

Section H

Section 38 Agreement Standard Specification for Residential, Industrial and Commercial Estate Roads

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1 Section 1 – Standard Specification for Residential, Industrial and Commercial Estate Roads

1.1 The specification referred to in this agreement shall be the Specification for Highway Works (SHW) published by T.S.O. (The Stationery Office). The edition of the specification shall be that current three months prior to the agreement being signed. The developer is advised that the Quality Assurance requirements listed in Appendices A and B of the Specification for Highway Works will be enforced for all aspects of the works.

1.2 Design, Setting-out, Construction, Completion and Maintenance of the Works

The Developer shall be responsible for the true and proper design, setting-out, construction and completion of the works. If at any time during the progress of the works any error shall appear or arise in the design, position levels, dimensions, or alignment of any part of the works, the Developer on being required so to do by Rhondda Cynon Taf County Borough Council (RCTCBC) shall at his own cost rectify such error to the satisfaction of the RCTCBC, unless such error is based on incorrect data supplied in writing by the RCTCBC in which case the cost of the same shall be borne by the RCTCBC. The checking of any design, setting-out or any line or level by the RCTCBC shall not in any way relieve the Developer of his responsibility to design, construct, complete and maintain the works until the Final Certificate of Completion has been issued and the roadworks adopted accordingly.

The specification shall be further modified and extended by any substitute, additional and cancelled clauses listed in Section 2.

1.3 A Substitute Clause, as indicated by the suffix 'S' is a modification originating from the Overseeing Department and is published in Section 2. A Substitute Clause suffixed 'SR' is a Regional or scheme specific modification.

Both types of Substitute Clauses are major text modifications of a clause in the Specification and supersede the whole of the Clause.

1.4 An Additional Clause supplementing the Specification with a suffix 'A' originates from the Overseeing Department and is published in Section 2. A Clause with suffix 'AR' is a Regional or scheme specific addition. Both types of additional clause have a number subsequent to the last Clause of its Series in the Specification.

- 1.5 A Cancelled Clause is indicated by the suffix 'C' or 'CR' and is a Clause entirely deleted from the Specification, either by the Overseeing Department in Section 2, or a Regional or scheme specific cancellation respectively.
- 1.6 Insofar as any of the numbered Appendices, Regional, Substitute, Additional or amended Clauses may conflict or be inconsistent with any provision of the Specification for Highway Works then the numbered Appendices, Regional, Substitute, Additional or amended Clauses shall always prevail.
- 1.7 Any reference in the Section 38 Agreement to a Clause number or Appendix shall be deemed to refer to any Substitute Clause or Appendix as listed in Section 2.
- 1.8 Reference to Clauses shall apply equally to Tables. Where a Clause is amended or Substituted any Table referred to in the original Clause shall apply unless the Table is also amended. When a Table is amended any reference in a Clause to the original Table shall apply to the amended Table.
- 1.9 Any Clauses in the specification which relate to work or materials not required for the Works shall be deemed not to apply.
- 1.10 Any Appendices referred to in the Specification, which are not used, shall be deemed not to apply.
- 1.11 The term "Contractor" referred to in the "Specification for Highway Works" shall be substituted by the term "Developer" when used in connection with this Section 38 Agreement, and the term "Engineer" shall be substituted with the term "Highway Authority".

2 Section 2 - Substituted, Additional and Cancelled Clauses

SUMMARY

Series No.	Series Title	Clause No.	Clause Title
100	General	100S	Note
		117AR	Temporary Diversion of Traffic
		170AR	Notice of Operating
		171AR	Temporary Lighting
		172AR	Publicity
		173AR	Road Cleansing
		174AR	Control of Airborne Dust
		175AR	Limitation of Vibration
700	Road Pavements General	770AR	Adjustment of Ironwork in Carriageways and Footways
900	Road Pavements	970AR	Heating and Planning, Cold Planning and Carbonising
1100	Kerbs, Footways and Edgings	1170AR	Concrete paving blocks

100S:-Note

- a. Any Clauses in this Specification which relate to work or materials not required for the works shall be deemed not to apply.
- b. Unless stated to the contrary, any thickness of material described means the thickness after full compaction.
- c. Unless specifically defined otherwise, the definition of terms used in this specification shall be that in the Glossary of Highway Engineering Terms BS 6100:Part 2:Section 2.4 and abbreviations are in accordance with the recommendations given in BS 5775:Part 11

117 AR – Temporary Diversion of Traffic

- a. The Developer shall construct temporary diversion ways whenever the Works will interfere with existing public or private roads or other ways over which there is a public or private right of way for any traffic.
- b. The standard of construction and lighting shall be suitable in all respects for the class or classes of traffic using the existing road and the width of the diversion shall not be less than that of the existing way unless otherwise agreed with the Highway Authority Engineer. The existing way includes the footways, back lanes and private means of access.
- c. Diversion ways must be constructed in advance of any interference with the existing ways and shall be maintained to the satisfaction of RCTCBC and the Highway Authority Engineer for as long as required to provide adequately for the traffic flows. The Developer shall submit in writing for the Highway Authority Engineer's approval all details of the layout, signs and markings and construction of any diversion which he proposes to provide. He shall give the Engineer at least 7 days' notice to such proposals.
- d. The provisions of this Clause shall not apply to any temporary access or accommodation works, which the Developer may construct for his sole use in the execution of the Works.
- e. The Developer shall consult with occupiers before commencing construction to any temporary diversion affecting the freedom of access to their property and shall maintain equivalent access at all times.
- f. Detailed requirements relating to construction and layout of all temporary diversions are set out in Section 3 Table 3/1 and are subject to the Highway Authority Engineer's approval.
- g. The Developer shall ensure that except as varied hereafter a highway or private means of access which is to be stopped under the Side Roads Order is not physically closed as a result of the works until the alternative is available for use. The Developer shall provide and maintain suitable signs to convey to the public the diversion route on the highway. Before any diversion is opened the Developer shall obtain final approval from the Highway Authority Engineer. The rearrangement of traffic flows on the day on which the diversion is initially put into effect shall be carried out after consultation with the Police.

170AR – Notice of Operations

- a. No important operation shall be carried out without the consent in writing of the Engineer or without full and complete notice, also in writing, being given to him sufficiently in advance of the operation to enable him to make such arrangements as he may deem necessary for its inspection.
- b. The Developer shall also give to the Highway Authority Engineer's representative not less than 48 hours notice of his intention to set out or give levels for any part of the works, in order that arrangements may be made for checking.

171AR: Temporary Lighting

The Developer shall ensure that the roadworks are adequately illuminated during the period of the works. The positions and types of temporary street lighting are to be agreed with the Highway Authority Engineer before any existing street lamps are moved.

172AR: Publicity

- a. The Developer shall not give any information concerning the works for publication in the press or on radio, television or screen or elsewhere without the written approval of the Highway Authority Engineer.
- b. All advertisements to be erected within the Site by the Developer or by his Sub-Contractor shall first be approved by the Highway Authority Engineer.
- c. All advertisements within the site shall be removed within one month of the date of issuing the Section 38 Part 2 Certificate.

173AR – Road Cleansing

Existing roads, footways, accesses to adjacent houses, buildings etc. and any new roads, drains, ditches and grips whether part of the site or not and which are being used by any vehicles or items of plant of the Developer or his subcontractors or suppliers in connection with the works, shall be kept clean and free from all dirt, mud and material dropped from vehicles or tyres and tracks.

The Developer shall arrange for the frequent inspection of the highway used by his vehicles and those of his subcontractors or suppliers and for the immediate removal of any mud or other material deposited thereon.

174AR: - Control of Airborne Dust

The Developer is required to take all precautions to prevent the spread of airborne dust to any habitable property and / or premises requiring a very high standard of hygiene and to conform to all Statutory Instruments.

175AR – Limitation of Vibration

The Developer shall take all steps necessary to limit the vibration caused by plant and machinery used on the Site within 100 metres of dwellings to a reasonable level and shall obtain the prior approval of the Highway Authority Engineer to the type of plant to be employed in these locations.

770AR: Adjustment of Ironwork in Carriageways and Footways

All existing gullies, manhole covers, stop valves, hydrants and the like shall be adjusted to conform with finished carriageway and footway levels prior to the laying of the surface course material.

970AR – Heating and Planning, Cold Planning and Carbonising

- a. Work carried out shall include all the works necessary for proper execution and shall be carried out under the supervision and to the satisfaction of the Highway Authority Engineer.
- b. The machinery shall be fitted with equipment for smoke elimination, dust control, suppression of unnecessary noise as appropriate and for loading planed materials into lorries.
- c. The Highway Authority Engineer will direct that the surface is treated by one of the following methods:-

- i. Heating and Planning comprising the heating of surfaces of carriageways and removal of surplus material by the planning action of a machine of suitable design.
- ii. Cold Planning comprising the grinding and planning of carriageway surfaces by a machine of suitable design and removal of surplus materials.
- iii. Carbonising comprising the heating of carriageway surfaces to a temperature just sufficient to carbonise excess binder only.

Whichever method is used, the carriageway on completion should have a clean and regular running surface capable of satisfactorily receiving a surface course. The Developer will be required to reinstate to the necessary standard any area damaged by faulty plant or workmanship.

- d. No payment shall be made for material removed in excess of the thickness specified by the Highway Authority Engineer. The Developer will be required to bear the cost of replacing additional material required in subsequent surfacing work to restore the levels of areas of road removed in excess of the thickness specified.
- e. The Highway Authority Engineer shall decide whether or not climatic conditions are suitable for work or will necessitate the cessation of work and the Developer shall disregard the Highway Authority Engineer's decision only at his own risk.
- f. The Developer shall take all necessary steps to prevent damage to hedges, trees, street furniture or anything, which may be damaged by heat or by the Contractor's plant.

1170AR – Concrete Paving Blocks

Concrete paving blocks should comply with the requirements of the Specification for Precast Concrete Paving Blocks BS 1338 and be laid in accordance with BS 7533: Part 3.

1. **Construction details and tolerances**

- a) Laying patterns : recommended laying pattern for cul-de-sacs shall be herringbone
- b) Surface levels of pavement layers : The surface levels of the various layers of pavement construction shall not deviate from the design levels by more than the following:

Formation + 20mm to – 30mm

Sub-base	± 20mm
Base course (where required)	± 10mm
Binder course	± 10mm
Sand laying course	± 10mm
To gullies	– 6mm

- c) Surface levels adjacent to drainage furniture: The surface level of the paving blocks immediately adjacent to gullies, surface drainage channels and outlets should not deviate from the design level by more than ± 6mm.
- d) Deviations in surface levels: The deviation from the design profile measured under a 3m edge should not exceed 10mm.
- e) Levels of adjacent blocks: The levels of two adjacent blocks should not differ by more than 2mm.
- f) Requirement for coloured blocks : Refer to Design Guide for Residential, Industrial and Commercial Estate Roads

2. Crossfalls and Gradients

A minimum crossfall of 1 in 32 should be adopted where practicable. Longitudinal gradients should be not less than 1 in 80 where practicable.

3 Pavement Construction

3.1 Preparation of subgrade

- (i) Width of subgrade: This subgrade should be prepared to the required formation (see Clause 1170AR.1.b). It should be sufficiently wide to extend to the rear face of proposed edge restraints and abut existing structures.
- (ii) Drainage of subgrade: This subgrade should be drained and protected against inundation and ground water by piped or channelled storm water drainage and subsoil drainage.

All drainage trenches within the pavement area should be backfilled in such a way as to be not inferior to undisturbed ground.

All piped and subsoil drainage construction located beneath the pavement should be completed in conjunction with subgrade preparation before the commencement of sub-base construction.

- (iii) Removal of unsuitable material: Any unsuitable material should be removed from the subgrade and treated or replaced with a suitable properly compacted material.

3.2 Preparation of Sub-base

- (i) New sub-base: Sub-bases (Type 1) should be constructed by using one or other of the materials complying with the Highways Agency Specification for Highway Works, Clause 803, where recycled aggregates are prepared for use; this must be subject to the Highway Authority Engineer's approval.
- (ii) Existing sub-base: The sub-base should be inspected to ensure that it is suitable for the purpose and its surface free from deleterious materials and soft patches.

Any unsuitable material should be removed and replaced by sub-base material complying with Clause 803 and compacted in accordance with Clause 802 to bring it within the tolerances given in Clause 1170AR.1.b.

3.3 Preparation of the Binder Course

Material for use as a binder course layer shall be Open Graded binder course AC20 open bin 100/150 to BS 13108-01 laid to a compacted thickness of 100mm.

3.4 Laying Course

- (i) Surface on to which laying course is placed: The surface on which the laying course is placed should be structurally sound, free from contamination and true to line and level within the tolerances given in Clause 1170AR.1.b.
- (ii) Laying course material: Laying course material shall be selected, prepared and installed in accordance with the requirements of Clause 5.3 of BS 7533: Part 3.

3.5 Edge restraints

Edge restraints should be provided along the perimeter of all paved areas and should be adequate to support traffic loads and to prevent the escape of laying course material from beneath the paved surface.

Edge restraints should be formed before compacting adjacent blocks and the restraint, together with any concrete haunching, should be mature before vibration of the surface course is undertaken. Haunching to an edge restraint on the paving face should be vertical down to the level of the underside of the laying course.

3.6 Laying Block Paving

The blocks should be laid hand tight, in the design pattern, working from the existing laying face or edge restraint wherever possible.

Mechanical force should not be used to obtain tight joints. Block shapes designed to assist with the formation of boundaries and with changes in direction may be incorporated as appropriate.

3.7 Trimming

Blocks should be trimmed to shape and size in order to form boundaries and in order to work around any obstructions. Where trimming of blocks is necessary, portions of less than a third of an entire block must be avoided.

3.8 Compaction of Block Paving

Installation of the surface course shall be in accordance with BS 7533-3, Clause 5.4. The surface course should be compacted by use of the appropriate equipment in order to ensure the filling of the lower portion of the block to block joint by the laying course material. Two or three passes of the compacting equipment will normally be required to achieve this position.

Compaction should follow laying as soon as possible but should not be carried out within one metre of the laying face. Apart from the edge strip no area of paving should be left un-compacted at the completion of the day's work.

3.9 Joint Filling

After compaction of the surface course, joint filling material conforming to Annex D.1.2 of BS 7533: Part 3 should be spread over the surface and brushed into the joints. The block paved area should then be re-vibrated as before in order to encourage the filling of the upper part of the block to block joint by the surface applied sand. Top filling and final compacting should be completed as soon as practicable after laying and in any case prior to the termination of work on that day.

3.10 Early Trafficking

Immediately after the finishing pass of the plate compactor, traffic may be permitted to use the pavement. If, during the early trafficking period, any movement of the surface course occurs the units should be removed, the cause established and the area re-laid immediately.

Section 3 - Traffic Safety and Management (Clause 117)

Responsibility for Traffic Management etc

Agent / Developer: - _____

Address: - _____

Tel. No.: - _____

is responsible for the traffic safety and management and associated work as described in Clause 117 and the following _____

Traffic and Management Requirements

The developer shall submit in accordance with Clause 117.3 drawings showing the traffic management layout he intends to utilise and these should contain sufficient detail for the Highway Authority Engineer to consider his proposals. Specifically these drawings should contain details of the following:

- a) Position of any proposed temporary traffic signals
- b) Width of all running lanes (see Table 3/1)
- c) Details of temporary signing to be used

Traffic Orders

Notice required by the Highway Authority Engineer for him to arrange for:

- a) Amending or Making Temporary Traffic Orders – Minimum 8 weeks
- b) Authorising of non-prescribed signs – Minimum 3 months
- c) Authorising temporary traffic signals – Minimum 6 weeks (the Engineer will also require 1 week notice prior to the actual date of installation of the temporary traffic signs)
- d) Moving signs to be compatible with the state of the works as described in Clause 117.6 – Minimum 2 weeks

Table 3/1

Schedule of Minimum Standards for Temporary Diversions

Item	Standard
Width of running surface	3.5m one-way 5.5m two-way (both with widening as necessary at curves and junctions)
Radius of horizontal curvature	45m
Visibility distance at	50m 1.05m above road surface (excluding ramped sections)
Gradient	Desirable minimum – Not steeper than 6% Absolute maximum – Not steeper than gradient of existing route
Crossfall	Not greater than 5% Adverse crossfall will not be permitted
Carriageway Construction (on approved formation)	200mm Type 1 sub-base 150mm coated macadam 75mm single course dense macadam
Carriageway edges	Carriageway constructed full depth to a width 0.5m greater than the running surface with a continuous line of 300mm x 300mm timber baulks dogged together and bolted to road surface and painted with alternate white and black bands

Table 3/1

Schedule of Minimum Standards for Temporary Diversions

Item	Standard
Drainage	An adequate system of drainage shall be maintained at all times
Road markings	If any gaps in carriageway edgings are left for access they shall be marked by a continuous white edge line 100mm wide.
Lighting	Diversions of public and private rights of way which have existing illumination shall be illuminated to at least the same standard. All ramps and temporary traffic signs shall be illuminated
Footways	Minimum width 1.5m 100mm Type 1 sub-base 25mm open textured macadam Footways shall be constructed behind the timber baulks at the carriageway edges and be bounded on both sides by protective fencing
Fencing	Cleft chestnut pale fencing in accordance with Clause 303

Notes

1. In the case of private accesses, the diversions shall conform with the requirements of Clause 117AR. The Developer shall provide maintain and finally remove all necessary temporary gates, stiles, ramps and the like and shall provide temporary crossings of trenches and other obstructions. While these ways are maintained across the Site they shall, unless otherwise agreed by the Highway Authority Engineer, be maintained at existing ground level and fenced on both sides with cleft chestnut pale fencing in accordance with Clause 303. Gaps in the fencing for Site traffic shall be to the approval of the Highway Authority Engineer.
2. The Developer shall submit all proposals to the Highway Authority Engineer for prior approval.

Section 4 - Manhole, Gully and Fabricated Steel Access Covers

1. General Requirements for Manhole Tops and Gully Tops

All castings shall be certified by certification bodies approved by RCTCBC. Approval will be conditional upon the certification body being accredited to EN 45011 by UKAS, and approved with EN 124 accreditation included within the scope granted within EN 45011 and be accredited to EN 45012 for assessment.

All products must fully comply with European Standard BS EN 124.

- All products shall have been designed and manufactured by a company operating an ISO 9001:1994 Quality Management System that has been assessed by an approved certification body.
- All products shall have been tested with a body (third party) that is accredited to EN 45001, BS EN 124 within its scope.
- All certificates provided shall have been issued to the manufacturer by an approved certification body.
- All elements of the BS EN 124 certification process shall have been undertaken by a single certification body.

The classification for all manholes and gullies shall be D400. All products shall be marked as stated in Clause 9 of BS EN 124:1994 and include the manufacturers name not just a code, the BS EN 124 markings shall be visible after installation.

All manholes and gully gratings shall be supplied with a raised pattern to improve skid-resistance in service.

2. Materials for Manhole Tops and Gully Tops

2.1 Manhole covers and frames shall be made from either:

(I.) Flake Graphite cast iron. (Grey iron) (ISO 185:1988).

(II.) Spheroidal Graphite cast iron (Ductile iron) (ISO 1083:1987).

2.2 Gully gratings and frames shall be made from Spheroidal graphite cast iron. (Ductile iron) (ISO 1083:1987)

2.3 Fine cast units are required.

3. Design Requirements - Manhole Tops

- 3.1 Manhole tops are not required to have vents
- 3.2 Manhole tops shall have a minimum clear opening of 675mm with a diagonal measurement not less than 955mm.
- 3.3 Depth of insertion shall be at least 50mm or the depth of the cover / grating immediately adjacent to the frame shall be not less than 80mm if the design relies upon the depth of insertion for security.
- 3.4 Seatings are to be manufactured in such a way as to ensure stability and quietness are achieved without the use of any cushioning inserts.
- 3.5 If couplings are present in the casting then loose couplings shall be of steel or spheroidal graphite cast iron (ductile iron). If bolts are used as couplings in manhole covers, they shall comply with BS 4190, be of no less size than M16, hexagon head complete with hexagon nuts. Other types of loose couplings shall have a minimum cross-sectional area of 140mm². Any pins or circlips used as part of the securing device shall be of equal cross section or be sufficiently protected to give a life equal to main components. Any loose coupling shall not be able to vibrate free during its service life.
- 3.6 Manhole tops shall be to BS EN124 Class D400 of double triangular design with a minimum clear opening of 675mm (minor intrusions at the frame corners are allowed for the cover support). The design shall be non-rocking and incorporate a hinged, locking mechanism. The frame shall be 150mm deep and shall have a base flange width of at least 75mm. Alternatively manhole tops shall be to BS EN 124 Class D400 with a traffic intensity rating N (normal) of double triangular design with a clear opening of 675mm (minor intrusions at the frame corners are allowed for the cover support). The design shall be non-rocking. The frame shall be 150mm deep and shall have a minimum corner flange width of 75mm and incorporate bonding ribs on corner flanges and a load transfer system.
- 3.7 For all units the frame bedding width shall be a minimum of 75mm of metal. The external corners of the frame shall be solid and may be square, curved or chamfered but at no point should the width be less than the minimum bedding width. There should be a maximum variation of ± 3 mm in the bedding flange depth.

- 3.8 Where the weight of a frame exceeds 15kg it shall be provided with suitable lifting holes. These shall be located to give a balanced lift. Any holes within the bedding area of the frame shall not reduce the specified minimum bearing area of the frame.
- 3.9 At least two keyways shall be provided. Where a cover is divided into two or more coupled sections each section shall be provided with at least one keyway. Closed keyways shall be provided unless otherwise specified.
- 3.10 Sealing is not required unless otherwise specified.
- 3.11 Where vertical frame webs/gussets are provided, the tops of the webs/gussets shall be at a minimum of 15mm below the top of the frame for triangular webs / gussets and at a minimum of 25mm for quadrilateral shaped webs / gussets.

4. Design Requirements - Gully Tops

- 4.1 Gully tops shall be to BS EN 124 Class D400.
- 4.2 Gully gratings and frames shall be of hinged design kerbside opening. Hinged gully gratings shall be manufactured so that the grating is an interference fit in the frame to prevent casual opening in service.
- 4.3 Nominal width of gully gratings shall be 375mm, minimum area of waterway shall be 980cm². Of the total waterway area, there shall be a minimum waterway area of 45cm² between the kerb face of the frame and a parallel line 50mm distant and there shall be a minimum waterway area of 65cm² between the kerb face of the frame and a parallel line 90mm distant. The frame shall be at least 100mm deep and shall have a base flange of at least area 1000 sq. cm.
- 4.4 If slot orientation to direction of traffic is between 0° to 45° and 135° to 180°, the maximum length of slot shall be 150mm if the slot is wider than 16mm.
- 4.5 Kerb type gully covers and frames.

Kerb type units should provide a kerb-side water intake and an access cover, if hinged it shall open away from the carriageway. Weir depth (distance from top of cover to top of fixed weir, if any,) shall be 115mm, Type 1.

NOTE: - Kerb type gully covers and frames should be provided with a half batter profile to BS EN 1340 unless otherwise specified.

(i) SPECIFIED DIMENSIONS

The critical dimensions of kerb-type gully covers and frames shall be as given in the table 4/1.

Table 4/1

KERB TYPE GULLY COVERS AND FRAMES				
Reference	Weir Depth	Minimum net weir length	Minimum rectangular clearway	Minimum rectangular clear opening
Type 1	mm 115	mm 425	cm ² 250	mm 400 x 250

(ii) DESIGN FEATURES

Weir length and waterway. Interruptions to weir length and cleaning area, produced by debris trap features should not reduce the specified minima.

Road retaining bar. A metal road retaining bar, of minimum cross-section 35mm x 25mm for use during construction shall be provided. It should be supplied loose so as to allow adjustment to suit the required road level.

Access Cover. The cover should be provided with either (an) open keyway(s) or a locking mechanism. Where a cover can be readily raised without the use of the key or other tool, a locking mechanism should be provided. Where a hinge is provided this should be at the rear edge of the cover, as viewed from the road. The top shall be self-draining and have a raised pattern conforming with BS EN 124.

Debris trap. A grid with (a) horizontal bar(s) of minimum diameter of 12mm, galvanised in accordance with BS EN ISO 1461 or a minimum of two integrally cast vertical fins shall be provided to act as a debris trap across the open mouth of the unit.

Cleansing access. The opened unit should provide a minimum rectangular clear opening 375mm x 250mm.

5. Installation of Manhole Tops and Gully Tops

Installation shall be in accordance with the Department of Transport Standing Committee on Highway Maintenance (SCHM) - Preferred Method 7, Adjustment of Street Ironwork.

6. Fabricated Steel Access Covers

6.1 General Requirements

The classification for all fabricated access covers shall be BS EN 124 Class D400.

All fabricated steel covers shall be certified by certification bodies approved by RCTCBC and be appropriately marked.

6.2 Materials

- (i) Fabricated steel covers and frames shall be manufactured from heavy gauge steel to BS EN 10025 or stainless steel to BS EN 10088 of appropriate thickness to ensure long term serviceability
- (ii) All units shall be galvanised to BS ES ISO 1461 requirements
- (iii) Units shall be supplied as single seal unless otherwise specified
- (iv) Neoprene gaskets are not required unless otherwise specified

6.3 Installation of Fabricated Steel Access Covers

- (v) The developer shall follow any installation recommendations made by the access cover and frame manufacturers. A method statement detailing the proposed installation system to be adopted by the developer shall be supplied for approval before works commence.

Note: The requirements for Steel Access Covers with a clear opening of over 1m² are detailed in BS 9124:2008. Where these are required they will be specified / approved by Rhondda Cynon Taf County Borough Council.

Section 5 - Permitted Pavement Options – Flexible Construction

The relevant details of the flexible construction pavement are set out below.

1. Location: Residential (R) and Industrial (I) Estate Roads
2. Grid checking surface levels of pavement courses (Clause 702.4)
3. Longitudinal dimension: 5 metres Transverse dimension: 2 metres
4. Surface Regularity (Clause 702.5, Table 7/2)
5. Rolling Straight Edge Category of Road B (Table 7/2)
6. Void Content at Refusal (Clause 929.3)
7. Void Content at Refusal (Clause 929.3) is not required for base course and binder course materials unless otherwise directed by the Highway Authority Engineer
8. N/A
9. Measurement of surface macrotexture of bituminous Surface Courses (Clause 921) is required for high speed roads where posted speed of traffic exceeds 80km/hr. The sand patch method in BS 594-105 may be used for routine monitoring, but the BS EN 13036-01 method (volumetric patch) shall be used as the reference method in case of dispute.
10. N/A
11. Before the asphalt is laid, the vertical faces of access chamber covers, gully tops, kerbs, channels and similar projections against which the asphalt is to abut shall be cleaned and painted with a thin uniform coating of hot applied 40/60 or 70/100 paving grade bitumen, or other product which has been approved by the Highway Authority Engineer.
12. No additional requirements
13. No additional requirements
14. N/A
15. Surface course material and other bituminous pavement layers:

Coarse aggregate percentage:	No additional requirements
Minimum delivery temperature:	No additional requirements
Thickness:	As defined in schedule(s) following

Maximum wind speed: No additional requirements
Minimum air temperature: No additional requirements

The use of limestone aggregates in accordance with BS 812 will not be permitted in any surface course. The type and source of coarse and fine aggregates shall not be changed without the approval of the Highway Authority Engineer. Fine aggregates produced by blending two constituent materials shall be proportioned by a method approved by the Highway Authority Engineer.

16. The Aggregate Types used in binder course and base course materials shall be Crushed Rock or Blast Furnace Slag (Not Limestone) when it is proposed to traffic that section of the works for more than 6 months prior to laying of the surface course.
17. Where macadam materials containing blue pennant gritstone aggregate are to be trafficked for more than 4 weeks before the application of the next course the binder content shall be increased by 0.5%.
18. For Hot Rolled Asphalt Surface Course that requires the addition of chippings, the clause 7.2 of BS 594987 apply in that the rate of spread of chippings shall be at least 70% of that needed to give shoulder-to-shoulder cover.
19. Details of the materials and corresponding thickness comprising the permitted pavement options are set out in the following tables.

Table 5/1 PERMITTED MATERIALS FOR FLEXIBLE PAVEMENTS: Industrial and Commercial Estate Roads

	Clause	Material	Grade of Binder	Thickness (mm)	Special Requirements
Surface Course	911	Hot Rolled Asphalt Surface Course (Design mixtures)	40/60	40	<p>Mixture designation: HRA 30/14 F surf 40/60 or HRA 30/14 C surf 40/60 des (to BS 13108-4; PD 6691 Annex C).</p> <p>Minimum PSV of course aggregate: 45.</p> <p>Aggregate Types: Crushed rock or Slag (Blast Furnace or Steel Slag).</p> <p>Coated chippings: 14/20mm (to BSI PD 6682-2) and Clause 915 (BS 13108-4; PD 6691 Annex C).</p> <p>Minimum PSV: 65 Maximum AAV: 12</p> <p>Surface macrotexture: is required only on high speed roads where posted speed of traffic exceeds 80km/hr.</p> <p>Initial texture depth: 1.5mm (average for 1000m section) and 1.2mm (average for set of 10 measurements) as per Table 9/3 (SHW).</p>
Binder Course	905	Hot Rolled Asphalt Binder Course (Recipe mixtures)	40/60	60	HRA 60/20 bin 40/60 to BS 13108-4 (PD 6691 Annex C).
	906	Dense Binder Course Asphalt Concrete (Recipe mixtures)	100/150	60	AC 20 Dense bin 100/150 to BS 13108-1 (PD 6691 Annex B). Where blue pennant gritstone is used the binder content should be 5.2 ± 0.5%.



	Clause	Material	Grade of Binder	Thickness (mm)	Special Requirements
Base Course	906	Dense Base Asphalt Concrete (Recipe mixtures)	100/150	150	AC 32 Dense base 100/150 to BS 13108-1 (PD 6691 Annex B). where blue pennant gritstone is used the binder content shall be: $4.7 \pm 0.5\%$.
	904	Hot Rolled Asphalt Base	40/60	150	HRA 60/32 base 40/60 to BS 13108-4 (PD 6691 Annex C).
Sub-base	803	Granular Sub-base Type 1		250	Minimum CBR: 5% Note: Capping required as shown in Design Guide for Residential, Industrial and Commercial Estate Roads where CBR values lower than 5%

Note: For Base and Binder course mixtures that will be trafficked for more than 4 weeks before the application of a surface course / binder course, the binder content must be increased by 0.5%.

Table 5/2

PERMITTED MATERIALS FOR FLEXIBLE PAVEMENTS: Residential Roads

	Clause	Material	Grade of Binder	Thickness (mm)	Special Requirements
Surface Course	912	Close Graded Asphalt Concrete Surface Course	100/150	40	AC 10 Close surf 100/150 to BS 13108-1 (PD 6691 Annex B). Minimum PSV: 55 Maximum AAV: 14 Aggregate: Crushed Rock or Slag (LIMESTONE IS NOT PERMITTED IN SURFACE COURSE).
Binder Course	905	Hot Rolled Asphalt Binder Course (Recipe mixtures)	40/60	60	HRA 60/20 bin 40/60 to BS 13108-4 (PD 6691 Annex C).
	906	Dense Binder Course Asphalt Concrete (Recipe mixtures)	100/150	60	AC 20 Dense bin 100/150 to BS 13108-1 (PD 6691 Annex B). Where blue pennant gritstone is used the binder content should be $5.2 \pm 0.5\%$.
Base Course	906	Dense Base Asphalt Concrete (Recipe Mixtures)	100/150	100 (150 for bus routes)	AC 32 Dense base 100/150 to BS 13108-1 (PD 6691 Annex B). Where blue pennant gritstone is used the binder content shall be: $4.7 \pm 0.5\%$.
Sub-base	803	Granular Sub-base Type 1		250	Minimum CBR: 5% Note: Capping required as shown in Design Guide for Residential, Industrial and Commercial Estate Roads where CBR values lower than 5%

Note: For Base and Binder course mixtures that will be trafficked for more than 4 weeks before the application of a surface course / binder course, the binder content must be increased by 0.5%.

Table 5/3 BLACKTOP TEMPERATURES AND THICKNESSES

Material		Bitumen penetration grade	Maximum temperature of mixed material at any stage	Minimum temperature in lorry after 30 minutes on site	Minimum rolling temperature *	PD 6691 Reference	Nominal layer Thickness (mm)	Minimum thickness at any point (mm)
Hot Rolled Asphalt mixtures to BS EN 13108-4 (PD 6691:2007 Annex C).	Base, binder course and regulating course mixtures	40/60	170	130	105	HRA 50/10/reg/bin HRA 50/14/reg/bin	25 - 50 35 - 65	20 30
		70/100	165	125	90	HRA 50/20bin/base HRA 60/20/bin/base HRA 60/32/bin/base	45 - 80 45 - 80 60 - 150	40 40 55
	Surface course mixtures (Design / recipe mixtures)	40/60	190	140	110 (85)	HRA 0/2 F surf	25	20
		70/100	185	125	90 (80)	HRA 15/10 F surf	30	25
						HRA 30/10 F surf	35	30
		100/150	175	120	85 (75)	HRA 30/14 F surf	40	35
					HRA 35/14 F surf	50	45	
					HRA 55/10 F surf	40	35	
					HRA 55/14 F surf	45	40	
					HRA 0/2 C surf	25	20	
					HRA 55/10 C surf	40	35	
					HRA 30/14 C surf	40	35	
					HRA 35/14 C surf	50	45	
					HRA 55/14 C surf	45	40	

- NOTES:
- a) Minimum compacted layer thicknesses for HRA mixtures taken from Table 1B – BS 594987:2010.
 - b) * Minimum temperatures just prior to rolling taken from Annex A; BS 594987:2010. Minimum temperatures at the substantial completion of rolling (figures in brackets) taken from Table 3 – BS 594987:2010.
 - c) Preferred mixtures denoted in bold.

Table 5/3 BLACKTOP TEMPERATURES AND THICKNESSES

SMA surface course mixtures to BS EN 13108-5 (PD 6691:200 7 Annex D).	Surface course	40/60		130	100	SMA 6 surf	20 – 40	15
	/ regulating	70/100		125	90	SMA 10 surf	25 – 50	20
	course / binder	100/150		120	85	SMA 14 surf	35 – 50	30
	& base					SMA 6 reg	15 – 40	10
	mixtures					SMA 10 reg	20 – 50	15
						SMA 14 bin/reg	30 – 60	25
					SMA 20 bin/base/reg	50 - 100	40	

NOTE: a) Minimum compacted layer thicknesses for SMA mixtures taken from Table 1C & 1D – BS 594987:2010.
 b) Minimum temperatures just prior to rolling taken from Annex A; BS 594987:2010.

Table 5/3 BLACKTOP TEMPERATURES AND THICKNESSES / continued

Material		Bitumen penetration grade	Maximum temperature of mixed material at any stage	Minimum temperature in lorry after 30 minutes on site	Minimum rolling temperature *	PD 6691 Reference	Nominal layer thickness (mm)	Minimum thickness (mm)
Asphalt Concrete mixtures to BS EN 13108-1 (PD 6691:2007 Annex B).	Dense, HD & HM, Base	30/45 40/60 70/100 100/150 160/220	190 185 - 170 150	130 125 120 110	110 105 (100) 90 (95) 75 (90) 60 (80)	AC 32 dense/HDM/HMB/base	70 - 150	55
	Open graded binder course	250/330 160/220	115 125	85 95	65 75	AC 20 open bin	45 - 75	40
	Dense, HD & HM, binder course	30/45 40/60 70/100 100/150 160/220	190 185 - 150	130 125 120 110	110 105 (100) 90 (95) 75 (90) 60 (80)	AC 32 dense/HDM/HMB/bin	70 - 150	55
	Dense, HD & HM binder course	30/45 40/60 70/100 100/150 160/220	190 185 - 150	130 125 120 110	110 105 (100) 90 (95) 75 (90) 60 (80)	AC 20 dense/HDM/HMB bin	50 - 100	40
	Open graded surface course	250/330 160/220	115 125	85 95	65 75	AC 14 open surf	35 - 55	30
	Open graded surface course	250/330 160/220	115 125	85 95	65 75	AC 10 open surf	30 - 35	25



Material	Bitumen penetration grade	Maximum temperature of mixed material at any stage	Minimum temperature in lorry after 30 minutes on site	Minimum rolling temperature *	PD 6691 Reference	Nominal layer thickness (mm)	Minimum thickness (mm)
Close graded surface course	160/220	150	110	85	AC 14 close surf	40 - 55	35
	100/150	160	120	95			
	160/220	150	110	85	AC 10 close surf	30 - 40	25
	100/150	160	120	95			
	160/220	150	110	85	AC 6 dense surf	20 - 30	15
100/150	160	120	95				
160/220	150	110	85	AC 6 med surf	20 - 25	15	
Fine graded surface course	160/220	150	110	85	AC fine surf	15 - 25	10

NOTES: a) Minimum compacted layer thicknesses for Asphalt Concrete mixtures taken from Table 1A – BS 594987:2010.
 b) * Minimum rolling temperatures for. **DESIGNED** Asphalt concrete mixtures from Table 4 – BS 594987:2010. **RECIPE** mixtures shown in (brackets) from Annex A – BS 594987:2010.
 c) Preferred mixtures denoted in bold

Bond Coat

1. A proprietary polymer modified bitumen 'bond coat' in accordance with BS EN13808:2005 is to be used to bond new surface course to an existing road surface and to promote adhesion between layers, particularly in situations where a base course surface has been utilised as a running surface for a period of time.
2. Bond coat has enhanced adhesive and cohesive properties allowing heavier rates of application to improve the impermeability of the lower layer whilst providing greater confidence in the adhesion between layers.
3. Bitumen emulsion bond coats must conform to BS EN 13808:2005 and have a minimum cohesion by pendulum test in accordance with BS EN 13808:2005 Table 4 Class 4. Bond coats should have a BBA/HAPAS certificate detailing the performance claims made for them.
4. Bond coat should be machine applied at a uniform rate by calibrated metered mechanical spraying equipment, spray tanker or spraying device integral with the paving machine operated in accordance with Manual of Contract Documents for Highway Works, Volume 1 Clause 920[1]. The rate of spread should be 0.35kg/m² of residual binder or in accordance with the BBA/HAPAS performance certificate.
5. Following application the emulsion shall be allowed to 'break', (i.e. turn from black to brown), before the asphalt is laid, unless it is applied by a paver with integral spray bar. Any emulsion accumulating in hollows shall be dispersed by brushing and allowed to 'break' before it is overlaid.

Tack Coat

1. The use of 'tack coat' is no longer considered best practice and may only be used with the approval of the Engineer when laying small quantities of asphalt on very lightly trafficked sites.
2. Tack coat, where its use is authorised by the Engineer, shall be a class C40B4 cationic emulsion to BS EN 13808 applied using a metered mechanical spraying device at a rate of 0.5 litres/m² in accordance with Clause 902.

Section 6 - Excavation and Reinstatement of Existing Surfaces

1. For the location of trenches, pits, overbreak in front of proposed kerblines and the like which require to be excavated in existing pavement surfaces see the appropriate contract drawings
2. Figure 6/1 below illustrates a typical for trench re-instatement in bituminous pavements.

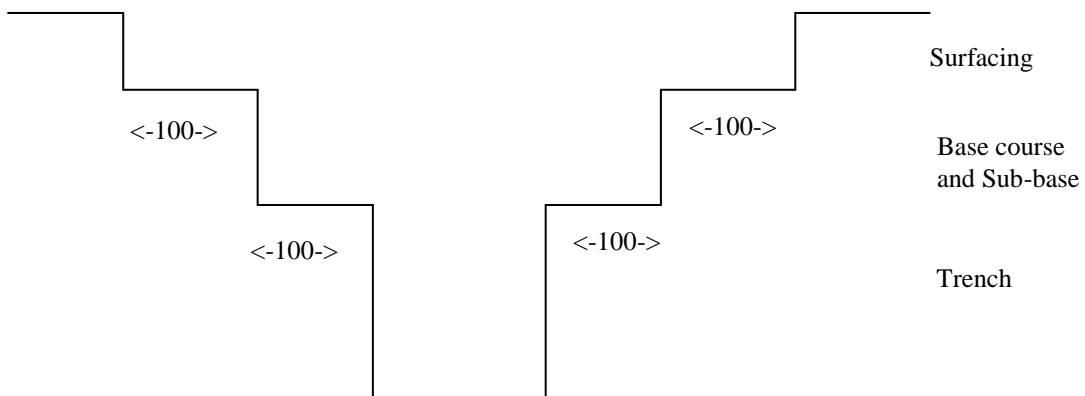


Figure 6/1

The permitted materials for re-instatement are as set out in Table 6/1 overleaf

3. Hot bituminous binder 40/60 or 70/100 paving grade, is to be applied to both the horizontal and vertical faces of exposed bituminous materials in existing pavements and the vertical face of kerbing, access covers, gully tops beneath finished road level, prior to the laying of bituminous reinstatement materials.

TABLE 6/1

	Clause	Material	Grade of Binder	Thick-ness (mm)	Special Requirements		
					Coarse Aggregate	Fine Aggregate	Remarks
Surface Course	912	Close Graded Asphalt Concrete Surface Course	100/150	As existing	Crushed rock or blast furnace / steel slag NOT limestone	NOT Limestone	AC 10 Close surf 100/150 to BS 13108-1 (PD 6691 Annex B). Minimum PSV: 55 Maximum AAV: 14 Aggregate: Crushed Rock or Slag (limestone is not permitted in Surface Course).
	911	Hot Rolled Asphalt Surface Course (Design mixtures)	40/60	As existing	Crushed rock or blast furnace / steel slag NOT limestone	—	Mixture designation: HRA 30/14 F surf 40/60 or HRA 30/14 C surf 40/60 des (to BS 13108-4; PD 6691 Annex C). Minimum PSV of course aggregate: 45. Aggregate Types: Crushed rock or Slag (Blast Furnace or Steel Slag). Coated chippings: 14/20mm (to BSI PD 6682-2) and Clause 915 (BS 13108-4; PD 6691 Annex C). Minimum PSV: 65 Maximum AAV: 12 Surface macrotexture: is required only on high speed roads where posted speed of traffic exceeds 80km/hr. Initial texture depth: 1.5mm (average for 1000m section) and 1.2mm (average for set of 10 measurements) as per Table 9/3 (SHW).

	Clause	Material	Grade of Binder	Thickness (mm)	Special Requirements		
					Coarse Aggregate	Fine Aggregate	Remarks
Binder Course	905	Hot Rolled Asphalt Binder Course (Recipe mixtures)	40/60	60	Crushed rock or slag	None	HRA 60/20 bin 40/60 to BS 13108-4 (PD 6691 Annex C).
	906	Dense Binder Course Asphalt Concrete (Recipe mixtures)	100/150	60	Crushed rock or slag	None	AC 20 Dense bin 100/150 to BS 13108-1 (PD 6691 Annex B). Where blue pennant gritstone is used the binder content should be $5.2 \pm 0.5\%$.
Base course	906	Dense Base Asphalt Concrete (Recipe mixtures)	100/150	100	None	None	AC 32 Dense base 100/150 to BS 13108.1 (PD 6691 Annex B). Where blue pennant gritstone is used the binder content shall be: $4.7 \pm 0.5\%$.
	904	Hot Rolled Asphalt Base	40/60	100	None	None	HRA 60/32 base 40/60 to BS 13108-4 (PD 6691 Annex C).
Sub-base	803	Granular sub-base Type 1		250 min	None	None	

Section 7 - Traffic Signs: Road Markings and Studs

ROAD MARKINGS

General Requirements

Approval will be based on certification. The organisation must provide evidence of certification (issued by a UKAS accredited certification body) that the holder operates a quality Management System complying with BS EN ISO 9001:2000, and National Highway Sector Scheme (NHSS) 7 – “for the application of road marking materials and road studs”.

Materials

All road marking materials must comply with Clause 1212 of the SHW, and the following standards: BS EN 1871; BS EN 1436; BS EN 1423; BS EN 1424; BS EN 1824.

Road Markings (Permanent and Temporary)

1. White and yellow markings shall be reflectorised with glass beads in accordance with BS EN 1423 and BS EN 1424, by the incorporation with the road marking mixture and into the wet surface of the marking.
2. A test certificate must be submitted for the glass beads ensuring compliance with BS EN 1423 and BS EN 1424 and Clause 1212.4 of the SHW.
3. All materials/containers should carry the product conformity BSI kitemark Symbol as required under Clause 1212.
4. Road markings shall be Thermoplastic (Synthetic Resin Binder) in accordance with BS EN 1871. The thickness of the line shall be:
 - (i) Screed lines: not less than 2.0mm, nor more than 5.0mm
 - (ii) Extruded lines: not less than 2.5mm, nor more than 3.5mm.

The minimum thickness specified is exclusive of surface applied solid glass beads. No line shall exceed a thickness of 6.0mm.

The surface of the lines shall be free from blisters, streaks, slumps and other defects. The extruded line application process shall ensure that all surfaces are filled and the thickness given in ii) above shall provide, on the completion of the marks, a smooth line which is neatly finished with square ends at all break points. Lateral tolerance shall be within the limits given in part 17 of Chapter 5 of the Traffic Sign Manual.

5. Road markings shall have the following road performance as defined in BS EN 1436 for the period of the functional life (2 years) starting from the date of application or when the road is trafficked, whichever is later.
 - White marking: Coefficients of retro reflectorised luminance R_L of minimum 100mcd/lux/sq.m (Class R2, Table 3 of BS EN 1436).
 - Yellow marking: Coefficients of retro reflectorised luminance R_L minimum 80mcd/lux/sq.m (Class R1, Table 3 of BS EN 1436).
6. Locations where enhanced skid resistance is required.

Where braking and turning is to occur on large areas of road surface covered with road marking materials, a minimum skid resistance value (SRV) of 55 (BS EN 1436, Table 7, Class 53) is required.

7. On concrete roads and on surfaces that have become highly polished an application of tack coat shall be applied before the road markings are laid.

Preformed Road Markings

Preformed temporary road markings requiring removal shall be used only with the Highway Authority Engineer's approval.

Raised Rib Road Markings

Raised rib road markings shall be used in locations specified by the Highway Authority Engineer. When used there should be no gap within the line.

Removal of Road Markings

If road markings require removal, the process of removal shall be approved by the Highway Authority Engineer.

ROAD STUDS

General Requirements

All retro-reflecting road studs shall be installed in accordance with the manufacturer's instructions and with the Sector Scheme NHSS 7.

1. Retroreflecting road studs and components that are not within the scope of BS EN 1436, but have statutory type approval by the Secretary of State as per Appendix D, SHW. Products conforming to this are acceptable.
2. Non-reflecting road studs shall be installed in accordance with the manufacturer's instructions in locations as directed by the Highway Authority Engineer.

Section 8 - Road Restraint Systems

ROAD RESTRAINT SYSTEMS

General Requirements

RCTCBC will undertake the role of overseeing organisation as defined in TD16/09 in respect to the roads that it maintains or will maintain as a result of a Highway Agreement, and will be responsible for the approval of any relaxations or departures from standards.

Approval will be based on certification. The installing organisation must provide evidence of certification (issued by a UKAS accredited certification body) that the holder operates a quality Management System complying with BS EN ISO 9001:2000, and National Highway Sector Scheme 2B – “for the supply, installation, maintenance and repair of vehicle restraint systems”.

Materials

All road restraint systems must comply with the requirements set out in series 400 of the SHW, and comply with the requirements of BS EN 1317-1, BS EN 1317-2, BS EN 1317-3 and DD ENV 1317-4:2002

Provision of Information

Information required as SHW Appendix 4/1 see schedule at end of this section.

Additional information, which will be required for approval.

1. Designers Road Restraint Risk Assessment documentation in accordance with Design Manual for Roads and Bridges (DMRB) TD19/06.
2. The location, Containment Level, Impact Severity Level (ISL), Working Width Class, maximum height that allows the required visibility, and the Length of Need requirements for safety barriers and transitions shall be shown on 1:500 or 1:1000 Site Plans.
3. The location, Containment Level, Impact Severity Level (ISL), and Working Width Class requirements for vehicle parapets are shown on 1:500 or 1:1000 Site Plans.
4. The location, Performance Class, Impact Severity Level (ISL), Permanent Lateral Displacement Zone (PLDZ) Characteristic, Exit Box Class (D), and maximum height that allows the required visibility requirements for terminals shall be shown on 1:500 or 1:1000 Site Plans.

5. The location, Performance Level, [indicating type e.g. re-directive (R) or non-redirective (NR) crash cushion], Impact Severity Level (ISL), Redirection Zone Class (Z), Permanent Lateral Displacement Zone Class (D), and maximum height that allows the required visibility requirements for crash cushions are shown on 1:500 or 1:1000 Site Plans.
6. Manufacturer's specification.
7. Installation drawings.
8. Manufacturer's installation instructions including foundation requirements and test methods to verify their performance.
9. Manufacturer's repair and maintenance manual.
10. Certificate of Compliance with the Quality Management Scheme 1 for the Manufacture of Fencing Components.
11. Compliance with the Quality Management Sector Scheme 2 - Supply and Installation of Fences: Sector Scheme 2B for Vehicle Restraint Systems.
12. Certificate of compliance for the Quality Management Sector Scheme 5 for the Manufacture and Installation of Bridge Parapets and Cradle Anchorages: Sector Scheme 5A for the Manufacture of Parapets for Road Restraint Systems
13. Nominal loads (direct forces, moments and co-existent shears) to be transferred from the parapet to the structure or foundation.

Information required prior to commencing Installation

1. Installation programme.
2. Workforce allocation of named employees.
3. Employees qualifications / training records.
4. Company designation of Lead Installers, Operatives, Trainees etc.
5. Installers CSCS/FISS cards will be periodically checked on site.

Information required on completion of installation

All information listed above will also need to be included in the H&S file together with:-

1. Copies of Site Installation records completed by the Lead Installer
2. Copies of QA records relating to the materials and installation.
3. Copies of any independent inspections and testing of components.
4. Certification that the product has been installed in accordance with the manufacturers recommendations.
5. Manufacturers / Installers Certification / Guarantees.
6. Details of any relaxations or departures from TD19/06 with supporting information.
7. As built drawings including details of any deviations from the original proposal.

Schedule of Road Restraint Systems in Accordance with TD19/06 Appendix 4/1

Cross reference should be made to drawings where possible.

Road Restraint systems should be listed in order of occurrence irrespective of type.

All Performance Class Requirements appropriate for the Road Restraint System and other details such as parapet height should be included. The difference between start and finish chainages should be at least the Length of Need of the Road Restraint System as defined in TD19/06.

Location Start Chainage* (m)	Finish Chainage (m)	Position on Cross Section +	Type of Road Restraint System ** (Safety Barriers, Vehicle Parapets, Transitions, Terminals, Crash Cushions, Pedestrian Parapets, Pedestrian Guardrails)	Set Back (m)	Containment Level ** (Safety Barriers, Vehicle Parapets, Transitions) Performance Class (P) **	Impact Severity Level (ISL) (Safety Barriers, Vehicle Parapets, Transitions, Terminals, Crash Cushions)	Working Width Class **	Performance Level and whether # Re-directive (R) or Non Re-directive (NR) (Crash Cushions)	Permanent Lateral Displacement Zone (PLDZ) Characteristic (Terminals) Permanent Lateral Displacement Zone (Class (D)) (Crash Cushions)	Exit Box Class ** (Terminals) Redirection Zone Class (Z) (Crash Cushions)	Other Requirements / Comments ** ++ +++
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NOTE - * e.g. Road Name, verge, central reserve, slip road etc

** Enter temporary barrier where required

+ e.g. LH Verge, Central Reserve, RH Verge etc

++ Height Requirements etc

+++ Anti-Glare Screens

1 Design Philosophy

- 1.1 The Road, Street and Footpath lighting design and specification shall incorporate, wherever possible use of modern materials, energy saving devices and proven innovation in lighting provision. As a result design and specification may vary and therefore further advice should be obtained from the Council prior to the commencement of lighting design.
- 1.2 This section of the design guide provides current Council standards for lighting and use of innovative materials. As such, deviation from the current standards would attract a commuted sum to cover the additional maintenance costs. Refer to Section D of the document for further details on commuted sum payments.

2 General Requirements

All Road and Street Lighting Installations shall comply with all relevant BS EN 13201:2003 Standards and BS5489-1:2013 Standards and BS7671:2008 and revisions thereof.

Any revisions of BS EN or BS Standards thereof, whether mentioned or not in this Specification must be complied with at the Developers cost.

All unless otherwise agreed by the Network Lighting Manager columns shall be supplied with an individual Electricity Supply Company's 230 Volt 50 Hz PME type 24 Hour Live Service, it is the responsibility of the Developer to arrange for and pay for services to be provided.

Unless otherwise agreed by the Network Lighting Manager Signposts, Re Boundable Bollards and the like shall be sub fused from the nearest column.

3 Design Service

Rhondda Cynon Taff County Borough Council is able to offer a complete Road/Street Lighting Design Service, details of which may be obtained from the Network Lighting Manager on application, Tel (01443) 494700, Fax (01443) 494705.

4 Equipment Specification

All equipment shall be new, unused and substantially recyclable.

4.1 Luminaires

LED luminaires shall be used in all locations unless otherwise agreed by the Network Lighting manager.

LED luminaires shall have integral dimming as standard set to reduce the output at times to be agreed with the Network Lighting Manager, luminaires shall be suitable for use with a specified CMS system and in all instances the luminaire shall be able to accommodate a complete range of mini cell, node and control gear.

Particular attention is drawn to the use of Dimmable LED luminaires at conflict areas as defined by BS5489-1:2013, dimming levels are to be subject to approval of the Network Lighting Manager.

The aluminium body and LED driver compartment shall be rated at IP66, a complete choice of optics shall be available as standard, the body shall be manufactured from die cast aluminium and be painted Grey.

The luminaire body shall be so designed to disperse excess heat produced by the operation of the lantern so as to maintain the output and life of the LED's.

All LED luminaires shall be suitable for post top or side entry mounting, two locking screws shall be fitted as standard.

Where circumstances dictate other luminaires may be considered for use with the approval of the Network Lighting Manager all such luminaires shall have a complete Manufacturers Specification and Photometric data available as standard.

Decorative luminaires will only be considered if LED's and optic control is fitted as standard, the Network Lighting Manager may attach additional conditions to their use which may or may not be identified in this Specification.

4.2 Luminaire Control

All luminaires shall be controlled by a Computer Management System (CMS) the Authority operates the Harvard LeafNut System this CMS system shall be specified .

Each LED luminaire shall be fitted with a LeafNut enabled driver; node and one column shall be fitted with a Branch Node.

The developer shall be responsible for the operation and maintenance of the CMS system on a stand alone basis to include the energy bills and maintenance costs until such time the Developer meets the required installation standard to enter into the maintenance period. It is the responsibility of the Developer to liaise direct with Harvard Engineering to operate the CMS system.

The use of other photocells with alternative switching regimes may be considered and are subject to the prior approval of the Network Lighting Manager.

4.3 Light Source

The preferred light source shall LED unless otherwise approved by the Network Lighting Manager.

The LED output is to be suitably chosen so as to comply with this Specification and the luminance/illuminance requirements of BS EN 13201:2003 and BS5489 -1:2013.

4.4 Securing of Components

All components other than those mounted by the Manufacturer shall be secured by means of suitably sized round headed brass screws.

4.5 Lubrication of Mechanical Parts

All movable mechanical parts such as hinges, door locks and the like shall be lubricated by means of Coppergrease anti -seize lubricant or similar approved.

4.6 Columns and Bracket Arms

The required durability is no maintenance other than a clean down before adoption using the cleaning chemicals specified by the manufacturer. Columns and bracket arms shall be of a tubular Aluminium construction designed to:-
EN 40-3-3-2003, BSEN 40-3-1-2000, ENV 1999-2.4 and ENV 1999-1-1.

Generally all columns shall be a minimum of 6.0 Metres and above dependent on their location and road category unless otherwise approved by the Network Lighting Manager.

Columns shall be one piece extruded aluminium complete with double flush fitting vandal resistant doors fitted with anti-vandal stainless steel M8-8mm centre pin recessed socket screw lock door bolts as the Aluminium Lighting Company or similar approved. Columns may be:

Mounting Height	Outreach Arm	Ref No	Drawing No
6 Metre	0.4 Metre	RCT6HS42A	MA-5S-16655-010100-02
8 Metre	1.00 Metre	RCT8HS42A	MA-5S-16655-010100-05
10 Metre	1.00 Metre	RCT10HS42A	MA-5S-16655-010100-03
6 Metre	Post Top	RCT6PTA	5NS-79126-010200-09
8 Metre	Post Top	RCT8PTA	5NS-78815-010200-11
10 Metre	Post Top	RCT10PTA	MA-8S-21484-010100-01
12 Metre	Post Top	RCT12PTA	MA-8S-21419-010100-02
6 Metre	Hinged	RCTEHC6A	MA-8S-21419-010100-01

Other manufactures types of aluminium column may be used subject to the prior approval of the Network Lighting Manager.

A one metre concrete "mowing strip" shall be provided around street lighting columns where installed in a verge.

Spare keys shall be provided to the Network Lighting Manager upon request.

In areas where vehicular access is difficult, Aluminium 6.0 Metre mid hinged raising & lowering type columns with a double lock mechanism shall be used, restraint cords or mechanical leverage apparatus must be provided as standard equipment.

Crank root or flange-based columns may only be used subject to the prior approval of the Network Lighting Manager.

Where ground conditions dictate, columns may be erected in suitably sized pots subject to the prior approval of the Network lighting Manager.

If period or decorative columns are to be used, the Developer shall provide the Manufacturers Specification for approval.

Where decorative columns are used the Network Lighting Manager may impose additional conditions that may or may not be identified in this Specification.

All columns shall be erected in accordance with the Manufacturers Specification.

Wall brackets may be used subject to the prior approval of the Network Lighting Manager.

All bracket arms are to be erected in accordance with Manufacturers Specifications.

No attachments shall be made to any column without prior approval.

4.7 **Illuminated Road Traffic Signposts**

Traffic Signposts to be illuminated must be of a tubular steel large base type to BS 873 Part 7:1984 and be capable of passing the tests described in BS 873.

The posts shall be hot dipped galvanised and shall comply with BSEN 1461:1999 and shall be manufactured from steel complying with the requirements of BS 4360 1986 Welded Steels, complete with double lock flush fitting vandal resistant doors, fitted with anti-vandal stainless steel M8-8mm centre pin recessed socket screw lock door bolts.

Each post shall be factory primed and undercoated to G2A prior to erection with a black bituminous base as standard, after erection they are to be painted Grey RAL 693 (aircraft grey). The ground section shall remain as black bitumen with at least 150mm visible above ground level.

Large base posts shall be of a steel gauge not less than 3.2mm thick and shall be cylindrical with a base diameter of not less than 139.7mm and a shaft diameter of not less than 76.1mm as a minimum.

An internal backboard of dimensions not less than 450mm x 95mm x 12mm, manufactured from a substantial non-hygroscopic material, shall be fixed in the housing and an earth bolt shall be provided. The opening to the housing shall be not less than 450mm x 95mm and shall be positioned to afford easy access to the control equipment. An access slot of not less than 75mm x 150mm high for cabling purposes shall be provided approximately 300mm below ground level.

Each signpost shall be suitably sized to accommodate all necessary attachments including numbering below the sign face to ensure the clearance to the finished ground level is an absolute minimum of 2.1 metres but 2.3 to 2.45 metres is preferred. However where certain signage is associated with “roundabouts, splitter islands etc” mounting heights used are to be as deemed appropriate. Signposts in the same location shall be of the same material and height unless otherwise approved by the Network Lighting Manager.

A concrete "mowing strip" shall be provided around signposts, 300mm offset from sign assemblies, where installed in verge areas.

Flange based signposts may be used subject to the prior approval of the Network Lighting Manager.

Where ground conditions dictate, signposts may be erected in suitably sized pots subject to the prior approval of the Network Lighting Manager.

Signpost Luminaires shall be Signature Exlite Delta or similar approved PTS or PTD type with an ingress protection rating of IP66, each luminaire shall be complete with LED's and 0.25 watt, 35/18 lux miniature electronic type photocell. These luminaires are generally suitable for sign faces of up to 1.0M x 1.0M.

For sign faces up to 1.5 x 1.5 Metres luminaires shall be Simmons signs or similar approved LUB/PTS or PTD type with an ingress protection rating of IP56, each luminaire shall be complete with LED' s and 0.25 watt, 35/18 lux miniature electronic type photocell.

For sign faces up to 1.5 x 2.5 Metres luminaires shall be Simmons signs or similar approved LUB/PL type with an ingress protection rating of IP56, the luminaires shall be fitted with a fused PL 36 Watt compact fluorescent lamp and shall be fitted with a 0.25 watt, 35/18 lux miniature electronic type photocell.

Illumination for sign faces in excess of 1.5 x 2.5 Metres shall be subject to the prior approval of the Network Lighting Manager.

Where approved by the Network Lighting Manager LED internally illuminated sign may be used they shall be mounted NOT CLAMPED to an approved suitably sized signpost in accordance with this Specification.

Signpost electrical supplies shall be sourced from the nearest lighting column and are to be sub fused at 10Amp unless otherwise agreed by the Network lighting Manager.

4.8 Internally Illuminated and Non Illuminated Re Bound Bollards.

Internally Illuminated re bound bollard bases shall be rated at IP68 and shall be manufactured from a corrosion resistant and impact resistant material, where approved by the Network Lighting Manager Non Illuminated re bound bollards may be used.

All re-bound bollards are to be installed in accordance with the Manufacturers Specification nil aspect re bound bollards do not require illumination provided there are constructed of a suitable reflective material. Full Specification Drawings are available from the manufacturers.

Generally lit bollard bases shall be of the Re bound Signmaster Type as manufactured by Glasdon or similar approved, the unit is to be fitted with LED s and shall be complete with a low light, infra red type photocell fitted as standard equipment.

Re bound bollards shall be fitted with flexible shells as manufactured by Glasdon or similar approved, with inlaid graphics as required, non illuminated re bound bollards shall be black in colour.

Re bound bollard electrical supplies shall be sourced from the nearest lighting column and are to be sub fused at 10Amp unless otherwise agreed by the Network lighting Manager.

Armoured 6.0mm Sq 3 core XLPE/SWA/PVC cables shall enter the base compartment through the waterproof cable gland and be properly sealed in accordance with the Manufactures Specification to prevent the ingress of moisture.

The armoured cables shall then be terminated in the base compartment as detailed in this Specification to a double pole cut-out fixed to the plywood fuse board base, the LED Driver compartment shall be connected using the lead provided.

4.9 Feeder Pillars

Feeder Pillars including small service types are only to be used with the prior approval of the Network lighting Manager.

Feeder pillars shall be manufactured with 2.5mm Stainless Steel, grade 3CR12 or similar approved and have a brushed finish complete with bolt on bitumen root. The doors shall have embedded durable hazard warning sign and earth fly lead, the backboard shall be treated 12mm exterior ply.

The required durability is no maintenance other than a clean down before Adoption using the cleaning chemicals specified by the manufacturer.

Every feeder pillar shall be vandal proof, have a minimum ingress protection rating of IP54 and IP65 for the door gasket complete with an inbuilt 'Secret' ventilation system as standard.

The door hinges shall be lube for life maintenance free Stainless steel and Phosphor Bronze.

The door locks shall be quarter turn, captive, heavy duty stainless steel with anti vandal socket screws and security plugs as standard.

Each feeder pillar shall have an A4 document pocket fitted as standard.

All ducts entering the feeder pillar base shall be suitably sealed with a waterproof material, a layer of sand is then to be laid into the base, care shall be taken not to block ventilation grills.

Where excessive condensation within a feeder pillar shell is found the Developer with the approval of the Network Lighting Manager is to take all necessary measures to alleviate the problem. Any damages caused by condensation shall be made good at the Developers cost.

The feeder pillar shall be suitably sized to accommodate the Local Electricity Supply Company cutout, isolator and Authority switchgear.

All feeder pillars are to be erected in accordance with the Manufacturers Specification a one Metre wide concrete “mowing strip” shall be provided around feeder pillars installed in a verge.

One number spare key shall be provided to the Network Lighting Manager. Separate feeder pillars are to be provided for Main Estate/Spine Roads on Residential Sites.

Each Developer shall provide their own feeder pillar unless otherwise agreed to by the Network Lighting Manager.

The minimum acceptable dimensions are: -

Height	1030mm
Internal Width	550mm
Working Depth	220mm

4.10 Feeder Pillar Wiring

Each feeder pillar shall be provided with a Local Electricity Supply Company’s 230 Volt or 230/400 Volt 50 Hz PME type 24 Hour Live Service as required.

The provision of the Mains Service/s as are required shall be the responsibility of the Developer and shall be adequate to meet the expected maximum demand of the Road/Street Lighting Installation up to a maximum of 500Watts unless otherwise approved.

The Network Lighting Manager prior to their installation must approve all Mains Services.

Where applicable provide PVC Insulated/PVC Sheathed 10.0mm Sq minimum Brown and Blue mains tails and PVC Insulated 10.0mm Sq minimum Green/Yellow equipotential earth bonding conductor between the Local Electricity Supply Company's cut-out and Local Authority's stainless steel consumer unit. These tails must enter through a knock out in the base of the consumer unit and must be protected by a rubber grommet.

A separate single core 10.0mm Sq minimum PVC Insulated, Green/Yellow earth bonding conductor between the stainless steel consumer unit and feeder pillar shell and door.

A separate single core 10.0mm Sq minimum PVC Insulated, Green/Yellow earth-bonding conductor between the stainless steel consumer unit and the compression gland earth continuity brass rings fitted to the outgoing XLPE/SWA/PVC 600/1000 Volt Local Authority owned cables.

The cross sectional area and rating of the mains tails and equipotential earth bonding conductor is relevant to the size and rating of the largest out going XLPE/SWA/PVC Local Authority owned cable.

4.11 Sub Main Feeder Pillar Wiring Details

All sub-mains are to be adequately designed to comply with voltage drop and earth loop impedance requirements in order that the final sub circuits under full load conditions meet the requirements of BS7671: 2008.

4.12 Identification of Circuits

All circuits are to be correctly identified in ink or indelible marker on the consumer board fuse indicator panel or on a fuse chart placed in a sealable wallet fixed to the feeder pillar door.

Road/Street Names, column numbers, sign post numbers or bollard numbers must be identified.

A copy of the circuit schematic must also be provided and be placed in a sealable wallet secured to the inside of the feeder pillar door.

4.13 **Circuit Protective Devices and Switchgear**

Individual circuits shall be protected either by BS88 (parts 2 & 6) HBC fuses, BS1361 fuses or Type B, Miniature circuit breakers to BS EN 60898 or with the prior agreement of the Network Lighting Manager RCBO's to BS EN 61009.

Generally individual circuit protective devices shall be mounted in a suitably sized stainless steel consumer grade 304 or similar approved the unit mechanically tested to BS EN 60439 with a minimum ingress protection rating of IP31 and integral 100 Amp minimum double pole switched isolator tested to BS EN 60947.

Pre wired panels may be used with an ingress protection rating of IP55 and shall be mechanically tested to BS EN 60439/BS EN 60947. Their use is subject to the prior agreement of the Network Lighting Manager.

Other mains switchgear, fuse panels and the like shall have an ingress protection rating of IP41 and shall be mechanically tested to BS EN 60439/BS EN 60947. Their use is subject to the prior approval of the Network Lighting Manager.

Consumer units or fuse panels must allow for a minimum of 25% spare ways, blank covers are to be provided to any unfused spare ways and a fixed protective hinged cover is to be fitted over the fuses or MCB's as standard.

The maximum number of units, on any one circuit, subject to acceptable voltage drop and earth loop impedance values shall be no more than 12 unless otherwise agreed to by the Network Lighting Manager. Care shall be taken to ensure that under fault conditions that not all lighting in one area is extinguished by the operation of one protective device.

The use of Residual Current Devices to BS EN 61008 shall only be allowed in exceptional circumstances subject to the prior approval of the Network Lighting Manager.

4.14 **Underground Cables**

Underground cables shall be 3 core XLPE/SWA/PVC 600/1000 volt grade Black cable with copper conductors with Brown, Blue and Green /Yellow sheathed inner cores, outer sheath to be embossed 'STREET LIGHTING' to BS5467/with a minimum C.S.A of 10.0 mm Sq unless otherwise identified in this Specification.

All cables are to be glanded to a double pole cut-out, with brass compression glands, brass locknuts and PVC shrouds made off into a brass cable entry plate. XLPE cable compression glands shall be manufactured to BS6121 PT 1 2005.

Unused brass cable entry plate holes shall be fitted with blanked rubber grommets or plastic inserts.

The use of cable joints will not be allowed unless otherwise agreed by the Network Lighting Manager.

All underground cables shall be laid in Twinwall Ducts as follows:-

- a) Bitmac Footway 595mm cover below wearing course level.
- b) Paved Footways 545mm cover below finished level.
- c) Driveways etc 595mm cover below wearing course level.
- d) Carriageways 845mm cover below wearing course level.
- e) Verge 495mm cover below finished level.

4.15 Existing Underground Authority Cables

Where existing underground cables are exposed during excavation works the Developer is to immediately notify the Network Lighting Manager. Any remedial works required to the exposed cable are to be at the Developers cost.

Only with the permission of the Network Lighting Manager are cables that are redundant to be pot ended, cables that are to remain energised are to be ducted through a split twinwall duct provided that the cable can be laid in at the required depth.

Cables that cannot be laid in at the required depth are to be replaced the method of replacement is to be agreed with the Network Lighting Manager. Under no circumstances are cable joints to be used.

Where old and new wiring is connected together the wiring shall be terminated in accordance with BS 7671:2008 the section shall be suitably labelled at the supply point with the specified caution label. The method for termination of these cables is subject to the approval of the Network Lighting Manager.

Where the Local Electricity Supply Company cables are exposed and damaged the Developer must contact the Supply Company, any costs incurred are the Developers responsibility.

4.16 Internal Column, Signpost and Re bound Illuminated Bollard Wiring

Generally columns, signposts and Re bound bollards shall be internally wired using cables manufactured to BS6500.

Please note some internal Re bound bollard wiring details are not shown in this Specification, please contact the Network lighting Manager for more information.

4.17 Internal Cable Details, Columns and Signposts

Flexible Blue Arctic Grade cable-3183Y PVC Insulated/PVC Sheathed Circular 3 core 2.5mm sq minimum cable between cutout and each lantern, with a drip loop of at least 0.5 metres at the cutout.

A separate single core, 10.0mm sq minimum PVC Insulated, Green/Yellow earth bonding conductor between cable entry gland plate and column/signpost and between the cable entry gland plate and E3 earth block.

A separate 16.0mm sq minimum PVC Insulated, Green/Yellow earth bonding conductor between cable entry gland plate or column/signpost and earth electrode where required.

Where applicable, PVC Insulated/PVC Sheathed 10.0mm Sq minimum Brown and Blue mains tails and PVC Insulated 10.0mm Sq minimum Green/Yellow earth bonding conductor between the Local Electricity Supply Company cut-out and Local Authority's double pole cut-out and column/signpost shaft.

4.18 Street Lighting Column Supplies

Each Street Lighting column shall be provided with an individual Local Electricity Supply Company's 230 Volt or 230/400 Volt 50 Hz PME type 24 Hour Live Service as required.

The provision of the Mains Service/s as are required shall be the responsibility of the Developer and shall be adequate to meet the expected maximum demand of the Road/Street Lighting Installation.

The Network Lighting Manager prior to their installation must approve all Mains Services.

Where applicable provide PVC Insulated/PVC Sheathed 10.0mm Sq minimum Brown and Blue mains tails and PVC Insulated 10.0mm Sq minimum Green / Yellow equipotential earth bonding conductor between the Local Electricity Supply Company's cut-out and Local Authority's double pole cut out.

Double pole cut outs shall be used in every column and any other street lighting apparatus connection point.

The cut-out shall be rated at 25 Amp, designed, manufactured and tested to BS7654 and IEC 947 Part 1, with an ingress protection rating of IP43.

The terminal blocks shall be able to accept circular conductors up to 25 mm CSA and the terminal block cover shall be moulded in red, the thermoplastic construction shall meet the requirements of BS7654.

Plastic cable entry plates are to be used where DNO supplies are connected direct to the cut-out unless an outgoing fused sub circuit is required.

Individual lighting units shall be protected by a BS88 part 1, AC6 Tag Type 6 Amp HBC fuse, cable seals must be utilised.

Double pole single phase, twin fuse, fused units or similar may be used for particular applications subject to the prior approval of the Network Lighting Manager.

Double pole cut-out shall be fitted with an internal earth block as standard.

The Lucy Trojan Festive Lighting type unit or similar may be used for relevant applications subject to the prior approval of the Network Lighting Manager.

The use of Residual Current Devices to BS EN 61008 shall only be allowed in exceptional circumstances subject to the prior approval of the Network Lighting Manager.

5 Earthing

The installation earthing arrangements shall be of TN-C-S configuration (PME).

The minimum cross sectional area of the main equipotential bonding conductor shall be 10.0mm Sq.

Copper earth electrodes (1200mm x 20mm) with a suitable copper clamp shall be installed at the end of each circuit with more than two units in specified earth pits where required.

6 Erection and Installation

6.1 General

The whole of the installation shall be situated within Highway limits.

The recommended minimum desirable clearances from edge of the carriageway to the face of Street Furniture must be in accordance with BS EN 13201:2003 and BS5489 -1: 2003.

The vertical clearance of Street Furniture erected over a carriageway shall be 5.7 Metres. Where Street Furniture is installed in verges and the like they shall incorporate a concrete surround as specified.

During development work all existing lighting is to remain in full operation during the hours of darkness. Temporary lighting may be provided which is of equal standard to that of the existing and in all aspects is to be in compliance with the relevant parts of BS EN13201:2003 and BS5489 -1:2013.

6.2 Columns and Feeder Pillars

Columns and feeder pillars shall be situated at the rear of the footpath and on the party line between adjacent properties wherever possible.

Columns shall be located so that access doors always face away from approaching traffic.

Where columns are situated in a cul-de-sac or at a turning head and the like access doors must always be situated so as to give maintenance staff a clear view of approaching or reversing traffic.

Columns and feeder pillars are to be installed at least 450mm behind any traffic barriers.

6.3 **Signposts**

Generally signposts shall be situated at the rear of the footpath and located so as not to cause obstructions to the general public, private property and traffic.

Where applicable the absolute minimum clearance between the signpost face and or attachments from the kerb edge should be 450 mm.

Signposts are to be installed at least 450 mm behind any traffic barriers.

Signposts shall be located so that access doors always face away from approaching traffic.

6.4 **Re Bound Bollards**

Where practicable the minimum clearance between each re bound bollard face and the kerb edge should be 450 mm.

7. **Ducts**

The use of Street Lighting duct is subject to the approval of the Network Lighting Manager, all ducts shall be installed in accordance with the Manufacturers Specification and shall be inspected before being backfilled by the Authority's Engineer. Ducts shall not be installed in soft verges. Cables shall be marked with PVC marker tape laid 150mm above cable.

All ducts shall be marked with PVC marker tape laid 150mm above the duct.

Where approved all cables shall be run throughout their length inside twinwall duct with a ribbed MDPE outer profile and smooth LDPE inner bore with a draw wire inserted as standard.

Ducting must meet the requirements of BS EN 50086-2-4.

The twinwall duct is to be Orange in colour with 9mm high White lettering legend 'Street Lighting'. The lettering shall be upper most at all times and shall be shown at intervals of not more than 1.0 Metre.

The twinwall duct to be used may be general purpose twinwall duct with an outside diameter of 110mm, an inside diameter of 94mm and 6.0 Metres in length, or flexible twinwall duct with an outside diameter of 110mm, an inside diameter of 94mm, continuous from a 50 Metre coil.

Lengths of twin wall duct are to be connected together and be connected to the relevant access chambers using the specified adapters to give a smooth continuous bore.

Ducting shall be bedded on and surrounded with 100mm of stone dust and the trench backfilled with a suitably graded material.

8. Access Chambers

Access chambers shall only be used in exceptional circumstances and their use is subject to the approval of the Network Lighting Manager.

Access chambers shall be installed in accordance with the Manufacturers Specification unless otherwise stated in this Specification and shall be inspected by the Authority's Engineer before being back filled.

Access chambers are to be located at each column, sign post, bollard and feeder pillar position adjacent to the cable entry side of the particular unit, also at each change of direction of the cable route and both sides of road crossings.

Each access chamber shall be 450mm x 450mm sq and consist of High Density Polyethylene (HDPE) sections or rotationally moulded Polyethylene sections with pre-trepanned duct entry holes, both resistant to shock, chemicals, UV exposure, corrosion and weathering. Chambers may either be assembled in sections or in complete units and are designed to provide a minimum cover to the uppermost part of duct walls suitable for footways, drives, carriageways and verges. Please note that upon exiting the chamber the duct shall be laid at the depths previously specified in this specification.

Where access chambers are located in a verge and the like they shall incorporate a concrete path/surround as shown in the Standard Drawings.

Each access chamber is to be mounted on a 100mm deep ST4 concrete base with a 225 mm round plastic pipe set into the base, this pipe is to be a minimum of 200mm in depth, 14mm clean gravel infill 200mm in depth is then to be laid into the base of the pipe to act as a soakaway. The assembled sections are then to be surrounded with 100mm of ST4 concrete.

Generally unless otherwise stated each access chamber is to be 450mm x 450mm fitted with a Class B125 ductile iron cover and frame to BS EN 124.

The cover must be secured with greased stainless steel fixing screws, Kite Marked and preferably badged 'Street Lighting' and be Black in colour. The Manufactures name, loading details, Kite Mark and BS EN number must be stamped on the cover. Two lifting bars shall be provided to the Network Lighting Manager upon request.

B125 lockable composite anti slip covers with galvanised steel frames to BS EN 124 may be used subject to the approval of the Network Lighting Manager. These composite covers are to be badged 'Street Lighting' must be Black in colour and indicate the Manufactures name and loading details on the cover. The frames are to be secured by means of two stainless steel screws the threads of which are to be greased.

Access chambers installed on an Industrial Estate or in a Carriageway must be 600 mm x 600 mm fitted with a Class D400 ductile iron cover and frame to BS EN 124. The cover must be Kite Marked an preferably badged 'Street Lighting' and is to be Black in colour. The Manufactures name, loading details, Kite Mark and BS EN number must be stamped on the cover. Installation must be in accordance with this Specification as previously detailed. Two lifting bars shall be provided to the Network Lighting Manager upon request.

Columns and signposts are to be ducted to access chambers by means of 63mm flexible twinwall duct at a depth of 450mm with lettering and legend 'Street Lighting' as previously detailed. The end of the duct is to be pushed up inside the column to the base of the back board.

Where columns or sign posts are installed in pots, from the access chamber provide a 110 mm twinwall duct as previously listed through an aperture in the pot and into the cable entry hole as provided by the Manufacturer, 63mm twinwall duct may be used subject to the approval of the Network Lighting Manager.

Where applicable earth electrode inspection chambers are to be installed adjacent to the final column in each circuit or sub circuit and be connected to the relevant access chamber by means of an Orange flexible twinwall duct. The duct shall be of a diameter of not less than 63mm and legend 'Street Lighting' as previously detailed.

9. Reinstatements

Please refer to the Carriageway and Footway construction details shown in the Main Specification.

10. Testing and Inspection

Upon completion of the installation the following tests shall be carried out in accordance with BS7671: 2008 IEE Regulations for Electrical Installations unless otherwise stated below.

- a. Continuity of protective conductors including main and supplementary equipotential bonding.
- b. Insulation resistance at a test voltage of 1000 Volts DC for individual units reading to be not less than 1 Meg Ohm.
- c. Insulation resistance at a test voltage of 1000 Volts DC for networks reading to be not less than 20 Meg Ohm.
- d. Insulation of site built assemblies.
- e. Polarity.
- f. Earth electrode resistance.
- g. Earth fault loop impedance at every unit.
- h. Prospective short circuit current.
- i. Operation of residual current devices where applicable.

The tests listed shall be undertaken taking into consideration the type of installation.

A test form shall be provided for all electrical works prior to any inspection being carried out by the Network Lighting Manager.

11 Numbering and Labels

11.1 Numbering Requirements - Columns

The numbering system to be used is that as supplied by Multi Sign Systems, telephone number 01736 757975.

Column identification numbers shall comprise of 75mm high Black numerals and or lettering on a White background. The Authorities logo, telephone number and a bilingual message shall also be shown.

On columns numbering shall be mounted at 3.0 Metres above the finished footway level facing approaching traffic.

All numbering is to be installed and secured in accordance with the Manufactures Specification

Each column shall be numbered, if more than one luminaire is attached to a column they are to be numbered separately on that column for example 1A, 1B.

11.2 Numbering Requirements - Signposts.

On signposts in the footway numbering shall be painted on at 2.0 Metres above the finished footway level facing oncoming traffic. The numerals/lettering shall comprise of Black 75mm high numerals/lettering on a White background, suitably sized to accommodate the numbering and or lettering.

In non-pedestrian areas signposts shall be numbered below the sign face, facing approaching traffic.

Each signpost shall be numbered, if more than one luminaire is attached to that signpost they are to be numbered separately on that signpost with the letter S before the number, for example S1A, S1B.

11.3 Numbering Requirements - Re Bound Illuminated Bollards

Re bound Illuminated bollards shall be numbered with Black 50 mm high numerals/lettering on a White background. Numerals/lettering is to be applied to the bottom of the re bound bollard shell using adhesive or painted numerals and letters facing on-coming traffic.

Each re bound bollard shall be numbered with the letter S before the number, for example S1.

11.4 Numbering Requirements - Feeder Pillars

Feeder pillar identification numerals/lettering shall comprise of 75mm high Black numerals/lettering on a suitably sized White background on the uppermost side of the feeder pillar shell facing approaching traffic, the letters FP shall be provided before any identification number for example FP1.

11.5 Hazard Warning Labels

Hazard warning labels as required by the ESQC Regulations 2002 shall be attached to all Authority electrical street lighting furniture in the highway. Please contact the Network Lighting Manager for details.

12 Lighting Levels

12.1 Traffic Routes

All traffic routes shall be lit in accordance with BS EN 13201:2003/BS5489 -1:2013 switching regimes and dimming levels are to be agreed With the Network Lighting Manager at the design stage.

12.2 Residential Sites.

All residential sites shall be lit to BS EN 13201:2003/BS5489-1:2013 switching regimes and dimming levels are to be agreed with the Network Lighting Manager at the design stage.

12.3 Conflict Areas.

Conflict areas shall be lit in accordance with BS EN 13201:2003/BS5489 -1:2013 and shall not be dimmed unless otherwise agreed by the Network Lighting Manager.

12.4 Infill Lighting.

Where it is deemed appropriate by the Network Lighting Manager it is the responsibility of the Developer to provide improved or additional infill lighting between the proposed lighting installation and any existing lighting installation at the Developer's cost. Switching regimes and dimming levels are to be agreed with the Network Lighting Manager at the design stage.

12.5 **Outdoor Car Parks.**

Car parks shall be lit in accordance with BS EN 13201:2003/BS5489: -1:2013. Switching regimes and dimming levels shall be agreed with the Network Lighting Manager at the design stage.

12.6 **Cycle Tracks**

Cycle tracks shall be lit in accordance with BS EN 13201:2003/BS5489: -1:2013. Switching regimes and dimming levels shall be agreed with the Network Lighting Manager at the design stage.

12.7 **Footbridges, Stairways, Ramps and Subways**

These areas shall be lit in accordance with BS EN 13201:2003/BS5489: -1:2013 and are subject to the approval of the Network Lighting Manager.

13 **Design Appraisal**

Please note the Local Authority reserves the right to request amendments and or additions to any design submitted for Approval whether or not those amendments or additions are mentioned within this Specification.

The Developer shall provide the Network Lighting Manager with plans and documentation indicating the following information listed below including the complete Manufacturers part reference numbers and index protection rating where applicable.

Part and category of BSEN 13201:2003/BS5489-1:2013 to which the proposed scheme is designed with calculations using a maintenance factor of 0.9.

Column positions and location in the footway.

Column type, door lock option, Manufacturer mounting height and bracket arm projection.

Double pole cutout type, with complete Manufacturers reference.

Lantern type, Manufacturer, light source and wattage.

Type and Manufacturer of luminaire control device.

Feeder Pillar location and Manufacturer.

Local Electricity Supply Company Service Details.

Switch gear and earthing arrangements.

Underground cable size/s and routes.

Ducts, inspection chambers, earth electrode chambers and locations thereof. Full cross sectional details of the Street Lighting ducted system.

Means of connection between columns and the ducted system.

Circuit schematic detailing voltage drop and earth loop impedance calculations, which are to comply with BS7671: 2008 and revisions thereof.

Existing circuit schematic detail where existing installations are to be altered or added to in any way detailing voltage drop and earth loop impedance calculations, which are to comply with BS7671: 2008 and any revisions thereof.

Maximum demand of the installation.

Approved signpost schedule including bollard details where applicable, showing positions, mounting heights, bracket, sign face and aspect details.

14 Location of Services

It is the responsibility of the Developer to identify all existing and proposed Utility, Communication, Drainage and Sewer Services on documentation sent for approval and to identify such services visually on site prior to any excavation work being carried out.

15 As Laid Drawings and Documents

The developer shall not deviate from the approved layout plans without the authority of the Network Lighting Manager.

Upon completion of the installation the developer shall provide the following documentation as listed below, please note that **No Final Inspection** of the installation will take place until the information requested has been provided to the Network Lighting Manager.

2 No. signed copies of the "as-laid" drawings to include column, signpost, bollard and feeder pillar locations together with details of the cable route/s (with dimensions).

2 No. signed completed copies of the Authority's Street Lighting Inventory Sheet as detailed in this document.

1 No. signed copy of the Standard Test Form and Continuation Sheets as set out in Appendix 6 of BS7671: 2008. IEE Regulations for Electrical Installations.

16 Maintenance Period

Upon satisfactory completion of the installation and the issuing of the relevant Certificate, the Local Authority shall assume responsibility for Energy, Routine Maintenance and Minor Non Routine Maintenance charges (**Lamps and Photocells only**).

Any Major Non-Routine Maintenance items such as underground cable faults; column 'knock downs' gear failure etc occurring up to the date of final Adoption shall remain the responsibility of the Developer.

Attention is also drawn to the fact that the Developer will also be responsible for the payment of all energy charges for lighting incurred up to the date of the issuing of the Part 2 Certificate. To this end the Developer is to enter into a (Short Term Connection Agreement) with the Regional Electricity Company, an extract of which is detailed in this document.

17 Site Supervision

Prior to the commencement of any street lighting work the Developer must arrange a site meeting between the Site Manager, the Installer and Network Lighting Managers representative, it is the developers responsibility to supervise and monitor the works of the installer and bring to the attention of the Network Lighting manager any matters considered to be detrimental to the approval of the street lighting installation.

The Developer is required to provide the installer with the correct Road/Street Lighting Specification and Approved Road/Street Lighting Installation Drawings. The Local Authority will upon request inspect the scheme prior to the issuing of a Part 2 Certificate and draw up a comprehensive defects list provided that the installation is in a safe and well constructed condition.

The Developer is strongly advised to ensure that the Electrical Contractor commissioned to install the Road/Street Lighting Installation is suitably qualified to do so and is fully conversant with the requirements of the Specification and all other relevant BS EN Standards.

The Developer shall ensure that the Road/Street Lighting Contractor employed shall be suitably qualified and experienced in the installation of Road/Street Lighting Works.

The Contractor employed **Must** be registered with the National Inspection Council for Electrical Installation Contracting (NICEIC) and preferably also be a member of an appropriate Trade Organisation for example the Association of Signals, Lighting and other Electrical Contractors (ASLEC) or the Electrical Contractors Association (ECA).



**Rhondda Cynon Taff
Road/Street Lighting Inventory**

DATE : _____

<u>Road</u>	Route No.	Classification		Name		Town		Map Ref						
<u>Authority</u>	D.N.O Account Number					General Location of Road								
Location of Unit	<u>Lamp</u>		<u>Column</u>		Bracket	C a b l e	Lantern	Gear	Fuse	Control	B A N D	Control Charge	Control Position	Proximity to E/B Services
	No.	Type	Type	Owner										