



Subdivision and Land Development Bylaw 2005



SOUTHLAND DISTRICT COUNCIL

In pursuance of the powers vested in it by the Local Government Act 2002, the Southland District Council makes the following Bylaw:

**THE SOUTHLAND DISTRICT COUNCIL
SUBDIVISION AND LAND DEVELOPMENT BYLAW 2005.**

REVOCATION

The Southland District Council Subdivision and Land Development Standards Bylaw 1999, together with the Southland District Council Subdivision and Land Development Standards Bylaw Amendment No. 1, 2000 are revoked with effect from the day this bylaw comes into force.

TITLE

This bylaw may be cited as the Southland District Council Subdivision and Land Development Bylaw 2005.

COMMENCEMENT

This bylaw shall come into force on the 12th day of December 2005.

OFFENCES

Every person commits an offence who breaches the provisions of this bylaw.

PENALTIES

Every person who commits an offence against this Bylaw is liable on summary conviction to a fine not exceeding \$20,000.00.

This Bylaw has been made and confirmed by a resolution passed at a meeting of the Southland District Council held on the 30th day of November 2005.

THE COMMON SEAL OF THE
SOUTHLAND DISTRICT COUNCIL
was hereunto affixed in the presence of:

MAYOR

CHIEF EXECUTIVE

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SECTION 1

INTRODUCTION

1.1 SCOPE

This bylaw applies to all engineering infrastructure constructed on or under any urban or rural residential, commercial or industrial subdivision and land development within the Southland District Council area. It has the standing of an acceptable means of compliance with Acts and Council requirements governing subdivision and land development works within the District.

The scope does not include any building work as defined under the Building Act 1991. In any areas of overlap the Building Act 1991 and the New Zealand Building Code take precedence.

Please note that this is primarily an engineering document. While there is reference to requirements of the District Plan, the bylaw does not cover all of the District Plan requirements and reference must be made to that document for a full understanding of the relevant provisions.

1.2 BASIS OF POLICY

The authority for Council to set and monitor compliance with this bylaw is given in the following sources:

(a) **Resource Management Act**

Section 31 gives the Territorial Authority control of land subdivision.
Sections 218 to 246 relate to the application and approval process.

(b) **District Plan**

Sections 3.6 and 3.7 of the District Plan set out Council's policy and rules relating to subdivisions and associated financial contributions.

(c) **Local Government Act 2002**

Part 8 sets out the powers of local authorities to make bylaws.

This bylaw is to be interpreted in conjunction with the above documents and is an acceptable means of compliance with them.



1.3 **OTHER RELEVANT DOCUMENTS**

Other documents which may need to be referred to in the design of new subdivision or land development works are:

(a) **Planning Documents**

SDC District Plan
Regional Freshwater Plan
Regional Coastal Plan
Regional Effluent Land Application Plan
New Zealand Coastal Policy Statement
New Zealand Urban Design Protocol

(b) **Bylaws**

SDC Stormwater Bylaw
SDC Trade Waste Bylaw
SDC Roading Bylaw
SDC Water Supply Bylaw
SDC Rural Water Supply Bylaw
SDC Trenching Bylaw

(c) **SDC Policies and Guidelines**

SDC Roading Policy
Te Anau Green Network Parks and Reserves
Te Anau Strategic Road Hierarchy Plan
Development Contribution Policy

(d) **Other**

NZEC 34:2001, The NZ Electrical Code of Practice for Electrical Safe Distances
Transit New Zealand Standards and Guidelines
Austroads Geometric Design Standards
Telecom Subdivision Reticulation Policy
All Codes of Practice and Standards referenced in this document.

Referenced documents should include all amendments current at the time of the subdivision or development application. In the event of conflict between the bylaw and reference documents, the bylaw requirements shall prevail.

1.4 **OBJECTIVES**

In formulating this bylaw the objectives of Council are to:

- (a) Provide a uniform set of conditions for the convenient reference by Developers so that they are aware of Council's minimum requirements before committing themselves to a subdivision or land development project.
- (b) Allow and encourage Developers to come up with innovative engineering solutions which fulfil Council's minimum conditions while demonstrating individuality. There are many ways of achieving the desired standards and it is Council's desire to empower Developers to produce individual designs that are alternatives to the standards while still achieving the desired end results.
- (c) Minimise the lifetime costs of maintenance and replacement for the District ratepayers.
- (d) Set performance rules which will enhance the habitable environment.



- (e) Promote sustainable development.

1.5 **GENERAL PERFORMANCE STANDARDS**

All subdivision and land development work shall be of such design and construction so as to:

- (a) Not require any major maintenance or replacement of parts (for other than direct vandalism, accident or act of God) for the following minimum periods:

All subsurface features	-	80 years
All surface and above surface features (unless listed separately below):	-	25 years
Road formation	-	25 years
Road surfacing (asphalt and chip seals)	-	10 years
Road signs	-	7 years
Street lamps (ie the lamps only, not poles, etc)	-	5 years
Mechanical equipment	-	15 years
Electrical equipment	-	10 years

- (b) Be fit for the purpose and usage intended and minimise the lifetime maintenance and replacement costs.
- (c) Be adequate for all anticipated usage and demand, including demand imposed from adjacent development, for periods compatible with the above.
- (d) Be compatible with other adjacent Council infrastructure and sympathetic to the environment.
- (e) Satisfy the assessment criteria of the District Plan, Section 3.6
- (f) Be safe and sustainable in the face of natural hazard impacts forecast over the upcoming 100 years.
- (g) Comply with the relevant documents listed in Section 1.3.

1.6 **URBAN DESIGN REQUIREMENTS**

Urban design is to incorporate and facilitate the following:

- (a) A clear structure. A well structured layout where the parts fit together.
- (b) A distinctive character, strengthened by design.
- (c) Good access - both physical (roads and paths) and visual (view lines).
- (d) Good fit. This helps people to feel comfortable and enhances their sense of self worth.
- (e) Variety. Visual and social stimulation is important. Need to encourage a mix of activities.
- (f) Continuity and change. Preserve the heritage links but encourage development of new aspects.
- (g) Sustainability. Development should be robust to stand the test of time.
- (h) Animation. Do not design empty places without allowing for actual usage by real people.



- (i) Sense. Include elements that appeal to hearing, touch, sight.
- (j) Equity. Public places have to be open for and usable by all, including those who are disabled.

1.7 **INFRASTRUCTURE REQUIREMENTS**

Unless advised otherwise by the Group Manager Services and Assets all new subdivisions and land developments shall provide within the confines of the subdivision or land development area the following at the Developer's cost:

- (a) Fully formed road access, complete with road marking and signage.
- (b) Footpaths and cycleways.
- (c) Power and telephone reticulation.
- (d) Street lighting.
- (e) Provision for sewerage and stormwater disposal.
- (f) Provision for water supply.

All network utility services are to be undergrounded, except in rural areas where the Council may permit overhead power and telephone servicing if considered appropriate.

If one or more of the utility services is not available the Developer shall be required to demonstrate that the proposed subdivision or land development is able to sustain the lack of service in its own right.

The Developer shall also provide or contribute to, at the Developer's cost, additional or upgraded infrastructure outside the confines of the subdivision if this is required to service the subdivision or to address impacts generated by the subdivision.

Examples

- (a) *Increased stormwater runoff from the subdivision will impact on an existing drain downstream of the subdivision. The Developer will be required to upgrade this drain to cater for the increased runoff.*
- (b) *Traffic generated by a new subdivision will require an existing road connecting to the subdivision to be widened and strengthened. The Developer will be required to undertake this upgrading.*
- (c) *Increased traffic generated by a new subdivision may impact on the adjacent roading network requiring safety improvements. The Developer will be required to pay for the safety upgrade.*

1.8 **DEFINITIONS AND ABBREVIATIONS**

In this bylaw, unless inconsistent with the context, the following definitions shall apply:

APPROVED means to a standard approved by the Group Manager Services and Assets, Southland District Council.

CARRIAGEWAY means the formed roadway for the carriage of vehicles.



CLEANFILL means material consisting of natural components such as clay, soil and rock and such other materials such as concrete, brick or demolition products (excluding asphalt), which are free of combustible and organic materials, free of voids and which are not subject to biological or chemical breakdown and not capable of leaching chemicals or toxins into the environment.

CONCEPT PLAN means the plan of a proposed subdivision or land development of land into a significant number of lots or a subdivision, which, in the opinion of Council, will have special or unusual features.

COUNCIL means the Southland District Council.

CYCLEWAY means a path constructed for the use of cyclists or for the joint use of both cyclists and pedestrians.

DEVELOPER means the person or persons undertaking a development.

DEVELOPMENT means the development or redevelopment of any land area for the purposes of facilitating changed or more intensive usage of the land. In this bylaw the words **DEVELOPMENT** and **SUBDIVISION** shall have the same meaning unless the context requires that they are mutually exclusive.

DEVELOPMENT PLAN means such plans and reports showing information that is necessary to identify the effects of the development on the environment and to enable the assessment for Financial Contributions under the Resource Management Act 1991 and as identified by the Southland District Plan or assessment in terms of Council's Development Contribution Policy

DISTRICT PLAN means the District Plan of the Southland District Council, as prepared under the Resource Management Act 1991.

DRAINAGE means wastewater drainage and/or stormwater drainage and includes pipes, ponds, swales, open drains and wastewater treatment plants, and "drain" has a corresponding meaning.

EARTHWORKS means any alteration to the natural ground contours, including the excavation and backfilling or recompaction of existing natural ground and the stripping of vegetation and topsoil.

ENGINEER means the Southland District Council Group Manager Services and Assets or any other officer or other person appointed by the Council to control engineering work on behalf of the Council.

FOOTPATH means any surface as is laid out or constructed primarily for pedestrians; and may include the edging, kerbing and channelling thereof.

FREEBOARD means the clear height above the secondary flow level of stormwater runoff used when determining allowable floor levels. This is to cater for flood surface undulation, tolerance for flow estimation methods, and for possible failure of the primary system.

GROUND is a general term used to describe the material in the vicinity of the surface of the earth whether soil, gravel, rock or other.

HOUSEHOLD UNIT OR DWELLING UNIT means any building or group of buildings, or part thereof used, or intended to be used principally for residential purposes and occupied or intended to be occupied by not more than one household.

INFRASTRUCTURE means all roading and road features, parking areas, utility cables, pipes and associated network, collection, treatment and disposal features, landscaping, footpaths and lighting in reserves, cycleways and retaining walls.

INSPECTING ENGINEER means any person who, on the basis of experience or qualifications, is competent to design and supervise earth fill construction.



LGA means the Local Government Act 1974, 2002 and all amendments current at the time of subdivision or land development application.

MINOR WORKS means subdivisions or developments in which the quantity of new underground pipework is less than 20 m and does not have any significant implications for other infrastructure or for any structure.

OCCUPIER means the inhabitant occupier of any property and may or may not be the owner.

OWNER in relation to any land or interest therein, includes an owner thereof, whether beneficially or as trustee, and his agent or attorney, and a mortgagee acting in exercise of power of sale; and also includes the Crown, the Public Trustee, and any person, local authority, board, or other body or authority however designated, constituted or appointed, having power to dispose of the land or interest therein by way of sale, and may include the owner's representative.

PRELIMINARY PLAN means a preliminary plan of a proposed subdivision or land development in terms of Section 218 of the Resource Management Act 1991.

POST-CONSTRUCTION SETTLEMENT means the settlement of the ground surface, which takes place after completion of the construction of the earthworks.

PRIMARY DESIGN FLOW is the estimated stormwater runoff selected to provide a reasonable degree of protection to the surrounding land. In most cases this flow will be piped or contained within relatively narrow confines under public control and be protected by a reserve or easement.

PRIVATE ROAD means any roadway, place, or arcade laid out within the district on private land by the owner thereof but intended for the use of the public generally.

PRIVATE WAY means any way or passage whatsoever over private land within the district, the right to use which is confined or intended to be confined to certain persons or classes of persons, and which is not thrown open or intended to be open to the use of the public generally.

PUBLIC UTILITIES means power, telecommunications, water, gas, stormwater and sewerage networks.

RMA means the Resource Management Act 1991 and all amendments current at the time of subdivision or land development application.

RURAL RESIDENTIAL means any parcel of land (or parcels within the same Certificate of Title) outside of the Urban Resource Areas as defined in the District Plan, with a total area of between 4000m² and 9,999m².

RURAL LIFESTYLE means any parcel of land (or parcels within the same Certificate of Title) outside of the Urban Resource Areas as defined in the District Plan, with a total area of between 1 hectare and 4 hectares.

RURAL LAND means any parcel of land (or parcels within the same Certificate of Title) outside of the Urban Resource Areas as defined in the District Plan, with a total area of exceeding 4 hectares.

SDC means the Southland District Council.

SECONDARY FLOW PATH refers to the paths taken by stormwater runoff in excess of the primary design flow and should be capable of producing a high degree of protection to the surrounding buildings.

SHALL indicates a requirement that is to be adopted in order to comply with the standards set out in the Bylaw, while the words "**should**" or "**may**" indicate a recommended practice.



SOIL means the heterogeneous aggregation of particles comprising either peat, clays, silts, sands, gravels, crushed and re-oriented rock fragments, or a mixture of any of the above. The term excludes rock that is intact rock masses whether highly jointed or not.

Cohesionless Soil means a non-plastic soil (sand, gravel) where the strength is derived primarily from interlocking forces between soil grains.

Cohesive Soil means a plastic soil (clay, silt, organic) where the strength is derived primarily from cohesion between the soil particles.

Soft Soil means cohesive soil having a low shear strength (less than 25 kPa).

Loose Soil means cohesionless soil (having a Standard Penetration resistance of less than 10 blows per 300 mm). Also refers to uncompacted or poorly compacted fill.

SOILS ENGINEER means a person who is currently entitled to practice as a Registered Engineer (as defined by the Engineer s Registration Act 1924) and has experience in soils engineering acceptable to the Council; or such other person as the Council may specifically approve as being competent.

STABLE GROUND means ground existing in a state which can be shown by a Soils Engineer is unlikely to settle, slip, erode or otherwise move to the detriment of superimposed buildings, services, road or property generally.

STORMWATER means water or other runoff resulting from precipitation (rain, hail, snow) and does not include Trade Waste or Domestic Wastewater.

STORMWATER DRAINAGE means a drain primarily for the reception and discharge of stormwater.

STREET has the same meaning as “road” as defined by Section 315 of the Local Government Act 1974.

SUBDIVISION has the same meaning as subdivision of land as defined in Section 218 of the Resource Management Act, or means the subsequent development upon the subdivided land, depending on the context.

SURVEY PLAN has the same meaning as defined in Section 2 of the Resource Management Act 1991.

TRADE WASTE DISCHARGE is any liquid with or without matter in suspension or solution, that is or may be discharged from a trade premises in the course of any trade or industrial process or operation, or in the course of any activity or operation of a like nature, but does not include stormwater or domestic wastewater.

URBAN AREA means an area which is used or intended to be used solely or principally for residential, commercial, industrial or any other similar urban purposes or any two or more such purposes and includes rural residential areas.

WASTEWATER means water or other liquid, including waste matter, in solution or suspension discharged from a premises.

WORKING DAY means any day except a Saturday, Sunday or recognised national or Southland holiday and except any day in the period commencing 20 December and ending on the following 10th day of January.



SECTION 2

APPLICATIONS

2.1 DISTRICT PLAN REQUIREMENTS

(a) Subdivisions to Comply

No subdivision of land into allotments may be carried out except in accordance with the requirements of the RMA and with the provisions of the District Plan and shall comply with any conditions imposed in any resource consent.

(b) Applications for Subdivisional Consent

Any person wishing to subdivide land shall make application for a subdivision consent in accordance with the provisions of Rule APP.1 of the District Plan - Rules for Resource Consent Applications.

(c) Preliminary Consultation

Prior to formal application for any substantial subdivision consent or project having unusual features or physical constraints, Council strongly recommends early consultation and the submission of a concept proposal which enables the design and servicing issues to be addressed with Council before the design is finalised.

(d) Submission of Preliminary Plan

Any application made in accordance with (b) above shall be accompanied by a Preliminary Plan which clearly illustrates, in visual form, the subdivision which is intended.

(e) Notification

Depending on whether the application is considered by Council to be a controlled activity, a discretionary activity or a non-complying activity and whether the application is considered to be routine or contentious it will be treated as a non-notified or notified process under the Resource Management Act.

(f) Approval of Survey Plans

Once a Subdivision Consent has been granted pursuant to Section 220 of the RMA then the Survey Plan may be submitted for Council approval pursuant to Section 223 of the RMA.

(g) Issue of Section 224(c) RMA Certificate

The Section 224(c) RMA Certificate shall not be issued by Council until Council is satisfied that all requirements of the District Plan have been met and that all conditions imposed under the subdivisional consent have been satisfied or a bond agreement has been entered into as allowed for under the RMA.

(h) Information Required

Refer Section 2.2(iv) of the District Plan - Information to be Submitted and Schedule 6.16 Guidelines for Resource Consents.



2.2 **SUMMARY OF STEPS**

A summary of the steps involved in applying for subdivision consent, approval of the construction documents and for acceptance of the finished infrastructure are set out. Abbreviations DEV and SDC are used to denote the Developer and the Southland District Council respectively.

Activity	Agent
Stage 1 - Preliminary Consultation	
Concept discussion with Council	DEV/SDC
Submit concept plan if required	DEV
Stage 2 - Resource Consent	
Assess environmental effects	DEV
Assess site suitability	DEV
Complete application form	DEV
Evaluate notified/ non notified	SDC
Submit preliminary plan	DEV
Concept plan checked	SDC
Preliminary plan checked	SDC
Conditions of resource consent formulated and consent issued	SDC
Stage 3 - Engineering Approval	
Submit engineering documentation	DEV
Documentation checked	SDC
Conditions of approval notified	SDC
Stage 4 - Construction	
Compliance with conditions of approval	DEV
On site testing and certification	DEV
Stage inspections of infrastructure to be taken over by Council	SDC
Notify when works complete	DEV
Stage 5 - Completion and Hand-over	
As-built documents submitted	DEV
Compliance check	SDC
Title plan submitted	DEV
Title plan sealed (Section 223 Certificate)	SDC
Section 224 certificate issued	SDC
Title plan lodged with LINZ	DEV
Maintenance period completed	DEV
Infrastructure accepted by Council	SDC



2.3 **ASSESSMENT OF SITE SUITABILITY**

All applications for subdivision shall include sufficient detail to demonstrate that the site is suitable for the proposed activity, having regard for the provisions of the District Plan, Council bylaws, policies and guidelines. Applications shall also have regard to the presence, or potential presence of coastal hazards, erosion, subsidence, standards for filling, slippage, inundation, proximity of hazards such as dieldrin and other toxic dumps, earthquake fault lines, land prone to liquefaction during earthquakes the location of existing high voltage electricity transmission lines and to the availability of public utilities (particularly where utilities are not available and will not be available within 10 years).

Building sites subject to inundation require approval from Environment Southland. They generally set a minimum freeboard of 600 mm above recorded maximum inundation levels.

Coastal sites shall be assessed in regard to projections of sea level rise set out by the Inter-governmental Panel on Climate Change.

Section 106 of the RMA requires the Council to refuse the subdivision if the site is not suitable.

2.4 **PROVISION OF UTILITY SERVICES**

Where existing water supply and/or sewer and stormwater services are available immediately adjacent or within a reasonable distance of a proposed subdivision the application shall include provision for connection to these services.

Applicants are to show that all existing infrastructure to be used or connected is adequate to cope with the proposed increase in usage, or to show upgrading requirements where necessary.

The definition of "a reasonable distance" shall be assessed on a case-by-case basis and take into consideration such factors as the relative cost of the in-property reticulation and the extensions to connect to the existing services, the lengths of connections and any difficulties in making a connection at grade.

However, in general terms, an application is expected to include connection to existing services where any of the following apply:

- (a) The subdivision is wholly or partially within the Urban Resource Area as defined by the District Plan.
- (b) The centre of the subdivision is within 500 m of the boundary of an Urban Resource Area.
- (c) The centre of the subdivision is within 500 m of an existing service.

All new subdivisions are to include underground power and telephone reticulations except in rural areas where Council may permit overhead power and telephone servicing if considered appropriate.

2.5 **CONCEPT PLAN**

Prior to formal application for subdivision consent, Council recommends early consultation and the submission of a concept proposal plan which enables the servicing and design issues to be addressed with Council before the final design is drawn.



Such a plan is will be required where:

- (a) Ultimate development of the site has the potential to have a significant effect on existing infrastructure, including high voltage electricity transmission lines
- (b) The work proposed is only one stage of a continuing development.
- (c) The servicing of the subdivision will affect land owned by others.
- (d) Council is of the opinion that the subdivision will have unusual features or effects.
- (e) Major earthwork cuts or fills are required.
- (f) Any land is to vest in Council.

The concept plan is to include such detail as is necessary to:

- (a) give a general outline of the topography of the site and nature of the proposed subdivision;
- (b) indicate the location of and compliance with the works and services criteria for:
 - * streets, footpaths, cycleways, parking areas
 - * reserves and walkways;
 - * school sites;
 - * public utilities and amenities;
- (c) indicate the approximate layout and contour of proposed allotments;
- (d) describe the effects the subdivision will have as viewed from the surrounding environs;
- (e) describe any other land of the subdividing owner adjoining the land in the proposed subdivision which may be subdivided in the future;
- (f) identify any unusual physical aspects which may affect the subdivision; and
- (g) identify design considerations, compliance with appropriate Regional Plans, Regional Land Transport Strategies and compliance with all aspects of the Minimum Engineering Requirements and referenced documents contained in this Bylaw.

Council's objective would be to comment on the concept plan within 15 working days of receipt.

If applicable, Council may suggest that the Developer refers copies of the subdivision concept plan to:

- (a) Environment Southland;
- (b) the New Zealand Historic Places Trust;
- (c) Transit New Zealand;
- (d) Local Iwi.
- (e) Transpower New Zealand Ltd
- (f) Other affected agencies.

A Schedule of Council's Fees and Charges is publicly notified each financial year.



2.6 **PRELIMINARY PLAN**

A preliminary subdivision plan shall be prepared in accordance with Section 219 of the RMA and submitted in duplicate.

The Council may approve the preliminary plan, with or without conditions or amendments, require submission of a new preliminary plan, or refuse to approve the preliminary plan in terms of its statutory authority under the RMA. The Council may require comment from Environment Southland, the New Zealand Historic Places Trust, Transit New Zealand or other agencies when appropriate.

If the Council does not approve the preliminary plan, it shall inform the subdividing owner of its reasons for not doing so.

2.7 **DEVELOPMENT AND FINANCIAL CONTRIBUTIONS**

Under the authority of Section 108 of the RMA, Section 198 of the Local Government Act 2002 and Section 3.7 of the District Plan Council may impose requirements for development and financial contributions to cover the development, provision or improvement as appropriate of infrastructure.

In addition to this, Council may also ask that the Developer pay for the construction of a service from its existing terminus up to the new allotments. If the new service is such that it will be used by allotments other than the Developers, the applicant's financial responsibility is limited to the extent to which the new construction shall serve his property.

2.8 **APPLICATION FEES**

All applications for subdivision consent are contingent on payment of the following fees:

- (a) Resource consent fees.
- (b) Engineering fees for the checking of documentation prior to construction.
- (c) Engineering fees for checking during construction eg pipe pressure testing.
- (d) Inspection fees related to checking the infrastructure prior to acceptance by Council.
- (e) Fees incurred from attendance at hearings.
- (f) Fees incurred in checking as-built documentation and lodging this into Council's systems.

A Schedule of Council's Fees and Charges is publicly notified each financial year.



SECTION 3

DOCUMENTATION

3.1 RESOURCE CONSENT DOCUMENTATION

The extent of the information required to be submitted with any resource consent application is set out in Section 2.2 and Schedule 6.16 of the District Plan and Section 88 and the Fourth Schedule of the Resource Management Act.

This information shall be clearly and logically laid out and be presented in such a manner as to be easily read without ambiguity.

If a high voltage electricity transmission line crosses a subdivision site, the documentation shall include accurate positioning of the line and demonstrate how the requirements of NZECP 34 will be met. Agreed measures such as designated building platforms must be clearly shown on all subsequent plans submitted for engineering approval.

3.2 PRE-CONSTRUCTION ENGINEERING DOCUMENTATION

When a subdivision includes any infrastructure works full engineering drawings and specifications shall be submitted for the approval of the Engineer.

Council's objective will be to check this documentation within 15 working days.

The applicant shall also submit calculations for aspects such as pavement design, stormwater and wastewater reticulation, water supply, slope stability and fill settlement to demonstrate suitability and adequacy of the infrastructure in terms of this bylaw and the referenced documents.

When required by the nature of the development a traffic management plan shall be prepared and submitted with the consent application. This plan shall show the basis for selection of the roading dimensions and layout proposed and how it will cope with expected traffic needs over its lifetime. The plan shall cover the requirements of public transport and traffic calming where applicable as required under the following clauses of this Bylaw and/or the relevant District Plan.

In addition it shall evaluate the effects of the proposed development as its ultimate extent (and staged, where applicable) on the surrounding road network. Where the evaluation shows the changed traffic volumes and patterns to have detrimental impacts on the surrounding road network the consent process may require that either financial contribution be made or works carried out at the developer's expense to mitigate the detrimental impacts.

3.3 DRAWINGS TO BE SUBMITTED

The following engineering drawings are to be submitted :

- (a) Locality Plan.
- (b) Roading: Plan complete with street lighting layout, long-section, cross-sections and detailed typical cross-sections.
- (c) Wastewater, Stormwater and Water Reticulation: A separate plan showing all reticulation in relation to section boundaries. Long-sections of each wastewater and stormwater drainage line. Plans showing the complete catchments and areas for each drainage system.



- (d) Landscaping and Earthworks: Where any works involve in excess of 500 m³ and either 0.6 m depth of cut or 1.0 m fill a separate plan showing original contours and areas of cutting and filling together with a grid of depths relative to original level. The grid interval shall be appropriate to the scale of the earthworks and shall be sufficient to give a reasonably accurate indication of the effects.

Existing vegetation, physical features, buildings etc to be shown together with any proposed planting. Details of vehicular access to each lot must be shown where access may be difficult.

- (e) Any infrastructure not covered above.
- (f) Staged Development Plan: Where a block is to be developed in stages each stage must include a plan showing how the particular stage relates to the whole block and also to other stages.
- (g) Detailed Drawings: Detailed drawings of any items not covered by Council s Standard Drawings.
- (h) As-built plans: Plans of the completed works.

Documents and drawings up to A3 size are to be submitted unbound to facilitate copying. Three copies of any plans larger than A3 size are to be submitted.

3.4 **SCALES**

The following scales are preferred:

Plans		1:500 or 1:200	
Long Section	Horizontal	1:500 or 1:200)
	Vertical	1:100 or 1:50) where necessary
Cross-Sections	Horizontal	1:100 or 1:50)
	Vertical	1:100 or 1:50) where necessary

Note: The vertical scale may be exaggerated where unavoidable.

Details	General	1:10, 1:20, 1:50
	Roading	(eg kerb lines, cul-de-sac heads) 1:200

Preliminary plans Urban 1:500 and 1:1000 (or as suits)

Note: Preliminary plan scales are required to conform wherever possible to the Engineering Plan Scale (ie 1:500).

Rural As suits.

All dimensions and levels shall be in metric measurement.

Notwithstanding the above, drawing scales shall be sufficient to detail all features, dimensions, text and numbers clearly and in a straight forward manner.

3.5 **SIZE OF DRAWINGS**

All drawings, including Preliminary plans, shall be prepared and submitted on sheets of the Standard ISO Type A Series. Principal drawings are to be on A1, A2, A3 or A4 sizes as appropriate. Detailed drawings, site plans etc may be of A3 or A4 sizes. A 40 mm border is to be provided along the left-hand edge of all sheets for binding.



3.6 **ORIENTATION OF PLANS**

(a) Plans and Long-Sections

The north point shall be to the top of the sheet wherever practicable. Long sections should be oriented the same as the plan as far as possible.

(b) Cross-Sections

Cross-sections shall commence at the bottom left-hand corner of the sheet and proceed upwards in order of increasing traverse distance. Where the road reserve is 20 m wide it may not be possible to place two columns of sections on one sheet, in which case the sheet may be rotated 90° clockwise and the sections plotted from the "bottom" of the sheet to the "top".

The left and right kerb lines shall be determined by facing in the direction of increasing distance.

For open channel flow, left and right banks shall be the true left or right banks as determined by facing in the direction of flow.

3.7 **DRAUGHTING STANDARDS**

All draughting is to conform to NZS/AS 1100 and NZS 5902 Part 5: 1981 or other New Zealand Standard where appropriate. In particular, the minimum height of letters is to conform to NZS/AS 1100. In order to make microfilm file copies, line drawings and text must be no finer than 0.18 mm and all lines must be of uniform density.

Minimum letter sizing should be:

General text	2.5 mm height with 0.25 mm line thickness when printed
Sub headings	3.5 mm height, 0.35 mm thickness
Main titles	5.0 mm height, 0.50 mm thickness

3.8 **SYMBOLOLOGY**

The symbols shown on the standard drawings are to be used. Other symbols are to conform to NZS/AS 1100 or appropriate New Zealand Standard.

3.9 **SURVEY DATUMS**

In order to complement Council's Data Capture and Geographic Information System (GIS) all engineering, subdivision, development and as-built plans shall be referenced to an accepted standard survey map projection.

The standard reference datum for all work shall be mean sea level and all levels shall be stated in terms of this datum.

3.10 **GIS COMPATIBILITY**

Council operates a GIS (Geographical Information System) system based on GeoMedia Professional.

The GIS system holds textual and graphical information for private property and public infrastructure.

Council also operate an Infrastructure Management System (Hansen IMS) which stores utility information and maintenance records.



All consent application and as-built information must be recorded in a logical and systematic manner for easy transfer to Council's GIS and Hansen database.

3.11 **SPECIFICATIONS**

Each subdivision application involving the construction of infrastructure shall be accompanied by two copies of specifications clearly setting out the standard of the materials and workmanship to be included in the works.

3.12 **CALCULATIONS**

Supporting calculations for the utility systems shall be provided, including secondary flow paths, with such flow paths being shown on the drawings.

3.13 **POST-CONSTRUCTION DOCUMENTATION**

Following construction and before acceptance of the subdivision by Council, the Developer shall submit such additional documentation as is necessary to prove compliance with the conditions of approval. Normally this documentation will include the following:

- (a) As-built drawings.
- (b) A certificate from the supervising soils engineer that any filling has been carried out in accordance with the agreed project specification and is suitable for erecting buildings on.
- (c) Confirmation from the supervising engineer that all water supply lines, wastewater and storm drainage pipes have been tested and approved.
- (d) CCTV inspection records for all stormwater and sewer pipes.
- (e) Confirmation from the Fire Service that the fire hydrants have been tested and have adequate water flows and pressures.
- (f) Confirmation in writing from Telecom and the Power Authority that their reticulation systems have been completed and comply with their standards.

Other specific approvals, such as by Transit New Zealand, may be set during the approval process.

3.14 **"AS-BUILT" DOCUMENTS**

- (a) General

Full as-built documentation is to be submitted for all infrastructure, whether on Council projects, private developments or Transit New Zealand work.

The as-built documentation shall consist of:

- One set of paper prints showing the plan location of all new infrastructure features and utilities and any that have been either removed or retired as a consequence of the project.
- For all except very limited developments involving only one or two pipes, a digital copy of the plan information.
- A digital table of asset information such as pipe type, pipe diameter, pipe lengths, position co-ordinates, levels, depths, etc.



Except for minor works, all As-built plans are to be prepared under the supervision and certified as to accuracy by a Licensed Cadastral Surveyor.

The documents are to be prepared in a format suitable for downloading into Council's GIS with minimal reworking.

Detailed requirements for each of these are set out below.

(b) Plan Coverage

Plans shall show:

- Accurate property boundary positions.
- The datums for levels and for coordinate positions.
- Local benchmarks for level and position, if applicable.
- All roading features (kerb and channel, footpaths).
- Street lighting and transformers.
- All wastewater, stormwater and water supply surface features.
- All pipelines with gravity and rising mains identified.
- Pipelines and other assets removed from the site.
- Superseded or disconnected pipelines still remaining at the site.
- The location of all cable to be taken over by Council.
- The location of any non-council utility services sited by agreement on council reserves.
- Areas of filling showing the extent of and depth of fill (appropriate grid or fill contours).
- Correct road names as approved by Council.

All alterations from the original design shall be shown on the plan with reference made in accompanying correspondence to the Engineer's approval for the alterations.

(c) Plan Prints

Hard copy plan prints shall be prepared in accordance with accepted good engineering design practice. They shall be easy to follow and clear to read. Draughting shall comply with AS/NZS 1100.

(d) Digital Plans

Digital plans are to be prepared in a format such as DXF or DWG that can be imported into Council's GIS. Surveyors and draughtsmen are advised to contact the Council office to check particular requirements.

Plans are to be prepared in accordance with the following conventions:

- The coordinate system shall match that used by the Council GIS (NZMG until approximately June 2006 and GD 2000 thereafter, subject to confirmation)
- Each utility asset type is to be placed on a specific separate level.
- The level is to be given a meaningful name (such as sewer mains or street lights) with this name being consistently used for all plans.
- Only information relevant to the level is to be placed on that level.
- Each pipe is to be represented by a single line representing the pipe centreline.



- Each pipe shall run continuously between manholes and be broken at manholes.
- Water mains with bends are to be drawn as one continuous line.
- Pipes are not to be broken at service lines, sump leads or laterals junctions.
- Line work is to be accurately snapped to point features and to be accurately joined at junctions and bends.
- Point assets on water mains, such as valves, hydrants, tees are to be snapped on to the main, not breaking it.
- Manholes are to be located by the point at the centre of the manhole lid. Other surface features such as sumps, valves and hydrants are to be represented by the point at their centre.
- Gravity flow stormwater and sewer pipes are to be numbered in the direction of flow.
- Pressure networks are to be generally numbered in the direction of falling pressure.
- Each point feature and each line end on the plan is to be uniquely numbered with position and descriptive details relevant to each point being attached in a table, as set out in the next section.

(e) Digital Tables

The following tables of information are to be supplied in digital format:

For all facilities:

- Feature number.
- Feature type.
- X, Y, Z co-ordinates.
- Additional information as below.

For underground facilities:

- Depths to manhole inverts and to pipe inverts entering manholes through drop connections.
- Depths of lateral service pipes at property terminations.
- Position of lateral connections relative to property side boundaries.
- Descriptive information. Descriptive information shall include such aspects as material type, pipe class, pipe diameter, manhole diameter, hydrant manufacturer relevant to the type of asset being described and sufficient to **fully specify** what has been installed.

For street-lighting:

- Descriptive information about poles such as make, model, material, height
- Information on the mounting arm or bracket and final mounting height.
- Information on the luminare such as make, model type.

Conventions to be followed in populating the tables with information are:

- The feature number may be any unique whole number allocated by the licensed cadastral surveyor, but the numbers used are to be sequential.
- The feature type is to be the commonly used name such as sump, valve, and manhole with the naming being consistent over the project.
- Co-ordinate positions shall be accurate to within +/-100 mm



- Levels shall be accurate to within +/-20 mm and expressed in terms of mean sea level.
- The local origin of levels shall be recorded.
- Pipe lengths are to be in metres.
- Levels are to be in metres.
- Diameters and other descriptive dimensions are to be in millimetres.

All text in tables is to be in UPPER CASE lettering.

3.15 **CCTV INSPECTIONS**

The Developer shall supply to Council, prior to acceptance of the subdivision CCTV inspection records on DVD for all newly constructed foul sewer and stormwater mains. The closed circuit television (CCTV) inspection shall be carried out in accordance with the "New Zealand Pipe Inspection Manual" Current Edition. A pan and tilt camera shall be used and lateral connections shall be inspected from inside the main. Inspection data shall be provided digitally in a format for capture into Council's Hansen Information Management System (eg Flexidata or similar).

When any defect is identified in the CCTV survey, remedial work shall be carried out to the satisfaction of the Engineer and a further CCTV inspection carried out to confirm correction of the defect.



SECTION 4

ACCEPTANCE

4.1 INTRODUCTION

Acceptance of infrastructure or sign off that it is to an acceptable standard by Council is dependent on compliance with conditions set during the resource and engineering consent process and typically involves various inspections during and after site construction.

4.2 TESTS DURING CONSTRUCTION

- (a) Water main and sewer line pressure tests under the supervision of Council's Water Services Supervisor.
- (b) Soils compaction/density/moisture content tests leading to certification of a soils engineer as to the suitability of the sites for development.
- (c) Road construction material tests.
- (d) Road formation compaction/density/ moisture content tests.
- (e) Trench backfill and compaction.
- (f) Pre-sealing formation inspection by Council's Sealing Supervisor.

All test results are to be reported in terms of the relevant New Zealand Standards and are to be at the Developer's cost.

4.3 TESTS ON COMPLETION OF CONSTRUCTION

- (a) Hydrant flow tests by the Fire Service (or alternative as approved by Council).
- (b) Road seal inspection by Council's nominated sealing supervisor.
- (c) Complete infrastructure inspection by Council's nominated engineer(s).
- (d) CCTV inspection of stormwater and sewer pipe networks.
- (e) Certification by the utility companies that the telephone, power and street lighting systems are in accordance with their standards.

All tests are to be at the Developer's cost.

Specific requirements for each of the above checks are given in the relevant sections of this bylaw.

4.4 COMPLETION DOCUMENTATION

A list of typically required documentation to be submitted by the Developer is included in Section 3.14.



4.5 **MAINTENANCE**

Unless agreed otherwise all infrastructure is to be maintained in good, tidy and operational condition by the Developer for a period of 12 months from the date of the signing of the Section 224 Certificate by Council. However a longer period (for example two years for landscaping) may be required where this is necessary to verify the adequacy of the initial establishment.

4.6 **BONDS**

A bond may be required by Council to ensure maintenance of infrastructure between the time that the Section 224(c) certificate is issued and final takeover of the infrastructure by Council.

A bond equivalent to at least 150% of the assessed value of outstanding works may be required where application is made to issue the Section 224(c) certificate prior to acceptance of all infrastructure.

Generally bond payments will be required in cash. No interest will be paid on these amounts.

A bond document in the name of a surety in lieu of cash payment will be accepted at the sole discretion of Council only if:

- (a) The total contribution amount for whatever purposes (eg reserves, water, sewerage, roading, landscaping or other) exceeds \$20,000 per allotment of the new subdivision, or the total contribution amount exceeds \$100,000 in gross, whichever is the greater.
- (b) The bond amount is increased by an inflation allowance based on a relevant Department of Statistic construction index movement over the last three years and a realistic estimate of the time that the bond will be in place.
- (c) The surety for the bond is in the form of a guarantee from a registered financial business with both the form of guarantee and the guarantor being subject to approval of Council.
- (d) The developer pays all costs in preparing the bond documents and having it checked by Council's solicitor.

Acceptance of a bond is solely at the discretion of Council.

4.7 **LAND TO VEST**

Lands to vest in Council, ie roads and reserves, are to be clearly defined as such on subdivision plans. No land (other than roads) to vest in Council will be accepted unless prior discussion and agreement has been reached with Council staff on the area and proposed purpose for the land.

The names of roads are to be approved by Council and these names shown on all documentation as early as possible.

The widths of road reserves are to be shown.

The area and purpose of reserves are to be shown. A separate title will be required for each reserve to vest in Council.

Formal easements will be required for utility services crossing reserves if:

- The utility is not vested in Council, or
- The reserve is not vested in Council.



SECTION 5

EARTHWORKS

5.1 SCOPE

This section shall apply for any works involving more than 0.6 m depth or 50 m³ of filling or more than 1 m depth of cut.

5.2 RELEVANT LEGISLATION

Sections 106 and 220 of the RMA require Council to ensure that subdivision land is not subject to inundation, erosion, subsidence or slippage.

Section 106 of the RMA requires Council to refuse a subdivision application if the land is not suitable because of any of the above reasons.

The Regional Solid Waste Management Plan sets out rules for the discharge of fill on to the land.

5.3 PERFORMANCE STANDARDS

In undertaking any investigation, design or construction which involves earthworks Council shall require the Developer to conform to the following performance standards:

- (a) Modifications to the existing natural environment are to be minimised or avoided in order to preserve the existing landscape and habitat features as far as practicable.
- (b) The land is to be stable at all times. Compliance with NZS 4431: "Code of Practice for Earthfill for Residential Development" and its associated Standards will be deemed to be a means of compliance with this performance standard (b).
- (c) Modified land within a subdivision is suitable for the purpose for which it will be required without detrimental effects on the users or on adjacent landowners.
- (d) Modifications shall be such that the land can be easily maintained and will be resistant to erosion.

5.4 RESPONSIBILITY FOR EARTHWORKS

Where any proposed subdivision involves the construction of earth fills on any part of a proposed housing lot, then an inspecting engineer shall be engaged to ensure that the earthworks are suitable for their intended use. The inspecting engineer shall specify the relevant compaction standards to be achieved, the test methods, and the construction practices to be used, and shall carry out the following functions:

- (a) Before work commences or during construction, to determine whether further specialist services such as geological or soil engineering services are required to achieve satisfactory performance of the earth fills;
- (b) Before work commences, to prepare or approve the drawings and specification defining the earth fill;
- (c) During construction to ensure that regular inspection is provided. While a daily visit might be regarded as a reasonable minimum during earthwork construction on minor projects, inspection on a near full-time basis is often necessary;



- (d) During construction, to determine the methods and frequency of construction control tests to be carried out, determine the reliability of the testing and to evaluate the significance of test results and of his Inspector's reports in assessing the quality of the finished work;
- (e) On completion, to submit a report as to the compliance of the earthworks with this Standard.

5.5 **SITE INVESTIGATIONS**

Prior to any detailed planning or design, the Inspecting Engineer should undertake a preliminary evaluation of the general nature and character of the site in sufficient detail to determine the likely requirements for earthworks and/or the need for further investigations into the suitability of foundation conditions, and the stability of the natural ground. The preliminary evaluations should be carried out in the context of the total surroundings of the site and should not be influenced by details of land tenure, political or other boundary considerations. In simple cases a visual appraisal may be sufficient. In other cases, depending on the nature of the project, its locality, the history of previous usage, the scale of development proposed and individual site characteristics, soil sampling and testing may be needed.

5.6 **EMBANKMENTS**

Where fill batters:

- (a) Are steeper than 2 horizontal to 1 vertical, or
- (b) Exceed 3 m in height, or
- (c) Are constructed using moisture content susceptible soils, or
- (d) Have features that Council deems to be unusual

a suitably qualified person shall provide a site-specific design (including benching if appropriate) for approval by Council.

The minimum width of bench should be 1.8 metres. Stormwater should be controlled to a point clear of the filling to discharge in such a manner as to prevent erosion. Minimum stability batters produce areas which are difficult to maintain and remain in unsightly condition. Batter slopes of 6 horizontal to 1 vertical are more readily maintained.

The edge of the batter should be generally a minimum of 600 mm behind the kerb or back edge of the footpath. Where topography restricts normal berm width a safety fence will be required for the minimum distance situation.

5.7 **CUTTINGS**

The slope of batter cut will vary from locality to locality dependent upon the type of material to be cut. Slopes steeper than 1 to 1 can be adopted, based upon experience and soil tests, but the more commonly expected maximum slope is 1½ horizontal to 1 vertical.

Where cut batters:

- (a) Are steeper than 2 horizontal to 1 vertical, or
- (b) Exceed 3 m in height, or



- (c) Are constructed using moisture content susceptible soils, or
- (d) Have features that Council deems to be unusual

A suitably qualified person shall provide a site-specific design (including benching if appropriate) for approval by Council.

The minimum width of bench should be 1.8 metres. Stormwater should be controlled to a point clear of the filling to discharge in such a manner as to prevent erosion. Minimum stability batters produce areas which are difficult to maintain and remain in unsightly condition. Batter slopes of 6 horizontal to 1 vertical are more readily maintained.

The distance from kerb face or footpath to toe of cut should be a minimum of 600 mm but this will be permitted only in situations where the full berm width cannot be provided.

5.8 **BULK EARTHWORKS**

Where bulk earthworks are in excess of 500 m³, the Regional Council will require application to be made for resource consent. Drawings as set out in Section 3 of this Bylaw are to be provided in order that the effects of the earthworks may be clearly assessed.

5.9 **BERM SLOPES**

Grassed berms shall be sloped and shaped for easy maintenance. Provision shall be made for maintenance of steep slopes and walls.

Berms shall be formed with at least 75 mm depth of good quality topsoil, fertilised with Nitrophoska 12:10:10 or equivalent at the rate of 20 gm/m² and then sown with a fine fescue/NZ brown top grass seed mix at a minimum rate of 30 gm/m².

Seed shall be raked in and rolled. All areas are to be watered and maintained until a full sward is established.

5.10 **CONSTRUCTION STANDARDS**

Earthworks shall be carried out in compliance with NZS 4431: "Code of Practice for Earthfill for Residential Development" and with the TNZ specification F/1 for earthworks as appropriate.

During construction the Developer will be responsible for:

- (a) Control of dust so as not to cause a nuisance to adjacent landowners and/or occupiers or to existing infrastructure including high voltage electricity transmission lines.
- (b) Control of stormwater to ensure that silt from works under construction is not carried beyond the boundaries of the work site. The Developer will be responsible for constructing and maintaining adequate silt traps until such time as the land is fully stabilised with adequate ground cover.



SECTION 6

ROADING

6.1 SCOPE

This section applies to roads, accessways and rights of way in both urban and rural subdivisions.

6.2 RELEVANT LEGISLATION

Section 108 of the RMA authorises Council to set financial contribution conditions for resource consents.

Rule SUB.3 K3 of the District Plan sets out assessment criteria for considering resource consents involving roading. Section 3.2 of the District Plan sets out a description of the roading hierarchy, policies and rules relating to roading.

6.3 PERFORMANCE STANDARDS

Subdivisional roading shall be designed and constructed so that:

- (a) The general performance standards of Section 1 are met.
- (b) Adequate levels of access, safety and convenience are provided for all road users, including pedestrians, persons with disabilities and cyclists, while ensuring acceptable levels of amenity and protection of the environment from the impact of traffic.
- (c) A distinctive and hierarchical network of roads is provided having regard to the desired servicing levels with clear physical distinctions between each type of road based on road formation, convenience, traffic volumes, vehicle speeds, public safety and amenity.
- (d) The road hierarchy and network provides convenient linkages in a consistent style between different neighbourhoods and commercial areas. The roading network must provide for both vehicle and pedestrian access to adjoining land where deemed necessary by Council. Cul-de-sac construction shall be limited unless pedestrian linkages to other streets are provided at the end of cul-de-sacs.
- (e) Efficient provision is made for all utility services.
- (f) Allowance is made for sufficient width of carriageway and berm to allow roads to perform their designated functions within the road network.
- (g) Adequate provision is made for the planting of trees and shrubs within the road reserve for beautification purposes and for innovative design of parking bays and general streetscape.
- (h) The road geometry provisions are consistent with the needs of the road hierarchy, physical land characteristics, use and safety. Road widths shall be sufficient to cater for ultimate development of the land.
- (i) Roads are constructed to an appropriate strength to enable the carriage of the proposed vehicle numbers and loading at a minimum total cost to the community, both in initial construction and long-term maintenance.
- (j) A pavement edge is provided that is appropriate for the control of vehicle movements, performs any required drainage function and is structurally adequate.



- (k) All regularly used vehicle crossings (eg urban, rural, residential, commercial and industrial) are formed, surfaced and drained to allow safe and effective vehicle access from carriageway to the property boundary and in locations giving visibility equal to the safe stopping distance for the carriageway speed limit.

6.4 **MEANS OF COMPLIANCE**

In general terms compliance with the following design guides will be accepted as the basis for satisfying Council's performance standards. Note, however, that specific conditions in the following clauses of this section may supersede details in the standard guides:

Urban Streets

Austrroads Guide to Traffic Engineering Practice

Rural Roads

Austrroads Guide to the Geometric Design of Rural Roads.

General

SDC Rooding Policy.

6.5 **ROAD NETWORK LAYOUT**

Roads shall be laid out such that:

- (a) The road hierarchy and network provides convenient linkages in a consistent manner between residential neighbourhoods within the District, and the road and pedestrian network provides convenient linkages to activity centres.
- (b) Streets, service lanes and accessways are laid out to fit in with the general rooding requirements of the locality in which they are situated and conform to any provision of the District Plan. The rooding layout must provide for access to adjoining land where deemed necessary by Council.
- (c) Access to and from state highways is limited to arterial routes as agreed with Transit NZ.

6.6 **ROAD RESERVE WIDTHS**

The width of the road reserve shall be as appropriate to comfortably accommodate the carriageway, turning circles, parking lanes or parking bays, footpaths (if applicable) services and street-scaping.

Minimum road reserve widths shall be as shown in Table 6.1 attached.

6.7 **ROAD NAMES**

Developers are encouraged to suggest names for new roads. However all names for new roads, including named private ways, are to be approved by Council before sealing of the title plan for the subdivision. Names must comply with the New Zealand Geographic Board's rules. Road names should be short (25 characters or less), not hyphenated or multiple words, readily pronounced and spelt and not resemble other existing names (including geographic feature names) in either spelling or pronunciation.

A road name will be required for every private access lane servicing more than eight properties, in order to facilitate easy property addressing.

TABLE 6.1 – ROAD WIDTHS AND LAYOUT

Street Type	Traffic (AADT) or length (m)	Units Served (Indicative only)	Parking Lanes (m)	Traffic Lanes (m)	Carriageway Width (m)+	Kerb Type	Formed Shoulder Width (m)	Footpaths No. x m	Minimum Reserve Width (m)
Commercial/Industrial									
Arterial	>500		2 x 2.5	2 x 3	11	Vert		2 x 1.4	20
Collector	100 - 500		2 x 2.5	2 x 3	11	Vert/mountable		2 x 1.4	20
Local	<100		2 x 2.5	1 x 3	8	Vert/mountable		2 x 1.4	17
Urban/Residential									
Arterial	800	> 100	2 x 2.5	2 x 3	11	Vert		2 x 1.4	20
Collector	<800	21 - 100	2 x 2.5	1 x 3	8	Vert/mountable		2 x 1.4	20
Local	400	50 max	2 x 2.5	1 x 3	8	Vert/mountable		2 x 1.4	20
Cul-de-sac / ROW		20 max	1 x 2.5	1 x 3.5	6*	Mountable		1 x 1.4	15
Private ROW		7 to 12		1 x 5	5	Mountable		Nil	6
Private ROW		up to 6		1 x 3.5	3.5	Mountable		Nil	5
Rural/Lifestyle									
Local		<100			6*	**	1	1 x 1.4 ***	20
Long cul-de-sac	<200 m long	10-20 max			5.5*	**	1	1 x 0.9 ***	15
Short cul-de-sac	<100 m long	<5			5	**	0.75	Nil	12
Private ROW		up to 5		3	4	Nil	0.5	Nil	6

* **Note** Passing bays (6 m carriageway width) are required at 100 m spacings (nominal).

** **Note** Kerb and channel may be required for scour protection. See Clause 6.13.

*** **Note** - Footpaths may not be required in rural and rural /residential situations

+ **Note** Carriageway width is defined as kerb face to kerb face in urban situations.

This table is to be used as a guide only and will be subject to particular requirements of the Engineer for each situation.



6.8 **CARRIAGEWAY WIDTHS**

Carriageways shall be of sufficient width to accommodate forecast traffic loads, parking lanes, cycle lanes, parking bays, and turning movements as applicable.

Minimum widths shall be as in Table 6.1 attached. However greater widths may be required by the Engineer to address demand drivers such as:

- Potential frequent use by commercial vehicles
- Potential frequent use of roads by vehicles towing boat trailers
- Compatibility with existing road widths in the community.

6.9 **CARRIAGEWAY SURFACING**

Unless specified otherwise, all roads within township areas shall be finished with a sealed surface constructed from approved materials such as chip seal, asphalt, paving blocks etc.

The carriageway of roads in rural lifestyle blocks shall be sealed if:

- (a) The subdivision is immediately adjacent to an existing developed urban resource area and has the potential to create a dust nuisance.
- (b) The longitudinal grade on roading is greater than 8% or scour is likely to be a problem because of the nature of the ground or of the construction materials.
- (c) The number of allotments serviced by the road is greater than 10.

Council may also require the carriageway to be sealed if there is a strong possibility that the number of allotments serviced will exceed 10 through further subdivision within 10 years.

Council may waive sealing if the road servicing the development adjoins an existing unsealed road.

6.10 **WIDTHS OF SHOULDERS**

In rural situations where kerbs and channels are not provided, formed shoulders to the widths of Table 6.1 shall be provided.

6.11 **TURNING CIRCLES**

The heads of cul-de-sacs in residential areas shall incorporate a minimum 19.0 m diameter turning circle with heavy duty footpath, skerb and channel constructed to give additional turning capacity for large trucks. In commercial and industrial areas the diameter shall be increased to 30 m. Alternate turning provisions using T, L or Y shaped heads may be accepted for short cul-de-sacs servicing less than five residential properties. Such turning heads shall be sized to accommodate 90 percentile light commercial vehicles.

6.12 **SERVICES POSITIONING**

Unless dictated by other constraints, underground services shall be installed as set out in Section 7 and the standard drawing, SO1. A minimum berm width of 1800 mm is required in all streets for service layout with all power, telephone and water services laid between the back of the footpath and the property's boundary. Council sewer and stormwater services will normally be laid beneath the carriageway.



6.13 PROVISION FOR LANDSCAPE PLANTING

5 m² for every potential lot (based on minimum permitted lot sizes) shall be set aside within the road reserve for the purpose of landscaping and street tree planting. Such areas are to be planted and landscaped and are to be spread evenly throughout the street to provide aesthetically pleasing areas, and each such area must be able to contain a 3 m diameter circle and be free from utility services.

Landscape plans shall be submitted for approval prior to any planting taking place.

Proposals for roadside planting shall take into consideration Council s Roading Policy: Road Margin Planting.

In assessing whether to approve any existing or proposed planting application the following principles will be considered:

- (a) Safety Issues
 - shading of the road
 - sight distances at intersections
 - entrances and curves
 - clarification of road definitions
 - shade light effect of the planting
 - frost shading
 - clearance to high voltage power lines
- (b) Asset Preservation
 - water channel and drain integrity
 - seal and road surface integrity
- (c) Utility Protection
 - water, wastewater, telephone
 - stormwater, tile drainage, power and telephone
 - high voltage power lines
- (d) Equity Issue
 - fair approach to existing and new planting proposals.

6.14 STREETSCAPING

While considering the **minimum** requirements of the previous clauses and the required performance standards, Developers are encouraged to promote innovative streetscapes which blend all of the infrastructure elements into harmonious and pleasing designs.

Street designs should consider the use of such features as carriageway meanders, parking bays rather than parking lanes, special landscaping, different surface colourings, speed reduction features and roundabouts where appropriate.

6.15 KERBS AND CHANNELS

Kerbs and channels shall be provided in all subdivisions except where:

- (a) the Developer can demonstrate the viability of alternative systems, or
- (b) the average allotment size for the subdivision is at least one hectare.

Kerbs and channels may be required where road gradients and natural ground material are such that artificial drainage methods are required to prevent scour.



The minimum longitudinal grade on channels shall be 1 in 300.

Mountable kerbs may be used in all cul-de-sacs and may also be used in other lightly trafficked areas. Channels may be omitted on the high side of carriageways with one way crossfall, but the edge of the seal must still be protected by a concrete keeper strip of kerb.

Kerbs and channels including dish channels, shall be of the profiles shown in standard drawing R02 and shall be generally constructed from concrete with a minimum 17.5 MPa strength unless approved otherwise. Slip-formed concrete may require higher strengths for operational requirements. Shrinkage control gaps shall be constructed at maximum 4 m centres.

Concrete kerbs and channels shall generally not be required for rural lifestyle blocks unless needed to prevent scour or where the subdivision is immediately adjacent to an urban resource area with existing kerb and channel.

Where footpaths are used to provide additional turning area at the head of cul-de-sacs, the kerb and channel shall be constructed to a heavy duty standard in accordance with standard drawing R02.

6.16 **DISH CHANNELS**

Dish channels shall be provided:

- (a) At the base of batters where ground water seepage is likely to be a hazard to pedestrians or vehicles.
- (b) Where ground levels are such that it is not possible to construct berm and footpath falls to the kerb and channel.

Dish channels shall be constructed to the same performance standards as kerbs and channels.

6.17 **FOOTPATHS**

Footpaths may be required on one or both sides of the carriageway at Council's discretion. Generally footpaths shall be provided where potentially more than eight households will be serviced. (Refer Table 6.1).

The width of footpaths shall be appropriate to the expected foot traffic, with guidelines as follows:

- Generally double lane foot traffic - 1,400 mm minimum.
- Adjacent to schools, shops, halls and other crowd generators - four lane foot traffic - 2.8 - 3.5 m minimum width.
- As per Section 14 for walkways and cycleways.

In all cul-de-sacs or other roads with a reserve width of 15 m or less, footpaths shall preferably be located immediately behind the kerbs. In other locations a grass berm may separate the footpath and the kerb.

Footpath construction shall consist of:

- 100 mm depth of 17.5 MPa concrete on a compacted subbase of AP20 crushed gravel at least 75 mm deep, with control joints generally at 4 m centres and 3 m centres around curves.



- 25 mm depth of M10 asphalt on a compacted subbase of AP40 crushed gravel at least 150 mm deep, with 100 30 tanalised timber edgings held in place by 50 x 50 x 400 mm pegs @ 750 mm centres, or
- 60 mm depth of 50 MPa interlocking paving blocks on 30 mm of sand on a compacted subbase of AP40 crushed gravel at least 150 mm deep with 100 x 200 mm cast insitu concrete edgings.

The choice of surface finish shall be to Council's approval with a general guideline being that the finish should match with adjacent footpath finishes.

All footpaths shall be constructed on a prepared subgrade stripped of all topsoil and organic matter and having a minimum CBR test value of 5 (allowable bearing pressure of approximately 80 kPa).

Where a footpath is constructed around the head of a cul-de-sac turning head the depth of construction shall be increased to accommodate wheel loads from turning trucks as follows:

125 concrete reinforced with 665 mesh.

50mm of asphaltic concrete on 300mm depth of AP 40 crushed compacted gravel

80 mm paving blocks on 30mm of sand on 250mm of AP 40 with 150 x 250mm concrete edgings.

6.18 **CYCLEWAYS**

Where required by Council, cycleways shall be provided, either separately or in conjunction with footpaths. Cycleways shall have a minimum width of 1.4 m.

Joint footpath/cycleways shall have a minimum width of 2.5 m. Unless agreed otherwise the surfacing requirements for cycleways shall be the same as for footpaths.

6.19 **PRAM/WHEELCHAIR CROSSINGS**

Pram crossings shall be provided in the kerb line at all road intersections.

Pram crossings shall preferably be located immediately "downstream" of a sump or at the high spot in the kerb and channel so that there is a minimum flow of water in the channel past the crossing. The grade on pram crossings shall not exceed 1 in 8 but shall preferably be no more than 1 in 12.

The surface of crossings shall include an insert at least 1,200 x 600 mm in a tactile non-slip finish to alert visually impaired persons of its presence.

6.20 **VEHICULAR CROSSINGS**

Vehicle crossings shall be provided as follows:

- At the entrance to all strips to rear lots, private ways and service lanes, existing houses, commercial and industrial entrances and all frequently used entrances.
- For each front lot where the location of the crossing can be determined reasonably from the contour of the section.



There shall be three types of crossings - Residential, Commercial and Industrial, or Rural, with following plan dimensions:

	Residential	Commercial (single)	Commercial Industrial (double lane)	Rural (Farming) Fronting Arterial Routes	Rural (Farming) Fronting Collector and Local Roads
Width (m) at property boundary	2.5	3.5	6.0	Refer to Drawings R09 - 1, 2, 3	
Width (m) at kerb line or edge of seal	3.5	7.0	9.5		

(a) Residential

Residential crossings shall be of 100 mm thick concrete reinforced with central 665 mesh on a compacted subgrade. Where however, a concrete footpath is already in position (not adjacent to the kerb line) and there is no evidence of damage due to traffic, then the footpath may be left in place and incorporated as part of the crossing.

See standard drawing R03.

(b) Commercial and Industrial

Crossings shall be provided in all commercial and industrial areas, and as crossings to all private ways and service lanes. Construction shall be 150 mm thick concrete reinforced with one layer of 665 mesh placed centrally. Channels across the mouth of commercial/industrial crossings shall incorporate two D12 reinforcing bars full length.

Alternative vehicle crossing designs for residential, commercial and industrial areas using hotmix may be used subject to specific approval.

See standard drawing R04.

(c) Rural

Rural crossings shall be constructed with an appropriate depth of compacted hardfill. For typical situations the accepted depth is 250 mm, but this should be varied to suit local ground conditions and actual truck loading.

The primary purpose of rural crossings is to protect the edge of existing seal. The crossing must therefore be formed to cover the anticipated or (in the case of existing unsealed crossings) the existing swept vehicle area, with the full area of vehicle exit and entry from the carriageway to the legal boundary being covered. The design shall be in accordance with Council's Roading Policy and the Austroads Guidelines for Visibility at Driveways.

Localised road widening or slip lanes may be required where road conditions and traffic use warrant this.

Where the crossings are on to roads classified as arterial or collector routes in Council's District Plan, localised road widening may be required by the Engineer.

If the road is sealed Council may also require the rural crossing to be sealed if:

- (a) The transport of gravel out on to the carriageway is likely to cause a safety hazard, or



- (b) The speed environment is such that the safety of users exiting from the crossing would be improved by sealing the crossing.

Rural crossings shall be culverted as necessary. The minimum culvert shall be the greater of 200 mm diameter or a size sufficient to accommodate 75% of the cross-sectional area of the adjacent open water channel.

Culverts shall extend a minimum of 1 m beyond the edges of the crossing.

See standard drawings R09-1,2,3.

Crossings shall be installed at the time of subdivision wherever possible when the likely position of the crossing can reasonably be ascertained.

Where the position cannot be ascertained Council will require an application to form a crossing to be completed by the new owner and the payment of the prescribed fees as set out in Council's Schedule of Fees. Council's policy is that generally construction of a new crossing may be undertaken by any reputable contractor experienced in this work provided the work is to Council's standards.

6.21 ALLOTMENT ACCESS

Council may require that access on common lots (rights of way) be formed at the time of subdivision if:

- (a) The topography is such that subsequent construction may affect adjacent land.
- (b) Particular drainage or retaining measures are required to protect adjacent land.
- (c) The special features of the site or the number of lots serviced by the access may lead to conflict between adjacent landowners in the future.

Where the access is required to be formed, its standard shall be appropriate for the intended usage and shall comply with standards set out in this Bylaw.

6.22 GEOMETRIC DESIGN

Geometric design of roads shall be appropriate for the expected traffic volumes and the design speeds.

In general, the following shall be accepted as suitable design guides:

Urban Streets

Austrroads Guide to Traffic Engineering Practice

Rural Roads

Austrroads Guide to the Geometric Design of Rural Roads

These general design guides shall be interpreted in conjunction with subsections as below:

- (a) Design Speeds

All roads in the 50 km/hr zone urban areas shall be designed for safe traffic movements at 50 km/hr:

Roads in rural areas shall be designed for:

- (i) Arterials and Collectors - 100 km/hr
- (ii) Local through roads - 100 km/hr



(iii) Local rural subdivision roads - 60 km/hr

(b) Longitudinal Gradients

Residential streets shall not be steeper than 12.5% without specific approval. Arterial roads and major collectors carrying significant volumes of public transport or heavy vehicles shall not be steeper than 8%.

(c) Grades at Intersections

Centreline grades at major intersections should be kept below 3% wherever possible. At an intersection of two streets of differing classifications, the grade of the street having the higher classification should be carried through the intersection, adjusting the grades of the lower classified street accordingly.

Generally the centreline grade of the lower classified street should intersect the crossfall of the main street at the following distances from the main road centreline:

Main Road Carriageway Width (m)	Offset from main centreline to intersection point (m)
13.0	3.5
11.0	3.0
8.5	2.5

(d) Vertical Curves

Vertical curves shall be designed for a minimum speed value of 50 km/hr and a minimum sight distance of 60 m. In areas that may have a higher speed value in the future, the minimum speed value and sight distance shall be determined by the Engineer.

(e) Horizontal Curves

Curves in 50 km/hr areas may be circular with a minimum radius of 50 m on the centreline. In areas that have or may have a higher speed limit in the future, the Engineer will require transition curves with a specified speed value. Transition curves shall be computed in accordance with a recognised method with a balance of spiral length to circular arc of between 1: 1.5: 1 and 1:2:1 and with a maximum rate of rotation of 0.025 m/m/sec.

At intersections the kerb line shall have a minimum radius of 9 m except at major intersections where the Engineer may require a larger radius.



(f) Superelevation

Superelevation is not necessary in 50 km/hr zones, or areas that in the opinion of the Engineer, are likely to become 50 km/hr zones. Superelevation may however be employed where it suits boundary levels up to the allowable design maximum crossfall. All curves in areas with an actual or potential greater than 50 km/hr speed value shall require superelevation to match the 85 percentile speed value unless otherwise agreed with the Engineer. Certain main routes may in the future have an increased speed limit. If this development is a possibility the Engineer may require superelevation to be constructed to a speed value nominated at the time of the request. In any circumstances the maximum crossfall should not exceed 10% where uniform crossfall is developed.

(g) Extra Widening

Widening is not required on circular curves.

Extra widening on curves is not normally required where the centreline radius exceeds 60 m.

Where curves of less than 50 m are necessary for topographical or other reasons extra widening of between 0.5 m and 1.5 m may be applied according to the width of carriageway normally available to moving traffic, the radius of curvature and to the traffic function of the street. Should it be necessary to preserve a minimum berm width extra widening shall be applied to the street reserve also.

(h) Crossfall On Carriageway

Normal crossfall of 3% in both directions from the crown shall be developed on all standard seated carriageways. However, in exceptional circumstances this requirement may be waived with special approval, but in no case shall be less than 2.5% or greater than 5% from the crown coupled with a lateral shift in the crown of up to one quarter of the road width. Where a uniform crossfall is developed from kerb to kerb this shall not exceed 2% unless on a curve where superelevation may be permitted.

In rural situations with gravelled carriageways normal crossfall shall be 6% in both directions from the crown.

(i) Grading Of Kerb Lines

Generally kerbs will be at the same level on both sides of the street. However, in special circumstances the left-hand and right-hand kerb line may be better graded individually in conjunction with centreline levels, footpath levels and boundary levels. Under such circumstances at a given cross-section the left-hand and right-hand kerbs may differ from each other in level provided the following standard design tolerances are not exceeded:



Width of Carriageway (m)	Maximum Difference in Kerb Level (mm)
7.5	140
8.0	150
8.5	160
11.0	175
13.0	200

In order to achieve a satisfactory design, it will often be necessary to plot existing centreline and boundary levels as long sections on a separate design sheet, at a vertical scale of 1:20 and a longitudinal scale of 1:200.

Trial design centrelines and kerb lines should then be plotted and examined in relation to existing boundary and centrelines, and existing fixed features such as driveways etc. Where necessary, modifications of design lines shall be made to reach a compromise solution matched as closely as possible to all existing features.

Grading shall then be checked visually and if necessary “smoothed” out before final kerb and centreline levels are computed.

The minimum grade of kerb and channel shall be 0.33% or 1 in 300.

(j) Intervisibility At Intersections

Where a local residential street meets a principal street or local distributor, adequate sight distance both up and down the major route is to be provided to enable traffic to emerge safely from the side street. Sight distances shall be determined in accordance with the Austroads Design Manual.

6.23 **FORMATION DESIGN AND CONSTRUCTION**

The formation shall be designed and constructed in accordance with accepted engineering practice for a design life of at least 25 years.

The materials used and procedures employed shall be in accordance with Transit New Zealand guidelines in order to meet Council’s performance criteria. Crushed basecourse aggregate shall be to TNZ M4 standard unless otherwise approved by the Engineer.

Construction shall aim for the proportions of the maximum dry density (MDD) at the optimum moisture content (OMC) as specified in TNZ B2:1997.

The following performance measures may be employed:

- (a) Densities shall be within 2% of the plateau density as measured by the nuclear density meter (NDM).



- (b) Benkleman Beam deflection tests which do not exceed the following standards.
 - Not more than 5% of the tests shall exceed the maximum as follows:

Road Type	Maximum permitted deflection (mm)
Urban - Arterial	0.75
Collector	0.75
Local	1.00
Rural - Arterial	1.50
Collector	2.00
Local	2.50

- No single result shall exceed the maximum allowable by more than 40%.
- No two adjacent readings shall vary from each other by more than 20% of the maximum allowable value given above.

- (c) Other methods approved by the Engineer.

Provided that the tests are satisfactory, the Engineer shall give authority in writing for the specified form of surfacing to proceed.

If the section of road fails to achieve the required standard, the Developer shall arrange for the carrying out of such remedial work as may be necessary to achieve the required standard and subsequent retesting.

Prior to sealing sufficient traffic or passes of a pneumatic-tyred roller shall pass over the roadway (covered by a layer of running course) to produce a suitable surface for sealing.

This surface shall:

- Have a uniform, dense, stable surface free from contaminants, excess crusher dust and other blinding material.
- Be at the optimum moisture content.
- Have a mosaic texture when broomed which is sufficiently stable that it does not scour during the brooming operation.
- Be fully cured.
- Be within +0, -5 mm of design level for chip seal surfacing and within +5, - 5 mm of design level for asphaltic surfacing at bound edges.
- have no deviation exceeding 10mm on a 3m straight edge at other locations and be such that there are no sudden changes or areas of where water ponding may occur.

6.24 SURFACE DESIGN AND CONSTRUCTION

Roading materials and construction methods shall be sufficient to give at least the minimum design lives set out in Section 1.



Acceptable solutions are:

(a) Chip Seal

Two coat bitumen chip seal using grades 3 and 5 chips (TNZ:M6) and 180/200 penetration grade bitumen (TNZ:M1) in accordance with TNZ Specifications P3 and P4.

(b) Asphaltic Concrete

Asphaltic concrete of at least 25 mm, but subject to specific design, may be used as an alternative to chip sealing.

The asphaltic concrete shall comply with TNZ Specifications M10 and P9.

(c) Interlocking Paving Blocks

Interlocking paving blocks may be used on cul-de-sacs or wherever traffic speeds are generally less than 50 km/hr so that the tyre noise does not become obtrusive.

Blocks shall be manufactured in accordance with NZS 3116 and shall be of minimum 50 MPa crushing strength and minimum 80 mm thickness. The blocks shall be laid in a herringbone pattern. The road design and block abrasion resistance shall be approved by the Engineer.

(d) Other Surfaces

Acceptance of other surfacing shall be subject to provision of information to prove the strength, reliability and durability of the materials to the satisfaction of the Engineer.



SECTION 7

INSTALLATION OF UTILITIES

7.1 SCOPE

This section applies to all underground and overhead services; ie power, telephone, gas, water, wastewater and stormwater.

Where relevant this section is to also be read in conjunction with Section 8 - Piped Utilities and Section 12 - Cabled Utilities.

7.2 PERFORMANCE STANDARDS

The installation of utilities shall be carried out in such a manner that:

- (a) The general performance standards of Section 1 are met.
- (b) Existing utility services are extended and upgraded where necessary to permit connection at each new property and also to allow for future development in the area.
- (c) Where one or more of the utility services are not available, that the subdivision is able to sustain the lack of the particular service in its own right.
- (d) Utility services are located within road reserves unless agreed otherwise and parallel to common property boundaries wherever practically possible.
- (e) Utility services within road reserves are provided at the designated locations and depths wherever possible.
- (f) Utility services are provided in a manner which can be economically maintained over their design life.

7.3 POSITIONING OF UTILITIES

Wherever possible utilities are to be laid in the street reserve at the positions as shown on the Standard Drawing S01.

In general terms these positions shall be as follows:

Power	- 700 mm from property boundary
Telecommunications	- 1,000 mm from boundary
Water	- between telecommunications and back of footpath
Wastewater/Stormwater/Gas	- 1,000 - 2,000 mm outside face of channel.

There shall be a minimum horizontal clearance of 500 mm between pipes and between pipes and cables.

The position of all utilities is to be marked by laying appropriate detector tape in the backfill above the utility.

Utilities shall generally be aligned parallel with the road network. However their alignment may deviate from the standard parallel alignment provided there is no interference with other services and the pipes are still fully located in the road reserve.



Where there is no alternative Council utilities may be located on private property in areas which will not reduce the building area available on the lot (that is, within the front, side or rear yard areas). Pipelines shall be located not closer than 1.5 m plus one half the depth to invert from any building, or structure.

Where a Council utility or utility structure is laid within private property, it shall be protected by an easement in favour of Council and of sufficient width to allow practical access for maintenance. Such access shall be not less than 4.0 m wide nor less than the sum of 0.6 m plus the pipe diameter plus the depth to invert.

Non-Council utilities shall not be installed within private property or on Council reserves without the express approval of the Engineer. In such situations an accurate as-built plan as well as appropriate easement documents will be required.

Power transformers and local area telephone terminals shall be located on their own separate allotment or widened portion of road reserve if they cannot be safely and conveniently placed within the clear width of the berm.

Gas distribution networks shall be designed and installed in accordance with NZS 528:2003.

7.4 POSITIONING OF LATERAL CONNECTIONS

Wherever possible connections shall be made at the following positions on the road frontage of each property:

- Power and Telephone - immediately adjacent to side boundary
- Stormwater - 1 m from lower elevation side boundary
- Sewer - 1.5 m from lower elevation side boundary
- Water - centre of road frontage
- Gas - centre of road frontage

All piped connections shall extend to 0.5 m inside the property boundary.

The depth of connection at the property frontage shall be:

- Power and Telephone - minimum 600 mm cover, if installed
- Stormwater and Sewer - minimum 750 mm cover, preferred depth 900 mm cover, but sufficient to service all future building connections at grades set out in the Building Code
- Water - 450 mm cover
- Gas - Minimum 450 cover (low pressure)
- Minimum 600 cover (intermediate pressure)

The position of stormwater and sewer laterals shall be shown by incorporating a vertical riser on the service line and extending to 200 mm above ground level. The top of the riser shall be securely capped. Sewer laterals are to be painted red to clearly distinguish them from storm laterals.

Water connections shall include a toby valve clearly marked with a cover.

See standard drawing W06.



7.5 **STATUS OF LATERALS**

All services within the boundaries of the road reserve shall be property of Council or other utility company once formally taken over by that organisation.

Unless specifically arranged otherwise and protected by an easement, services through privately owned allotments shall be the responsibility of the landowner.

Accordingly, in the construction of new services to rear allotments, Council's policy is as follows:

- (a) A separate connection to be provided to each allotment wherever possible.
- (b) Where various allotments are serviced by a common right of way or access lot, a public drain is to be constructed along the right of way. The public drain is to be constructed to Council's standards with manholes at each end (or manhole and cleaning eye where permitted by the Engineer) and maintenance access for Council is to be provided via a registered easement in gross.
- (c) Where a separate connection is not possible or not easily achievable, then a drain in common may be constructed provided that:
 - (i) All of the affected landowners are in agreement with this option.
 - (ii) The common drain is to be registered against the affected titles.
 - (iii) No more than seven lots are to be serviced by any one common private drain.
- (d) The costs of registering easements and agreements against titles shall be borne by the Developer.

In the case of common sewers or storm drains, Council will require manholes at each end of the service, or one manhole and one cleaning eye depending on the length, in order to maintain the line and remedy any blockage. In the case of common water supplies Council will require the installation of appropriate valving in order to isolate the supply.

7.6 **TRENCHING**

Before any excavation is commenced in a road or public area an application shall be made to Council for a road opening permit in accordance with Council's Trenching Bylaw 2002. In all cases the position and depth of all existing underground services in the locality, including telephone and electric power cables shall be ascertained from the appropriate authority as accurately as possible. All necessary steps shall be taken to prevent damage to or accident arising from interference with such services. Any leaks or fractures discovered or damage caused shall be reported immediately to the authority concerned.

Trenching shall be carried out in accordance with any conditions set in the Road Opening Permit and in such a manner that adjacent ground stability is maintained and there is no danger to the public.

The minimum width of the trench should be such that the barrel of the pipe is not closer than 150 mm to the trench wall, or to timbering.

Not more than 120 m of trench should be open at any one time.

If road material is to be reused, care shall be taken to prevent it being mixed with soil.

In fine-grained soil (clay, silt or fine sand) good drainage of the trench floor shall be ensured and ponding and flooding avoided at all stages. It is essential to prevent disturbance of softening of fine-grained soils on the trench floor. This is achieved firstly by proper drainage and then by placing a layer of granular bedding material on the undisturbed formation as soon as it is uncovered and before commencement of laying. Soft spots should be hardened to the general condition of the bottom by tamping in extra granular bedding material.



Large areas of soft foundation material shall be stabilised so that movement of the trench bottom will not occur after the trench has been backfilled. This can be accomplished by over-excavating and replacing the excavated material with compacted granular material similar to that used in road foundations, or by the use of ground stabilisation fabric.

The depth of compacted granular material shall be varied in accordance with the softness of the foundation material, but should not be excessive. A depth of 500 mm should not normally be exceeded.

7.7 **STEEP TRENCHES**

Where the longitudinal slope of the base of the trench is 1 in 8 or greater, anti-scour blocks shall be provided. These anti-scour blocks shall be:

- (a) Constructed from 150 mm thick concrete (17.5 MPa) up to pipe diameters of 300 mm and 300 mm thick concrete for diameters greater than 300 mm.
- (b) Keyed into the sides and floor of the trench by 150 mm.
- (c) Extended to 300 mm above the drain or to ground level where the drain cover is less than 300 mm, and
- (d) Spaced at:
 - (i) 7.5 m centres for trench slopes between 1 in 8 and 1 in 5, or
 - (ii) 5.0 m centres for trench slopes greater than 1 in 5.

Note: The anti-scour blocks partition off the trench and prevent ground or surface water running along the trench and causing scouring.

7.8 **EXCAVATION BELOW WATER**

Should water appear in excavations, it shall be kept down below the level of the joints and bedding by the appropriate means of either a side channel and pumping, or well pointing.

All wells or sumps shall be sunk and pumps fixed so as not to interfere with the work of bedding, laying and jointing of the pipe.

7.9 **BACKFILLING**

Backfilling shall be carried out in such a way as to:

- (a) Give even support to the sides of the pipe and not cause any deformation or pipe offset.
- (b) Not settle, shrink or expand differently to the ground each side of the trench.
- (c) Give full support equivalent to the adjacent ground and to reinstated surfacings.

In order to achieve these standards it is expected that in general:

- (a) Care must be given to dewatering trenches before backfill.
- (b) The utility is bedded on sand or fine chip with particle size in the range 5 mm to 10 mm. For pipes the bedding shall extend one quarter of the pipe diameter above the base of the pipe.



- (c) Selected backfill with particle size in the range 5 mm to 20 mm, free from organic material, lumps and stones larger than 40 mm be carefully placed around the utilities and compacted by hand in layers not exceeding 150 mm thick, until the backfill is 150 mm above the crown of the utility.
- (d) The bulk backfill be spread and compacted in layers suitable for the method of compaction, but generally no more than 300 mm deep
- (e) Any temporary trench timbering be withdrawn as the backfilling proceeds.
- (f) No backfilling shall be compacted to a lesser standard than the undisturbed ground immediately adjacent to the trench.
- (g) Reinstatement of the ground surface shall be to a high standard and slumping of any trench will not be tolerated. Council may specify asphalt reinstatement where trenches cross existing sealed carriageways.

The performance standards for backfilling are as follows:

- (a) The minimum density is 2,200 kg/m³ in road reserve and 2,100 kg/m² elsewhere, or 95% maximum clay density as measured by laboratory test.
- (b) Density tests are carried out at sufficient frequency to verify the standard of compaction.
- (c) There is no discernible or measurable surface depression on the reinstated trench over a 12 month period.



SECTION 8

PIPED UTILITIES

8.1 SCOPE

This section applies to underground piped utilities such as water, stormwater, wastewater, gas and fuel pipes and is to be read in conjunction with Section 7 - Installation of Utilities.

8.2 PERFORMANCE STANDARDS

Piped utilities shall be designed and constructed so that:

- (a) The general performance standards of Section 1 are met for components maintained by Council.
- (b) Stormwater and wastewater systems are positioned at such a depth so as to be able to service all potential building sites.

Compliance with NZS 2566, Installation of Buried Flexible Pipelines will be accepted as a means of compliance for stormwater and wastewater systems.

8.3 PIPES

Pipes shall be appropriate for the intended use and suitable to enable the piped networks meet the performance standards. The more common types of pipes which are acceptable are as follows:

PVC Gravity Pipes

Stormwater pipes and wastewater pipes shall comply with NZS 1260: PVC Pipes and Fittings or NZS 7649: Unplasticised PVC Pipes and Fittings.

PVC Pressure Pipes

Shall comply with NZS 1477 (Supersedes NZS 7648).

HDPE/MDPE Pipes

All materials supplied shall be in accordance with NZS 7604:1981, AS/NZS 4129 and 4130 and be purchased from an approved supplier.

Solvent cement jointed pipes shall **not** be permitted.

Rubber Rings for Pipe Joints

(Excluding ductile iron pipes) shall comply in every respect with BS 2494:1976 and amendments. Rings of any one size delivered to the site shall have been moulded at the same factory. Only an approved water soluble lubricant shall be used for jointing pipes. Mineral based grease shall not be used.



Concrete Pipes

Both reinforced and unreinforced concrete pipes shall comply with NZS 3107.

Other more specialised pipes and pipe fittings shall comply with the relevant standards, but shall be used only with the approval of the Engineer.

Pipe classes shall be as follows:

- Storm and sewer gravity pipes - SN4, SN6 for \leq 150 mm diameter
- Sewer pressure mains - PN6 except where high operating pressures require PN9
- Water mains - PN12

In carriageways the bedding is to be compacted to a minimum of 150 mm above the pipe.

8.4 PIPE GRADES

Pipes shall be laid so that their minimum half-full velocity is 0.8 m/sec if possible and no less than 0.6 m/sec, so that self-cleansing is achieved. Unless specially designed and approved by the Engineer, minimum pipe gradients shall be as follows:

Pipe Diameter (mm)	Minimum Gradients	
	Desirable	Absolute Minimum
100	1 in 75	1 in 120
150	1 in 130	1 in 200
200	1 in 170	1 in 300
225	1 in 225	1 in 350
300	1 in 325	1 in 500

8.5 PIPE BEDDING

Bedding for pipes shall be adequate to enable the pipe to function efficiently without damage for its full design life (typically 80 years), taking into consideration the nature of the surrounding ground, the backfill materials and superimposed loads.

Unless specific design is required to achieve the above, all pipe bedding for stormwater and wastewater pipes shall be equivalent to Type B NZS 2566, ie:

(a) In Earth Trenches

Compacted granular materials with a minimum depth of 100 mm under the pipe and launched around the sides of the pipe up to one quarter of the diameter.

(b) In Rock or Rocky Soil Trenches

Compacted granular materials with a minimum depth of 200 mm under the pipe and launched around the sides of the pipe up to one quarter of the diameter.

The granular bedding material shall comply with the requirements of NZS 2566. The maximum particle size shall not exceed 10 mm.



Water main pipes shall be bedded on suitable fine granular material, either natural (for example fine damp clay chippings) or imported. All water mains under carriageway shall have sand or fine granular bedding and surround. The requirement for bedding and surrounding of uPVC pipe is set out in NZS 7643.

The same bedding and surround shall also be used in rock country or where the trenching has brought out hard lumpy clay. There shall be no sharp stones or large clay lumps in the bedding or surround. Each pipe shall be laid so that the barrel of the pipe is supported for 60 to 90° of its circumference along its entire length. The bottom of the trench shall be cut out to sufficient size to permit jointing of the pipes, and all pipes shall be supported upon their barrels only.

Where unstable or unsuitable material is encountered in the bottom of the trench prior to pipe laying the material shall be undercut either until suitable material is reached or until the Engineer considers a suitable foundation can be achieved.

Care shall be taken to ensure that the pipe is supported continuously along the barrel and not on the socket: a chase shall be excavated in the bedding to accommodate any socket or fitting.

Haunching of the surround to half barrel height shall be carried out and compacted after the pipe has been laid on the bedding and inspected and approved by the Engineer. The bedding material, except when otherwise directed, shall be used for the haunching which shall be well compacted by hand tamping in layers not exceeding 150 mm. Material at the sides of the pipes shall be compacted to 80% of the optimum density before placing excavated or imported materials over the pipe.

8.6 **PIPE LAYING**

All pipes shall be laid by a Registered Drainlayer unless otherwise approved by Council. The requirements of Section 7 relating to trenching and backfill shall be noted.

Pipes shall be laid commencing from the downstream end, with collars pointing upstream. Pipes shall be laid on their barrels with no load bearing on the collar. Each pipe shall be individually and accurately positioned true to line and grade. The maximum tolerance level for line or level is 5% of the nominal pipe diameter with no sudden changes.

Pipes may be laid in smooth curves provided that the manufacturer's recommended maximum deflection angle is not exceeded. Where greater curvature is required, fabricated bends shall be used. Such fabricated bends shall be separated by at least one full pipe length. Laying of uPVC pipe shall comply with NZS 7643:1979 and NZS 4451:1986 and AS/NZS 2566. The deflection of rubber-ring jointed uPVC pipe shall not exceed 300 mm per 6 metre length (ie 3° per joint). Approval must be received from the Engineer prior to any gravity line being laid in a curved fashion.

The spigot ends of pipes and inside of couplings shall be thoroughly cleaned and all lumps, blisters and coatings shall be removed. Rubber rings shall be free from dust, dirt and grease. Joints shall be made in accordance with the manufacturer's instructions and to the satisfaction of the Engineer.

During the course of the work, every endeavour shall be made to exclude foreign matter from the pipework. To this end, all temporary openings such as pipe ends, fittings, etc shall be effectively covered with approved blank caps and flanged throughout the work and all pipes shall be inspected and cleaned as pipe laying proceeds. At the completion of the work all pipework is to be flushed out with copious water and sealed with the pipe manufacturer's blank end caps where directed by the Engineer.



8.7 MANHOLE SPACING AND DIMENSIONS

Manholes shall be provided at every change of direction, at every main junction, at every change of gradient and at distances apart not exceeding 100 m except where approved by the Engineer for stormwater lines 1 m or greater in diameter. Manholes may also be required at the end of every line, although normally cleaning eyes will be accepted.

Where the depth to invert of the manhole is less than 1 metre and it is serving less than four houses without any other contributory flow a shallow type manhole may be constructed with a minimum diameter of 500 mm. In all cases, shallow manholes shall be of sufficient dimension to allow full benching.

Where the depth to invert exceeds 1 metre and where inlet and outlet pipes are 600 mm diameter or less, a standard manhole of 1,050 mm internal diameter is to be constructed.

For pipes greater than 600 mm diameter, each manhole will have to be individually designed and approved.

Indicative minimum manhole diameters are as follows:

Minimum Manhole Internal Dia (mm)				
Outlet Pipe Dia (mm)	Pipeline Deviation Angle ()			
	0 - 15	16 - 45	46 - 75	76 - 90
Up to 300	1050	1050	1050	1050
375 to 600	1050	1050	1050	1200
675 to 750	1050	1200	1500	1500
825 to 900	1500	1500	1800	1800

8.8 MANHOLE REQUIREMENTS

Manholes shall satisfy the following performance standards:

- (a) The general performance standards of Section 1.
- (b) Be tightly sealed so that surface and ground water cannot enter.
- (c) Be structurally adequate to support the surrounding ground and any traffic loads without movement, detrimental settlement or flotation.
- (d) Contain base haunching which is self cleansing and maintains efficient hydraulic flow through the manhole.
- (e) Contain the means for safe maintenance access down to the base.
- (f) Be of sufficient dimensions to permit maintenance cleaning and CCTV inspection.
- (g) Shall have a flexible joint within 1 m maximum of the manhole for all pipelines.

Specific details which will be accepted as a means of compliance with these requirements are as follows:

Lids and Frames

Lids and frames shall be of cast iron to details of the Standard Drawing D04. The frame shall permit a 500 mm diameter clear opening and when closed the lid should fit flush with the top of the frame. The maximum depth from top of the lid to underside of the concrete cover slab shall be no more than 450 mm.



Heavy duty covers shall be used in road reserves, storage yards and in driveways. Light duty lids may be used elsewhere when approved by the Engineer.

Cover Slabs

Cover slabs for 1,050 mm diameter manholes shall be of 17.5 MPa concrete reinforced with D12 reinforcing bars at 150 mm crs each way and D12 trimmer bars around an offset 540 mm diameter access hole. Cover to reinforcing shall be 50 mm. In traffic areas the slab shall be 150 mm thick. In other areas the slab may be 100 mm thick.

Precast Manhole Risers

Precast manhole risers for standard manholes shall consist of 1,050 mm internal diameter class X flush jointed pipes with holes precast in the walls at 300 mm centres for step rungs.

Prior to jointing, the recess at the joint shall be filled with an approved jointing compound such as RB 200 in order to prevent leakage at the joint. In country where the watertable is high or where directed by the Engineer, joints between sections and between manholes and lid shall be effected using approved jointing "clips".

Details are shown on the Standard Drawing D01.

Manhole Rungs

Rungs shall be of the dropper or safety type such that a foot will not slide sideways off them and shall be of fibreglass or plastic coated steel to the details of the Standard Drawing D06 and placed at 300 mm centres. In deep manholes (ie more than 6 m deep) galvanised iron ladders may alternatively be used. Rungs shall be of minimum 20 mm diameter and verticals of minimum 60 x 10 mm steel. Ladders shall be hot dip galvanised after fabrication to attain a minimum zinc coating of not less than 500 g/m².

The earth face of holes for rungs in the manhole risers shall be sealed with epoxy mortar to prevent moisture ingress.

Intermediate Landings

Manholes greater than 6 m deep shall not be used unless specifically approved. Deep manholes shall incorporate intermediate landings as per Standard Drawing D03. Landings shall consist of a fixed half, and two removable quarters constructed from hot dip galvanised masongrill 7 bar MG4 profile. The fixed portion of each landing shall be oriented so that easy and safe access to and from each lift of rungs or ladders is facilitated. The spacing between landings shall be no more than 5 m and no less than 3 m.

Drop Connections

Side pipes which enter a foul sewer manhole any higher than the top of the outlet pipe shall be connected to the main flow by a drop connection mounted externally or internally and having provision for cleaning of the high level pipe.

Details are shown on Standard Drawing D03.

Manhole Benching

The base of the manhole shall be benched in 17.5 MPa concrete above the soffit of the outlet pipe to provide safe foothold during maintenance access. The top of the benching shall include a fall so that any moisture is self draining. The channel or channels containing the flow shall be smoothly finished in durable plaster so that head losses are minimised. Normal pipe gradient shall be maintained through the manhole unless a greater fall is required to maintain self-cleansing velocities.



However, stormwater manholes with pipes of 900 mm diameter or more shall be specifically designed to compensate for the energy lost in flow through the manhole.

Manhole Foundations

Precast manhole risers shall be securely bedded in a cast insitu 17.5 MPa concrete base of sufficient size to support the manhole and secure it from uplift. Alternatively precast bases may be used if securely bedded and constructed as to ensure a tight seal is obtained. For all precast manholes the base shall extend beyond the walls so that the surrounding soil augments the weight opposing flotation.

In weak ground the foundation shall be made oversize or the weak material undercut to firm and replaced with compacted gravel as appropriate.

8.9 **SADDLE CONNECTIONS ON STORMWATER LINES**

Saddle connections on to main pipes shall be made only where the main line is no less than 300 mm in diameter. Connections shall use a 45° saddle on mains up to 525 mm diameter and a 90° saddle on mains greater than 525 mm diameter.



SECTION 9

WATER SUPPLY

9.1 SCOPE

This section covers the installation of water supply reticulation only. Standards for more specialised aspects such as raw water supply, treatment facilities and storage reservoirs are not covered. Details may be obtained from Council on request if required. This section, except for Clause 9.21, does not apply to rural water supplies.

This section of the bylaw shall in particular be read with Sections 7 and 8, which set out general requirements for trenching and backfill of underground pipes.

9.2 RELEVANT LEGISLATION

The Drinking Water Standards of New Zealand, detail quality and safety standards for drinking water. Council's objectives are to ensure that all water reticulation schemes fully comply with the most recent version of the Drinking Water Standards for New Zealand and are able to attain a public health grading of at least "Bb" in accordance with these standards: ie

B rating for water supply
b rating for distribution

Section 3.6.5 of the District Plan requires all subdivisions in urban resource areas to be fully reticulated and may require developments adjoining a reticulated area to be also reticulated.

The Fire Services Code of Practice SNZ PAS 4509:2003, sets out requirements for fire fighting water supplies.

The SDC Rural Water Supply Bylaw sets out the process for adding consumers to a rural water supply or modifying the network.

Council has adopted NZS 9201: Chapter 7: 1973 as its Water Supply Bylaw. This is due to be superseded at the time of writing with a New Southland District Council Water Supply Bylaw 2005.

9.3 PERFORMANCE STANDARDS

Water supplies shall be designed and constructed so that:

- (a) The general performance standards of Section 1 are met for components to be maintained by Council.
- (b) An adequate, reliable, safe and efficient supply of potable and wholesome water is provided, in accordance with the current Drinking Water Standards

Further, for developments required to have a reticulated water supply:

- (c) No building site is further than 135 metres from a fire hydrant.
- (d) For fire fighting purposes a minimum fire fighting supply of 25 litres/sec from two adjacent hydrants and a 30 metre head is available within all residential developments.
- (e) Every commercial and industrial property receives minimum head and flows designed in accordance with specific parameters set out in SNZ PAS 4509.



- (f) All lots are able to be serviced by connections from water mains within the adjacent berm and not by connections crossing road carriageways unless otherwise approved by the Engineer.
- (g) All mains and connections are constructed to ensure zero leakage of water and easy connection for service connection fittings.
- (h) No more than 12 lots within a cul-de-sac are serviced by a rider main less than 100 mm in diameter. The rider main shall commence no more than 65 m from the dead end of the cul-de-sac and shall continue on standard alignment from the end of the larger main around the head of the cul-de-sac and up the other side of the street.

9.4 **RETICULATION DESIGN**

The water reticulation network shall be designed to meet the performance standards. In addition:

- (a) No main on which a fire hydrant is installed shall be less than 100 mm in diameter.
- (b) Reticulation shall be designed to minimise pipework passing under road surfaces. Rider mains shall be looped so as to serve the maximum number of lots with the minimum number of road crossings.
- (c) All arterial and collector roads shall be serviced by fire fighting mains in each berm.
- (d) Local roads may be serviced by a fire fighting main on one side of the street and a rider main on the other side.
- (e) Should an unreasonable length of rider main with no service connection be involved, the Engineer may agree to extra road crossings being provided.
- (f) All mains shall be connected at each end, except in the case of minor streets.
- (g) The layout shall be designed to minimise head losses and take into consideration future demand from adjacent areas.
- (h) If directed by the Engineer, high points on mains and rider mains shall be provided with a 20 mm service connection and valve mounted vertically and enclosed in a surface box for the purpose of air release.
- (i) Approved scour points shall be provided where directed by the Engineer.

9.5 **WATER MAINS**

New mains and fittings shall be uPVC pipe or mPVC complying with AS/NZS 1477 unless otherwise approved.

All pipes shall conform to a minimum PN12 standard (120 m working head, 1,200 kPa maximum working pressure) unless approved otherwise.

Pipe joints shall be of an approved type and generally of the pipe manufacturer's proprietary type rubber-ring flexible joint or detachable gibault type joint.

Solvent cement jointed pipes will **not** be permitted.

Subject to special written approval, pipes of other manufacture, material or class may be used.



9.6 RIDER MAINS

Rider mains shall be connected to the supply main by means of a tee or tapped elongated gibault in accordance with Standard Drawing W05. Where possible rider mains shall be fed from both ends by connection to a larger main. The size of rider mains shall be governed by the following table:

Criteria For Rider Mains		
Maximum Number of Services on through roads	Size of Rider Main (mm)	
	Single Feed	Both Ends Fed
Less than 3	25	25
3 - 6	40	32
7 - 15	Not applicable	40
16 - 30	Not applicable	50
Maximum Number in Cul-de-sacs	Size of Rider Main (mm)	
	Single Feed	Both Ends Fed
12 max	As above	

The above table is based on the assumption that all service connections will be normal 20 mm internal diameter connections to all lots. Where special provision is made for larger supplies then larger rider mains may be required or special connections made to the principal main in the street. Such cases shall be subject to special approval.

When a rider main must be laid on a curve which is too sharp for convenient laying of rigid pipes, eg small diameter cul-de-sacs, the Engineer may approve the use of flexible pipe over those lengths where curvature is excessive, or alternatively may require the line to be laid as a series of straights connected with formed bends and couplings. If, for any reason, a rider main is reduced in diameter, the whole of the length of the rider main shall be assessed as if it was fed from one end only.

9.7 SERVICE PIPES AND CONNECTIONS

Service connections will normally be made by Council upon application and payment of the relevant connection fees at the time of building consent application.

Except for special large connections, all lots shall be provided with a 20 mm service connection connected to the main by means of an approved tapping band (or tee on 20 mm and 25 mm pipes) and an angle ferrule of approved proprietary type.

See standard drawing W06.

Service connections are normally required to be located at the centre of the road frontage boundary and be fabricated from MDPE PN12 pipe complying with NZS 7610.

The body of rear lots shall be individually serviced by connection to the street frontage with the connection points located offset from the centreline of the right of way so as to be clear of the vehicle crossing with the connection terminating outside of the right of way formation.

All service connections shall include an approved copper alloy (DR) gate valve to BS 5154:1989, PN12 or higher, or an approved plastic alternative. Gate valves shall be enclosed in a toby box and in accordance with Standard Drawing W06.

Commercial and industrial properties are required to be metered and a water meter of a type approved by the Engineer shall be included at the connection and located beyond the gate valve. Meters and valves shall be enclosed in a box in accordance with Standard Drawing W08.



All rural, commercial and industrial properties- and other developments as required by the Engineer, shall be provided with an approved backflow preventer.

9.8 DEPTH OF MAINS

The minimum depth of cover from the finished surface level to the top of the pipe shall be as shown in the table below:

Depth of Mains	
Location	Minimum depth of cover from the finished surface level to top of the pipe (mm)
Service pipes in all cases	450
Mains under grass berms and footpaths	750
Mains under carriageways	900

9.9 VALVES

Valves on mains shall be resilient seated cast iron waterworks pattern sluice valves, nylon coated for corrosion protection and conforming to NZS/AS 2638.2. All valves shall be anti-clockwise closing unless stipulated otherwise. The use of light pattern valves will not be permitted. All valve joints isolated from other fittings may be plain ended. In all other cases valves shall be flanged.

All valves shall be enclosed in a surface box set flush with the finished ground surface in such a way that the spindle is not more than 600 mm below finished ground level and readily accessible to a standard valve key.

Valves on rider mains shall be either sluice valves as above or gate valves. Gate valves shall be hand wheel operated and enclosed in a surface box set flush with the finished ground surface. Valves shall have the spindle not more than 400 mm below the finished ground level. Gate valves shall conform to BS 5154:1989 PN12 or higher, with non-rising stems.

Valves shall generally be placed on all branches of each tee or cross and shall be sited adjacent to the flanged tee or cross or at such other location as may be directed. Valves shall be located clear of the carriageway wherever possible. The spacing of line valves on principal mains in any street shall not exceed 500 m. Where possible, not more than 40 consumers on a main or rider main shall be isolated should the supply be shut down for maintenance purposes. Individual branch mains are to be valved at the tee or cross and all sections of interconnecting mains and riders are to be provided with isolation valves at each end. In no case shall more than three valves be required to isolate any section of the reticulation.

Refer to NZS 4404:2004 Section 6 for suggested locations.



9.10 **HYDRANTS**

All mains (other than rider mains) 100 mm or more in diameter, shall be provided with fire hydrants. These shall be clockwise closing of the screw-down type and shall comply with BS/NZS 750:1984 or as otherwise approved by the Engineer.

Hydrants shall generally be located at street intersections and near private ways. Hydrants shall be evenly spaced between these points so that the maximum spacing does not exceed 135 m in residential areas and 90 m in commercial and industrial areas. In special situations the Engineer may require this spacing to be reduced.

In cul-de-sacs or other terminal streets or right of ways, the last hydrant at the end of the supply main shall be not more than half the maximum approved spacing from the head of the street, and in no case more than 135 m from the furthest building site on any allotment when measured along the route of travel.

Hydrants shall be mounted on approved hydrant tees with risers, if necessary, so that the top of the spindle on the hydrant is between 175 mm and 250 mm below the finished surface level. A loose lid surface box shall be installed to enclose the hydrant in such a way that a standpipe and key can be fitted and the hydrant operated without obstruction.

Hydrant locations shall be marked in accordance with NZS 4501.

9.11 **PIPE FITTINGS**

Pipe fittings such as tees, hydrant tees, tapers, crosses, hydrant risers, caps, plugs and bends shall be of approved manufacture to the general requirements of the relevant Standard. All pipe fittings shall comply with the dimensions of the line on which they are to be used. Flanges shall be drilled to AS 4087:1986.

All fittings for use with uPVC pipe shall be moulded fittings as produced by the pipe manufacturer to a pressure rating equal to at least that of the pipe used or as otherwise approved by the Engineer.

All water supply fittings shall be corrosion protected in accordance with AS/NZS 4158.1: 1994.

Gibaults and tapping bands shall be constructed to BS 2035 and BS 4772.

All gibault joints shall be denso-tape wrapped.

9.12 **SURFACE BOXES**

Hydrant boxes shall comply with AS/BS 750:1984 and shall be Grade A. Hydrant boxes shall be loose lid type, cast iron (unless otherwise approved) and mounted on concrete or similar supported on a firm foundation having a CBR ≥ 10 in accordance with Standard Drawing W01 so that no load can transfer to the pipe. Surface boxes shall be set flush with the finished surface level.

Valve boxes and toby boxes shall be surrounded in concrete and mounted over the valve in accordance with Standard Drawing W09.



9.13 **THRUST BLOCKS**

Cast in-situ thrust blocks shall be provided at all bends, sluice valves, tees, and crosses to the sizes shown in the Standard Drawings. All thrust blocks shall be poured against trimmed natural ground and placed in such a way that access to and removal of any bolts on adjacent fittings is unimpaired. The concrete is to be separated from the uPVC, HDPE or ABS by a material such as malthoid, approved by the Engineer. This material shall prevent any bond forming between the pipe and the concrete. Concrete shall not encase more than 135 degrees of the pipe diameter.

All sluice valves shall be provided with anchorage in accordance with Standard Drawings. Special requirements apply to the anchoring of uPVC lines and developers should refer to the manufacturer s specifications.

9.14 **PIPE LAYING**

Pipes shall be laid on straight grades and lines or on smooth curves without exceeding the manufacturer s recommended deflection of the joints or, in the case of flexible pipe, the recommended curvature of the barrel.

Where greater deflections are needed, formed bends shall be separated by one full pipe length unless flanged joints are used. Flanged joint combinations must be interspersed by flexible couplings to allow ready removal and replacement of individual fittings. A series of flexible joints in close proximity to each without adequate lateral support will not be acceptable.

The method of pipe laying and jointing shall be as recommended by the manufacturers for the type and class of pipe in use. All pipe barrels shall be evenly supported over the entire length by the trench floor on suitable bedding material placed before the pipe is laid. Collars shall be unsupported. The open ends of pipes shall be kept covered to prevent the ingress of foreign matter and all pipes shall be inspected and cleared as laying proceeds.

uPVC pipes shall be laid in conformity with the requirements of NZS 7643:1979.

9.15 **TESTING**

Once an installation and backfilling is complete, all new pipework shall be slowly filled with water to remove all air and allowed to stand for 24 hours under a static head of up to the intended working pressure. Any leaks found by visual inspection shall be repaired and the process repeated before testing commences.

Pipes to be tested shall not include any service lines. When the pipeline is ready for a pressure test the Engineer shall be given not less than 48 hours notice in advance.

All pipes shall be tested in accordance with NZS 7643:1979, the Code of Practice for the Installation of Unplasticised PVC Pipe Systems, Clause 9.3, using Procedure B and the following additional requirements:

Minimum test pressure:	110 m head at the highest point along test pipeline.
Maximum test pressure:	Class PN12 - 180 m head at the lowest point along test pipeline.

As a minimum, a 100 mm diameter test pressure gauge manufactured to NZS 1780:1985 "Specification for bourdon tube pressure and vacuum gauges" Section 7: Industrial accuracy is required to monitor the tests. The gauge is required to be in good working order with current test certification (within last 12 months) and having less than 1% error.

**9.16 STERILISING AND FLUSHING**

All mains shall be fully sterilised using calcium hypochlorite at a minimum concentration of 50 gm/m³ and left for at least 24 hours. At the end of this contact period the chlorinated water shall be tested for minimum residual chlorine, a minimum concentration of 0.25 ppm (0.25 gm/m³) being required for the test to be acceptable. If the minimum amount is not detected, the line shall be flushed and the disinfection process repeated until a satisfactory result is achieved. In all cases the residual test shall be carried out by a Council representative.

When the connection to existing reticulation has been made the new reticulation shall be thoroughly flushed through a standpipe or other suitable tapping to remove all debris and unchlorinated water. Flows through hydrants shall be measured to ensure that no obstruction remains in the pipelines. Where such obstruction is considered present, the lines shall be dismantled and cleared through fully open ends.

9.17 CONNECTION TO EXISTING RETICULATION

After the system has passed the pressure test a connection to the existing distribution system will be made. It will be necessary for the Contractor to give at least 48 hours notice to Council staff that a connection is required. The connection is to be made under Council's supervision and at the expense of the Contractor.

9.18 BACKFILLING

Cover material placed over each pipe for anchorage during testing shall be evenly spread along the trench length and compacted before backfilling commences.

This initial layer shall be laid evenly along and around the pipe to a minimum of 150 mm depth over the pipe and compacted by hand. Backfilling shall proceed in layers not exceeding 300 mm depth with each layer being fully compacted as it is placed. Any unsuitable material removed from the trench shall be removed from the site and not used for backfilling. Any settlement of backfill shall be made good until the end of the defects liability period (minimum 12 months). Backfill in roadways shall conform with the appropriate requirements for roading.

Refer to NZS 7643:1979 for the requirements for backfilling of uPVC lines.

9.19 SURFACE MARKING

All hydrants shall be painted with yellow road marking paint complying with the relevant specifications. Refer to Section 13.

Fire hydrants shall be additionally marked with a double sided blue cats eye reflective marker fixed near the centre of the road.

All valve covers shall be painted with blue road marking paint. Where a hydrant or valve is located in a grass berm a concrete surround shall be constructed to enable clear marking.

9.20 WATER FOR FIRE FIGHTING

All developments shall be provided with fire fighting capacity in accordance with the New Zealand Fire Service Fire Fighting Water Supplies Code of Practice SNZ PAS 4509:2003.

Where a development cannot be connected to a high pressure supply the following will apply:



Each allotment will require:

- (a) The installation of a dedicated fire fighting water supply of at least 14,000 litres within 90 m of each new residence at the time of building consent.
- (b) Heavy-duty vehicle access a minimum of 4 m wide to a connection site on a hardstand area suitable for fire service appliance parking. Access shall be maintained at all times to the hardstand areas. The connection site shall be within 6 m of the water source.
- (c) Connections that are compatible with Fire Service equipment. The fittings are to comply with the following standard, being either:
 - 70 mm instantaneous couplings (female) to NZS 4505, or
 - 100 mm and 140 mm suction coupling (female) to NZS 4505 with the hose tail of the same diameter as the threaded coupling, eg 140 mm coupling to have 140 mm hose tail.

Alternatively communal water supply tanks servicing a number of properties may be utilised provided that:

- At least two tanks are located within 135 m of each building.
- Each tank has at least 45 m³ capacity.
- Permanent couplings as detailed for private tanks are installed at each tank.

9.21 **RURAL WATER SUPPLIES**

Sufficient information shall accompany subdivision applications to ascertain:

- (a) If the property is connected to any rural water supply scheme.
- (b) If the new allotments will be connected to any scheme.

The application process to connect to any scheme is independent of the subdivision process: a connection is not compulsory and if a connection cannot be made this does not negate the subdivision application.

Prior to making application for the issue of the Section 224(c) certification by the Council, the consent holder shall:

- (a) Apply to the Water and Wastes Department for installation of separate water connections to each allotment requiring a supply. A scheme plan for any alterations to the rural water scheme shall be included with the application, and, all applications shall be subject to Council's usual terms, conditions and fees, and any special conditions that may apply.

Note (a): Only applies when the water allocated to the property is to be redistributed.



- b) Arrange for all existing internal water supply lines that cross the new subdivisional boundaries to be disconnected. The disconnections shall be left uncovered until they have been inspected by Council or its representative, to verify that disconnection has been completed. The consent holder shall notify Council's Water and Waste Services Department, telephone (03) 214 9746. At least two working days prior notice is required.
- c) Arrange for a surveyor to prepare as-built drawings showing the revised water reticulation layout, detailed within an accuracy of +/- 0.5 m. Certification of the scheme plan will not be completed until this verification has been made.
Note (c): Only applies when the water allocated to the property is to be redistributed.
- d) Pay Council's fees to cover processing, inspection costs and updating of records by Water and Waste Services.
- e) Arrange for Council's maintenance contractor to install any new connection to an existing main and any new tank fittings.

Any internal reticulation crossing a proposed boundary shall be disconnected. The Surveyor shall be required to confirm, when lodging the survey plan of subdivision for seal that this has been done.

This condition will be imposed on all consents where the existing property is connected to a rural water scheme. This condition protects the owner of an allotment connected to a scheme from having other properties connect via their property, as well as ensuring continuation of supply for all consumers.

Where water allocations are assigned to new parties through a subdivision process, Council will continue to bill the previously designated parties until a change of ownership is formally advised.

Where a property is within a Rural Water Supply Scheme area but is not connected no condition will be imposed requiring the property to be connected. However, applicants are encouraged to consider the benefits of connecting to a scheme. Applications for connection to any Rural Water Supply Scheme shall be made by a separate application through Council's Water and Wastewater Services section.

There must be a minimum of **TWO DAYS** storage of water on each lot. Some water schemes are for the purpose of supplying stock only (not for human consumption or irrigation).



SECTION 10

WASTEWATER

10.1 SCOPE

This section covers the design and construction of wastewater systems to on-site disposal or to existing piped networks. It does not cover the more specialised area of centralised treatment facilities. Details of Council's requirements for these may be obtained on request.

The scope does not include any building work as defined under the Building Act 1991. In any areas of overlap the Building Act and the New Zealand Building Code take precedence.

This section of the bylaw shall in particular be read with Sections 7 and 8, which set out general requirements for trenching and backfill of underground pipes.

10.2 RELEVANT LEGISLATION

The Resource Management Act 1991 (Section 9) includes a provision that no person may deposit any substance on to or in the land contrary to the District Plan.

The District Plan [Section 3.6.5{] requires all subdivisions in an urban resource area to be fully reticulated and may require developments adjoining a reticulated area to be also reticulated.

Environment Southland sets objectives and policies for the disposal of effluent in their Effluent Land Application Plan (1996).

Where it is not possible to connect a new allotment to a sewer, the allotment size shall be such that it is possible to dispose of wastewater and wastewater effluent on the allotment without detrimentally affecting the quality of surface water and groundwater draining from the land.

10.3 PERFORMANCE STANDARDS

Wastewater pipe network and disposal facilities shall be designed and constructed so that:

- (a) The general performance standards of Section 1 are met.
- (b) The facilities are adequate for the maintenance of public health and have no harmful effects on the environment.
- (c) Stormwater and groundwater are prevented from ingress to the reticulation parts of the system.
- (d) Domestic systems on reticulated water supply systems are designed for flows of 220 litres per head per day. For flow estimate purposes 3.1 persons per household and 15 households per hectare should be used. This flow is subject to peak loading factor of four times the average flow being applied.
- (e) Commercial and industrial systems are designed for parameters approved at the time of development but with a minimum of 40 litres per second per 100 ha. This flow shall be subject to a peak loading factor of four times the average flow and applicable to a development of 100 hectares.
- (f) Self cleansing velocities (with a minimum of 0.65 m/sec) are maintained within gravity systems.
- (g) The systems are capable of passing 75 mm solids.



10.4 **METHOD OF DISPOSAL**

Onsite disposal of wastewater may be permitted where:

- (a) No piped system is immediately available or will not be available within 10 years of the subdivision application.
- (b) No piped system is available immediately adjacent or within a reasonable distance of the site. The definition of what constitutes a reasonable distance is set out in Clause 2.4 of this bylaw.
- (c) The site is capable of disposing of treated effluent without harmful effects on the environment.

In all other cases wastewater is to be collected and disposed of to an existing Council system, via a localised pump station if necessary.

10.5 **PRIVATE ON-SITE DISPOSAL SYSTEMS**

Septic tanks for on-site domestic wastewater treatment must be designed in accordance with AS/NZS 1546.1:1998, On-Site Domestic Wastewater Treatment Units, Part 1, Septic Tanks.

On-site disposal systems shall be designed and constructed in accordance with AS/NZS 1547: 2000, On-Site Domestic Wastewater Management.

Where on-site disposal is proposed the Developer will be required to demonstrate the ability of the ground to accept and dispose of the treated effluent in accordance with the above standard.

The disposal area shall be wholly contained within the allotment serviced.

If ground conditions are considered to be marginal in any way Council will require a specific design, based on-site investigations, to be submitted at the time of subdivision application.

On site treatment/disposal systems must comply with the Regional Effluent Land Application Plan for Southland.

Communal on-site systems shall be designed as per Clause 10.12.

10.6 **RETICULATION DESIGN**

Piped sewer systems shall be designed to meet the performance standards and in addition all sanitary drainage systems shall be capable of serving the entire natural catchment upstream of the actual system. The flow from the upper section of catchment shall generally be calculated assuming complete urbanisation of the area or other such specific uses as the Engineer may require.

Provision may be required to be allowed for the flow from a pumping station outside the natural catchment, the details being supplied by the Engineer. A contribution towards the additional cost of the gravity system will be considered by Council where allowance for a pumping station flow is required.

In no case shall a sanitary sewer main be less than 150 mm internal diameter unless approved by the Engineer.

The minimum coefficient of roughness used in flow calculations shall be $K = 1.5 \text{ mm}$.

Minimum pipe gradients shall be as per Section 8.4.



10.7 **VALVES AND FITTINGS**

All fittings shall be of the type specifically designed for use with the pipe in which they are inserted. No fabricated fittings, adaptors, end seals, etc shall be used without permission from the Engineer.

Valves and fittings shall be installed and fixed in accordance with accepted practice and the manufacturer's recommendations. The position of all valves, fittings and bends shall be marked by the developer by an approved method adjacent to the fitting at the time of backfilling. No fittings are to be backfilled until approved by the Engineer.

All connections to uPVC pipes shall be by purpose made tees or saddles and under no circumstances will the use of tapping bands or the like be permitted. Unbalanced thrust in the vertical plane resulting from sharp changes of grade, sufficient to warrant special bends, shall also be provided against.

Upward thrust shall be countered by special anchors to the Engineer's approval. Downward thrust shall be countered by thrust blocks at least 200 mm thick on the firm bottom of the trench with a minimum ground bearing area of 400 x 400 mm.

The faces of flanges shall be perfectly clean before jointing and the joints shall be made with approved rings of insertion rubber not less than 1.5 mm thick. The nuts shall be carefully tightened in opposite pairs until the joint ring is only just sufficiently compressed between the flanges to ensure water tightness at test pressure.

10.8 **PIPE LAYING**

Pipe laying shall be in accordance with Section 8 of this bylaw.

Where pipes are bedded, capped or surrounded in concrete, provision shall be made for breaking the concrete at each pipe joint to preserve the flexibility. This can be done by inserting a piece of "soft board" into the wet concrete at the time of pouring.

Where thrust blocks are required they shall be as per Section 9, Water Supply.

10.9 **COVER**

Cover to pipes shall preferably be not less than 900 mm in roads or 750 mm in driveways, berms, footpaths or gardens. Exceptions will be permitted only where absolutely necessary and where concrete encasement is provided.

10.10 **PUMP STATIONS**

Pump stations to service new subdivision areas will be permitted only where there is prior agreement with Council on need and positioning.

Pump stations shall meet the following performance standards:

- The pump well shall be underground and have lockable aluminium or stainless steel lids complete with the supply of standard Southland District Council padlocks for all opening lids.
- Valve chambers shall be below ground level, attached but separate to the pump well. Provision shall be made to bypass the pumps in case of breakdown. Non-return valves shall be ball-valves full-bore opening. Valve chambers shall have lockable aluminium or stainless steel lids complete with the supply of standard Southland District Council padlocks.



- Residential pump stations shall be designed for a peak flow rate of 1 m³ per person per day of the fully developed catchment. Pump stations with non-residential catchments will be subject to specific design and must be approved by the Engineer.
- The capacity of the wet-well between start and stop levels shall be such as to limit pump starts to no more than 10 per hour.
- Pump stations shall have emergency storage in case of mechanical or electrical failure or blockage of the pumps or rising main. The storage must be located at such a level as to prevent overflow from any manholes, gully traps, pump station lids or any other outlet from the system. Emergency storage capacity equal of eight hours at the design average daily 220 litres per person per day flow is to be provided.
- All pump stations shall have an approved and controlled overflow system which discharges in such a manner to ensure maximum storage is used prior to discharge.
- A rigid ventilation pipe shall be provided with breather cap at least 3 m above ground level.
- A 25 mm diameter water supply shall be provided to the immediate vicinity of the station. The supply shall be fitted with an above-ground backflow preventer in accordance with the requirements of the Water Supply Protection Regulations and the Engineer.
- If required a Mag Flow meter complete with all electrical and data cables shall be fitted to the main outlet of the pump station.
- The actual site of the pumping station shall be on a separate lot with an accessway (if required) to a formed road. Resource consent may be required for the installation, and where necessary must be obtained by the Developer prior to the commencement of engineering works. The site shall be developed to prevent entry of surface runoff into the station.
- Permanently surfaced vehicle access and manoeuvring areas shall be provided to the station.
- The area around the pumping station shall be fenced if required to the Engineer's satisfaction, and such that Council shall not become a party to fencing costs.
- The power supply to the station shall be underground.
- The main switchboard shall be mounted on a concrete plinth which extends at least 1,200 mm from the front of the switchboard and 300 mm on the other three sides.
-

A design drawing of a typical pumping station is available at Council's Invercargill office.

Pumps shall be as follows:

- There shall be a minimum of two pumps in all pump stations.
- Pumps shall be of a make approved by the Engineer, three phase submersible type designed for each to take the full flow and be capable of passing a 75 mm diameter solid.
- Pumps shall be controlled so that while one pump is acting as duty pump, the other is on automatic stand-by.
- Each pump shall have power factor correction to 0.95 or better.
- Each pump shall have a multi-pin plug for cable connection/disconnection.



- If available each pump shall also have oil seal monitoring and thermistor or micro-therm protection (oil seal monitors supplied by pump supplier).

Pump control shall include:

- Multi-trode level stick with 3 x floatless relay switches (Omron or similar approved). Alternatively an ultrasonic level transducer with pump controller unit or a pressure transducer with pump controller unit can be used (prior approval from SDC Engineer required). Multi-trode to have "Start", "Stand-by", and "High" switches. That is duty pump starts at "Start" and stand-by pump starts at "Stand-by". Both run together until stop level. "High" switch triggers alarm.
- 2 x back-up float switches for "High-high" (overflow) (to be back-up supplied from back-up 12V DC battery) and "Low" levels. Floats to be hard wired to start **both** pumps if "High-high" tripped and both stop at stop level or when "Low" float tripped.

The electrical control cabinet shall be above ground level, constructed from a powder-coated stainless steel, weather proof, lockable enclosure (to IP 56 rating). The internal main switchboard metalwork arranged into cubicles (layout to be approved by SDC Engineer). The enclosure shall be large enough to house the following items:

- The internal main switchboard metalwork, including supply authority metering.
- 1 x selector switch for Mains/Off/Generator.
- 1x load break main switch isolator appropriately sized, minimum 63A and HRC or circuit breaker type distribution board.
- 1 No. direct on line motor starter per pump (may need to be reduced voltage starter based on the supply authorities requirements) complete with overload protection, ammeter, hours run, run and fault light indication and auto/off/manual selector switches.
- Phase failure protection for each pump motor.
- High and low well level indication lights.
- Each pump shall have a multi pin plug and socket for cable connection/disconnection.
- 1 x 10A single phase RCD protected switch socket.
- 1 x 72 mm voltmeter c/w phase selector switch.
- 1 x portable generator appliance 3 phase plus neutral inlet and plug.
- 1 x light complete with switch.
- 1 x anti condensation heater and thermostat.

The control system shall be as follows:

- 1 x 25 watt Motorola or Tait radio and antenna system compliant with the Southland District Council Scada system.
- The radio shall have a 7 A power supply and a 17 Ah battery backup.
- The telemetry monitoring system shall be a "Kingfisher" or approved similar system linked to Council s SCADA system by an approved radio link.
- Kingsfisher telemetry equipment (minimum rack system complete with 8 bit QRTC card, 3 amp/7 Ah (datum backup).



- Southland District Council standard padlock and latch.

10.11 **TREATMENT SYSTEMS**

If a new treatment system is required to service a subdivision it shall be designed in accordance with best practice parameters advised by Council's Engineer and in compliance with the conditions of resource consent. Approval of any system shall be at Council's discretion.

10.12 **COMMUNAL SEWERAGE SYSTEMS**

Privately operated communal sewerage systems are not encouraged but may be accepted by Council as a solution provided that the Developer can demonstrate that the following issues are addressed:

- Where required by Regional Plans, a discharge consent is obtained from Environment Southland, covering both water and air quality (odour) discharges.
- An adequate buffer distance is established between the sewerage treatment facilities and any building or potential building.
- Adequate buffers are maintained around discharge areas to separate these from open water sources and occupied land in accordance with the requirements of the Regional Effluent Land Application Plan.
- For discharge to land, a stand-by area is set aside as a backup. Unless there are other mitigating features, the stand-by area shall be at least the same size as the calculated field area.
- Package systems are compatible with New Zealand systems and conditions and with Council's electrical requirements.
- The performance standards of Section 1 are met.
- Systems incorporate robust security measures to prevent or address the effects of vandalism and deliberate interference.
- A full asset management plan for the system is submitted to and approved by Council. This plan must address all life cycle issues including maintenance, depreciation and renewal costs.
- Acceptable levels of service are agreed with Council and are maintained.
- Electronic monitoring and reporting of the system operation is provided.
- Clear responsibilities for ownership, operation, maintenance and renewal of the system and for updating of the asset management plan are established with one person or organisation designated as the primary contact for all response requirements.
- Those responsible for the maintenance of the system have the appropriate competencies and all health and safety issues are addressed.



SECTION 11

STORMWATER

11.1 SCOPE

This section covers the design and construction of stormwater collection and disposal systems.

The scope does not include any building work as defined under the Building Act 2004. In any areas of overlap the Building Act 2004 and the New Zealand Building Code take precedence.

This section of the bylaw shall in particular be read with Sections 7 and 8, which set out general requirements for trenching and backfill of underground pipes.

11.2 RELEVANT LEGISLATION

Section 108 of the RMA gives Council the authority to require a Developer to install stormwater works in a new subdivision.

The District Plan (Section 3.6.5) requires all subdivisions to provide a system for the disposal of stormwater runoff without causing damage or harm to the environment, other property or people.

The SDC Stormwater Bylaw sets out the responsibilities of Council and the Developer in regard to stormwater connections and discharge.

11.3 PERFORMANCE STANDARDS

Stormwater disposal networks should be designed and constructed so that:

- (a) The general performance standards of Section 1 are met.
- (b) The primary network is capable of carrying water resulting from a 1 in 10 year storm event.
- (c) Backup and secondary flow paths are provided to carry water arising from a 1 in 50 year storm event without surface water entering any buildings with floor levels above normal ground level.
- (d) Adequate provision is made for the collection of surface water from roads, buildings and other impermeable surfaces.
- (e) Piped networks are designed so that self cleansing velocities are maintained in them and blockages and root infiltration are minimised.
- (f) Accessible inspection chambers are provided at each change of grade, direction and pipe size.
- (g) Adequate provision is made for maintenance access to open water courses.



- (h) The objectives of the District Plan and the requirements of the Regional Plan and any resource consents regarding discharge to waterways and water bodies are met.
- (i) Pipe blockages are reduced by using pipes of internal diameter no less than:
 - 100 mm for house connections
 - 200 mm for sump connections less than 15 m long
 - 300 mm for sump connections greater than 15 m long
 - 300 mm for main pipes
 - 300 mm for cross road relief culverts
 - 375 mm for connections to double sumps.

Unless covered by specific design pipe diameters shall not decrease in the direction of flow.
- (j) The stormwater disposal system is compatible with systems in adjacent upstream and downstream catchments.

11.4 **DESIGN CONSIDERATIONS**

The stormwater system shall be designed within the terms of the catchment management plan for the relevant catchment, if available. There should be early consultation with Council. The drainage system shall be capable of serving the entire catchment upstream of the subdivision and also have due regard to the effect it may have on downstream waterways and adjoining areas. Where, due to increased runoff, the existing downstream system is inadequate, the Developer may be required to either limit outflow from the subdivision or upgrade the downstream system.

Unless approved in writing by the Engineer, the drainage system shall be fully piped and all property connections shall be made direct to the pipes rather than to the road channel.

Where further subdivision is likely upstream of the development under consideration, the Developer may be required to extend the drainage system to the upper limits of the subdivision.

Where the proposed subdivision or development brings about the need for additional works to be undertaken downstream of the subdivision or development, the Developer may be required to contribute to the costs of the additional works, in proportion to the catchment area of the subdivision or development.

11.5 **CATCHMENT RUNOFF**

The Developer shall provide design calculations for the proposed stormwater system.

Calculations shall be provided by a suitably qualified person and be based on reasonable judgement, taking account of the overall site conditions, details of the drainage system, and the probable impediments to free flow, (both upstream and downstream) and shall determine the expected runoff „Q, and show that the design flood levels at the site satisfy the Performance Standards.



Estimation of the surface runoff shall be by a recognised engineering method with the following being acceptable:

- (a) Catchments less than 500 ha - Rational Method.
- (b) Catchments greater than 500 ha - Modified Rational Method.

Runoff coefficients used shall be as follows:

Description of surface	C
Natural surface types	
Bare impermeable clay with no interception channels or run-off control	0.70
Bare uncultivated soil of medium soakage	0.60
Heavy clay soil types:	
- pasture and grass cover	0.40
- bush and scrub cover	0.35
- cultivated	0.30
Medium soakage soil types:	
- pasture and grass cover	0.30
- bush and scrub cover	0.25
- cultivated	0.20
High soakage gravel, sandy and volcanic soil types:	
- pasture and grass cover	0.20
- bush and scrub cover	0.15
- cultivated	0.10
Parks, playgrounds and reserves:	
- mainly grassed	0.30
- predominantly bush	0.25
Gardens, lawns, etc	0.25
Developed surface types	
Fully roofed and/or sealed developments	0.90
Steel and non-absorbent roof surfaces	0.90
Asphalt and concrete paved surfaces	0.85
Near flat and slightly absorbent roof surfaces	0.80
Stone, brick and precast concrete paving panels	
- with sealed joints	0.80
- with open joints	0.60
Unsealed roads	0.50
Railway and unsealed yards and similar surfaces	0.35
Land use types	
Industrial, commercial, shopping areas and town house developments	0.65
Residential areas in which the impervious area is less than 36% of gross area	0.45
Residential areas in which impervious area is 36% to 50% of gross area	0.55

**Note:**

- Where the impervious area exceeds 50% of gross area the chosen run-off coefficient shall be based on the conditions likely to exist after the full catchment development allowable by the District Plan.
- The run-off coefficient C is the variable in the rational formula least able to be precisely determined, and represents the integrated effects of such things as infiltration, storage, evaporation, natural retention and interception, all of which affect the time distribution and peak rate of run-off.
- The run-off coefficients given assume saturated ground conditions from previous rain, and shall be used in the calculation of *surface water* run-off.

11.6 PIPE DESIGN

Calculations of pipe capacity shall be by the use of Manning's formula and due allowance shall be made for energy losses through structures.

Pipes shall be sized so that, when flowing full, a minimum velocity of 0.7 m/sec is maintained.

Where a pipe gradient exceeds 10%, allowance shall be made for bulking of the flow due to air entrainment where the air to water ratio may be calculated from:

$$\frac{\text{air}}{\text{water}} = \frac{kv^2}{gR}$$

where k = coefficient of entrainment (dimensionless)

= 0.004 for smooth concrete

= 0.008 for cast in situ culverts

v = velocity, m/sec

R = hydraulic radius, m (A/P)

g = acceleration due to gravity, m/sec²

11.7 SUMPS

Sumps shall be spaced to provide for local rainfall intensities and the channel slope. Suggested typical spacings are:

- In channels draining one lane, in such a position that the run of water in any channel is 90 to 125 m, and for channels draining two lanes, 60 to 90 m.
- Where required at intersections, at the uphill kerblines tangent points.
- At changes of gradient or direction in the channel where there may be a tendency for water to leave the channel.
- A double sump is required -
 - At the lowest point in a sag vertical curve;
 - At ends of a cul-de-sac where water falls to the end;
 - On all channels where the gradient is steeper than 5%.

All sumps shall be fitted with a back entry grate and should normally be connected to a manhole on the stormwater drainage system by 200 mm diameter pipes, except that if the trunk stormwater drain is of a greater diameter than 600 mm and a manhole is not conveniently located the sump lead may be saddled direct to that drain.



On footpath and accessways, sumps, if not required to take a design flow of more than 15 L/S may be 450 mm x 450 mm internal dimensions. An outlet of 150 mm diameter will be permitted providing it is adequate for the designed flow.

11.8 **SOAKAGE SYSTEMS**

On-site disposal of stormwater may be approved by the Engineer if it can be demonstrated that:

- (a) Sufficient field permeability testing has been undertaken before design approval to demonstrate the suitability of the ground across the site for soakage disposal.
- (b) Soakage pits can be maintained and are viable as a long-term solution.
- (c) The entry of silt into soakage systems is minimised.
- (d) Due allowance has been made for long term pore clogging of the receiving ground.
- (e) Lifetime costs do not exceed those of a fully piped network.
- (f) The positioning of soak pits in road reserve does not unduly limit the options for placement and extensions of other utility services.
- (g) Specific proving tests are carried out on each soak facility and certified by the Developer s Engineer.
- (h) Secondary flow paths are identified and protected.

11.9 **RETENTION PONDS**

Stormwater retention ponds shall be designed taking the following considerations into account:

- Provision of a separate, easily maintained rubbish and sediment catchment fore bay with a hardstand base and easy maintenance vehicle access.
- A pond that is ideally wedge shaped, being narrow at the inlet and widest at the outlet, and a length at least 1.5 times the average width.
- A long flow path and adequate water volumes where water treatment is important.
- A permanent water depth not exceeding 2 m.
- Side slopes not exceeding 1 vertical to 3 horizontal if fully planted, 1 vertical to 6 horizontal where grassed and 1 vertical to 12 where designed for recreational pedestrian access to the water s edge.
- Provision of a low level safety berm between steep side slopes and the pond water.
- Provision of measures to completely drain the pond in no more than 24 hours.
- Provision of an overflow spillway for extreme rainfall events.
- A freeboard of at least 600 mm.
- Easily cleaned outlets.
- Scour control, primarily through reduction in flow velocities, at inlets and outlets.
- Pondscaping that takes into account the fluctuation and duration of water levels.



- Provision for easy maintenance of the pond itself and its surroundings.

11.10 **OVERLAND FLOW PATHS**

Overland flow paths to cater for extreme rainfall events shall be:

- Clearly identified during the design process.
- Protected by easements with restriction on any building, (including buildings on pole construction) walls or fences that would impede water in the flow paths.
- Shaped for easy maintenance.

11.11 **CONSTRUCTION**

Construction of piped stormwater systems shall be as per Sections 7 and 8 of this Bylaw.



SECTION 12

CABLED UTILITIES

12.1 **SCOPE**

The section covers the provision of power supply, street lighting and telecommunications (including telephone, cable tv, data transmission lines and the like).

12.2 **RELEVANT LEGISLATION**

Sections 108 and 220 of the Resource Management Act give Council the authority to impose appropriate servicing conditions.

Rule 3.6.5 of the District Plan gives Council the option of requiring the Developer to install at his own cost network utilities at the time of subdivision.

In line with Section 502 of NZS 4404, which had previously been adopted by Council as a bylaw, electricity supply and telephone cabling are generally required to be underground.

12.3 **PERFORMANCE STANDARDS**

Utility services shall be designed and constructed so that:

- (a) The general performance standards of Section 1 are met.
- (b) Services are provided in such a manner that they may readily be extended to service adjacent undeveloped areas when necessary.
- (c) Services are provided to the boundary of each property.
- (d) Unless advised otherwise in writing by the Engineer, all service cabling shall be entirely underground.
- (e) Above ground service features such as power transformers and lighting poles are sited to ensure the safety of all road users.
- (f) Above ground connection boxes for power and telecommunication utility services are located at the front boundary to each property and are of a design which is compatible with the overall design of the subdivision and are approved by the Engineer.
- (g) Trench backfilling complies with the performance measures of Section 7.

12.4 **POSITIONING OF UTILITIES**

Wherever possible underground utilities are to be laid in the street reserve at the positions as shown on Standard Drawing S01.

Utilities shall generally be aligned parallel with the road network. However their alignment may deviate from the standard parallel alignment provided there is no interference with other services and the pipes are still fully located in the road reserve.

Where there is no alternative, utilities may be located on private property in areas which will not reduce the building area available on the lot (that is, within the front, side or rear yard areas). Cables shall be located not closer than 1.5 m from any building, or structure.



Where a Council utility or utility structure is laid within private property, it shall be protected by an easement in favour of Council and of sufficient width to allow practical access for maintenance. Such access shall be not less than 4.0 m wide.

Power transformers and local area telephone terminals shall be located on their own separate allotment or widened portion of the road reserve if they cannot be safely and conveniently placed within the clear width of the berm.

12.5 APPROVALS

Where specialist network services are being installed, Council will require the following before issuing the Section 224 RMA Certificate.

- (a) Design drawings for each network service showing the proposed layout of cabling and details of the service.
- (b) Agreement with Council on the siting of power transformers and local telecommunication exchanges.
- (c) Confirmation from the supply authority that the service has been correctly installed and is operative.
- (d) Creation of easements as appropriate.

12.6 POWER RETICULATION

Power cables along roads are to be laid within 900 m of the legal property boundary as per standard drawing S01. Cables crossing roads are to be at right angles to the road. Minimum depths and protection are to be as follows:

Location	Cable Type	
	400 V	11 kV
	Depth mm	Depth mm
Along frontages	600	900
Road Crossings	900	900

All details including cable protection must comply with NZECP 28. In residential subdivisions the supply is to be looped to a plinth or pedestal at approximately every second side property boundary.

12.7 STREET LIGHTING

Street lighting shall be provided in accordance with NZS 6701 : Code of Practice for Road Lighting or AS/NZS 1158: Road Lighting, in such a manner to:

- (a) Reveal all road and traffic features so that drivers can identify these in sufficient time to take appropriate action.
- (b) Minimise glare and light spill.
- (c) Provide visual guidance on the course of the road ahead. The positioning of lanterns is important in this respect.

For arterial and collector roads (defined as main and intermediate in NZS 6701) lighting shall be designed to the following performance values:



Lighting Parameter	Main Roads	Intermediate Roads
min av luminance, L	0.75 cd/m ²	0.50 cd/m ²
min overall uniformity, U _o	0.35	0.25
min longitudinal uniformity, U _L	0.30	0.25
max threshold increment, TI	20%	20%

Residential local roads and cul-de-sacs shall be serviced to provide adequate general illumination over the area of the road between property lines for safe and comfortable pedestrian movement, crime prevention and identification of premises.

In general terms this will require:

- (a) A lantern mounting height between 5.5 m and 7.5 m.
- (b) A uniform spacing of lighting columns with spacing preferably not exceeding 8 times the mounting height or 60 m, whichever is the lesser. The spacing may be increased to the lesser of 12 times the mounting height or 80 m if using existing service poles.
- (c) Positioning of lanterns at intersections, sharp bends, noticeable crests and dips in the road.
- (d) Confirmation of the design suitability (type of lantern and location) from an appropriately qualified person.
- (e) Design of the lighting columns in accordance with the AS/NZS 4676: Structural Design Requirements for Utility Services Poles.

Council may require the installation of flag lighting at isolated intersections of new subdivision roading and existing roads if traffic volumes or the road geometries indicate a potential hazard.

Council's preferred lantern for all roads except Stewart Island is a 70 watt, high pressure sodium vapour fitting. Preferred poles are Octlyte or similar segmental galvanised iron construction.

Lanterns and poles are to be wired in three core cable back to the nearest service pillar to the satisfaction of PowerNet Limited.

Reflective fluorescent disk beacons and floodlighting shall be installed at pedestrian crossing locations on all arterial and collector roads where required by the Engineer.

12.8 **TELECOMMUNICATIONS**

Telecommunication cabling is to be laid parallel to street boundaries and within 1,200 mm of the boundary as per standard drawing S01 wherever possible. Subject to agreement with PowerNet Limited, cables may be laid in the same trench as power cables provided that minimum separations are observed, as follows:

Minimum 150 mm separation from low voltage, neutral screened or armoured power cable
Minimum 450 mm separation from 11 kV power cable.

Cables shall be laid so that there is a minimum 450 mm cover in footpaths and 600 mm in roads. Cables are to be laid on a bedding of sand, crusher dust or pea gravel and the cable covered by a plastic hazard warning strip. Cables crossing roads are to be laid in PVC ducts for future maintenance, renewal or duplication.

Dedicated lateral connections are to be laid to pedestals at every second side property boundary.

Developers shall pay all installation fees charged by the utility companies.



SECTION 13

STREET SIGNS AND ROAD MARKING

13.1 **SCOPE**

This section covers street name signs, traffic advisory and regulatory signs and roadmarking.

13.2 **RELEVANT STANDARDS AND LEGISLATION**

TNZ C20	Specification for the erection and maintenance of Traffic Signs, Chevrons, Markers and Sight Rails
TNZ MOTSAM	Manual of Traffic Signs and Markings
NZS 5414:1977	Specification for Construction of Traffic Signs
AS/NZS 1906/1993	Retroreflective materials and devices for road traffic control purposes.

13.3 **PERFORMANCE MEASURES**

All signs and road marking shall be installed so that:

- (a) The general performance measures of Section 1 are achieved.
- (b) They can be clearly interpreted, both by day and by night, at a distance compatible with the road design speed.

13.4 **STREET NAME SIGNS**

Street names shall be approved by Council before being used. Names shall be chosen early in the subdivision design process and submitted for consideration so that approved names can be included on title plans before sealing of the plans.

The style of street names signs shall be consistent with others being used in the same area, unless the Engineer advises that an alternative style is preferred or is acceptable.

(a) Ground Mounted Signs

Low level street signs shall be of the type illustrated in Standard Drawing S04 as approved by Council.

The specifications of these signs is as follows:

Ground mounted signs shall be housed in a frame constructed from 100 x 100 mm posts and 125 x 50 mm top and bottom rails. All timber shall be tanalised to a minimum H3 standard, top shaped to shed water, and protected by two coats of red/brown oil-based stain, or similar if approved. Posts to be in-ground shall be tanalised to H4 standard. The timber rails shall be checked into the posts and the sign plate housed into saw cuts on both the posts and rails.

The bottom of the bottom rail shall be generally 400 mm clear of the ground and the top of the sign shall be no more than 900 mm above ground level.

Posts shall extend 150 mm above the top of the top rail.



(b) Post Mounted Signs

Post mounted signs shall be constructed in accordance with the following standard details. Timber posts shall be Building Grade or No. 1 Framing Grade timber as specified in NZS 3631 and treated to H4. The timber finish may be gauged or dressed. Generally the post length will be 3.6 m.

The timber posts shall be primed and finished with high gloss white paint for all of the above ground level. The primer must be compatible with the preservation treatment.

Galvanised bolt fittings shall be used.

Aluminium fluted posts shall be 3.5 m long, 60 mm OD painted white.

(c) Position Height and Orientation

New signs and chevrons shall be located in accordance with the TNZ: "Manual of Traffic Signs and Markings" or as otherwise directed by the Engineer. In particular the height of signs and chevrons shall be confirmed on-site as being appropriately located to provide maximum visual effect. Signs and chevrons at curves and changes in grade shall effectively intersect headlight alignments of approaching traffic.

All items shall be firmly installed in a vertical position and securely attached to posts.

Sign height is to be a minimum of 1.0 m to the under side of the lower panel of multi panel signs and 1.5 m to the under side of single panel signs (notably exceptions to this are chevron signs which are to be a minimum of 1.0 m to the under side). Heights are measured from the underside of the lowest sign to the surface of the adjacent road.

All support posts shall be firmly anchored a minimum of 600 mm or at least 20 percent of the total length which ever is the greater below ground. The post hole shall be backfilled and firmly rammed for its full depth.

The aluminium posts shall be firmly concreted into the ground except where a ground socket is used, in which case the ground socket shall be firmly concreted in.

(d) Street/Road Name Blades

These blades shall be of aluminium extrusion manufactured in accordance with the Road Safety Manufacturers Association Guidelines Section 5.14.1 and the following minimum dimensions:

- 200 mm deep „J” section
- 2.5 mm web thickness
- 18.5 mm flange width
- 3.3 mm flange thickness

All signs are to be reflectorised blue or green background (depending on the local township's preference) with white lettering (Class 2 Engineering Grade). The sign shall be 200 mm high.

Where a No Exit sign is required it shall be the small, „T” section clip on type of sign to the same standard as the „J” section blade. This sign shall be 395 mm long and 120 mm high with 60 mm text. All No Exits to be double sided.

Main lettering shall be series A or C upper and lower case as per the TNZ Manual of Traffic Signs and Markings, Part I. Lettering shall be 100 mm series C up to a sign length of 1.2 m. Series A lettering shall be used where the sign length would normally be between 1.2 m and 1.7 m with Series C and the sign should be mounted in the conventional manner.



Signs greater than 1.7 m with Series C lettering shall be altered to use Series A. They shall be mounted with the post midway along the blade and two blades will be used when double sided signs were specified.

13.5 **TRAFFIC SIGNS**

Traffic signs, frames, fittings, chevron boards and markers shall comply with NZS 5414: The Construction of Traffic Signs. The layout and size of signs shall comply with the Transit New Zealand Code of Practice TNZ C20 and the provisions of the TNZ Manual of Traffic Signs and Markings. All traffic advisory and regulatory signs shall be in compliance with the current edition of TNZ Manual of Traffic Signs and Markings.

The standard details for post mounted street name signs shall apply to traffic signs unless otherwise approved by the Engineer.

Any new give way or stop signs need to be approved by the road controlling authority prior to the installation of the signs in order to be enforceable.

13.6 **ROAD MARKING**

Pavement marking for traffic control and hazard warning shall comply with the Transit New Zealand Code of Practice TNZ P/12 and the provisions of TNZ Manual of Traffic Signs and Markings.

13.7 **SERVICE MARKING**

Fire hydrants shall be marked in accordance with NZS 4501.

Generally this shall require:

- (a) Yellow paint on the hydrant lid.
- (b) A yellow isosceles triangle of 600 mm sides and 450 mm base painted near the centreline of the road and pointing in the direction of the hydrant.

Additionally:

- (a) Where access to the hydrant within a sealed surface is likely to be obstructed by parked vehicles its position shall be further marked by a yellow painted circle of 1200 mm outside diameter and 100 mm line width.
- (b) Where the hydrant position is likely to be obscured by silt, vegetation or in any other manner its positions shall be marked by an indicator plate mounted at least 600 mm above the ground surface. The indicator plate shall contain the letters FH.
- (c) All hydrants in sealed streets are to be marked with a double sided blue reflectorised cats eye fixed near (not on) the centreline of the road opposite the hydrant.

All valve boxes, valve indicator posts and toby boxes shall be painted with blue road marking paint.



SECTION 14

PARKS AND RESERVES

14.1 SCOPE

This section covers the provision of parks and reserves within subdivisions.

14.2 RELEVANT STANDARDS AND LEGISLATION

The provisions of Section 3.7 of the District Plan have been superseded (as from 1 July 2004) by Council's Policy on Development Contributions.

The Reserves Act 1977 sets out requirements for vesting, control and management of public reserves.

NZS 5828 sets out standards for playground design and construction.

SDC policy and guidelines are set out in:

- SDC Recreation Plan.
- SDC Reserves and Open Spaces Policy and Guidelines.
- Guidelines for Te Anau Green Network Parks and Reserves Development.

14.3 PERFORMANCE STANDARDS

Where a developed or partially developed park is provided by a Developer, the park shall:

- (a) Comply with the relevant standards and/or legislation applicable to that specific category of park/reserve.
- (b) Complement the strategy for parks development in the area and physically link to the greater network if applicable.
- (c) Have a layout and contain structures that emphasise user enjoyment and safety.
- (d) Include at least one street frontage of more than 10 m and preferably at least 20 m.
- (e) Contain good sightlines for users, particularly children, with no re-entrant corners.
- (f) Be easily maintained.

14.4 LANDSCAPE PLANTINGS

Landscape plantings shall be to Council's approval and shall:

- (a) Be of an appropriate height and species for the location.
- (b) Prevent unwanted shading using the rule of thumb that for every metre of height a 4 metre shadow will be cast on the south side of the planting between 1000 to 1400 hours on the shortest day of the year.
- (c) Not cause blockages to stormwater and/or other drainage systems through root growth and leaf fall.
- (d) Avoid interference with both underground and overhead power supplies and telephone lines.



- (e) Maintain clear sightlines of at least 10 metres and “escape routes” to open areas especially in isolated locations or in areas of low visitor use.
- (f) Maintain a clear sightline from the last junction in the path in the case of dead end pathways.
- (g) As a general rule avoid the selection of trees (as distinct from shrubs) with a dense growth form down to ground level.
- (h) Avoid any increased maintenance costs or damage to equipment resulting from species such as flax or cabbage trees in grassed areas that require regular mowing because of the fibrous nature of their leaves which when caught up in machinery cause damage.

14.5 **GRASS**

Grassed areas shall be of a shape and contour suitable for easy mowing. New grassed areas shall be sown with seed mixes which produce hardwearing, low maintenance turfs. Unless agreed otherwise the seed mix shall be:

- 70% Turf ryegrass.
- 25% Fine fescue.
- 5% New Zealand browntop.

Sowing rate shall be at least 30 gm/m² fertilised with Nitrophoska 12:10:10 or equivalent at a rate of 20 gm/ m².

14.6 **WALKWAYS**

Walkways through reserves shall be constructed to the same standard as set out for street footpaths.

14.7 **CYCLEWAYS**

Cycleways shall have a minimum width of 1.4 m and joint walkways/cycleways shall be a minimum width of 2.5 m.

14.8 **LIGHTING**

Lighting for walkways shall be bollard type with louvre covers to limit glare at eye level.

The illumination level shall be sufficient to enable safe navigation of walkways with bollards placed at changes in walkway direction and at no more than 70 m centres on straight sections.



SECTION 15

STANDARD DRAWINGS

D1/1	Standard manholes - cross sections
D1/2	Standard manholes - plan
D2	Shallow manholes
D3	Deep manhole details
D4	Heavy duty manhole lids
D5	Standard drop manhole
D6	Manhole rungs, ladders, etc
D7	Cleaning eyes
D8	Cleaning eye cover
D9	Pipe bedding and trench reinstatement
D10	Pressure bedding
D11	Road sumps
D12	Grate for road sump
D13	Berm sumps
D14	Grate for berm sump
D15	Stormwater outfalls
D16	Stormwater outfalls through footpaths
D17/1	Private connection details
D17/2	Deep private connections
D18	Land drainage sump manhole
R1	Urban road formation widths
R2	Kerb and channel
R3	Residential crossings
R4	Commercial crossings
R5	Footpaths
R6	Pram crossings
R7	Rural roads - sealed
R8	Rural roads - gravel
R9/1	Private rural access
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R9/3	High use access
R10	Trench reinstatement in roads
R11	Trench reinstatement in grass
S1	Service layout in streets
S2	Street lighting
S3	Street signs - pole mounted
S4	Street signs - ground level
S5	Rapid number signs
S6	Valve and hydrant markers
S7	Standard symbology
S8	Standard fence details
W1	Fire hydrants
W2	Hydrant cover
W3	Valve boxes
W4	Water meter boxes
W5	Water main connections
W6	Toby connections
W7	Thrust blocks
W8	Sluice valve