
TABLE OF CONTENTS

2.1	<i>GENERAL</i>	1
2.2	DRAWINGS	1
2.2.1	Tender Drawings	1
2.2.2	Drawings to be Provided by the Contractor	1
2.3	MATERIALS	3
2.4	STATUTORY REGULATIONS AND DESIGN CRITERIA	3
2.4.1	<i>General</i>	4
2.4.2	CDM Regulations	5
2.4.3	Hazard Identification	6
2.4.4	Risk Assessment and Method Statements	7
2.4.5	Regulations and Standards	7
2.5	MILLENNIUM	7
2.6	DESIGN RESPONSIBILITY	7
2.7	DESIGN CRITERIA	7
2.7.1	Reliability of Equipment/Systems	8
2.7.2	Maintenance Aspects	8
2.7.3	Energy Efficiency	8
2.7.4	Capital Cost	8
2.7.5	Plant/Equipment 'Life' Spans	8
2.7.6	System Efficiencies (at Full Load and Part Load Operation)	8
2.8	BUILDER'S WORK DETAILS AND DRAWINGS	9
2.9	INSTRUCTION	9
2.10	ELECTRICAL PLANT AND APPARATUS	9
2.11	SWITCHGEAR	9
2.12	CONDUIT AND FITTINGS	10
2.13	FLEXIBLE CONDUIT	12
2.14	CABLE TRUNKING	12
2.15	PVC CONDUIT AND TRUNKING	13
2.16	PLASTIC TRUNKING AND DUCTING	14
2.17	<i>CABLES</i>	14
2.18	METHODS OF INSTALLATION	15
2.19	<i>LUMINAIRES</i>	16
2.20	LIGHTING WIRING	17

2.21	ERECTION OF LUMINAIRES	17
2.22	CEILING ROSES	18
2.23	LAMPHOLDERS	18
2.24	LAMPS	18
2.25	LOCAL LIGHTING SWITCHES	18
2.26	SOCKET OUTLET INSTALLATIONS ·GENERAL	19
2.27	30 AMP SOCKET OUTLETS	19
2.28	15, 13 AND 5 AMP SOCKET OUTLETS	19
2.29	FUSED CONNECTION UNIT/FINAL CONNECTIONS	20
2.30	ISOLATORS FOR FIXED APPLIANCES	20
2.31	GENERAL FIXING	20
2.32	CIRCUIT IDENTIFICATION	21
2.33	DOOR ENTRY SYSTEMS	22
2.33.1	General	22
2.33.2	Mode of Operation	22
2.33.3	Main Entrance Station	23
2.33.4	Supplier of Door Entry Equipment	23
2.33.5	<i>Lock Release Override Switch (Fireman's Switch)</i>	23
2.33.6	Mains Wiring to Control Unit	24
2.33.7	Low Voltage Wiring to Mains Control Unit	24
2.33.8	<i>Electric Lock Release (Fail Safe Type)</i>	24
2.33.9	Aids for Disabled Persons	24
2.33.10	Entrance Panel in Stainless Steel	24
2.33.11	Secondary Fixing Plates	25
2.33.12	Microphone Amplifier Unit	25
2.33.13	Apartment Station/Handsets	25
2.33.14	Main Control Unit	26
2.33.15	Door Open Alarm Sounder	26
2.33.16	General Standards	26
2.33.17	General- Wiring for Door Entry System	27
2.33.18	Locks and Fob Reader	28
2.34	DOORS AND SCREENS	28
2.34.1	General	28
2.34.2	Graded Security Door Specification	29
2.35	STEELWORK	30
2.35.1	General Requirements/Information	30
2.35.2	Welding	32
2.35.3	Bolt Assemblies	32
2.35.4	<i>Erection</i>	33

•

2.35.5 General Requirements for Protective Coating Work
2.35.6 Protective Coating *System(s)*

33
34

SECTION 2

GENERAL SPECIFICATION

2.1 GENERAL

This part of the Specification and the Particular Specification in Section 3 indicate the requirements, quality and standard of the Electrical Services section of the Works. However, the Contractor shall inspect the Specification and Drawings and should anything have been omitted therefrom, which is necessary for the due and proper completion of the Works, the Contractor shall either clarify the same before submitting his tender or execute the same as if it had been specified or shown without the additional payment being claimed for such work.

The clauses in this part of the Specification cover all items which are generally standard in this type of installation, while Section 3 of the Specification, the Particular Specification, covers the materials and method to be used in the Works, Sections 2 and 3 are to be read as one.

2.2 DRAWINGS

2.2.1 Tender Drawings

The Contract Administrator will provide design drawings necessary for the placing of the Contract. These drawings will be known as tender drawings. The tender drawings will together with this Specification provide outline design information and have been used for the allocation of plant space and structural provision.

The positions of all fittings, equipment, plant, apparatus, etc., indicated on the drawings are intended to indicate generally the arrangements of the Works under this Contract. The Contractor shall be responsible for setting-out the whole of the Works in relation to the Works of any other tradesmen. If during the progress of the Works any error shall appear or arise in the position, levels, or dimensions of several Works, the Contractor shall disconnect and alter the Works at his own expense and to the satisfaction of the Contract Administrator if required to do so.

In the event of any discrepancy between the tender drawings and the Particular Specification the Particular Specification shall be given precedence.

2.2.2 Drawings to be Provided by the Contractor

The Contractor is to carry out any design and drawing work (*additional to that incorporated in the documentation provided by the Employer for tender purposes*) which is necessary to ensure the suitability, compatibility and correct location within the system. (*This shall include sizing of cables and trunking where sizes are not specifically state!*).

Drawings necessary for accurately and properly carrying out the Works shall be prepared by the Contractor for the Contract Administrator's approval. The Contractor shall amend these drawings from time to time as necessary and shall be responsible for their accuracy.

The Contractor shall allow for providing sufficient numbers of dye line prints to all interested parties.

All drawings shall be prepared in sufficient time to be approved and issued to suit the Contractor's phasing and programme of work. Any delay in preparing these drawings resulting in extra costs for cutting away, altering or reinstating will be the responsibility of the Contractor.

The following drawings shall be prepared by the Contractor :

- a. The Contractor shall provide all the necessary production drawings or details which must be approved before the work is put in hand.

Where the Contractor is installing several services in the vicinity of one another, he shall be responsible for determining the most suitable position for each service. In positions where any other services are to be installed in the vicinity of services to be installed by the Contractor he shall co-operate with any others to determine the position where each service shall be installed and to indicate on his drawings.

Composite and detail wiring diagrams for all controls and wiring required for equipment and plant provided under this Contract shall be provided by the Contractor.

A schedule containing the rating of all items, shall be prepared by the Contractor showing the correct fuse rating.

- b. Manufacturers' drawings - The Contractor shall submit to the Contract Administrator for comment all drawings showing construction and dimensions of fences, railings, gates, doors, door entry equipment. locations and the like.
- c. Variation drawings - The Contractor shall prepare all necessary variation drawings as a. above, in addition to which he shall keep on site a full set of drawings altered in red ink as a running record indication the variations authorised by the Contract Administrator or his approved representative.
- d. The Contractor shall also submit the following drawings :

GENERAL ARRANGEMENT drawings showing the proposed arrangement of the gates and railings, the louvres and ramps., including the overall sizes and weights of all major items of equipment.

BUILDERS WORK drawings showing the details and extent of all builders work which is required for the proper installation of the systems including:

- a) core drill locations.
- b) ramp positions
- c) railing fixings.

Provide two (2) copies of each drawing submitted for comment.

2.3 MATERIALS

Except where otherwise stated or contradicted materials are to be of the best quality consistent with the character of the Works. Materials are deemed to be specific in the following order of priority unless otherwise indicated :

Complying with current British Standards and Codes of Practice.

Complying in general with British Standards and Codes of Practice of European Common Market Manufacture.

The Specification recommends, in certain instances, various manufacturers' equipment which is given as a guide to the performance and quality that will meet the requirements of the design. The Contractor is at liberty to provide alternatives which are equal in performance and specifications to those recommended.

Where the Contractor takes advantage of this choice a list should be appended to the Tender in Section 4, Equipment Manufacturers, giving the substitutes he proposed to use. Any further alternatives not indicated in the appendix will not be allowed without the written authority of the Contract Administrator and if used in the installation without approval will be removed and replaced at the Contractor's expense.

Where no recommendations are made it is incumbent on the Contractor to include a list of equipment he is proposing to use. Any additions to this list after tender shall require the approval of the Contract Administrator's approval.

It is the responsibility of the Contractor to ensure that any of his proposed alternatives shall fit within the overall building and structural design without causing any major changes. Where minor changes occur because of the Contractor's alternative, any costs arising thereto shall be at the expense of the Contractor.

The fact that particular manufacturers' equipment may be specified shall not relieve the Contractor of the liability of ensuring that such articles are in sound condition and in accordance with the appropriate clauses of the Specification before he installs them.

Branded materials are to be handled, stored, used and processes are to be carried out strictly in accordance with manufacturers' instructions and recommendations. Such materials are to be obtained direct through the manufacturers or through their accredited distributors.

The Contractor shall allow for the cost of obtaining materials from any source whatsoever as may be necessary to ensure the progress of the Works in accordance with the Contract requirements.

2.4 STATUTORY REGULATIONS AND DESIGN CRITERIA

The Works carried out under this Contract and the Administration of the Contract by the Contractor shall be carried out in full compliance with the current requirements of the appropriate Statutory Regulations, Local Authority Bye-Laws and any requirements of Public Utility Authorities, Fire Authorities and Building Control.

2.4.1 General

Particular attention is drawn to the following which lists relevant statutory instruments, regulations and standards. The list is not exhaustive and any omissions from the list does not exonerate the Contractor from his duties under his duty of care.

1. The Health and Safety at Work etc. Act 1974.
2. The Management of Health and Safety Works Regulations 1992.
3. The Workplace (Health, Safety and Welfare) Regulations 1992.
4. The Provisions and Use of Work Equipment Regulations 1992.
5. The Manual Handling Operations Regulations 1992.
6. The Health & Safety (Display Screen Equipment) Regulations 1992.
7. The Personal Protective Equipment at Work Regulations 1992.
8. The Factories Act 1961.
9. The Offices, Shops and Railways Premises Act 1963.
10. The Fire Precautions Act 1971.
11. The Control of Substances Hazardous to Health Regulations 1988.
12. The Electricity at Work Regulations 1989.
13. The Noise at Work Regulations 1989.
14. The Abrasive Wheels Regulations 1970.
15. The Health and Safety (First-Aid) Regulations 1981.
16. The Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 1972.
17. The Highly Flammable Liquids and Liquefied Petroleum Gases Regulations 1972.
18. The Safety Representative and Safety Committees Regulations 1977.
19. The Safety Sign Regulations 1980.
20. The Health and Safety Information for Employees Regulations 1977.
21. The Gas Safety (Installation and Use) Regulations 1994.
22. The Control of Asbestos at Work Regulations 1987, amended 1992.
23. The Construction, Design and Management Regulations 1994.
24. British Standards and Codes of Practice.

-
25. Model Water Bye-Laws.
 26. Building Regulations.
 27. IEE Regulations for Electrical Installations, 16th Edition (BS 7671) including all amendments up to the date of the Contract.
 28. Local Bye-Laws (including Fire Officer's requirement).
 29. Trade Association Recommendations, such as - Heating Ventilation Contractors Association Recommendations.
 30. CIBSE Recommendations.
 31. Water Fittings and Materials Directory.
 32. Employers Site Access and Security Regulations.

The Contractor shall comply with :

- i. Requirements of the London Fire and Civil Defence Authority (LFCDA).
- ii. All Standards referred to within this Specification.
- iii. CJBSE Publications.
- iv. European Lifts Directive- 95/16/EC.
- v. European Standard EN 81.
- vi. Fire Prevention on Construction Site - Fire and Safety in Section 20 Building.
- vii. The Construction/General Provisions (Lifting Operations) (Working Places) Health & Welfare Regulations.
- viii. Regulations under the Electricity Acts.
- ix. The Lifts Regulations 1997 (SI1997 No. 831).

2.4.2 COM Regulations

Comply with The Construction (*Design and Management*) Regulations 1994 in respect of the duties and power of the Principal Contractor under the Regulations.

Allow for allocating adequate resources to ensure compliance with and implementation of the Regulations under the supervision of a competent person experienced in the requirements of all matters related to Health and Safety at Work.

Allow for developing and implementing the Health and Safety Plan in relation to the works on site ensuring it always reflects the current situation and on Practical Completion of the Contract the completed document, including any relevant supporting documentation is handed to the Planning Supervisor.

Allow for ensuring all Sub-Contractors whether domestic or nominated and all site operatives and other persons authorised to be on site are aware of and comply with the requirements of the Health and Safety Plan.

Allow for ensuring all information which should be included in the Health and Safety File is provided to the Planning Supervisor. Such information shall include all relevant data obtainable from Sub-Contractors whether domestic or nominated and all suppliers.

2.4.3 Hazard Identification

The potential hazards to be considered may include, amongst others :

Dangerous substances, i.e. corrosive, irritant, flammable, explosive, toxic, harmful, oxidising substances and specifically asbestos, legionellae and lead.

Electricity at Work.

Tools (power and hand tools).

Working at heights (e.g. ladders, scaffold, towers, roofs, etc.).

Falling objects.

Manual handling (lifting, carrying, pulling, pushing).

Hot work.

Pressure systems (air handlers, compressors, gas cylinders, etc.).

Confined spaces (sewers, trenches, etc.).

Fire and explosion

Smoking.

Waste.

Pollution.

Noise.

Vibration.

Radiation.

Natural Gas.

Bomb.

Drugs and Alcohol.

P.C.B.s.

2.4.4 Risk Assessment and Method Statements

In order to comply with the requirements of the Health and Safety at Work etc. Act 1974 and the Construction (Design and Management) Regulations 1994, the Contractor will be required to provide suitable and sufficient :

- a. written risk assessments
- b. specific method statements
- c. safe systems of work
- d. personnel protective equipment.

All as deemed necessary by the Employer/Contract Administrator.

NOTE: The various Standards and Regulations referred to in the Technical section of this Specification are also mandatory.

The Works shall be completed using the best current practices in order to produce a first class installation. The work carried out shall at all times be adequately and effectively supervised and at no time shall the ratio of unskilled to skilled operatives exceed that given by the National agreements for the Contracting Industry. All skilled operatives shall be J.I.B. registered.

2.4.5 Regulations and Standards

The materials and completed installations shall conform to all relevant British Statutory instruments, Regulations, and Codes of Practice together with all relevant British Standards which relate specifically to these works.:

2.5 MILLENNIUM

The Contractor shall ensure that all equipment supplied under this Contract will not fail or malfunction due to time related anomalies at the millennium. The Contractor shall contact all his suppliers to confirm that their equipment is millennium "proof" and report to the Project Manager. The Contractor shall note that this applies to all equipment, uniquely specified or not.

For a definition of Year 2000 refer to Disc PD 2000-1 : 1998.

2.6 DESIGN RESPONSIBILITY

The Contractor shall adopt responsibility for the integrity of the installations and for achieving or surpassing the design and performance criteria for all systems, components, plant, equipment, fittings, accessories, constituent materials and fixings of the installations. The Contractor may employ Specialists with regard to meeting the technical and other aspects of the Employer's Requirements.

2.7 DESIGN CRITERIA

The Contractor shall be responsible for ensuring the design and the selection of equipment meets the functional requirements as indicated within the documentation and includes for all features included in this specification.

The design of the installation should include consideration of the following factors :

Reliability of equipment

Maintenance aspects

Energy efficiency

Capital costs

Running costs

Plant/Equipment 'life' spans

2.7.1 Reliability of Equipment/Systems

The installation is generally to an area that is operational 24 hours a day, 365 days a year operation. The Contractor shall ensure that all equipment/system selection have proven reliability in use with minimum failure statistics.

2.7.2 Maintenance Aspects

Systems design and equipment shall ensure minimal associated maintenance requirements

2.7.3 Energy Efficiency

Equipment shall be designed to achieve maximum economic utilisation of energy/under full and part load operation.

2.7.4 Capital Cost

There are particular manufacturers of plant which offer good to excellent plant in terms of reliability and life-span, but at a capital cost premium.

The benefits to the Employer of items attracting a high capital cost shall be clearly identified such that the Employer can apply the appropriate judgement/directive as to the inclusion of the proposal within the scheme.

2.7.5 Plant/Equipment 'Life' Spans

Plant/equipment shall be designed/selected to obtain the best 'life' cycles. The 24 hour a day/365 days a year operation of the building shall also be taken into consideration when selecting plant equipment/systems. The system shall be designed to operate at maximum efficiencies throughout the full life cycle of the plant/equipment. The Contractor may be required to define the optimum 'life cycle' of all equipment and its effect on the overall system and the associated maintenance requirements to achieve the overall life cycle.

2.7.6 System Efficiencies (at Full Load and Part Load Operation)

Individual items of equipment shall be selected such as to maximise the overall system efficiency. Plant/equipment shall be selected at or near the maximum efficiency of the component taking into consideration any future growth requirements.

2.8 BUILDER'S WORK DETAILS AND DRAWINGS

The Installer shall provide all builder's work details such as holes, fixings, inserts, fixtures, steels, beams, openings, etc. on fully dimensioned drawings.

The Installer shall provide these drawings within 2 weeks of nomination to meet the requirements of the project construction programme.

2.9 INSTRUCTION

Include for the instruction of selected members of the Employer's staff to fully acquaint them with the correct operation and routine maintenance of the equipment

Instruction of the Employer's staff will take place on site following satisfactory completion of the witness tests.

2.10 ELECTRICAL PLANT AND APPARATUS

The Contractor shall ensure that all plant and apparatus for incorporation in the Works, complies with this Specification, is in new condition when received at Site, is protected from damage prior to installation and is left clean and in good condition when installed.

The position of all plant and apparatus shall be marked by the Contractor and the position agreed by the Employer or the Contract Administrator before the plant and apparatus is fixed.

All plant and apparatus shall be suitable for operation on a supply system of 230V single phase 50Hz or 400V three phase 50Hz as appropriate and the Contractor is to confirm the voltages when ordering the plant. For motive power single phase plant will not be allowed for rates duties of 0.75 kW and above.

2.11 SWITCHGEAR

Fuse switches and switches shall be manufactured from rust protected sheet steel and be finished in stove enamel. They shall have removable top and bottom end plates, have gasketed doors and comply with BS 5419.

Distribution boards shall be fully shrouded type to comply with BS 5486 requirements and shall house miniature circuit breakers. A 25% spare capacity shall be provided in each distribution board.

HRC fuses to BS 88 shall be fitted in the main switchgear. The fuses shall be suitable for use on a 400/230V 50Hz A.C. system, shall have a breaking capacity of 46 kA and shall provide close excess current protection, having a fuse factor not exceeding 1.5 i.e. Class Q1.

All switchgear shall be of approved manufacture and shall be purchased from the manufacturer or his accredited distributors.

All circuit breaker distribution boards and main switchgear shall be totally enclosed metal clad in accordance with current British Standard Specifications. Finishes which may subsequently deteriorate and result in rusting when located in positions liable to dampness will not be accepted.

Distribution boards shall NOT be mounted with their centres more than 2.4m from floor level unless otherwise stated in the Drawings and/or the Particular Specification.

If the Contractor does not comply with this requirement he will be required to remove and re-fix distribution boards at the required lower level and shall re-cable the installation to the extent that is necessary, as no joints will be accepted for such alterations.

Distribution boards shall be single, double or triple pole with or without neutral as required in the Drawings and/or the Particular Specification.

Where a neutral bar is required it shall be fitted with terminals to enable neutral conductors to be connected in the same order as live conductors. In all cases the neutral terminals shall correspond in numbers to the number of single pole ways (or equivalent if a double or triple pole board).

All distribution boards shall be provided with earth bars. The number of ways on each shall be in accordance with the drawings and/or the Particular Specification and as generally described above.

All fuse switches and switch fuses shall be fitted with protected type fuses on the live pole. On the pole connected to the neutral point of the system, they shall be fitted with a substantial neutral link suitably drilled and fitted with pinching screws for outgoing cables. The various circuits controlled shall be clearly marked inside the cover.

Ample space shall be provided in enclosures and panels for wiring and any fillets for dividing purposes shall be in fireproof non-warping material.

All control gear shall be clearly labelled as specified in Clause 2.33 below to identify its function and labelling details shall correspond with schematic drawings.

2.12 CONDUIT AND FITTINGS

Solid drawn conduits shall be mild steel, galvanised, heavy gauge to BS 4568 and jointed with solid screwed couplings where exposed, elsewhere it shall be enamelled.

Surface conduits shall be fixed by means of single unit distance type saddles, spaced as indicated in the following table, and 230 mm both sides of bends and sets :

Size of Conduit	Maximum Spacing Distance
	Straight Runs
20mm	1,200 mm
32mm	1,500 mm
35mm	2,000 mm

No conduit smaller than 20 mm diameter and no manufactured elbows, bends or tees shall be used except by the express permission of the contract Administrator.

Where new conduits are to be connected to an existing imperial sized system manufactured imperial/metric adapters shall be used.

Conduits are to be run, where possible, without too much disturbance to the structure, decorations etc. in floors, roof voids, etc. and where conduits are to be buried in the finish of walls, columns or other vertical surfaces, all conduits shall run vertically only and shall be securely fixed with crampets.

Where conduit systems are installed in floor, roof or other voids a 'loop in' system using back entry 'loop in' type conduit boxes shall be used.

When conduits are run on surfaces they are to be securely fixed by means of steel hollow back spacer bar saddles, having the saddle fixed to the bar by roundhead, non-ferrous screws, so that the conduit is spaced not less than 3 mm clear of the surface.

Each conduit shall be of adequate size to ensure that the number of cables installed does not exceed the appropriate total cable factor as set out in the IEE Regulations for Electrical installation 16th Edition (BS 7671).

All boxes which form part of a conduit system shall be securely fixed to walls, etc. by means of at least one screw passing through the base of the box and all screws used for fixing conduit and accessory boxes shall be of the round head non-ferrous type.

The conduit and accessories of a conduit system shall be mechanically continuous throughout the system and shall be erected complete before the drawing in of cables is commenced. Every conduit system shall be so installed that it may be rewired without difficulty.

The inside surface of all conduit boxes and other accessories in the system shall be smooth and free from burrs. Where conduit is cut and/or threaded both internal and external burrs shall be removed before the conduit is assembled into the system.

Special care shall be taken to prevent the ingress of dirt, rubbish, plaster, concrete, etc., into the conduit system before completion of the work and where conduit plugs are not practicable, wooden plugs may be used. Paper, rags or similar such means must not be used for this purpose.

All boxes used in the conduit system, except where direct mounting lighting fittings or such similar accessory is mounted on the box shall be fitted with a purpose made lid. Flush mounted boxes shall have an overlapping lid and boxes mounted externally shall have a heavy pattern lid and moisture proof gasket.

Malleable iron circular boxes or sheet steel adaptable boxes, for inspection and to facilitate the drawing in of cables, shall be inserted in straight conduit runs at spacing not exceeding 18m and wherever the conduit has been set by the equivalent of two 90° bends.

Where bends or sets are required they shall be formed with conduit cold and without altering the cross section of the conduit. Where bending or setting is not practicable, subject to the express permission of the Contract Administrator, boxes may be used.

Wherever the finish of the conduit is damaged, during erection, cutting of threads etc. the damage shall be made good by painting with red lead or zinc rich paint after all rust or corrosion has been cleaned off.

Where conduits terminate in untapped conduit boxes or the untapped cases of distribution and/or control gear, a screwed coupler shall be fitted to the conduit, adjusted to butt tightly to the exterior of the box or case and a brass hexagonal bush screwed

through from the interior of the box or case to form a good electrical and mechanical joint. For all circuits an additional earth protective conductor of appropriate size shall be used.

Where a lubricant is used in the curing of thread this shall be a purpose made screw cutting lubricant. Mineral oils must not be used.

Couplers shall be of the heavy duty steel or malleable iron type.

Where it is necessary to run conduits adjacent to steam or hot water pipes, they shall be set below the hot pipes and shall be at least 150mm distant from the hot pipe. In cases of this being impracticable the Contract Administrator shall be consulted as to what action is to be taken.

Where conduit runs terminate in cable trunking, entries shall be made with flanged coupling, washer and hexagon male brass bush to form a good electrical and mechanical joint.

2.13 FLEXIBLE CONDUIT

Flexible conduit complying with BS 731 shall be used for the final connection of the rigid conduit installation to the terminal boxes of all plant where vibration is likely to occur.

Unless otherwise stated flexible conduit shall comprise Kopex type LS with PVC sheath or equal and approved by the Contract Administrator and it shall be terminated using approved steel glands of Kopex manufacture or similar approved. Aluminium glands will not be accepted.

Couplings and connectors with electrical threads to BS 4568 (Parts 1 and 2) shall be cadmium plated mild steel, for heavy duty use, fitted to both ends of the conduit. An 'end cap' i.e. special bush, shall be inserted in the ends of conduit to protect cables when drawn in.

The inside surface of conduit, ends of same and all fittings used in connection therewith to be smooth, free from burrs and all defects.

A separate PVC insulated earthing lead coloured green and yellow complying with the I.E.E Regulations, shall be installed internally and securely bonded at each end of the conduit in purpose made earthing terminals.

No flexible conduit shall exceed an unstretched length of 800 mm and flexible conduit will not be permitted in lieu of sets and bends in rigid conduit installations.

2.14 CABLE TRUNKING

Cable trunking shall be of sheet steel and of such sizes and finish as called for in the Particular Specification.

All bends, tees, reducers, couplings, etc., shall be of standard pattern and supplied by the trunking manufacturer, unless particularly specified otherwise in the Particular Specification. Welded joints must not be used without the express permission of the Contract Administrator.

At each joint between trunking lengths and between trunking fittings copper earth bonding links shall be used, fixed by means of screws.

Cable supports are to be inserted in vertical runs of trunking and cables shall be laced thereto in their respective groups.

In vertical runs a fire resisting barrier, supplied by the manufacturer, shall be inserted in the trunking at maximum centres of 3,000 mm and in all cases in the trunking where it passes through floors and ceilings, walls, etc. Cable retaining straps are to be installed at maximum centre of 600 mm.

Trunking shall be of adequate size to ensure that the number of cables installed does not exceed the appropriate total cable factor as set out in the IEE Regulations for Electrical Installation 16th Edition (BS 7671) or alternatively does not exceed a 45% space factor.

The surface of trunking, both inside and outside, the ends of same and all fittings used in connection therewith shall be free from burrs and all other defects.

All open holes, slots, etc., in trunking shall be bushed or grommetted using the appropriate materials obtained from the trunking manufacturer.

2.15 PVC CONDUIT AND TRUNKING

All conditions outlined in Clause 2.9 Metal Conduit Installation shall apply:

1. All tubing and accessories shall be of super high impact heavy gauge rigid polyvinyl chloride, all accessories shall be of the following manufacture :

Egatube Limited, Type HIP

Marshall Tufflex

Gilflex Key

or equal and approved by the Contract Administrator.

2. Tube shall be joined with plane couplings and the manufacturers' purpose made adapters shall be sealed at all accessories, adaptable or equipment boxes, and sealed with a vinyl solvent adhesive for making watertight joints.
3. Saddles shall completely encircle and shall be of the 'spacer bar' type. Spring in type coils will not be accepted. Under no circumstances shall crampets be used with plastic conduit. In concealed installation preformed single hole plastic or aluminium fixing clips shall be used, secured by means of cadmium coated or sheradized wood screws.
4. Where it is proposed to cast plastic conduit in concrete the Contractor shall ensure that the conduit is effectively secured to the shuttering, and protected against all hazards of fracture and deformation.
5. An earth continuity conductor shall be provided and installed with the whole of the plastic conduit installation which shall comply with the IEE Wiring Regulations for Electrical Installations, 16th Edition.

2.16 PLASTIC TRUNKING AND DUCTING

Rigid PVC trunking shall generally be installed in accordance with the requirements of Clause 2.11. The following additional items shall also apply :

1. PVC trunking shall in all instances be of the same manufacture as the plastic conduit installation with which it is associated. It should be noted that PVC trunking shall only be used in conjunction with a plastic conduit installation, and in this respect the Contractor shall provide and install the trunking in strict accordance with the manufacturers' instructions.
2. Trunking shall be joined with plain couplings and the manufacturers purpose made adapters shall be used at all accessories, adaptable or equipment boxes, and sealed with a vinyl solvent adhesive for making watertight joints.

Expansion couplings shall be installed in accordance with the manufacturers' instructions and sealed with an adhesive that remains flexible although providing watertight joints.

3. Trunking shall be rigidly supported at distances of not less than 500 mm. All fixings shall be effected by means of cadmium plated or sheradised wood screws. Where appropriate, purpose made brackets or supports shall be provided for fixing purposes.
4. 'Snap-in' type of 'Snap-on' type lids are acceptable where the trunking faces upwards or sideways.
5. Each conduit shall have its own separate earth continuity conductors which shall meet with the requirements of the IEE Wiring Regulations for Electrical Installation, 16th Edition.

2.17 CABLES

Cables shall be one of the following types :

- a. XLPE insulated cables with copper conductors, steel wire armour and LSF outer sheath to BS 6724.
- b. Mineral insulated cables with copper conductors and sheath and with LSF outer sheath to BS 6207.
- c. PVC insulated cables with copper conductors (non-armoured) to BS 6004.
- d. Insulated flexible cords to BS 6500.
- e. Cables for higher temperature applications with insulation to BS 6746 and BS 6899.
- f. Communication cables to be to CW 1308.

Cables of 2.5 mm² and above are to have stranded conductors and no cable of a size less than 1.5 mm² shall be used, except for mineral insulated cables and monitoring/control circuits.

No joints in cables will be permitted, unless specifically stated and then only for extending existing cables. The loop-in system is to be employed throughout. Variations to this requirement will only be permitted in special circumstances, where detailed in the Particular Specification.

Sub-main circuit cables shall be grouped and where possible enclosed in a separate conduit i.e. shall not be mixed with sub-circuit cables.

All cables inside flexible steel conduits shall be heat resisting or standard as directed in the Particular Specification. No joints in cables will be permitted between control gear and motors or any other so connected gear and motors or any so connected apparatus. Cables for mains, sub-mains and three phase circuits shall be coloured in accordance with IEE Regulations for Electrical installation 16th Edition (BS 7671) but neutral shall be black in all cases.

Mineral insulated cable sizes of 2.5 mm² and above shall be of the 1,000 volt grade. No light duty cables below 1.0 mm² shall be used.

Each coil or drum of cable or flexible cord shall bear the manufacturers' label, sealed to the coil or drum, stating the length, size, type and other relevant details.

No coil or drum which has been manufactured more than twelve months prior to its delivery to site will be accepted and the Contractor will be expected to furnish satisfactory evidence of the date of manufacture of any coil.

In the case of 1,000 volt grade cables, the Contractor shall have the cable delivered to site on a drum and he will be required to furnish manufacturers' test sheets. The reference numbers on all cable drums shall correspond with those on the test sheets.

Cables to heating equipment shall have insulation and sheath suitable for higher temperature applications (up to 85°C) to BS 6746 and BS 6899.

Flexible cords shall be of the 450/750 volt grade with one core coloured brown, one blue and the other yellow/green. The separate insulated cores shall be twisted together to form a circular section of the whole and sheathed overall with tough rubber.

2.18 METHODS OF INSTALLATION

The routes of cables shall be so arranged that they are adequately spaced away from other services and from each other, as provided for in the IEE Regulations for Electrical Installation 16th Edition (BS 7671).

At all terminations, there shall be left a sufficient amount of slack cable to allow for future trimming without causing undue stress in the conductors.

All multiple cable runs shall be fixed to cable trays by means of single multi-way saddles and all single runs of cables shall be fixed by spacer bar saddles direct to walls.

Where cable glands are exposed to atmospheric conditions and in all instances where they are screwed into aluminium or zinc base alloy fittings, bitumastic paint shall be applied to the junction of thread before erection to eliminate the possibility of corrosion.

Where cables terminate in switchgear, busbars, etc., compression or soldered type cable lugs shall be used. where compression type ferrules or cables lugs are used the

compressing tool shall be such type and working pressure as recommended by the manufacturer of ferrule, lug or system used.

The securing of the mineral insulated cables shall be by means of copper saddles fixed by non-ferrous screws, 'except that where cables are laid on and supported by the structure, PVC clips may be used to anchor the cable down. MICC cables shall be brought into switch or outlet boxes through metal glands of approved type and cables shall be sealed in accordance with the manufacturers' instructions. Where two or more cables run side by side they will be fixed by multi way saddles or shaped PVC coated copper tape.

Cold screw-on pot type seals shall be used, complete with ring type gland and these shall be obtained from the cable manufacturer.

No heat shall be applied to any end seal or termination. Each length of cable shall be tested after the seals have been fitted.

Where required pots shall be fitted with earthing tails insulated and identified with green/yellow sleeving.

Cable tails shall be insulated by means of insulation sleeving of the 'Neoprene' type. The sleeving shall be anchored and sealed into the pot type seal. Coloured sleeving must be used for identification of conductors at all terminations.

The tools necessary for the correct cutting and making of cable ends shall be obtained from the cable manufacture and used.

All cables shall be installed as straight as possible. Any final straightening necessary is to be carried out using a wooden straight edge and a hammer.

The Contractor shall supply all cable glands required for the connection to all equipment connected by MICC cables, whether the equipment is supplied under his contract or not.

The Contractor shall not employ men to terminate MICC cables who have not had full experience on this type of work.

The required size of MICC cables are given in the Particular Specification.

Infinity only will be accepted on insulation tests of mineral insulated cables.

Note : The use of draw wires, tapes, cords, etc. for the drawings of cables into conduits is not permitted except by the express agreement of the Contract Administrator.

2.19 LUMINAIRES

All luminaires shown on the drawings and listed in the lighting schedule shall comply with the BS 4533 and be supplied and installed complete with lamps. Where a choice of colour of either metal work or glass work for the luminaires and none is specified, the colour will be specified at a later date.

If different colour finishes alter the price of the luminaires the standard finish shall be on the basis on which the tender is made unless otherwise specified. All diffusers, louvres and glassware for luminaires shall be cleaned, immediately prior to handover.

2.20 LIGHTING WIRING

Wiring to the lamp holders of tungsten filament luminaires which are not equipped with cool wiring devices or suspended from ceiling roses shall be silicone-rubber-insulated and braided or glass fibre insulated capable of withstanding a temperature of 140°C.

2.21 ERECTION OF LUMINAIRES

Decorative luminaires shall be suspended by the manufacturers' pendant sets which shall include a separate suspension wire integral with the flexible cable.

Luminaires shall be mounted at the heights given in the schedules or drawings.

Fluorescent luminaires shall have fixing and cable entry arrangements on two centres to suit the luminaires. The fixing arrangement shall be suitable for use with conduit boxes and plug and socket ceiling roses.

For luminaires in suspended ceilings the cabling or conduit system shall terminate in a BS box above the ceiling. From the conduit box to the luminaire either of the following methods of wiring may be used.

- a. An integral threaded dome cover with a cable gland for flexible cords shall be fixed to the BS box and a flexible cord shall be run from the dome cover to the fitting.
- b. A three plate ceiling rose with socket and plug attachment shall be fitted to the box and a flexible cord run to the luminaire.

Flexible cords shall be 3-core 0.75 sq. mm in 5 amp circuits, 1.0 sq. mm in 10 amp circuits and 1.5 sq. mm and 15 amp circuits. The third core of the flexible cord shall be used for earth continuity and shall be securely fixed to the conduit and luminaire.

For surface mounted luminaires the cable or conduit system shall terminate in a BS box to which the luminaire is fitted.

Suspended fluorescent and industrial tungsten luminaires shall be suspended by rigid conduit from ball-and-socket dome covers. Such dome covers shall be fitted with flexible copper connectors between the ball and socket.

Break-joint of approved colour shall be provided wherever the diameter of the ceiling rose or plate from which the luminaire is suspended, or the diameter of the gallery or the width of the spine of a surface mounted luminaire does not exceed the diameter of the aperture in the ceiling for the associated conduit box by at least 10 mm. If this requirement causes a break-joint to be provided for any luminaire, then break-joint rings shall be used for all other similar luminaires in the same room or area.

Fluorescent luminaires which are to be mounted end-to-end in continuous rows shall be provided with all necessary jointing pieces for the battens and diffusers or reflectors. The manufacturer shall be informed of the precise quantities required at the time of ordering to avoid delay. Battens for which special joint pieces are not provided shall be butted together and connected by means of smooth bore bushes and locknuts tightened up to ensure that no gap appears between adjacent battens. End caps shall be fitted only at the ends of rows.

All luminaires shall be carefully stored before erection and prior to handover, any damaged paintwork made good and the complete luminaires cleaned.

2.22 CEILING ROSES

Ceiling roses shall comply with BS 67 and be of approved manufacture. They shall be coloured white having a moulded plastic base suitable for direct mounting on to a conduit box, and three terminals plus earth terminal, the 'live' terminal being shrouded.

2.23 LAMP HOLDERS

Lamp holders shall comply with BS 5042 and be effectively earthed where of metal construction (e.g. brass).

Where lamp holders are screwed direct to conduit systems they shall be brass, unless they are installed in a bathroom or toilet when they shall be insulated.

Lamp holders which are not electrically continuous shall be complete with Home Office pattern skirts.

Lamp holders used in conjunction with PVC sheathed cables shall be provided with a cable grip.

Batten lamp holders shall be suitable for direct mounting on circular conduit boxes.

Unless otherwise specified lamp holders for emergency lighting systems shall be SBC positioned in such a way as to place the lamp specified in its normal position.

2.24 LAMPS

The sizes, types and colours of lamps are shown on the schedule or drawings.

Lamps for use at a voltage other than 230V shall be fitted with caps which prevent them from being used in 230 volt lamp holders.

2.25 LOCAL LIGHTING SWITCHES

Lighting switches shall be manufactured in accordance with the BS 3676 and shall be of the type and ratings shown in the schedules or drawings.

The mountings height to the bottom of the switch shall be 1.3 metres unless otherwise specified, and where the structure and furnishing permit, the distance from the edge of the architrave to the near edge of the switch shall be 150 mm.

Where several switches on one phase are shown at one position, a ganged box shall be used. Different phases shall not be ganged in one box unless each phase is segregated in a separate compartment which is covered by a separate internal warning plate.

Where possible the arrangement of switches in ganged boxes shall be similar to the lighting points which they control. Switches not so arranged shall be labelled in an approved manner to indicate the circuits controlled.

Flush switches shall be mounted in sheet steel or malleable cast iron boxes of minimum depth 37 mm fitted with adjustable grids to allow for variations in the thickness of plaster.

The face plates of flush switches shall be fixed square and flush with the wall. Fixing rings shall not be the only means of securing the face plates.

The swing of all doors shall be checked on site before marking out any chases for switch positions.

Surface mounted switches connected to surface conduits shall be fitted to either malleable cast iron or pressed steel boxes with cover plates giving protection to the dummies.

Watertight switches shall be in malleable cast iron boxes or die cast aluminium with spout nipple entries.

Lighting switches installed in ducts shall be of the weatherproof type.

Ceiling switches shall be fixed to circular BS boxes using break-joint rings. The switches shall be white or ivory coloured and fitted with silent interiors.

Any requirement in such rooms for sparkless switches will be particularly specified, and where they are required they shall be of the same pattern of dolly, switchplate, box and finish as the other switches in the same area or room.

Sparkless or flameproof pattern switches shall be provided in all areas classified as 'Division 2'.

2.26 SOCKET OUTLET INSTALLATIONS- GENERAL

The requirements specified in these clauses refer to sockets on 50 Hz, A.C. supplies at a normal 240 volt. Socket for special circuits will be detailed elsewhere.

2.27 30 AMP SOCKET OUTLETS

30 amp switch socket outlets shall have quick made and break switches with separate shuttered BS gauge socket and be mounted in a cast iron case. The overlapping cover plate shall be not less than 2.5 mm thick brass, finished as specified.

2.28 15, 13 AND 5 AMP SOCKET OUTLETS

Surface and flush mounted switched and unswitched socket outlets shall have shuttered sockets and A.C only switches in either malleable cast iron or pressed steel boxes with cover plates as specified.

Surface mounted switches and unswitched socket outlets connected to surface conduits shall be fitted to either malleable cast iron or pressed steel boxes with cover plates as specified.

Where socket outlets are shown together on a drawing a twin unit shall be used.

13 amp socket outlets and plugs shall comply with BS 1363. The plugs shall contain the correct rated cartridge fuse link complying with BS 1362 to protect the apparatus or appliance connected to the outlet.

2.29 FUSED CONNECTION UNIT/FINAL CONNECTIONS

All fused connection units shall be complete with galvanised metal box with earthing terminal, of the same manufacturer.

Plates, switch dollies and screws shall be of specified materials and finish.

Front plates shall be engraved as described in the Specification.

Units shall be fitted with a fuse of the correct rating to suit the appliance concerned.

Flex outlets shall generally be arranged as follows.

From the particular connection unit a galvanised conduit will be run direct to the appliance, if the appliance is fixed and permanent.

If the appliance requires a flexible connection the galvanised conduit shall run to a point close to the point of entry of the supply into the appliance. It shall terminate in a conduit box with a flex outlet cover, and cord outlet suitable for the particular flexible cable. In the case of three phase equipment, connection by means of cables drawn into 'Kopex' or PVC flexible conduit, running from the conduit box to the appliance shall be adopted. An earthing lead shall be connected to each appliance from suitable earthing terminal.

In certain cases, where specified, fused connector units with direct flex outlets shall be used.

2.30 ISOLATORS FOR FIXED APPLIANCES

The Contractor shall include for the supply and installation of a local isolator for every fixed appliance, whether or not such an isolator is explicitly specified.

Each isolator shall have the rating and number of poles suitable for the particular appliance, and shall be the approved type and manufacture, flush or surface mounted, as required. All isolators shall be mounted in accessible positions local to the particular appliance which they serve. They shall be generally mounted at a height of 1.3 metres above finished floor level to the centre line of switch. All isolators shall be metal clad complete with "ON" "OFF" indication and padlocking facilities where required.

2.31 GENERAL FIXING

1. Lightweight equipment and conduit saddles may be fixed to the building structure by means of screws in white metal, bronze or other approved plugs. Loadings shall not exceed 50 kg per fixing.
2. Fixing to brickwork shall be made in the bricks and not in the bond.

If it is possible to make all fixing in the brickwork, then the equipment shall be positioned to enable the upper fixings to be made in the brickwork.

3. Woodscrews shall be sheradized and greased before use. Machine thread screws shall be solid brass and greased before use except as other specified.
4. Where fixings are made on hollow partitions the appropriate type of toggle bolt shall be employed.

-
5. heavy equipment shall not be fixed by plugs or shot bolts without the written approval of the Contract Administrator. Approved purpose made clamp brackets, rawlbolts or patent fixing bolts such as rawlbolts shall normally be used.
 6. All steelwork fixings shall be galvanised or similarly protected.
 7. The supply and fixing of all support, brackets, clamps and spacers and other steelwork whether or not shown in detail on the drawings or otherwise, which may be required for the proper and effective fixing of any equipment shall be deemed to be included.
 8. Where cable or conduits pass through walls, partitions or ceilings, the hole provided shall, after installation, be made good with cement/sand mortar mix, plaster or similar incombustible materials to the full thickness of the wall, partition or ceiling and left ready for decoration.

2.32 CIRCUIT IDENTIFICATION

All plant and apparatus supplied under this Contract, shall be provided with name plates showing manufacturers' reference number and details of the plant. The Contractor may fix to the main switch panel only, his trade plate, provided that the same does not exceed 100 x 100 mm.

At each distribution board there shall be supplied and fixed securely, either inside the door of the distribution board or externally to the case of adjacent wall, a substantial clear plastic envelope containing a list of the circuits connected to that particular distribution board. (Note: Fixing of the envelope by adhesive or adhesive tape will not be accepted).

The circuit list shall be typewritten and state clearly the outlets connected to that circuit and the current rating of the fuse or circuit breaker. A sample of the proposed circuit lists shall be submitted to the Contract Administrator for his approval before these are installed.

On the cover of each distribution board, switch fuse, isolator, contactor, control panel etc., there shall be an Ivorine or plastic laminate label of minimum size 50mm x 25mm identifying the particular item in accordance with the names of the plant, circuit etc., used in the Specification and Drawings.

Where control panels, e.g. boiler house controls, ventilation controls etc., are installed each item of equipment, i.e. indicator lamps, switches, push buttons, time switches, etc., shall be provided with an Ivorine or plastic laminate label to identify its purpose.

Where premises are connected to a three phase four wire electricity supply every distribution board and controlling switch fuse or isolator shall be provided with a coloured disc or button indicating to which phase or phases of the supply the item is connected.

Ivorine or plastic laminate labels shall have the lettering and/or numbering engraved upon them and these labels and phase identification discs or buttons shall be fixed to the particular equipment by means of self tapping screws or bolts, nuts and washers.

2.33 DOOR ENTRY SYSTEMS

2.33.1 General

The door entry shall be offered in the following formats :

- a) Blocks of flats to a maximum of 10 flats. A functional system is to be installed.
- b) Blocks of flats, 11 flats or more. A digital system is to be installed.

Both systems will provide :

- a. Duplex speech
- b. Full peripheral isolation
- c. Trades facility
- d. Door monitoring
- e. Privacy control
- f. Multiple doors
- g. Variable locking devices
- h. Compatible with proximity or swipe card systems
- i. EMC tested.

2.33.2 Mode of Operation

The flats will be called by means of depressing the required flat numbers on the door panel. On pressing these buttons the control card will activate providing a timed speech path. The relevant flat circuit will be enabled and a call tone will be sounded in the handset receiver and a reassurance tone will sound at the entrance panel.

An indication by means of a green LED will show which flat has been called and also the status of the door control board (*i.e.* *door active time*). When the handset is lifted the user presses the lock button which will activate the door control board lock circuitry, which will operate the door lock and give an audible and visual indication of the operation.

Should a handset or interconnecting cable become damaged it will have no effect on any other part of the system and the handset will not be able to be called until the problem is rectified.

Reassurance tones will sound at the call panel to indicate the following functions :

- a. Call button pressed
- b. Door lock open
- c. Lock activated

On a two-door system the visual indicator is to be provided at the door panel to indicate the system is in use. All other door panels will be disabled during this period and they will not emit the reassurance tones or call tones until the system is free.

A system operating to PAC or Keri will be acceptable.

2.33.3 Main Entrance Station

- a. Duplex speech to telephone in each dwelling.
- b. Main control unit contained in a lockable steel cabinet mounted in client's electrical intake cupboard.
- c. Mains power supply from landlords consumer unit.
- d. Electrically operated lock release for control entrance doors.
- e. Main entrance/exit door locks.
- f. Fire switch override.
- g. Door closers.
- h. Electromagnetic locking systems where required.
- i. Aids for disabled persons as deemed necessary.

2.33.4 Supplier of Door Entry Equipment

All door entry equipment shall be as supplied by :

Integrated Security Manufacturing Ltd.

1600 Functional System

2000 Digital System

Ensign Security Manufacturing Ltd

3400 Functional System

7800 Digital System

Or equivalent approved.

The Contractor will obtain a signed completion certificate from the commissioning engineer, which is subsequently to be forwarded with the guarantee document to the Contract Administrator.

2.33.5 Lock Release Override Switch (*Fireman's Switch*)

The Contractor shall supply and install a fireman's drop release key to all controlled entrance doors wired in such a manner that when in the ON position the lock release will be operated enabling access by the authorised services.

The fireman's switch will be mounted 2m above the finished floor level directly above the main entrance panel.

The panel shall be constructed from stainless steel with fine-grained finish and shall be fixed to back box by four snake eyed security screws. Stainless steel mitred bezel welded to a galvanised back box. Suitable for either timber, steel, screen or brick installation.

2.33.6 Mains Wiring to Control Unit

The power supply to the mains control unit will be run in 2.5mm² PVC single cables drawn into conduit and wired from a new 20 Amp SP&N fused isolating switch in the landlord's electrical intake room/cupboard. The supply shall be derived from the landlord's metered supply side only. The siting of the above 20 Amp SP&N isolation switch is to be sited as close to the mains control unit as possible.

2.33.7 Low Voltage Wiring to Mains Control Unit

Individual multi-core cable BT CW 1308 shall be installed between the mains control unit junction box and the main entrance station/panel. No joints of any description shall be allowed in these cables. Each cable shall be identified for its purpose at the control unit.

2.33.8 Electric Lock Release (*Fail Safe Type*)

The system shall include for a 12 volt ac electrically operated lock release. The release shall be able to withstand a shock load of 1 tonne. The release will contain a micro switch so that connections can be made in each dwelling to indicate that the main entrance door is open. In addition changeover contacts type MCR204 read switch wired in parallel to release micro switch shall be installed in the top of the door frame head to act as backup above release micro switch. An audible buzzer shall sound when the release is operated to advise callers that the door is open. Each release shall be fixed by vandal resistant machine screws as manufactured by the lock release supplier.

2.33.9 Aids for Disabled Persons

Where flashing lights are specified or required under instructions, then a flashing light system shall be installed.

The number of lights and positions shall be agreed by the tenant and authorised by the Contract Administrator prior to installation.

2.33.10 Entrance Panel in Stainless Steel

The entrance station shall be mounted at such a height that the uppermost buttons are no more than 1270mm above finish floor level. The precise location is to be agreed with the CA before installation.

The panel fascia is to be manufactured in straight grained stainless steel finish. All panels are to be front fixed with security screws complete with a hinged fascia plate to facilitate servicing. The push/touch sensitive buttons are to be rotating mechanical stainless steel and vandal resistant. All buttons are to be circular and flush fitting with an internal shoulder to prevent the ingress of any moisture. Buttons are to be minimum of 20mm, contacts are to be of stainless steel and designed to withstand a heavy impact on the button face without any adverse effect on the operational capabilities. Buttons must be individually fixed by studs welded directly onto stainless steel fascia.

The beacon shall be interfaced to the door entry system via beacon interface pcb, which should have a variable time to control how long the beacon will flash for. The input from the handset shall be call tone, which will operate an opto-isolator to switch the beacon dial ON. The beacon shall be mounted on a black 95mm x 150mm ABS enclosure.

In instances where additional telephones are required then the same type of telephone shall be used as previously specified.

The number of telephones and positions shall be agreed by the tenant and authorised by the Contract Administrator prior to the installation.

2.33.11 Secondary Fixing Plates

Secondary fixing plates are expressly forbidden and totally unacceptable.

The back box is to be constructed of a welded galvanised steel and is to incorporate a 3mm mitred stainless steel bezel welded to the back box and is to allow the button to be recessed 12mm into the bezel for extra protection. A system of seals/gaskets is to be fitted to inhibit the ingress of moisture when the button panel is fitted.

All engraving on the entrance panel is to be stove enamelled in black deep engraving. Each panel is to be fitted with a lock call reassurance tone/signal.

2.33.12 Microphone Amplifier Unit

The amplifier unit is to operate efficiently throughout a frequency range of 200 hertz to 8 kHz with sensitivity sufficient to maintain satisfactory speech clarity over and above all ambient noise levels without distortion of the Larcen effect.

Amplification is to be directed through an integrated circuit with separate controls for adjustment of the microphone and speaker levels. The speaker unit is to be mounted by means of bolting it behind a slotted area in the fascia panel. It is to be protected by a section of heavy gauge stainless steel gauze so designed to prevent the insertion of small objects or liquid damage to the speaker.

2.33.13 Apartment Station/Handsets

Individual wall mounted telephones shall be sited in the hall of each dwelling in such a manner that a call tone can be heard from any of the rooms within that dwelling. The height of the telephone shall be a maximum of 1370mm above finished floor level. The height and position shall be agreed with the CA/tenant prior to installation.

The handsets will be white with engraved (*not silk screen-printed or transfer*) instruction indicating door open and privacy LED's and a lock and on/off control buttons. The privacy indicator will be a green LED, which will be controlled by a pre-set timer circuit. This circuit will consist of an adjustable time providing off periods of between 5 minutes and 8 hours and will be activated by a single press of the on/off button. The time period must be capable of being overridden by a subsequent press of the button to allow the user to switch the handset on or off manually if required. The means of time adjustment on each handset will be achieved by potentiometers located within each handset so as to facilitate individual adjustments for particular tenant requirements. In addition an easy removable link will be provided in each handset to allow the expedient disabling of the timer so as to convert the privacy circuitry into a standard on/off function (*untimed*). The handsets will be called by means of an oscillator generated call tone (*ac or de buzzers are not permitted*) which will utilise the handset receiver as a loud speaker to emit the

tone. The call tone will be present only whilst the panel button is being operated and the handset cradle switch is depressed. The lock and on-off button should not be capable of being operated before removal of the handset receiver to avoid accident operation.

The telephone handset shall be constructed of ASS impact resistant toughened plastic. The handset should incorporate the following :-

- a. Full duplex speech
- b. Nuisance/privacy switch to disconnect the call tone.
- c. Green indicator light (*LED*) to signify privacy activated.
- d. Red indicator light (*LED*) to signify the main entrance door is unlocked.

Fully discreet locking service when only the dwelling called is to be able to remotely unlock the main entrance door via a programme time period. Complete privacy of speech from other users.

2.33.14 Main Control Unit

The main control unit shall be housed in a robust steel cabinet with a lockable door. The system is to comprise the minimum of the following :

- a. DC power board and logic circuits.
- b. Telephone terminal mounted on a common motherboard.
- c. An isolating switched 13amp fused connection unit.
- d. A digital time clock with 3 month battery backup reserve **inco ng 3** on and 3 off time periods minimum.
- e. An AC/DC fail-safe or fail secure option. _
- f. Fault indicators.
- g. An LED status indicator.

The control cabinet shall be sited in the landlord's electrical intake or other approved position as specified by the Contract Administrator before installation.

2.33.15 Door Open Alarm Sounder

The sound enclosure shall be constructed from stainless steel with straight fine-grained finish and shall be fixed to the back box by 4 snake-eye security screws. The sounder will be a 12-volt operated soundbomb fixed to the back box on 2 studs. (*Note system to be fitted for but not connected*).

2.33.16 General Standards

The works shall be installed to the London of Camden's document entitled "Electrical Standards of materials and workmanship" and to Best Practice. (*Documents available from London Borough of Camden*).

All components will be those that are readily available through recognised sources. No programmable devices will be accepted i.e. EPROM's, pals etc.

The system shall be powered by a single output de supply, which is not to be an integral part of the door control or isolator boards. Ensuring that no further ratification or smoothing is carried out external to the power supply module. Power supply unit will be self-contained and capable of being replaced in its entirety without necessitating the disconnection of or unplugging of flats and risers cables.

All central control equipment will be housed in a steel powder coated IP55X lockable box which is to have a hinged door with a reversal facility at both right and left hand opening. The box should have a maximum depth of 150mm and is to be fitted with a removable painted steel back plate.

2.33.17 General- Wiring for Door Entry System

The wiring shall be carried out in multi-core PVC British Telecom approved cables Ref. No. BT CW 1308 and the minimum size shall be 0.5mm tinned copper conductors enclosed in PVC sheathing. Multi pair cable is to carry a minimum 20% spare conductors above the number required. The cables shall be installed in public areas only; they shall not pass through dwellings with the exception only of individual service cable serving the speech unit/handset in the particular dwelling. Where joints are required to complete the electrical circuit serving a particular dwelling or group of dwellings, then the Contractor shall install an approved connection box.

No twisted or crimped joints will be allowed in any circuit.

Lock release, zero vaults and de wires shall be doubled for good engineering practice and cabling to manufacturing specification.

The door entry system cables shall be protected in their entirety at all levels in new heavy gauge galvanised conduits/trunking.

BT Conduit/Trunking shall not be used to protect door entry system cables in common or dwellings area, nor shall any other existing conduit/trunking be used.

The conduits protecting cables shall be heavy gauge class B galvanised conduits fixed at 1 metre centres and adjacent to each bend. Bends shall be formed by cold bending with a proprietary bending machine. Bends shall be painted with aluminium after installation. All couplings, threads, joints etc. shall be similarly painted. The fixing of the conduit shall be by means of spacer bar saddles fixed by 32mm sheradised counter-sunk screws fixed into plastic plugs. Where joint/junction boxes etc. are required in conduits systems the Contractor shall use heavy gauge galvanised cast-iron adaptable box fitted with waterproof gaskets and lids with tamper proof screws, in all position internal or external. All conduits shall be bushed at terminations with brass male brushes and couplings.

Where the numbers of cables exceed No.2 cable trunking, which shall be obtained from Salmandre Metalworks of Swindon or other, equal and approved. The lid above trunking shall be fixed with tamper proof Alan screws where trunking passes through floors.

Cables that run within the dwellings shall be run in plastic mini-trunking and located in the hallway. Final position of the handsets shall be agreed by the tenant.

The Contractor shall provide samples of all equipment proposed for installation of the entry phone system.

2.33.18 Locks and Fob Reader

Magna lock as Armlock 260 series Magnetic locks or equivalent approved may be used.

Magna locks shall be installed with a fob reader system for access as manufactured by PAC Access Systems or Keri Systems, complete with push to access button.

Fobs are to be programmed and identified before issue.

The Contractor is to supply 3no. keys or 3no. fobs to each flat.

The Contractor is to supply 2no. spare keys or 2no. extra fobs per flat to the Contract Administrator.

2.34 DOORS AND SCREENS

2.34.1 General

The doors and associated framework in this specification shall be designed to achieve the highest level of resistance to vandalism.

Doors shall have a minimum opening of 900mm.

The frame shall be of modular, bolt together design utilising security fixings. This modular approach will allow for the easy design and construction of all installations.

All ancillary hardware shall be based on the ASSA range of locks or equivalent approved, handles and cover plates incorporating either master or non-master key systems.

Doors available from :

Multisecure Ltd.
Multisecure House
115 Brent Terrace
LONDON
NW21LL

Tel: 0181 208 1766
Fax: 0181 450 0259

Soundcraft Ltd.
Orchard Building
Hewitts Road
Chelsfield
ORPINGTON
Kent
BR6 7QL

Tel: 01959 533 788
Fax: 01959 532 544

or equivalent approved.

2.34.2 Graded Security Door Specification

2.34.2.1 Level1 - GRP Doors

The doors and associated framework specified in this section shall be designed to achieve the highest level of resistance to vandalism.

The construction of GRP doors shall comprise a 15mm marine ply sandwich with internal steel reinforcing rods and 6mm GRP skin. This multi layer construction shall be supported by a stainless steel framework to all edges. A viewing aperture constructed of 6mm Lexan fixed with stainless steel beads shall be installed.

The framework shall be of the same design as the door incorporating a void in the frame for the inclusion of an integral heavy duty lock release.

A cushion type concealed floor closer shall be utilised which, when the door is in the closed position, provides a virtually vandalproof seal. The door shall be hung on 50mm continuous stainless steel hinge which shall be fixed to the door and frame with security headed bolts with a normal spacing of 100mm.

The colour of the GRP finish will be decided by the Contract Administrator.

Level2- Portcullis Style Doors

The door and frame shall be constructed from sustainable supplies of hardwood of Oak/Mahogany type. The design shall be based on the standard vertical section with the triple horizontal transoms. The upper and lower transoms shall be of a nominal dimension of 200 x 50mm.

Portcullis style reinforcing timbers having a cross section of 30 x 60mm are to be spaced across the full width of the door on both faces having a nominal spacing of 100mm. An external secured bead is to be provided for the laminated glass infills. Internal beads shall be fixed with snake eyed security screws.

- a. Doors will have a minimum opening of 900mm.
- b. The door hinge will be 50mm continuous stainless steel.
- c. A LCN super smoothie door closer or equivalent approved shall be fitted to secure side of the door.
- d. All ancillary hardware shall be based on the ASSA range of locks or equivalent approved, handles and cover plates incorporating either master or non-master key systems.
- e. Alternatively a Magna lock as Armlock 260 series Magnetic lock or equivalent approved may be used.

Panel lengths shall not exceed 3 metres.

Design post fixings allowing for the strength and details of existing walls, parapets, copings, ground etc.

2.35.1.2 Site Works

Posts into ground are to be in post holes not less than 600mm deep by 300mm square and filled with 1:2:4 concrete trowelled off with a slight fall away from the post to surrounding finish levels.

Where posts are in macadam surfacing, the concrete is to be set down to allow for dressing over.

Where mechanical gate opening devices are sunk into the ground they are to be embedded in concrete and the surface finished flush except in macadam surfaces where the concrete level is to be kept down to allow for dressing over.

Any asphalt or weatherproofing to be made good.

Surfaces disturbed by the works are to be reinstated and left clean and tidy.

Tree roots, when encountered, are to be protected and covered over to prevent drying out.

2.35.1.3 Materials Generally

Grades of metals, section dimensions and properties to be to the appropriate British Standard. When not specified, select grades and sections appropriate for the purpose.

Fastenings to be to the appropriate British Standard and, unless specified otherwise, to be of the same metal as the component, with matching coating or finish.

2.35.1.4 Fabrication Generally

Fabricate components carefully and accurately to ensure compliance with design and performance requirements.

Do not permit contact between dissimilar metals in components which are to be fixed where moisture may be present or occur.

Finished components to be rigid and free from distortion, cracks, burrs and sharp arrises. Moving parts must move freely and without binding.

Unless specified otherwise, mitre comer junctions of identical sections.

2.35.1.5 Cold Formed Work

Use brake presses or cold rolling to produce accurate profiles with straight anises.

2.35.1.6 Drawings etc.

Before fabrication, submit general arrangement drawings and calculations to the CA for approval.

2.35.2 Welding

2.35.2.1 Welding on Site

Site welding is not permitted unless shown on drawings or otherwise approved. When permitted, ensure suitable, safe conditions. Do not weld when ambient temperature is below 0 degC or surfaces are wet.

Welding/Brazing Generally

2.35.2.2

Thoroughly clean surfaces to be joined.

Ensure accurate fit using clamps and jigs where practicable. Use tack welds only for temporary attachment.

Make joints with parent and filler metal fully bonded throughout with no inclusions, holes, porosity or cracks.

Remove all traces of flux residue, slag and weld spatter.

Welding of Steel

2.35.2.3

Metal arc welding to BS 5135, or other methods subject to approval.

Finishing Welded/Brazed Joints

2.35.2.4

Butt joints which will be visible in completed work to be smooth, flush with adjacent surfaces.

Fillet joints which will be visible in completed work to be executed neatly. Grind smooth where specified.

2.35.3 BoltAssemblies

2.35.3.1 Zinc Plated Finish to Bolt Assemblies

Applied by fastening manufacturer, nuts tapped after plating and:

To BS 3382 for threaded components up to 18 mm diameter.

Use/location: All areas.

2.35.3.2 Expanding Bolts and Nuts

Manufacturer: Rawplug or equivalent approved, type to suit design and location.

Bonded Anchors

2.35.3.3

Manufacturer: Rawplug or equivalent approved, type to suit design and location.

2.35.3.4 Sealed Hollow Sections

Seal bolt holes to prevent access of moisture. If method of sealing is not specified, submit proposals for approval.

2.35.4 Erection

2.35.4.1 Modifications

1

Inform CA of any defects due to detailing or fabrication errors.

Obtain approval of methods of rectification before starting modification of remedial work.

Defective Works

2.35.4.2

2

As soon as possible after any part of the work or any materials are known or suspected to be defective, submit proposals to CA for further testing, inspection or replacement and obtain instructions.

2.35.5 General Requirements for Protective Coating Work

2.35.5.1 Surfaces not Requiring Coating

Parts embedded in concrete to receive all coatings except site top coat.

2.35.5.2 Operatives

Operatives must be appropriately skilled and experienced in the use of specified materials and methods of application.

2.35.5.3 Coating Materials

3

To be applied in accordance with manufacturers specifications.

Whenever possible, to be from one manufacturing batch. Where more than one batch is to be used, keep separate, allocate to distinct parts or areas of the work, and inform the CA accordingly.

Check that all coating materials to be used are recommended by their manufacturers for the particular surface and conditions of exposure, and that they are compatible with each other.

Applying Coatings

2.35.5.4

Apply after fabrication is complete and all fixing holes have been drilled, unless otherwise specified.

Galvanising

2.35.5.5

5

All cutting, welding and drilling must be completed beforehand. Provide all necessary vent and drain holes in approved locations and seal to approval after galvanizing.

2.35.5.6 Handling and Storing Coated Steelwork

Use methods and equipment which will minimise chafing, chipping and other damage to coated components.

Ensure an adequate drying/curing period for each coat before handling.

Use suitable packings, lashings, lifting harnesses, nylon slings, rubber protected chains and chocks, etc.

Stack coated components clear of the ground, separated by timber chocks, and so that ponding does not occur.

2.35.5.7 Protection

Adequately protect freshly applied surface coatings from damage.

Exhibit 'Wet paint' signs and provide protective barriers where necessary.

Adequately protect surfaces adjacent to those being covered.

2.35.5.8 Remedial Work

Early degradation of coatings by blistering, peeling, flaking, cracking, lack of adhesion, etc. must be made good by complete removal, preparation and reapplication of all coats, as instructed.

Inadequate dry film thickness or surface defects due to inclement weather may, depending on the type of paint, be remedied by rubbing down and applying further coat(s), as instructed.

Mechanical damage to coatings must be made good by local cutting back of coatings, preparation and reapplication of all coats to leave a neat, continuous and flat finish.

Where damage to coatings or subsequent surface preparation has exposed bare metal, it must be thoroughly cleaned and primed within two hours.

Protective Coating System(s)

2.35.6

2.35.6.1 Galvanising Plus

Use/location: All specified steelwork

Galvanising: To BS 729, minimum average coating thickness 85 microns.

Paint manufacturer: Harberts Industrial Protective Coatings, Freshwater Road, Dagenham, Essex or equivalent approved

- a. Preparation: As clause 2.37.7.8
- b. Shop preparation: Apply Mordant solution
- c. Shop intermediate coat: Epoxy MIO Buildcoat- Permacor 2329/EG

-
- d. Dry film thickness: 75 microns
 - e. Site top coat: High Build Modified Urethane - Permacor 2330
 - f. Dry film thickness: 75 microns
 - g. Colour: To be agreed with CA

2.35.6.2 Protective Painting

Use/location: All specified steelwork

Paint manufacturer: Herberts Industrial Protective Coatings, Freshwater Road, Dagenham, Essex or equivalent approved

Shop preparation: Blast clean as clause 2.37.7.5 to BS 7079: Part A1, preparation grade (equiv. SA 2%)

Shop primer: High build epoxy zinc phosphate primer - Permacor 2328

Dry film thickness: 75 microns

Shop intermediate coat: Epoxy MIO Buildcoat - Permacor 2329/EG

Dry film thickness: 75 microns

Site top coat: High Build Modified Urethane- Permacor 2330

Dry film thickness: 75 microns

Colour: To be agreed with CA

2.35.7 Preparation for Painting

2.35.7.1 Offsite Preparation and Painting

To be carried out under cover in property lit, heated and ventilated conditions.

2.35.7.2 Inaccessible Surfaces

The sequence of working must be such as to ensure that surfaces inaccessible after assembly receive the full specified treatment and coating system including, if necessary, local shop application of site coatings.

2.35.7.3 Treatment of Site Welded Joints in Painted Steelwork

After welding, and without delay, remove all scale and weld spatter from the weld areas by grinding or chipping, abrade to remove all traces of rust, wash with clean water and allow to dry.

Prime without delay and apply further coatings to the weld areas to match the surrounding painted areas.

2.35.7.4 Bolted Joints (*Nonfriction Grip*)

Where steelwork is to be shop painted, ensure that the full shop specification is applied to joint faces.

2.35.7.5 Blast Cleaning for Painting

Ensure that steel complies with BS 7079 : Part A 1 at time of blasting as follows :

Dry blasting : initial rust grade A or B

Wet blasting : initial rust grade A, B or C.

Thoroughly degrease. Remove millscale by chipping, grinding and/or heat treatment.

Blast clean to the specified BS 7079: part A 1 preparation grades and control quality of preparation in accordance with BS 5493, Appendix F. Use abrasive of suitable type and size, free from contamination by fines, water and oil. Remove abrasive residues.

Remove all surface defects likely to be detrimental to the protective painting system, including defects in the steel, including cracks, surface laminations, shelling and deep pitting as required by BS 4360.

Defects resulting from fabrication, including fins at cuts, burrs, sharp edges and weld spatter.

Apply primer as soon as practicable and while the surface is still in a condition acceptable to the primer manufacturer.

2.35.7.6 Galvanised Fastenings

After erection, thoroughly degrease and clean and apply a suitable etch primer before applying specified site coating(s).

2.35.7.7 Site Preparation of Shop Painted Steelwork

Carry out all necessary remedial work as specified. Prepare all surfaces by abrading and/or washing down as recommended by manufacturer before applying coats.

2.35.7.8 Preparation of Galvanised Surfaces for Painting

Thoroughly degrease. If metal coating is defective obtain instructions before proceeding. Remove any white corrosion products with a stiff brush, wash off and allow to dry before applying specified etching wash or primer.

2.35.8 Painting

2.35.8.1 Suitability of Conditions

Do not apply coatings:

To surfaces affected by moisture or frost.

Unless the steel temperature is at least 3 degC above the dew point with conditions stable or improving.

Unless the relative humidity is below 85%.

When heat is likely to cause blistering or wrinkling.

Take all necessary precautions including restrictions on working hours, providing temporary protection and allowing extra drying time, to ensure that coatings are not adversely affected by climatic conditions before, during and after application.

2.35.8.2 Apply Coatings

Adjacent coats of the same material must be of a different tint to ensure that each coat provides complete coverage.

Apply coatings to clean, dust free, suitably dry surfaces in dry atmospheric conditions and after any previous coats have cured adequately.

Apply coatings evenly to give a smooth finish of uniform thickness and colour, free from brush marks, nibs, sags, runs and other defects.

Keep all surfaces clean and free from dust during coating and drying. Adequately protect completed work from damage.

2.35.8.3 Film Thickness

Check the thickness of each coat during application using a wet film thickness wheel or comb in accordance with BS 3900:Part C5.

Over any square metre of coating the average accumulated dry film thickness must equal or exceed the specified thickness, with no reading less than 75% of the specified thickness.

If at any stage the accumulated dry film thickness is deficient, the CA may require application of additional coat(s) at no extra cost.

2.35.8.4 Colour of Top Coat

To be selected by CA (unless already specified). Colour of preceding coat to be as recommended by the paint manufacturer to suit the top coat colour.

2.36 TESTING AND COMMISSIONING -OTHER WORKS

The Contractor shall satisfy the Contract Administrator that on completion of the installation, all circuits are operating in accordance with the design intention.

Tests shall be carried out in accordance with Chapter 16 of the IEE Regulations for Electrical Installation 16th Edition (BS 7671), and the result shall comply with the Regulations, before any section or phase is commissioned. After satisfactory tests have been completed, the Contractor shall commission the section or phase of the installation.

On the completion of the Works, test in accordance with the requirements Chapter 16 of the IEE regulations for Electrical Installations 16th Edition (BS 7671).

On completion of the works supply to the Contract Administrator with a certificate stating that the installation has been inspected, tested and is complete.

The Installation Certificate shall be as required by the current Regulations for Electrical Installations issued, in accordance with the requirements Chapter 16 of the IEE Regulations for Electrical Installations 16th Edition (BS 7671).

2.37 TESTING, COMMISSIONING AND DOCUMENTATION

2.37.1 General

1. Provide all the testing, commissioning, documentation for the complete engineering installation.
2. Use commissioning and testing codes produced by or authorised by the Chartered Institute of Building Services and/or Heating and Ventilating Contractors Association, National Inspection Council for Electrical Installation Contractors.
3. Ensure sufficient supplies of fuel, electricity and water required for the test are available.
4. Provide all test instruments, together with sufficient labour and skilled supervision to properly carry out the tests.
5. Agree details of the method of carrying out and recording the tests with the Contract Administrator.
6. If the tests fail to demonstrate the satisfactory nature of the installation, or portion thereof, the Contract Administrator will decide whether such failure is due to defective equipment or non-compliance with the Specification and in such cases he may reject the said installation or part thereof. In the event of such rejection the Contractor shall, at his own expense, rectify the matter and re-test to the satisfaction of the Contract Administrator.
7. In the event that the Contractor does not satisfactorily carry out any test or tests the Contract Administrator shall be at liberty after giving due notice to the Contractor arrange for such tests to be carried out and charge to the Contractor accordingly. Such action shall not relieve the Contractor of any of his responsibilities under the Contract.

2.37.2 Test Records

1. Provide the Contract Administrator with test records in an approved form immediately on completion of the tests.
2. All test records shall be provided in triplicate.
3. Test records shall, for hydraulic or similar tests and for tests on equipment at the manufacturers works, comprise test certificates showing the date of the test, the pressure applied and the period of application. For performance tests the test record shall comprise a report and record sheet showing the date of the test, a tabulated summary of the test readings and a report stating the result of the tests.

2.37.3 Tests at Manufacturers' Works

1. The requirements of relevant British Standard Specifications with regard to works tests shall be complied with.
2. Specific tests of items of equipment at the manufacturers' works, other than those called for in British Standards, shall be carried out as described in the appropriate section of the Specification.
3. Statutory and Insurance tests shall be carried out as necessary.
4. Where specifically indicated by the Contract Administrator, tests described in paragraphs 1, 2 and 3 above shall be carried out in the presence of their representative. In such cases fourteen clear days notice of each test shall be given to the Contract Administrator.
5. In all cases described above, the Contractor shall provide copies of test certificates. Such certificates shall clearly state whether the certificates are for type tests, or for tests of individual items of equipment.

2.37.4 Setting to Work and Commissioning

1. Set to work the complete Works, or part thereof, at the selection of the Contract Administrator, and make all necessary adjustments to ensure correct functioning.
2. Before starting up any equipment, installation or part thereof ensure it is both safe and fit to do so.
3. Where another Contractor or Authority is providing a service or supply to a system or piece of equipment provided under the Contract the Contractor shall provide certification of fitness to accept such service or supply as a pre-requisite to its being made live by others.
4. Items of plant shall be run as soon as possible after installation and shall be checked for satisfactory operation.
5. On completion of commissioning demonstrate to the Contract Administrator that :
 - a. The equipment provided complies with the Specification in all particulars and is of adequate capacity for the full rated duty.
 - b. That all items of plant and equipment operate sufficiently quietly to meet the specified requirements.
 - c. That all instruments, protective devices, control, etc. are correctly calibrated and accurate.
 - d. - That all electrical circuits are properly fused and protected and that all systems and equipment are properly earthed and conduit systems electrically continuous.
 - e. That the systems have been properly balanced and adjusted in respect of flow signals, volumes brightness or as relevant.

2.37.5 Instruction of Employer's Staff

1. At times to be agreed, instruct the Employer's staff in the use and correct operation of the Works and ensure that such staff are competent to take over the installation on completion.
2. Obtain a signature from the staff so instructed, stating this instruction has been received and properly understood.

2.37.6 Provision of Record Documents

1. Supply to the Contract Administrator as a pre-requisite to Practical Completion of the Works, comprehensive record documents finalised in detail and approved by the Contract Administrator. Great importance will be placed upon the quality, accuracy, clarity and completeness of the record documents and upon their being made promptly available.
2. Demonstrate from time to time as required by the Contract Administrator throughout the execution of the Works, that adequate and accurate records are being kept such as will ensure the ultimate completeness and accuracy of the record documents and that the record documents are themselves being progressively compiled as the work on site proceeds.

2.37.7 Scope of Record Documents

1. Record documents shall comprise, all as described in this Specification, the following:
 - a. Record Drawings and Schedules
 - b. Operating and Maintenance Instructions
2. All record documents shall be provided in triplicate, two sets for the Employer and one set for the Contract Administrator's retention. In the case of drawings and diagrams (other than the Manufacturers' drawings) one set of the three sets shall be on opaque material and the other two sets shall be on transparent material, one of these latter being the contract Administrator's copy.

Manufacturers' drawings shall be on opaque material.

3. The record document shall be adequate for the following purposes:
 - a. To record clearly the arrangements of the various sections of the Works as actually installed and to identify and locate all component parts thereof.
 - b. To make it possible to comprehend the extent and purpose of the Works as actually installed and to identify and locate all component parts thereof.
 - c. To set out clearly the extent to which maintenance and servicing is required and how, in detail, it should be executed.
 - d. To provide sufficient and readily accessible information properly to facilitate the ordering of spares and replacements.

-
4. The Record Documents shall be correlated so that the terminology and numerical and/or other references used therein are consistent with and similar to those used in the physical identification of component parts of the Works. Reference shall also be made where appropriate, to the colour identification system.

2.37.8 Record Drawings and Schedules

1. The Record Drawings provided by the Contractor shall comprise the following as applicable. Drawings may be first originals.
 2. Drawings or sets of drawings to a scale of 1:1200 showing the following as installed:
 - a. The location, including level is buried, of Public Service connections provided, within this Contract whether carried out by the Contractor or by the appropriate Authority, together with the points of origin and termination, size and material of pipes, line pressure and/or other relevant information.
 - b. The layout, location and extent of all piped services showing pipe sizes throughout, together with all valves for regulation, isolation and other purposes.
 - c. Location, identity, size and details of all apparatus served by, or associated with, each of the various services. The information with respect to size and details may be present in schedule form subject to the prior approval of the Contract Administrator.
 - d. The layout, location and extent of all air ducts including those formed in builder's work or otherwise outside the present Contract but forming part of the system(s) showing all dampers and other equipment, acoustic silencers, grilles, diffusers or other terminal components. Each duct and each terminal component shall be marked with its size and the air quality flowing, as actually measured after approved regulation of the system or as computed by the addition of such measured quantities.
 - e. The location and identity of each room or space housing plant, machinery or apparatus.
 3. Drawings or sets of drawings to a scale of 1:25 showing the following as installed
 - a. The detail general arrangement of all boiler houses, machinery spaces, air handling plant, tank rooms and/or other plant or apparatus including the location, identity, size and details of each piece of apparatus. The information with respect to size and details may be presented in schedule form subject to the prior approval of the Contract Administrator.
 - b. The detailed general arrangement of service subways, ducts, meter rooms or other special sections of the Works where, in the opinion of the Contract Administrator, the smaller scale drawings cannot provide an adequate record.
 4. Manufacturers' drawings showing the general arrangement and assembly of component parts of all machines and any piece of equipment which may require servicing.

-
5. Flow diagrams indicating the principles of, the arrangement and operation of each of the various services as related to central plant, other principal components and zoning of distribution, etc.
 6. Diagrams illustrating the principles of application of automatic controls and of instrumentation, present in combination with item (5) foregoing, or separately as agreed with the Contract Administrator.
 7. Manufacturers' internal wiring diagrams for each piece of electrical equipment supplied under the Contract, together with physical arrangement drawings where necessary to locate and identify the component parts.
 8. Comprehensive diagrams showing in detail all power wiring and all control wiring and/or pneumatic or other control piping in accordance with details provided by the Contractor, including size, and type of conductors or piping used and identifying the terminal points of each.

2.37.9 Operating Maintenance Instructions

1. Operating and maintenance instructions shall be provided by the Contractor and shall comprise the following, as applicable (all contained in volumes strongly bound in flexible covers and suitable for heavy usage over a long period) written to be read in conjunction with the Record Drawings.
 - a. A general description of the scope, purpose and manner of working of each system or apparatus forming part of the Works.
 - b. A detailed description of the scope, purpose and manner of working of each system of automatic controls and/or monitoring instruments.
 - c. Data on general design parameters and associated normal operating temperatures, pressures, etc., based on the commissioning tests.
 - d. Clear and comprehensive instructions for the starting up, running and shutdown of each system or apparatus.
 - e. Instructions in respect of any precautionary measures from time to time necessary (e.g. against freezing or corrosion).
 - f. Instructions in respect of the care of apparatus normally subject to seasonal disuse.
 - g. Instruction, as to the nature, extent and frequency of serv1cmg necessary properly to maintain the Works in good condition and as to the materials to be used for the purpose. This information may be supported in detail, but not replaced, by maintenance instructions provided by the suppliers of particular components apparatus.
 - h. Users duties with respect to legislation, Health and Safety and the like, e.g. periodic inspection and testing.
2. Copies of manufacturers' data with respect to the nature, type and method of operation of individual pieces of equipment, together with their detailed maintenance instructions shall also be supplied. Such data, in the form of individual booklets and the like, shall be indexed and cross-referenced to the

--

operating and maintenance instructions and presented, suitably protected in box files or folders.

3. Receipt of record drawings, negatives, schedules and operating maintenance instructions by the Contract Administrator shall be a pre-requisite of final payment.

3.1 DESCRIPTION OF THE SITE

3.1.1 General

Curnock Street is an estate surrounded by 4 streets, namely Camden Street, Pratt Street, Bayham Street and Plender Street

There are a number of vehicular entrances on to the site for services and Fire Brigade use and there is a service road that passes through the middle of the estate

The estate comprises twelve blocks containing approximately 292 dwellings. The blocks are:

BLOCK NAME	ADDRESSES
Hickleton	1-20
Trimdon	1-32
Ravenscar	1-18
Conisbrough	1-9
Thurnscoe	1-18
<i>The Marr</i>	<i>1-17</i>
Goldthorpe	1-34
Darfield	1-18
Mexborough	1-66
Billingly	1-18
Warmsworth	1-18
Barnbrough	1-24

The Marr already has a door entry system. This door entry system will not be affected by these works and will remain unaltered. Mexborough also has a door entry system. This system will be replaced.

3.1.2 Scope of Works

This section of the specification gives the particular design performance and installation requirements of the project. The works covered by the specification are for the whole of the materials required and labour necessary for the complete execution of the door entry system, inclusive of the physical security measure comprising, gates, fences and railings and replacement louvres.

This section of the specification shall be read in conjunction with the other sections of this document.

The electrical installation as a whole as detailed within this specification shall be fully rewirable. To achieve this, the installation as a whole shall utilise complete conduit and trunking systems of the type, size and manufacture as detailed elsewhere within the specification. Should it prove impossible or impracticable to install a complete conduit or trunking system the Contractor shall seek the Contract Administrator's approval to any alternative means of installation.

3.2 GENERAL SCOPE OF WORKS

These Works shall comprise the detailed design, supply, installation, testing, commissioning and setting to work of fully automatic Door Entry Systems in the blocks of dwellings, site access points and in the car park. This shall be complemented by the installation of physical security measures and anti climb louvres and new access ramps.

All facets to be fully integrated to provide a complete system of physical security.

Each residence shall be fitted with a door entry telephone handset dedicated to one particular gate, as indicated. The residents in the ground floor dwellings of Warmsworth, Barnbrough and Hickleton will not be included in the door entry system but will be included in the distribution of fobs.

Gates shall be installed in decorative "swan neck" shaped railings surrounding each block.

The security system shall be enhanced by the replacement of the existing garage louvres with a new system of louvres, for which access to both public and residents car parks will be required.

3.3 CONTRACTOR DESIGN ELEMENT

The Contractor shall visit site and carry out a fully detailed survey to assess and ascertain all site conditions. These shall include exact locations of all switchrooms, routes for cables and conduits, locations and fixing methods for fencing and railings, gates louvres and the like all as shown on the general layout drawing.

Heights, elevations, slopes and inclines shall be ascertained to determine final positions, arrangements and details of ramps, access slopes and the like. Positions of trees, communication pillars, telephone boxes, bus shelters, man holes and all other structures affecting the positioning and design of all site elements shall be taken into account during the survey.

Detailed installation drawings shall be submitted for approval by the CA prior to any works starting on site. These drawings shall show general layout arrangements on a block-by block basis. They shall include plans and elevations to show co-ordination and setting out of new and existing features.

The Contractor shall allow for incorporating design changes as required by Environmental Services in connection with Planning Consent, at no additional cost.

3.4 ELEMENTS AND COMPONENTS

3.4.1 General

The descriptions below shall be read in conjunction with the General Specification in Section 2.

3.4.2 Access Ramps

New access ramps shall be fully detailed designed based on the Structural Engineers general information provided with this specification. This element of the works shall include a fully detailed survey of the site to ascertain levels, positions of existing street items and furniture and the like. Full working drawings shall be submitted for comment prior to the works commencing.

All new ramps shall be complete with straight railings and hand rails, integrated with the general railing system.

3.4.3 Railings

3.4.3.1 General

Railings shall be designed, generally to the shapes and sizes shown on the Tender Drawings. These may be altered to suit site conditions subject to the approval of the CA.

Where railings are set back behind the existing railing line, to prevent overhang of the highway, the area behind the highway boundary and the post line shall be filled in with block paving (approx 300mm)

3.4.3.2 Swan Neck (2.2m High Railings)

2.2m High railings shall be constructed in panel lengths to suit existing post centres to a maximum of 2000mm They shall comprise 20mm O circular steel bar formed in the shape of a swan neck or "S" shape.

Radius of upper bend to be 200mm, radius of the lower bend to be 425mm. Section of bar between bends to be straight. Bars to be set at 100mm centres, welded to 60x10mm flat bars at top and bottom.

Posts to be 80x80mm square (*min*) x 3mm thick, hollow section with square top cap. Posts to be complete with 60x60x10mm welded lugs for fixing railing panels. All panels to be fixed with tamper proof fittings. Posts shall be level with the top of the railings.

Posts shall be fixed according to site conditions. Where they are to be fixed to flat concrete the posts shall be fitted with a base plate as Structural Engineers general arrangements. Fixings are detailed elsewhere.

Where the posts are to be fixed into the ground they shall be installed in accordance with the fixing details specified elsewhere.

All railings and posts to be off site heavy duty galvanised, site welding will not be accepted.

All railings and posts to be painted as described elsewhere, colour to be agreed.

3.4.3.3 Swan Neck (1.2m High Railings)

1.2m High railings shall be constructed in panel lengths to suit existing post centres to a maximum of 2000mm. They shall comprise 20mm O circular steel bar formed in the shape of a swan neck or "S" shape.

Radius of upper bend to be 150mm, radius of the lower bend to be 250mm. Section of bar between bends to be straight. Bars to be set at 100mm centres, welded to 60x10mm flat bars at top and bottom.

Posts to be 80x80mm square (*min*) x 3mm thick , hollow section with square top cap. Posts to be complete with 60x60x10mm welded lugs for fixing railing panels. All panels to be fixed with tamper proof fittings. Posts shall be level with the top of the railings.

Posts shall be fixed according to site conditions. Where they are to be fixed to flat concrete the posts shall be fitted with a base plate to suit Structural Engineers general arrangements. Fixings to be as detailed elsewhere.

Where the posts are to be fixed into the ground they shall be installed in accordance with the fixing details specified elsewhere.

All railings and posts to be off site heavy duty galvanised, site welding will not be accepted.

All railings and posts to be painted as described elsewhere, colour to be agreed.

3.4.3.4 Swan Neck (1.6m High Railings and Other Sizes)

Where swan neck railings are sizes other than those specified the railings shall be proportioned between the sizes given. All intermediate designs shall be approved prior to manufacture.

3.4.3.5 Straight (2.2m and 1.2m High Railings)

Straight railings shall be constructed in panel lengths to suit existing post centres to a maximum of 2000mm. They shall comprise 20mm O circular steel bars set at 100mm centres welded to 60x10mm flat bars at top and bottom.

Posts to be 80x80mm square (*min*) x 3mm thick , hollow section with square top cap. Posts to be complete with 60x60x10mm welded lugs for fixing railing panels. All panels to be fixed with tamper proof fittings. Posts shall be level with the top of the railings.

- Posts shall be fixed according to site conditions. Where they are to be fixed to flat concrete the posts shall be fitted with a base plate to Structural Engineers general arrangements. Fixings to be as detailed elsewhere.

Where the posts are to be fixed into the ground they shall be installed in accordance with the fixing details specified elsewhere.

All railings and posts to be off site heavy duty galvanised, site welding will not be accepted.

All railings and posts to be painted as described elsewhere, colour to be agreed.

3.4.3.6 Handrails

All railings that are installed down ramps, around staircases and steps shall incorporate a hand rail. The hand rail shall be rectangular in section, not less than 60mm highx30mm wide.

3.4.3.7 Fixing to Existing Post Positions

The adaptation of the existing post positions may be acceptable. Each post position may be modified to suit the new railing posts. Load tests must be carried out to demonstrate the suitability of each point, prior to any works being carried out. The existing posts may be cut down and a suitable adapter fitted.

In positions where the existing post fixings are not secure or are in doubt or have been previously repaired, the fixing position shall be core drilled out and a new "stub" fixed by grouting or resin anchors, all as Structural Engineers detail.

3.4.3.8 Core Drilling

Core drilling shall be undertaken by a specialist contractor in the field of this type of work.

Dust shall be kept to a minimum and all coolant water shall be controlled and cleared up on completion. Any soiling or staining produces as a result of the core drilling shall be cleaned to the satisfaction of the C.A.

3.4.4 Gates

3.4.4.1 Personnel Gates

Personnel gates shall be constructed in panels to match straight railings with their top and bottom rails set to match straight and swan neck railings. They shall comprise 20mm O circular steel bars set at 100mm centres welded to 60x10mm flat bars at top and bottom.

Gates shall be complete with secure hinges and closers. Gate side screen shall include space for either a fob reader or entry panel. Side screens shall be formed of solid panels with hidden, internal, wire ways.

All gates, side screens and posts to be painted as described elsewhere, colour to be agreed.

3.4.4.2 Front Garden Gates

Front garden gates shall be fitted to the fronts of the ground floor properties of Warmsworth, Barnbrough and Hickleton.

They shall be constructed in panels to match straight railings with their top and bottom rails set to match straight and swan neck railings. They shall comprise 20mm O circular steel bars set at 100mm centres welded to 60x10mm flat bars at top and bottom.

Gates shall be complete with secure hinges, closers and locks and handles.

All gates, side screens and posts to be painted as described elsewhere, colour to be agreed.

Where gates are specified to include a handle and lock they shall be fitted with a Welka 555500 (*or equivalent and approved*) gate lock with lever handles complete with cylinder lock and three keys.

3.4.4.3 Vehicle Gates

Vehicle gates shall be constructed in panels to match straight railings with their top and bottom rails set to match straight and swan neck railings. They shall comprise 20mm O circular steel bars set at 100mm centres welded to 60x10mm flat bars at top and bottom. All gate openings to be 3300mm min.

Gates shall be complete with secure hinges with fastenings as described. These shall include sliding bolt, ground bolt, FB padlock. NOTE where a hasp and staple is specified a sliding bolt may be substituted.

All gates, side screens and posts to be painted as described elsewhere, colour to be agreed.

3.4.5 Replacement Louvres

Carefully dismantle, take down and remove the existing underground car park ventilation louvres. The louvres are found on all four sides of the elevated sections of the car parks. Care must be exercised when removing the louvres, there will be residents cars parked in the residents garages and customers cars in the public car park. Full consultation with the residents, the District Housing Office and the public car park operator must be carried out by the Contractor.

The louvres shall be replaced in logical phases and carried out in such a manner so as to leave the garages secure at all material time. Temporary security shall be used to close off garages when necessary.

The new louvres shall be constructed to the following minimum specification:

Grid	20x40mm -40mm between vertical bars
Bars	30x2mm- vertical bars 40x2mm -45° horizontal bars @20mm centres
Edge	50x3mm -on all four sides Flanges at 500mm centres for fixing to existing opening

Drip tray	Drip tray at base to drain to outside any driven water off the louvres
Mesh	Install mesh to provide a combined free area of 50%

Louvres to be finished galvanised after manufacture. Louvres to be manufactured in panel sizes not exceeding 1000mm long. All louvre sections to be bolted together. Where louvres are fitted to corners of the garages a suitable corner post detail shall be installed.

NOTE: Due to the sloping nature of the site on particular elevations, the louvres shall be capable of being modified on site to suit. Any modifications shall be suitably treated with a minimum of two coats of zinc rich paint, prior to any other paint finishes being applied.

Louvres to small areas such as the boiler house shall be purpose made to fit the openings.

A louvre system as manufactured by Elefant Gratings Ltd (Tel 01311 223788) or equal and approved will be acceptable

Replacement Mesh

3.4.6

Remove existing mesh from the ends of the garage driveways. Install new galvanised mesh grid as detailed below:

Grid	62x66mm
Vertical bars	25x3mm -vertical bars at 62mm centres
Horizontal bars	5mm dia. Circular at 66mm centres
Edge	25x4mm -on top an bottom.

Mesh to be heavy duty galvanised after manufacture and manufactured in panel sizes not exceeding 1000mm long. Joints in mesh panels to be bolted to steel frames made up of 32mm SHS .

All louvres and meshes to be fixed internally to the soffitt and slab within existing openings. Existing openings to be repaired and made good as necessary to accept the new louvres.

All louvres and meshes to be heavy duty galvanised and painted as described elsewhere, colour to be agreed.

Grid/Mesh system as supplied by Alpha Rail (Tel 01623 750214) their type "Orsogril Pleione" or equal and approved will be acceptable.

3.4.7 Door Entry System

The door entry system shall comprise an entry panel, push to release buttons and telephone hand sets. The general requirements for the systems are described in Section 2.

3.4.7.1 Capacity

Systems must be capable of operating with at least 1000 different fobs. This is to allow flexibility in programming not just the immediate residents' fob but also those from adjacent buildings. The system for the car park must also be capable of recognising at least 1000 different fobs

3.4.7.2 Door Release Buttons/Fob Reader

Door release buttons and fob readers shall be positioned on the appropriate railing or side screen within easy reach of the gate. The button shall be arranged within a shrouded cover to prevent access to the button from the other side of the gate. Other barriers shall be incorporated as necessary to prevent operation of the buttons from outside the protected area.

3.4.7.3 Distribution of Fobs

The Contractor shall be responsible for distributing the access fobs. Fobs will be distributed according to the number of bedrooms a particular dwelling has up to a maximum of three.

A register shall be maintained detailing the address, resident's name and fob code. Fobs shall be distributed prior to the systems becoming energised and it shall be the Contractor's responsibility to ensure all residents have the appropriate number of fobs and that all their details are registered.

3.4.7.4 Telephone Hand Sets

Each dwelling, which is to be accessed from outside a protected zone, shall be equipped with a dedicated telephone handset.

3.4.7.5 Gates

All gates associated with the door entry system shall be complete with a closer and maglock system. Depending on the size and type more than one lock may be required for each gate. The appropriate number of locks shall be fitted.

3.4.7.6 Wiring

All wiring shall be contained within conduits or ducts. Generally the conduits shall be run on the under side of balconies and in stairwells and other "common" areas.

Wiring that runs from the blocks to remote gate positions shall be run in conduits or ducts. All ducts shall be at least 300mm deep with a warning tape at 150mm. All routes shall be agreed prior to installation. Conduits may be run in the car park. Wiring that has to be run below the paving on concrete areas shall be steel wire armoured with a galvanised, heavy duty, top hat section protective channel fixed with corrosion resistant fixings.

All wiring for the mains supplies to systems shall be run in galvanised steel conduits segregated from the DES wiring.

3.4.7.7 Aids for the Disabled

Aids for the disabled shall be incorporated wherever they are required. These shall generally comprise lamps and buzzers in one or more rooms and shall operate when the flat or dwelling is called from the door entry panel. All wiring will be in plastic mini trunking.

3.4.7.8 Provisional Sum for Disabled Equipment

Allow a provisional sum of £3000 for aids for the disabled.

3.4.7.9 Programming of Door Entry System

The door entry system shall be programmed at the end of the works to ensure that only authorised persons have access to the appropriate buildings. Where programming is required to intermediate gates. this will be carried out with consultation with the Tenants Association, District Housing Office and all other interested parties. Allow for convening a meeting to discuss programming and access issues with interested parties and for balloting all residents if necessary.

Allow for modifying the programming once during the Defects Liability Period.

3.5 GARAGE ENTRANCES AND EXITS

3.5.1 Resident's Garage

Remove the existing garage entrance gates.

Install new 2.2m high, double vehicular gates and side screens to the residents underground car park entrance. Gates and screens to close off completely the opening to the garage.

Install automatic, hydraulic gate operators (*below ground type*) to both vehicle gates. Install gate control panel at high level, under cover of the garage. Gates to operate independently of each other, one to allow vehicles in and the other to allow vehicles out.

Install vehicle gate access panel with fob reader, on tamper proof, highly vandal resistant pedestal. Pedestal to be positioned for ease of use by driver of car or small van on the approach to the garage. Install fob gate release on garage side of gates • under cover, for pedestrian egress.

Install warning notices of automatic gate operation, road markings to show sweep of gates and "Keep Clear" warnings. All markings to be agreed prior to installation.

All gates, controls and panels to be fully weatherproof and highly vandal and tamper resistant.

Install induction loop detectors in two locations for safety and gate closing (*incoming and outgoing*). Cut cables into tarmac/concrete road surface and seal with proprietary tar/compound.

Derive power supply from landlords distribution board in garage. Install 20A SPN switch fuse for gate system. Install new 4way (*minimum*) metal clad consumer unit to serve new gate controls

Install communication cables to walls at high level, Cable positioning and route to be agreed before installation. Where cables pass through tarmac or concrete they shall be installed in PVC ducts sealed at both ends. Cables to be installed clear of induction loop detectors. All cables installed vertically from the ground shall be mechanically protected with galvanised steel "top hat" section channel.

Make good road surfaces to match existing to highways standards.

3.5.2 Pedestrian Exits From All Underground Garages

Egress from the underground garages (*Resident's and Public Car Park*) are via doors in the garages and steps up to outside.

The doors are all fitted with closers and crash bar type furniture with closers. All door furniture shall be inspected, serviced adjusted and tested.

Replace existing railings and handrails on garage escape stairs with new, straight railings incorporating a hand rail, to each of the garage escape/exit staircases.

3.5.2.1 Provisional Sum for Repair/Replacement Door Furniture

Allow a provisional Sum of £1000 for replacement or repair of existing door furniture



3.6

3.6.1

Carry out detailed survey of the existing site areas in the locations of the new ramps to ascertain site conditions. Design, construct and install pedestrian ramps in the positions shown on the drawings, within the constraints laid down in the Structural Engineers details.

New ramps to be as general information as shown in the Structural Engineers details. Fit handrails to all ramps and anti-cycling measures similar to existing.

3.6.2 Existing Ramps

Replace existing ramp railings and handrails with new straight railings incorporating handrails to match new railings specified elsewhere. Fit anti-cycling measures in existing positions.

3.7 DWELLINGS GENERAL

Install in each affected dwelling, a dedicated telephone handset for operation of the door entry system. Final position of handset to be agreed with the resident. Allow for installing the handset up to 3m from the point of entry to the flat. No additional cost will be accepted for a longer installation distances, which will be balanced against shorter distances.

Residents on the ground floor of Warmsworth, Barnbrough and Hickleton are not included in a door entry system. They will not require a telephone hand set. They will receive access fobs to their appropriate block in the quantities specified.

3.8 WARMSWORTH

3.8.1 Ground Floor Dwellings

Remove existing low railings to the front of the block and make good.

Install 1.2m high swan neck railings along the front elevation and ends of the block. Positions of new railings to be agreed. Adequate clearance to be provided to take into account swan neck feature. Special care to be taken at corners to provide suitable corner detail to match straight runs.

Install 1.2m high, straight railings between the street and the block to divide each ground floor dwelling. Positions of posts to be co-ordinated to tie up with street level railings and individual dividing railings. Railings to be installed to take into account the sloping ground.

Provide openings in each railing section, opposite the front doors to each ground floor dwelling. Install 1.2m high personnel gate of straight bars to match dividing railings. Fit hinges and secure latching lock and knob to each gate. Consult with residents for individual, final positions of gates.

Lift and reinstate existing paving as necessary. Cut and modify existing paving as necessary. Paving to be re-laid on new sand/mortar bed and grouted as necessary

Increase height of existing back garden wall of property on Pratt Street and Camden Street by seven courses of brickwork, bricks to match existing as closely as possible.

3.8.2 Upper Floor Dwellings

Leave opening in ground floor railings for access to first floor.

Install 2.2m high, straight railings between each side of the front entrance to the upper floor and the street. Railings to be installed to take into account the sloping ground.

Install 2.2m high gate and side screens at street level within the opening created by the tall side railings.

Install door entry panel, magna lock and closer to gate and shrouded push button to exit.

Install all wiring to gate and door entry panel in below ground ducts. Allow for lifting and reinstating paving, drainage gullies and the like

3.9 BARNBROUGH

3.9.1 Ground Floor Dwellings

Remove existing low railings to the front of the block and make good.

Install 1.2m high swan neck railings along the front elevation and ends of the block. Positions of new railings to be agreed. Adequate clearance to be provided to take into account swan neck feature. Special care to be taken at corners to provide suitable corner detail to match straight runs.

Install 1.2m high, straight railings between the street and the block to divide each ground floor dwelling. Positions of posts to be co-ordinated to tie up with street level railings and individual dividing railings. Railings to be installed to take into account the sloping ground.

Provide openings in each railing section, opposite the front doors to each ground floor dwelling. Install 1.2m high personnel gate of straight bars to match dividing railings. Fit hinges and secure latching lock and knob to each gate.

Lift and reinstate existing paving as necessary. Cut and modify existing paving as necessary. Paving to be re-laid on new sand/mortar bed and grouted as necessary

Increase height of existing wall of No. 1 Warmsworth by thirteen courses of brickwork, to 2.2m.

3.9.2 Upper Floor Dwellings

Leave opening in ground floor railings for access to first floor.

Install 2.2m high, straight railings between each side of the front entrance to the upper floor and the street. Railings to be installed to take into account the sloping ground.

Install 2.2m high gate and side screens at street level within the opening created by the tall side railings.

Install door entry panel, magnalock and closer to gate and shrouded push button to exit.

Install all wiring to gate and door entry panel in below ground ducts. Allow for lifting and reinstating paving, drainage gullies and the like

3.10 HICKLETON

3.10.1 Ground Floor Dwellings

Remove existing low railings to the front of the block and make good.

Install 1.2m high swan neck railings along the front elevation and ends of the block. Positions of new railings to be agreed. Adequate clearance to be provided to take into account swan neck feature. Special care to be taken at corners to provide suitable corner detail to match straight runs.

Install 1.2m high, straight railings between the street and the block to divide each ground floor dwelling. Positions of posts to be co-ordinated to tie up with street level railings and individual dividing railings. Railings to be installed to take into account the sloping ground.

Provide openings in each railing section, opposite the front doors to each ground floor dwelling. Install 1.2m high personnel gate of straight bars to match dividing railings. Fit hinges and secure latching lock and knob to each gate.

Lift and reinstate existing paving as necessary. Cut and modify existing paving as necessary. Paving to be re-laid on new sand/mortar bed and grouted as necessary.

3.10.2 Upper Floor Dwellings

Leave opening in ground floor railings for access to first floor.

Install 2.2m high, straight railings between each side of the front entrance to the upper floor and the street. Railings to be installed to take into account the sloping ground.

Install 2.2m high gate and side screens at street level within the opening created by the tall side railings.

Install door entry panel, magnalock and closer to gate and shrouded push button to exit.

Install all wiring to gate and door entry panel in below ground ducts. Allow for lifting and reinstating paving, drainage gullies and the like

3.11 TRIMDON

3.11.1 General

Access to Trimdon shall be directly from Plender Street. New railings shall be installed along the street to secure the whole estate from this side. The small railings around the block, mounted on the podium, shall be replaced.

3.11.2 Street Level Railings

Remove the existing street level railings along the Plender Street boundary. Remove all re-entrant sections of railings from street position into the estate. Remove ballard. Retain existing hedge to rear of Hickleton.

Install 2.2m swan neck railings along the boundary of Trimdon, from the rear of Hickleton to the entrance to the residents garage. Install gate and side screen at existing path position to coincide with the base of existing ramp. Install fob reader in side screen. Install gate and side screen at existing path position at rear of Hickleton. Install fob reader in side screen

3.11.3 Podium Level Railings

Remove all existing podium steel railings from around Trimdon including those between Trimdon and Thumscoe. Install 1.2m swan neck railings to replace existing.

Railings to be installed down the full length of the two ramps and around the sides of the garage exit parapet.

3.11.4 Ramps and Steps

Remove the existing low railings from the three ramps and steps to Thurnscoe.

Install 1.2m straight railings along the ramps and around the steps, generally in the original positions. Link railings to swan neck railings .

3.12 RAVENSCAR

3.12.1 General

Ravenscar stands on a podium and is to have a separate entrance ramp constructed off Bayham Street.

3.12.2 Podium Level Railings

Remove all existing podium steel railings from around Ravenscar. Install 1.2m swan neck railings to replace existing.

Install 2.2m high railings at the rear of Ravenscar along the boundary that overlooks Trimdon and that abuts the garage. Modify concrete planter to suit by removing the first five sections of the planter and replacing the end section to provide a finished end. (See *a/so clause 3.11.4*)

Install 2.2m swan neck railings to the boundary of Ravenscar at No 9, with anti-climb railing to the rear. Install gate and side screen with door entry panel in the front section.

Install 2.2m (*approx*) swan neck railings to the front elevation of the space between Ravenscar and Consibrough. Final height of railing to be equal to that at the end of Consibrough. Leave opening in railings to co-ordinate with new ramp position.

3.12.3 Ramp to Street

Install new steel ramp to street level to Structural Engineers general arrangements.

3.12.4 Existing Planter

Carefully cut, to the nearest natural joint, the existing concrete planter at the boundary of No.9 Ravenscar and form new end to planter. Re-instate tenants fence to close gap created by planter removal. Remove planter up to Consibrough and make good surface with waterproofing to existing standards and as detailed herein.

Install 1.2m swan neck railings between No.9 Ravenscar and edge of Consibrough.

Install decorative anti-climb railing to the parapet over the garage entrance, not exceeding 500mm high and co-ordinated with adjacent railings

3.13 CONISBROUGH

3.13.1 General

Consibrough will utilise the existing ramp for a shared access with Thurnscoe.

3.13.2 Podium Level Railings

Remove all existing podium steel railings from around Conisbrough. Install 1.2m swan neck railings to replace existing.

Install 2.2m straight railings to the boundary of Conisbrough at No1, with anti-climb railing to the rear. Install gate and side screen with door entry panel in the front section.

Allow for removing and reinstating existing resident timber fence panelling including repositioning posts as necessary.

3.13.3 Ramp to Ravenscar

Remove the existing short staircase to Ravenscar and make good. Install new steel ramp with appropriate gradient and landing as necessary to Ravenscar, all as Structural Engineers general arrangements.

3.13.4 Existing Ramp

Remove all existing ramp steel railings and install 1.2m swan neck railings to replace existing.

3.14 THURNSCOE

3.14.1 General

Thurnscoe will be accessed from the existing ramp close to Conisbrough.

3.14.2 Podium Level Railings

Install 2.2m straight railings from Conisbrough to form secure enclosure at top of ramp. Install gate and side screen with door entry panel facing Thurnscoe. Extend straight railings to top of existing ramp. Install anti-climb railing to top of ramp.

Install gate and side screen with fob control, facing Trimdon. Install anti-climb railing to the side of the gate position.

Install 2.2m straight railings on the boundary of No. 1 Thurnscoe rear garden, with anti-climb railing over the open area.

3.15 THE MARR

3.15.1 General

The Marris already fitted with a door entry system which is to remain unaltered.

3.15.2 SideRailings

Install 2.2m straight railings between The Marr and Thurnscoe, coincident with the front of The Marr. Install double 2.2m high vehicle gates with straight vertical bars. Secure with bolt, hasp and staple and FB padlock.

3.16.2 GOLDTHORPE

Remove all existing podium steel railings from around Goldthorpe including those between Goldthorpe and Billingly. Install 1.2m swan neck railings to replace existing.

3.16.3 Ramps

Remove the existing railings on the ramps. Install new 1.2m straight railings down the full length of both sides for the two ramps to the front of the block and the ramp to the road side.

3.17 DARFIELD

General

3.17.1

Darfield is to be accessed by a new ramp with entry control system

3.17.2 Podium Level Railings

Remove all existing podium steel railings from around Darfield. Install 1.2m swan neck railings along the street and service road elevations. Including the return to the ramp.

Install 2.2m high swan neck railings along the rear of Darfield behind numbers 1-4. Install gate and side screen with door entry panel in this section to line up with the ramp position.

Install 1.2m swan neck railings in the open area between Darfield and Mexborough. Replace the existing railings on rear of open area with 1.2m swan neck railings

3.17.3 Ramp

Construct new ramp to Structural Engineers general arrangements. Ramp to include 1.2m straight railing with hand rail. Demolish existing concrete steps.

3.18 MEXBOROUGH

3.18.1 General

Mexborough currently has a door entry system installed. This system is to be removed and replaced by a new system. The new system shall be suitable for multi door operation and shall operate the door to the block and the perimeter gate. Existing

3.19.4 Personnel Gates

Install 2.2m high personnel gate to the Pratt Street end of the block with door entry panel, fob reader and control and closer.

Install 2.2m high personnel gate to the Goldthorpe end of the block, with fob reader and control and closer.

3.19.5 Access Ramp

Construct ramp to Structural Engineers detail.

3.20 GOLDTHORPE

3.20.1 General

Access to Goldthorpe shall be via the existing ramp with a new gate and railing.

3.20.2 Low Railings

Remove the existing low railings from around the block.

Install 1.2m swan neck railings around the block, generally in the original positions. Leave opening for ramp access.

3.20.3 Ramps and Steps

Remove the existing low railings from the three ramps and steps to Billingley.

Install 1.2m straight railings along the ramps and around the steps, generally in the original positions. Link railings to swan neck railings .

3.20.4 Personnel gates

Install 2.2m high personnel gate with side screen, between Goldthorpe and the elevated section of Darfield. Extend side screen in 2.2m straight railings to the side of the escape stairs from the underground garage.

3.21 ACCESS BETWEEN BLOCKS

3.21.1 Access Between Warmsworth and Barnbrough

Demolish twin walled planter on Camden Street. Make good brickwork joint with newly raised wall on Barnbrough. Construct short end wall to remaining part of planter to match existing. Fill remaining section of planter with any soil and remove excess.

Install 2.2m high, swan neck railings in place of demolished wall. Install double 2.2m gates with straight vertical bars. Secure with bolt, hasp and staple and FB padlock

3.21.2 Access Between Barnbrough and The Camden Public House.

Install 2.2m high straight railings between Barnbrough and the Camden Public House. Install single personnel gate with latch and close to Barnbrough.

Install double 2.2m high gates with straight vertical bars. Secure with bolt, hasp and staple and FB padlock.

3.21.3 Access Between Hickleton and Trimdon

Install 2.2m high straight railings from the rear garden of Hickleton to the opening for the residents garage.

Railings to start close to the rear hedge of No 1.

At existing opening, close to Hickleton, install 2.2m high personnel gate with fob control for resident use. Remove existing concrete ballard and make good paving with new paving

3.21.4 Access Between Conisbrough and Darfield

Install double 2.2m gates with straight vertical bars. Secure with bolt, hasp and staple and FB padlock. Install single personnel gate with latch and closer. Ensure maximum width available for vehicular access.

3.21.5 Access Between Billingly and Wannsworth

Install double 2.2 gates with straight vertical bars. Secure with bolt, hasp and staple and FB padlock. Install single personnel gate with fob access control and closer

Install 2.2m high swan neck railings to close off the remainder of the opening.

3.21.6 Access Between Barnbrough and Goldthorpe

Partially demolish brick wall surrounding the garden of No.1 Barnbrough back to undamaged brickwork. Rebuild wall to a new height of 2.2m. Remove 2 existing fence panels and lengths of railing from rear of garden. Build wall to match existing to a height of 2.2m for the length of the dwelling. Reinstated residents fencing on garden side of wall if required by the resident.

Install 2.2m straight railings between the rear of Barnbrough and the front edge of Goldthorpe. Install 2.2m high personnel gate, with fob access control and closer, to side of Goldthorpe.

3.21.7 Access Between Thurnscoe and The Marr

Install 2.2m high swan neck railings from the front edge of the Marr to the Podium of Thurnscoe. Install single personnel gate with fob access control and closer at the paved area.

3.21.8 Access Between Thurnscoe and Trimdon

Install 2.2m high, straight railings, to the end of Thurnscoe, dividing off the front walk way and rear gardens from the open space. Install 2.2m high personnel gate with fob access control and closer.

Install anti-climb barrier railings at each side of Thurnscoe, in line with and tied to the main railings. Anti-climb railings to protrude a minimum of 500mm beyond the podium.

3.21.9 Access Between Billingly and Goldthorpe

Install 2.2m high, straight railings, to the end of Billingly, dividing off the front walk way and rear gardens from the open space. Install 2.2m high personnel gate with fob access control and closer.

Install anti-climb barrier railings at each side of Billingly, in line with and tied to the main railings. Anti-climb railings to protrude a minimum of 500mm beyond the podium.

3.21.10 Access Between Conisbrough and Ravenscar

Install 2.2m high personnel gate between Conisbrough and Ravenscar with fob reader and control and closer. Gate to be co-ordinated with the outer railings and dividing railings.

3.21.11 Access Between Darfield and Mexborough

Install 2.2m high personnel gate between Darfield and Mexborough with fob reader and control and closer. Gate to be co-ordinated with the outer railings and dividing railings.

3.22 RESIDENTS OWN FENCING

Many residents have erected their own fencing, generally comprising timber lap fences of varying sizes. It is generally fixed to the existing steel railings by an assortment of methods including tie wraps, wire and bolts. Where the fencing impedes the installation of the railing system the fencing shall be carefully removed and put aside for reinstatement.

After the installation of the railing system the residents' own fencing shall be reinstated as close as possible to its original position allowing for the swan neck shape of the new railings.

Allow a Provisional Sum of £2000 for replacing damaged and defective timber fence panels