STATUTORY RULES OF NORTHERN IRELAND

1994 No. 131

PRIVATE STREETS

The Private Streets (Construction) Regulations (Northern Ireland) 1994

Made . . . . . *30th March 1994*

Coming into operation . . *11th May 1994*

To be laid before Parliament under paragraph 3(3) of Schedule 1 to the Northern Ireland Act 1974.

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The Department of the Environment, in exercise of the powers conferred on it by Article 5(1) and (2) of the Private Streets (Northern Ireland) Order 1980(**a**) and of every other power enabling it in that behalf, hereby makes the following regulations:

(**a**) S.I. 1980/1086 (N.I. 12) as amended by S.I. 1992/3203 (N.I. 19) Article 6; see Article 2(2) for the definition of "the Department"

PART I

INTRODUCTORY

Citation and commencement

1. These regulations may be cited as the Private Streets (Construction) Regulations (Northern Ireland) 1994 and shall come into operation on 11th May 1994.

Interpretation

2.—(1) In these regulations—

"anchoring material" means material placed around the barrel of a pipe to locate it securely in position;

"basecourse" means a course forming part of the surfacing immediately below the wearing course;

"bedding" means a layer of material for providing continuous support;

"benching" means a series of stepped platforms excavated in sloping ground to prevent the ground from sliding or a sloping surface formed on either side of, and above, a channel;

"binder" means a material for the purpose of holding solid particles together as a coherent mass;

"camber" means the convexity given to the curved cross section of a carriageway;

"carriageway" means a way comprised in or constituting a road being a way over which the public have a right of way for the passage of vehicles;

"catchment area" means the total area from which the run-off of all surface water flows by gravity to a collecting point;

"catchpit" means a pit excavated or a chamber constructed in and below the normal level of a ditch or drain to trap silt and solid matter and facilitate its removal;

"channel" means a narrow strip specially constructed to carry and lead away surface water;

"compaction" means the process of producing a closer packing of particles by rolling or other mechanical means;

"construction of a street" includes provision for the drainage and sewerage thereof;

"the Construction Products Directive" means Council Directive 89/106/EEC on the approximation of laws, regulations and administrative provisions of the member States relating to construction products(a);

(a) O.J. No L40, 11.2.89, p 12

"crossfall" means the difference in level measured transversely between two specified points on a surface expressed as a ratio of one vertical linear unit to a specified number of horizontal linear units;

"cutting" means that portion of the site of a road where the formation has been excavated below ground level;

"cycle track" means a way or part of a road for use only by pedal cycles;

"datum" means a known or assumed point, line or plane to which others may be referred;

"dowel bar" means a steel bar used for load transfer in structures or at transverse joints in concrete road slabs;

"EEA Agreement" means the Agreement on the European Economic Area signed at Oporto on 2nd May 1992 as adjusted by the Protocol signed at Brussels on 17th March 1993;

"EEA State" means a State which is a Contracting Party to the EEA Agreement other than the United Kingdom;

"embankment" means a ridge of earth, stones or other material constructed to carry a road at a higher level than the surrounding ground;

"fixing bracket" in relation to a manhole ladder means a member designed to connect the ladder to the supporting wall;

"flight of steps" means that part of a set of steps which consists of a series of consecutive steps;

"footpath" means a way, not being a footway, comprising a street over which the public have a right of way on foot only;

"footway" means a way which together with a carriageway comprises a street, being a way over which the public have a right of way on foot only;

"formation" means the surface of the sub-grade in its final shape after the completion of the earthworks;

"formation level" means the surface of the sub-grade;

"formwork" means temporary structures of timber, metal or other material comprising of moulds in which concrete is formed to the desired shape;

"foul water" means any water contaminated by domestic sewage or trade effluent;

"going" means in relation to a step or stepped ramp the distance (measured on plan) between its nosing and the nosing of the step, ramp or landing next above it;

"haunch" means continuous material support to the sides of a pipe above the bedding;

"landing" means a platform situated between consecutive flights of steps or stepped ramps or at the top or bottom of a flight of steps or stepped ramp;

"mountable shoulder" means an area abutting the carriageway constructed to carry heavy wheel loads to accommodate the turning of large vehicles;

"nosing" means the front edge of a step and includes the front edge of the top surface of any landing or ramp which is situated at the top end of a ramp;

"the Order" means the Private Streets (Northern Ireland) Order 1980;

"pavement" means the part of the road structure above the sub-grade;

"pitch line" means a notional line which connects the nosing of all steps in a flight with the nosing of the landing or ramp at the top of the flight and extends down to the landing or ramp at the bottom and forms the greatest possible angle to the horizontal;

"retaining wall" means a wall constructed to resist lateral pressure from the adjoining ground or to maintain in position a mass of earth;

"rise" means the vertical distance between two consecutive treads or between a tread and the top surface of a landing or ramp immediately above or below that tread;

"roadbase" means one or more layers of material constituting the main structural element of the pavement;

"rumble strip" means an area of carriageway which is surfaced using block paving and positioned at the entrance to a shared surface to emphasise the boundary between the two types of road;

"safety fence" means a rail on posts intended to minimise damage from impact to vehicles leaving the carriageway;

"service strip" means a verge adjacent to a shared surface provided specifically to contain mains, drains, pipes, cables or other apparatus;

"setting out" in relation to a street means establishing on the ground the required line and level to which the street is to be constructed;

"shared surface" means a road or part of a road which is provided for the joint use of pedestrians and vehicles and which does not include a footway;

"standpipe" in relation to the water test for testing drains means a vertical pipe connected to the pipe under test;

"stepped ramp" means a route for pedestrians formed by a combination of steps and ramps;

"storm water" means rain water discharged from a catchment area as a result of storm;

"stringer" in relation to a manhole ladder means the side members of the ladder to which the rungs are fitted;

"sub-base" means a layer of material situated between the roadbase and the sub-grade;

"sub-grade" means the upper part of the soil, natural or constructed, which supports the load transmitted by the overlying pavement;

"sub-soil" means the undisturbed stratum lying immediately below the topsoil;

"sump" means that portion of a catchpit lying below the level of the invert of the outlet pipe in order to trap silt and solid matter;

"superelevation" means the inward tilt or transverse inclination given to the cross section of a carriageway throughout the length of a horizontal curve to reduce the effects of centrifugal force on a moving vehicle and expressed as a ratio of one vertical linear unit to a specified number of horizontal linear units;

"surface water" means the run off of natural water from a surface including paved areas, roofs and unpaved land;

"surround" means material completely encasing a pipe;

"tamping" means compaction of loose material by repeated blows from a heavy headed tool;

"toe" in relation to the landing on a flight of steps means an integral part of the landing projecting into the ground to form an anchorage for the flight of steps;

"tread" means the upper surface of a step;

"trimming" means the final shaping of earthworks;

"valley curve" means a sagging curve on the vertical alignment of a road over which there is a reversal of gradient;

"wearing course" means the part of a carriageway which directly supports the traffic.

(2) In these regulations a reference to a British Standard shall be construed as a reference to a British Standard published by the British Standards Institution, Linford Wood, Milton Keynes MK14 6LE (Telephone Number Milton Keynes (0908) 221166).

(3) Schedule 1 sets out in tabular form the publications referred to in these regulations.

(4) In these regulations a reference to a publication shall be construed as relating to—

(*a*) the edition of the publication of the date mentioned in the reference together with any amendments mentioned in Schedule 1; and

(*b*) so much only thereof as is relevant in the context in which the publication is mentioned.

(5) In these regulations any requirement for goods or materials to comply with a standard (whether a British Standard or other named standard) shall be satisfied by compliance with that standard or with any of the following standards, that is to say—

(*a*) a relevant standard or code of practice of a national standards institution or equivalent body of any EEA State; or

(*b*) a relevant international standard recognised in any EEA State; or

(*c*) a relevant specification acknowledged for use as a standard by a public authority of any EEA State; or

(*d*) traditional procedures of manufacture of a EEA State where these are the subject of a written technical description sufficiently detailed to permit assessment of the goods or materials for the use specified; or

(*e*) for goods or materials of an innovative nature or subject to an innovative process of manufacture and which fulfil the purpose provided for by the named standard—

(i) a European Technical Approval issued in accordance with the Construction Products Directive; or

(ii) a specification sufficiently detailed to permit assessment.

(6) The standard, code of practice, specification, technical description or European Technical Approval as set out in paragraph (5) must provide in use levels of safety, suitability and fitness for purpose equivalent to those required by the named standard insofar as such levels are not inconsistent with the essential requirements set out in terms of objectives in Annex 1 to the Construction Products Directive.

(7) Paragraph (5) applies to works in the same manner as it does to goods or materials but only insofar as the means of carrying out such works are indivisibly associated with the goods or materials for which a standard, code of practice, specification, technical description or European Technical Approval, as set out in the said paragraph (5) is proposed.

(8) Where goods or materials are used on the basis of a standard, code of practice, specification, technical description or European Technical Approval as set out in paragraph (5) testing and sampling may be carried out as specified in or applicable to such standard, code of practice, specification, technical description or European Technical Approval.

(9) Where testing is carried out in another EEA State such tests shall be undertaken by—

(*a*) an organisation accredited in a EEA State in accordance with the relevant parts of the BS7500:1989 (equivalent European Standard EN 45000 series) series of standards for the tests carried out; or

(*b*) an organisation offering suitable and satisfactory evidence of technical and professional competence and independence to fulfil the minimum conditions as set out in Annex IV of the Construction Products Directive.

(10) In these regulations the abbreviations and symbols listed in the following table are used—

Abbreviation or Symbol	*Definition*
BS	British Standard
e.g.	for example
EN	European Standard
etc.	and the rest; and so on
HMSO	Her Majesty's Stationery Office
i.e.	that is
kg	kilogram
KN	Kilo Newton
l	litre
m	metre
mm	millimetre
m^2	square metre
m^3	cubic metre
N/A	not applicable
N/mm^2	Newtons per square millimetre
No.	number
Ref.	reference
UPVC	Unplasticized Polyvinylchloride
μm	micron
±	plus or minus

Application

3. These regulations apply to the construction of streets in respect of which the Department has exercised street planning functions under Article 3(1) of the Order after the coming into operation of these regulations.

PART II

STANDARDS OF CONSTRUCTION

Goods and materials

4. All goods and materials used in the construction of a street shall comply with the detailed requirements set out in Schedule 2.

Preliminary works

5. The setting out of a street, clearance of the site of a street, earthworks and preparation of the sub-grade shall be carried out in accordance with the detailed requirements set out in Schedule 3.

Level of street

6.—(1) A street shall be constructed at such level as, having regard to the intended use of the premises abutting the street, will afford the easiest practicable gradients for communicating with any other street or intended street with which it may be connected.

(2) The maximum gradient of a street shall not exceed 10 per cent except where the topography of a site would render this impracticable.

(3) The minimum gradient shall not be less than 0.8 per cent except in valley curves.

Surface water drainage

7.—(1) A street shall be provided with a proper and sufficient drainage system for carrying off the surface water from the street.

(2) The drainage system provided shall comply with the detailed requirements set out in Schedule 4.

Location of services

8.—(1) Where mains, drains, pipes, cables or other apparatus are to lie within a street they shall where practicable be located under footways or verges.

(2) Where a shared surface is provided any mains, drains, pipes, cables or other apparatus shall where practicable be located in a service strip adjacent to the shared surface.

(3) Subject to paragraph (4) a manhole shall where practicable be so positioned that its cover can be located off the carriageway on a verge, footway or service strip.

(4) If it is not practicable to position a manhole in accordance with paragraph (3) it may be located—

(*a*) where carriageway width exceeds 6.5m, at the centre line of the carriageway; or

(*b*) where carriageway width is 6.5m or less, on the carriageway but not more than one third of the carriageway width distant from the nearest edge of the carriageway.

Sub-soil drainage

9.—(1) The sub-soil of the site of a street shall be effectively drained—

(*a*) where the water table is within 600mm of the formation;

(*b*) where there is water run-off or seepage from adjacent ground;

(*c*) where the sub-soil is waterlogged; and

(*d*) where springs, watercourses or existing drains are encountered.

(2) The sub-soil drainage provided shall comply with the detailed requirements set out in paragraph 10 of Schedule 4.

(3) Drains for the conveyance of sub-soil water shall not be permitted to discharge to a drain conveying foul water.

(4) Discharge to the drainage system shall be through a catchpit.

Drains

10.—(1) A drain provided in the construction of a street shall—

(*a*) be of sufficient strength having regard to the manner in which it is bedded or supported and the maximum loads and forces to which it may be subjected, and be protected against damage;

(*b*) have all joints formed in such a manner—

(i) as is appropriate to the materials of which the drain is made; and

(ii) that, except for a drain for the conveyance of sub-soil water only, it shall remain watertight under all working conditions;

(*c*) except where it is provided for the conveyance of sub-soil water only, be laid in a straight line between points where changes of direction or gradient occur; and

(*d*) be of such capacity and so designed and constructed as to ensure that it is self-cleansing and efficiently carries away the maximum volume of matter which may be discharged into it.

(2) A drain provided in the construction of a street shall have such manholes as may be necessary, and every manhole shall—

(*a*) be so designed and constructed of brickwork, concrete or other suitable and durable material as to sustain the loads which may be imposed upon it and be watertight;

(*b*) be of such size and form as to permit ready access to the drain for inspection and cleansing;

(*c*) where the depth of the manhole so requires, have such step-irons, ladder or other fittings as to provide safe access to the level of the drain; and

(*d*) have a removable cover of adequate strength, constructed of suitable and durable material, which shall be non-ventilating where the manhole is in a drain which is to carry foul water.

(3) A drain which is to carry foul water shall be capable of withstanding a suitable test for watertightness after the work of laying the drain has been carried out, including any necessary work of haunching or surrounding it with concrete and backfilling the trench.

(4) The construction of a drain and its testing and the construction of the means of access to it shall be carried out in accordance with the detailed requirements set out in Schedule 4.

Carriageways and shared surfaces

11.—(1) A carriageway or a shared surface shall be so constructed that it will carry away surface water to the surface drain in the street.

(2) A camber or crossfall shall be in accordance with the detailed requirements set out in paragraph 1 of Schedule 5 or paragraph 1 of Schedule 6 as the case may require.

(3) A carriageway, or a shared surface, shall be constructed, laid and compacted on the sub-grade to provide a durable and satisfactory surface in accordance with the detailed requirements set out in paragraphs 2 to 17 of Schedule 5 or paragraphs 2 to 4 of Schedule 6 as the case may require.

Retaining walls, pipelines and other structures

12.—(1) Where the construction of a street necessitates the provision of a retaining wall with greater than 1m retention or a single span structure or pipe

with greater than 2m clear span, the wall, structure or pipe as the case may be shall be designed and checked in accordance with the design criteria procedures set out in the Department of the Environment for Northern Ireland Technical Approval Scheme (3rd revision 1989) for the Design and Checking of Highway Structures Retaining Walls and Pipelines.

(2) Where the construction of a street necessitates the provision of a retaining wall with greater than 500mm retention but not exceeding 1m retention or a single span structure or pipe greater than 900mm but not exceeding 2m, the wall, structure or pipe as the case may be shall be certified to the Department by a Chartered Civil or Structural Engineer as having been designed in accordance with the requirements set out in the Scheme mentioned in paragraph (1).

Footways and footpaths

13.—(1) A footway shall be constructed with a crossfall towards the carriageway and shall be provided with kerbing between the carriageway and footway.

(2) Crossings of footways to permit vehicular access shall be provided where necessary.

(3) A wheelchair access to carriageways shall be provided at all road junctions.

(4) A footpath shall be constructed with a crossfall.

(5) The maximum longitudinal gradient of a footpath shall not exceed 10 per cent except where the topography of a site would render this impracticable.

(6) The minimum longitudinal gradient of a footpath shall not be less than 0.8 per cent except in valley curves.

(7) Steps or stepped ramps shall only be permitted where there is no practicable alternative means of providing access along a footpath.

(8) Where steps or stepped ramps have been permitted an alternative footpath route with normal gradients shall be provided.

(9) The construction of footways, footpaths, steps, stepped ramps, crossings of footways and kerbing shall be in accordance with the detailed requirements set out in paragraphs 1 to 5 of Schedule 7.

Cycle tracks

14. A cycle track shall be constructed to the same standard as a footway and in accordance with the detailed requirements set out in paragraph 6 of Schedule 7.

Lay-bys, bus bays, parking bays, turning areas, verges and service strips

15.—(1) A lay-by, bus bay, parking bay or turning area shall be constructed to the same standard as the adjoining carriageway in accordance with the detailed requirements set out in paragraphs 2 to 17 of Schedule 5.

(2) The construction of verges and service strips shall be in accordance with the detailed requirements set out in paragraphs 7 and 8 of Schedule 7.

(3) In this regulation—

"bus" has the same meaning as in Article 1(2) of the Roads (Restriction of Waiting) Order (Northern Ireland) 1982(**a**);

"bus bay" means that part of a road adjacent to the carriageway intended for the waiting of buses;

"lay-by" means that part of a road adjacent to the carriageway intended for the waiting of vehicles;

"parking bay" means a part of a road set aside for the parking of vehicles; and

"turning area" means a part of a road intended for the turning of vehicles.

PART III

DEPOSIT AND APPROVAL OF PLANS AND NOTICE OF COMMENCEMENT AND COMPLETION OF STAGES OF WORK

Deposit of plans

16.—(1) A person who intends to construct a street to which these regulations apply shall not commence work until he has—

(*a*) deposited with the Department six sets of the plans mentioned in paragraph (2); and

(*b*) received the Department's approval of those plans in writing.

(2) Those plans are—

(*a*) a plan to a scale of not less than 1 in 500 showing—

(i) the name, if any, of the street;

(ii) the direction of the north point of the compass;

(iii) the width, position and arrangement of the street;

(iv) the land to be regarded for the purposes of adoption under Part III of the Order as being comprised in the street; and

(v) such particulars as are necessary to show that the street will comply with these regulations; and

(*b*) a plan showing a longitudinal section and cross section of the street but, where the crossfall or camber varies, a plan showing the cross section of the street at intervals of not more than 25m.

(3) The plan referred to in sub-paragraph (*a*) of paragraph (2) shall (without prejudice to head (v) of that sub-paragraph) also show in particular—

(*a*) the provision intended for carrying off of surface water from the street including the invert levels and position of manholes and the connections to existing drains;

(*b*) the position, levels and gradients of drains intended for the conveyance of foul water and the invert levels and position of manholes and the connections to existing drains;

(**a**) S.R. 1982 No 44

(*c*) the general location of mains, drains, pipes, cables and other apparatus; and

(*d*) the position of all structures, pipelines and flanking retaining walls together with outline proposals, detailed drawings and supporting calculations as required in accordance with the Scheme mentioned in regulation 12;

(4) The scale of the plan referred to in paragraph (2)(*b*) shall not be less than 1 in 500 horizontally and 1 in 100 vertically and cross sections shall indicate all particulars necessary to show that the street complies with the provisions of these regulations which apply to it including provisions relating to—

(*a*) the levels of the present surface of the ground over or through which the street is to pass, such levels being expressed by reference to either ordnance datum, or to an assumed datum clearly defined on the drawings;

(*b*) the levels and gradients of the street;

(*c*) the levels of the ground immediately abutting on each side of the street and the intended levels of the building sites on each side of the street;

(*d*) the carrying off of surface water from the street and the conveyance of foul water;

(*e*) the invert levels and gradients of all drains; and

(*f*) the levels and gradients of any intended or existing streets with which it is intended that the street shall connect, so far as it is necessary to show the levels and gradients at which the new street will connect with such intended or existing streets.

(5) In paragraph (4) ''ordnance datum'' means the datum for the system of levels shown on ordnance maps.

Notice of commencement and completion of stages of work

17.—(1) Subject to paragraph (2) a person who intends to construct a street in respect of which the plans referred to in regulation 16 have been approved shall give to the Department not less than three days notice, exclusive of Saturdays, Sundays and public holidays, in writing of the date and time at which it is intended to commence—

(*a*) the construction of the street;

(*b*) the construction of any drain;

(*c*) the testing of any drain;

(*d*) the covering up of any drain;

(*e*) the making of a connection to an existing drain;

(*f*) the covering up of the formation;

(*g*) the covering up of the sub-base;

(*h*) the covering up of each layer of the base; and

(*i*) the laying of the basecourse and wearing course, the concreting, or laying of block paving.

(2) The setting out of the street shall be completed prior to the giving of the notice referred to in paragraph (1).

(3) The person shall within fourteen days after the completion of the construction of the street give to the Department notice in writing of the completion.

(4) Where a person constructs a street without giving the notice required in paragraph (1) the Department may by notice in writing require him within seven days to cut into or lay open so much of the street as is necessary to enable the Department to ascertain whether any of these regulations have been contravened.

(5) Where a person receives a notice in writing from the Department setting out the extent to which the regulations have been contravened and alters or adds to the street so as to secure compliance with these regulations, he shall within fourteen days after the completion of such work give to the Department notice in writing of its completion.

Manner of giving notice and submitting plans

18.—(1) A person who is required by these regulations to give notice in writing to or deposit a plan with the Department shall sign that notice or plan, or cause it to be signed by a duly authorised agent.

(2) If a notice or plan is signed by an agent the notice or plan shall state the name and address of the person on whose behalf it has been signed.

PART IV

INSPECTIONS, INVESTIGATIONS AND TESTS

Access and facilities for inspection of work and testing

19.—(1) A person constructing a street shall when so requested supply to the Department such evidence as is necessary to show that a material used in the construction complies with these regulations and shall take such samples as are specified for testing purposes.

(2) An officer authorised by the Department may at any time inspect work in progress, carry out investigations and tests and take such samples as are necessary to ensure compliance with these regulations.

Expenses of carrying out investigations and tests and taking of samples

20. The Department may recover from the person by whom or on whose behalf the plans were deposited any expenses reasonably incurred by it in carrying out investigations and tests and the taking of samples.

Removal or alteration of work not in conformity with the regulations

21.—(1) If any work does not comply with these regulations, the Department may by notice in writing require the person by whom or on whose behalf the plans were deposited, within such reasonable time as the Department may specify in the notice either to remove the work or to carry out such alterations to it as may be necessary to make it comply with the regulations.

(2) If a requirement under paragraph (1) is not complied with within the time specified in the notice the Department may execute the works specified in the notice and may recover the expenses reasonably incurred by it from the person by whom or on whose behalf the plans were deposited.

PART V

GENERAL

Determination of matters under the regulations

22. Where any question arises under these regulations between the Department and the person by whom or on whose behalf the plans were deposited it shall be referred to arbitration under and in accordance with the Arbitration Act (Northern Ireland) 1937(**a**).

Revocation and transitional provisions

23.—(1) The Private Streets (Construction) Regulations (Northern Ireland) 1966(**b**) shall continue to apply to the construction of streets in respect of which the Department has exercised street planning functions before the coming into operation of these regulations.

(2) Except as provided by paragraph (1) the Private Streets (Construction) Regulations (Northern Ireland) 1966 shall cease to have effect.

Sealed with the Official Seal of the Department of the Environment on 30th March 1994.

(L.S.)

E. J. Galway
Assistant Secretary

(**a**) 1937 C. 8 (N.I.)
(**b**) S.R. & O. (N.I.) 1966 No. 262

SCHEDULE 1 Regulation 2(3) and (4)

Publications to which reference is made in the Regulations

TABLE A BRITISH STANDARDS CITED IN REGULATION 2

Publication	*Amendment*		*Citation*
	Serial No	*Reference No or date*	
BS 7500 Series 1989	—	—	Regulation 2(9)(*a*)

TABLE B PUBLICATION CITED IN REGULATION 12

Publication	*Citation*
The Technical Approval Scheme for the Design and Checking of Highway Structures, Retaining Walls and Pipelines (3rd Revision 1989). Published by the Department of Environment for Northern Ireland, Roads Service HQ, Clarence Court, Adelaide Street, Belfast	regulation 12(1)

TABLE C BRITISH STANDARDS CITED IN SCHEDULE 2

Publication	*Amendment*		*Citation*
	Serial No	*Reference No or date*	
BS 12: 1991	1	AMD 7122	paragraph 7
BS 65: 1991	—	—	paragraph 12(5)
BS187: 1978	1	AMD 5427	paragraph 3(3)
BS 497: Part 1: 1976	1 2	AMD 5034 AMD 6643	paragraphs 13(3), 15
BS 594: Part 1: 1992	—	—	paragraphs 6(1), 6(2), 6(3)

Table C British Standards Cited in Schedule 2 — *continued*

Publication	*Amendment*		*Citation*
	Serial No	*Reference No or date*	
BS 882: 1992	—	—	paragraph 1(1)
BS 1200: 1976	1 2 3	AMD 4510 AMD 4834 AMD 5126	paragraph 2
BS 1247:.Part 2: 1990	—	—	paragraph 16
BS 1521: 1972 (1980)	1	AMD 3519	paragraph 25
BS 3148: 1980	—	—	paragraph 17
BS 3656: 1981 (1990)	1	AMD 5531	paragraph 12(7)
BS 3921: 1985	—	—	paragraphs 3(1), 3(4)
BS 4482: 1985	—	—	paragraph 24
BS 4483: 1985	—	—	paragraph 26
BS 4660: 1989	—	—	paragraph 12(6)
BS 4987: Part 1: 1988	1	AMD 6148	paragraphs 1(2), 5(1), 5(2), 5(3), 5(4)
BS 5178: 1975	—	—	paragraph 12(2)
BS 5328: Part 1: 1991	1	AMD 7174	paragraphs 19, 20, 21, 22, 27
BS 5328: Part 2: 1991	1	AMD 7175	paragraphs 19, 20, 21, 22, 27
BS 5328: Part 3: 1990	1 2	AMD 6927 AMD 7176	paragraphs 19, 20, 21, 22, 27
BS 5328: Part 4: 1990	1	AMD 6928	paragraphs 19, 20, 21, 22, 27

Table C British Standards Cited in Schedule 2 — *continued*

Publication	*Amendment*		*Citation*
	Serial No	*Reference No or date*	
BS 5481: 1977 (1989)	1 2	AMD 3631 AMD 4436	paragraph 12(6)
BS 5911: Part 2: 1982	1	AMD 5146	paragraphs 13(1)(*a*), 13(1)(*b*), 14
BS 5911: Part 3: 1982	—	—	paragraph 12(3)
BS 5911: Part 100: 1988	1	AMD 6269	paragraph 12(1)
BS 5911: Part 114: 1992	—	—	paragraph 12(4)
BS 6073: Part 1: 1981	1 2	AMD 3944 AMD 4462	paragraph 3(2)
BS 7263: Part 1: 1990	—	—	paragraphs 10(1), 10(2), 11

TABLE D BRITISH STANDARDS CITED IN SCHEDULE 3

Publication	*Amendment*		*Citation*
	Serial No.	*Reference No or date*	
BS 1377: Part 2: 1990	—	—	paragraph 4(2)(*f*)
BS 5930: 1981	—	—	paragraph 4(2)(*h*)

SCHEDULE 1 — *continued*

TABLE E OTHER PUBLICATIONS CITED IN SCHEDULE 3

Publication	*Citation*
The Department of the Environment for Northern Ireland Manual of Contract Documents, Volume 1, Specification for Highway Works, Series 400, Safety Fences, Safety Barriers and Pedestrian Guardrails published by HMSO	paragraph 9(2)(*a*)
The Department of the Environment for Northern Ireland Manual of Contract Documents, Volume 3, Highway Construction Details, Section 2, Safety Fences and Barriers published by HMSO	paragraph 9(2)(*b*)

TABLE F BRITISH STANDARDS CITED IN SCHEDULE 4

Publication	*Amendment*		*Citation*
	Serial No	*Reference No or date*	
BS 65: 1991	—	—	paragraph 3(4)
BS 449: Part 2: 1969	1 2 3 4 5 6 7 8	AMD 416 AMD 523 AMD 661 AMD 1135 AMD 1787 AMD 4576 AMD 5698 AMD 6255	paragraph 6(11)(*b*)
BS 497: Part 1: 1976	1 2	AMD 5034 AMD 6643	Paragraphs 6(13), 6(16)
BS 812: Part 110: 1990	—	—	paragraph 4(8)
BS 882: 1992	—	—	paragraph 3(7)
BS 1247: Part 2: 1990	—	—	paragraph 6(10)(*a*)

SCHEDULE 1 — *continued*

Table F British Standards Cited in Schedule 4 — *continued*

Publication	*Amendment*		*Citation*
	Serial No	*Reference No or date*	
BS 1377: Part 2: 1990	—	—	paragraph 4(9)
BS 4211: 1987	1	AMD 7064	paragraph 6(11)(*f*)
BS 4660: 1989	—	—	paragraph 3(4)
BS 5178: 1975	—	—	paragraph 3(4)
BS 5481: 1977 (1989)	1 2	AMD 3631 AMD 4436	paragraph 3(4)
BS 5911: Part 3: 1982	—	—	paragraph 3(4)
BS 5911: Part 100: 1988	1	AMD 6269	paragraph 3(4)
BS 5911: Part 114: 1992	—	—	paragraph 3(4)
BS 5911: Part 200: 1989	—	—	paragraphs 6(4), 7(3), 7(5)
BS 6073: Part 1: 1981	1 2	AMD 3944 AMD 4462	paragraph 6(2)
BS 8005: Part 0: 1987	—	—	paragraph 1(4)
BS 8005: Part 1: 1987	—	—	paragraph 1(4)

TABLE G OTHER PUBLICATIONS CITED IN SCHEDULE 4

Publication	*Citation*
The Department of Transport, Transport and Road Research Laboratory publications "Simplified tables of external loads on buried pipelines" 1986 and "A guide to design loadings for buried rigid pipes" 1983 published by HMSO	paragraphs 1(1), 2(6)

SCHEDULE 1 — *continued*

TABLE H BRITISH STANDARDS CITED IN SCHEDULE 5

Publication	*Amendment*		*Citation*
	Serial No	*Reference No or date*	
BS 594: Part 1: 1992	—	—	paragraphs 12(3), 13(3), 13(4)
BS 594: Part 2: 1992	—	—	paragraphs 12(3), 13(3)
BS 598: Part 100: 1987	1	AMD 6122	paragraph 10(6)
BS 598: Part 101: 1987	—	—	paragraph 10(3)
BS 598: Part 102: 1989	1 2	AMD 6585 AMD 7534	paragraph 10(3)
BS 598: Part 104: 1989	1	AMD 6738	paragraph 10(3)
BS 598: Part 105: 1990	1	AMD 7294	paragraph 10(3)
BS 598: Part 106: 1990	—	—	paragraph 10(3)
BS 598: Part 107: 1990	—	—	paragraph 10(3)
BS 598: Part 108: 1990	—	—	paragraph 10(3)
BS 598: Part 109: 1990	—	—	paragraph 10(3)
BS 812: Part 1: 1975	1 2 3 4	AMD 2069 AMD 4572 AMD 4875 AMD 6587	paragraph 10(3)
BS 812: Part 2: 1975	1	AMD 4615	paragraph 10(3)
BS 812: Part 101: 1984	—	—	paragraph 10(3)
BS 812: Part 103: 1985	1	AMD 6003	paragraph 10(3)
BS 812: Section 105.1: 1989	—	—	paragraph 10(3)
BS 812: Part 111: 1990	—	—	paragraphs 7(1), 8(1), 10(3)
BS 1377: Part 2: 1990	—	—	paragraphs 6(7), 7(5), 8(3)

Table H British Standards Cited in Schedule 5 — *continued*

Publication	*Amendment*		*Citation*
	Serial No	*Reference No or date*	
BS 2000: Part 105: 1991	—	—	paragraph 10(3)
BS 3690: Part 3: 1990	—	—	paragraph 10(3)
BS 4483: 1985	—	—	paragraph 2(4)
BS 4987: Part 1: 1988	1	AMD 6148	paragraphs 9(1), 12(2), 13(2), 13(5), 14(2), 15
BS 4987: Part 2: 1988	1	AMD 6586	paragraphs 9(1), 9(2), 11(3), 12(2), 12(4), 13(2), 13(5)
BS 6677: Part 1: 1986	—	—	paragraph 17(4)
BS 6677: Part 3: 1986	—	—	paragraph 17(4)
BS 6717: Part 1: 1986	—	—	paragraph 17(1)
BS 6717: Part 3: 1989	—	—	paragraphs 2(1), 17(2)

SCHEDULE 1 — *continued*

TABLE I OTHER PUBLICATIONS CITED IN SCHEDULE 5

Publication	*Citation*
The Department of the Environment Transport and Road Research Laboratory, Report LR90: 1967, Published by the Road Research Laboratory, Crowthorne, Berkshire.	paragraphs 6(6), 7(4), 8(2)
The Department of the Environment for Northern Ireland Manual of Contract Documents, Volume 1, Specification for Highway Works, Series 1000, Road Pavements — Concrete and Cement Bound Materials published by HMSO	paragraphs 16(1), 16(4)

TABLE J BRITISH STANDARDS CITED IN SCHEDULE 6

Publication	*Amendment*		*Citation*
	Serial No	*Reference No or date*	
BS 4987: Part 1: 1988	1	AMD 6148	paragraph 2(2)(*b*)(ii)
BS 4987: Part 2: 1988	1	AMD 6586	paragraph 2(2)(*b*)(ii)

TABLE K BRITISH STANDARDS CITED IN SCHEDULE 7

Publication	*Amendment*		*Citation*
	Serial No	*Reference No or date*	
BS 594: Part 1:1992	—	—	paragraph 2(6)(*a*)
BS 882: 1992	—	—	paragraph 2(13)

SCHEDULE 1 — *continued*

Table K British Standards Cited in Schedule 7 — *continued*

Publication	*Amendment*		*Citation*
	Serial No	*Reference No or date*	
BS 1881: Part 101: 1983	1 2	AMD 6091 AMD 6728	paragraph 2(28)
BS 1881: Part 102: 1983	1 2	AMD 6090 AMD 6727	paragraph 2(28)
BS 1881: Part 108: 1983	1	AMD 6105	paragraph 2(28)
BS 1881: Part 111: 1983	1	AMD 6102	paragraph 2(28)
BS 1881: Part 112: 1983	1	AMD 6100	paragraph 2(28)
BS 1881: Part 116: 1983	1 2	AMD 6097 AMD 6720	paragraph 2(28)
BS 4483: 1985	—	—	paragraph 5(21)
BS 4987: Part 1: 1988	1	AMD 6148	paragraphs 2(5), 2(7)
BS 4987: Part 2: 1988	1	AMD 6586	paragraphs 2(5), 2(7)
BS 7263: Part 1: 1990	—	—	paragraphs 2(10), 4(2), 4(8)(*b*), 4(9)(*b*)

TABLE L OTHER PUBLICATIONS CITED IN SCHEDULE 7

Publication	*Citation*
The Department of the Environment for Northern Ireland Layout of Housing Roads Design Guide 1988 published by HMSO	paragraphs 4(6), 8

SCHEDULE 2 Regulation 4

Detailed Requirements for Goods and Materials to be used in Construction of Streets

Goods and Materials	*Specification*
1. Aggregates	
(1) for concrete	To BS 882: 1992.
(2) for bituminous materials	Sound clean hard crushed rock graded to BS 4987: Part 1: 1988.
2. Building sand	To BS 1200: 1976: Table 1.
3. Bricks	
(1) Clay	Well fired solid common brick or ordinary quality to BS 3921: 1985.
(2) Concrete	To BS 6073: Part 1: 1981.
(3) Sand Lime	To BS 187: 1978
(4) Engineering	To BS 3921: 1985: Table 4 Class B.
4. Bitumen	Straight run or cut back petroleum bitumen in accordance with the requirements of Schedule 5 paragraph 15.
5. Bitumen macadam	
(1) Carriageway and shared surface basecourse	20mm dense graded basecourse to BS 4987: Part 1: 1988 supplemented by the requirements of paragraph 12 of Schedule 5 and paragraph 2(2)(*b*) of Schedule 6 respectively.
(2) Carriageway and shared surface wearing course	10mm or 14mm size close graded wearing course macadam to BS 4987: Part 1: 1988 supplemented by the requirements of paragraph 13 of Schedule 5 and paragraph 2(2)(*b*) of Schedule 6 respectively.
(3) Footway basecourse	20mm size dense basecourse in accordance with BS 4987: Part 1: 1988 subject to the requirements of paragraph 2(5) of Schedule 7.
(4) Footway wearing course	6mm size medium graded wearing course in accordance with BS 4987: Part 1: 1988 subject to the requirements of paragraph 2(6) of Schedule 7.
6. Asphalt	
(1) Carriageway and shared surface basecourse	60 per cent coarse aggregate hot rolled asphalt to BS 594: Part 1: 1992 Table 2; Column 2/4, Binder to Table 1, Binder Numbers 3 or 5; supplemented by the requirements of paragraph 12 of Schedule 5.

SCHEDULE 2 — *continued*

(2) Carriageway and shared surface wearing course	30 per cent coarse aggregate hot rolled asphalt to BS 594: Part 1: 1992 Table 6, Column 6/4, Schedule 1B; Binder to Table 1, Binder Numbers 3 or 5; supplemented by the requirements of paragraph 13 of Schedule 5 and paragraph 2(2)(*b*) of Schedule 6 respectively.
(3) Footway or footpath wearing course	15 per cent coarse aggregate hot rolled asphalt to BS 594: Part 1: 1992 Table 6, Column 6/2, Schedule 1B; Binder to Table 1, Binder Numbers 3 or 5; supplemented by the requirements of paragraph 2(6) of Schedule 7.
7. Cement	Ordinary or rapid hardening Portland to BS 12: 1991.
8. Cement mortar	
(1) general use	1 part by volume of cement to 5 of building sand.
(2) for jointing pipes	1 part by volume of cement to 1 of building sand.
(3) for jointing kerbs	1 part by volume of cement to 3 of building sand.
9. Lime mortar	1 part by volume of hydrated lime to 2½ parts of building sand.
10. Kerbs and edgings	
(1) Concrete kerbs	Hydraulically compressed to BS 7263: Part 1: 1990 Type HB 2.of figure 1 (150mm × 125mm Type BN of figure 1 in shared surfaces).
(2) Concrete edgings	Hydraulically compressed to BS 7263: Part 1: 1990 Type ER or EF of figure 1.
11. Concrete flags	Hydraulically compressed to BS 7263: Part 1: 1990 Type E70.
12. Pipes	
(1) Concrete	To BS 5911: Part 100: 1988
(2) Concrete prestressed	To BS 5178: 1975
(3) Concrete perforated	To BS 5911: Part 3: 1982. With holes not greater than 10mm or less than 3mm; the total area of holes shall be not less than 1,000mm^2 per m length of pipe.
(4) Concrete porous	To BS 5911: Part 114: 1992.
(5) Clay	To BS 65: 1991.

SCHEDULE 2 — *continued*

(6) UPVC	To BS 5481: 1977 (1989) or BS 4660: 1989.
(7) Asbestos cement	To BS 3656: 1981 (1990).
13. Gullies, gully gratings and frames	
(1) Concrete gullies	(*a*) Shall have an internal diameter of 375mm, and conform to BS 5911: Part 2: 1982. (*b*) Rectangular gullies shall conform to BS 5911: Part 2: 1982 and shall have internal dimensions of 300mm × 385mm with all other dimensions as per Table 3 of BS 5911: Part 2: 1982 for a gully of 375mm internal diameter.
(2) Cast iron gullies	To the requirements of paragraph 7 of Schedule 4.
(3) Gully gratings and frames	Cast iron to BS 497: Part 1: 1976: Table 7 BS Ref GA2/325. The metal used for the manufacture of castings to be ductile iron as described in Para 3.1 of BS 497: Part 1: 1976.
14. Precast concrete manholes	To BS 5911: Part 2: 1982.
15. Manhole covers and frames	Grade A Class 2 and test load 350 KN. To BS 497: Part 1: 1976.
16. Step irons	To BS 1247: Part 2: 1990 and the requirements of paragraph 6(10) of Schedule 4.
17. Water	Mains supply, otherwise to BS 3148: 1980.
18. Sub-base and roadbase	Shall be hard sound uniformly graded crushed rock, reasonably cubical in shape and free of soil, slate, vegetable or other injurious matter and graded in accordance with the requirements of paragraphs 7 and 8 of Schedule 5 respectively.
19. Concrete grade C30/20	To BS 5328: Part 1: 1991 and Parts 2, 3 and 4: 1990 20mm nominal size aggregate with 270kg per m^3 minimum cement content and medium workability.
20. Concrete grade C20/40	To BS 5328: Part 1: 1991 and Parts 2, 3 and 4: 1990 40mm nominal size aggregate with 220kg per m^3 minimum cement content and medium workability.

SCHEDULE 2 — *continued*

21. Concrete grade C20/20	To BS 5328: Part 1: 1991 and Parts 2, 3 and 4: 1990 20mm nominal size aggregate with 220kg per m^3 minimum cement content and medium workability.
22. Concrete grade C7.5/40	To BS 5328: Part 1: 1991 and Parts 2, 3 and 4: 1990 40mm nominal size aggregate with 200kg per m^3 minimum cement content and medium workability.
23. Grass seed	Each 100kg of grass seed shall consist of— 60kg of red fescue S59 20kg of smooth stalked meadow grass 15kg of crested dogstail 5kg of white clover.
24. Mild steel reinforcing	To BS 4482: 1985
25. Waterproof membrane	To BS 1521: 1972 (1980) Class B.1F.
26. Steel fabric reinforcement	To BS 4483: 1985 and the requirements of paragraph 2(1) and (4) of Schedule 5.
27. Ready-mixed concrete	To BS 5328: Part 1: 1991 and Parts 2, 3 and 4: 1990.
28. Block paving	Shall be in accordance with the requirements of paragraph 17 of Schedule 5.
29. Blinding	Shall be crushed rock of 19mm maximum size which is capable of filling the intricacies of the top layer of roadbase stone and being compacted to form a dense surface.

SCHEDULE 3 Regulation 5

Detailed requirements — Setting out of street, site clearance, earthworks, preparation of sub-grade

Setting out

1.—(1) Before construction of the street is commenced—

(*a*) there shall be established on the ground by marker pegs the kerb line or the centre line, tangent points and intersection points and any other points necessary to provide intervisibility;

(*b*) the position of each marker peg shall be preserved during construction;

(*c*) works bench marks to the datum shown in the plans approved under regulation 16 shall be established and preserved during the course of the works and the levels of these shall be made available to the Department;

and in sub-paragraph (*c*) "bench marks" means well defined marks established as a datum for levelling.

(2) The line and levels of formation, side slopes, drains, carriageways, kerbs and footways shall be set out so as to obtain everywhere in as far as is reasonable the gradients and cross sections shown in the approved construction drawings.

Tolerances

2.—(1) Horizontal alignments shall be constructed within the tolerance of ± 12mm from the horizontal alignments as set out.

(2) The surface level of kerbs, pavement courses and formation shall lie within the tolerances stated in the following table when checked against the setting out.

TABLE

TOLERANCES IN SURFACE LEVELS

Flexible wearing course	± 6mm
Flexible basecourse	± 6mm
Concrete wearing course	± 3mm
Concrete block paving	± 3mm
Concrete flags	± 2mm
Kerbs	± 5mm
Roadbase	+ 10mm − 15mm
Sub-base	+ 10mm − 30mm
Formation	+ 20mm − 30mm

Site clearance

3.—(1) Before the commencement of any street works, other than setting out, the site of the street shall be cleared of all encumbrances.

(2) Disused underground structures, chambers and drains shall be removed to depths as found necessary and the voids shall be filled with compacted suitable material.

Removal of unsuitable material

4.—(1) The site of a street shall be cleared of unsuitable material.

(2) In sub-paragraph (1) "unsuitable material" includes—

(*a*) all vegetable matter;

(*b*) material from swamps, marshes and bogs;

(*c*) peat, logs, stumps and perishable material;

(*d*) material susceptible to spontaneous combustion;

(*e*) material in a frozen condition;

(*f*) clay of liquid limit exceeding 90 and/or plasticity index exceeding 65; as determined by the liquid limit test BS 1377: Part 2: 1990;

(*g*) material damaged by weather or site traffic; and

(*h*) soft material which can be moulded by light finger pressure, in accordance with BS 5930: 1981.

(3) Wherever unsuitable material occurs in the site of a street, it shall be removed down to a gravel, clay, rock or other suitable foundation.

(4) The excavation shall be filled with broken rock or granular material placed in layers not exceeding a loose depth of 225mm levelled and compacted by rolling with a roller of not less than 8 tonnes in weight.

Cuttings

5.—(1) Materials shall be excavated from the site of road cuttings to the line and level as shown on the approved drawings.

(2) Where it is not proposed to construct the sub-base and roadbase immediately after excavation, or if it is proposed that site traffic shall use the cutting, the surface at the bottom shall be left at least 300mm above formation level.

(3) Where solid rock occurs it shall be cut down to 150mm minimum thickness under the surfacing level to allow for a regulating course of roadbase material as specified in the detailed requirements of paragraph 8 of Schedule 5 or if the carriageway is to be of concrete construction, to permit the laying of a 75mm (minimum) regulating course of concrete grade C20/40.

(4) Subject to sub-paragraph (5) the side slopes of cuttings shall not be steeper than 1 in 1.5.

(5) Where a cutting is in solid rock the side slopes of the cutting shall not be steeper than 1 in 0.5.

Embankments

6.—(1) Where formation levels are higher than natural ground levels, the ground levels, after unsuitable materials have been removed shall be raised by placing suitable imported or excavated material in layers not exceeding a loose depth of 225mm and compacting each layer by rolling with a roller of not less than 8 tonnes in weight as soon as practicable after deposition and each layer shall be finished parallel with the running surface of the road.

(2) In areas of shallow filling where after removal of topsoil the ground level is within 300mm of formation level, site traffic shall not use the surface unless it is brought up and maintained at least 300mm above formation level.

(3) Where an embankment is to be placed on steeply sloping ground the surface shall be benched in steps or trenched, and under-drainage shall be provided where necessary.

(4) The side slopes of embankments shall not be steeper than 1 in 2.

Earthworks to be kept free of water

7. Water shall be prevented from accumulating in excavations and cuttings, on embankments or on the sub-grade.

Soiling and sowing

8.—(1) All verges and side slopes after trimming shall be soiled to an even surface with topsoil to a settled depth of not less than 100mm.

(2) The soil shall be dressed with an appropriate fertiliser, cultivated and sown with grass seed at the rate of 1kg to 110m^2.

(3) The grass seed shall be a tested mixture and certificates of purity and germination shall be provided and the mixture shall comply with the requirements of paragraph 23 of Schedule 2.

(4) In case of failure the sowing shall be repeated until a strong permanent growth is obtained.

Safety fences

9.—(1) Safety fences shall be erected alongside a carriageway—

(*a*) on embankments which slope downwards from the carriageway to a depth of 6m or more;

(*b*) on other embankments where there is a road, railway, water hazard or other feature (eg subway entrance) at or near the foot of the slope of the embankment;

(*c*) at obstructions including bridge piers or abutments; and

(*d*) on the outside of curves less than 850m radius on embankments between 3m and 6m in depth.

(2) Safety fences shall be in accordance with the following—

(*a*) The Department of the Environment for Northern Ireland Manual of Contract Documents, Volume 1, Specification for Highway Works, Series 400, Safety Fences, Safety Barriers and Pedestrian Guardrails; and

(*b*) The Department of the Environment for Northern Ireland Manual of Contract Documents, Volume 3, Highway Construction Details, Section 2, Safety Fences and Barriers.

SCHEDULE 4 Regulations 7(2), 9(2) and 10(4)

Detailed requirements — Drainage

General

1.—(1) Pipes shall be designed to withstand the loading calculated in accordance with the Department of Transport and Road Research Laboratory publications "Simplified tables of external loads on buried pipelines" 1986 and "A guide to design loadings for buried rigid pipes" 1983.

(2) Only one type of pipe complying with the relevant BS shall be used within any individual drain length between manholes.

(3) The type of pipe to be used shall be as indicated in Table B.

(4) The design and construction of drains shall in as far as is reasonable be in accordance with BS 8005: Part 0: 1987 and BS 8005: Part 1: 1987 except where this Schedule specifies otherwise.

(5) Pipes greater than 900mm diameter shall be classified as highway structures (i.e. buried rigid structures) and their design shall be carried out in accordance with regulation 12.

Excavation for pipelines and manholes

2.—(1) Any excessive excavation arising from the method of working or the removal of soft spots shall be filled with grade C7.5/40 concrete.

(2) Water shall not be allowed to accumulate in the excavation and, where practicable, pipe trenches shall be started at the lower end.

(3) A trench shall be excavated to a sufficient depth and width, as detailed in Table A, to enable the pipe and any joint, bedding, haunching and surround to be accommodated.

(4) The width of a trench to accommodate a pipe having an internal diameter as set out in column 1 of Table A shall be within the limits set out in columns 2 and 3 of that table.

(5) The said width shall be maintained up to a minimum of 300mm above the top of the pipe.

(6) Battering of the sides of trenches shall only be permitted where the pipe has been designed to withstand the loadings applicable under wide trench conditions calculated in accordance with the Department of Transport and Road Research Laboratory publications "Simplified tables of external loads on buried pipelines" 1986 and "A guide to design loadings for buried rigid pipes" 1983.

SCHEDULE 4 — *continued*

TABLE A

Column 1 *Internal diameter of pipe in mm*	Column 2 *Minimum trench width in mm*	Column 3 *Maximum trench width in mm*
100	430	630
150	490	690
225	580	780
300	680	880
375	950	1,150
450	1,030	1,230
525	1,120	1,320
600	1,240	1,440

(7) Where the trench is in ground that does not afford proper support to the pipe—

(*a*) it shall be excavated down to solid ground and extra depth refilled with grade C7.5/40 concrete; or

(*b*) the pipe shall be supported by piles.

Type, laying, bedding and protection of pipes

3.—(1) Immediately following the excavation of the trench, pipes shall be laid and jointed on granular material or concrete in accordance with sub-paragraphs (2) to (4).

(2) After jointing and before any backfilling the pipes shall be tested in accordance with the detailed requirements in paragraph 8. Pipes shall be laid so that each one is in contact with the bedding material throughout the length of the pipe, provision being made to accommodate the joints.

(3) The perforations in perforated pipes shall not be blocked and all pipelines shall be laid true to line and level.

(4) Pipes shall be in accordance with paragraph 12 of Schedule 2 and shall be jointed as indicated in Table B.

TABLE B

Type of pipe (not exceeding 600mm diameter)	*Joint type*	*Bedding class*
Concrete to BS 5911: Part 100: 1988. Standard pipes for diameter not exceeding 300mm; Class M pipe or Class H pipe for diameter greater than 300mm	Flexible spigot and socket joints as described in BS 5911: Part 100: 1988	B
Prestressed concrete pipes to BS 5178: 1975 for pipes diameter 450mm or greater	Flexible spigot and socket or rebated joints as described in BS 5178: 1975	B

Table B — *continued*

Type of pipe (not exceeding 600mm diameter)	*Joint type*	*Bedding class*
British Standard clay pipes to BS 65: 1991. Extra strength pipes to be used in all cases	Type 1 sockets with flexible joints as described in BS 65: 1991	B
UPVC pipes to BS 5481: 1977 (1989) or BS 4660: 1989	As described in BS 5481: 1977 (1989) or BS 4660: 1989	E
Perforated concrete pipes to BS 5911: Part 3: 1982	Ogee or rebated joints as described in BS 5911: Part 3: 1982	A
Porous concrete pipes to BS 5911: Part 114: 1992	Ogee or rebated joints as described in BS 5911: Part 114: 1992	A

(5) UPVC pipes shall—

(*a*) be stored and handled carefully and shall not be subjected to stresses which would induce permanent set or ovality; and

(*b*) be protected from the effects of temperature in accordance with the manufacturer's recommendations and shall not be laid in freezing conditions.

(6) Sufficient of the infill material shall be placed around the barrel of the pipes to prevent movement and stones, bricks or similar materials shall not be used below or against the pipes to locate them in position in the trench or to level the pipes.

(7) Granular bedding Type A shall comprise material to BS 882: 1992; Clause 5.3 with 10mm nominal size for pipes of 375mm diameter or less or 20mm nominal size for pipes of more than 375mm diameter.

(8) Selected fill Type B shall comprise uniform readily compactable material free from tree roots, vegetable matter, building rubbish and frozen soil, excluding clay lumps retained on 75mm sieve and stones retained on 25mm sieve.

(9) Granular bedding Type C shall be as specified for granular bedding Type A but to pass a 10mm sieve.

(10) For Class A bedding concrete grade C20/20 shall be placed in the excavation over the full width of the trench to give a minimum thickness of 100mm below the pipe.

(11) For Class B bedding—

(*a*) Type A granular material shall be placed by hand in the excavation below the level of the pipe barrel and shall be tamped by hand in layers not exceeding 150mm thick before compaction, to provide a dense, well compacted bed;

(*b*) the minimum thickness of the bed below the pipe shall be the greater of ¼ of the outside diameter of the pipe or 100mm;

(*c*) after the pipes have been properly bedded and tested Type A granular material shall be carefully placed into the spaces between the pipe and the sides of the trench to the level of half the pipe;

(*d*) the Type A granular material shall be thoroughly packed by careful tamping in layers not exceeding 150mm thick before compaction;

(*e*) the placing and tamping of the material shall proceed equally on both sides of the pipe;

(*f*) thereafter Type B selected fill shall be placed into the space between the pipe and the sides of the trench to the level of the crown of the pipe;

(*g*) the Type B fill shall be thoroughly packed and rammed by careful hand tamping in layers not exceeding 150mm thick before compaction;

(*h*) the placing and tamping of the material shall proceed equally on both sides of the pipe; and

(*i*) the bedding shall be completed by placing Type B fill material at least 300mm deep after compaction along the full width of the trench in 2 equal layers over the crown of the pipe, each layer lightly tamped by hand.

(12) For Class E bedding—

(*a*) Type C granular material shall be placed by hand in the excavation below the pipe and shall be tamped by hand in layers not exceeding 150mm thick before compaction to provide a dense well compacted bed free from soft spots throughout the length of the pipeline;

(*b*) the minimum thickness of the bed below the pipe shall be the greater of ¼ of the outside diameter of the pipe or 100mm;

(*c*) after the pipes have been properly bedded and tested, Type C granular material shall be carefully placed into the spaces between the pipe and the sides of the trench to the level of the crown of the pipe;

(*d*) the Type C granular material shall be thoroughly packed by careful hand tamping in layers not exceeding 150mm thick before compaction;

(*e*) the placing and tamping of the material shall proceed equally on both sides of the pipe; and

(*f*) Class E bedding shall be completed by placing Type C granular material over the crown of the pipe to a minimum depth of 150mm and the material shall be thoroughly compacted by hand tamping.

(13) Drains for the conveyance of sub-soil water shall be haunched using concrete grade C20/20. Haunching shall be a minimum of 50mm thick and shall extend from the pipe to the edge of the trench. The surface of the concrete shall be trowelled smooth and shall slope towards the pipe at a minimum grade of 1 in 12.

(14) During the placing of bedding, haunching, surrounding or anchoring materials, temporary side supports shall be removed and the full width of the trench shall be infilled with bedding, haunching, surrounding or anchoring material.

(15) Concrete for the protection of pipes shall be grade C20/20 and of minimum thickness 150mm.

(16) Concrete surrounds shall be provided for all pipes with less than 1.2m depth of cover.

(17) In order to avoid penetration of the sub-base by the concrete protection the minimum depth of cover to any concrete surround shall not be less than 625mm.

Backfilling

4.—(1) Backfilling shall wherever practicable take place immediately after the operations described in paragraph 3 have been completed.

(2) Except for drains for the conveyance of sub-soil water all backfilling shall consist only of suitable material deposited in layers not exceeding 225mm thick and each layer compacted to the degree of compaction required for earthworks and embankments.

(3) Any material which when excavated had been suitable for re-use, shall be replaced with suitable material if it has subsequently become unsuitable for backfilling.

(4) Suitable compacting equipment power rammers or vibrating plate compactors shall be used to compact the backfilling from 1m above the crown level of the pipe up to the appropriate level as described in sub-paragraphs (5) and (6).

(5) Backfilled material shall be terminated 75mm below surface level in grass areas and topsoiled over.

(6) In carriageways, footways and footpaths the backfilled material shall be brought up to formation level.

(7) Backfilling of drains for the conveyance of sub-soil water shall be with Type D filter material of clean, hard, crushed rock or gravel having a grading within the limits of Table C.

(8) The aggregate crushing value of the material shall not exceed 30 per cent as determined by the tests in BS 812: Part 110: 1990.

(9) The material passing the 425μm BS sieve shall be non-plastic when tested in accordance with BS 1377: Part 2: 1990.

(10) Filter material shall be deposited in layers not exceeding 225mm loose depth and each layer lightly compacted.

TABLE C RANGE OF GRADING OF FILTER MATERIAL

BS Sieve Size	*Percentage by weight passing*
37.5 mm	100
10 mm	45-100
3.35 mm	25-80
600 μm	8-45
150 μm	0-10
75 μm	0-5

Connections to existing drains

5.—(1) Where necessary, existing drains shall be properly extended, connected and jointed to the new drains.

(2) Where a drain for the conveyance of sub-soil water or a drain for the conveyance of surface water from the road is to connect into an existing drain for the conveyance of storm water a suitable catchpit shall be provided.

(3) All necessary precautions shall be taken to prevent the entry of debris or any other material into any existing drain and a free and uninterrupted flow shall always be preserved therein.

Manholes, inspection chambers and catchpits

6.—(1) Manholes, inspection chambers and catchpits are referred to as chambers in this paragraph.

(2) Bricks for construction of chambers and adjusting courses shall be Class B engineering bricks or concrete bricks to BS 6073: Part 1: 1981 of average compressive strength 30N/mm^2.

(3) Brick adjusting courses shall be kept to the minimum consistent with satisfactory construction of adjacent features and shall not exceed 300mm in depth.

(4) Chambers shall be constructed of either—

(*a*) precast concrete in accordance with BS 5911: Part 200: 1989 and to the sizes detailed in Table D and where precast units of appropriate diameter are used for the lower chamber the height shall not be less than 2m; above 2m taper units may be used to reduce the diameter to 900mm; or

(*b*) brick in accordance with sub-paragraph (2) and to the sizes detailed in Table E.

TABLE D

Dimension for Precast Concrete Chambers

Diameter of Pipe in mm	*Depth of Chamber in m*	*Internal Diameter of Chamber in mm*
150	up to 1.4	900
150	1.4 to 3.1	1050
225	up to 2.4	1050
225	2.4 to 3.2	1200
300	up to 3.275	1200
375	up to 3.35	1200
450	up to 3.75	1350
525	up to 3.825	1350
600	up to 3.9	1350
675	up to 4.0	1350
750	up to 4.075	1500
825	up to 4.15	1500
900	up to 4.225	1800

TABLE E

Dimension for Brick Chambers

Diameter of Pipe in mm	*Depth of Chamber in m*	*Length and Breadth of Chamber in mm*
Up to 225	Up to 1.4	900 × 675
Up to 225	1.4 to 2.5	1125 × 900
Up to 225	Over 2.5	1350 × 900
Over 225 and up to 375	Up to 2.5	1125 × 1125
Over 225 and up to 375	Over 2.5	1350 × 1125
Over 375 and up to 750	All depths	1350 × 1500

(5) Foundations to chambers shall be concrete grade C20/40 of minimum thickness 225mm.

(6) Channels up to 300mm diameter may be either vitrified clay or precast concrete; channels above 300mm diameter may be either preformed or formed in granolithic concrete.

(7) Benching shall be formed in grade C20/40 concrete and be rendered in granolithic concrete 50mm thick trowelled smooth and shall slope at 1 in 12 towards the main channel.

(8) Cover slabs of a suitable design shall be reinforced concrete grade C30/20.

(9) Chambers or systems collecting road surface water or water from sub-soil drains shall have a sump of not less than 225 mm depth below the invert of the outlet pipe.

(10) Where the depth of invert or sump of chambers below the finished surface of the carriageway or adjacent ground exceeds 900mm either—

(*a*) step irons to BS 1247: Part 2: 1990 shall be built in at vertical intervals of 300mm and at 300mm centre to centre horizontally; or

(*b*) in the case of brick chambers in addition to the requirements specified in sub-paragraph (*a*) step irons shall have 230mm ± 10mm tails.

(11) Where the depth to invert or sump of chambers below the finished surface of the carriageway or adjacent ground exceeds 2.5m—

(*a*) a manhole ladder shall be provided instead of step irons;

(*b*) manhole ladders and fixing brackets shall be of mild steel complying with the requirements of BS 449: Part 2: 1969 galvanised after manufacture;

(*c*) the stringers shall be 64mm by 19mm minimum section and the rungs 25mm minimum diameter;

(*d*) the stringers shall be placed not less than 380mm apart and connected to the supporting structure with fixing brackets of material equal in section to the stringers located at centres not exceeding 2m (minimum of 2 pairs of fixing brackets per ladder);

(*e*) the fixing brackets shall be of sufficient length to give a clearance of not less than 210mm behind the rungs; and

(*f*) the rungs shall be equally spaced at centres of between 230mm and 250mm and fixed to the stringers in accordance with BS 4211: 1987.

(12) Backfilling around chambers shall normally be similar to backfilling of trenches; however, where the design of the chamber is such that it requires concrete backfilling this shall be provided.

(13) All chambers shall be watertight on completion and shall be fitted with heavy duty double triangular covers to BS 497: Part 1: 1976 type MA-60, in carriageways, including shared surfaces.

(14) Chambers shall be provided at the start of the run of pipe, at sharp changes of direction, at the junctions of pipes or changes of diameter of pipes, or where excessive gradients require the positioning of back-drop chambers.

(15) Chambers shall be spaced at distances not greater than 90m.

(16) In footways, verges or service strips covers to BS 497: Part 1: 1976 type MB2-60 may be provided.

(17) In sub-paragraph (10) "tails" means that part of the step iron which forms the legs of the 'U-shape' and is measured from the free end to the first bend.

Gullies and connections

7.—(1) Gullies shall be as detailed in sub-paragraphs (2) to (9) and be capable of being easily rodded.

(2) Footway gullies shall be of cast iron 300mm long, 230mm wide and 280mm deep with a rodding eye and the grating shall be hinged and channelled.

(3) Carriageway, including shared surface, gullies shall be circular 375mm internal diameter or rectangular having internal dimensions 300mm × 385mm in accordance with BS 5911: Part 200: 1989.

(4) Gullies shall be fully surrounded with concrete grade C20/20 to a minimum thickness of 150mm.

(5) Gullies shall have 150mm outlet and all other dimensions shall be as detailed for 375mm diameter in Table 3 of BS 5911: Part 200: 1989.

(6) Untrapped gullies shall only be used for storm water drains.

(7) Carriageway gully gratings and frames shall comply with the requirements of paragraph 13(3) of Schedule 2.

(8) A sufficient number of gullies shall be provided to drain adequately the surface water from the street and the normal spacing of gullies shall be at 40m centres on both sides of a cambered street and at 30m centres on the low side of a street with crossfall.

(9) Where gradients fall below 0.8 per cent in valley curves or at points of reversal of crossfall closer gully spacing or precast concrete drainage units slotted to allow continuous access of surface water to a drain shall be required.

(10) Junction pipes for gullies which are laid but not immediately connected to gullies shall be fitted with suitable temporary stoppers or seals and the position of all such junctions shall be clearly marked by means of stakes or tracing wires.

(11) In sub-paragraph (2) ''rodding eye'' means an inclined shaft constructed in the line of a drain connected to the main pipeline to facilitate the clearance of blockages by rodding.

Testing and cleaning

8.—(1) All drains with watertight joints shall be tested between manholes by means of the water test or the air test referred to in sub-paragraphs (2) and (3) respectively—

(2) In the case of the water test—

(*a*) the pipes shall be filled with water under a head of not less than 1.2m above the crown of the pipe at the high end and not more than 6m above the pipe at the low end;

(*b*) steeply graded pipes shall be tested in stages where the latter head would be exceeded if the whole section were tested at once;

(*c*) a period of one hour shall be allowed for absorption;

(*d*) the loss of water over a period of 30 minutes shall be measured by adding water from a measuring vessel at regular intervals of 10 minutes and noting the quantity required to maintain the original water level in the standpipe; and

(*e*) the sewer or drain shall have passed the test if the volume of water added to the standpipe does not exceed 0.06 litres per hour per 100 linear metre per millimetre of nominal internal diameter over 300mm nominal diameter.

(3) In the case of the air test—

(*a*) the length of pipe under test shall be effectively plugged and air pumped in by suitable means, until a pressure of 100mm head of water is indicated; and

(*b*) the sewer shall have passed the test if the air pressure does not fall below 75mm head of water during a period of five minutes without further pumping after a period for requisite stabilisation.

(4) The drains referred to in sub-paragraph (1) shall be tested—

(*a*) after laying, including the placing of concrete, if any is required under this Schedule, but before backfilling; and

(*b*) after backfilling has been completed.

(5) Drains constructed of steel, spun iron or other material designed for high pressure shall be tested in accordance with sub-paragraphs (6) to (8).

(6) Pipes shall be tested for infiltration after backfilling.

(7) All inlets to the system shall be effectively closed and the residual flow shall be deemed to be infiltration.

(8) The amount of infiltration shall not exceed 0.1 litre per hour per 100 linear metre per millimetre of nominal bore of the pipe and infiltration to manholes shall not exceed 5 litres per hour per manhole.

(9) Should any drain fail to pass any of the tests in this paragraph, the defects shall be made good and the pipes re-tested until they comply with the requirements of the test.

(10) On completion of the work—

(*a*) all pipes shall be thoroughly cleaned and pipes not exceeding 400mm diameter shall be flushed with clean water while being rodded from manhole to manhole with a rubber tipped plunger 12mm less than the bore of the pipe; and

(*b*) chambers and sumps shall be washed down, emptied and left to dry and the pipe and filter of drains for the conveyance of sub-soil water shall at all times be kept free of obstructions.

Intercepting ditches and existing land drains

9.—(1) Intercepting ditches, and drains having a similar function to intercepting ditches, shall if practicable be constructed in advance of the excavation of cuttings and forming of embankments.

(2) Existing land drains severed by the works shall be located and connected into the intercepting ditches or new pipes which are provided for the interception of surface and sub-soil water.

Sub-soil drainage (see also regulation 9)

10.—(1) Perforated or porous concrete pipes for the purpose of sub-soil drainage shall be laid on one or both sides of the carriageway.

(2) The depth of cover shall not be less than 1.2m and the pipes shall be backfilled in accordance with the requirements in paragraph 4.

SCHEDULE 5 Regulations 11(2) and (3) and 15(1)

Detailed requirements — Carriageways

Camber, crossfall and superelevation

1.—(1) Carriageways shall be constructed with camber or crossfall of 1 in 40.

(2) Where the cross-section of a carriageway changes from camber to crossfall the rate of change shall not exceed 1 in 100.

(3) Subject to sub-paragraph (4) superelevation shall be applied to the carriageway and shall be 1 in 40.

(4) Where it is satisfied in any particular case that the requirement of sub-paragraph (3) as to the ratio of superelevation is unreasonable the Department may relax that requirement to permit superelevation not exceeding 1 in 25.

Types of construction

2.—(1) Subject to sub-paragraph (5) carriageways shall be of flexible, block paving or rigid construction as specified in Tables A, B or C—

TABLE A FLEXIBLE CONSTRUCTION

Layer	*Material*	*Depth of Material*		
		Carriageway width greater than 6m (excluding carriageways serving industrial premises)	*Carriageway 6m or less in width (excluding carriageways serving industrial premises)*	*Carriageways serving industrial premises*
Blinding	Stone dust	75mm	75mm	75mm
Sub-base	Crushed rock in accordance with the requirements in paragraph 7	250mm	225mm	N/A
	Crushed rock in accordance with the roadbase requirements in paragraph 8	N/A	N/A	225mm
Roadbase	Crushed rock in accordance with the requirements in paragraph 8	225mm	150mm	N/A

SCHEDULE 5 — *continued*

TABLE A — Flexible Construction — *continued*

Layer	*Material*	*Depth of Material*		
		Carriageway width greater than 6m (excluding carriageways serving industrial premises)	*Carriageway 6m or less in width (excluding carriageways serving industrial premises)*	*Carriageways serving industrial premises*
	Bituminous roadbase in accordance with the requirements in paragraph 9	N/A	N/A	180mm
Basecourse	Bitumen macadam or asphalt in accordance with the requirements in paragraph 12(1)	50mm	50mm	60mm
Wearing course	Bitumen macadam or asphalt with chippings in accordance with the requirements in paragraph 13(1)	40mm	40mm	N/A
	Asphalt with chippings in accordance with the requirements in paragraph 13(3)	N/A	N/A	40mm
Chippings	Precoated chippings in accordance with the requirements in paragraph 13(4)	20mm	20mm	20mm

SCHEDULE 5 — *continued*

TABLE B BLOCK PAVING

Layer	*Material*	*Depth of Material*		
		Carriageway width greater than 6m (excluding carriageways serving industrial premises)	*Carriageway 6m or less in width (excluding carriageways serving industrial premises)*	*Carriageways serving industrial premises*
Blinding	Stone dust	75mm	75mm	75mm
Sub-base	Crushed rock in accordance with the requirements in paragraph 7	250mm	225mm	225mm
Roadbase	Crushed rock in accordance with the requirements in paragraph 8	225mm	150mm	N/A
	Concrete C7.5/40	N/A	N/A	200mm
Laying Course	Graded sharp sand in accordance with BS 6717: Part 3: 1989	50mm	50mm	50mm
Surface Course	Concrete or other approved paving blocks in accordance with the requirements in paragraph 17	80mm	80mm	80mm

TABLE C RIGID CONSTRUCTION

	Depth of Stone Dust Blinding Layer	*Depth of Crushed Rock Roadbase (in accordance with the requirements in paragraph 8)*	*Depth of Concrete Slab (in accordance with the requirements in paragraph 16)*	*Transverse Joint Reinforcement (minimum)*	*Longitudinal Joint Reinforcement (minimum)*	*Transverse Joint Spacing (maximum)*
Carriageway width greater than 6m (excluding carriageways serving industrial premises)	75mm	180mm	200mm	0.75kg per m^2	2.61kg per m^2	15m
Carriageway width 6m or less (excluding carriageways serving industrial premises)	75mm	180mm	150mm	0.75kg per m^2	1.8kg per m^2	12m
Carriageways serving industrial premises	75mm	250mm	220mm	0.75kg per m^2	3.41kg per m^2	20m

(2) In the case of flexible construction and block paving the blinding layer sub-base and roadbase shall extend 450mm beyond the kerb face on each side of the carriageway.

(3) In the case of rigid construction the blinding layer sub-base and roadbase shall extend 300mm beyond the kerb face on each side of the carriageway.

(4) Rigid construction shall be of reinforced concrete and fabric reinforcement No. B283 to BS 4483: 1985 may be used or alternatively No. C283 to BS 4483; 1985 with the addition of at least 5mm bars at 400mm centres placed transversely across the main reinforcement.

(5) Where the formation consists of solid rock the requirements of sub-paragraph (1) for the blinding layer set out in Tables A, B and C shall not apply.

Drains, etc. to be completed first

3. Before any carriageway construction work has begun the installation of all drains, pipes, cables and other apparatus shall be completed.

Preparation of formation

4.—(1) The formation shall be well cleaned of mud and slurry, properly trimmed to the line and level as shown on the approved plans and maintained free of standing water.

(2) When the formation has been prepared, construction traffic, apart from compaction equipment, shall not be allowed to run on it.

Materials for sub-base and roadbase

5.—(1) Subject to sub-paragraph (2) materials for sub-base and roadbase shall consist of crushed rock.

(2) Where it is satisfied in any particular case that the requirement of sub-paragraph (1) is unreasonable the Department may relax that requirement to permit the use of materials consisting of gravel (crushed or screened), bituminous or cement bound granular material or lean mix concrete.

Protection

6.—(1) During construction the sub-base, roadbase and surfacing shall be kept clean and free from clay or other deleterious materials.

(2) Construction shall be so organised that only traffic directly engaged in laying and compacting shall traverse the surface of the roadbase.

(3) Traffic which would damage the partially constructed road shall not be permitted to use it.

(4) Any damage to any layer shall be made good before the application of the subsequent layer.

(5) Where site construction traffic is to use a partially constructed road there shall be a minimum of 300mm thickness of compacted material, blinded by the application of crushed rock of 19mm maximum size compacted to form a dense even surface, provided to protect the formation.

(6) The blinding material shall not be frost susceptible as described in the Department of the Environment Transport and Road Research Laboratory Report LR90: 1967.

(7) The portion of blinding material passing the 425μm BS sieve when tested in compliance with BS: 1377: Part 2: 1990 shall be non-plastic.

Sub-base

7.—(1) Crushed rock sub-base shall consist of sound clean approved rock with a 10 per cent fines value of not less than 160 KN when tested in accordance with the requirements of BS 812: Part 111: 1990.

(2) Other materials shall conform to the appropriate BS.

(3) With the exception of the mixed materials, sub-base materials shall be graded in accordance with Table D—

TABLE D

110mm Crushed Rock: Range of Grading for Sub-base Material	
BS Sieve Size	*Percentage by Mass passing*
125.00mm	100
100.00mm	90-100
90.00mm	83-100
37.50mm	25-52
28.00mm	10-30
14.00mm	0-10
6.30mm	0-6
3.35mm	0-2

(4) Sub-base material used shall not be frost susceptible as defined by the test described in the Department of the Environment Transport and Road Research Laboratory Report LR 90: 1967.

(5) The material passing the 425μm BS sieve when tested in compliance with BS 1377: Part 2: 1990 shall be non-plastic.

(6) Where the total depth of sub-base is 250mm or less this shall be spread in one layer so that when compacted the total depth shall be in accordance with the requirements in paragraph 2.

(7) Compaction shall be by not less than the required number of passes of a roller as shown in Table E for the required compacted layer depth.

SCHEDULE 5 — *continued*

TABLE E

Compaction Requirements for Granular Sub-base and Roadbase Material

Type of compaction plant	*Category*	*No. of passes of compaction equipment for layers not exceeding the following compacted depths*			
		110mm	*150mm*	*225mm*	*250mm*
Smooth-wheeled roller (or vibratory roller operating without vibration)	Mass per m width of roll:				
	over 2700kg up to 5400kg	16	N/A	N/A	N/A
	over 5400kg	8	16	N/A	N/A
Pneumatic-tyred roller	Mass per wheel:				
	over 4000kg up to 6000kg	12	N/A	N/A	N/A
	over 6000kg up to 8000kg	12	N/A	N/A	N/A
	over 8000kg up to 12000kg	10	16	N/A	N/A
	over 12000kg	8	12	N/A	N/A
Vibratory roller	Mass per metre width of vibrating roll:				
	over 700kg up to 1300kg	16	N/A	N/A	N/A
	over 1300kg up to 1800kg	6	16	N/A	N/A
	over 1800kg up to 2300kg	4	6	10	N/A
	over 2300kg up to 2900kg	3	5	9	10
	over 2900kg up to 3600kg	3	5	8	9
	over 3600kg up to 4300kg	2	4	7	8
	over 4300kg up to 5000kg	2	4	6	7
	over 5000kg	2	3	5	6
Vibrating plate compactor	Mass per sq metre of base plate:				
	over 1400kg/m^2 up to 1800kg/m^2	8	N/A	N/A	N/A
	over 1800kg/m^2 up to 2100kg/m^2	5	8	N/A	N/A
	over 2100kg/m^2	3	6	10	N/A
Vibro-tamper	Mass:				
	over 50kg up to 65kg	4	8	N/A	N/A
	over 65kg up to 75kg	3	6	10	N/A
	over 75kg	2	4	8	N/A
Power rammer	Mass:				
	100kg up to 500kg	5	8	N/A	N/A
	over 500kg	5	8	12	N/A

(8) When compaction has been completed the surface of the sub-base shall be true to line and level within the tolerances given in paragraph 2 of Schedule 3.

Crushed rock roadbase

8.—(1) Crushed rock roadbase shall consist of sound clean approved rock with a 10 per cent fines value of not less than 160KN when tested in accordance with the requirements of BS 812: Part 111: 1990. That material shall be graded in accordance with Table F:

TABLE F

65mm Crushed Rock: Range of Grading for Roadbase Material	
BS Sieve Size	*Percentage by Mass Passing*
65.00mm	100
50.00mm	67-100
37.50mm	52-70
28.00mm	30-45
14.00mm	10-28
6.30mm	6-10
2.36mm	0-6
1.16mm	0-2

(2) The material described in sub-paragraph (1) shall not be frost susceptible as defined by the test described in the Department of the Environment Transport and Road Research Laboratory Report LR 90: 1967.

(3) The material passing the 425μm BS sieve when tested in compliance with BS 1377: Part 2: 1990 shall be non-plastic.

(4) The roadbase material shall be laid in layers so that when compacted the total thickness shall be in accordance with the detailed requirements in paragraph 2.

(5) The minimum compacted layer depth of material laid in one layer shall be 110mm and the maximum compacted layer thickness laid in one layer shall be 225mm.

(6) The final layer of material shall be spread using a paving machine.

(7) Compaction shall be by not less than the required number of passes of a roller as shown in Table E for the required compacted layer depth.

(8) When compaction has been completed the surface shall be true to line and level and within the tolerances given in paragraph 2 of Schedule 3.

Bituminous roadbase

9.—(1) Bitumen macadam roadbase shall be manufactured and tested in accordance with BS 4987: Part 1: 1988 28mm size dense roadbase and transported, laid and compacted in accordance with BS 4987: Part 2: 1988 to the depth shown in Table A and subject to the requirements in paragraphs 10 and 11.

(2) Where a bituminous roadbase is to carry traffic prior to the application of the basecourse a tack coat in accordance with BS 4987: Part 2: 1988 shall be applied prior to the laying of the basecourse.

Flexible surfacing

10.—(1) The testing of materials for flexible surfacing shall be in accordance with sub-paragraphs (2) to (6).

(2) In the case of bituminous materials a sample of the proposed mix shall be submitted for testing at least three working days before being laid on the road and continuous daily sampling and testing shall be carried out during the progress of the works.

(3) The testing of bituminous materials shall be carried out by an approved laboratory as laid down in BS 598: Part 101: 1987; Part 102: 1989; Part 104: 1989; Part 105: 1990; Part 106: 1990; Part 107: 1990; Part 108: 1990 and Part 109: 1990; BS 812: Part 1: 1975; Part 2: 1975; Part 101: 1984; Part 103: 1985; Part 111: 1990 and Section 105.1: 1989; BS 2000: Part 105: 1991; BS 3690: Part 3: 1990; and copies of the certified results of the tests shall be given to the Department.

(4) In the event of failure to supply such certified results samples shall be taken from the road for testing.

(5) Where a sample fails to conform to the specifications in the relevant requirements in Schedule 2 the Department may order the replacement of material supplied during that day, or the carrying out of appropriate remedial measures.

(6) Samples shall be taken in accordance with BS 598: Part 100: 1987 and the manufacturer's instructions and recommendations provided these do not conflict with the BS.

11.—(1) The preparation for flexible surfacing shall be in accordance with sub-paragraphs (2) to (4).

(2) Before the application of the surfacing layers the surface of the roadbase shall be well compacted, free from mud, loose material or other deleterious materials, true to line and level and any deficiencies shall be made good with a regulating course of bitumen macadam of appropriate nominal size.

(3) Subject to sub-paragraph (4) the laying and compacting of bitumen macadam shall be in accordance with the recommendations in BS 4987: Part 2: 1988 and shall be machine laid in accordance with the BS.

(4) Notwithstanding the provisions of sub-paragraph (3) hand laying of bituminous material shall be permitted in the following circumstances—

(*a*) for laying regulating courses of irregular shape and varying thickness;

(*b*) in confined spaces where it is impracticable for a paver to operate; and

(*c*) for footways and footpaths.

12.—(1) The basecourse for flexible surfacing shall be in accordance with sub-paragraphs (2) to (4).

(2) Bitumen macadam basecourse shall be manufactured and tested in accordance with BS 4987: Part 1: 1988 20mm size dense basecourse and transported, laid and compacted in accordance with BS 4987: Part 2: 1988 to the depth shown in Table A.

(3) Asphalt basecourse shall be 60 per cent coarse aggregate hot rolled asphalt of depth shown in Table A and shall be manufactured and tested in accordance with BS 594: Part 1: 1992 Table 2 Column 2/4; binder to Table 1, binder numbers 3 or 5 and transported, laid and compacted in accordance with BS 594: Part 2: 1992.

(4) Where a basecourse is to carry traffic prior to the application of the wearing course, the depth shall be increased to 70mm compacted thickness and a tack coat in

accordance with BS 4987: Part 2: 1988 shall be applied prior to the laying of the wearing course.

13.—(1) The wearing course for flexible surfacing shall be in accordance with sub-paragraphs (2) to (5).

(2) Subject to sub-paragraph (5) bitumen macadam wearing course shall be manufactured and tested in accordance with BS 4987: Part 1: 1988 14mm close graded wearing course for Category B traffic and transported, laid and compacted in accordance with BS 4987: Part 2: 1988 to the depth shown in Table A.

(3) Asphalt wearing course shall be 30 per cent coarse aggregate manufactured and tested to BS 594: Part 1: 1992 Table 6 Column 6/4 Schedule 1B of depth shown in Table A and shall be covered with a layer of pre-coated chippings of size in accordance with the requirements in Table A applied as specified in BS 594: Part 2: 1992 Clause 7 and shall be transported, laid and compacted in accordance with BS 594: Part 2: 1992.

(4) The chippings shall comply with BS 594: Part 1: 1992 Clause 4 with a maximum aggregate abrasion value of 12 and a minimum polished stone value of 55.

(5) Where the depth of the basecourse has been increased to 70mm compacted thickness to comply with paragraph 12(4) bitumen macadam wearing course manufactured and tested in accordance with BS 4987: Part 1: 1988 10mm size close graded wearing course for Category B traffic and transported, laid and compacted in accordance with BS 4987: Part 2: 1988 to a compacted depth of 30mm may be used as an alternative to the requirements of paragraph 13(2).

14.—(1) The aggregates for flexible surfacing shall be in accordance with sub-paragraphs (2) and (3).

(2) The aggregates used for bituminous surfacing materials shall be sound, clean, hard broken rock graded to BS 4987: Part 1: 1988.

(3) Where they are used in the wearing course they shall have a maximum aggregate abrasion value of 16 and a minimum polished stone value of 45.

15. The binder for bitumen macadam roadbase, basecourse and wearing course shall be in accordance with BS 4987: Part 1: 1988.

Concrete carriageways

16.—(1) Subject to paragraph 2(1) concrete carriageways shall be in accordance with the Department of the Environment for Northern Ireland Manual of Contract Documents, Volume 1, Specification for Highway Works, Series 1000, Road Pavements — Concrete and Cement Bound Materials, and the following provisions.

(2) The depth of concrete slab shall be in accordance with the requirements in Table C.

(3) The concrete slab shall be reinforced to an extent not less than that specified in Table C.

(4) Transverse joints for concrete carriageways shall be in accordance with the Department of the Environment for Northern Ireland Manual of Contract Documents, Volume 1, Specification for Highway Works, Series 1000, Road Pavements — Concrete and Cement Bound Materials, and the requirements of sub-paragraphs (5) to (7).

(5) The spacing for transverse joints along the entire length of the carriageway shall be as specified in Table C.

(6) Every third joint shall be an expansion joint.

(7) The remainder shall be contraction joints.

(8) In sub-paragraph (6) "expansion joint" means a permanent joint between two slabs or elements of a structure which allows a small relevant movement perpendicular to the joint.

(9) In sub-paragraph (7) "contraction joint" means a joint to reduce stresses due to shrinkage or temperature change and to control the possibility of cracks.

Block paving

17.—(1) Subject to sub-paragraphs (3) and (4) concrete paving blocks shall be used and shall comply and be tested in accordance with BS 6717: Part 1: 1986.

(2) Subject to sub-paragraph (3) concrete paving blocks shall be laid in accordance with BS 6717: Part 3: 1989.

(3) Where it is satisfied in any particular case that the requirements of sub-paragraphs (1) and (2) are unreasonable the Department may relax those requirements to permit the use of proprietory shaped concrete paving blocks not complying with the requirements referred to in sub-paragraph (1) and to permit laying techniques different from those contained in the BS referred to in sub-paragraph (2) if the blocks are laid in accordance with the manufacturer's specification in relation thereto.

(4) Where it is satisfied in any particular case that the requirements of sub-paragraph (1) are unreasonable the Department may relax those requirements to permit type PB clay paving blocks manufactured in accordance with BS 6677: Part 1: 1986 and laid in accordance with BS 6677: Part 3: 1986.

SCHEDULE 6 Regulation 11(2) and (3)

Detailed Requirements — Shared Surfaces

Camber and crossfall

1.—(1) Subject to sub-paragraph (3) shared surfaces shall be constructed with camber or crossfall of 1 in 40.

(2) Where the cross-section of a shared surface changes from camber to crossfall the rate of change shall not exceed 1 in 100.

(3) Where a centre line drainage system is provided construction shall be with a fall of 1 in 40 towards the centre line.

Types of construction

2.—(1) Shared surfaces shall be of flexible, block paving or rigid construction in accordance with sub-paragraphs (2) to (4) as appropriate.

(2) In the case of flexible construction—

(*a*) the blinding layer, sub-base and roadbase shall be in accordance with the requirements in Table A of Schedule 5; and

(*b*) the basecourse and wearing course shall be either—

(i) bitumen macadam basecourse and wearing course in accordance with the requirements in Table A of Schedule 5; or

(ii) bitumen macadam basecourse manufactured and tested in accordance with BS 4987: Part 1: 1988 20mm size dense basecourse and transported, laid and compacted in accordance with BS 4987: Part 2: 1988 to a compacted depth of 55mm; and

35mm compacted depth of hot rolled asphalt wearing course with precoated chippings in accordance with the requirements in paragraph 13(3) and (4) of Schedule 5.

(3) In the case of block paving, construction using block paving shall comprise blinding layer, sub-base, roadbase, laying course and surface course in accordance with the requirements in Table B of Schedule 5.

(4) In the case of rigid construction, the construction for a rigid surface shall comprise blinding layer, roadbase and reinforced concrete in accordance with the requirements in Table C and paragraph 16 of Schedule 5.

Rumble strips

3.—(1) Subject to sub-paragraph (6) at the entrance to a shared surface a rumble strip shall be constructed in accordance with sub-paragraphs (2) to (5).

(2) Kerbs in accordance with paragraph 4(9) of Schedule 7 shall be laid in two rows 1.5m apart across the carriageway and shall abut the carriageway edges.

(3) The rectangular area enclosed by the kerbs and the edges of the carriageway shall be infilled with block paving in accordance with Table B of Schedule 5.

(4) Where the carriageway or shared surface on the higher side of the rumble strip is constructed with camber, gullies in accordance with paragraph 7 of Schedule 4 shall be sited on each side of the carriageway or shared surface immediately adjacent to the rumble strip.

(5) Where the carriageway or shared surface on the higher side of the rumble strip is constructed with crossfall a gully in accordance with paragraph 7 of Schedule 4 shall be sited on the lower side of the carriageway or shared surface immediately adjacent to the rumble strip.

(6) Where a shared surface is constructed of block paving a single row of kerbs in accordance with paragraph 4(9) of Schedule 7 shall be laid across the carriageway at the entrance to the shared surface instead of a rumble strip.

Mountable shoulders

4.—(1) Kerbs in accordance with paragraph 4(9)(*b*) of Schedule 7 shall be laid where the mountable shoulder abuts the carriageway.

(2) Kerbs in accordance with paragraph 4 of Schedule 7 shall be laid at the back of the mountable shoulder to provide a 40mm kerb face.

(3) The area of the mountable shoulder bounded by the kerbs shall be constructed in accordance with Table C and paragraph 16 of Schedule 5.

(4) As an alternative the area of the mountable shoulder bounded by the kerbs may be constructed using block paving in accordance with Table B and paragraph 17 of Schedule 5.

(5) The surface of the mountable shoulder shall fall towards the carriageway at a rate of 1 in 25.

SCHEDULE 7 Regulations 13(9), 14 and 15(2)

Detailed requirements — Footways, Footpaths, Footway Crossings, Kerbs, Steps and Stepped Ramps, Cycle Tracks, Verges and Service Strips

Drains etc. to be completed first

1. Before any construction work in relation to a footway, footpath, cycle track, steps or stepped ramps is commenced the installation of all drains, pipes, cables and other apparatus shall be completed.

Footways and footpaths

2.—(1) The formation of footways and footpaths shall be prepared in accordance with paragraph 4 of Schedule 5 with a crossfall not exceeding 1 in 24 maximum or 1 in 40 minimum.

(2) For footways the crossfall shall be at 1 in 40 towards the carriageway.

(3) The base of footways and footpaths shall consist of crushed rock as specified in paragraphs 8(1) to (3) and (8) of Schedule 5 compacted to a minimum thickness of 150mm with a roller of at least 2.5 tonnes weight and blinded with just enough stone dust or fine granular material to give a close textured surface.

(4) Subject to sub-paragraphs (9), (16) and (30) footways and footpaths shall be of flexible construction, in accordance with sub-paragraphs (5) to (8).

(5) Basecourse shall be bitumen macadam manufactured and tested in accordance with BS 4987: Part 1: 1988 20mm size dense basecourse and transported, laid and compacted in accordance with BS 4987: Part 2: 1988 to a compacted depth of 50mm.

(6) Subject to sub-paragraph (7) the wearing course shall be—

(*a*) 15 per cent course aggregate hot rolled asphalt to BS 594: Part 1: 1992 Table 6, Column 6/2, Schedule 1B, binder to Table 1, binder number 3 or 5, laid to give a compacted depth of 25mm; and

(*b*) clean dry 10mm chippings of light colour distributed to the asphalt wearing course after the first pass of the roller at a rate of 1kg/m^2 and rolled in.

(7) In a development with access to a road with a speed limit greater than 30 miles per hour bitumen macadam wearing course manufactured and tested in accordance with BS 4987: Part 1: 1988 and transported, laid and compacted in accordance with BS 4987: Part 2: 1988 to a compacted depth of 25mm on footways may be used as an alternative to the requirement of sub-paragraph (6).

(8) Compaction shall be by means of a roller of at least 2.5 tonnes weight.

(9) Where it is satisfied in any particular case that the requirements of sub-paragraphs (4) to (8) are unreasonable the Department may relax those requirements to permit the use of pre-cast concrete flags complying with and laid in accordance with sub-paragraphs (10) to (15).

(10) Flags to BS 7263: Part 1: 1990 Type E70 shall be laid on a 25mm ± 5mm thick bed of clean sharp sand on a 150mm stone base so that the whole area of the flag is supported.

(11) Joints shall be at right angles to the kerb or outer edge between 3mm and 9mm wide.

(12) Where flags are laid on a curve of 12m radius or less both edges of the flag shall be radially cut to the required line.

(13) Sharp sand shall comply with BS 882: 1992 grading C or M.

(14) Joints shall be close jointed and filled with fine dry sand.

(15) Flags shall be neatly trimmed round all street furniture.

(16) Where it is satisfied in any particular case that the requirements of sub-paragraphs (4) to (8) are unreasonable the Department may relax those requirements to permit the use of in-situ construction complying with sub-paragraphs (17) to (29).

(17) Concrete shall be used on a base which complies with sub-paragraph (3).

(18) Grade C30/20 concrete shall be laid to a finished minimum thickness of 90mm well compacted and the surface shall be given a suitable non-slip texture by brushing, screeding or the application of an indented roller and protected from frost, drying wind, direct sunshine and traffic for at least 48 hours.

(19) The concrete shall be compacted against a firm rigid temporary or permanent formwork at least as deep as the concrete thickness and adequately supported.

(20) All formwork shall be free from warp twists and kinks and where they are in contact with concrete shall be cleaned and oiled immediately before each use.

(21) Formwork shall be set and supported so as not to be displaced in line or level during the placing and compacting of the concrete.

(22) Temporary formwork shall be removed but not earlier than 48 hours after the placing of the concrete.

(23) The maximum free water to cement ratio for concrete grade C30/20 shall be 0.5.

(24) The concrete shall contain an air entraining agent so that the total volume of the mix shall be 5 per cent $\pm$ 1½ per cent.

(25) The air content shall be determined at least six times per day by a pressure type air meter and at such times as test specimens are made.

(26) Where any such determination of air content gives a result outside the specified limits a further test shall be made immediately on the next available load of concrete before discharging. Where the air content is still outside the limit steps shall be taken to adjust the air content of the concrete or improve its uniformity.

(27) The air entraining agent shall be added at the mixer by an apparatus capable of dispensing the correct amount so as to ensure uniform distribution of the agent throughout the batch during mixing.

(28) During the process of concreting 150mm test cubes shall be made, cured and tested all in accordance with BS 1881: Parts 101, 102, 108, 111, 112 and 116: 1983.

(29) Curing of exposed concrete surfaces shall be carried out immediately following the application of the surface texture described in sub-paragraph (18) using a suitable aluminised curing compound which shall be mechanically sprayed on to the surface at the rate of 0.22-0.27 l/m^2 using a fine spray or by covering with polythene sheeting.

(30) Where it is satisfied in any particular case that the requirements of sub-paragraphs (4) to (8) are unreasonable the Department may relax those requirements to permit the use of block paving complying with sub-paragraphs (31) to (33).

(31) The base for block paving on footways and footpaths shall be in accordance with sub-paragraph (3).

(32) The laying course for block paving shall be in accordance with the requirements of paragraph 2(1) of Schedule 5.

(33) Block paving shall be in accordance with the requirements of paragraph 17 of Schedule 5, 60mm thick.

Footway crossings

3.—(1) Crossings of a footway to permit vehicular access to places or premises other than private dwellings shall be constructed to carriageway standards in accordance with Schedule 5, with kerbs in accordance with paragraph 4.

(2) Crossings of a footway to permit vehicular access to private dwellings shall be constructed with kerbs in accordance with paragraph 4 and in accordance with sub-paragraphs (3) to (5) as appropriate.

(3) On a base in accordance with paragraph 2(3) but to a minimum compacted thickness of 225mm; flexible surfacing in accordance with paragraphs 2(4) to (8); or

(4) on a base in accordance with paragraph 2(3) with concrete C30/20 laid to a minimum thickness of 125mm in accordance with paragraph 16 of Schedule 5; or

(5) in accordance with the standards of the adjacent carriageway.

Kerbs

4.—(1) Kerbs shall be laid to a smooth flowing alignment in advance of the laying of the carriageway surfacing.

(2) Subject to sub-paragraph (6) kerbs shall be laid to provide a 125mm (40mm in shared surfaces) kerb face and shall be 255mm by 155mm hydraulically compressed concrete to BS 7263: Part 1: 1990 Type HB2 of Figure 1 (150mm × 125mm Type BN of Figure 1 in shared surfaces) set on a grade C7.5/40 cast in-situ concrete bed 400mm wide by 150mm deep and backed with grade C7.5/40 concrete.

(3) For radii of between 5.5m and 12m straight kerbs cut to 300mm length shall be used.

(4) For radii of less than 5.5m kerbs cut to 300mm lengths shall be used and mitered at each end so that when laid they shall have a uniform joint width in accordance with sub-paragraph (5).

(5) Joints shall be between 3mm and 6mm wide and filled with cement mortar.

(6) On shared surface roads kerbs in accordance with the Department of the Environment for Northern Ireland publication "Layout of Housing Roads Design Guide" 1988 may be used as an alternative to the requirement of sub-paragraph (2).

(7) At footway crossings and wheelchair accesses to carriageways—

(*a*) kerbing shall be continued at the carriageway edge and dropped to give an upstand of 10mm for the full width of the footway crossings and wheelchair accesses;

(*b*) the drop shall be achieved over one kerb length at each side of the footway crossings and wheelchair accesses;

(*c*) kerbs shall be set on a grade C7.5/40 cast-in-situ concrete bed 400mm wide by 175mm deep and backed with grade C7.5/40 concrete;

(*d*) the access width for a wheelchair shall be a minimum of 1.8m; and

(*e*) at junctions the footway crossing shall be located on the minor road behind the tangent point of the entry radius and enable crossing of the carriageway at right angles.

(8) Edgings shall—

(*a*) be provided at the rear of footways and at the sides of footpaths of flexible construction which are not retained by boundary or other walls;

(*b*) be 150mm by 50mm hydraulically compressed concrete to BS 7263: Part 1: 1990 Type ER or Type EF of Figure 1 and shall be set on a grade C7.5/40 cast in-situ concrete bed 250mm wide by 100mm deep backed with grade C7.5/40 concrete; and

(*c*) have the tops of square edgings set at the finished level of the footway or footpath but an upstand of 50mm shall be accepted for half round edgings.

(9) Where a rumble strip is required under paragraph 3 of Schedule 6—

(*a*) kerbs shall be laid to a smooth flowing alignment in advance of the laying of the carriageway; and

(*b*) kerbs shall be laid on flat to provide a total rise of 40mm from the carriageway surface to the top of the kerbs and shall be 255mm by 125mm hydraulically compressed concrete to BS 7263: Part 1: 1990 Type HB2 of Figure 1 set on a grade C7.5/40 cast in-situ concrete bed 400mm wide by 200mm deep and backed with grade C7.5/40 concrete.

Steps and stepped ramps

5.—(1) Steps and stepped ramps shall comply with sub-paragraphs (2) to (14).

(2) There shall be a landing at the top and the bottom of any flight of steps or stepped ramps.

(3) The going of a landing shall be not less than the width of the flight of steps or stepped ramps which it serves.

(4) Where the total rise of any flight of steps or stepped ramp exceeds 600mm a handrail shall be provided on both sides in accordance with sub-paragraph (16).

(5) Any flight of steps shall have a minimum of three rises and a maximum of 16 rises.

(6) There shall be a maximum of 24 rises on consecutive flights of steps or on a stepped ramp and the total rise shall not exceed 4m.

(7) The rise of any step on a flight of steps or stepped ramp shall be—

(*a*) uniform throughout its length;

(*b*) the same as the rise of every other step in the flight; and

(*c*) between 75mm and 180mm.

(8) The going of any step shall be the same as the going on every other step in the flight and be not less than 280mm.

(9) On a flight of steps the aggregate of the going and twice the rises of a step shall be not less than 500mm and not more than 700mm.

(10) Each tread on a flight of steps shall be a parallel tread and shall be level.

(11) The going of any ramp on a stepped ramp shall be the same as the going on every other ramp in the flight and shall be greater than 1m and less than 2m.

(12) The ramp of a stepped ramp shall slope towards the nosing of the step at a gradient not exceeding 1 in 12 but greater than 1 in 40.

(13) The width of any flight of steps, stepped ramp or landing shall be greater than 1.8m.

(14) The nosing of the treads on any flight of steps shall be parallel.

(15) In sub-paragraph (3) "going" means the distance across the landing measured along the projection of the centre line of the flight of steps, stepped ramp or section thereof at the top or bottom of which the landing is situated.

(16) Any handrail provided in accordance with sub-paragraph (4) shall be—

(*a*) so designed as to afford adequate means of support to the person using the flight of steps or stepped ramp;

(*b*) continuous for the length of the flight of steps or stepped ramp;

(*c*) securely fixed at a height of not less than 840mm nor more than 1m (measured vertically above the pitch line); and

(*d*) be terminated by a scroll or other suitable means.

(17) A flight of steps or stepped ramp shall be constructed using in-situ construction in accordance with the requirements of paragraph 2(17) and (19) to (29) and sub-paragraphs (18) to (24).

(18) Grade C30/20 concrete shall be laid to form the flight of steps or stepped ramp and have a minimum depth of 100mm at any point measured perpendicular to the pitch line.

(19) The concrete shall be well compacted and the surface finish given a suitable non-slip texture by brushing, screeding or the application of an indented roller and protected from frost, drying wind, direct sunshine and pedestrian traffic for at least 48 hours.

(20) Steel reinforcement to a flight of steps shall be in accordance with sub-paragraphs (21) to (24).

(21) Steel fabric reinforcement shall comply with BS 4483: 1985 and shall be delivered in flat mats.

(22) Transverse reinforcement shall be not less than 0.7kg per m^2.

(23) Longitudinal reinforcement shall be not less than 1.8kg per m^2.

(24) The reinforcement shall be so placed that after compaction of the concrete there shall be a minimum of 50mm cover to the reinforcement at any point measured perpendicular to the pitch line and it shall terminate at least 50mm and not more than 75mm from the edges of the steps and at all joints in the concrete.

(25) Landings to a flight of steps or stepped ramp shall be constructed using in-situ construction in accordance with the requirements of paragraph 2(17) and (19) to (29) and sub-paragraphs (26) to (28).

(26) Grade C30/20 concrete shall be laid to form the landings and have a minimum depth of 150mm.

(27) The concrete shall be well compacted and the surface finish given a suitable non-slip texture by brushing, screeding or the application of an indented roller and protected from frost, drying wind, direct sunshine and pedestrian traffic for at least 48 hours.

(28) The lowest landing to a flight of steps shall include a cast-in-situ toe 300mm wide and 300mm deep. This toe shall be parallel to the treads on the steps and shall form part of the landing.

(29) Steel reinforcement to landings adjoining a flight of steps shall be in accordance with the requirements of sub-paragraphs (21) to (23) and (30) to (33).

(30) The reinforcement shall be so placed that after compaction of the concrete it is 50mm below the finished surface of the slab.

(31) The reinforcement in the landing shall be continuous with the reinforcement in the steps.

(32) Where the lowest landing to a flight of steps includes a toe the reinforcement shall be returned down the vertical face and terminated at least 50mm and not more than 75mm from the bottom edge.

(33) The reinforcement in the landing shall be terminated at least 50mm and not more than 75mm from the edges of the landing.

Cycle tracks

6. Cycle tracks shall be constructed in accordance with paragraph 2(5) to (8) except that those requirements may not be relaxed by the Department.

Verges

7. Verges shall slope towards the carriageway at a grade not exceeding 1 in 20 and shall be soiled and sown in accordance with paragraph 8 of Schedule 3.

Service strips

8. Service strips shall comply with paragraph 5.2.18 of Chapter 5, Chapter 8 and paragraph 15.1.6 of Chapter 15 of the Department of Environment for Northern Ireland publication "Layout of Housing Roads Design Guide" 1988.

EXPLANATORY NOTE

(This note is not part of the regulations.)

These regulations make provision in relation to matters connected with or affecting the construction of private streets.

Part II and Schedules 2 to 7 prescribe standards and detailed requirements for the construction of private streets.

Part III provides for the deposit and approval of plans and for the giving of notice of the commencement and completion of the various stages of work to the Department by the person by whom or on whose behalf the plans are deposited.

Part IV relates to the inspection of work, the carrying out of such investigations and tests and the taking of samples to ensure that the work is in conformity with the regulations. It also provides for the removal or alteration of work not in conformity with the regulations. The Department is empowered to recover any expenses reasonably incurred by it in carrying out such investigations and tests or in removing or altering work.

Part V provides for the determination by arbitration of any question arising under the regulations between the Department and the person by whom or on whose behalf the plans are deposited.

It is an offence by virtue of Article 5(3) of the Private Streets (Northern Ireland) Order 1980 to contravene the regulations.

Schedule 1 provides a detailed list of the various technical publications which are referred to in the regulations. Copies are obtainable from the publishers referred to in that Schedule. Copies of British Standards may be obtained from any of the sales outlets operated by the British Standards Institution or by post from the British Standards Institute at Linford Wood, Milton Keynes MK14 6LE.

Detailed information on ordnance datum (see regulation 17(4)) is available from Department of the Environment (NI), Ordnance Survey Division, Colby House, Stranmillis, Belfast BT9 5BJ (telephone 661244).

Copies of Council Directive (89/0106/EEC) are available from the Commission of the European Communities, Windsor House, 9-15 Bedford Street, Belfast BT2 7EG.

These Regulations replace the Private Streets (Construction) Regulations (Northern Ireland) 1966 which are revoked by regulation 23.

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