

7 SPECIFICATIONS

There is currently no Irish specification for construction of drainage works, or water supply works. There are several publications that give guidance on drainage works, such as the Building Regulations, “Recommendations for Site Development Works for Housing Areas” and “Code of Practice for Development Works – Drainage”. Otherwise specifications are produced for specific projects from the designers’ own knowledge and previous experience.

The risk in this approach is that drainage projects are built to a variety of standards, and that design standards will stagnate, as designers reproduce specifications from previous projects.

For drainage works in the UK, the Civil Engineering Specification for the Water Industry is published by WRc, and regularly updated to account for developments in technology and experience in the industry. This specification covers the following topics:

- ◆ General: Setting up and maintenance of the site, public liaison, safety and standards;
- ◆ Materials: detailed specifications for items used in the construction of the drainage works and associated buildings;
- ◆ Excavation, backfilling and restoration: working standards for these and associated activities, such as use of compressed air;
- ◆ Concrete and formwork: mixes and working standards for concreting, together with construction of formwork, joints and finishes;
- ◆ Construction of pipelines, tunnels and ancillary works: working standards, tolerances and record keeping;
- ◆ Testing and disinfection: cleansing and testing of pipelines and water retaining structures;
- ◆ Roadworks: working standards for bituminous and concrete roads associated with drainage construction;
- ◆ Sewer and water main renovation: general requirements for works in accordance with the techniques in the “Sewerage Rehabilitation Manual” and “Water Mains Rehabilitation Manual”.

This specification would be a good document from which to produce an Irish specification for the water industry, covering major construction works for drainage, sewerage and sewage treatment.

Further specification for SuDS installations, such as planting and landscaping, will be needed.

The existing documents entitled “Recommendations for Site Development Works for Housing Areas”, the Building Regulations for Drainage and WasteWater Disposal, and their variants, contain much valuable practical information. The various sections of EN 752 “Drain and sewer systems outside buildings” also provide useful information.

Sewers for Adoption has been produced in the UK, as the design and construction guide for developers. This document specifies materials and working standards for more modest projects. It is also regularly updated to reflect changes in the industry, the latest 5th edition introducing SuDS.

Specification for the Irish Water Industry

A Specification Committee should be set up, containing members from the Client Authorities, to produce a particular specification for materials and working standards within the water industry

This specification to be applied to all water construction projects in Ireland, and regularly updated to reflect developments in technology and working practices in the water industry

Once the main specification for water construction projects has been prepared, the need for a particular specification for systems serving smaller residential-type developments should be considered.

Notwithstanding the above, Appendix F contains proposed specifications for particular aspects of sewerage and drainage contained in the Policy Document. These are:

- ◆ Cleansing and Testing;
- ◆ Connections to Existing Drainage Systems;
- ◆ Standards of Construction and Workmanship.

7.1 Pipes, Materials, and Fittings

Although the proposed particular specification will include the requirements for pipes, materials and fittings, the policy needs to be agreed on types of these items to be used in particular circumstances.

7.1.1 Current Arrangements

There are various statutory specifications in place, including:

Table 5 of the Building Regulations, which lists pipe materials for:

- ◆ sanitary pipework as cast iron, copper, galvanised steel, unplasticised polyvinylchloride (PVC-u), plastics ABS, MUPVC, and polyethylene;
- ◆ gravity drainage as fibre cement, vitrified clay, concrete, grey iron and PVC-u.

“Recommendations for Site Development Works for Housing Areas” permits foul and surface water sewers and drains to be PVC-u, spigot and socket concrete, clay, glass reinforced plastic (GRP) and glass composite concrete (GCC). Rebated concrete pipes and fittings may be used for surface water sewers and drains only.

The “Code of Practice for Development Works – Drainage” produced by Dublin City Council requires that PVC pipes are not to be used in the construction of main pipelines, and connections from gullies or private drains to the public sewer.

Designers for larger water schemes will select pipe materials to suit overall design requirements. For example steel pipelines would be necessary for large diameter pressure applications where ductile iron pipes are not manufactured.

7.2 Proposed Arrangements

It is proposed that pipe material for sewers and drains be separated from the lists in the Building Regulations, which of necessity include building pipework. The proposed lists are:

Pipe Materials for Gravity Sewers and Drains

- ◆ Concrete, using sulphate resisting cement;
- ◆ Vitrified Clay;
- ◆ Ductile Iron;
- ◆ Glass Reinforced Plastic (GRP);
- ◆ Structured Wall Plastic, subject to further investigation.

Pipe Materials for Pumping Mains

- ◆ Ductile Iron, subject to appropriate protection;
- ◆ Polyethylene 80;
- ◆ Polyethylene 100;
- ◆ Steel, for large diameters.

Pipes, Materials and Fittings

The proposed list of pipes, materials and fittings should be agreed

The agreed list should be periodically reviewed by the Specification Committee and updated to reflect changes in technology and drainage practice

Designers are to be permitted to use other pipes, materials and fittings to suit particular projects and applications, supported by technical justification

7.3 Sewerage and Drainage Details

Standardisation of manhole and pumping station details has long been a goal of drainage engineers, and it has not yet been reached. For example, even though Sewers for Adoption is in its 5th Edition, the committee has been unable to produce definitive details for such basic components of drainage systems.

7.3.1 Current Arrangements

Dublin City Council currently leads the region with its Standard Manhole Details covering pipeline diameters up to 750mm and depths up to 6m. The Council's insistence on in-situ concrete and brick/blockwork construction for watertightness has drawn criticism about long construction times.

Other councils favour the use of pre-cast concrete rings with concrete surround for manhole wall construction.

7.3.2 Proposed Arrangements

Mindful of the lengthy debate that standardisation will produce, we propose that a committee be set up to agree construction details among the Client Authorities. In the meantime Dublin City Council's Standard Details, as contained in Appendix G, should be adopted by all Councils, subject to flexibility of choice in manhole wall construction.

Sewerage and Drainage Details

The Specification Committee should agree construction details among the Client Authorities

Health and safety aspects of safe access and ingress in manholes and chambers shall be included with high priority

Where agreement cannot be reached the various requirements for each Authority should be documented

7.4 Building Over or Near Sewers

Under the Public Health of Ireland Act of 1878, it is not permissible to construct a building over a public sewer, and hence construction of sewerage and associated manholes and chambers, is generally not permitted by the Councils under or near buildings. Building over sewers causes major problems with access for maintenance and renewal of drainage assets. Sewers for Adoption, 5th Edition supports this principle, and the current Policy should remain.

Where access to a sewer is to be restricted on both sides, the clear distance required is a minimum of 6m, being normally 3m either side of the centreline. Where the clear distance does not contain a public right of way of sufficient width for plant access, typically 3m, the clear distance should ensure satisfactory access and support arrangements.

Where the depth to invert exceeds 3m, the boundary of the clear distance shall not be within the 45-degree line of influence from the base of the pipeline trench.

Foundations and basements of adjacent buildings shall be designed to ensure that no building load is transferred to the sewer. The nearest point of the building or basement must not fall within a 45-degree line of influence from the base of the pipeline trench.

This policy covers permanent clear distances required in connection with pipe-laying and subsequent maintenance, for both public and private drainage systems. The policy excludes temporary working areas used during construction.

The reasons for the policy criteria are:

- ◆ The clear distance of 6m typically coincides with the minimum compensation per unit length of pipeline acceptable to the farming community in general;
- ◆ The minimum clear distance of the 45-degree line of influence from the base of the pipeline trench is deemed reasonable for maintenance of the pipeline, assuming the presence of buildings on both sides. These clear distances allow for storage of excavated material and access for excavation and pipe-laying equipment;

- ◆ The clear distances derived from depth to invert are intended to prevent loads from buildings, etc, being imposed upon the pipeline.

Dimensions below these minima should only be accepted where there are particular on-site restrictions, which would otherwise prevent drainage from being constructed.

Building Over or Near Sewers

Clear distances for public and private drainage will have minimum widths of 6m

Where the depth to invert exceeds 3m, the boundary of the clear distance shall not be within the 45-degree line of influence from the base of the pipeline trench

7.5 Monitoring of Construction

This Policy must achieve the practical balance between the Council's Drainage Inspector monitoring every aspect of drainage construction, and the Inspector being satisfied that construction is of adequate quality and fitness for purpose. The former situation could require the Inspector to be full time on site, which is not practicable in terms of provision of manpower or recovery of costs from the developer.

It is therefore proposed that testing be carried out on a priority basis, being:

Priority 1: Mandatory requirement for all sites;

Priority 2: Mandatory requirement for all sites exceeding 1 hectare in area.

The proposed checking regime is:

Item	Priority	Comments
Construction Drawings and Specifications available on site	1	Held by Contractor, access for Inspector
Materials and Equipment Test Certificates to be available on site	1	Materials for the Works Plant And Equipment Manufacturers' Pump Tests Electrical safety
Pipelines		
Trench Excavation & Backfilling	2	Responsibility for H&S remains with Contractor
Cleansing and Testing	2	Initial Backfill, Joints Exposed
Back-filling and temporary reinstatement in roads	1	By LA Inspector after back-filling complete
Final Reinstatement	2	By Roads Inspector
Manholes		
Watertightness Test	1	Visual Internal Inspection
Connection with Pipeline	1	Visual Internal Inspection
Pumping Stations		
Sump Watertightness Test	1	Visual Internal Inspection
Pump Drawdown Test	1	Individual tests for each pump and in combination
Electrical safety Test	2	Responsibility for H&S remains with the Contractor

Table 7.1 Monitoring Regime for Drainage Construction Works

The actual frequency of visits by the Drainage Inspector will depend on his confidence and trust in the developer and his contractor to construct to the agreed standards. Where there is less confidence, there will be the need for additional visits.

Monitoring of Construction

Drainage and related construction work shall be monitored on site in accordance with the agreed schedule

A Drainage Inspectorate shall be set up to carry out this work on behalf of the Client Authorities

Private drainage shall be supervised and checked to the same standards as systems to be taken-in-charge

The developer shall be responsible for all construction, supervision and checking of drainage works

7.6 Cleaning and Testing of Sewerage and Drainage Systems

7.6.1 Current Arrangements

Requirements for cleaning and testing of sewers and drains are contained in “Recommendations for Site Development Works for Housing Areas”, the “Code of Practice for Development Works - Drainage” and the Building Regulations. These documents require that developers clean to the satisfaction of the local authority, with the option of sewer condition surveys, using CCTV surveys.

Both air and water tests for sewers and drains are permitted. The type of test is to be determined by the Drainage Inspectorate for each location or by Local Authority or Regional Regulation, according to the approved specification.

7.6.2 Proposed Arrangements

The proposals for cleaning and testing have been prepared against the background of concerns about poor workmanship, leading to inflow and infiltration (I/I) flows reducing the available hydraulic and treatment capacity in the systems. Such problems have been suspected by Council drainage engineers for some time. Results from the GSDSDS modelling work have proved these suspicions to be correct, in that high levels of I/I have been measured, discharging from predominantly separate systems of recent construction. The proposed arrangements should therefore comprise thorough regimes for cleaning and testing as the means of improving workmanship, and hence reducing I/I risks in future new development.

The proposed detailed specifications for cleansing and testing of sewers, drains, manholes, chambers and pumping stations are contained in Appendix F.

Cleaning and testing is the responsibility of the developer, and the Drainage Inspector is only responsible for monitoring the process.

Cleaning and Testing of Sewerage and Drainage Systems

Sewerage and Drainage systems and related construction work shall be cleaned and tested in accordance with the agreed specification

The requirements of Appendix F should be met pending the introduction of an agreed specification

7.7 Connections to Existing Drainage Systems

Connections to Existing Drainage Systems

Connections shall be carried out in accordance with the agreed specification

The requirements of Appendix F should be met pending the introduction of an agreed specification

7.8 Standards of Construction and Workmanship

Standards of Construction and Workmanship

Standards shall be maintained in accordance with the agreed specification

The requirements of Appendix F should be met pending the introduction of an agreed specification