British Standard

BRITISH STANDARD

BS 8010-1: 1989

Code of practice for

Pipelines —

Part 1: Pipelines on land: general

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Committees responsible for this British Standard

The preparation of this British Standard was entrusted by the Civil Engineering and Building Structures Standards Committee (CSB/-) to Technical Committee CSB/10, upon which the following bodies were represented:

Association of Consulting Engineers
British Compressed Gases Association
British Gas plc
British Plastics Federation
British Precast Concrete Federation Ltd.
Concrete Pipe Association
Country Landowners' Association
County Surveyor's Society
Department of Energy (Petroleum Engineering Division)
Ductile Iron Producers' Association
Electricity Supply Industry in England and Wales
Engineering Equipment and Materials Users' Association
Federation of Civil Engineering Contractors
Health and Safety Executive
Home Office
Institute of Petroleum
Institution of Civil Engineers
Institution of Gas Engineers
Institution of Mechanical Engineers
Institution of Water and Environmental Management (IWEM)
Ministry of Agriculture, Fisheries and Food
National Farmers' Union
Pipeline Industries Guild
Royal Institution of Chartered Surveyors
Society of British Gas Industries
Water Authorities' Association
Water Companies' Association
Water Research Centre

The following bodies were also represented in the drafting of the standard, through subcommittees and panels:

Institution of Civil Engineering Surveyors
United Kingdom Offshore Operators' Association

This British Standard, having been prepared under the direction of the Civil Engineering and Building Structures Standards Committee, was published under the authority of the Board of BSI and comes into effect on 28 February 1989

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Contents

Foreword

This Part of BS 8010 has been prepared under the direction of the Civil Engineering and Building Structures Standards Committee. The standard is to be published in four Parts to form a complete revision of all Parts of CP 2010 as follows.

— *Part 1: Pipelines on land: general;*

— *Part 2: Pipelines on land: design, construction and installation;*

— *Part 3: Pipelines subsea: design, construction and installation;*

— *Part 4: Pipelines on land and subsea: operation and maintenance.*

This Part 1 (which supersedes CP 2010-1:1966 which is withdrawn) contains general information which is relevant to pipeline construction for a variety of transported substances. It deals with those aspects of pipeline development which affect the owner and occupier of land through which the pipeline passes.

Part 1 is divided into six sections. Definitions and general details are given in section 1. Section 2 gives recommendations on the routing of pipelines and section 3 on the acquisition of the land and rights of way, compensation and legal documents. Section 4 deals with the construction of pipelines and the reinstatement of the land. The aspects of operation, maintenance and inspection are briefly examined in sections 5 and 6 and are to be dealt with fully in Part 4.

A list of principal Acts of Parliament and Statutory Instruments is included in Appendix A.

A flow chart for implementation of a pipeline project is included as a Appendix B.

Part 2 is to be divided into several Sections each of which contains information on the design, construction and installation of a pipeline in a particular material. These Sections are to be published as separate documents as follows.

— *Section 2.1: Ductile iron*[1)]*;*

— *Section 2.2: Steel for water and associated products;*

— *Section 2.3: Asbestos cement;*

— *Section 2.4: Prestressed concrete*[1)]*;*

— *Section 2.5: Glass reinforced thermosetting plastics;*

— *Section 2.6: Thermoplastic (under consideration);*

— *Section 2.7: Precast concrete;*

— *Section 2.8: Steel for oil, gas and associated products.*

These Sections are not intended to replace or duplicate hydraulic, mechanical or structural design manuals.

Part 3 will include information relevant to the design, installation and commissioning of subsea pipelines in steel and other materials.

Part 4 will contain advice on the operation and maintenance of pipelines and will be in Sections related to the conveyed material.

Until such time as each Part and Section of BS 8010 is published the relevant Part of CP 2010 will remain the applicable code.

It has been assumed in the drafting of this British Standard that the execution of its provisions is entrusted to appropriately qualified and experienced people.

[1)] Published

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, pages i to iv, pages 1 to 22, an inside back cover and a back cover.
This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

Section 1. General

1.1 Scope

This Part of BS 8010 gives recommendations on the installation of pipelines on land. It deals with those aspects of acquisition of land and other rights, construction, operation and maintenance, which affect land, and which are common to all applications and materials on land.

Principal Acts of Parliament are listed in Appendix A. These Acts enable pipelines to be constructed and regulate procedures. A flow chart for the implementation of a pipeline project given in Appendix B relates the required procedures.

NOTE The titles of the publications referred to in this standard are listed on the inside back cover.

1.2 Definitions

For the purposes of this Part of BS 8010 the following definitions apply.

1.2.1
pipeline

a line of pipes, of any length, without frequent branches. It does not include piping systems such as process plant piping within refineries, factories or treatment plants

1.2.2
on land

refers to a pipeline laid on or in land whose surface is above high water mark, including those sections laid under inland watercourses

1.2.3
subsea

refers to a pipeline laid under maritime waters and estuaries, and the shore below high water mark

1.2.4
promoter

an organization that seeks to install, operate and maintain a pipeline under statutory powers

1.2.5
lease

a legally binding agreement granted by a landowner to the promoter, for a determinable period of time, whereby essentially the ownership of the land is transferred to the promoter for use during that period

1.2.6
easement

a legally binding agreement granted by a landowner to the promoter of a pipeline, either in perpetuity or for a long term, which sets out the rights and obligations of both parties, (and their respective successors in title) in relation to the matter, but under which ownership of the land remains with the landowner

1.2.7
wayleave

an agreement (similar in nature but less specific than an easement) granted by a landowner to the promoter, permitting the promoter to execute works on the terms specified

1.2.8
statutory notice

a notice issued under an Act of Parliament by the promoter to a landowner, occupier or relevant authority stating the statutory powers which the promoter will exercise in surveying, installing, operating and maintaining a pipeline. Such notice is sometimes required to be displayed for public comment

1.2.9
working width

a strip of land, usually wider than that covered by an easement, lease or wayleave, which is used by the contractor for the purpose of installing a pipeline

1.2.10
pipeline spread

a continuous length of sequential pipeline installation on which the contractor is currently working

1.2.11
header drain

a length of land drainage pipe, usually installed parallel to a pipeline, for the purpose of conveying sub-surface water from existing land drainage systems severed by a pipeline

1.2.12
cathodic protection

a system to reduce the rate of corrosion of ductile iron and steel pipes, and the ferrous compounds of pipelines in other materials, by regulating the electrical potential between a pipeline and the surrounding ground

1.3 Safety

Specific safety matters are dealt with at appropriate places in the text of this and the other Parts of this standard.

There is a statutory requirement to provide for the health, safety and welfare of all employees and members of the public in connection with the design, construction, operation and maintenance of pipelines under the Factories Act 1961, the Factories Act (Northern Ireland) 1965, the Health and Safety at Work etc. Act 1974, the Health and Safety at Work (Northern Ireland) Order 1978, and Regulations enacted under these. Attention is also drawn to guidance notes published by appropriate Authorities.

Compliance with the Acts and Regulations requires knowledge of the relevant statutory notices, registers, records and forms. There are also British Standards which are particularly directed to health and safety considerations, and these will be referred to in this and other Parts of BS 8010, as appropriate.

1.4 Insurance

Promoters should ensure that there is adequate third party insurance in force during design, installation and subsequent operation of pipelines.

Section 2. Routing

2.1 General

2.1.1 Economic, technical and safety considerations are the primary factors governing the choice of pipeline routes. The shortest route may not be the most suitable, and physical obstacles, environmental and other factors should be considered.

2.1.2 The main factors influencing routing are:

a) contents of the pipeline and operating conditions;

b) terrain and subterranean conditions;

c) hazards;

d) existing and future land use;

e) permanent access;

f) transport facilities and utility services;

g) agricultural practice;

h) environmental impact.

2.1.3 Other considerations apply to underwater pipelines, namely:

a) underwater environment;

b) waterborne traffic;

c) fishing;

d) underwater development;

e) bed conditions.

NOTE Subsea pipelines will be covered in detail in BS 8010-3[2)] and BS 8010-4[2)].

2.1.4 Consultations should be held as early as possible during route selection, with appropriate organizations, in respect of their existing and future developments. These organizations include:

British Coal

British Geological Survey

British Pipeline Agency

British Railways Board and other statutory Railways

British Telecom and other telecommunications operators

British Waterways Board

Civil Aviation Authority

Country Landowners' Association

Council for the Preservation of Rural England

County, District and Parish Councils and London Boroughs

Electricity, Gas and Water Authorities

Government Departments

Independent pipeline operators

Independent developers of mineral rights

Internal Drainage Boards

Landowners and occupiers

Local Trusts for nature conservation and archaeology

National Farmers' Union

National Park Authorities

Nature Conservancy Council

Navigation: Harbour Authorities

or the equivalent national and local organizations which in Scotland include:

South of Scotland Electricity Board

North of Scotland Hydro Electric Board

Regional and Islands Councils

Scottish River Purification Boards

National Trust for Scotland

National Farmers Union of Scotland

Scottish Landowners' Federation

Scottish Woodland Owners' Association

In appropriate circumstances detailed consultation may be required with local and/or specialized organizations.

2.2 Operating conditions and hazards

2.2.1 The operating conditions in pipelines affect route selection. The main parameters concerned are:

a) the nature of the contents;

b) maximum working pressure;

c) peak flow rate;

d) pipeline material and diameter.

2.2.2 For a given pipeline material, diameter and content, consideration should be given to:

a) the probability of fracture and its consequences;

b) the maximum possible size of fracture;

c) the consequent maximum rate of release of contents;

d) any change of state of the contents under atmospheric conditions;

e) the total volume that can escape under emergency conditions.

[2)] In preparation

2.2.3 Where pipelines convey flammable or toxic substances or those liable to cause contamination, the routes selected should, wherever reasonably practicable, avoid built-up areas. Consideration should be given to routing that will minimize the possibility of external damage, which could lead to incidents and attendant damage to third parties. A safety evaluation may be requested by the approving authority, and this requirement should be checked before a preliminary route is put forward.

Fire authorities should be consulted in appropriate cases in order that they may take into account the risk categories of the areas being traversed, to determine measures required to deal with accidents.

2.3 Terrain and subterranean conditions

2.3.1 An important consideration in pipeline routing is the geography of the terrain traversed. On land, this can be broadly separated into surface topography and subterranean geology, and it is usually convenient to consider both natural and man-made geographical features under these two headings.

2.3.2 The principal geographical features which are likely to be encountered include the following.

Land surface	
Agricultural:	crops, livestock, woodlands
Heritage:	natural beauty, archaeological, ornamental
Natural barriers:	rivers, mountains
Natural resources:	water catchment areas, forestry
Occupation:	population, communications, services
Physical:	contouring, soil or rock type, water, soil corrosivity
Subterranean	
Earthquake zone category	
Geological features	
Land infill	
Mining and quarrying	
Old mine and quarry workings	
Pipelines and underground services	
Possible land slippage	
Tunnels	
Water table limits	

2.3.3 Surveying

An essential prelude to pipeline projects is to acquire from records, maps and physical surveys a complete set of data on each of the geographical and geological features that are relevant to the safe, reliable and economic operation of the pipeline.

The adoption of a tentative route should be preceded by a desk study, making use of all available material. In addition to current editions of maps and records, reference should be made to superseded editions. Before a route is finally adopted for construction, a physical survey should be made, aided as necessary by aerial photography, soil surveys and underwater observations.

Maps and plans used for land surveys are obtainable from the Ordnance Survey. Geological information may be obtained from the British Geological Survey. For information on mining, application should be made in the first instance to British Coal, or to the owners of mineral rights in the case of privately owned mines and quarries.

Many independent sources of specialist information exist which may assist in route determination. The pipeline promoter should employ professional advisers as early as possible on those aspects requiring expert knowledge.

2.3.4 Adverse ground conditions

The following adverse ground conditions should be considered during the route planning stage:

a) the proximity of past, present and future mineral extractions, including uncharted workings;

b) areas of geological instability including faults and fissuring;

c) soft or waterlogged ground;

d) soil corrosivity;

e) rock and hard ground;

f) flood plains;

g) earthquake zones;

h) existing or potential areas of land slippage and subsidence;

i) infilled land and waste disposal sites including those contaminated by disease or radioactivity.

British Coal, private mine owners and the owners of mineral rights should be consulted to determine the extent of present and possible future mining operations and the existence of tips and old workings. These bodies should be consulted on possible projected subsidence.

Local authorities, local geological institutions and mining consultants are available for consultation on general geological conditions, slippage areas, tunnelling and other possible adverse ground conditions.

Where there is a possibility that any of these conditions might arise during the lifetime of pipelines, observations leading to their detection should be incorporated in the regular surveillance procedures adopted. This will include measurement of local ground movement and of indicative changes in pipeline stresses.

2.4 Existing and future land use

Existing areas of development should be avoided as far as possible, but at locations where this is unavoidable, the proximity of pipelines to structures should be related to design parameters for particular contents. In exceptional circumstances it may be advantageous to override normal design limitations, and provide alternative installation methods or additional protective measures giving the same degree of reliability and safety.

Areas designated for future development require careful consideration, to reduce the incidence of expensive diversions or alternative works at a later date.

The routes of pipelines conveying substances which may cause contamination of water supplies should, wherever reasonably practicable, avoid crossing exposed aquifers or land immediately upstream of waterworks intakes or impounding reservoirs. Where avoidance is not possible, statutory water undertakers and private abstractors may require additional precautions to be taken.

Water authorities should be consulted about all watercourse crossings particularly in relation to future widening and deepening. The larger watercourses are classed as “main rivers” and are directly controlled by water authorities; lesser watercourses draining low level areas may come within the control of internal drainage boards. In other cases the riparian owners and occupiers should be consulted. The jurisdiction of water authorities includes river embankments, sea and tidal defences and secondary works to reduce the spread of flood water. Where pipelines cross or are laid adjacent to any such embankments, it is essential that the agreement of the relevant water authority be sought.

In Scotland, Regional Councils and River Purification Boards should be consulted about all watercourse crossings. Riparian owners and occupiers may also need to be consulted. As regards sea and tidal defences and works to reduce the spread of flood water, where pipelines cross or are laid adjacent to any such works, the agreement of the appropriate Regional Council should be sought. In Northern Ireland the relevant authority is the Drainage Division of the Department of the Environment.

Consideration should be given to the availability and suitability of water for hydrostatic test purposes and its subsequent discharge.

2.5 Permanent access

The final route should permit ready and adequate access from public highways for the equipment and materials necessary to carry out planned inspections, maintenance and emergency repairs. This aspect should be taken into account at the time pipeline routing is being negotiated with landowners and occupiers. Access may have to be negotiated with parties other than those through whose land pipelines will be laid.

Access facilities should be determined by the frequency of use, the testing and repair equipment likely to be required, and the anticipated urgency of repairs.

2.6 Transport facilities and utility services

Particular regard should be given to the layout and levels of existing transport facilities and utility services, and enquiries made regarding their foreseeable development. It is essential that pipeline routes accommodate the special conditions imposed by the authorities concerned.

Normally pipelines should be routed to minimize disruption to existing facilities and services. However at locations where this is not possible, the most appropriate solution may be to relocate existing services rather than divert the pipelines.

All relevant authorities should be approached in good time requesting details of their facilities and services. In certain cases they may arrange to excavate exploratory trial holes, or will carry out other locational tests on site in order to provide plans of the actual positions.

The number and lengths of crossings under or over transport facilities should be minimized, and the recommendations of the relevant transport authorities should be taken into account. Pipelines laid in highways are subject to legislation related to public utilities street works.

2.7 Agricultural practice

Pipelines should be located to produce minimum disturbance to established agricultural practice.

Permanent above ground apparatus, located on or adjacent to the line of pipelines, should be sited with the agreement of the land owners and occupiers concerned to minimize future obstruction.

Consideration should be given to terminating sewer manholes below the surface of agricultural land. Chambers which terminate at ground level should be sited at field boundaries.

2.8 Environmental impact

Among environmental factors to be considered should be the possible effects on the following.

a) Sites of Special Scientific Interest.

b) National Parks: Country Parks.

c) Areas of outstanding natural beauty.

d) Ancient monuments and archeological sites.

e) Tree preservation orders.

f) Noise and vibration.

g) Odour and dust.

Early reference should be made to the relevant planning authorities to determine whether an Environmental Impact Assessment (EIA) will be required for a pipeline and its associated above ground installations. If required, an EIA should cover the effect of pipeline works on local amenities and future developments. Pipeline promoters should also ascertain at the planning stage whether they are or are likely to be subject to Directives of the European Communities.

Where there is a possibility of pipeline construction and permanent facilities giving rise to noise complaints, an environmental noise survey should be carried out by suitably qualified persons before the pipeline route is established, so that a prior noise assessment can be made. Particulars of previous noise complaints may be obtained from relevant local authorities.

Section 3. Acquisition of land and other rights

3.1 General

The responsibility for acquiring the necessary land, easements and ancillary rights for the pipeline rests with the promoter. These should be obtained wherever possible by private negotiation. If statutory powers are necessary, the procedure to be followed has been established by legislation.

Promoters should, at the earliest stage, consult the owners and occupiers concerned, as well as statutory organizations, and other representative associations such as the Country Landowners' Association and National Farmers' Union or their equivalent counterparts in Scotland, Wales and Northern Ireland.

Promoters should make full use of other advice from land agents, surveyors and engineers in all negotiations with owners and occupiers. Promoters should make full use of legal advice although this may not be necessary in the case of wayleave orders acquired by Statute.

The practical considerations and aims in **3.2** to **3.7** apply, irrespective of whether the land is acquired by private treaty or by statutory powers.

3.2 Access for survey and route selection

Although much can be done from plans and geological and aerial surveys, route selection requires access to the land, and may often necessitate on site ground investigations. The consent of owners and occupiers should be sought individually for any such access.

The promoter will normally obtain temporary rights which will lapse after the survey is completed. A prior undertaking should be given to landowners and occupiers to make good damage done or loss sustained during the survey and to pay compensation for any damage not made good.

An unnecessarily large number of entries on to land can be avoided by prior consultation with planning and other local authorities, as described in section 2.

3.3 Types of rights

3.3.1 Rights granted directly by Acts of Parliament

Statutory Authorities and Government bodies have powers under Acts of Parliament to lay, use and maintain pipelines. Reference should be made to the Act or Order which grants those powers, as to the procedure to be adopted by the Authority concerned.

3.3.2 Rights granted by agreement between landowner and promoter

Where a promoter is not granted rights directly by Act of Parliament, he will require the agreement of the landowner, conferring some interest in or over the land concerned, to lay and maintain a pipeline. The agreement may take any of a variety of names (such as easement or lease) but legally the interests which may be conferred, and the associated degrees of security to the promoter, are, in the order of magnitude:

a) a freehold of the land;

b) a leasehold interest in the land for a term of years corresponding to the likely life of the pipeline;

c) an easement over the land;

d) a wayleave from the landowner to place the pipeline on his land.

The acquisition of these rights is similar in all parts of the UK although the legal terms are different in Scotland. The Scottish terms are described in the final paragraph of this clause.

The interests in land which the promoter will require are:

a) *Freeholds*. Generally, the only freeholds which need to be purchased outright will be for land on which buildings are to be constructed (e.g. pumphouses), or land which it will be necessary to fence (e.g. where there are valves) but, as these may sometimes be set back from a public highway, specific provision for permanent rights of access to and from the plots should be made.

b) *Easements and leases*. It will not usually be appropriate to purchase land for laying the pipeline itself and, where possible, easements or leases should be obtained.

If it is the promoter's own land which will be served by the pipeline (i.e. a dominant tenement, such as a refinery at one or other end of the pipeline) easements may be acquired. These may be for a term of years or in perpetuity and, as they run with the land, they will not be extinguished by a change of ownership; thus, if the landowner dies or sells his land or if the pipeline changes hands, the pipeline easement will continue automatically, provided it continues to serve the dominant tenement.

Where the promoter needs to obtain rights for a pipeline, but is not entitled to obtain an easement, a different form of grant (such as long leases of subterranean strips) will need to be acquired. Leases of subterranean strips are subject to the provisions of the Land Registration Acts as to registration of leases.

An easement or a lease will cover pipeline works (including surface obstructions) and, where necessary, rights of way, cathodic protection beds and other apparatus. The document will specify the rights and liabilities of each party, the width of an easement and the terms under which the rights are granted.

The width of an easement is not necessarily as large as the temporary working width. It is essential that the temporary working width be agreed before work commences. Any amendment to the working width has to be agreed between promoter and occupier. The promoter's rights and obligations incorporated in the document should include the number of pipelines, associated cables, etc., permitted to be laid, their depth and provision for inspection, maintenance, operation, repair or relaying, the future use of the surface of the land and procedure on abandonment (see section 6).

The restrictions on the grantor in respect of the protection of the pipeline should also be included.

Where an easement is acquired through registered land, notice of the grant of the easement or lease, together with notice of any ancillary covenants restricting the use of the land, should be registered at the Land Registry by the pipeline promoters against the title of the land affected. For unregistered land restrictive covenant and equitable easements (e.g. informal grants) should be registered.

c) *Wayleaves.* The wayleave will confer no interest in the land as such, the contractual rights being binding only on the original contracting parties, and will thus confer no security on the promoter if the original landowner sells his land. Care should therefore be taken by the promoter not to obtain only a wayleave when a greater interest in land is required.

d) *Additional rights.* Additional rights could be for construction, reconstruction and rights of way to and from the pipeline and provision for the installation and maintenance of cathodic protection outside the easement strip. In the case of a permanent installation, an additional grant of easement may be required for works not covered by the grant for the pipeline.

e) *Mineral rights.* It should be ascertained if any mineral rights are owned or leased separately from the surface ownership. Suitable arrangements will generally need to be made to safeguard rights of support and to negotiate compensation to mineral owners and operators. An adaption of one of the statutory mining codes may need to be incorporated in the deed of grant.

In Scotland, while the acquisition of these rights is similar in its practical effect, the separate statutory and legal system means that generally rights will be acquired under the appropriate Scottish statutes, although rights may be acquired through agreement with the landowner by the following:

1) Acquisition of the dominium utile (similar to freehold purchase in England).

2) Leasehold.

3) Deed of Servitude (similar to easement in England).

4) Wayleave.

3.3.3 Rights granted indirectly by Acts of Parliament

A promoter wishing to lay and maintain a pipeline over land may fail to obtain the agreement of a landowner. The promoter may then have to seek the right compulsorily under appropriate legislation.

3.4 Financial consideration and compensation

3.4.1 Payments to owners

Owners are generally entitled to receive payment for granting an easement or lease, or sale of freehold interest, or where rights are acquired by statute.

3.4.2 Compensation for damage and loss

Owners or occupiers or both are entitled to compensation for any land which cannot be fully reinstated.

Compensation is therefore payable for damage to crops, loss of profits, loss of residual manurial value, loss of or damage to sporting rights. Negotiations over compensation for land covered by rights described in **3.3** are the responsibility of the promoter.

Landowners and occupiers should be made aware that occupation of land by a contractor is permitted only within the designated working area.

Landowners and occupiers concerned should avoid entering into independent negotiations with the contractor executing the work.

In cases where the promoter is exercising statutory powers, owners and occupiers have a duty to mitigate any losses which may arise.

Shooting and fishing rights are often sub-let but may still be subject to compensation for loss. Before construction it should be determined to whom compensation should be paid.

Delay in payment of compensation should be avoided and, where appropriate, payment on account should be made for matters not in dispute.

3.4.3 Professional costs

The professional fees reasonably incurred by the owners and/or occupiers of any interest in land through which the pipeline may be routed should normally be reimbursed by the promoter. Costs may be based on the Ryde's scale of Professional Charges as appropriate for pipeline work.

3.5 Planning permission

Except where exemption has already been provided for by statutory powers, pipeline construction may not be commenced until either planning permission has been obtained from the local planning authorities or, where appropriate, authorization has been obtained from relevant Government Departments. Investigation with the local planning authorities should be carried out to determine if other construction related areas (e.g. construction camps, pipe storage areas) require planning permission.

3.6 Consultation with other interests

3.6.1 General

A pipeline will usually cross the routes of roads, railways, canals and water courses. It is also likely to cross or lie adjacent to existing underground or overhead services operated by water, gas and electricity undertakings, telecommunication, drainage and sewerage authorities and other pipeline operators. Construction drawings of the relevant sections of the project should be submitted to each appropriate authority in sufficient detail to enable proper consideration to be given.

It is always the responsibility of the pipeline promoter to ensure that all bodies or persons whose duties or interests are likely to be affected by the construction and operation of the pipeline are provided with sufficient information to enable them adequately to carry out their duties or safeguard their interests.

3.6.2 Railways

When pipelines are to be laid across or adjacent to tracks the appropriate railway authority should be consulted well in advance. In the case of main lines a year or more notice of works may be necessary. A complete closure of all tracks for a 24 h period is unlikely to be available. Appropriate administrative and operational costs should be paid by the promoter.

British Rail has produced a handbook, entitled "Engineering recommendations for pipelines constructed on or adjacent to railway property" to which reference should be made.

3.7 Plans

3.7.1 Preliminary routing plans

For preliminary routing plans, maps of either 1 : 25 000 or 1 : 50 000 scale should be used, according to the complexity of the terrain.

3.7.2 Field reconnaissance plans

For field reconnaissance plans, Ordnance Survey maps of either 1 : 10 000 or 1 : 25 000 scale should be used. The use of 1 : 10 000 maps may obviate duplication, since this is the smallest scale acceptable for applications under the Pipelines Act.

3.7.3 Final field survey plans

For final field survey plans, Ordnance Survey sheets of 1 : 2 500 scale with field numbers should be used.

3.7.4 Strip plans

Strip plans should be prepared from Ordnance Survey sheets of 1 : 2 500 scale. In built-up areas, consideration should be given to the use of plans of 1 : 1 250 scale. Any alteration to land drainage works should be detailed on these plans. Any vertical section or profile along the pipeline route should be shown to a scale appropriate to the variations in ground elevation. Special crossings should be detailed on separate drawings which should be cross-referenced to the appropriate strip plan; the scale should be between 1 : 250 and 1 : 25 depending on the complexity of the work.

3.7.5 Plans for attachment to legal documents

Plans for attachment to legal documents should be based on the Ordnance Survey sheets, preferably the 1 : 2 500 scale. It may be necessary to prepare these plans on a larger scale where the areas of land are very small or complex or, conversely, to a smaller scale where large areas of land are involved.

3.7.6 As built plans

If, during construction of the pipeline, there are any changes or deviations from any plans which have been issued in accordance with **3.6.1**, as built plans, to the same scale as the original plans, should be issued to all original recipients on completion of the work. If found more convenient the strip plans detailed in **3.7.4** may be used for this purpose.

3.7.7 Digital mapping

Consideration should be given to the method in which the horizontal and vertical alignments of a pipeline are recorded in digital form, known as the Coordinated Method.

Detailed design of the route by the Coordinated Method is based on a land survey, and the alignment of the pipeline related to the Ordnance Survey grid. Setting out of the pipeline for construction is controlled by permanent ground markers, established by the survey. These ground markers should be retained on site with the agreement of the landowner and occupier to enable subsequent pipeline location.

Using this method, the above plans can be recorded on stable film, showing Ordnance Survey grid lines and location of the pipeline for use in conjunction with conventional maps. Alternatively pipeline details can be recorded electronically for use in Digital Mapping systems.

NOTE 1 Ordnance Survey Maps and Sheets may not be reproduced or copied without the permission of the Director-General of Ordnance Survey.

NOTE 2 A publication "Coordinated Pipelines Practice" is available from the Institution of Civil Engineering Surveyors.

Section 4. Pipe installation and reinstatement

4.1 Entry upon land

4.1.1 Preparation

The promoter should arrange for representatives, e.g. agricultural liaison officers, to maintain close personal contact with occupiers, beginning well before construction is to commence and continuing until reinstatement is complete and compensation for damage has been paid. The promoter's representatives should discuss with the occupiers the implications of the work and the construction programme. The representative should advise occupiers whether the work will be completed in one operation or if return will be necessary after the main pipelaying has been completed; also whether night and/or weekend work will be involved. The representative should keep occupiers informed of any significant changes in the programme, and should advise owners of any changes affecting their interests.

Before the land is entered for construction, as much notice as possible over and above any statutory period should be given to individual owners and occupiers and to any authority affected. Each of these should be given the address and telephone number of the representatives of the pipeline promoter to whom any complaints or requests are to be made.

As far as practicable, the working width should have been determined and documented with owners and occupiers as part of the overall land acquisition process.

Advance provision should also be made for any land required for storing pipes and other materials, for parking and maintaining equipment, and for the siting of temporary offices, camps, sanitary facilities, etc.

4.1.2 Working width

Consultation should be undertaken by the promoter with occupiers at the earliest possible stage so as to determine the width of the working area for construction. Any later amendment to the working width should be negotiated by the promoter. In deciding upon the extent of any extra working width there should be recognition of the ground terrain and conditions at the following locations:

a) at major road, rail, river and canal crossings;

b) where deep pipelines are being installed;

c) where it is necessary to go beneath existing underground services;

d) where it is necessary to go beneath ditch and stream crossings and land drainage;

e) where it is necessary to stack separately various subsoil bands and topsoil to ensure correct order of replacement.

4.1.3 Infected areas

Wherever an area has been declared an infected area on account of foot and mouth disease, swine vesicular disease, fowl pest, swine fever or other notifiable disease, entry on the land for any purpose should be suspended except with the approval of the Ministry of Agriculture, Fisheries and Food or the Department of Agriculture and Fisheries for Scotland or Department of Agriculture for Northern Ireland. Entry will be governed by such conditions as may be stipulated or agreed. Promoters in conjunction with owners and occupiers directly affected by the pipeline should take such reasonable precautions as may be necessary to avoid the spreading of soil borne pests and diseases, e.g. Rhizomania.

Infected areas are not necessarily declared when a notifiable disease outbreak is confirmed, although this action is invariably taken with foot and mouth disease. Precautions should therefore be taken when there are outbreaks in an area or when individual infected farms are declared to have animals infected with notifiable disease.

4.1.4 Record of condition

Before work starts, a record should be made of the state of the land including photographs where appropriate. Particular note should be made of the depth of the topsoil and any special features, so that they may be adequately reinstated if disturbed. This record should be agreed with the occupier and, wherever possible, the owner. The cost of preparing it will be borne by the promoter. The method of dealing with any trees growing within the working width should be agreed at this time. Where trees are not to be felled, it may be necessary to make slight deviations in the alignment of the pipeline or require additional working width to allow the passage of equipment. Where special protective works exist or are required on account of a notifiable disease, the fact should be noted in the record.

4.2 Working season

Wherever possible the construction period for pipelines laid through agricultural land should be limited to the period in each year when climatic conditions are such that pipeline construction will cause least harm to the soil condition. In England this is generally between the spring and late October with an additional period of one moth for reinstatement works. Arrangements should also be made where possible for construction works in agricultural land to stop if extreme adverse weather conditions are encountered which could seriously affect the final condition of the land.

4.3 Pipeline spread

It is recommended that the promoters restrict the total length of each pipeline spread from the start of the temporary fencing, to the point of the sub-soil backfilling operations. Where the spread exceeds 15 km it may be advisable to appoint additional Agricultural Liaison Officers.

4.4 Trespass

Construction personnel should not trespass outside the working limits of the pipeline route or other agreed areas. Goodwill should be maintained with owners, occupiers and representatives of authorities, by respecting their rights and causing the least possible damage or interference.

4.5 Preparation of the working width

4.5.1 Clearing and grading

Preliminary work in pipeline construction should include pegging out, erection of temporary fencing, the clearing and disposal of all scrub, hedges and debris from the route, together with the proper and adequate fluming or bridging of ditches and streams. These operations should be planned from the outset to cause the least possible disturbance to owners and occupiers.

Trees should not be felled unless absolutely necessary and special precautions will need to be taken where any tree within the working width is subject to a preservation order.

Where trees have been felled, any resulting timber will, in the absence of any arrangement to the contrary, remain the property of the landowner. The removal of any roots of trees felled should be agreed with the occupier.

In good agricultural land, unless agreed otherwise by the occupier, topsoil should be stripped from the whole of the working width apart from that area used for the stacking of the topsoil. The width and depth of stripping of top soil will be governed by individual circumstances. The depth will not normally exceed 300 mm (12 in) unless otherwise agreed with the occupier. Special arrangements should be made for moor and heathlands.

All topsoil should be deposited separately, ready for replacement in its original position without contamination. Where possible turf on lawns, sports and ornamental grounds, etc. should be carefully cut, rolled and kept in moist condition for subsequent replacement.

The height of stacked top soil should be limited to avoid compaction. If reinstatement of land is delayed beyond the current season then precautions should be taken to try to avoid loss of topsoil through erosion. This may necessitate the grassing over of the stacked topsoil. In addition if prolonged exposure is encountered it may be necessary to carry out spraying of the stacked topsoil for weed control.

The land should be restored to its original contours and the topsoil replaced, unless otherwise arranged with the landowner.

Care should be taken to avoid earth slippage out of the working width. Travel along the working width should be minimized to avoid increasing compaction of the soil.

4.5.2 Temporary fencing

In agricultural land, appropriate stock-proof fencing should be provided along each side of the working width to exclude animals kept on adjoining land. This is normally the first operation after pegging out. Where no stock is kept, the limits of the working width should be adequately marked in agreement with the occupier. All temporary fences should be maintained until work on the section is completed, the ground fully restored and permanent walls, fencing, or hedges reinstated. In no case should nails or staples be driven into trees. In areas where special (e.g. anti-vermin) fencing has been erected, precautions should be taken at all times during construction not to nullify the purpose for which the fencing was provided.

Gaps in hedges or walls at field and road boundaries should, where necessary, be temporarily closed during construction. Temporary fencing for this purpose should be to a standard equivalent to the adjoining boundary hedge, wall or fence. A removable section or gates should be provided for contractors' plant access.

Temporary bridging and widening of access roads for the passage of plant and equipment may be required.

All temporary fencing, access bridges and access roads should be to a reasonable standard agreed with the occupier. Additional precautions may need to be undertaken where infectious disease is encountered.

The removal of temporary fencing should be carried out in consultation with the occupiers.

4.5.3 Public safety

The contractor should ensure at all times that the general public is protected from any danger arising from the installation and testing of pipelines.

Fencing should be provided to prevent free access to the site with particular attention be given to excavations, open pits and boreholes. Care should be taken to avoid accidents to children who may trespass on the site. If the entrance to a site crosses a public road or footpath this should be kept clear of obstructions, mud and spoil.

4.5.4 Emergency services

The promoter should advise all of these services of the works in hand prior to commencement. This notification should include the supply of maps and plans of any temporary access points.

4.6 Pipe distribution

Stringing of the pipes end to end along the working width should be done in such a manner that the least interference is caused in the land crossed. Gaps should be left at intervals to permit the passage of farmstock and equipment across the working width. Pipes should be laid out carefully to prevent damage to the pipe or coatings and in a manner to ensure that they remain safely where placed until incorporated in the pipeline. If straw is used for protecting pipes, etc., in transit, it should all be collected and burnt in a safe area immediately after use so as to avoid any possible agricultural contamination.

4.7 Trenching

Trenching includes all excavation which is carried out by trenching machine, excavator, or by hand, to prepare the trench to the required dimension for the pipeline.

Special consideration should be given to the depth of the trench. in agricultural land the depth of cover should not be less than 900 mm (3 feet).

It may be necessary to increase the depth of trench for pipelines following hydraulic gradients, to avoid land drains, drainage systems, roads, railways or other crossings or for other special reasons such as fenlands, peat and marsh areas and for improved pipeline security.

In rocky ground, rough grazing, or by special arrangement, the cover may be reduced, provided the contents of the pipeline are not liable to be adversely affected by frost and the pipe material is strong enough to withstand the loading of any anticipated vehicular traffic.

Temporary underpinning, supports and other protective measures for supporting building structures or apparatus in or adjacent to the trench should be of proper design and sound construction.

If the backfilled pipeline trench is likely to act as a drain, precautions should be taken to prevent loss of any fine material.

4.8 Support of excavations

An excavation should be properly supported, or the sides sloped back to a safe angle, before the excavation reaches a depth of 1.2 m. At this depth persons working in it would be buried or trapped if there were a collapse. An adequate store of suitable supports should be kept on the site to provide immediate shoring and strutting as found necessary. No timbering or other support for any part of an excavation should be erected or substantially added to, altered or dismantled, except under the direction of a competent person with adequate experience of such work. All material for such work should be inspected by a competent person on each occasion before being taken into use, and material found defective in any respect should not be used.

The condition of the ground being excavated may necessitate the sides of the excavation being closely supported. This is particularly important when temporary spoil heaps, material stacks, excavating plant, pipe handling devices, cranes, or pile-driving apparatus are positioned adjacent to an excavation. The shoring and strutting of excavations in proximity to a railway or a highway, whatever its use, will need to take into account the support of services such as gas and water mains, sewers and underground tunnels, in addition to the loading on the highway from foot and vehicular traffic.

The stability of the excavation should be investigated in relation to the safety of the services, their structural condition and likely movement. Likewise, structures on adjacent lands may necessitate an appraisal of the live and dead loads, and whether the resultant of the loads will cause a loading on the sides of the excavation, or whether the excavation will affect the stability of the neighbouring structure. It may be necessary to provide temporary shoring, strutting, ground treatment or other support to the structure to safeguard its stability. Detailed information may be found in BS 6031 and Report 97 “Trenching Practice” published by the Construction Industry Research and Information Association. Attention is also drawn to the Statutory instrument 1961 No. 1580 the Construction (General Provisions) Regulations 1961.

4.9 Explosives

If it is proposed to use explosives, regulations regarding their storage and use should be strictly observed and agreement obtained from the owners, occupiers, authorities and all others affected concerning their use and the timing of blasting operations. Attention is drawn to the danger of unexploded charges. The promoter's as built records should indicate where explosives were used. Detailed guidance may be found in BS 5607 on the use of explosives in the construction industry.

4.10 Avoidance of other services

It will generally be advantageous to lay the pipeline below most existing services, such as water and gas pipes, cables, cable ducts and drains, but not necessarily sewers. Sufficient clearance between the pipeline and other services should be agreed between the parties and adequate arrangements should be made to protect and support the other services. Where thrust or auger boring or pipe jacking methods are used, the clearances required should be the subject of consultation between the parties concerned. The pipeline should be laid so as not to obstruct access to the other services for inspection, repair and replacement.

Particular care should be taken when operating under or near overhead services. In such cases, the authority concerned should be asked to give advice on the clearances which should be maintained between the overhead services and any equipment which is employed, together with the use of height gauges on each side of the overhead service. In addition, in the case of overhead power lines, the possibility of induced voltage should be discussed with the relevant authority in order that appropriate safety measures may be taken.

Warning slabs, tape, tiles or other markers should be placed over and close to pipelines and any associated cables at their points of intersection with other services.

4.11 Land drains

The method of restoring disrupted land drains in any particular case should be agreed with the owner and occupier concerned at the time of negotiating easements. In the event of a dispute, the advice of an agreed drainage expert with knowledge of local conditions should be taken and followed.

Information regarding the location of land drains in agricultural land should be obtained wherever possible from local sources or from the Divisional Office of the Ministry of Agriculture, Fisheries and Food or the Department of Agriculture and Fisheries for Scotland or the Department of Agriculture for Northern Ireland.

It is essential that the course and general condition of all land drains which are located during pipeline construction be marked and recorded at the time.

Before backfilling is commenced, the landowner or occupier should be given adequate notice of the reinstatement of drains to enable the landowner or occupier to inspect if they so wish.

The repair of land drains should keep pace with the progress of pipelaying to ensure that drainage systems are out of action for the shortest possible time. However such repairs should only be carried out in suitable ground conditions.

Prior to or immediately after the pipeline is commissioned the drainage of the land affected should be restored to a condition as efficient as that before the work was started. This will usually consist of laying one or more header drains parallel to the pipeline trench. In the case of a single header drain it should be laid on the uphill side of the trench to collect water from all the disturbed drains, and graded to a free outfall. The drains on the downhill side of the trench should be properly sealed to prevent the intake of soil into the drains. Arrangements may be required to drain the working width.

In the case of narrow trenches it may be possible to reconnect the existing drains across the pipeline. For wide trenches reconnection across the pipeline should only be considered where no suitable outfalls are available for header drains.

Where existing drains are reconnected, they should be first cleaned out at the junctions as far as possible, and then connected across the pipeline trench and supported in such a way as to be protected against displacement or settlement.

The backfilled pipeline trench itself will usually collect water and may act as a drain. In some cases this water will not drain away, but collect, e.g. at a low point or where the backfill is impermeable. Arrangements should be made to drain these points to a free outfall. It should be recognized that defects in the system may not become apparent for a number of years.

It is recommended that the promoter provides the landowner/occupier with a set of records relative to the drainage system as installed and modified.

4.12 Ditches

Where a pipeline passes underneath a trench, ditch or culvert, it should be suitably protected with concrete or other similar material, having a minimum cover of 300 mm (12 in) from the hard cleaned bottom of the ditch or culvert to the top of the protection. Ditches, drains, culverts and watercourses which are in any way interfered with by the pipeline operations should be maintained in effective condition during the construction period and be restored finally to as good condition as before the commencement of work.

Where a crossing has to be made above the bed of a ditch, but below the level of the banks, or across a culvert, the underside of the pipe should be at such a level above the bed of the watercourse that it will not obstruct any flow which can reasonably be expected. In such a case reasonable cover adjoining the ditch should be provided: normally 450 mm (18 in) cover at a distance of 900 mm (36 in) from the edge of the ditch is considered reasonable.

Where a pipeline runs parallel to a ditch, the edge of the pipeline trench nearest to the ditch should be kept at a distance from the edge of the ditch at least equal to the depth of the ditch, or the depth of the trench, whichever is the greater.

4.13 Maintenance of services

It is essential that services such as water, gas and electricity supplies, sewerage and telephones be maintained during the progress of work. Pipes, cables and other apparatus belonging to statutory undertakers should not be interfered with or altered without the consent of the undertakers. Undertakers may require to carry out alterations themselves at the expense of the promoters.

Private pipes, cables and other service apparatus should not be interfered with or altered without the consent of the owner, and any alterations should be carried out so that interruption to the service is kept to a minimum. It should be noted that privately owned apparatus may be subject to byelaws, regulations or other control.

Private water supplies affected by pipeline operations should be maintained during the progress of the work, protected from pollution and permanently restored as soon as possible after the pipeline is laid. If necessary, they should be replaced during the progress of the work by water from another suitable source. Where fields containing animals are split, consideration should be given to the need for additional drinking troughs.

4.14 Fishing and sporting rights

Fishing and sporting rights should at all times be protected. Where a watercourse is frequented by migratory fish, the flow should be maintained during the progress of the works in such a manner as will allow the passage of the fish. The local fisheries official should be consulted over the periods suitable for the execution of works in order to take into account the needs of migratory Salmonids and freshwater fish.

4.15 Pollution

Steps should be taken to prevent pollution of watercourses by chemicals, fuels, oils, excavated spoil, silt laden discharges or other materials. The disturbance of bed deposits should be minimized as far as practicable.

4.16 Maintenance of access

Where the trench and pipeline interfere with any normal access an alternative access or a bridge should be constructed and maintained, together with access ways to provide adequate temporary communications across the works until normal access has been restored. The temporary access across the working width should, where necessary, be provided with properly hung swing gates which effectively prevent livestock straying on to the working width.

4.17 Canal, river, road and rail crossings

Special methods of construction may be required when pipelines cross canals, roads and railways. Agreements reached with the appropriate authorities may be conditional upon approval of the design, construction, timing, and issue of statutory notices. These vary according to the size of the pipeline, the material conveyed and the nature of the crossing. Consideration should be given to the use of pre-tested pipe in crossings.

4.17.1 Roads

Where a pipeline crosses or passes along a highway the exact siting and constructional details should be agreed with the highway authority, who may also specify the manner in which trenches should be backfilled and compacted, and the nature of reinstatement of the road surface. In the event of a road closure being considered necessary, agreement with the highway authority should be sought at an early stage as statutory periods of notice are required for such closures.

Where the highway authority considers that the road affected is of such importance as to justify the avoidance of traffic disruption, or the disturbance of the carriageway pavement, they may require the use of pipelaying techniques which do not necessitate open trench excavation.

Where work is being carried out adjacent to or on any public or private road, warning signs — and at night warning lights — should be provided and maintained as required by the body having jurisdiction over the road.

Particular care should be taken to avoid damage to drains, sewers and all other services laid within the highway.

Where these services are disturbed they should be reinstated in accordance with the highway and appropriate service authority requirements.

4.17.2 Railways

The appropriate railway authority should be approached before any works are carried out on or adjacent to any railway property.

Private level crossings are provided only for the landowner and tenant of the adjacent land. There is seldom any warning given of approaching trains, and the profile may be unsuitable for the equipment being used. The appropriate railway authority should be approached before the crossing is used as access to the worksite.

4.17.3 Watercourse crossings

Where a pipeline crosses a watercourse, the design and method of construction require consent from the drainage or water authorities concerned, and in Scotland from the appropriate river purification board. The design and method of construction should take into account the characteristics of the watercourse. Consideration should be given to the suspended solids generated and the particular requirements of the water authority under the Control of Pollution Act. It may be necessary to plan the work to take advantage of seasonal variations and to make arrangements to take action on receipt of flood warnings in order to prevent damage to the works or the surrounding country.

4.18 Backfilling, cleaning-up and reinstating

Backfilling operations should follow as closely as possible the laying of the pipe. The backfill should be compacted to suit the type of bedding and the type of pipeline material. Neither topsoil nor material harmful to the pipeline should be used. Safe working practices should be adopted to avoid damage to the pipeline.

The trench should be backfilled with selected material from the excavation to preserve as far as possible the original soil sequence and should be compacted to minimize subsequent settlement. The backfill should not contain any perishable material including scrub or vegetable growth. If the owner or occupier so requires, the top 300 mm (12 in) or any agreed greater depth of subsoil should be loosened by an agreed method before reinstatement of topsoil and where possible the land restored to its original contours. Unless otherwise arranged with the landowners or occupiers the topsoil should be replaced. Top soiling and reinstatement work should only be carried out when ground and weather conditions are suitable.

The topsoil of agricultural land should be left in a loose, friable and workable condition to its original full depth and over the whole working width and should be as free from stones as the adjacent land. Any additional topsoil imported will be subject to the reasonable requirements of the occupier as to the testing of the suitability of the imported soil. Arrangements for final reinstatement and seeding of any land should be agreed in advance with the owner or occupier.

Disposal of any surplus material from the site should be by agreement with the landowner, and such surplus should not include topsoil.

The permanent reinstatement of gaps made in fences, hedges, walls, etc., should be agreed with the landowner or occupier. Where hedges have to be re-planted, they should be protected on both sides by a fence together with wire netting turned out or buried at the bottom for protection against rabbits. The fencing and netting should be maintained until the hedge is fully established. All wire fences should be well strained when reinstated.

All constructional debris, tools, equipment and any temporary works should be removed and the working width reinstated so that the route of the pipeline may be restored as nearly as possible to its original condition and handed back to the occupier without delay. Debris should not be buried without the consent of the landowner or occupier.

The reinstatement should include all permanent walls, fencing, hedges, footpaths, private roads and temporary accesses.

Any certificate presented to the occupier for signature relating to the completed reinstatement should be limited to the condition ascertained at the time.

About one year after the completion of the work, the promoter should make a survey to check the adequacy of the reinstatement. Where possible, this should be done by reference to the agreed record of condition (see **4.1.4**).

4.19 Pipeline markers

Distinctive markers should be erected at all road, rail, river and canal crossings and elsewhere as required to identify the pipeline and to indicate its position and other details. Markers should be placed at field boundaries and not in fields, preferably in such a way that they are not obscured by vegetation and do not interfere with agricultural operations.

Where aerial surveillance is intended, sufficient markers should be visible from the air to indicate the pipeline route. At all valve installations plates should be provided to give the same information as on the markers. Groups of marker posts can be avoided by the use of special marker plates bearing engraved dimensioned diagrams of the layout.

Markers should not be treated with any substance likely to be harmful to livestock.

4.20 Cathodic protection

Where a pipeline is to be cathodically protected the promoter should establish liaison with owners of other pipelines, cables, sheetpiling and other buried metallic structures likely to be affected so that these may be safeguarded.

Further information on this matter is contained in BS 8010-2[3)] and in CP 1021.

4.21 General supervision

The pipeline promoter should provide competent and adequate supervisory staff and be satisfied that contractors employed do likewise.

4.22 Safety during testing

The safety precautions required when pipelines are being pressure tested are detailed in other parts of this code. These may involve the temporary closure of highways. (including footpaths and bridleways). The highway authority should be consulted regarding the procedure to be adopted. Other statutory authorities should be consulted as appropriate. Notices warning the general public should be clearly displayed.

4.23 Records

Records should be kept by the promoter of all tests and inspections carried out on the pipeline.

Copies of as built plans indicating the pipeline's size, depth and location related to surface features should be provided for each owner and occupier by the promoter.

[3)] Published in Sections.

Section 5. Operations, modifications, maintenance, repair and inspection

5.1 General

It is essential that procedures for the operation, modification, repair, maintenance and inspection of pipelines are formulated and adhered to so that a pipeline continues to function safely whilst in use. This standard encompasses the transportation of widely differing fluids and it is not practicable to specify in Part 1 a detailed set of procedures covering the many cases involved. Until BS 8010-4[4)] is available operating bodies should develop procedures for operating, modifying, maintaining, repairing and inspecting pipelines based upon the recommendations given here and upon best industry practice.

5.2 Operations

All matters of operation, maintenance, repair and modification of an operating pipeline are properly the concern of the operating body. Correct operating procedures are those which ensure that the operating demands upon the system at any particular time can be achieved safely. All maintenance works and modifications should be coordinated with operating needs. Operating bodies should take account of these inter-relating factors when drawing up their procedures. Particular care should be taken in differentiating between routine procedures and emergency procedures.

5.3 Route inspection

Routine visual inspection of land pipelines should be made to check on the condition of the pipeline easement. Any third party activity on, or adjacent to the pipeline easement and which could affect the integrity of the pipeline should be investigated. The frequency of such inspection may vary dependent upon local conditions. Urban areas and intensively farmed agricultural land are likely to require more frequent and closer inspection than heathland. Particular attention should be paid to areas where problems may occur, for example, disused underground workings and river and watercourse crossings. Any excavation or development occurring near buried pipelines should be monitored.

Arrangements should be made with owners and occupiers to permit a routine programme of inspection of the route. In the absence of any such arrangement, except in cases of emergency, prior written notice of all pipeline inspections involving entry on land should be given to the occupiers.

All persons carrying out inspections should carry and produce on request adequate means of identification.

Where air patrols are used, aircraft should fly at a suitable height to avoid nuisance or harm to poultry or livestock.

5.4 Infected areas

Certain areas may be declared an infected area on account of foot and mouth disease, fowl pest, swine fever, or other notifiable disease including soil borne pests and diseases. Where this occurs, routine pipeline inspections involving entry on such land should be suspended unless there are exceptional circumstances. If there is a clear necessity to enter land, approval of the Ministry of Agriculture, Fisheries and Food, or the Department of Agriculture and Fisheries for Scotland or the Department of Agriculture for Northern Ireland should be obtained, and entry should be governed by such conditions as may be stipulated.

5.5 Emergencies

Emergency procedures should be drawn up for each pipeline by the operating body. The purpose is to ensure that all operations staff and other parties involved are adequately informed regarding the action to be taken in the event of an emergency. Other parties likely to be involved include personnel not normally involved with the routine operations, the public emergency services, local authorities and utility service authorities. Procedures should be developed to meet the needs of each individual pipeline and should include for periodic emergency exercises to be carried out in conjunction with the public emergency services.

All occupiers of land traversed by a pipeline should be requested by the pipeline operators to assist by speedy notification of any abnormal occurrences which may affect, or may have been caused by the pipeline. Pipeline operators should provide land occupiers with current telephone numbers for contact in an emergency. Similarly, pipeline operators should notify occupiers and any authority concerned of incidents which might affect their interests.

[4)] In preparation.

5.6 Maintenance

Complementary to the operating procedures, and mindful of operational constraints, maintenance procedures should be developed to ensure that the system retains its integrity and that all safety devices are in working order. The rights acquired for the construction of a pipeline usually include rights necessary to maintain and repair the line. Except in emergencies, maintenance and repair work should follow the same procedures as those for the original construction, particularly in relation to notices to landowners and occupiers.

Section 6. Abandonment

6.1 Disused pipelines

A pipeline may be considered disused when it has been abandoned or when the owners cease to inspect it regularly and are no longer prepared to maintain it in an operable condition.

When the owners are no longer prepared to maintain a disused pipeline in an operable condition they should take precautions to prevent the pipeline from becoming a source of danger or nuisance or an undesirable watercourse.

6.2 Precautions

Before being abandoned, the pipeline should be completely disconnected at both ends and if necessary divided into sections. All open ends should be capped and sealed. In certain areas, e.g. those subject to subsidence or where heavy external loads may occur, it may be necessary to close the pipeline at both ends and to fill the abandoned line with a suitable filler. Where the abandoned pipeline cannot be made safe by the above method, it should be removed. In all cases where the fluid conveyed is considered an environmental or safety hazard, or could become so after contact with the soil, it will be necessary to remove completely the fluid from the pipeline. In other cases, it may be possible to permit the fluid to remain in the disused pipeline.

All surface chambers should be removed to not less than 900 mm (36 in) below ground level. Backfilling and land reinstatement should be in accordance with **4.18**.

6.3 Records

A record should be kept by the owners of a pipeline to indicate that they have taken the necessary precautions. A record plan showing the size and depth of the pipeline and its location related to surface features should also be prepared and a copy given to the owners and occupiers of the land concerned.

Appendix A UK Statutes

The following list of principal Acts of Parliament and Statutory Instructions is given in alphabetical order and the dates quoted are the years in which the Acts were passed. This list should not be assumed to include all relevant statutes.

Acquisition of Land Act 1981

Ancient Monuments and Archaeological Areas Act 1979

Atomic Energy Authority Act 1954

Coast Protection Act 1949

Compulsory Purchase Act 1965

Construction (General Provisions) Regulations 1961

Control of Pollution Act 1974

Countryside Act 1968

Countryside (Scotland) Acts 1967, 1981

Customs and Excise Act 1952

Factories Act 1961

Fire Precautions Act 1971

Gas Acts 1965 and 1972

Health and Safety at Work etc. Act 1974

Health and Safety at Work (Northern Ireland) Order 1978

Highways Act 1980

Historic Buildings and Ancient Monuments Act 1953

Housing Acts 1961 and 1974

Land Compensation Act 1961 and 1973

Land Drainage Act 1976

Land Powers (Defence) Act 1958

Lands Clauses Consolidation Act 1845

Local Government Act 1972

Oil and Gas (Enterprise) Act 1982

Petroleum and Submarine Pipelines Act 1975

Pipelines Act 1962

Public Health Acts 1936 and 1961

Public Health (Ireland) Act 1978

Public Health (Drainage of Trade Premises) Act 1937

Public Health (Recurring Nuisances) Act 1969

Public Utilities Street Works Act 1950

Radioactive Substances Act 1960

Requisitioned Land and War Works Act 1945 and 1948

Rivers (Prevention of Pollution) Acts 1951 and 1961

Sewerage (Scotland) Act 1968

Town and Country Planning Act 1971

Town and Country Planning General Development Order 1977

Water Acts 1945, 1948, 1973, 1976, 1981 and 1983

Water Act (Northern Ireland) 1972

Water Resources Acts 1963, 1968 and 1971

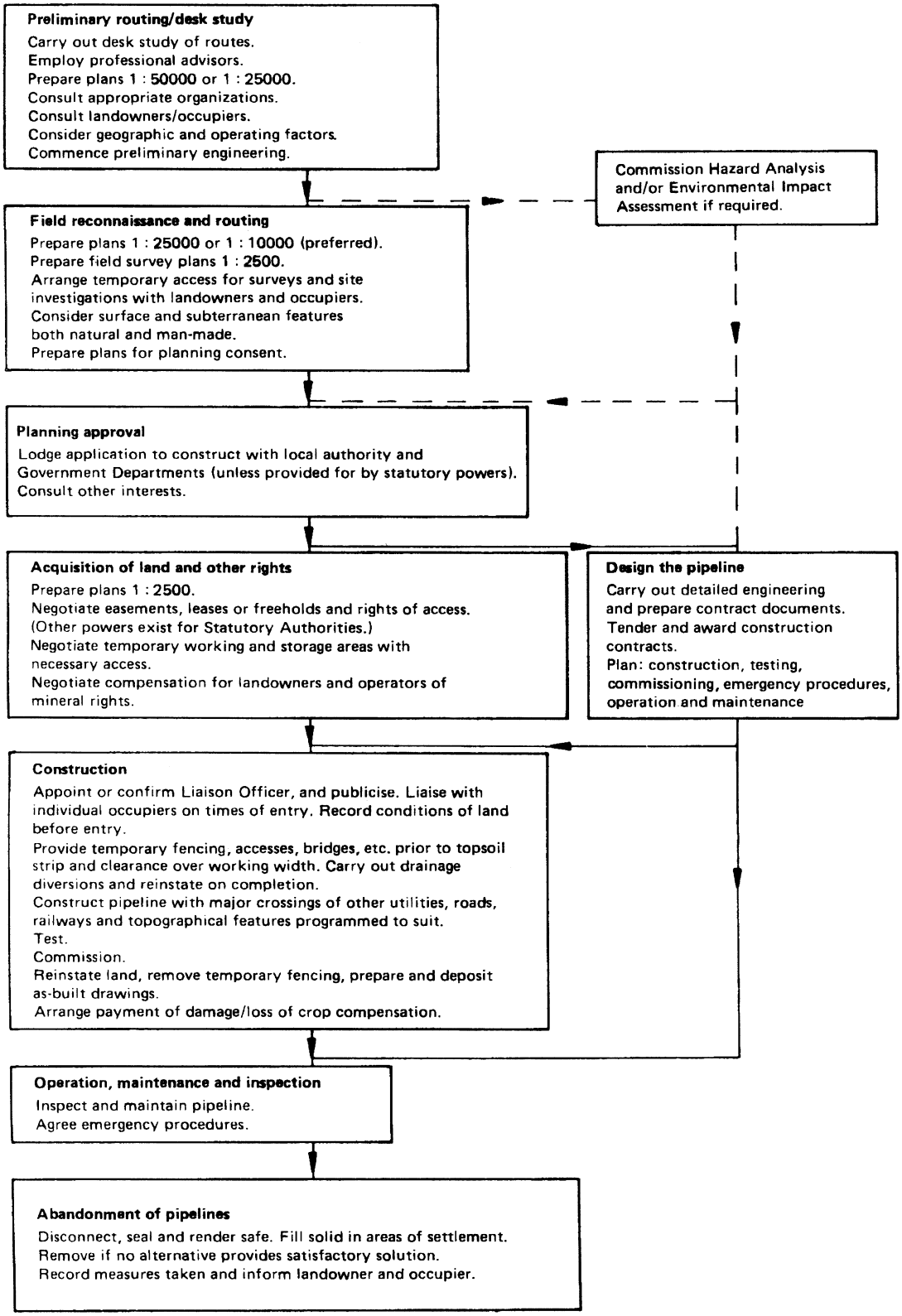
Water Scotland Act 1946, 1949, 1967 and 1980

Water Supplies and Sewerage Act (Northern Ireland) 1945

Water Supply and Sewerage Services (Northern Ireland) Order 1973

Wild Life and Countryside Act 1981

Appendix B Flow chart for implementation of a pipeline project



Publications referred to

BS 1722, *Fences.*
BS 5607, *Code of practice for safe use of explosives in the construction industry.*
BS 6031, *Code of practice for earthworks.*
BS 8010, *Code of practice for pipelines.*
BS 8010-2, *Pipelines on land: design, construction and installation*[5)].
CP 1021, *Code of practice for cathodic protection.*
CP 2010, *Code of practice for pipelines*[5)].

[5)] Published in Sections.

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