No.	Title
Preliminaries		
T/C	1/5	Testing to be Carried out by Project Co
T/C	1/9	Control of Noise and Vibration
T/C	1/16	Privately and Publicly Owned Services and Supplies
Site Clearance		
T/C	2/1	List of Buildings, etc. to be Demolished
	2/2	Filling of Trenches & Pipes
	2/3	Retention of Material Arising from Site Clearance
	2/4	Explosives and Blasting
T/C	2/5	Hazardous Materials
Fencing and Environmental Barriers		
	3/1	Fencing, Gates and Stiles
Road Restraint Systems (Vehicles and Pedestrian)		
T/C	4/1	Road Restraint Systems (Vehicle and Pedestrian)
	4/2	Information Required to Demonstrate Compliance of Road Restraint Systems to BS EN 1317-1, BS EN 1317-2, BS EN 1317-3 and DD ENV 1317-4:2002
Drainage and Service Ducts		
T/C	5/1	Drainage Requirements
	5/2	Service Duct Requirements
	5/3	Surface Water Channels and Drainage Channel Blocks
	5/4	Fin Drains and Narrow Filter Drains
	5/5	Combined Drainage and Kerb Systems
	5/6	Linear Drainage Channel Systems
T/C	5/70	Oil Interceptors
Earthworks		
T/C	6/1	Requirements for Acceptability and Testing etc of Earthworks Materials
	6/2	Requirements for Dealing with Class U1B and Class U2 Unacceptable Materials
	6/3	Requirements for Excavation, Deposition, Compaction (Other than Dynamic Compaction)

	Appendix No.	Title
	6/4	Requirements for Class 3 Material
	6/5	Geotextiles Used to Separate Earthworks Materials
	6/6	Fill to Structures and Fill Above Structural Foundations
	6/7	Sub-formation and Capping and Preparation and Surface Treatment of Formation
	6/8	Topsoiling
	6/9	Earthwork Environmental Bunds, Landscape Areas, Strengthened Embankments
	6/10	Ground Anchorages, Crib Walling and Gabions
	6/11	Swallow Holes and Other Naturally Occurring Cavities and Disused Mine Workings
	6/12	Instrumentation and Monitoring
	6/13	Ground Improvement
	6/14	Limiting Values for Pollution of Controlled Waters
	6/15	Limiting Values for Harm to Human Health and the Environment
Road Pavements - General		
T/C	7/1	Permitted Pavement Options (Schedules 1, 2, 3, 4 and 5)
T/C	7/2	Excavation, Trimming and Reinstatement of Existing Surfaces
	7/3	Surface Dressing - Performance Specification (Sheets 1, 2 and 3)
	7/4	Bond Coats, Tack Coats and Other Bituminous Sprays (Sheets 1, 2 and Binder Data Sheet)
	7/5	In Situ Recycling: The Remix and Repave Processes
T/C	7/6	Breaking Up or Perforation of Existing Pavement
	7/7	Slurry Surface Incorporating Microsurfacing (Sheets 1, 2 and 3)
	7/9	Cold-Milling (Planing) of Bituminous Bound Flexible Pavement
	7/10	Worksheet Pro Forma for Results of Testing for Constituent Materials in Recycled Aggregate and Recycled Concrete Aggregate
	7/11	Overband and Inlaid Crack Sealing Systems
	7/21	Surface Dressing – Recipe Specification (Sheets 1, 2 and Binder Data Sheet)
Road Pavements – Concrete and Cement Bound Materials		
	10/1	Plant and Equipment for the Construction of Exposed Aggregate Concrete Surface
Kerbs, Footways and Paved Areas		
T/C	11/1	Kerbs, Footways and Paved Areas
	11/4	Footbridges, Subways and Approach Ramps
Traffic Signs		
T/C	12/1	Traffic Signs: General
	12/2	Traffic Signs: Marker Posts
	12/3	Traffic Signs: Road Markings and Studs
	12/4	Traffic Signs: Cones, Cylinders, FTD's and Other Traffic Delineators
T/C	12/5	Traffic Signs: Traffic Signals

	Appendix No.	Title
	12/6	Traffic Signs: Special Sign Requirements on Gantries
Road Lighting Columns and Brackets, CCTV Masts and Cantilever Masts		
T/C	13/1	Information to be Provided When Specifying Lighting Columns & Brackets
	13/2	(Specification for Highway Works) Typical Lighting Column and Bracket Data Sheets 1 and 2
	13/3	Instructions for Completion of Lighting Column and Bracket Data Sheets
T/C	13/4	Information to be Provided When Specifying CCTV Masts
	13/5	(Specification for Highway Works) Typical CCTV Mast Data
	13/6	Instructions for Completion of CCTV Mast Data Sheets
T/C	13/7	Information to be Provided When Specifying Cantilever Masts
	13/8	(Specification for Highway Works) Typical Cantilever Mast Data Sheets 1 and 2
	13/9	Instructions for Completion of Cantilever Masts Data Sheets
Electrical Work for Road Lighting and Traffic Signs		
	14/1	Site Records
	14/2	Location of Lighting Units and Feeder Pillars
	14/3	Temporary Lighting
	14/4	Electrical Equipment for Road Lighting
	14/5	Electrical Equipment for Traffic Signs
Motorway Communications		
T/C	15/2	Cable Duct Requirements (Applicable to TfL Ducted Network Only)
Piling and Embedded Retaining Walls		
T/C	16/1	General Requirements for Piling and Embedded Retaining Walls
	16/2	Precast Reinforced and Prestressed Concrete Piles and Precast Reinforced Concrete Segmental Piles
	16/3	Bored Cast-in Place Piles
	16/4	Bored Piles Constructed using Continuous Flight Augers and Concrete or Grout Injection through Hollow Auger Stems
	16/5	Driven Cast-in-Place Piles
	16/6	Steel Bearing Piles
	16/7	Reduction of Friction on Piles
	16/8	Non-Destructive Methods for Testing Piles
	16/9	Static Load Testing of Piles
	16/10	Diaphragm Walls
	16/11	Hard/Hard Secant Pile Walls
	16/12	Hard/Soft Secant Pile Walls
	16/13	Contiguous Bored Pile Walls
	16/14	King Post Walls
	16/15	Steel Sheet Piles
	16/16	Integrity Testing of Wall Elements
	16/17	Instrumentation for Piles and Embedded Walls
	16/18	Support Fluid

	Appendix No.	Title
Structural Concrete		
T/C	17/1	Schedule for the Specification of Designed Concrete
T/C	17/2	Concrete - Impregnation Schedule
T/C	17/3	Concrete - Surface Finishes
	17/4	Concrete - General
	17/5	Buried Concrete
	17/6	Grouting and Duct Systems for Post-tensioned Tendons
Structural Steelwork		
T/C	18/1	Requirements for Structural Steelwork
Protection of Steelwork Against Corrosion		
T/C	19/1	(Specification for Highway Works) Form HA/P1 (New Works) Paint System Sheet
	19/2	Requirements for Other Work
	19/3	(Specification for Highway Works) Form HA/P2 Paint Data Sheet
	19/4	(Specification for Highway Works) Form HA/P2 Paint Sample Despatch List: Sheets 1 and 2
	19/5	General Requirements
Waterproofing for Concrete Structures		
	20/1	Waterproofing for Concrete Structures
Bridge Bearings		
T/C	21/1	Bridge Bearing Schedule
Bridge Expansion Joints and Sealing of Gaps		
T/C	23/1	Bridge Deck Expansion Joint Schedule
	23/2	Sealing of Gaps Schedule (Other than in Bridge Deck Expansion Joints)
Brickwork, Blockwork and Stonework		
	24/1	Brickwork, Blockwork and Stonework
Special Structures		
	25/1	Requirements for Corrugated Steel Buried Structures
	25/2	Requirements for Reinforced Soil and Anchored Earth Structures
	25/3	Requirements for Pocket-Type and Grouted-Cavity Reinforced Brickwork Retaining Wall Structures
T/C	25/4	Environmental Barriers
	25/4	Requirements for Buried Pipes for Drainage Structures
Miscellaneous		
	26/1	Ancillary Concrete
	26/2	Bedding Mortar
Landscape and Ecology		
	30/1	General, sheets 1, 2 and 3
	30/2	Weed Control
	30/3	Control of Rabbits and Deer
	30/4	Ground Preparation
	30/5	Grass Seeding, Wildflower Seeding and Turfing
	30/6	Planting, sheets 1 and 2

	Appendix No.	Title
	30/7	Grass, Bulbs and Wildflower Maintenance
	30/8	Watering
	30/9	Establishment Maintenance for Planting
	30/10	Maintenance of Established Trees and Shrubs
	30/11	Management of Waterbodies
	30/12	Special Ecological Measures

SCHEDULE 10

DESIGN AND CONSTRUCTION REQUIREMENTS

Part 3 - Project Co's Works Proposals[1]

Commercially sensitive information

[1] Note to Tenderers: Part 3 will contain the proposals for the Works submitted by the Preferred Bidder pursuant to Part 4 (*Tender Submission Requirements*) of the IGT.

SCHEDULE 10

DESIGN AND CONSTRUCTION REQUIREMENTS

Part 4 - Definitions

For the purposes of this Schedule 10 (*Design and Construction Requirements*) unless the context otherwise requires, the following words and expressions shall have the following meanings:

"AID System" has the meaning given in paragraph 8.2.2 of Annex 2 (*Requirements for Tunnel ME&P Systems*) of Part 1 (*Design and Construction Requirements*);

"Asset Management System" has the meaning given in paragraph 1.1 of Annex 8 (*Asset Management System*) of Part 1 (*Design and Construction Requirements*);

"Boat Masters Licence" means the licence required by masters of certain vessels on inland waterways and coastal areas;

"Buildings" means all of the assets, facilities, systems and supporting infrastructure which Project Co is required to:

a. design and/or construct pursuant to the D&C Requirements; or

b. operate and/or maintain pursuant to the O&M Requirements,

for running its site operations;

"Building Research Establishment" means the independent research organisation of that name providing advice, training and testing services related to the built environment;

"California Bearing Ratio" means the test described in BS1377: Part 9: 1990: *Soils for civil engineering purposes* and used to estimate the bearing value and the mechanical strength of highway subbases and subgrades;

"Carriage of Dangerous Goods Regulations" means the Carriage of Dangerous Goods and Use of Transportable Pressure Equipment Regulations 2009, as amended by the Carriage of Dangerous Goods and Use of Transportable Pressure Equipment (Amendment) Regulations 2011 and Part 1 Annex A to the European Agreement concerning the International Carriage of Dangerous Goods by Road (ADR 2015);

"Conformité Européene" or **"CE"** means the mandatory mark that indicates conformity with legal and technical directives of the European Union;

"Design Fire" means the peak fire convective heat release rate in megawatts used for design of the tunnel structure and Tunnel ME&P Systems;

"Durability Report" means the report of that name set out in Part 3 (*Project Co's Works Proposals*);

"DVNP" has the meaning given in paragraph 8.4.3 of Annex 2 (*Requirements for Tunnel ME&P Systems*) of Part 1 (*Design and Construction Requirements*);

"ELEXON Code" means the 13 digit charge code to calculate the volumes of electricity used on metred supplies;

"FFFS" has the meaning given to it in paragraph 11 (*Fixed fire fighting system*) of Annex 2 (*Requirements for Tunnel ME&P Systems*) of Part 1 (*Design and Construction Requirements*);

"Harvard Engineering LeafNut Central Management System" means a wireless control and monitoring system for street and outdoor lighting;

"Highways Authorities Product Approval Scheme" or **"HAPAS"** means an approval scheme for products and systems used in highway works;

"HR Wallingford" means the independent civil engineering and environmental hydraulics organisation of that name;

"IAN 91" has the meaning given in paragraph 1.1.6 of Annex 4 (*Existing Structures*) of Part 1 (*Design and Construction Requirements*);

"IK08" means the degree of protection provided by electrical enclosures (including luminaires) against external mechanical impacts, equivalent to impact of 1.7kg mass dropped from 300mm above impacted surface;

"International Safety Management Code" means the international management code for the safe operation of ships and for pollution prevention;

"IP Rating" means the ratings described in IEC 60598-1 (*Luminaries – Part 1: General Requirements and Tests*) and IEC 60529 (*Degrees of protection provided by enclosures*) and used to define levels of sealing effectiveness of electrical enclosures against intrusion from foreign bodies and moisture;

"Local Transport Notes" means the documents of that name relating to traffic management issues published by the Department for Transport;

"London Cycling Design Standards" means the document of that name published by TfL;

"National Highways Sector Schemes" means the management schemes developed by the Highways Agency (now Highways England) as supplements to ISO 9001:2008 for specific highway construction and maintenance activities;

"Project Co Tunnel Control Centre" has the meaning given in paragraph 9.1.3 of Part 1 (*General Structure Requirements*) of Annex 3 (*Structure Requirements*);

"PMCS" has the meaning given in paragraph 9.1.1 of Annex 2 (*Requirements for Tunnel ME&P Systems*) of Part 1 (*Design and Construction Requirements*);

"SCADA" means the supervisory control and data acquisition system architecture;

"SCOOT" has the meaning given to it in paragraph 2.15.2 of Annex 6 (*Traffic Safety and Control Requirements (Outside Tunnel)*) of Part 1 (*Design and Construction Requirements*);

"Signage System Implementation Plan" has the meaning given in paragraph 1.17.8 of Annex 6 (*Traffic Safety and Control Requirements (Outside Tunnel)*) of Part 1 (*Design and Construction Requirements*);

"Silvertown Tunnel Design Review Panel" means the panel commissioned by TfL to provide independent advice on the design of the above ground elements of the Project throughout the design process;

"TfL's Streetscape Guidance" means the TfL document dated December 2015 providing standards for London's streets and spaces;

"Thames Tideway Tunnel" means the 25 km sewage overflow tunnel running mostly under the tidal section of the River Thames in London;

"Traffic Open Products and Specifications (TOPAS) technical specifications" means specifications for traffic control equipment issued by TOPAS Ltd;

"TSMS" has the meaning given in paragraph 9.1.2 of Part 1 (*General Requirements*) of Annex 2 (*Requirements for Tunnel ME&P System*) of Part 1 (*Design and Construction Requirements*);

"Tunnel Safety Case Report" has the meaning given in paragraph 2.1 (*Tunnel Safety Case*) of Annex 2 (*Requirements for Tunnel ME&P Systems*) of Part 1 (*Design and Construction Requirements*);

"UK Roads Liaison Group" means the group of UK national and local government authorities established to consider roads infrastructure engineering and operation;

"UPS" has the meaning given in paragraph 10.2 (*Secondary Supply*) of Annex 2 (*Requirements for Tunnel ME&P Systems*) of Part 1 (*Design and Construction Requirements*); and

"VMS" has the meaning given in paragraph 1.3.3 of Annex 1 (*Highways and General Requirements*) of Part 1 (*Design and Construction Requirements*).