Schedule 1

Detailed Terms

Contract Reference Number:	TFL00901
Supplier Reference	LUL
Commencement Date:	
Completion Date	
Supplier's Representative: Address for service of notices: Telephone: Email:	Steve Hayward Denco Lubrication Ramsden Court, Ramsden Road, Rotherwas Industrial Estate, Hereford, HR2 6LR, UK [redacted]
Company's Representative: Address for service of notices: Telephone: Email	Darren Hillier [redacted] APJNP Frank Pick House Bollo Lane Acton London W3 8RP [redacted]
Additional applicable standards under Clause 3.2(d)	-
i) Programme	See Schedule 4
ii) Specification:	See Schedule 4

Contract Price:	See Schedule 2
Security required pursuant to Clause 42.1: Bond Parent company guarantee	 No No
Application for payment dates	Not used
Interest Rate pursuant to Clause 42.	Not used
The following Supplier Personnel are Key Personnel	Not used.
Warranty	24 Months from hand over

Schedule 2

Payment

See attached.

Pricing schedule:

Site and Escalator number:				
Scope and site survey including production of drawings and certificates of conformity				
Removal of existing obsolete system				
Oil lubrication system manufacturing cost				
Oil lubrication system installation cost to include number of shifts				
Oil lubrication commissioning costs				
Manual grease system manufacturing cost				
Manual grease system installation cost to include number of shifts				
Manual grease system commissioning costs				
Delivery				
Total				

Annual rebate scheme:

Spend	Discount	
£0K to £50K	0%	
£51K to £100K	1%	
£101K to £150K	2.5%	
£150K to £200K	5%	
£201K to £300K	7.5%	

Notes:

All redundant materials must be removed from site.

Escalator to be left in safe condition prior to handback to LUL.

Schedule 3
Specification

See SPC-LAE-301941170 attached.

Issue / Revision Description:		Date:
07		**July 2012**
Lead Author: P. Cooke LUL L&E Lead Engineer	Reviewed: C. Greatrex LUL L&E Design Manager	Approved: K. Seaborne LUL Professional Head L&E
		Approved: R. Williams Crossrail Head of MEP Engineering

Document Status:

APPROVED for use Pan-TfL

LUL L&E Engineering

Victoria Station House
191 Victoria Street
London
SW1E 5NE

Title:

Specification for Heavy Duty Metro Escalators

PART 2: MECHANICAL COMPONENTS

Format	Document Number	Revision
A4	**SPC-LAE-301941170 PART 2**	**07**

Contents

PART 2 – MECHANICAL COMPONENTS

1. Scope

1.1. Part 2 defines the requirements for escalator mechanical components, over and above the general requirements stated in Part 1.

2. Truss

2.1. Truss framework

2.1.1. Refer to annexe.

2.1.2. The site-specific documentation for a particular contract may impose additional constraints on the allowable truss dimensions, particularly where delivery routes are restricted.

2.1.3. The *Contractor* shall submit a CDS showing details for the proposed trusses and support systems, including civil engineering requirements for all escalators. Appendix 2.1 provides a sample template for information. The trusses shall be grouped according to height rise. The maximum variation between any escalator height in any group shall be no more than 15% of the maximum height rise within that group. The number and positions of supports in each group is to be similar, supports are to be located to suit site conditions. The variation between similar spans in each group is to be no more than 15% of the largest span. The truss depths, member sizes and geometry are to be similar in each group.

2.1.4. The *Contractor* shall be responsible for the design, manufacture, and installation of the truss.

2.1.5. The truss shall comply with BS EN 1990, BS EN 1991 and BS EN 1993.

2.1.6. The truss shall not rely on the surrounding concourse floor or adjacent escalators for any lateral support. The truss shall not provide any support to the station infrastructure, except for small areas of floor plates immediately adjacent to the escalator, in the upper and lower landing areas, to be agreed with the *Employer*.

2.1.7. For each height rise group, a three-dimensional framework model of the truss shall be prepared using a suitable software programme. The model shall facilitate the evaluation, by the *Contractor*, of all truss stresses acting on joints/elements and support reaction forces. The *Contractor* shall demonstrate that the member forces do not exceed those permitted by BS EN 1993, to verify the overall integrity of the structure.

2.1.8. The maximum deflection of the truss shall not exceed either 3mm or 1/1500th of the span (whichever is the lesser) between adjacent supports, under full passenger loading.

2.1.9. Access routes may require the truss to be broken down into sections to negotiate these routes. Such sections shall be provided with precision bolted joints and all separate truss components shall be clearly marked before leaving the factory to ensure the correct sequence of assembly on site.

2.1.10. The truss shall be designed for ease of manual cleaning, both internally and externally. Wherever possible, angle and channel members shall be orientated to prevent the build-up of detritus.

2.1.11. The underside of the escalator shall not have a soffit or panelling, to ensure that access to the area beneath the escalator is unhindered for cleaning purposes.

2.2. Truss supports

2.2.1. Truss supports may comprise either concrete plinths or steel structures, or a combination of both. Steel supports and fixings shall be provided and installed by the *Contractor*. Any builder's work to be carried out by others shall be clearly indicated on drawings by the *Contractor*.

2.2.2. The truss supports shall incorporate a facility for accurately aligning the escalator truss during installation and also for the correction of alignment following any subsequent ground settlement which may take place. The minimum range for adjustment shall be ±25mm.

2.2.3. All loading reactions during starting, running, stopping and abnormal fault conditions (i.e. sudden arrest of the step band), shall be taken by the truss supports.

3. Tracks

3.1. Tracks shall be constructed of steel or (where appropriate) cast iron, and shall be designed for ease of renewal. Running track wearing surfaces on the passenger side, including the upthrust tracks in the lower curve area shall be of a minimum 5mm thickness. Running track wearing surfaces on the return side shall be of a minimum 3mm thickness throughout, where load relieving ramps are provided. Where load relieving ramps are not provided, the running track wearing surfaces shall be a minimum 5mm of thickness in the regions of the curves, including the upthrust tracks in the lower curve area. Other track surfaces shall be nominally 3mm thickness. The maximum allowable wheel loadings are defined in clause 5.2 below.

3.2. The radius of track curvature at the upper landing, passenger side, shall be not less than 3.6m.

3.3. The radius of track curvature at the lower landing, passenger side, shall be not less than 2.4m.

3.4. All joints in the track system shall be scarfed (mitred) or dovetailed and shall not be perceivable by passengers using the escalator. Gaps at track joints shall be less than 0.8mm in the direction of travel except where a sliding half-track joint is employed. Track surfaces shall be flush within 0.8mm across each joint.

3.5. Where fixings are used in the running surface of the track and are within the running path of the wheels, they shall have countersunk heads flush to within +0.0/-0.8mm of the track surface. All other types of fixings shall be no closer than 10mm to the path of the wheels.

3.6. Support brackets shall provide a precise vertical and lateral location for all tracks, which guide the step band. Provision shall be made to permit accurate alignment and levelling of the tracks, without the aid of shimming.

3.7. The deflection of the tracks shall not exceed 1mm between any two adjacent track supports under static passenger loading. The *Contractor* shall provide calculations verifying this deflection, prior to manufacture.

3.8. The individual track sections and support brackets shall be of designs that are resistant to fatigue failure. The *Contractor* shall provide evidence, prior to manufacture, that tracks and support brackets are designed to meet all load conditions during the design life.

3.9. A step and chain wheel upthrust system shall be provided which shall be continuous, so that it shall be impossible for the wheels to rise more than 3mm from the running track, or for the steps to fail to form correctly at the upper and lower curves. The upthrust system shall be provided for both left and right hand sides of both upper line and return line tracks, and shall cover the tension carriage track gap.

3.10. Slide tracks shall be provided for all upthrust and running tracks, to span the gap between tension carriage and fixed tracks. These shall support the wheels on nominally half their width, over the gap area. The design of the tracks shall ensure free movement of the carriage.

3.11. A method of guiding the steps shall be provided which shall ensure that the specified clearances are maintained between steps and skirting.

3.12. Where an overhead chain guidance system is used, the upthrust system (see clause 3.9 above) shall be designed such that no step chain upthrust loads are applied to it.

3.13. The chain wheel tracks shall be adjustable in the vicinity of the top and bottom sprocket, in such a way that the chain shall lie tangential to the sprocket pitch line on both the upper and lower sides of the sprockets.

3.14. Reversing tracks shall be made in precision matched pairs. They shall be provided with rigid mountings and shall have a means of accurate location by reference to the main and idler shafts. The reversing tracks shall not be mounted directly onto the shafts.

3.15. A guard track shall be provided at the lower landing to ensure that the step chain cannot become unmeshed with the sprockets.

3.16. Auxiliary tracks shall be provided at both landings, covering the length of two steps, which shall be designed to support the steps and maintain meshing of the steps through the comb, in the event of failure or loss of a step or chain wheel.

3.17. Tracks, support brackets and upthrusts shall be designed to withstand maintenance staff using these as a foothold. This shall be taken to mean that a load of 1.5kN applied vertically downwards at any point shall cause no permanent deflection.

4. Steps

4.1. The nominal step width shall be 1.0m.

4.2. The complete step and chain axle assembly shall meet the type test requirements stated in Part 4, Appendix 4.2 of this specification.

Note: that this exceeds the requirements of BS EN 115-1

4.3. The *Contractor* shall demonstrate that, under the "worst case" of uneven chain wear and maximum loading conditions, the stress levels and ranges will not lead to failure of the step.