The British Museum

World Conservation and Exhibition Centre

42 Tonne Lorry Lift (Machinery Directive) Technical Specification

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Contents

1.0 GENERAL REQUIREMENTS

1.1 Scope Of Lift Works Contract

1.1.1 General

The work as detailed in this Specification shall comprise the whole of the labour and all materials necessary to form a complete installation and carry out such inspections, tests, adjustments and commissioning as required to give an effective working installation.

The Trade Contractor will be deemed to have included in the Tender all costs incurred in complying with the requirements of this Specification.

The Trade Contractor shall note the requirement to liaise with others and to provide the required information. The liaison shall include the necessary co-ordination with other Trade Contractors, Trade Sub-Contractors, and Trade suppliers in respect of:

- Dimensional compatibility between the Lift Contract Drawings and those supplied by others.
- Technical interfaces e.g. power supplies and finished floor levels.
- Programming of sequential operations to interface with the work of others and eliminate confrontational situations.

Full allowance shall be made for attending all design development workshops, progress meetings, all test equipment, meters, weights, works tests, watertightness tests, works visits, witness tests, etc as required by the specification.

The Trade Contractor shall submit drawings, calculations and any other information sufficient to substantiate that the proposals meet the performance requirements of this specification.

The lorry lift will be located in close proximity to spaces that are sensitive to the effects of vibration. The Trade Contractor will be required to demonstrate the measures that will be taken to control the transmission of vibration into the building structure as required to comply with the relevant sections of this specification.

1.1.2 Description of Building and Lift Provision

The Building is situated at – The British Museum, World Conservation and Exhibition Centre, London WC1B 3DG.

The works shall include – A 42 tonne direct acting lorry lift in accordance to the **machinery directive**, including the 'Pavement Lid' Assembly.

1.1.3 Lift Operation Sequence – Lift Below Pavement Level Travelling To/From Pavement – Call Lift to Pavement Level

a. Security zone around lift to be clear of persons, vehicles, goods and animals.

b. Security zone is proved by automatically scanning PIR's before and during operation – detail to be agreed.

c. When security zone is proved safe, a flashing beacon illuminates and movement sounder activates until lift is in final position.

d. A pavement call station is activated (remote control, key switch or pendant operation) – detail to be agreed.

e. Lift moves up to "locating Pins" to underside of pavement lid, lift stops to locate pins – detail to be agreed.

f. When pavement lid "locating Pins" are proved mechanically/electrically the lift completes its travel by lifting the pavement lid.

g. When the lift is at pavement level and floor pawls activated, the car shutter door's can be opened manually.

h. The lorry can now reverse into the lift. A series of traffic lights and sensors will ensure lorry is safely in lift.

i. The car doors can now be closed manually and floor call placed – lorry engine must be switched off.

j. The security zone is proved (a) (b) and (c).

k. The reverse control procedure is adopted (g),(f),(e) and (d).

l. Lorry or passengers can exit lift at lower level.

When the lift is required to operate between levels B3, and 00 its operation is as a conventional cargo lift, as it is not required to lift the 'pavement lid'

1.2 Pre-Contract Variations to the Specification

The Tender shall be priced strictly in accordance with the Tender documents. Should the Trade Contractor wish to offer an alternative system, variations to the work, as specified, shall be submitted in the form of an alternative Tender alongside a compliant submission.

Alternatives will not be accepted for items for which a change would cause a significant disruption to the design or construction of all or any part of the project with which the lift installation is associated.

The Trade Contractor shall include with the Tender, details of all proposed variations forming the basis of an alternative Tender in respect of the equipment, materials, installations, performance and operation of the system.

The Trade Contractor shall ensure that any proposed alternative is at least equal in quality and similar in design to the item specified, and is compatible with all other systems in the Tender works and with the building as designed.

Should a proposed alternative be accepted, all additional costs subsequently arising from necessary changes to the Lift Contract Works or any associated works, including costs attributable to any re-design and co-ordination, submittals and examination of the same, and all costs arising from consequent delays shall be paid by the Trade Contractor.

1.3 Quality Assurance

The Trade Contractor shall state at the time of Tendering, details of registration with a recognised authority or other procedures adopted to ensure compliance with an approved quality assurance scheme.

1.4 Trade Contractor's Design Warranty

The Trade Contractor may be required to enter into a Warranty with the Client in respect of the design of the contract works in accordance with the requirements of the contract documentation.

1.5 Trade Contractors Design Lift Parameters

The Trade Contractor shall provide a lift with a minimum service life of 25 years based upon a museum building. The lift assembly shall have the hydraulic, control and drive systems rated to a minimum of 50,000 motor starts per year in accordance with CIBSE Guide D recommendations.

1.6 Items to be Returned with Tender

The Trade Contractor shall complete all the Tender Information Schedules within the specification and return them with the Tender as part of a fully compliant bid.

1.7 Site Provisions and Requirements

1.7.1 Packing and Delivery

All packaging materials and delivery charges shall be included.

All plant and equipment shall be delivered with the Trade Contractors name on the outside of the packing, to facilitate identification.

All equipment and materials shall be delivered to site in accordance with the requirements of the construction programme, and shall be stored on site in a manner providing protection against such transportation, handling and weather damage and to facilitate removal for installation in accordance with the programme.

It shall be the Trade Contractor's responsibility to examine all materials and equipment, supplied under this Lift Contract, on delivery to site. The Trade Contractor shall replace, at its' own cost, any such material or equipment which is damaged or faulty.

1.7.2 Co-operation with Other Trades

The Trade Contractor shall co-operate with any other Trade Contractors who may be working adjacent to, or in connection with the Works. In positions where construction work and other services are to be installed, adjacent to, or in the vicinity of the Lift Contract Works, the Trade Contractor shall co-operate in every respect with the necessary parties, to determine the most suitable sequences of working.

1.7.3 Site Staff

Twelve weeks prior to the commencement of lift works on site, the Trade Contractor shall, at the request of the Contract Administrator, submit written details of the name, training and experience of the proposed senior site representative. The Contract Administrator, may, decide that the Trade Contractor provide an alternative representative, and the Trade Contractor shall comply with this requirement without delay or cost to the Lift Contract.

The Trade Contractors' staff shall wear overalls and personal protection equipment (PPE), at all times, incorporating the company name or logo, which shall be clearly visible.

1.8 Health and Safety

The Trade Contractor shall take account of any relevant legislation regarding Health and Safety, and shall provide all necessary guarding etc, to prevent harm coming to any responsible individual working within the confines of the machinery spaces, the lift well and adjacent areas.

1.9 Programme of Works

The lift works shall start and be completed as required in the Main Contract Documents. The Trade Contractor shall make such labour available at all stages of the lift works, as necessary to permit the programme to be achieved.

The Trade Contractor shall immediately inform the Contract Administrator of any delays caused by labour shortages, late delivery of materials and equipment, or the failure to meet the programme by any other Trade Contractor on site, which may affect the lift works programme.

The Trade Contractor is required to complete the programmes in the schedules within this specification for design and site based activities.

1.10 Drawings

1.10.1 Tender Drawings

At the time of tendering, the Trade Contractor shall submit five copies of drawings for the following:

- Concept Drawing of 'Pavement Lid' interface between pavement and pavement lid.
- Concept Drawing of 'Pavement Lid' operation system
- Lift motor room – layout of equipment
- Lift pit – layout of equipment
- Hydraulic valves, cylinder and reservoirs
- Controller
- Doors and locking system
- Car and landing control panels
- Car enclosure
- Car and landing signals
- Bore hole liner
- Procedure for ram/cylinder removal.

1.10.2 Project Drawings

Within six weeks, unless otherwise agreed, from the date of the acceptance of the Tender the Trade Contractor shall provide on BIW:

- 6 sets of Builders Work Drawings
- 6 sets of General Arrangement Drawings

1.10.2.1 Builders Work Drawings

Separate builders work drawings shall be submitted, incorporating comprehensive plan drawings of the lift well, borehole and liners, machinery spaces and lift entrances and full elevation details.

All builders' work shall be clearly identified and the drawings shall incorporate a written schedule of builders work required to be provided by others to ensure that necessary allowances can be made accordingly.

The builders work drawings shall include loading requirements for foundations, bases, lifting and supporting structures for plant or equipment, all holes in walls and floors and any works external to the lift well and machinery space as required in this specification.

The heat output generated by any lift equipment shall be clearly identified by the Trade Contractor to ensure adequate ventilation is provided in machinery space as necessary.

The loading and details of fixings required to any adjacent structure shall be clearly identified to enable comment or approval where necessary by the Structural Contract Administrator.

Electrical supply requirements shall be clearly detailed on the machine room drawing or a separate schedule providing at least the following information:

- Full load running current
- Maximum starting current
- Required protective device and capacity

1.10.2.2 General Arrangement Drawings

The general arrangement drawing shall clearly indicate the location and type of all lift well and machine room equipment, brackets and fixings.

1.10.3 Mechanical and Electrical Drawings

Drawings for all mechanical elements related to the aesthetic finishes, i.e. weather proofing 'Pavement Lid', car body works, doors and architraves, pushes, indicators and mounting plates etc. shall be submitted at suitable times during the design stages to enable review and comment accordingly.

Any drawings for item of plant or equipment produced or supplied by a sub-contract manufacturer or equipment supplier submitted for comment shall indicate principal dimensions, fixings, connections and all other relevant details.

Where a manufacturer's original drawings are used they shall be specific to the relevant lift works and all references to optional features, other machines of a range, etc, shall be deleted or the original drawings redrawn to comply with this clause.

1.10.3.1 Electrical Drawings

All wiring diagrams shall indicate clearly which wiring is internal to equipment and which is external to the equipment as delivered.

1.10.4 Drawing Review

The Contract Administrator will review and comment on all project drawings prior to manufacture of any related equipment. On receipt of comments to any drawings, the Trade Contractor shall revise the drawings and provide five further sets clearly identifying any revisions for final comment.

Following incorporation of all comments on revised drawings, six complete sets shall be submitted to the Contract Administrator.

Drawings will be subject to comment and shall be used for checking during the commissioning stages, that all equipment has been provided and fitted in accordance with the proposed design.

1.11 Works Tests, Inspections and Commissioning

1.11.1 Works Tests and Inspections

The Trade Contractor shall include all costs including travel and hotel accommodation and make arrangements for 5 people for the following works tests and inspections, in the manufacturers works, as identified in the schedules:

- Examination of selected machined parts of the lift before assembly and of electrical component parts to check freedom from latent defect.
- Witnessing the shop tests on the control equipment.
- Witnessing shop tests on hydraulic ram/cylinder/tank units.
- Inspection of the lift car and associated finishes.
- Witnessing the water proofing tests.

1.11.2 Commissioning The Tests on Site

1.11.2.1 Witness Tests

On completion, the Trade Contractor shall test and examine the whole installation to his own satisfaction. The Trade Contractor shall then carry out tests, to be witnessed by the Contract Administrator, to demonstrate compliance with this Specification.

These tests and examinations shall generally comply with the requirements of EN 81 annex D. The results of the tests shall be recorded on a separate test and examination certificate for each lift in the format of British Standards Institute document BS 8486. The Trade Contractor shall provide these certificates.

1.11.2.2 Dynamic Tests Lifts
Not withstanding the requirements of EN81 annex D, the witness tests shall include the following specific tests:

- Motor current readings shall be taken and recorded in the up and down direction with empty car and full load in the car.
- The Trade Contractor shall be deemed responsible for damage to equipment or property, occurring from tests and shall subsequently carry out all necessary remedial works at his own expense.
- Car buffers shall be tested by running the lift car carrying 100% rated load, at contract speed onto the buffers.

1.11.2.3 Dynamic Tests specific to Hydraulic Lifts

- Rupture valves shall be tested with the lift carrying 100% rated load and running downward at over speed.
- High and low-pressure switches shall be tested.
- The high-pressure bypass shall be tested and the setting recorded, to verify compliance with relevant codes.

1.11.2.4 Functional Tests

- The operational functions of the lift shall be demonstrated to the Contract Administrator including but not limited to:
- All push buttons, indicators and sounders, gongs etc.
- All key switches and functions controlled thereby.
- Special control features such as fire alarm recall, emergency recall switches, Out of service switches etc.
- All automatic PIR and all passenger safety devices around the platform lid.
- Operation of the 'Pavement Lid'.

1.11.2.5 Test Certificates
At the request of the Contract Administrator, the Trade Contractor shall make available, copies of all Manufacturers Test and Type Test Certificates.

1.11.2.6 Test Contract Administrator and Equipment
All testing and commissioning shall be carried out by suitably qualified Lift Test Engineers, experienced in the work and using suitable instruments.

All instruments and test equipment shall be calibrated in accordance with the Trade Contractors Quality Assurances procedures and at the request of the Contract Administrator, the Trade Contractor shall make available, copies of any Calibration Certificates for test equipment used during commissioning.

1.11.3 Putting Into Service

The Trade Contractor shall successfully complete the commissioning of the works, and rectify any defects or snags identified during commissioning, to the satisfaction of the Contract Administrator, prior to putting the lift into service.

Prior to the lift being put into service in accordance with the Machinery Directive the Trade Contractor shall clean the machinery space, lift well and car of all debris, and leave the complete installation in the state of cleanliness expected of a new product.

The lift installation when completed shall **not** be used prior to issue of a Declaration of Conformity in accordance with the Machinery Directive.

1.11.3.1 Operation and Maintenance Instruction
The Client may appoint representatives to undertake the operation and maintenance of the building services installation, including the lift.

The Trade Contractor shall include for a minimum period of two plant operating days prior to Practical Completion, to instruct the Client's representative in the day to day running of the plant and systems. The location and function of all items listed on the Record Schedules shall be explained. The controls systems, procedures for starting, isolation, emergency switching, and hand lowering shall be comprehensively explained, and demonstrated to the Client's satisfaction.

1.12 Operating & Maintenance and Record Manuals

1.12.1 General

1.12.1.1 Language and Content
All diagrams, documentation and design data shall be in English and shall contain the following sections:

1.12.1.2 Electronic Manuals
4 copies of the O & M manuals in an electronic format shall be provided. The proposed format of any electronic data shall be confirmed in the tender and agreed with the Contract Administrator to suit the Client's requirements.

1.12.2 Operating & Maintenance Manual (Hard Copy)

The Trade Contractor shall supply two draft copies of an Operating and Maintenance Manual(s) for comment.

After receiving comments, the Trade Contractor shall submit four copies of the Operating and Maintenance Manuals incorporating all revisions and corrections prior to the lift being put into service.

The manual(s) shall be specifically produced for the installation. A collection of manufacturers leaflets will not be acceptable unless they provide all the information as required by this specification.

The manual(s) shall be of loose-leaf 'A4' type with a plastic bound stiff cover and clearly printed titles on both the front cover and the spine.

The manual(s) shall incorporate separator sheets each containing a clearly labelled index tab to enable quick location of each section.

1.12.2.1 Index
The index shall be comprehensively written and shall be sufficiently detailed to ensure that any item can be correctly identified and its location in the manual found quickly and easily.

1.12.2.2 Introduction
The introduction shall include a concise description of the installed system and an overview of the intended method of operation and control of the lift.

1.12.2.3 Design Data
The design data shall be provided in tabular form and must include the manufacturer's lift identity number and details of contract load, speed and control and levels served. Details of special control features must be included together with Test Sheet data on ride comfort levels, as required by the Specification.

1.12.2.4 Description of Operation
The Description of Operation shall include a full technical description of the operation of the installation and shall clearly explain all controls, indicators and communication devices. A full description of all control features and operating and signalling controls shall be provided.

1.12.2.5 Schedule of Equipment
The Schedule of Equipment shall give full descriptions and manufacturers part numbers of all equipment supplied within the works to ensure that each type can be positively identified. The Schedule shall cross reference to other sections of the manual (i.e. the location of the relevant manufacturers' leaflets) to enable all the information on any particular item to be easily located.

1.12.2.6 Schedule of Recommended Maintenance
The Schedule of Recommended Maintenance shall give details of all statutory and recommended inspections for all equipment and clearly identify the scope and frequency of all other required inspections, adjustments, lubrication and replacement of components supplied.

1.12.2.7 Risk Assessments
Risk assessments shall be provided for all service and maintenance operations in accordance with BS EN 13015. Maintenance on Lifts and Escalators - Rules for Maintenance Instructions.

1.12.2.8 Spare Part and Lubricants
A comprehensive list of spare parts and lubricants shall be provided and shall include the make, type and part number of all items and any special ordering requirements.

The names and addresses of manufacturers and trade trade suppliers shall be provided.

1.12.2.9 Emergency Procedures
The Emergency Procedures shall be clearly detailed along with full details of call-out procedures that must be carried out in the event of a breakdown.

Concise instructions (with appropriate diagrams) of the emergency lowering of the lift, and arrangements for the release of trapped passengers shall be provided. It is essential that these procedures are formulated in such a way that the safety of the trapped passengers and those carrying out the procedures are maintained throughout.

1.12.2.10 Plant and Equipment Manufacturers
A complete list of all plant and equipment manufacturers shall be provided giving their addresses and telephone numbers along with the address and telephone number of local agents for imported equipment, identifying the items of equipment for which they were responsible.

1.12.3 Record Manual (Hard Copy)

After completion of all commissioning tests, the Trade Contractor shall supply two draft copies of the Record Manual incorporating all test certification and record drawings as detailed, for comment.

Within 2 weeks of receiving comments, the Trade Contractor shall submit four copies of the Record Manual incorporating all revisions and corrections.

The manual(s) shall be of loose-leaf 'A4' type with a plastic bound stiff cover, with clearly printed titles on both the front cover and the spine.

The manual(s) shall incorporate separator sheets each containing a clearly labelled index tab to enable quick location of each section.

1.12.3.1 As Installed Drawings
A complete set of as installed drawings of the lift system derived from the approved General Arrangement and Builders Work Drawings.

The drawings shall indicate the as installed conditions and shall be clearly labelled "As Installed" in the title block.

1.12.3.2 Electric Circuit and Control Diagrams
A complete set of all electrical circuit and control wiring diagrams of the installed system, including the position of all luminaires, alarms and socket outlets in the lift machinery spaces, well, pit and lift car.

The drawings shall indicate the as installed conditions incorporate any site modifications made during the installation period, and shall be clearly labelled "As Installed" in the title block.

1.12.3.3 Test Reports and Certificates
Copies of all type test and factory test certificates for all items of equipment and also signed copies of the BS 8486 Test Certificate for the completed installations. Any hand written certificate shall be produced with clear legible writing.

The Trade Contractor shall provide copies of all Type Test Certificates, manufacturers' Test Certificates, hydraulic hose, emergency lighting Test Certificates, also the Safe Working Load Certificates for lifting beams and car top safety hooks as applicable to the equipment provided.

1.12.3.4 Designation Schedule
A Designation Schedule shall be provided which shall tabulate all codes and abbreviations used for controller components and define the individual component functions.

All switches, relays and control system components shall be permanently labelled and any codes or abbreviations used shall exactly match the associated wiring diagram and be identified within the Designation Schedule.

1.12.3.5 Manufacturers' Leaflets
The Trade Contractor shall provide a complete set of all manufacturers' data leaflets relevant to the equipment installed. Where these leaflets refer to more than one variation of the equipment, the supplied item must be identified in an unambiguous manner.

1.13 Maintenance

1.13.1 Maintenance During Defects Liability Period

The Trade Contractor shall include for fully comprehensive maintenance during the Defects Liability Period on all plant and equipment supplied under the Lift Contract.

This shall include for maintenance and an emergency call-out service for the whole of the installations for a period of 12 months from date that the lift is put into service in compliance with The Machinery Directive.

This shall include for regular examination and any adjustments, lubrication, cleaning, replacement of parts, etc, as necessary to suit the type of equipment installed and to ensure continuous operation.

1.13.2 Comprehensive Maintenance Contract

The Trade Contractor shall complete the schedule within this specification quoting for a maintenance contract covering the entire installation, for the periods identified in the schedule.

The Contract shall commence at the end of the Defects Liability Period and shall include comprehensive maintenance and emergency call-out services for the entire system.

The sums for these Contracts shall be on a fluctuating basis, with a declared formula for variations with time.

The contract shall be based on a fully comprehensive contract and the Trade Contractor shall submit a model contract with the tender and confirm separately, any items that are not covered under the proposed agreement.

It shall include monthly service visits for general adjustments, lubrication, cleaning and replacement of worn or faulty parts as necessary to meet the requirements of the type of equipment installed.

As part of the maintenance contract, an annual report on the lift shall be submitted by the Trade Contractor detailing all visits to site, identifying call outs, breakdowns, service visits and any actions or work carried out on the systems.

1.14 Compliance with Codes, Standards and Legislation

Except where enhanced by this Specification and any other related documents submitted with the invitation to Tender, the equipment and installation shall conform to the requirements of all relevant codes and standards issued by recognised Codes and Standards and Legislative bodies for the location where the installation will take place.

This specification is based on British Standards and European / UK Legislation. The relevant codes shall include but are not limited to the following as applicable to the equipment specified:

- The Machinery Directive
- EN 81(all parts) for Design Guidance
- BS 5655
- BS 5810
- BS 5950
- BS 7255
- BS 6977
- BS 8486
- BS EN 12015
- BS EN 12016
- BS EN 13015
- VD1-4707 Class B
- CIBSE Guide D

Where this Specification is more stringent than those Standards and Codes, the provisions of this Specification shall prevail.

The Trade Contractor shall bring any requirements imposed by this specification that creates a non-compliant situation with a recognised standard to the attention of the Contract Administrator.

Reference to Standards and Codes of Practice shall mean the edition current, two months prior to the date for return of Tenders. Certificates of compliance with the relevant Standards shall be provided. Any subsequent changes in the relevant Standards shall be brought to the attention of the Contract Administrator.

1.15 Equipment Workmanship and Materials

1.15.1 General

The Contract Administrator shall be involved in the manufacturer's design development. The Trade Contractor will attend all design development meetings or workshops.

The Trade Contractor shall permit the Contract Administrator or a representative, free access to the Works during working hours and by agreement. Facilities are to be made available for inspection of materials, assemblies, method of manufacture and quality control of the process.

Unless otherwise described, all materials shall conform to the appropriate British Standard specification. The Trade Contractor shall furnish the Contract Administrator, upon request, with certificates or letters from the prime material manufacturers and trade suppliers proving that the materials to be used do in fact conform to such specifications and confirming that they approve the use of their materials. Such certificates and letters shall be incorporated into the Operation and Maintenance Manuals.

The Trade Contractor shall obtain the total quantity of each material from the same manufacture with proven experience of manufacture of similar materials. Where this is not possible, any alternative arrangements shall be agreed with the Contract Administrator.

The Trade Contractor shall, upon request, submit a list of all materials proposed which are not specifically described in this specification. The Trade Contractor shall submit manufacturer's recommendations as relevant to this Sub-Contract.

1.15.1.1 Fixing Devices

The Trade Contractor shall allow for all necessary fixing devices including framing, bearers, fillets and the like and all preparation in plugging and screwing or cutting for anchor bolts or for other fixing whatsoever necessary.

The Trade Contractor shall provide for an appropriate combination of all working tolerances in the elements of the Lift Contract Works as well as the design tolerances in the work of others and shall provide for all necessary adjustments to enable the Works to be fitted.

1.15.1.2 Fabrication

The material used in the fabrication shall be of a type to achieve the required performance and appearance.

Methods used in the fabrication shall be selected to achieve the specified appearance and performance. Methods used shall be based upon the use of suitable equipment and experienced operatives.

Methods statements shall contain control procedures to ensure compliance with the project requirements.

Control samples shall be produced to adequately demonstrate the standard of workmanship and finish required. Where appropriate range samples shall be established to assist in quality control procedures.

1.15.1.3 Accuracy and Compliance

The Trade Contractor shall fabricate and install all assemblies in accordance with agreed shop component and assembly drawings.

The Trade Contractor shall pre-assemble and carry out as great a proportion of the works as possible within a controlled factory environment.

1.15.1.4 Workmanship

The standard of workmanship for all the Lift Contract work shall be to relevant codes of practice, strictly in accordance with the agreed shop drawings. The Trade Contractor is deemed to be fully conversant with all relevant British Standards Specifications.

Workmanship for all constructions and components assemblies shall be of the highest standards in every respect. Work shall be true to detail with sharp, lean continuous profiles and surfaces straight and free from defects, dents, marks, cracks, indentations, distortions, waves, scratches or flaws or any nature impairing strength or appearance, fitted with proper joints and intersections and with specified finishes.

When assembled any moving parts must move freely without binding.

All fixings that are visible to lift users shall be either countersunk or of a decorative nature unless otherwise shown on drawings, specified or agreed.

Junctions of identical elements shall be mitred, unless otherwise shown on drawings, specified or agreed.

No modification or adaptation of the agreed details shall be undertaken without permission from the Contract Administrator.

The Trade Contractor shall not cut, drill or otherwise alter the work of other trades or the lift works, to accommodate other trades, unless such work is clearly identified on the drawings.

Whenever such alteration is required, the Trade Contractor shall obtain the Contract Administrator permission.

1.15.1.5 Appearance
The finished work is to be entirely free from loose material, chips, marks or any imperfection visible to the naked eye. Localised making good will not be acceptable.

1.15.1.6 Firmness and Solidity
The whole system shall be sturdy, rigid, firm and free of vibration, rattling, squeaking and other noises.

1.15.2 Materials

1.15.2.1 Castings, Extrusions or Profiles
All castings, extrusions or profiles are to be of adequate thickness and strength to meet the structural requirements and eliminate any risk of distortion in the finished surfaces. The thickness of such elements must be sufficient to ensure their complete rigidity in the lengths required in the final installation.

1.15.2.2 Sealant
The Trade Contractor shall satisfy himself that any form of sealant is compatible with the adjacent elements of construction in any one particular location. All excess sealant shall be properly cleaned from exposed surfaces.

Installed sealant shall provide a smooth continuous surface to the full width of the joint and shall be tooled flat.

Colours of sealant shall be agreed with the Contract Administrator.

1.15.3 Inspection of Lorry Lift Car

The Trade Contractor shall build the complete lift car, platform, sling and pavement lid and shall incorporate the doors, lighting, weatherproofing and operating rods and any external body panel for full inspection in the fabrication facility by the Contract Administrator and other clients' representatives as necessary. (Refer to Clause 1.11.1).

Following acceptance of the car, this will form a benchmark for all workmanship and the accepted lift car can be used in the actual installation.

Programming of the car fabrication shall allow sufficient time for remedial works, dismantling and delivery to site, without compromising the overall program for the Lift Contract Works.

1.16 Samples

The following samples are required to be submitted to the Contract Administrator prior to the installation of the Lift Contract Work. These samples will be used for comparison against the finished work.

- All internal and external car finish materials as shown on the Trade Contractor's detail drawings shall be supplied for comparison with the finished work. 300mm x 300mm samples shall be required.
- Car flooring.

- Call pushes, indictors and key switches.
- External finishes.
- A section of RSJ detailing priming, galvanising and finish.
- Internal finishes.

1.17 Weatherproofing

1.17.1 Test Methods and Standards

The waterproofing tests shall be based around the following standards.

Watertightness	BS 5368 Part 2 : and AAMA 501.1-94
Wind Resistance	BS 5368 Part 3 :
Watertightness on Site Hose Method	AAMA 502.2-94

1.17.2 General

The Trade Contractor shall ensure the effective weatherproofing of the lorry lift and pavement lid.

The lift shall be designed to function in the external environmental temperatures and in all weather conditions, for example rain, hail, snow and sunshine, expected in London.

1.17.3 Functional Consideration

Experience in external lifts have identified a number of specific problems which need to be addressed by the Lift Contactor, these being:

1. The effective and safe transfer of passengers and vehicles between car and building basements in adverse weather conditions.
2. The environmental resistance and functional ability of the pavement lid and lift landing entrances in various weather combinations. In particular to ensure that wind, rain and driven snow are excluded and that thermal losses are minimised.
3. Maintainability and durability of design.

1.17.4 Design Considerations

1.17.4.1 Effective sealing between car and pavement lid will be subject to detailed design, side seals will be required. It is required that weather seals will extend the full width and depth of the pavement lid. A labyrinth seal (Electro/Mechanical) shall be provided between the car platform and pavement edge when the car is at pavement level.

1.17.4.2 Details of the 'pavement lid' to assist weatherproofing of equipment plus effective sealing to prevent ingress of wind, rain and driven snow will be subject to full design development between the Trade Contactor and Contract Administrator.

The following design features and general construction of the 'pavement lid' shall be incorporated in the design as required to meet the design parameters.

1. Door Guidance – Suspended rollers running on a solid plated track. Bottom door guidance located in an inverted stainless steel sill section.
2. Inverted Sill section – To protect lower door evidence and to minimise problems associated with the possible build-up of dirt, snow, ice etc. caused by ledges and conventional sill sections.
3. Enclosed Landing Tread plates – To minimise the possibility of windborne rain entering the building.

4. Door Seals – All door edges to be protected by a combination of a labyrinth seal and a brush type draught excluder.
5. Trace Heating – To prevent possible icing up of the entrances, pavement lid, pavement, hydraulic rupture valves, cylinders and safety equipment.
6. Track Cover – To protect the door tracks and rollers and act as a gutter for directing water away from the doors.

1.17.4.3 The effect of wind buffeting from car movement in free air

The following design features shall be incorporated as required to minimise the effects of wind and buffeting.

The essence of the design can be split into two sub-assemblies as follows

1. Structural Framework – Incorporating all the main load bearing elements on which the hydraulic system and outer cladding will be mounted. The complete assembly being guided on guide shoes designed to minimise lateral movement of the framework.
2. Lorry Compartment – Comprising of the solid portion of the car bodywork, platform and rubbing rails. The complete assembly being resiliently mounted from the structural framework.

1.17.4.4 The effect of gusting wind on trailing cables.

1. Trailing Cables – To minimise wind effect on the travelling flexes shall be protected by suitable ductwork.

1.17.4.5 Arrangement of essential equipment to permit access for servicing and an effective and corrosion resistant enclosure.

1. Car Roof – Weatherproof outer cladding in stainless steel
2. Car Bodywork – clad in stainless steel panels

1.17.4.6 Prevention of Build-up of rainwater and snow on roof/pavement lid of car and means of clearance of water.

1. Marginal pitching of the roof will prevent rain or snow from lying on the roof.
2. Cladding Area – Collected water is dispersed by the means of uttering to discharge adjacent to the main guide rails. It is not feasible to stop the possible collection of snow.

1.17.4.7 Thermal effects and movement

1. Guides and Guide Clips – Guide are pinned to the pit floor and sliding guide clips utilised.
2. Cable ductwork – Fabricated section with expansion joints.
3. Positional Controls – All floor zone switches to be mounted to Contract Administrator requirements.
4. Electrical Conduits – Main trunking clamped to guide rails support steelwork. Conduit connections between trunking and the landing entrance terminal box makes allowance for relative movement.
5. Car/Landing Entrances – thermally induced movement or distortion shall be incorporated in clearances.

1.17.4.8 Arrangement for hydraulic hoses and travelling cables etc entering the machine room.

1. Suitable weather seals at point of entry shall be provided.

1.17.4.9 Treatment of guides, trailing cables, limit switches, etc to combat a build-up of ice and compacted snow.

1. Guide Rails – use of sliding brushes and trace heating effectively keeps the guides clear of snow and ice.
2. Limit switches, pipe rupture valves and safety devices – All mechanical switches are of the waterproof design and protected by trace heating.

1.17.5 Design Recommendations

1.17.5.1 For effective sealing of car and landing door to prevent ingress of wind, rain and driven snow. Provide metal astragal around side, top and bottom of landing doors.

Provide hinged cover for header, landing door track and interlock device.

Across bottom of car doors. Provide angled hinged cill cover full width of doors to prevent rain/snow from entering cill.

Provide car/landing cill with an increased depth door track to allow for possible build-up of ice in door track during freezing conditions.

Provide landing cill with slots in door track either side of the clear opening width to allow rain to be drained away.

1.17.5.2 For effective sealing between car platform and pavement when car door opens at a landing.

Provide moveable drop tray below cill to catch any falling objects between car and landing cill.

Similar device also provided above car door entrance to catch any falling rain/snow.

1.17.5.3 Treatment of guides, trailing cables, limit switches etc to combat a build-up of ice or compacted snow.

1. Guides Rails
   To be galvanised.

   Provide brushes to break-away any build-up of ice on the guide rails and trace heating.
2. Trailing Cables
   Provide metal duct around trailing cable with minimum opening room pit floor to halfway junction box. Thus preventing cables from swaying around due to wind and provides the minimum possible contact with rain.

   Provide trailing cables with one conductor permanently energised to act as a heating element within the trailing cable.
3. Limit Switches, etc
   Provide special all weather type electrical equipment including:
   - Stop switches
   - Indicator relays
   - Limit switches
   - Socket outlets
   - Car top controller
   - Fans
   - Gong/chime

- Overload switch
- Interlock switches

1.17.5.4 Fixing details for guide rails and arrangements for additional fixings between structural members.
The maximum guide bracket pitch shall be 1500mm. Use larger than standard bolt size and/or high pressure bolt with split pin fastener to allow for changes in climate. Use stainless steel fixings to reduce corrosion.

1.17.5.5 Thermal effects/movement for guide rails
Provide sliding guide rail clips with non-metallic shims to allow for expansion and contraction of guide rails during changes in the climate.

Provide guide rail adjusting device in pit to allow for changes in guide rail length.

1.17.5.6 Optimise the arrangement of trailing cables and hydraulic hoses etc entering machine room, to permit the use of standard equipment within the room.

The machine room shall be maintained between 5°C and 35°C by means of suitable heating and ventilating provided by the lift manufacturer.

1.17.5.7 Provide thermostatically controlled heating of car guide rails, pipe rupture valves, hydraulic oil lines, car/landing door cills, car/landing top track and pavement lid during periods of extreme weather conditions.

1.18 Weathertightness Testing

The Trade Contractor shall include for these tests as apart of the Lift Contract works.

The pavement lid system shall achieve the following performance.

Differential Pressure Drop	**Water Penetration**
0 up to 300 Pa	No leakage
300 up to 600 Pa	Minor leakage

For a differential pressure drop 600 pascals the air leakage through the pavement lid system shall not exceed 125m³/hr.

The Trade Contractor shall submit a method statement to describe the proposed method of testing the pavement lid.

1.19 Weather Station

The Trade Contractor shall provide a localised weather station compatible with the lift controller to control the operation of the trace heating elements, lift operation during windy or wet conditions. This minimum control functions shall include:

- Outdoor temperature
- Lift shaft temperature
- Wind speed
- Rain
- Capable of operating 10 sensors
- Data logger
- Outdoor transmitter

- PC connection

The location of the sensors and windspeed devices shall be determined by the Contract Administrator. All wiring and containment shall be by the Trade Contractor.

1.20 Pavement Lid – Design

The Trade Contractor will design the pavement lid assembly to the requirements of BS 5950, Table 8 for 'Brittle Finishes'. The depth of the pavement lid tray will be subject to design development.

The pavement finished surface will be provided by others, the Trade Contractor shall provide the sub-structure materials and bed to suit the lorry loadings fire containment and environmental conditions.

2.0 TECHNICAL SPECIFICATION

2.1 Accessibility

The hydraulic machinery, hydraulic hoses and other equipment in the machinery space are to be arranged so as to be accessible to facilitate safe inspection and maintenance.

2.2 Painting

2.2.1 General

With the exception only of self-finished surfaces and elements otherwise specified the whole of the equipment shall be painted one coat in the factory after full and proper surface preparation including priming. Any damaged surfaces shall be made good on site to the satisfaction of the Contract Administrator.

All steelwork provided by the Trade Contractor, shall be de-rusted, galvanised, primed and painted.

2.2.2 Special Paint Requirements

As the lift exposed to unusual atmospheric conditions, the Schedule of Paint Finishes in this specification shall be adopted and applied in a factory environment prior to shipping to site.

2.2.3 Surface Preparation

Site connections: After completing the connection, prepare the surface of the connection, adjacent unprimed surfaces and surfaces damaged during erection.

Steel surfaces generally: Remove loose millscale, loose rust, oil, grease, dirt, globules of weld metal, weld slag and other foreign matter.

2.2.3.1 Abrasive Blast Cleaning

Do not use silica abrasive for dry blasting. Use phosphate inhibitors when wet blasting.

2.2.4 Protective Coatings

2.2.4.1 General

Paint selection to be made in accordance with the British Standards recommendations.
Shop Work: Apply the primer coat or protective system to the steel before delivery to the site.

Transport and handling: Protect paintwork from damage during transport and handling. Do not handle or transport steel members until the paintwork is dry.

Site work: After erection, repair damage to the shop coating and apply coating omitted at site connections.

2.2.4.2 Priming
If the surface is contaminated or rust bloomed carry out surface preparation before priming.

Fast drying primers: Do not provide fast drying primers.

2.2.5 Galvanizing

2.2.5.1 Structural Sections
Cold worked items: Anneal to 650℃ before galvanizing.

2.2.5.2 Coating Quality
The zinc coating shall be free from lumps, blisters, gritty areas, uncoated spots, acids and black spots, dross, flux and other imperfections.

Coating mass: Other than nut and bolt thread surfaces:

- Average: 600 g/m2.
- Minimum: 550 g/m2.

2.2.5.3 Exposed Galvanised Surfaces
Passive exposed galvanised surfaces without paint finishes.

2.2.5.4 Bolted connections
General: Treat contact surfaces of friction-type bolted joints by wire brushing or light grit blasting to the extend necessary.

2.2.6 Galvanizing Schedule

Steel Member or Surface	Coating Mass
All steel work assemblies	600 g/m²

All damage to galvanising shall be repaired using two coats of a two-pack epoxy polyamide zinc-rich paint containing a minimum of 92% zinc dust in the dry film which shall be built up to an equivalent zinc coating in mass/m².

All cut ends and holes shall be painted as above in a factory environment.

2.3 Ride Comfort, Noise and Vibration

2.3.1 General
It is a requirement that the specified levels of vibration and noise are achieved. If the levels of the various noise and vibration measurements are not in accordance with the specified levels, the lift installation will be deemed to be non-compliant with the Specification and will be rejected.

2.3.2 Measuring Instruments and Results
The measurements shall be made with a ride comfort analyser that can store measurements electronically for analysis at a later date, for comparison purposes.

2.3.3 Noise Levels on Lift Lobbies
Lift noise, when measured at 1.5m from the floor and 1m from the door face with the doors closed, shall not exceed 58dB(A) at any time during the lift cycle.

2.3.4 Vibration in Lift Cars

Vibration measurements shall be taken at the centre of the car, on the floor, in three mutually perpendicular axes corresponding to vertical vibration and lateral quaking. Measurements shall be made of vibration levels in each direction over the following cycles,

- One full cycle from the bottom of the building to the top.
- One full cycle from the top of the building to the bottom.
- One full cycle over a single floor journey.
- Any short floor journeys shall be measured to identify that the correct speed profiles are being achieved.

The vibration levels shall not exceed the values indicated in the performance table.

2.3.5 Noise Levels in Lift Car

Noise levels in the car under acceleration, deceleration and at maximum car velocity in the cycle shall not exceed the values indicated in the performance table.

The engagement of the 'Pavement Lid' shall not exceed the noise and vibration levels detailed in clause 2.3.6 of this specification.

2.3.6 Noise and Vibration Performance Table

Lift Speed (m/s)	Maximum Acceleration (m/s2)	Maximum Jerk (m/s3)	Maximum Lateral Vibration (mg)	Maximum Vertical Vibration (mg)	Max. Noise in car (dBA)
0.05 – 0.1	1.2	1.4	12	18	54

The maximum vibration specified is the maximum peak-to-peak figure using the ISO ride quality filter.

2.3.7 Vibration in adjacent structure

The peak velocity of any surface of the building adjacent to the Lift Car guide rails, hydraulic rams, power packs or other associated equipment, as measured in the perpendicular direction to the building surface or in any of the two orthogonal axes parallel to the building surface, shall not exceed a value of 0.3mm/s at any of the 1/3rd octave band frequencies over the range 1 Hz to 160 Hz.

2.3.8 Tender Return - Methodology

As part of the tender return the Trade Contractor should include the methodology and exact details of the tests for proving that all of the vibration and noise criteria mentioned within this specification will be met as part of the their works.

2.4 Guide Rails and Brackets

2.4.1 General

The car guides shall be so jointed and fixed to their brackets so that they do not deflect by more than 1.0mm under normal operating conditions.

2.4.1.1 Design Calculations

Detailed calculations in accordance with Annex D of EN81 shall be submitted if requested by the Contract Administrator, verifying the design deflections and stresses of the selected guide rails.

2.4.1.2 Fixings

Wood or fibre blocks or plugs shall not be used for securing guide brackets to the structure.

2.4.1.3 Guide Rail Construction

All car guides shall be galvanised machined, undercut tee section, with tongue and groove plated joints and shall be provided with galvanised steel bases.

If lubricated guide rails are used, removable oil drip trays shall be provided to facilitate easy emptying of excess oil. The collection of lubricant within a buffer support channel will not be accepted.

2.4.1.4 Guide Fixing Pitches

The fixing pitch between guide brackets shall be arranged to restrict the designed deflection below the maximum specified. If due to limitations on the guide fixing pitches caused by construction or structural constraints, this maximum deflection cannot be achieved, suitable guide rail backing shall be provided to achieve the deflection criteria accordingly.

2.5 Buffers

The Trade Contractor shall provide all necessary supports, mountings and fixings for the buffers.

2.6 Guarding and Screening

2.6.1 General

All guarding will be subject to agreement and clear details of all proposed guards and screens shall be submitted with the tender.

2.6.2 Well Screening Construction

All well screening shall be manufactured from 10 s.w.g. x 25mm galvanised steel weld mesh securely welded within a rigid galvanised angle frame.

Screens shall not be used to support trunking, conduits or any ancillary lift equipment in the well.

2.6.3 Void Screens

Where the layout of lift well equipment produces void(s) with plan dimensions in excess of 350mm deep x 500mm wide, adjacent to an area accessible by authorised personnel during routine inspection and maintenance, a safety screen shall be provided for the full height and width of any such void.

2.6.4 Landing Fascia Plates and Aprons

Imperforate fascia plates shall be provided between the underside of each track or sill and the top of the landing door supporting frame below. A ramped apron shall be provided below the lowest track.

All fixings shall be countersunk with no projection into the running clearance between the car and landing sills.

As a minimum these panels shall extend for the full width of the landing door track header the panels shall extend a minimum of 100mm past the clear opening line on the slam post side.

2.6.5 Landing Door Side Screens

Where, due to constructional details of the lift well, the landing door sill forms a ledge adjacent to the closed doors that is greater than 150mm from the sill edge to the inside of the well structure, protective screens shall be supplied and fitted by the Trade Contractor. The screens shall be fixed between the rear of the landing sill and the header assembly.

2.7 Lift Pits

2.7.1 Emergency Stopping Devices

Emergency stopping devices shall be provided, of a mushroom head design. Toggle or rocker type switches will not be accepted.

These stopping devices shall be positioned approximately 1300mm above floor level and adjacent to the entrance door of the lowest floor served, such that it can be operated before inspection personnel enter the pit.

Where the configuration of the lift provides for more than a single entrance at the bottom floor served, stopping devices shall be provided adjacent to each and every landing entrance.

If the stopping device is more than 2000mm above the pit floor, an additional stopping device shall be fitted at low level.

All stopping devices shall be clearly and permanently labelled run/stop.

2.7.2 Socket Outlets

A socket outlet controlled by a local or integral RCD shall be provided in each lift pit.

2.7.3 Pit Access Ladders

2.7.3.1 General

2 pit ladders shall be provided to allow for safe and easy access to each lift pit with handrails extending to a minimum of 1100mm above the pit access level.

2.7.3.2 Fixed Pit Ladders

All ladders shall be permanently fixed within the lift well in a position that is easily visible and accessible from the pit access level.

2.7.4 Emergency Communication Unit

A waterproof communication unit incorporating a speaker, microphone and telephone button, as detailed elsewhere in this specification, shall be provided in the lift pit that shall initiate direct communication with a 24 hour manned rescue service.

Buttons located on the underside of the lift car will not be accepted as provision for the emergency communication link from the lift pit.

2.8 Lift Drives

2.8.1 General

The control system shall provide fully closed loop feedback for speed control or similar agreed method.

2.8.2 Harmonic Spectrum Data

At the request of the Contract Administrator the Trade Contractor shall, provide harmonic spectrum data relating to each phase of the supply to the drive motor:

- When a lift car is accelerating with full contract load.
- When a lift car is accelerating empty.
- During levelling operations.

2.8.3 Electricity Supply Company

The Trade Contractor shall be responsible for ensuring that all starting equipment supplied, is in accordance with any special requirements of the relevant Electricity Supply Companies regulations, with particular regard to limitations on starting currents etc.

2.9 Hydraulic Machines

2.9.1 General Provisions

All components comprising the hydraulic machine, hoses and associated supports, shall be supported on vibration isolators offering a vibration isolation efficiency of no less than 95% at all frequencies of forcing vibration in the range 1 Hz to 160 Hz or as required to achieve the requirements of clause 2.3.7.

The acceptable oils types, specification and quantities shall be stated on a labels permanently fixed to the drive unit.

2.9.2 Emergency Manual Operation

When the lift is being raised or lowered manually an audible and visual signal shall be activated when the lift passes through the unlocking zone. The indicator shall be easily seen and heard by personnel carrying out such emergency procedures.

This device shall be powered by a battery backed power supply to ensure correct operation in the event of a power failure.

The manual lowering procedures shall be clearly described on a, non-fading notice, mounted permanently in a prominent position in the machinery space.

2.10 Car Slings

2.10.1 Car Slings

The lift car shall be carried in a galvanised steel sling securely fixed together and substantially reinforced and braced to relieve the car enclosure of all strain and to withstand the operation of the pipe rupture valves under full-load conditions without any permanent deformation.

2.11 Guide Shoes

2.11.1 General

All guide shoes shall be selected to achieve the necessary noise and vibration limits as defined in the Specification.

2.11.2 Sliding Shoes

Sliding type shoes shall be fitted with renewable linings. The guide shoes shall also be resiliently mounted and self-aligning. Any necessary lubrication of the guide rails shall be applied by automatic means.

2.12 Lift Cars

2.12.1 Car Walls, Floors and Ceilings

The complete interior finishes and fittings of the lift car including ceiling, walls, door trims, skirting, floor and light fittings shall be to selected designs, as detailed in the schedules and indicated on any drawings.

2.12.2 Platform Isolation

The complete platform and car enclosure of the lift shall be effectively isolated from the car sling, by resilient rubber pads or suitable anti-vibration pads securely fixed to prevent displacement.

2.13 Car Lighting

2.13.1 Car Interiors

Interior lighting shall be by at least thirty (30) flush fitting LED (**vandal resistant**) lamps, suitably enclosed, each operated from independent control gear. The illumination at any point on the floor shall be not less than 200 lux.

The car lighting shall be controlled such that it is automatically switched off when the lift has been inoperative for a predetermined time. The lighting shall automatically switch back on when the lift is called or landing door opened.

The design of light fittings shall be in accordance with the schedules and agreed with the Contract Administrator.

2.13.2 Emergency Lighting

In addition to mains operated lighting an emergency system shall be energised automatically following the failure of the mains supply to the normal car lighting and shall provide constant illumination for a duration of not less than 3 hours.

The luminaires for the emergency lighting shall be located and rated such that, in addition to providing general illumination of the car, they shall provide sufficient luminance to distinguish the car thresholds and all communication and control features within the lift car.

2.14 Additional Requirements Car Requirements

2.14.1 General

The following requirements shall be provided.

2.14.1.1 Sealed Joints

The joints between wall panel sections and the car floor shall be sealed with a compound to prevent penetration of liquids.

2.14.1.2 Rubbing Rails

Three protective timber rails of nominal 150mm x 25mm section shall be provided on each wall of the lift car. These shall be securely bolted to the vertical wall sections using countersunk fixings; the nominal fixing height of the protective rails shall be 200mm, 600mm and 1200mm from floor level measured to the bumper rail centres.

Timber shall be sourced from sustainable, managed forests and at the request of the Contract Administrator, documentation shall be provided to verify this.

2.14.1.3 Durability

Push button, key switches and indicators etc. shall be of a suitably robust design to suit a heavy-duty application.

2.14.1.4 Fire Extinguishers

Four (4) fire extinguishers shall be provided in flush mounted cubicles within the lift car – the type of fire extinguishers shall be agreed with the Contractor Administrator.

2.15 Lift Car Roof Equipment

2.15.1 Maintenance Control Units

A waterproof maintenance control unit shall be provided on the top of the car and shall be mounted to eliminate the risk of accidental operation of any controls. In addition to housing an emergency stopping device, a common, run button shall be provided, which in conjunction with operation of the directional pushes for up and down shall provide movement of the lift car under maintenance control.

All controls on the maintenance unit shall be clearly labelled.

2.15.2 Car top Lighting

A low energy waterproof, fluorescent light fitting incorporating a non-maintained emergency light shall be provided on top of the lift car. The fitting shall be powered by a standby battery supply.

2.15.3 Roof Safety Hooks

The car roof shall be fitted with at least six ‘mansafe’ safety hooks. Each clearly marked with its safe working load, for the attachment of safety harnesses. Additional hooks shall be provided to ensure that a hook is located within 1500mm of any normally accessible point on the car roof.

2.15.4 Socket Outlet

A waterproof socket outlet controlled by a local or integral RCD shall be provided on the car roof.

2.15.5 Emergency Communication Units

A waterproof communication unit as detailed elsewhere in this specification, shall be provided on the lift car, incorporating an emergency call button that shall initiate direct communication with a 24 hour manned rescue service.

2.16 Lift Doors

2.16.1 General

2.16.1.1 Fire Rated Landing Doors

2 hour - fire rated doors shall be provided that have been tested and certificated by an authorised testing facility.

The Trade Contractor shall be responsible for co-ordinating the interface between the landing doorframes and the building fabric to maintain the fire integrity in accordance with the certification.

2.16.1.2 Mechanical Car Door Locking

In the interests of safety, it shall not be possible to open a car door, except when the car is within a designated unlocking zone.

All car doors shall be provided with a mechanical car door lock and electrical locking equipment.

2.16.2 Manual Shutter Doors (Power Assisted)

The lift car and landings shall be fitted with horizontally sliding folding shutter doors, incorporating vision panels and Mathews catches.

2.16.2.1 Clearances and installation

Maximum clearances between the shutter door and the surrounding trims and sills shall be 5mm when the doors are in the closed position. **Full wind/smoke seals to be incorporated.**

All doors shall be installed true and square within the supporting frame and any clearance gaps shall be adjusted before the lift will be accepted for final handover.

2.16.2.2 Door Sills, Guides And Suspension

Each door shall be provided, complete with a top track, running sill and supporting frame as required and shall have adjustable suspension points.

Door guide blocks shall be easily renewable from the well side of the door without the door having to be lifted or removed.

2.17 Alarms and Communication Systems

2.17.1 Emergency Alarm Devices

An emergency signal shall be provided, which shall be powered by a dedicated standby battery not used for any other purpose.

While the alarm button is pressed, the button shall illuminate and a reassurance sounder fitted on the lift car shall be clearly audible from within the lift car, to indicate that the emergency signal is functioning.

A secondary alarm sounder shall be fitted within the lift well at the main entrance level.

The volume of the sounders shall be adjustable.

The alarm system shall be capable of being extended to a central alarm panel and a volt-free contact with suitable terminals shall be provided for this purpose in the machinery space.

2.17.2 Hands Free Communication Systems

The lift manufacturer shall provide a 'hands free' communication system.

The 'hands free' system shall be activated by the car alarm push in accordance with EN81-1, EN81-28 and EN81-70. Continuous activation of the alarm push for a nominal period of 3 seconds shall initiate automatic, sequential dialling to a minimum of three numbers.

The system is to be fully compatible with the building telephone system.

Buttons, speakers and microphones, shall be located in the car-operating panel, on the car top, in the lift pit, in the machinery spaces where access for normal maintenance of the installation is required.

Buttons located on the underside of the lift car will not be accepted as provision for the emergency communication link from the lift pit.

A suitable notice shall be engraved in the car informing passengers how the 'hands free' telephone is operated in accordance with EN81. The wording, size and location of the notice shall be agreed with the Contract Administrator.

The Trade Contractor shall provide all wiring from the telephone to a connection terminal, including a travelling cable with a termination point in the lift machinery space.

2.18 Car and Landing Operating Panels

2.18.1 Engraving

The location and design of all engraving in the lift car shall be agreed with the Contract Administrator.

2.18.2 Push Buttons and Signal Panels

Push button and signal panels together with the floor designations and any other marking or engraving, shall be agreed with the Contract Administrator.

Car, landing, communication and alarm push buttons for passengers' normal use shall be located in a position agreed with the Contract Administrator.

The use of incandescent lamps will not be permitted for push button or signal illumination.

All faceplates for controls and indicators etc shall be heavy duty, vandal resistant and shall be secured with secret fixings or as otherwise agreed with the Contract Administrator.

2.19 Controllers

2.19.1 Construction

The controllers shall be mounted on acoustic mounts/pads offering a vibration isolation efficiency of no less than 95% at all frequencies of forcing vibration in the range 1 Hz to 160 Hz or as required to achieve the requirements of clause 2.3.7.

The control system shall be of the microprocessor type.

The components and cabinets shall be designed and mounted in a manner that facilitates inspection, maintenance, adjustment and replacement of any serviceable parts.

All earth connections shall be made at a common link within the control panel.

Components within the control panel shall be permanently labelled and any codes or abbreviations shall match the wiring diagrams and clearly detailed in the Designation Schedule.

Terminals shall be of the screw-clamp type, or equal alternative. A minimum of 10% spare terminals shall be provided for control wiring in addition to any spare terminals provided for the spare travelling cable cores.

All spare terminals shall be clearly identified.

2.19.2 Interference

The arrangement of the electrical equipment shall be such that there is no interference with the correct operation of radio, television receivers or other electronic apparatus in this or other buildings in the locality, caused by the normal working of the lift installation.

All lift equipment shall be provided within the limitations for Electromagnetic Emissions and Immunity given in BS EN 12015 and BS EN 12016 respectively.

No suppression components shall be used in any part of the circuit where their failure might cause an unsafe condition.

2.20 Control Features

2.20.1 General

The control features detailed shall be provided in accordance with the scheduled requirements within this specification.

2.20.2 Automatic Car Lighting Operation

The car lighting shall be automatically controlled to switch OFF five minutes after the last run, when the doors are closed and to switch ON when the car has a call to serve or landing door opened.

2.20.3 Automatic Re-levelling

Provision shall be made to allow for automatic, accurate re-levelling of the lift car where, after stopping at a floor, loading, unloading or in the event of hydraulic lifts causes the car to move out of floor level by more than 10mm with the doors open or closed.

2.20.4 Automatic Return on Hydraulic Lifts

After a maximum of 15 minutes from the last drive and closure of all car and landing doors and 'Pavement Lid' shut, the lift will be automatically returned to the defined level where it will park.

2.20.5 Building Fire Detection System Recall

Following receipt of a signal from the building fire detection system, the lift shall cancel all car and landing calls and return non-stop to a designated floor.

The lift shall return to normal operation automatically from the parked condition, when the alarm signal is removed.

2.20.6 Call Registered Indicator

Each push button or liner strip shall incorporate an illuminating indication that it has been operated, which shall be cancelled when the function has been completed.

2.20.7 Car Arrival Indicator

Flashing indicators shall be provided at each landing below street level, which shall illuminate an adjustable period before arrival, between 5 and 15 seconds.

2.20.8 Car Coming Indicator

A visible car coming indicator shall be provided within each landing call station, indicating that the car is coming to serve the corresponding call.

2.20.9 Lift in Use Indicator

A visible indication shall be provided at each landing call station, indicating when the lift is currently in use and cannot accept another landing call.

2.20.10 Out of Service Indicator

An indicator shall be provided at all floors below street level indicating that the lift is out of normal service. Any control feature that prevents normal use of the lift to passengers shall automatically activate this indicator.

This feature shall incorporate a battery backed emergency power supply to enable indication even in the event of mains power failure or disconnection.

2.20.11 CCTV Camera in the Car

Suitable cabling shall be provided by the Trade Contractor, within the travelling cables to suit the provision of 4 monitoring cameras installed in the lift car.

The Trade Contractor shall include for fitting a camera, supplied free issue by others, within the lift car.

2.20.12 Door Open Sounder

A sounder shall be provided to indicate that there is a landing call being registered, while the lift car is standing at a floor with the door open.

2.20.13 Motor Starts Counter

A mechanical, analogue, motor starts counter shall be provided which shall be easily readable by persons with authority to access the machinery space with out needing to open the control panel.

2.20.14 Out of Service Switch

Key switches shall be provided at the designated location(s). When the switch is activated, all landing calls shall be cancelled and the Out of Service Indicator shall illuminate on each landing. The existing car call shall be answered and no new call shall be accepted.

2.20.15 Overload Control

If the carload exceeds the lift capacity by more than 10%, (or a minimum of 4,000kg) the lift shall be prevented from starting.

A visual signal shall illuminate in the car-operating panel and in addition a buzzer shall sound and the voice announcer, shall announce the overload condition.

2.20.16 Voice Announcer

A digital voice recorder shall be provided for issuing lift users with spoken messages of floor arrivals, use of lift and safety announcements along with the ability to add managerial announcements via a fully programmable, easy to use method.

The volume of the voice announcer shall be fully and easily adjustable to minimise disruption to building occupants in the vicinity of the lift.

2.20.17 Induction Loop System

The Trade Contractor shall provide an induction loop system within the lift car complete with all controls and cable containment systems.

The system shall be discreetly fitted within the lift car and no wiring shall be visible from within the car.

Signage denoting that the car has been provided with an induction loop system shall be engraved on the car-operating panel in a format and location agreed with the Contract Administrator.

2.20.18 Water Sensor and Sump Pump in Pit

A sensor shall be provided in the lift pit, sump, which detects the presence of water.

When the sensor is activated, a signal will be provided via volt free contacts, which will enable automatic operation of a pumping device and pipework provided by others.

2.20.19 ECO Mode

The lift shall be fitted with an Energy Saving System with “Non Active” + “Active” sub systems which will turn off the car lights, fan, indicators and drives after a pre-determined period automatically.

2.21 Lift Remote Monitoring

2.21.1 System Details

The lift shall be arranged to provide information on status and functions to a monitoring station situated at a central location, to be agreed with the Contract Administrator.

The complete system shall incorporate all software, hardware and drivers (for the printer, remote stations etc.) required to provide a complete working system.

The monitoring station shall consist of a PC with a compatible printer for the viewing and printing of reports and data as necessary. The printer shall incorporate an automatic sheet feeder and be of a good quality inkjet or laser type and be provided complete with 2 spare ink / toner cartridges, which shall be readily available from stationary trade suppliers.

All information shall be stored locally in the lift controller and transmitted to the central monitoring system. Facilities shall be provided for interrogation both locally and remotely for at least the last 500 events, which shall be stored chronologically.

The Trade Contractor shall provide all wiring conduit and trunking associated with this system within the lift machinery space and all terminal and connection boxes for termination of the interconnecting wiring.

Interconnecting wiring and suitable supports, restraint and containment between the machinery space and the remote monitoring equipment shall be provided by the Trade Contractor in accordance with the schedules.

The remote monitoring system shall be provided with a standby battery.

2.21.2 Remote Monitoring Station

The monitoring system shall incorporate a remote monitoring station which will monitor and analyse the condition of the lift.

Fault conditions such as passenger alarm trappings, breakdowns and power failures shall be transmitted, immediately to the central monitoring station and advisory and performance events shall be transmitted at adjustable, regular intervals which shall initially be set to transmit once per day.

Remote monitoring stations shall incorporate a real time clock to enable the time and date of each event to be recorded. The clock shall automatically adjust for daylight saving and shall be backed up by a standby battery supply capable of retaining the correct date and time for a minimum of 21 days.

Remote monitoring stations shall incorporate a keypad or keyboard interface and a display and shall allow for different access levels, by way of a login system to provide for access by authorised persons.

Remote monitoring stations shall incorporate a dedicated standby battery system to enable full functionality and to maintain communication links with the central monitoring unit in the event of total power failure.

To minimise false alarms, lift alarm trappings shall be verified by the automatic input and monitoring of test calls to verify the lift car is not responding to normal operational commands.

Remote monitoring stations shall have a facility for programming self-integrity tests to enable continuous monitoring to be made during long periods of inactivity.

It shall be possible to set the level of reporting for all events.

A message facility shall be provided to enable messages to be left on an outstation from the central unit. These messages shall be accessible by authorised Contract Administrator with the relevant access authorities.

If the system uses a modem and phone line, it shall incorporate an intelligent interface with the auto dialler unit to enable shared use of a single phone line without affecting the effectiveness or availability of the auto-dial system.

Provision shall be made for automatic calls to be placed to check the integrity of the phone line connection to each outstation.

2.21.3 Central Monitoring Unit

The central monitoring unit shall be a PC based unit and shall incorporate the following features.

It shall be capable of receiving multiple incoming communications, during which it shall receive and process the fault and status information transmitted by remote outstations.

The data will be stored in files from where it can be processed to provide reports on individual lifts.

It shall be possible to store management data relating to statutory inspections, regular maintenance schedules etc. to enable monitoring and reporting of the same.

The system server shall be capable of supporting additional monitoring stations (PC's) that can operate locally within the system or remotely via a modem link.

An acknowledgement facility shall be provided to record and store the acknowledgement of any alarm or fault conditions. The acknowledgement feature shall be capable of being omitted at the discretion of the end user.

All menus shall be configurable to the client details.

The display interface shall support audible and visual indication of alarm or fault conditions.

All displays shall be configurable to enable client lift references to be used.

2.21.3.1 Reports

Statistical reports shall be provided for at least the following facilities

- % Time availability
- % Time planned maintenance
- % Time equipment out of service or under repair
- Total and duration of fault events per lift
- Listing of call outs and service visits with date, time and duration
- Fault acknowledgement details
- Detailed histories of the lift.
- Journey and door operation counters for each lift

2.22 Standby Battery System

2.22.1 Batteries

All batteries shall be of a compact design and shall be fitted within the machinery space. Batteries containing lead shall not be used.

Standby batteries shall be provided for the alarm sounders, car lighting, remote monitoring system, communication devices and powered ventilation equipment, allowing for the following standby times in the event of power failure.

Alarm sounders	1 hour continuous operation of all sounders
Emergency lighting (Car and well)	3 hours continuous illumination
Car fans	3 hours continuous operation
Communication devices	3 hours

Remote monitoring system data 100 hours

Remote monitoring real time clock 21 days

The alarm sounders shall have a dedicated standby battery, independent of any other battery-backed systems, which shall support all linked sounders operating continuously for the specified duration.

Other battery-backed units that share a common battery shall be capable of operating for the specified periods, assuming concurrent operation of all supported equipment.

2.22.2 Battery Charger

Automatic battery chargers shall be provided, which shall be suitable for trickle charging all standby batteries.

2.23 Electrical and Wiring Installation

Where no harmonised standards on the design of electrical installations exist, compliance with the current edition of the IEE Wiring Regulations for the 'Regulations for Electrical Installations' (BS 7671).

2.23.1 Wiring, Conduit and Trunking

2.23.1.1 General

The Trade Contractors' installation shall commence at the switch disconnector in the lift machinery space or other agreed location.

If the switch disconnector is located in a separate room then this room shall only be accessible to authorised persons and shall be locked and labelled in accordance with EN81 or other relevant National codes, standards or legislation.

The Trade Contractor shall include for all conduit, trunking, cabling and wiring necessary for a complete installation comprising of all the equipment provided within the lift installation in accordance with this specification, including remote monitoring and the weather station.

2.23.1.2 Wiring

All cables other than travelling cables shall be enclosed in conduit and/or trunking.

All cables drawn into conduit or placed in trunking shall be insulated with copper conductors.

Positive fixing of cable ends shall be ensured by purpose-made clamps or pinch type terminals, or by the use of crimped cable tags or other equally suitable termination devices.

All cables from the controller, including travelling cables, shall be of the low smoke and fume halogen free (LSF) type.

The wiring for mains voltage shall be of the low smoke and fume halogen free (LSF) type in phase colours, utilising either, self-coloured cable, or appropriately coloured ferrules. The colour or alphanumeric coding shall be as follows:

- Phase connections - brown, black, grey or L1, L2, L3
- Neutral connections - blue or N
- Earth connections - green/yellow.

Travelling cables shall be properly supported at each end using clamps, so that the cores are not under strain at the terminals.

Travelling cables shall include at least 10% spare cores and the requisite number of earth cores. All spare cores shall be terminated in terminal blocks at each end, which shall be clearly marked "SPARE".

2.23.1.3 Galvanised Steel Conduit and Trunking

The installation of conduit shall be in accordance with the following requirements:

All conduit and trunking shall be galvanised steel. Where the protective coating has been damaged or removed, it shall be made good with two coats of zinc rich anti-corrosion paint as the work proceeds.

Flexible conduit shall be used only for connections to equipment subject to vibration or on equipment that will need to be positioned during running adjustments. It shall be metallic and the end adapters shall positively grip the flexible conduit. The length of flexible conduit shall be kept to a minimum and shall not exceed 200mm without prior permission from the Contract Administrator.

Surface mounted trunking shall be run truly horizontal or vertical. Where these requirements cannot be met, trunking shall run parallel to the building lines. Manufacturer's standard fittings shall be used for bends, angles, offsets, crossovers and other non-standard runs or connections.

The practice of cutting and bending trunking to form flanges and attachments will not be permitted.

Where trunking passes through walls, floors and ceilings, non-combustible, non-metallic fire barriers shall be installed in the trunking.

Connections to termination boxes, switchgear and distribution boards shall be made with flanged units.

To relieve cables of strain in long vertical runs, internal cable supports shall be provided at not greater than 3m intervals.

All metal frames, conduit, trunking, metal boxes and such other parts of the installation as may be necessary for safety, shall be bonded to the earth system with clips of an approved pattern.

No trunking, conduit or ducts shall run across any machinery space floors.

2.23.1.4 Machinery Space Lighting and Power

A single-phase supply, terminating in a single-pole switch fuse located in the machinery space shall be provided for each car lighting circuit, taken from the local distribution board.

Machinery space lighting shall incorporate emergency lighting to serve any control panels, hydraulic machines or other serviceable equipment.

Two twin 13 amp switched socket outlet with integral RCD protection shall be installed in the machinery space and lift pit, fed from the local distribution board. The lift pit socket outlet shall be waterproof.

2.23.1.5 Lift Well Lighting

The Trade Contractor shall provide permanent waterproof lift-well lighting with three-way switching, (two way plus intermediate) switched from the machinery space, the lift pit and from on top of the lift car.

A clearly labelled switch for operating the lift well lighting shall be provided in an easily accessible location adjacent to any pit access ladders.

All well lighting switches shall incorporate a neon indicator that operates when the switch is in the off position to facilitate location of the switch in darkness.

Luminaires shall be positioned so as to provide a minimum luminance of 50 Lux when measured at 1m above any point on the lift car roof with the car top lighting switched off. This level of lighting shall be available for the full travel of the lift car.

In the lift well, the top and bottom luminaire plus every alternate luminaire in the well shall have a self-contained emergency battery pack.

2.23.1.6 Machinery Space Heating and Ventilation
Thermostatically controlled electrical heating and cooling equipment provided by the Trade Contractor and adequate ventilation shall be provided in the machinery space as required to maintain an ambient temperature between 15°C and 35°C.

The installation shall also provide for any other limiting temperature and humidity requirements that are associated with equipment supplied by the Trade Contractor.

2.23.1.7 Lift Car Commado Socket Outlets
The Trade Contractor shall fit 2 (two) Commando socket outlets (63 amp) with integral RCD protection. These socket outlets shall be to a minimum splash proof rating of I.P.44. The location of the socket outlets shall be determined during the design development phase of the project.

3.0 HYDRAULIC LIFTS

3.1.1 General

In addition to those requirements of Section 2, which are common to both traction and hydraulic lifts, the following provisions shall be made specifically for hydraulic lifts.

3.1.2 Drive

Rucksack or cantilevered design installations shall **not** be used,

3.1.3 Cylinders

As the cylinders are located in the ground they shall not be in direct contact with the earth and shall be **fully** protected against corrosion.

The bore hole(s) shall be fusion welded, capped and lined with a primary bore hole liner(s) of steel with a secondary bore hole liner(s) constructed from a corrosion resistant, waterproof material (PVC) sufficient internal diameter to permit easy inspection of the cylinder jacket.

All necessary supports or mountings for the cylinder(s) and secondary borehole liner(s) shall be provided by the Trade Contractor.

3.1.4 Oil Storage Tanks and Power Units

The power units shall be supported on efficient anti-vibration mounts offering a vibration isolation efficiency of no less than 95% at all frequencies of forcing vibration in the range of 1 Hz to 160 Hz or as required to achieve the requirements of clause 2.3.7.

The oil storage tanks shall be of sufficient capacity for the full travel of the car with a reserve of not less than 50 litres and shall have a drain connection and means of isolating the oil in the tank for servicing of the pump and any valves.

The cover shall be designed for low velocity breathing with a protected vent opening to prevent entry of liquids or debris into the tanks.

The pump units shall incorporate an efficient filter at its inlet and where necessary, shut off valves shall be provided to enable replacement with minimum oil loss.

A clearly visible, oil level gauge, marked with minimum and maximum levels shall be provided on the side of each tank unit.

Engraved data plates shall be affixed to each tank providing full particulars of the power unit and of the correct oil to be used in the system.

An efficient silencer shall be installed in the hydraulic line between the pumps and cylinders, to minimise both the transmission of pulsation from the pump and the emission of airborne noise.

Provision shall be made for the emergency manual raising and lowering of the car. This device shall be clearly identified and marked with its operating instructions.

Bund tanks shall be provided to each hydraulic oil storage tank.

3.1.5 Electronic Control Valves

The hydraulic system shall incorporate any electronic closed loop control valves necessary to ensure the specified performance, noise and vibration levels. A visual pressure gauge with shut-off valve shall be provided on each valve.

3.1.6 Pipe Rupture Valve

The installation incorporates more than one rupture valve, the rupture valves shall be 'pilot' interconnected to ensure simultaneous operation.

3.1.7 Hydraulic System

All piping shall be effectively isolated from the building structure to minimise the transmission of vibration.

Hydraulic rubber hose shall only be used where rigid steel piping would be unsuitable and where adequate precautions are taken to prevent chafing. Each hose and pipe assembly shall be indelibly marked with the manufacturer's identification.

Steel piping shall not be used on the connection to the valve block.

3.1.8 Pit Props or Stop Blocks

Means shall be provided to enable the car to be held at least 5.0m above the pit floor to ensure that work beneath the car can be carried out in safety. Pit props or stop blocks shall be painted safety yellow and stored in a suitable location to facilitate ease of use. Locating points on the pit floor and the underside of the lift car shall be clearly indicated and instruction provided for the correct installation of the props.

3.1.9 Oil Coolers

The hydraulic system shall be capable of reliable operation at the rated duty i.e. the maximum number of motor starts per hour detailed in the Schedules.

Where necessary the Trade Contractor shall install oil coolers to meet this requirement.

Water cooling systems will **not** be accepted.

3.1.10 Oil

Only specially prepared vegetable or biodegradable hydraulic oil with greater than 200°C flash point shall be used in the hydraulic system.

The oil, specification and quantities shall be stated on a permanent engraved label securely fixed to each oil reservoir tank.

3.1.11 Pawl Device

An electro-mechanical device for stopping involuntary ascent/descent of the lift car, and maintaining it stationary on fixed supports will be provided for this lift. When the device is in place the lift car will not experience any vibration associated with loading.

The device will be automatically operated by the lift controller. It will be automatic on all operations of the lift.

Multiple pawl devices shall be fitted to the lift car to prevent the lift car from sinking during loading and unloading whilst at floor level.

3.2 Lift Operation Sequence – Lift Below Pavement Level Travelling To/From Pavement – Call Lift to Pavement Level

a. Security zone around lift to be clear of persons, vehicles, goods and animals.

b. Security zone is proved by automatically scanning PIR's before and during operation – detail to be agreed.

c. When security zone is proved safe, a flashing beacon illuminates and movement sounder activates until lift is in final position.

d. A pavement call station is activated (remote control, key switch or pendant operation) – detail to be agreed.

e. Lift moves up to "locating Pins" to underside of pavement lid, lift stops to locate pins – detail to be agreed.

f. When pavement lid "locating Pins" are proved mechanically/electrically the lift completes its travel by lifting the pavement lid.

g. When the lift is at pavement level and floor pawls activated, the car shutter door's can be opened manually.

h. The lorry can now reverse into the lift. A series of traffic lights and sensors will ensure lorry is safely in lift.

i. The car doors can now be closed manually and floor call placed – lorry engine must be switched off.

j. The security zone is proved (a) (b) and (c).

k. The reverse control procedure is adopted (g),(f),(e) and (d).

l. Lorry or passengers can exit lift at lower level.

When the lift is required to operate between levels B3, and 00 its operation is as a conventional cargo lift, as it is not required to lift the 'pavement lid'

3.3 Preferred Supplies

Cylnder/Rams	Bucher	BZH
Valves	Bucher	VF
Power Units	Bucher	UC 1400
Invertor	Bucher	SP 4402
Controller	Liftstore	Ethos
Car/landing Gates	Bolton *Gate* Co	Eurofold – *Power Assisted*
Pushes	*Liftstore*	US 89
Indicators	*C E Electronics*	Sentry-Led
TFT Screens	C E Electronics	*TFT-LCD*
Hands Free Telephone	Commend	Auto Dialler
Car Frame	Innovation Lifts	Heavy Duty
Car Interior	Innovation Lifts	Vandal Resistant

4.0 SCHEDULES

4.1 Basic Requirements

4.1.1 Lift Details

Lift Reference No.	Lorry	Lift Group	1	Quantity	1

Description	Details	Notes
Lift type	Lorry	Lift will also move pavement automatically
Capacity	42 tonne	
Internal car width	4500 mm	
Internal car depth	18600 mm	
Internal car height	4700 mm	
Mass of applied lift car finishes	41 tonne	Including pavement lid
Rated speed	0.10 m/s	
Travel	16.725 m	
Total number of stops	6	
Number of landing entrances	9	Refer to Contract Administrators drawings
Power / Drive system	DA HYD	4 direct acting rams
Motor starts per hour	10	
Control System	Simplex	With full security control
Levelling accuracy	5 ±mm	Pawl devices to be fitted
3 phase mains supply voltage	400 Volts	
Single phase supply voltage	230 Volts	
Counterweight safety gear required	N/A	
Ventilation fan required	Yes	4 fans required
Climate control required	No	
Car to Car rescue required	N/A	
Works tests and inspection required	Yes	Car and control systems

Additional notes and special requirements:

- The lift is to be provided with electronic pawl devices to ensure accurate floor levelling during loading and unloading operations at all levels.
- Car doors to be 4500mm high (clear).
- Platform lid to have a U Value of 0.18 w/m^2/K.

4.1.2 Construction and Entrance Details

Lift Reference No.	Lorry	Lift Group	1	Quantity	1

Description	Details	Notes
Lift well width	6000 mm	Refer to Contract Administrators drawings
Lift well depth	19500 mm	Refer to Contract Administrators drawings
Well headroom	N/A	
Well pit depth	3500 mm	Refer to Contract Administrators drawings
Lift well construction details	-	Refer to Contract Administrators drawing 0152
Machinery space location	Side	At level B3
Machinery space width	-	Refer to Contract Administrators drawing 0152
Machinery space depth	-	Refer to Contract Administrators drawing 0152
Machinery space height	-	Refer to Contract Administrators drawing 0152
Machinery space construction details	-	Refer to Contract Administrators drawing 0152
Number of car operating panels in lift car	4	Linier strip and conventional
Number of car entrances	3	
Door type / configuration	Manual	Folding shutter doors – *power assisted*
Pre-opening	N/A	
Door opening	N/A	
Door Closing	N/A	
Vision Panels Required (Y/N)	Yes	
Certified Landing door fire rating	2 Hours	
Clear door opening width	-	Refer to Contract Administrators drawings 0152/3/4 & 6
Clear door opening height (car)	4500 mm	
Number of landing push button risers *	3/Floor	Refer to Contract Administrators drawing 0152/3/4/ & 6

Additional notes and special requirements:

- Landing Door Clear Heights
  0 – 4500mm
  B1 – 3325mm
  B2 – 3175mm
  B3 – 2750mm
- There is a requirement for landing pendant hand control of the lift so that the bed of the lorry is level with the finished floor level at all levels. The pawl devices shall **NOT** be operational during hand control

* The landing control station at Level 02 and 02A is to be of a remote control type – the Trade Contractor is to allow for ten (10) programmed remote control devices to be issued to the museum.

4.1.3 Schedule of floor levels, service and landing indicators

Lift Reference No.	Lorry	**Lift Group**	1	**Quantity**	1

Floor Designation	Height or level	Served	Position indicator fitted	Direction arrows	Comments
02	27.8	Yes	No	No	Pavement Level
02A	27.20	Yes	No	No	Street Level
00	21.7	Yes	Yes	Yes	Logistics Level
B1	17.875	Yes	Yes	Yes	Collection Storage
B2	14.225	Yes	Yes	Yes	Collection Storage
B3	11.075	Yes	Yes	Yes	Collection Storage
Pit	07.575	No	No	No	

Additional notes and special requirements:

- Trade Contractor to provide car “moving” siren and flashing beacon. To be provided when lift travels to pavement level.
- Trade Contractor to provide 8 security (automatic) PIR’s protection to pavement level on 8 automatic retractable posts, which will also contain flashing beacons and sirens.
- Service to street level (27.20) is from captive spring loaded key switch in car and by remote control (See 4.1.2).

4.2 Finishes Schedule

4.2.1 Lift car interior

Lift Reference No.	Lorry	**Lift Group**	1	**Quantity**	1

Full mock up of lift car required	**Yes**	

Component	Material	Finish	Pattern	Colour	Type
Lift car ceiling	ST/ST	Linen	-	-	316 Grade
Lift car lighting	Flush	-	VR	LED	IP 64
Lift car front wall / entrance return	ST/ST	Linen	-	-	316 Grade
Lift car left side wall (Top)	ST/ST	Linen	-	-	316 Grade
Lift car left side wall (Bottom)	ST/ST	Linen	-	-	316 Grade
Lift car right side wall (Top)	ST/ST	Linen	-	-	316 Grade
Lift car right side wall (Bottom)	ST/ST	Linen	-	-	316 Grade
Lift car rear wall (Top)	ST/ST	Linen	-	-	316 Grade
Lift car rear wall (Bottom)	ST/ST	Linen	-	-	316 Grade
Handrail (Left side)	ST/ST	Linen	-		N/A
Handrail (Right side)	N/A	-	-	-	N/A
Handrail (Rear)	N/A	-	-	-	N/A
Rubbing rails (Left side)	Timber	Natural	-	-	Hardwood
Rubbing rails (Right side)	Timber	Natural	-	-	Hardwood
Rubbing rails (Rear)	Timber	Natural	-	-	Hardwood
Skirting / Kick plate	ST/ST	C/Plate	-	-	316Grade
Lift car flooring *	ST/ST	C/Plate	Planks	-	316 Grade
Lift car door(s)	Steel	Galvanised	STD	Galvanised	STD
Car door vision panel(s)	Glass	Clear	-	Clear	Laminated
Lift car sill	ST/ST	STD	H/Duty	-	Trucking

Additional notes and special requirements:

VR = Vandal Resistant.

- Car floor has a watertight drain sump 300 x 18000 x 300 with a grill cover. Finished in 316 stainless steel.
- The lift car and landings will be provided with a twin traffic light safety system with photocell activation – provided and installed by the Trade Contractor.
- The lift car exterior shall be galvanised steel.
- Car to have 2 sets of “Commando Type” socket outlets fitted.

4.2.2 Landing entrances, controls and shaft equipment

Lift Reference No.	Lorry	**Lift Group**	1	**Quantity**	1

Component	Material	Finish	Pattern	Colour	Type
Landing entrance trims	ST/ST	Linen	-	-	316 Grade
Landing doors	Steel	Galvanised	STD	Galvanised	STD
Landing door vision panels	Glass	Clear	-	Clear	Laminated
Landing sills	ST/ST	STD	H/Duty	-	Trucking
Car operating panel(s)	ST/ST	Brushed	240 Grit	-	316 Grade
Car push buttons	ST/ST	STD	VR	STD	Linear Strip
Car position indicators	TFT	STD	STD	Colour	LD 100C
Car position indicator plates	ST/ST	Brushed	240 Grit	-	316 Grade
Key switches in car	ST/ST	STD	VR	-	KABA – Security
Landing push buttons	ST/ST	STD	VR	STD	US89
Landing push button plates	ST/ST	Brushed	240 Grit	-	316 Grade
Landing position indicators	LCD	STD	STD	Yellow	STD
Landing indicator plates	ST/ST	Brushed	240 grit	-	316 Grade
Car roof balustrades	Steel	Galvanised	-	Yellow	STD

Additional notes and special requirements:

- VR = Vandal Resistant.
- Trade Contractor to design fabricated and install “Pavement Lid”, others to provide stone pavers to be agreed during design development phase of the project.
- Trade Contractor to allow for four (4) Tft screens (LD 100C) in the lift car.
- Trade Contractor to provide a finishes tray to the ‘Pavement Lid’, to enable the finishes surface to be fitted ‘by others’.
- The ‘Pavement Lid’ shall have the deflection tolerances as detailed in this specification.
- The Trade Contractor shall provide 2 (two) plug-in pendant control stations at each landing for inching of lift car (see Clause 4.1.2).
- The lift car is to be provided with 4 flush fitting stainless steel cubicles for fire extinguishers.

4.3 Schedule of Related Works

4.3.1 General and Builders works

This section identifies related works and the parties responsible for provision or action of each element is necessary.

Lift Reference No.	Lorry	Lift Group	1	Quantity	1

Requirements	Required	To be supplied or actioned by:
Unloading, provision of storage space on site, and placing of heavy equipment in required positions on site.	Yes	Trade Contractor
All builders work such as cutting away and making good.	Yes	Trade Contractor
Dust proofing of lift well walls pit and ceiling; to include 2 coats of oil proof floor paint to the lift pit and walls up to the height of the first landing sill and 2 coats of dust inhibiting emulsion to the walls and ceiling of the lift well.	Yes	Trade Contractor
Painting of machine room; to include 2 coats of oil proof floor paint to the machine room floor and 2 coats of dust inhibiting emulsion to the walls and ceiling of the machine room.	Yes	Trade Contractor
Provision and installation of all primary supporting steelwork, to include well beams landing entrance support steelwork and pavement lid.	Yes	Trade Contractor
Provision and installation of all secondary steelwork to include machine beams and any fixing brackets between lift equipment and primary steelwork.	Yes	Trade Contractor
Provision of bund wall in Lift Machine Room	Yes	Trade Contractor
Provision and installation of lifting beams.	Yes	Trade Contractor
Testing and marking with S.W.L. of lifting beams.	Yes	Trade Contractor
Provision and fixing of structural fixing bolts. Provision of inserts.	Yes	Trade Contractor
Installation of inserts.	Yes	Trade Contractor
Provision of grilles or gratings to ventilation apertures, pit sumps, or any other opening in the lift well.	Yes	Trade Contractor
To ensure lift sills are compatible with finished floor datum levels.	Yes	Trade Contractor
Temporary guarding of lift wells.	Yes	Trade Contractor
Provision of access doors and trap doors with locks to EN81 or other relevant National, Regional or Local codes, standards and legislation.	Yes	Trade Contractor
Provision, erection and striking of all scaffolding as required for installation purposes.	Yes	Trade Contractor
Provision and installation of pit access ladders.	Yes	Trade Contractor
The provision and installation of all heating, ventilation, lighting and socket outlets in the lift machinery spaces.	Yes	Trade Contractor

4.3.2 Electrical Works

Lift Reference No.	Lorry	Lift Group	1	Quantity	1

Requirements	Required	To be supplied or actioned by:
Provision and maintenance of temporary lighting and power for mechanical tools, testing and equipment, etc.	Yes	Trade Contractor
The provision of an electrical supply, terminating in the form of a switch disconnector to machine.	Yes	Trade Contractor
The provision of a single-phase supply and an isolator feeding a consumer unit in machinery space to serve the lift car, well and machinery space lighting and socket outlets, etc.	Yes	Trade Contractor
Provision and installation of interconnecting wiring, supports and restraint between the machinery spaces and remote locations of associated lift equipment (remote monitoring, building life support systems weather station etc	Yes	Trade Contractor
The provision and installation of well lighting and lift pit sockets	Yes	Trade Contractor
The provision and installation of lift pit water sensor.	Yes	Trade Contractor
The provision and installation of machinery space lighting	Yes	Trade Contractor
Provision of secondary borehole liner	Yes	Trade Contractor
Provision of weather station	Yes	Trade Contractor
Provision of smoke detectors in lift car and lift shaft	Yes	Trade Contractor

4.4 Lift Equipment Painting Colour and Finishes Schedule

4.4.1 Car and Landing Equipment

The colour and finish to equipment will be manufacturer's standard unless indicated otherwise in the schedule below.

Lift Reference No.	Lorry	Lift Group	1	Quantity	1

Equipment	Colour	Finish	Comments
Car doors	STD	Galvanised	
Car doors - top track assembly *	STD	-	
Car door toe guard *	RAL	1026	
Lift car platform *	RAL	3020	
Car sling *	RAL	3020	
Car roof balustrades *	STD	-	
Landing doors	STD	Galvanised	
Landing doors - top track assembly *	STD	-	
Landing fascia panels/toe guards *	STD	Galvanised	

Additional notes and special requirements:

* All steelwork to be galvanised.

4.4.2 Machine Room Equipment

Lift Reference No.	Lorry	Lift Group	1	Quantity	1

Equipment	Colour	Finish	Comments
Hydraulic Tank	STD	-	
Machinery guards	N/A	-	
Machine room handrails & ladders	N/A	-	
Control panels	STD	-	
Machine & lift well trunking	STD	-	Galvanised
Lift motor room - floor	RED	Gloss	Floor Paint
Lift motor room - walls	WHITE	Matt	Wall Paint
Lift motor room - ceiling	WHITE	Matt	Wall Paint

4.4.3 Lift Shaft Equipment

Lift Reference No.	Lorry	Lift Group	1	Quantity	1

Equipment	Colour	Finish	Comments
Pit ladder *	RAL	1026	
Guide rails *	STD	-	Galvanised
Guide brackets *	RAL	3020	
Well steels *	N/A	-	
Well screens *	STD	-	
Steelworks *	RAL	3020	
Guide footing & buffer stools *	STD	-	
Buffers	STD	-	
Lift pit	RED	Gloss	Floor Paint
Lift well	WHITE	Matt	Wall Paint
Well brackets *	RAL	3020	
Lift car brackets *	RAL	3020	
Hydraulic cylinder	STD	-	
Hydraulic cylinder support steelwork	STD	-	
Hydraulic pipes	STD	-	

Additional notes and special requirements:

* All steelwork to be galvanised.

4.5 Commercial Information Required At Tender Stage

4.5.1 Programme Requirements

Based upon the 'Date for Commencement' and the 'Time for Completion', shown in the Appendix to the Form of Tender of Contract Works, the Trade Contractor is required to complete the following programme of events:

Lift Reference No.	Lorry	**Lift Group**	1	**Quantity**	1

Design, Procurement and manufacturing programme	
Agree construction programme and hand over of structure for commencement of installation by:	Date:
General Arrangement and Builders Work Drawings to be submitted by:	Date:
Comment on General Arrangement and Builders Work Drawings required by:	Date:
Samples, illustrations and finishes to be submitted by:	Date:
Comments on the above required by:	Date:
Power supply to be made available by:	Date:
Delivery of all materials to site by:	Date:
Overall Programme duration	
Procurement and manufacturing period:	Weeks:
Installation period:	Weeks:
Commissioning period:	Weeks:
Total elapsed period:	Weeks:

Additional notes and special requirements:

4.6 Schedule Of Maintenance Costs

The Trade Contractor shall complete the following Schedule of Rates to carry out the works detailed in the Specification.

Lift Reference No.	Lorry	**Lift Group**	1	**Quantity**	1

Post Defects Liability Period: Comprehensive Maintenance Contract Annual Contract Prices per lift.	**Duration**	**Annual cost**
	One Year	£
	Two Years	£
	Five Years	£
	Ten Years	£
	Twenty Years	£
Formula for Variation of Cost with Time		

Schedule of rates	**Cost per hour**
Hourly Team Rate	£
Standard Team Rate	£
Premium Time Team Rate	£
Saturdays	£
Sundays	£
Bank Holidays	£
Standby Team Rate	£
Travelling Time Team Rate	£

Additional notes and special requirements:

4.6.1 Hydraulic Lifts - Car and Landing Equipment

Lift Reference No.	Lorry	Lift Group	1	Quantity	1

Component	Details	Life Expectancy (Years)	Country of origin	Comments
Door manufacturer				
Door type / model				
Landing door lock manufacturer				
Landing door lock type / model				
Lift car bodywork / finishes fabricator				
Push button manufacturer				
Push button type / model				
Landing and car indicator manufacturer				
Landing and car indicator type / model				

4.6.2 Hydraulic Lifts - Machine Room Equipment

Lift Reference No.	Lorry	Lift Group	1	Quantity	1

Component	Details	Life Expectancy (Years)	Country of origin	Comments
Mains starting current (Full load up)	(A)			
Mains running current (Full load up)	(A)			
Protective device rating (3 phase supply)	(A)			
Pump motor manufacturer				
Pump motor type / model				
Pump motor rated starts per hour				
Rated power at full load	(kW)			
Pump manufacturer				
Pump type / model				
Silencer manufacturer				
Silencer type / model				
Oil cooler manufacturer				
Oil cooler type / model				
Hydraulic hose type				
Hydraulic hose external diameter	(mm)			
Total heat generated at rated duty cycle	(kW)			
Electronic control valve manufacturer				
Electronic Control Valve type / model				
Oil manufacturer				
Oil type / specification				
Controller manufacturer				
Controller type / model				

4.6.3 Hydraulic Lifts - Lift Shaft Equipment

Lift Reference No.	Lorry	Lift Group	1	Quantity	1

Component	Details	Life Expectancy (Years)	Country of origin	Comments
Cylinder / ram manufacturer				
Cylinder / ram type / model				
Pipe rupture valve manufacturer				
Number of cylinders / rams				
Diameter of ram	(mm)			
Diameter of cylinder	(mm)			
Guide rail manufacturer				
Car guide rail section				
Bore hole internal diameter	(mm)			
Primary bore hole liner material				
Primary bore hole liner internal diameter	(mm)			
Primary bore hole liner external diameter	(mm)			
Secondary bore hole liner material				
Secondary bore hole liner internal diameter	(mm)			
Secondary bore hole liner external diameter	(mm)			
Buffer manufacturer				
Car buffer type / model				
Travelling cable manufacturer				
Travelling cable type / model				
Pawl device manufacturer				
Pawl device type				