SCHEDULE Regulation 3(19).

"SCHEDULE 8 Regulation 15A

Detailed Requirements — Street Lighting

Design

1.—(1) Street Lighting shall be designed in accordance with BS 5489: Part 1: 1992; Part 2: 1992; Part 3: 1992; Part 4: 1992; Part 5: 1992; Part 6: 1992; Part 7: 1992; Part 9: 1996; Part 10: 1992 and BS 5489-8: 1998 to provide the level of lighting specified in Table A or B, as appropriate, on all carriageways, footways, footpaths and other areas to be adopted by the Department.

(2) Designs shall use the manufacturers value of initial lighting lumens, a maintenance factor not less than 0.75 and a CIE type C2 road surface as set out in BS 5489: Part 2: 1992 Table 3.

TABLE A

Road Type as defined in the Department of the Environment and the Department for Regional Development publication "Creating Places — achieving quality in residential developments and incorporating guidance on layout and access" published in 2000.	*Minimum Maintained Lighting Requirements*	
	Average Illuminance	*Minimum Point Illuminance*
Culs-de-sac and other access roads serving less than 100 dwellings	6 lux	2.5 lux
Access roads serving between 100 and 400 dwellings or serving industrial premises	3.5 lux	1 lux

TABLE B

Road Type	*Maintained Average Luminance L*	*Overall Uniformity Ratio*UO	*Longitudinal Uniformity Ratio*UL
Local distributor	0.5 cd/m^2	0.4	0.5

(3) Subject to sub-paragraph (4), street lighting equipment shall be in accordance with the requirements of paragraph 4.

(4) The Department may agree to the use of non-standard equipment subject to satisfactory arrangements being made for the increased maintenance costs.

(5) All lanterns shall be equipped with sodium discharge lamps.

Design procedure

2.—(1) Subject to sub-paragraph (2), luminaires shall be selected from equipment set out in a list available from the Department.

(2) Where the use of alternative luminaires has been agreed by the Department the person who intends to construct a street shall provide sufficient details of the lantern photometry to allow its performance to be checked by the Department.

(3) Lighting columns shall be at a minimum spacing of 25 m.

(4) The plans deposited under regulation 16(2)(*c*) shall show details of the method of calculation used to determine:—

(a) for residential and industrial access roads and footpaths as defined in the Department of the Environment and the Department for Regional Development publication "Creating Places —achieving quality in residential developments and incorporating guidance on layout and access" published in 2000, the average and minimum values of illuminance and the level of glare control; and

(b) for local distributor roads, as defined in the Department of the Environment and the Department for Regional Development publication "Creating Places—achieving quality in residential developments and incorporating guidance on layout and access" published in 2000, the average luminance, overall and longitudinal uniformity and the value of threshold increment of the scheme.

(5) Electrical design shall comply with BS 7671: 1992 and the person who intends to construct a street shall produce to the Department evidence of calculations for the determination of circuit current and voltage drop in the cables and for the selection of fuse sizes to ensure protection against electric shock and overcurrent.

(6) Streets with up to 50 columns shall be fed from a single supply point but streets having over 50 columns may require additional permanent supplies from a public electricity supplier.

(7) Where phased adoption of streets is proposed, the person who intends to construct a street to which these Regulations apply shall take account of this in the planning of the cable layout and the siting of the supply point.

(8) Internal wiring of the control pillar shall be in accordance with Figure 1 or 2 as appropriate and column wiring shall be in accordance with Figure 3.

(9) Fuse sizes in column bases shall be in accordance with Table C.

TABLE C

Recommended cut-out fuse values BS EN 60269-1: 1994 (1992)

Lamp wattage	*Lamp type*	*Fuse rating*
35/36/55	low pressure sodium	6 ampere
90/135	low pressure sodium	10 ampere
50/70/100	high pressure sodium	6 ampere
150	high pressure sodium	10 ampere

(10) Where conductors of a public electricity supplier are present within or adjacent to the street, the person who intends to construct a street to which these regulations apply shall consult with that public electricity supplier at the design stage to establish where columns may be safely positioned to avoid danger.

Electricity supply

3. Any person who intends to construct a street shall arrange with a public electricity supplier for a supply of electricity to be provided to the control pillar which shall be sited at the location shown on the approved plan.

Materials

4.—(1) All materials shall be in new (unused) condition when installed.

(2) Luminaires shall comply with the requirements in paragraphs (*a*) to (*l*), that is to say—

(a) luminaires shall comply with BS EN 60598-2-3: 1994 and BS 5489: Part 1: 1992; Part 2: 1992; Part 3: 1992; Part 4: 1992; Part 5: 1992; Part 6: 1992; Part 7: 1992; Part 9: 1996; Part 10: 1992 and BS 5489-8: 1998 and shall be approved by the Department;

(b) luminaires of the integral control gear type shall be complete with a power factor correction capacitor complying with BS EN 61048: 1993 and, where lamp starting is dependent on a high tension ignitor, this shall be provided as a separate item housed in the gear compartment;

(c) luminaire ballast shall comply with BS EN 60922: 1997 or BS EN 60923: 1996 as applicable and shall be suitable for operation on a nominal supply voltage of 230 volts;

(d) the bowls of side entry luminaires shall be hinged and when closed the bowl shall be secured by means of a substantial toggle catch, captive screw or nut;

(e) the whole of the luminaire, with the exception of any separate control gear compartment, shall be dustproof and weatherproof to at least IP 54 standard as defined in BS EN 60529 : 1992;

(f) the luminaire shall be designed so as to prevent any moisture which may collect in the bracket from entering the interior of the luminaire;

(g) the means of supporting the lamp within the luminaire shall ensure that the position of the lamp, relative to the optical equipment, remains constant under all normal conditions throughout the life of the luminaire;

(h) any prismatic refractors built into the luminaires shall have a smooth exterior surface to prevent the accumulation of dirt and to facilitate cleaning;

(i) all reflectors shall be anodised aluminium, vitreous enamelled sheet steel or other suitable material;

(j) an earthing terminal shall be provided in the luminaire;

(k) all luminaires shall be vandal resistant non-corrosive type and bowls shall be of ultra violet stablized material; and

(l) luminaires to comply with BS 5489: Part 2: 1992 shall be suitable for mounting on a 42 mm x 110 mm spigot, luminaires to comply with BS 5489: Part 3: 1992 shall be suitable for mounting on a 34 mm x 110 mm spigot and post top luminaires shall be suitable for mounting on a 76 mm spigot.

(3) Lighting columns, doors and bracket arms shall comply with the requirements in paragraphs (*a*) to (*p*), that is to say—

(a) columns shall be manufactured to BS 5649: Part 2: 1978 (1997); Part 3: 1982 (1997); Part 4: 1982 (1997); Part 5: 1982 (1997); Part 6: 1982 (1997); Part 7: 1985 (1997); Part 8: 1982 (1997) and BS EN 40-1: 1992;

(b) the lighting column manufacturer shall be registered with and certified by the British Standards Institution Quality Assurance Services Limited for the manufacture, supply and verification of lighting columns under their quality assurance schedule to BS EN ISO 9002: 1994;

(c) columns, brackets and doors shall be manufactured from steel equivalent to or better than Euronorm 25-72, Grade Fe 360 B;

(d) after fabrication the columns, brackets and doors shall be hot-dipped galvanised to BS 729: 1971 (1994) and the column root shall be coated internally and externally with bitumen to a height of 300 mm above ground;

(e) the door opening for 5 m and 6 m columns shall be a minimum of 500 mm high x 100 mm wide and for 8 m, 10 m and 12 m columns shall be a minimum of 600 mm high x 115 mm wide and the minimum distance from the edge of the door opening to any point on the surface of the backboard shall be 100 mm;

(f) the bottom of the door opening shall be between 500 mm and 700 mm above ground level;

(g) doors shall be of the overlapping type and shall provide a weatherproof seal to the door opening;

(h) lock assemblies shall be mounted on the door and the mechanism shall be corrosion resistant, fabricated from stainless steel or non-ferrous metal and operation of the lock shall be by a standard triangular headed screw of sufficient length to allow visual sighting of screw engagement;

(i) columns and bracket arms shall be designed for wind loading as designated in BS 5649: Part 2: 1978 (1997); Part 3: 1982 (1997); Part 4: 1982 (1997); Part 5: 1982 (1997); Part 6: 1982 (1997); Part 7: 1985 (1997); Part 8: 1982 (1997) and BS EN 40-1: 1992 using K factor of 2.2 for 5 m and 6 m columns and K factor of 3 for 8 m, 10 m and 12 m columns and Table D;

TABLE D

Column height	*Windage*	*Weight*
5 m and 6 m columns	0.175 sq m	7 kg
Side entry lanterns for 8 m, 10 m and 12 m columns	0.225 sq m	10 kg
Post top lanterns for 10 m and 12 m columns	0.3 sq m	17.5 kg

(j) a type test certificate as detailed in Appendix C of BS 5649: Part 8: 1982 (1997) shall be supplied for each type of column prior to erection on site and copies of the certified results of the tests shall be given to the Department;

(k) column and bracket arm shall be electrically continuous when installed and a brass earthing stud of minimum diameter 6 mm shall be fitted within the column base compartment using 2 nuts and washers of the same material;

(l) the base compartment shall be fitted with a full length hardwood or other substantially non hygroscopic backboard not less than 115 mm wide and 15 mm thick securely fixed internally;

(m) all columns shall have 2 cable entry slots 150 mm x 75 mm located opposite each other, one being under the door opening, and the top of each slot shall be 300 mm below the ground line;

(n) bracket arms shall be separate, demountable type and shall be such that anti-rotation is provided in any of the 90° positions relative to the centreline of the door opening;

(o) bracket arm and spigot dimensions shall be as set out in Table E;

TABLE E

Column height	*Bracket dimensions*
5 m and 6 m columns	Projection: 0.5 m or 0.8 m Uplift: Not exceeding 0.3 m Spigot: 34 mm dia x 110 mm
8 m, 10 m and 12 m columns	Projection: 0.5 m to 3.0 m in 500 mm steps Uplift: not exceeding 2.0 m Spigot: 42 mm dia x 110 mm

; and

(p) columns shall be identified by a number in accordance with a schedule which will be provided by the Department and the number shall be painted mid yellow on a matt black background, 75 mm in height located 2.5 m above ground level facing at right angles to the carriageway or footpath line.

(4) All discharge lamps shall comply in all respects with the following:—

(a) high pressure sodium to BS EN 60662: 1993; or

(b) low pressure sodium to BS EN 60192: 1993.

(5) Electrical control equipment may be installed in damp conditions but shall be adequately protected against corrosion and the ingress of moisture.

(6) Electrical switch fuses and fuse switches shall comply with the requirements in paragraphs (*a*) to (*d*), that is to say—

(a) switch fuses and fuse switches shall be double pole and be of the quick make, quick break type, fitted with removable shields over fixed contacts and complete with operating handle incorporating "ON"/"OFF" indications and fuse carriers shall be suitable for HBC fuses to BS 1361: 1971 (1986);

(b) enclosures shall be of all insulated construction and units shall include an earthing terminal;

(c) the maximum depth of units including handle shall not exceed 125 mm; and

(d) the units shall be type tested to BS EN 60947-3: 1992 with kw ratings as detailed by the manufacturer and shall be satisfactorily tested for a mechanical endurance of 10,000 cycles.

(7) Contactors shall comply with the requirements in paragraphs (*a*) to (*c*), that is to say—

(a) single phase contactors shall be single pole with neutral connecting link and shall be rated with an AC3 utilisation category and complying with BS EN 60947-4-1: 1992;

(b) coil/rectifier units shall be suitable for 230 volt, 50 Hertz, AC operation and shall be protected by a suitable incorporated fuse; and

(c) the contactor shall be enclosed in an all insulated housing, the maximum depth of which must not exceed 125 mm.

(8) PECUs shall comply with the requirements in paragraphs (*a*) to (*h*), that is to say—

(a) all PECUs for road lighting shall comply with BS 5972: 1980 and be guaranteed electrically, mechanically and photometrically for a period of 5 years from the date of purchase;

(b) one-part units suitable for insertion into a twistlock socket to obtain electrical and mechanical connection shall include a current calendar moulded onto the base and have switch on and switch off levels or switch on level and switching ratio clearly marked on the unit;

(c) sockets for use with one part PECUs shall comply in all respects with the requirements of BS 5972: 1980;

(d) the PECU shall be totally solid state with no thermal components and the detector shall be photo diode/transistor. "Switch-on" level shall be 70 lux (± 10 per cent) which must be maintained throughout the life of the cell;

(e) the ratio of the measured "switch-on" level to the measured "switch-off" level shall be 1: 0.5;

(f) an inherent time delay of 15 to 30 seconds shall be incorporated to prevent false switching by transient variations in illuminance;

(g) the PECU shall be pre-set at works and not be capable of adjustment on site and shall be suitable for 207-244 Volt 50 Hz operation; and

(h) the PECU shall be so designed that in the event of a fault occurring within the control circuit the PECU shall "fail safe" in the "on" position.

(9) Cut-outs shall comply with BS 7654: 1997 and shall be as follows:—

(a) all insulated double cable entry for looped services 2 No. 16 mm^2; or

(b) all insulated triple cable entry for looped services 2 No. 25 mm^2 with 6 mm^2 service and shall comply with the requirements in paragraphs (*c*) to (*e*);

(c) all cut-outs shall be constructed from impact resistant material;

(d) provision shall be made for double pole and earth connections within the body of the cut-out; and

(e) cut-outs shall accept HBC fuses up to 25 ampere rating and fuse carriers shall only be removable by use of a suitable tool.

(10) Underground electrical cable may be of the following types:—

(a) PVC insulated and sheathed split concentric cable with earth continuity conductor to BS 4553-1: 1998 except that the neutral conductor shall be covered with black PVC compound providing an insulating layer which shall comply with Type 2 of BS 6746: 1990 and shall be applied by an extrusion process forming a compact homogeneous layer; or

(b) PVC insulated and sheathed, steel wire armoured and PVC sheathed to BS 6346: 1997; or

(c) Multicore wiring cable—covers to comply with BS 6346: 1997 with additional earth core and high-impact PVC sheath.

(11) Surface mounted electrical cables shall be to BS 6004: 1995 and shall comply with the following configurations:—

(a) PVC/PVC flat twin with bare CPC; and

(b) PVC/PVC single core cables; and

(c) green/yellow PVC insulated copper earth wire.

(12) Cable ducting shall be orange, 32 mm internal diameter, made from polythene or PVC and shall be printed along its entire length in 6 mm high blue lettering with the legend "Department for Regional Development— Street Lighting" with the year of manufacture.

(13) Marker tape shall be 150 mm wide coloured yellow and printed along its entire length in 100 mm high black lettering with the legend "Caution—Street Lighting Cable below".

(14) Cable joints, tee and straight through types may be required for cable jointing in connection with the cables specified in the requirements in sub-paragraphs (10) and (11).

(15) Control pillars shall be constructed using hot dip galvanised 3 mm thick mild steel press formed and welded to provide a weatherproof rigid structure and shall comply with the requirements in paragraphs (*a*) to (*m*), that is to say—

(a) doors shall be hinged with brass replaceable hinges;

(b) closed cell PVC compression gasket shall be fitted round the rear door faces providing full weather protection;

(c) louvred vents protected by insect-proof perforated internal mesh baffles shall be provided;

(d) mounting brackets shall have two 15 mm holes at 230 mm centres;

(e) door key aperture shall be protected by a brass bung removable by special key which should be compatible with Lucy-type locks and bungs, and

(i) small pillars shall have single lock only;

(ii) medium pillars shall have twin locks; and

(iii) large pillars shall have double doors and twin locks;

(f) a facility shall be provided on the mini pillar to enable the door to be securely locked by means of a padlock by an operative while working on a system serviced from this pillar;

(g) storage shall be provided, on the rear of the pillar door, for A4 size documents;

(h) brass 10 mm studding complete with 10 mm full nuts and whole plain washers in brass shall be mounted midway up the left inside wall of pillar;

(i) the lower portion of the pillar shall be fitted with a removable 3 mm thick apron plate manufactured from galvanised steel, painted and retained by six 8 mm bolts and washers, screwed into nutserts within the main body of the enclosure;

(j) the pillar shall be protected against corrosion to meet the requirements of the Department of the Environment for Northern Ireland Manual of Contract Documents Volume 1, Specification for Highway Works, Series 1900 Protection of Steelwork against Corrosion; colour shall be Hollybush Green in accordance with BS 4800: 1989 (1994)—14639 so as to give a guaranteed life on site, in areas of mild environmental pollution, of at least 15 years;

(k) mini pillars shall be coated internally and externally with bitumen from the base up to bottom line of door;

(l) a backboard manufactured from 15 mm thick tanalised plywood shall be fitted using 4 screws and nuts with nylon shrouded washers and shall be of the following dimensions—

(i) small pillar backboard— height 600 mm by width 600 mm; or

(ii) medium pillar backboard— height 1,000 mm by width 600 mm; or

(iii) large pillar backboard— height 1,000 mm by width 1,400 mm

fitted to provide the following depths from backboard to door—

(iv) small pillar, minimum 140 mm; or

(v) medium pillar, minimum 200 mm; or

(vi) large pillar, minimum 300 mm; and

(m) each pillar shall be provided with a white heavy duty plastic label secured to the outside of the door, bearing the legend "DRD Roads Service" in black embossed lettering, 6 mm high.

Setting out and location of equipment

5.—(1) The position of all equipment shall be approved by the Department subject to its right to modify the position of that equipment.

(2) Columns and supply pillars shall normally be positioned a minimum of 800 mm from the edge of carriageways but in all cases underground and above ground equipment shall be located within the area to be adopted.

Storage of materials

6.—(1) To ensure that all materials are in a new (unused) condition when installed they shall be stored in accordance with sub-paragraphs (2) to (4).

(2) Columns shall be properly stacked to prevent damage and the collection of water inside them.

(3) Underground cables, both in storage and when installed, shall have cut ends sealed to prevent the ingress of moisture.

(4) Luminaires and other electrical equipment shall be kept in dry storage until installed.

Civil works

7.—(1) Trenches for street lighting cables in footways or footpaths shall be excavated to a depth of 600 mm from finished ground level, a 100 mm bed of quarry dust or dead sand shall be spread along the base of the trench prior to laying the orange cable duct, or the steel wire armour cable and when the duct or cable has been laid it shall be covered with 100 mm of quarry dust or dead sand and the marker tape laid on top in accordance with Figure 4.

(2) Trenches for street lighting road duct in a carriageway or shared surface shall be excavated to a depth of 900 mm from finished ground level and a 150 mm UPVC duct shall be laid in the trench and haunched with 100 mm of concrete prior to being backfilled.

(3) Cable laying shall comply with the requirements of paragraphs (*a*) to (*d*), that is to say—

(a) cable shall be laid in the longest practicable lengths with no straight joints on runs of less than 50 m;

(b) cable laying shall not be carried out unless the ambient temperature is above zero degrees Celsius and has been above this temperature for the previous 24 hours;

(c) cable drums shall be supported on an adequate transport mechanism whilst cable is being drawn off and when drawn off, cable shall be handled carefully to avoid kinking or damage by site traffic; and

(d) cable loops in supply pillars and column bases shall be of sufficient length to enable connection to be made to the intended equipment.

(4) Excavations for street lighting column bases shall be in accordance with Figure 5 with the final 150 mm layer of excavation not removed until immediately before installing the column which shall be erected in a vertical position and the bracket and door orientation in accordance with Figures 6 and 7 respectively.

(5) Where the excavation exceeds the dimensions set out in Figure 5 the backfilling in excess of the minimum concrete volume shall consist of grade C7.5/40 concrete.

Electrical works

8.—(1) The electrical installation shall be carried out—

(a) by a contractor approved by the National Inspection Council for Electrical Installation Contracting(**1**); and

(b) in accordance with BS 7671: 1992 Figure 1 or 2 as appropriate.

(2) Wiring between the lantern terminal block and cut-out in the column base compartment shall be twin and earth cable of 1.5mm^2 conductor size, secured by plastic cable clips or ties and generally installed in accordance with Figure 3.

(3) All metalwork (other than current carrying parts) shall be earthed and all connections to earth studs shall be by means of correctly sized crimped lug terminations and the protective conductor within the twin and earth lantern supply cable shall run continuously from the lantern terminal block to the cut-out earth terminal on the outgoing side, with a separate 2.5mm^2 protective conductor taken from the column earth stud to the cut-out earth terminal on the incoming side.

(4) Cabling between control pillar and single part photo cell shall be by means of 4 core 2.5mm^2 Hi-Tuf cable with fault, overcurrent protection and isolation provided in the control cubicle and a separate photo cell neutral supply provided.

(5) Any person who intends to construct a street shall arrange for each completed electrical installation to be tested in accordance with BS 7671: 1992 and for a copy of the test results to be supplied to the Department."

(**1**) A list of approved contractors is obtainable from NICEIC, Vintage House, 37 Albert Embankment, London SE1 7UJ (Telephone: 0171 5642323)