Code of Practice for Subdivision and Land Development

Addendum to be used in conjunction with NZS4404:2004 Land Development and Subdivision Engineering

26 June 2008

MARLBOROUGH
DISTRICT COUNCIL

Marlborough District Council
PO Box 443
Blenheim 7240
New Zealand

15-21 Seymour Street (Seymour Square)
Blenheim

Phone 03 520 7400
Fax 03 520 7496

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Introduction

A1 Purpose

The Council recognises the need for a code of practice for subdivision and land development, both to enable developers to adequately plan projects and for the Council to ensure that development takes account of the many special features of the Marlborough district.

This Code of Practice for Subdivision and Land Development (Code) replaces the Code of Practice for Subdivision and Land Development (ISBN 0-95583398-8-0). The Code is based on New Zealand Standard NZS4404:2004. Modifications and amendments required to suit local conditions and practice in Marlborough have been documented in this Addendum. Together, this Addendum and NZS4404:2004 is the Marlborough Code of Practice for Subdivision and Land Development.

The Council intends that the Code will enable developers to adequately manage subdivision and land development projects, and assist in maintaining a consistent and integrated standard of services within the District.

A2 Scope

The Code shall apply to the following:
(a) Any application for subdivision consent under the Resource Management Act 1991; and
(b) Any proposal to develop land.

A3 Statutory Context

(This statement will be replaced once the Proposed Wairau / Awatere Resource Management Plan is operative.)
Section 313 of the Local Government Act 1974 states that:
Subject to any provisions of any proposed or operative district scheme for the district, the Council shall prepare and publicly notify a code of urban subdivision setting out:

(a) Minimum requirements that the Council requires to be observed by any person undertaking such a subdivision of land within the district; and
(b) Such other matters as the Council considers to be of assistance to any person undertaking such a subdivision.

Although Section 313 was repealed by the eighth schedule to the Resource Management Act 1991, it will continue to apply for a transitional period, to subdivision plans approved from 01.10.91, until a new plan becomes operative under the Resource Management Act.
For the transitional period, therefore, the Council must have in place a code of practice for urban subdivision. Once a new plan becomes operative, the Council will continue to apply the code as it considers necessary and appropriate.

The provisions of this code shall be read subject to the provisions of the Council's operative and proposed plans, and to any applicable statutes, regulations and bylaws. Notwithstanding the provisions of the code other consents or approvals may be required under other legislation.

A4 Format of Code

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The Code presents the Council's requirements for physical works and construction for land subdivision and development. Procedural requirements are contained in Marlborough's Resource Management Plans, under the chapters entitled 'Standard Requirements for Subdivision and Development.'

For each of the categories of physical works covered, the Code sets outs the means of compliance or methods that are known to result in achievement of the standard.

Under the Resource Management Act 1991, where the Council grants a subdivision consent, it may decide to do so subject to certain conditions being met.

This Code is not a part of the Transitional Plan or of the Marlborough Sounds or Proposed Wairau / Awatere Resource Management plans. Its content is not the result of a public process, and consequently, it may be amended by a resolution of the Council. The "stand alone" Council-controlled status of the Code, as it applies to subdivision and development, limits the effect of the standards contained therein to that of **methods of achieving compliance**.

The Council had previously adopted its own code (the first Marlborough code), based on the new Standard NZS 4404: 1981 Code of Practice for Urban Land Subdivision. The relationship between this Code and the plans is explained in (both plans) and linked to Marlborough's resource management plans as follows:

> *The Council's 'Code of Practice for Subdivision and Development' is not, in a statutory sense, a **part** of this plan. The Code provides a means for subdividers and land developers to meet the general standards described in this Plan. The Code sets out, in more specific terms, the standard expected from each phase or type of land subdivision and development.*
>
> *Compliance with the methods or standard practices of the Code in respect of any prescribed requirement of the Marlborough Sounds or Wairau/Awatere Resource Management Plans or of any condition of consent, shall be deemed to be compliance with that requirement or condition.*

Scope for Alternative Means of Compliance

If a developer proposes an alternative means of compliance, to a requirement of Marlborough's resource management plans or a condition of consent that may be met by compliance with the Code of Practice, then the alternative proposal is required to be submitted to the Council and accompanied by a detailed report from a Registered Civil Engineer. The engineering report lodged with the Council is required to have been the subject of peer review and a related report by a Registered Civil Engineer or other expert, who has established credentials with the Council. The peer review report is to corroborate and accompany the alternative proposal.

(The above statement is extracted from the Standard Requirements for Subdivision and Development, Volume Two-Chapter 28 - Marlborough Sounds Resource Management Plan and Volume Two – Chapter 4 of the Proposed Wairau / Awatere Resource Management Plan. The references to 'Registered Civil Engineer' are no longer valid. This term is replaced with the new term Chartered Professional Engineer, in keeping with the Chartered Professional Engineers of NZ Act 2002.)

This Code (NZS 4404:2004 plus Addendum) will continue to be a means of compliance, as referred to in the plans, above. The new Standard, which is the Code's template, recognises and provides for alternative design that will result in development equivalent or superior in performance to that complying with the Standard. This flexibility can be used to meet circumstances peculiar to a site or to the Council.

A significant difference between the new Standard and this Code is that the Standard does not cover regional issues. Consequently, the Code adds sections on such matters as storm water and catchment-related management issues. One very helpful aspect that the new Standard brings to this Code is that it covers development and rural subdivision and landscape design and practice, whereas the former standard and code did not.

A5 Updates of the Code

The Code will be reviewed periodically, but particularly at the time the (Resource Management) Plans are notified for public submissions.

A6 Relationship to Resource Management

The functions of the Council, set out in s.31 of the Resource Management Act 1991, include the following:

(1) Every territorial authority shall have the following functions for the purpose of giving effect to this Act in its district:

(a) The establishment, implementation, and review of objectives, policies and methods to achieve integrated management of the effects of the use, development, or protection of land and associated natural and physical resources of the district:

[(b) the control of any actual or potential effects of the use, development,

or protection of land, including for the purpose of –

(i) the avoidance or mitigation of natural hazards; and

(ii) the prevention or mitigation of any adverse effects of the storage, use, disposal, or transportation of hazardous substances; and

[[(iia) the prevention or mitigation of any adverse effects of the development, subdivision, or use of contaminated land:]]

(iii) the maintenance of indigenous biological diversity:]

(c) Repealed.

(d) The control of the emission of noise and the mitigation of the effects of noise.

(e) The control of any actual or potential effects of activities in relation to the surface of water in rivers and lakes:

(f) Any other functions specified in this Act.

[(2) The methods used to carry out any functions under subsection (1) may include the control of subdivision.]

The Standard sets out in more specific terms methods to achieve the standard expected from each phase or type of land subdivision and development.
Compliance with the methods or standard practices of this Code, in any respect of any prescribed requirement of the Plan or any condition of consent, shall be deemed to be compliance with that requirement or condition.

A7 Related Consents

Depending on the circumstances, additional consents may be required under the Resource Management Act 1991 including:

- Land use consent
- Discharge Permit
- Water Permit
- Coastal Permit

It may be that all required consents will have to be lodged concurrently. Confirmation should be sought from the Council prior to lodging an application for consent.

A8 Functions of the Council

The Council has the authority to verify compliance with the provisions of this Code as prescribed in its Resource Management Plans and may delegate such authority to any officer of the Council or person provided that:

(a) The observance or performance of any provision of this Code shall not be dispensed with except as provided herein.

(b) Means of compliance with the requirements of this Code shall be accepted by the Council as specifying good practice.

(c) In determining whether any matter or thing complies with this Code, established principles of good engineering and trade practice shall apply.

Amendments to NZS 4404: 2004

The clauses within NZS 4404 that the Council has amended or deleted are listed below in the order they appear in this Addendum.

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Addendum Number	NZS4404:2004 – Clause to be amended	Page Number of NZS4404:2004	Type of Amendment
Part 1: General Requirements and Procedures			
1.	1.1 Scope	14	Amend clause
2.	1.2.3 Definitions	16/17	Insert definitions
3.	1.2.3 Definitions	17	Amend definition
4.	1.2.4 Abbreviations	18	Insert abbreviation
5.	1.3.1 Resource Management Act	19	Amend clause
6.	1.3.2 Building Act	19	Change date
7.	C1.3.2	20	Change date
8.	1.5.2.3 Scale	21	Amend clause
9.	1.5.2.4 Content of drawings	22	Amend clause
10.	Schedule 1D	30	Amend clause
Part 2: Land Stability, Foundations and Earthworks			
11.	2.1 Scope C2.1	32	Amend clause
12.	2.2 General	33	Amend clause
Part 3: Roads			
13.	3.3.1 Minimum Requirements	46	Amend clause
14.	3.3.2.1 Design parameters	47	Delete paragraph
15.	3.3.2.2 Sight Distance	47	Amend clause
16.	Table 3.1	48	Delete table
17.	Table 3.2	49	Delete table
18.	3.3.9 Cul-de-sac heads	59	Amend clause
19.	3.3.12.1 Urban	59	Amend clause
20.	Figure 3.8	65	Replace figure
21.	3.3.19.1 Urban	69	Amend clause
22.	3.3.19.2 Rural	69	Insert text and figures
23.	Figure 3.10	71	Replace figure
24.	3.3.21.5 Sumps	74	Amend clause
25.	Figure 3.12	75	Replace figure
26.	Figure 3.14	77	Replace figure

Addendum Number	NZS4404:2004 – Clause to be amended	Page Number of NZS4404:2004	Type of Amendment
27.	Figure 3.15 and Figure 3.16	78/79	Delete figure
28.	Figure 3.18 and Figure 3.19	81/82	Delete figure/ Replace figure
29.	3.4.2.3 Basecourse (c)	83	Amend clause
30.	Table 3.6A Particle Size Distribution Envelope Limits	83	Insert table and figure
31.	Table 3.7 Minimum Surfacing Standards	84	Amend Table
32.	3.4.4.2 Double wet lock coat	85	Delete clause
33.	3.4.16 Berms and landscaping	89	Amend clause
Part 4: Stormwater Drainage			
34.	4.1 Scope	92	Amend clause
35.	4.2.3 Local authorities' requirements	92	Amend clause
36.	4.2.3.1 Authorization from the Regional Council	93	Amend clause
37.	4.3.1.1 Approval process for stormwater drainage systems	95	Amend clause
38.	4.3.2.4 Secondary flow paths	97	Amend clause
39.	Table 4.1 minimum AEP for design storms	98	Amend table
40.	4.3.2.5.2 Freeboard and c4.3.5.2	99	Delete clause
41.	4.3.3.1 Location and alignment of stormwater mains	100	Amend clause
42.	Table 4.2 Acceptable pipe materials	101	Amend table
43.	4.3.3.4 Pipeline connections	102	Amend clause
44.	4.3.3.5 Minimum pipe sizes	102	Amend clause
45.	4.3.3.6 Minimum cover	102	Amend clause
46.	4.3.5 Waterways	105	Amend clause
47.	4.3.5.1 Constructed waterways	105	Delete clause
48.	4.3.5.2 Natural waterways	105	Delete clause
49.	4.3.6 Water quality and quality control	106	Delete clause
50.	4.3.7 Connection to the public system	106	Amend clause
51.	4.3.8.1 Approved outfall	107	Amend clause
52.	4.3.8.2 Soak pits	107	Amend clause

Addendum Number	NZS4404:2004 – Clause to be amended	Page Number of NZS4404:2004	Type of Amendment
53.	4.3.12.3 Sizing of the stormwater drainage system and profiles 4.3.12.3.3 Determination of water surface profiles	109	Amend clause
54.	4.3.12.3.4 Outfall water levels	114	Delete & amend clause
55.	4.3.12.5 Waterways	115	Delete clause
56.	4.3.12.5.1 Manning's 'n'	115	Amend clause
57.	4.3.12.6 Outlets	116	Amend clause
58.	4.3.12.7 Stormwater quality control	116	Amend clause
Part 5: Wastewater			
59.	5.3.5.1 Design Flow	124	Amend clause
60.	5.3.5.2 Hydraulic design of pipelines	124	Amend clause
61.	Table 5.3 Coefficients for gravity lines	125	Delete table
62.	Table 5.4 Minimum pipe size for wastewater reticulation and property connections	125	Amend clause
63.	Table 5.5 Minimum grades for wastewater pipes	126	Amend table
64.	Table 5.6 Minimum grades for property connections and permanent ends	126	Amend table
65.	Table 5.7 Acceptable MH, MS and TMS options for wastewater reticulation	127	Amend table
66.	Table 5.9 Minimum internal fall through MH joining pipes of same diameter	129	Replace table
67.	5.3.10 Pumping stations and pressure mains	135	Insert text
68.	5.4 Construction	135	Amend clause
69.	5.4.2 Manhole connections	135	Insert clause
70.	5.4.3 Below ground structures	135	Insert clause
Part 6: Water Supply			
71.	6.3.8.3 Fire flows	143	Insert clause
72.	6.3.8.4 Fire sprinkler systems	143	Insert clause

Addendum Number	NZS4404:2004 – Clause to be amended	Page Number of NZS4404:2004	Type of Amendment
73.	6.3.9.3 Peak flows	144	Amend clause, insert text and diagram
74.	6.3.9.4.1 Hydraulic roughness values	144	Amend clause, insert text and table
75.	Figure 6.1 Conceptual hydraulic operation of a gravity main	146	Replace figure
76.	6.3.9.6.2 Operating pressure working pressure	147	Amend clause
77.	6.3.10.1 General	149	Amend clause
78.	6.3.10.3 Water mains in easements	149	Amend clause
79.	6.3.10.5 Water mains near trees	150	Amend clause
80.	6.3.11.8.1 Thrust blocks	154	Amend clause
81.	Table 6.2 Clearance between water mains and underground services	155	Amend table
82.	6.4.2.1 Gate valves	157	Amend clause
83.	6.4.2.3 Stop valves for reticulation mains	158	Amend clause
84.	Figure 6.4 Secure connection	160	Amend clause
85.	6.4.2.7 Toby valves	162	Insert clause
86.	6.5.6 Hydrant location marking	163	New clause
87.	6.11 Means of Compliance	168	Amend clause
88.	6.11.2 Minimum pipe sizes	168	Amend clause
89.	Clause 6.11.3 Allowable operating pressure (head) and Table 6.5 Operating pressure units	168	Amend clause and table
90.	6.11.4 Minimum flows	168	Amend clause
91.	6.11.5 Minimum water demand	168	Amend clause
92.	Table 6.6 Empirical guide for minimum principle main sizing	169	Amend table
93.	Table 6.7 Empirical guide for sizing rider mains	169	Amend table
94.	Table 6.8 Stop valve spacing criteria	170	Amend table

Addendum Number	NZS4404:2004 – Clause to be amended	Page Number of NZS4404:2004	Type of Amendment
Part 7: Landscape Design and Practice			
95.	7.2.2 Compatibility with engineering design	172	Amend clause
96.	7.2.7 Safer Design Guidelines	173	Insert clause
97.	7.3.1.2	173	Amend clause
98.	7.3.2.2	176	Amend clause
99.	7.3.3.1	176	Amend clause
100.	7.3.5.1	177	Amend clause
101.	7.4.1.2	177	Amend clause
102.	7.4.4.1	178	Amend clause
103.	7.4.7 Pruning	181-182	Delete clause
104.	7.4.8 Restoration and tidy up	182	Amend clause
105.	7.4.8.5	182	Insert clause
Part 8: Reserves			
106.	8.2.4	184	Amend clause
107.	8.2.5	184	Insert clause
108.	8.2.6 Esplanade reserves	184	Insert clause
109.	8.3.4 Existing trees	185	Amend clause
110.	8.3.5 Park furniture/structures	185	Amend clause
111.	8.3.7 Presentation of reserves	185	Amend clause
Appendix			
112.	B1 Testing of steel and PVC pipes in Appendix B	212	Amend clause
113.	Appendix E Unsuitable Street Trees	216	Insert appendix

Marlborough District Council – Code Of Practice For Subdivision And Land Development. Addendum Of Changes To Be Read In Conjunction With NZS4404:2004.

1. Clause *1.1 Scope* p 14 is amended as follows:

1.1 Scope

This Standard~~, if adopted by territorial authorities (TAs),~~ serves as a basis for technical compliance for the subdivision and development of land where these activities are subject to the Resource Management Act 1991.

Part 1 of this Standard concerns matters of general application and general requirements to be observed.

Parts 2 to 9 of this Standard provide good practice guidelines relating to particular types of infrastructures to be provided.

2. Clause *1.2.3 Definitions* p 16/p17 is amended by inserting the following:

ESPLANADE RESERVES & STRIPS have the meaning defined in the Resource Management Act 1991.

RECREATION RESERVES means areas for the purpose of providing open space for recreation, sporting activities, space for the physical welfare and enjoyment of the public and for the protection of the natural environment and the beauty of the countryside.

SOILS 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.

TOBY VALVE means the valve at the point of supply (the point where piping changes from TA water pipe to consumers private piping).

3. Clause *1.2.3 Definitions Territorial Authority* p 17 is amended as follows:

TERRITORIAL AUTHORITY (TA) means Marlborough District Council.~~a territorial authority (TA) as defined in the Local Government Act. 2002.~~

4. Clause *1.2.4 Abbreviations* p 18 is amended by inserting the following:

ID internal diameter

5. Clause *1.3.1 Resource Management Act* p 19 is amended as follows:

1.3.1 *Resource Management Act*

The Resource Management Act 1991 is the principal statute under which the development and subdivision of land is controlled.

The Council's resource management ~~district~~ plans (Proposed Wairau-Awatere Resource Management Plan and Marlborough Sounds Resource Management Plan) ~~of TAs~~ are resource management instruments with the purpose of achieving the promotion of sustainable management of natural and physical resources, which is the overarching purpose of the Resource Management Act 1991.

Standards unless incorporated …

6. Clause *1.3.2 Building Act* p 19 is amended as follows:

1.3.2 *Building Act*

The Building Act ~~1991~~ 2004 provides a national focus for building control to ensure that buildings are safe and sanitary and have suitable means of escape from fire, and the Building Regulations made under the 1991 Act provide the mandatory requirements for building control in the form of the New Zealand Building Code. The Building Code contains the objective, functional requirements and performance criteria that building work must achieve.

Where infrastructural development associated with subdivision or development of land involves the creation of structures with associated site works, the requirements of the Building Act must be observed. Nothing in this Standard shall detract from the requirements of the Building Act ~~1991~~ 2004 or the Building Code.

7. Clause *C1.3.2* p 20 is amended as follows:

C1.3.2
Systems owned or operated by a network utility operator for the purpose of reticulation to other property are not included in the definition of building under the Building Act ~~1991~~2004

8. Clause *1.5.2.3, Scale* p 21 is amended as follows:

1.5.2.3 *Scale*
The required scale for plans is generally 1:500 but 1:200 or 1:250 may be ~~other~~ accepted if the full design can be accommodated on a single plan ~~engineering scales may be used to suit the level of details on the plans~~. Special details shall be to scales appropriate for clarity. ~~Individual TAs may require other specific scales to be used~~.

9. Clause *1.5.2.4 Content of drawings part (I)* p 22 is amended as follows:

1.5.2.4 *Content of drawings*
The following information shall be shown on the design drawings:

…..

(i) Details of proposed landscaping of roads and allotments, and details of proposed reserve development including earthworks, landscaping features, landscaping structures (see 7.3.5), tree planting, hard and soft surface treatment, park furniture, irrigation and playground equipment (see 8.3.5).

10. *Schedule 1D* p 30 is amended as follows:

SCHEDULE 1D

AS-BUILT PLANS

Information given on as-built drawings~~,~~ ~~whether~~ submitted ~~electronically or~~ as paper plans and electronically~~,~~ shall include but shall not be limited to:

(a) Stormwater and wastewater reticulation – including the co-ordinated positions of manholes, manhole inverts, inverts of pipes and lid levels, measurements to house connections, and laterals and their length and position. Positions of connections and laterals shall be both co-ordinated and referenced to adjacent manhole lids and boundary pegs. All levels shall be in terms of datum approved by the TA;

(b) Flood and secondary flow information, flood water levels and the extent of any overland secondary flows shall be shown where these have been obtained or derived during the design;

(c) Water reticulation (including irrigation)– including the position of reservoirs, mains, location of hydrants, valves, tees, reducers, connections, tobies, specials, etc. All features shall be accurately dimensioned, co-ordinated and referenced to boundary pegs so that they can be accurately relocated in the field; The Ground Level plus minimum and maximum water levels of all tanks and reservoir to be included. All levels shall be in terms of datum approved by the TA;

(d) Ducts – measurements to ducts installed for utilities;

(e) Labelling of pipes and ducts to cover diameter (including whether ID, OD, or DN (dia Nominal), pipe material and class, year laid, jointing type; Terminology, especially relating to diameter sizing, is to be similar to that used in the appropriate standard to which the pipe is made)

(f) Road names – as approved by the TA;

(g) Co-ordinates of all utility surface features to be taken over by the TA, including tobies,

(h) The co-ordinates of at least two points on each plan in terms of an appropriate geodetic or cadastral datum and the origin of the plan level datum;

(i) Geotechnical completion report as detailed in 2.11 of this Standard. As-built surface contours covering all areas of undisturbed and cut/fill ground to indicate the finished ground and any deviation from approved design plan;

(j) Road construction, including location, structural details and details of road marking, signals, lighting, signs, landscape features, seating and other amenities and features;

(k) Road surfacing information – for sealed roads, information shall include binder type and application rate, cutter type and quantity, adhesion agent type and quantity, type and quantity of other additives, the width, length and area of each street sealed, chip size, the design basis for the binder application rate and a discussion on any reasons for differences between the design and applied rate.

(l) Landscaping – including details of plant names and location, materials to be used, an electrical plan for landscape lighting, and an irrigation plan

11. Clause *2.1 Scope C2.1* p 32 is amended as follows:

C2.1

This Part 2 is not a geotechnical standard but sets out some, but not necessarily all of the matters which need to be considered in planning and constructing a land development project. Its function is to provide information for professionals involved in designing

and constructing a land development project and to require geotechnical expertise in projects where land stability could be an issue or where earthworks other than of a minor nature will occur.

The assessment of land stability to meet the provisions of the Resource Management Act and Building Act is the responsibility of the TA. The TA requires and relies on the assessment made by the geotechnical engineer employed by the developer.

The methods used and investigations undertaken are defined by the TA and the geotechnical engineer.

This Standard does not set those requirements or set standards for assessing geotechnical risk.

Special requirements apply when land is subject to erosion, avulsion, alluvium, falling debris, subsidence, inundation or slippage. In such situations reference needs to be made to s.106 of the Resource Management Act 1991, and for subsequent building work, s. 71-74 ~~36~~ of the Building Act ~~1991~~ 2004.

12. Clause 2.2 General *p 33 is amended as follows:*

2.2 General

The choice of final land form is dependent on many factors which may be specific to the development. These include the relationship with surrounding landscapes, the size of the development, the proposed and existing roading patterns, the preservation of natural features, the land stability, the function and purpose of the development and the potential for flooding, erosion and other natural events including earthquakes.

The order of importance of the above factors will vary from project to project.

NOTE: The Council's Geotechnical Reporting Requirements 2005 contain detailed requirements relating to providing the Council with a report and an opinion on proposed development where land stability is an issue. These requirements can be found on the Council's website under Plansandreports\summarylist\otherdocuments\geotechicalreporting2005. These requirements must be met prior to any work commencing.

13. Clause *3.3.1 Minimum requirements* p 46 is amended as follows:

3.3.1 *Minimum requirements*

~~Unless approved otherwise by the TA, road standards as defined in table 3.1 (urban) and table 3.2 (rural)~~ The Council's Resource

Management Plans shall be used as the basis for road design. Traffic calming measures may be used in conjunction with these road dimensions to enhance streetscape and community amenity and control vehicle speeds.

Urban roads shall be provided with kerbs and channels and be adequately drained unless the TA approves an alternative. Subsoil drains under pavement/kerb edges shall be provided in terms of good engineering practice….

14. Clause *3.3.2.1 Design parameters* p 47 is amended as follows:

3.3.2.1 *Design parameters*

Primary and collector roads shall be designed to accepted standards (generally satisfied by the use of the Austroads *Guide to Traffic Engineering Practice*) and shall incorporate horizontal transition curves. Other urban roads within speed limit zones below 70 km/h or with adequate bend widening may satisfy the geometric standards incorporated in table 3.1 of this Standard or other standards set from time to time by the TA and horizontal geometry may generally use wholly circular curves.

Rural roads shall be designed in general compliance with the TNZ *State Highway Geometric Design Manual or Austroads Guide to the Geometric Design of Rural Roads* except as modified by the design parameters given in table 3.2 for the applicable road class. Rural roads in steep hill country where speed limits do not exceed 70 km/h may utilize circular curves without horizontal transition curves.

Combination of carriageway widening and off-street parking shall be used to provide extra and/or safe parking in the vicinity of shopping centres or community facilities (e.g. schools, community centres, hospitals etc.).

~~For design speeds, carriageway width, road reserve width, berms, maximum and minimum gradients, camber and super-elevation refer to tables 3.1 and 3.2~~.

Horizontal and vertical curve design aids suitable for urban roads without horizontal transition curves are given in tables 3.3 to 3.6 inclusive.

15. Clause *3.3.2.2 Sight distance* p 47 is amended as follows:

3.3.2.2 *Sight distance*

Sight distance criteria at intersections as well as for stopping, overtaking, curves and obstructions shall be applied in

accordance with the Council's Resource Management Plans ~~Austroads *Guide to Traffic Engineering Practice Part 5: Intersections* and *Part 6: Roundabouts*~~.

16. Table *3.1* – Road Design Standards - Urban p 48 has been deleted as follows:

~~**Table 3.1 – Road design standards – Urban (speed limit ≤ 70 km/h)**~~

17. *Table 3.2* – Road Design standards – Rural p 49 has been deleted as follows:

~~**Table 3.2 – Road design standards – Rural (speed limit up to 100 km/h)**~~

18. Clause *3.3.9 Cul-de-sac-heads* p 59 is amended as follows:

3.3.9 *Cul-de-sac heads*

~~Typical heads are shown in figures 3.4 and 3.5~~ Figure 3.4 shows an acceptable cul-de-sac head. The heads shown in figure 3.5 will only be acceptable if:

A the head is temporary prior to connection with an adjoining link road, or

B the topography prevents construction of a figure 3.4 head, or

C the head is part of a private right-of-way or access

Subject to design a central area may be provided for parking or beautification in a cul-de-sac head. The minimum kerb gradient around cul-de-sac heads shall be 0.5 %. Where the head of a cul-de-sac is also a low point it shall be provided with a double sump with individual leads from each sump.

19. Clause *3.3.12.1 Urban* p 59 is amended as follows:

3.3.12.1 *Urban*

Footpaths shall be provided to adequately service all urban developments.

Their dimensions, strength, durability and finish shall be appropriate to their use and expected loadings. Footpaths shall be a minimum of 1.4 m wide surfaced over their full width. Wider footpaths or areas of local widening will often be required by the TA where higher use or other needs dictate such widening.

Grassed berms shall be provided over the widths between path and kerb and between path and road boundary. The berm shall incorporate not less than 100 mm compacted thickness of loam topsoil placed over a base material capable of allowing root penetration and sustaining healthy growth.

In all cases the combined berm and footpath width shall be adequate to enable landscaping and all current and expected services to be installed. To enable tree and amenity plantings, services must be confined to a defined area, so as not to conflict with or prevent amenity planting.

Berm crossfall shall, where possible, be 1 in ~~25~~ 30. Where this cannot be obtained the crossfall shall be no ~~greater~~flatter than 1 in 50.

Grassed areas for tree planting which are additional to the minimum berm width shall be specifically designed, and in these areas steeper gradients may be permitted to a maximum of 1 in ~~5~~3 providing the area can be mown.

Where a berm crossfall greater than 1 in 12.5 is proposed, the designer shall produce a cross section along suitable individual property access locations to show that the sag or summit curves at crossings can be satisfactorily negotiated by a 90th percentile car.

Pedestrian accessways shall be a minimum of 2.2 m wide and be designed for user safety. They should:

(a) Be direct and as short as possible;

(b) Have good sight lines for casual surveillance;

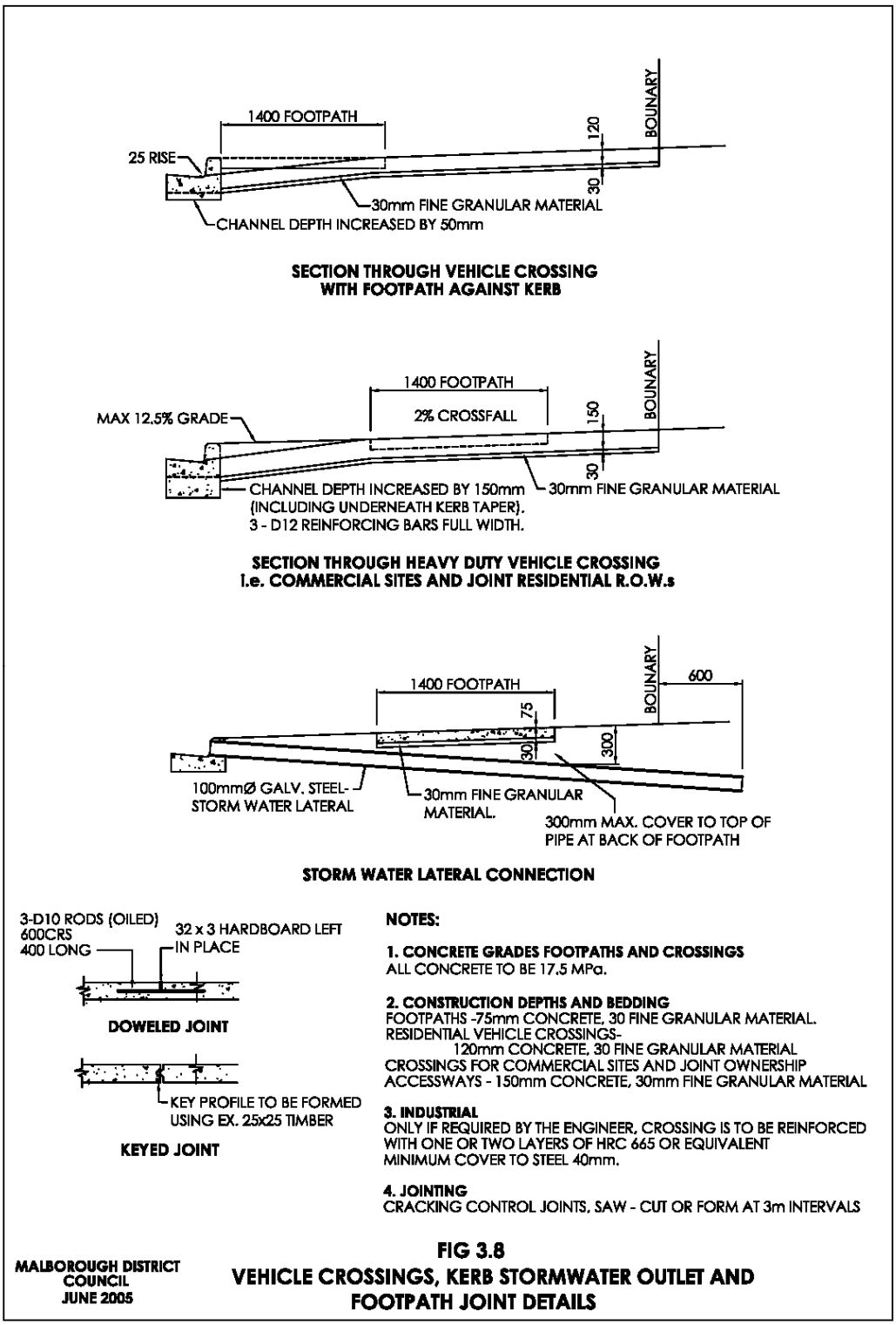
(c) Be sited to ensure high levels of community use.

Pedestrian accessways shall be at least 2.2m wide with at least 1.4m surfaced and the remainder soft landscaping. ~~over their full width and p~~ Provision shall be made for the collection and disposal of stormwater. Both sides of the accessway shall be fenced with solid fencing at least 1.2 m high and an optional trellis or similar 600mm high with at least 50% fill. ~~provided with m~~Mowing strips shall be provided to all sides of the fence base. The palings or approved fence facing shall face the accessway or reserve as applicable. Cycle barriers ~~shall~~ may be ~~provided~~ required at both ends of pedestrian accessways suitable for disabled access including wheelchairs and mobility scooter access.

Acceptable details for pedestrian accessway cycle barriers are shown in figure 3.7. For fencing details refer to figure 8.1 of this Standard.

Stormwater disposal and lighting shall be provided to all pedestrian accessways.

20. *Figure 3.8 Footpath construction – typical sections* p 65 is replaced with *Figure 3.8 Vehicle crossings, kerb stormwater outlet and footpath joint details* as follows:



~~**Figure 3.8 – Footpath construction – typical sections**~~

21. Clause *3.3.19.1 Urban* p 69 is amended as follows:

3.3.19.1 *Urban*

Vehicle crossings shall be provided between the kerb line or carriageway edge and the road boundary at the entrance to all private ways and service lanes and to any lots, front or rear where access points are clearly identifiable at the subdivisional or development stage.

~~Where access points are not clearly identifiable at the subdivisional or development stage, crossings shall be constructed at the building consent stage.~~

Vehicle crossings shall be designed to enable the 90th percentile car to use them without grounding of any part of the vehicle. Figure 3.9 shows details satisfying this requirement. Structural design shall be adequate to carry the loads to be expected over its design life. All crossings shall be surfaced with asphalt or concrete or paving stone as approved by the TA. If alternative materials are used Council shall not be responsible for replacing these materials after maintenance work is undertaken. Figure 3.10 shows an acceptable detail of vehicle crossing.

Where kerb and channel is not provided, and stormwater drainage is provided by open drain rather than piped system, crossings shall be provided as for rural locations as specified in 3.3.19.2.

Pram and wheelchair crossings shall be provided at all road intersections and pedestrian crossings. The crossings shall be sited to facilitate normal pedestrian movements in the road and where possible sumps shall be sited so as to reduce the flow of stormwater in the channel at the crossing entrance. Pram, ~~and~~ wheelchair and mobility scooter crossings shall satisfy NZS 4121 for disabled persons access and shall incorporate tactile tiles.

22. Clause 3.3.19 *Rural* p69 is amended by adding the following at the end of the clause and inserting Figures 3.10A to 3.10F after Figure 3.10

3.3.19.2 *Rural*

…

Figures 3.10A, 3.10B and 3.10C show an acceptable detail for rural accesses on roads other than state highways, based on the number and type of users of the road. (Note: these figures are Figures 11, 12 and 13 in the Proposed

Wairau/Awatere Resource Management Plan.)

Figures 3.10D, 3.10E and 3.10F show acceptable detail for rural accesses onto state highways based on the level of use. (Note: these figures are Diagrams C, D and E from Transit New Zealand's Planning Policy Manual. Figures 26.9, 26.10 and 26.11 in the Marlborough Sounds Resource Management Plan specify the permitted activity standards for accesses onto State Highways within the Marlborough Sounds).

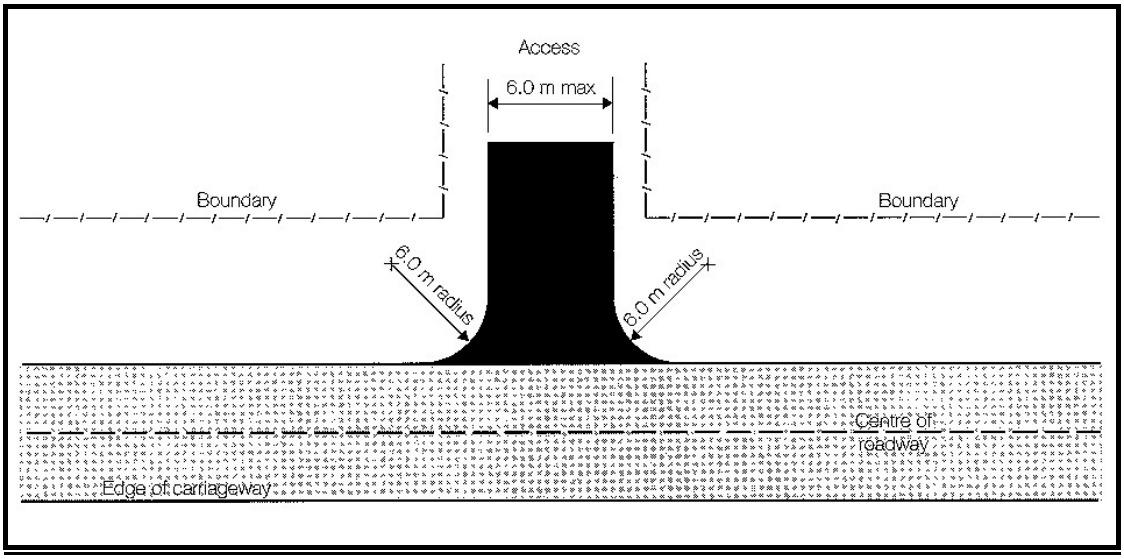


Figure 3.10A Private Access for One Rural User

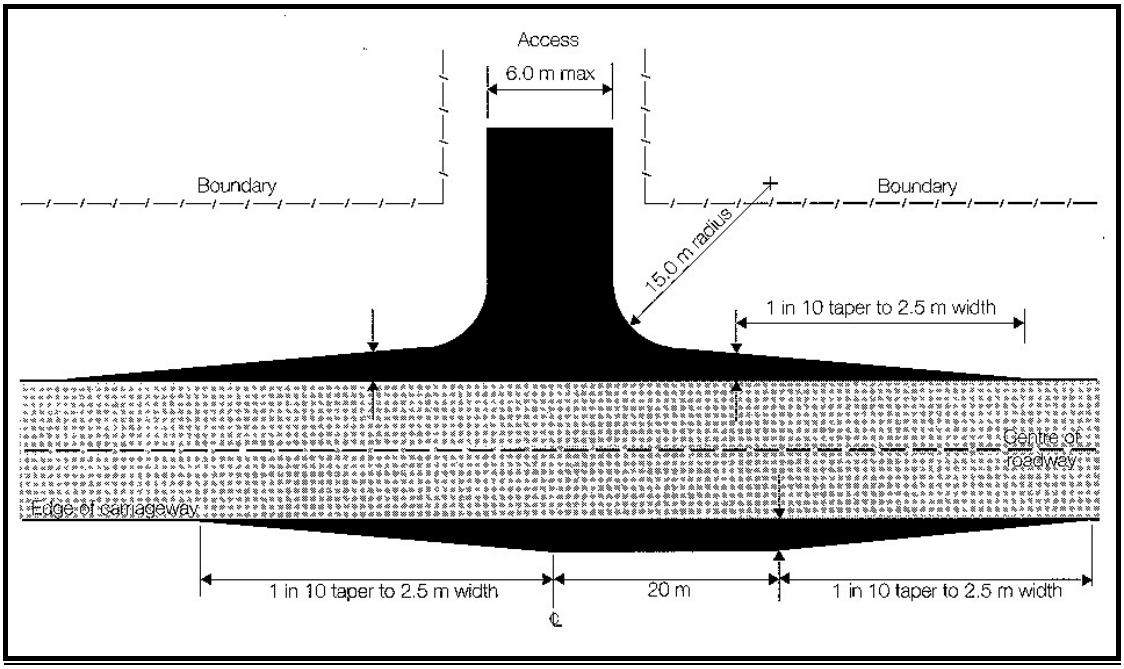


Figure 3.10B Private Access for 2 – 6 Rural Users

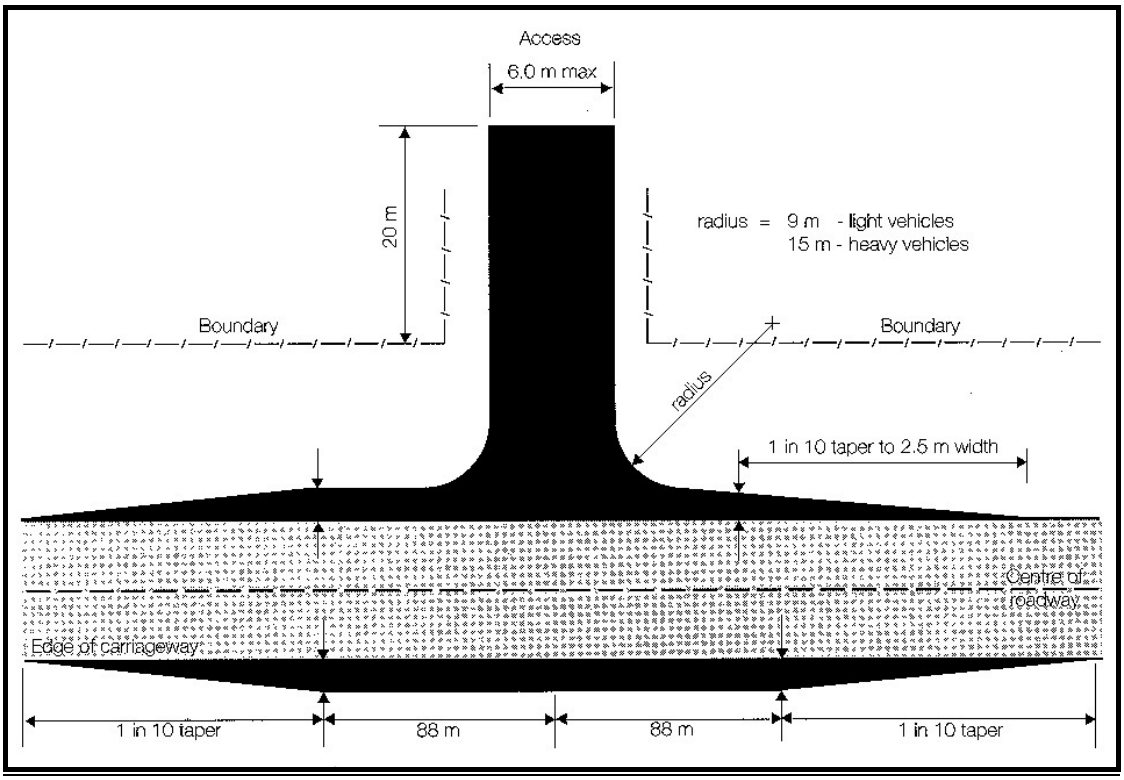


Figure 3.10C Local Road Widening Commercial Access Rural Zones

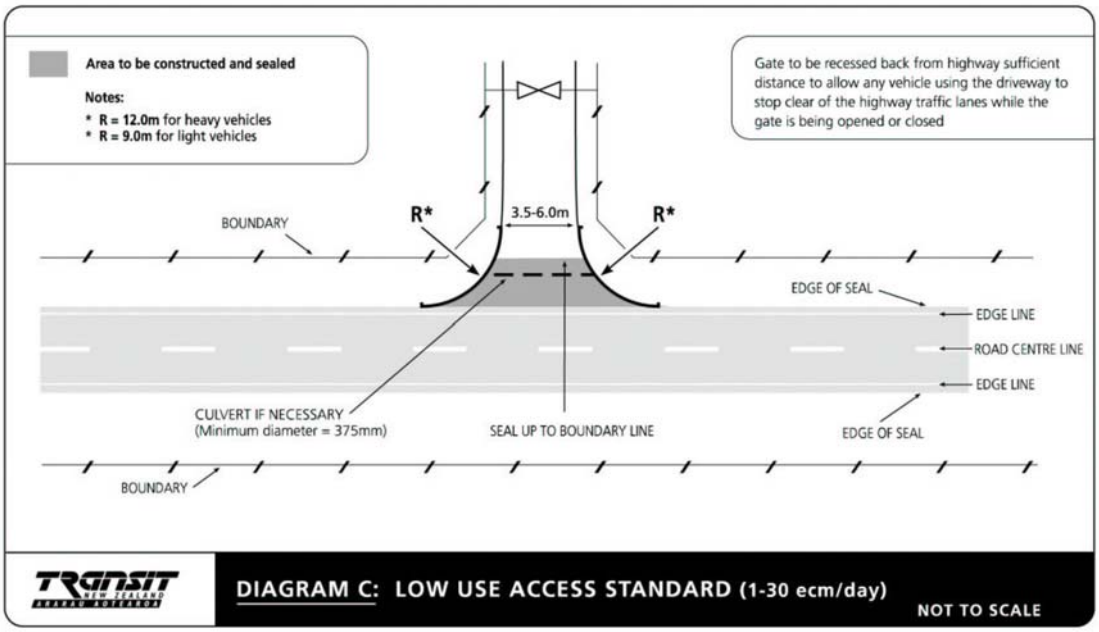


Figure 3.10D

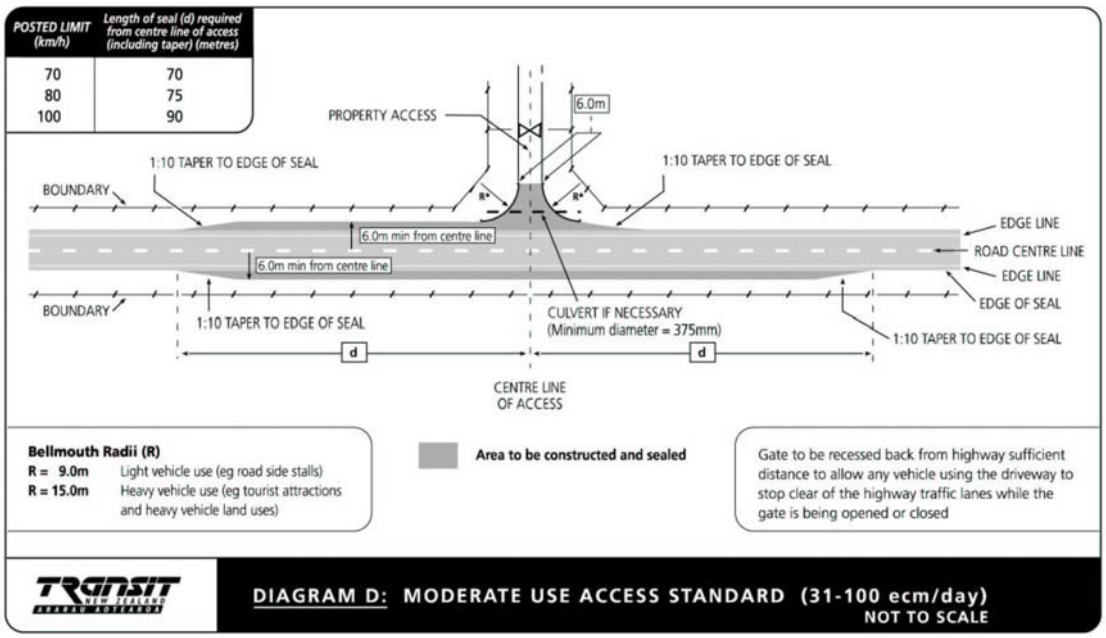


Figure 3.10E

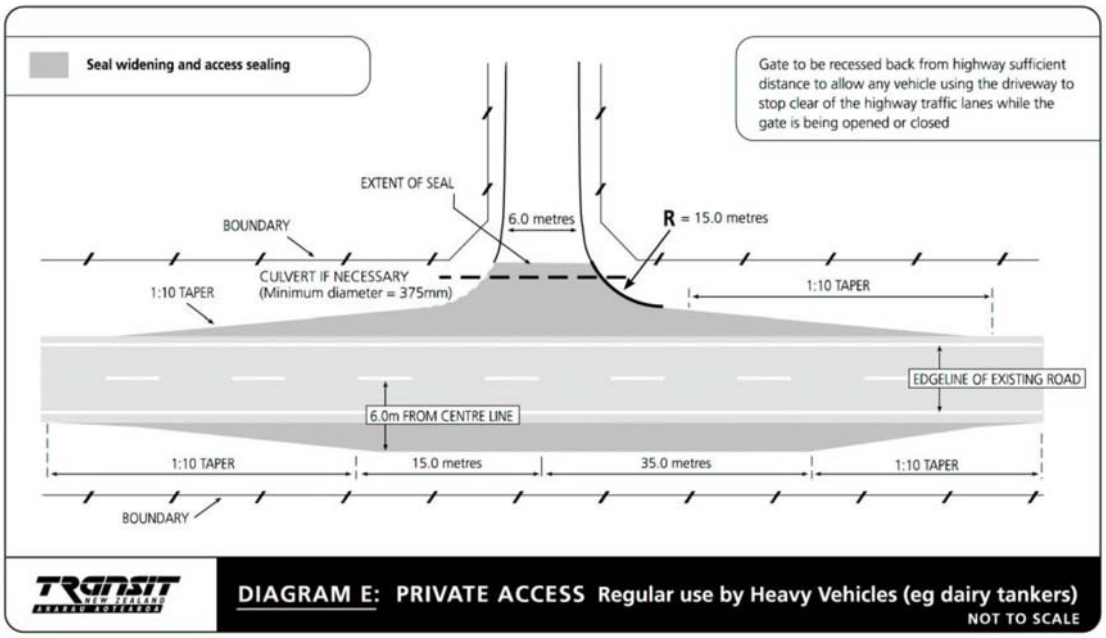
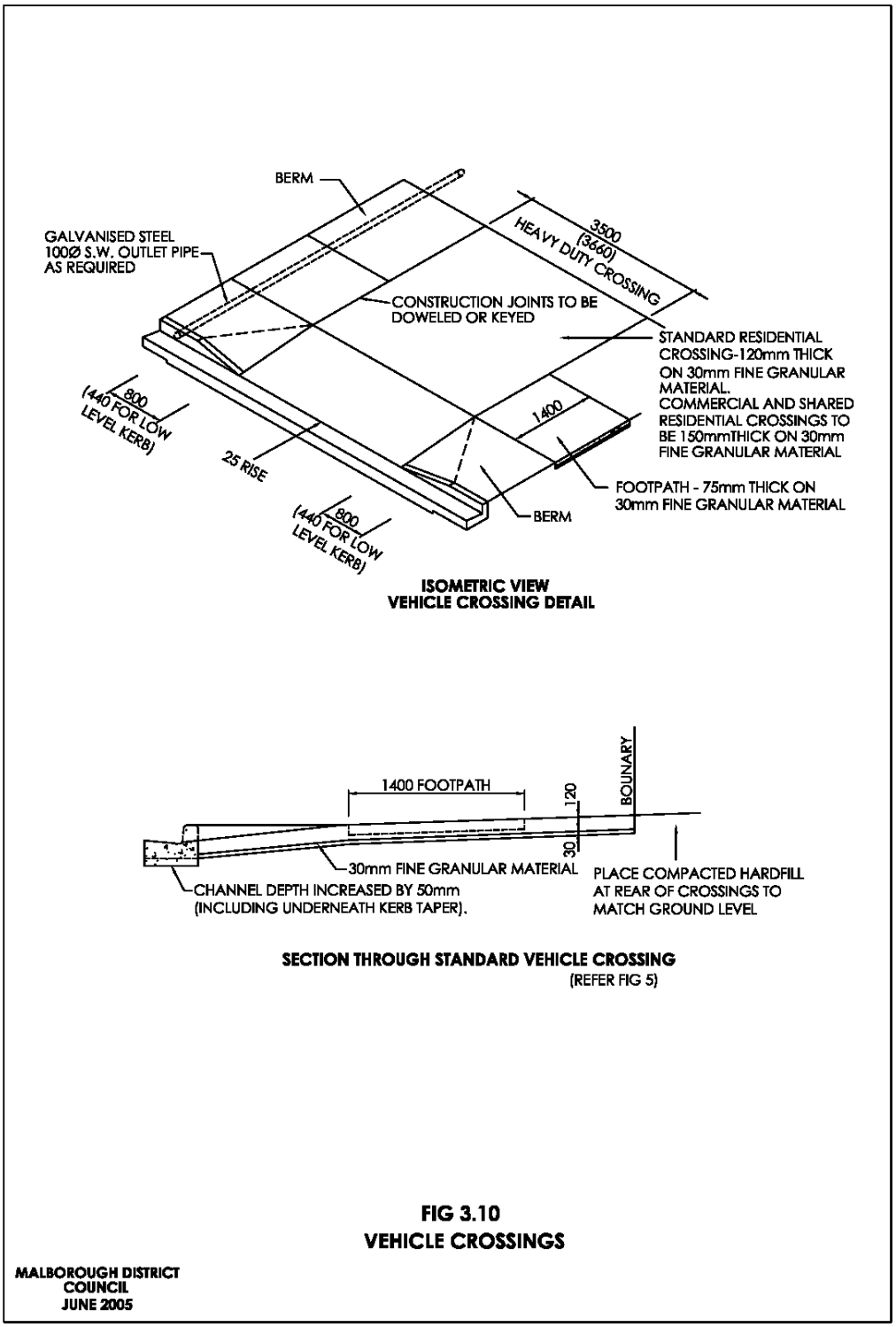


Figure 3.10F

23. Replace Figure 3.10 - Standard light duty vehicle crossing detail p71 with Figure 3.10 – Vehicle Crossings as follows:



~~**Figure 3.10 – Standard light duty vehicle crossing detail**~~

24. Clause *3.3.21.5 Sumps* p 74 is amended as follows:

3.3.21.5 *Sumps*

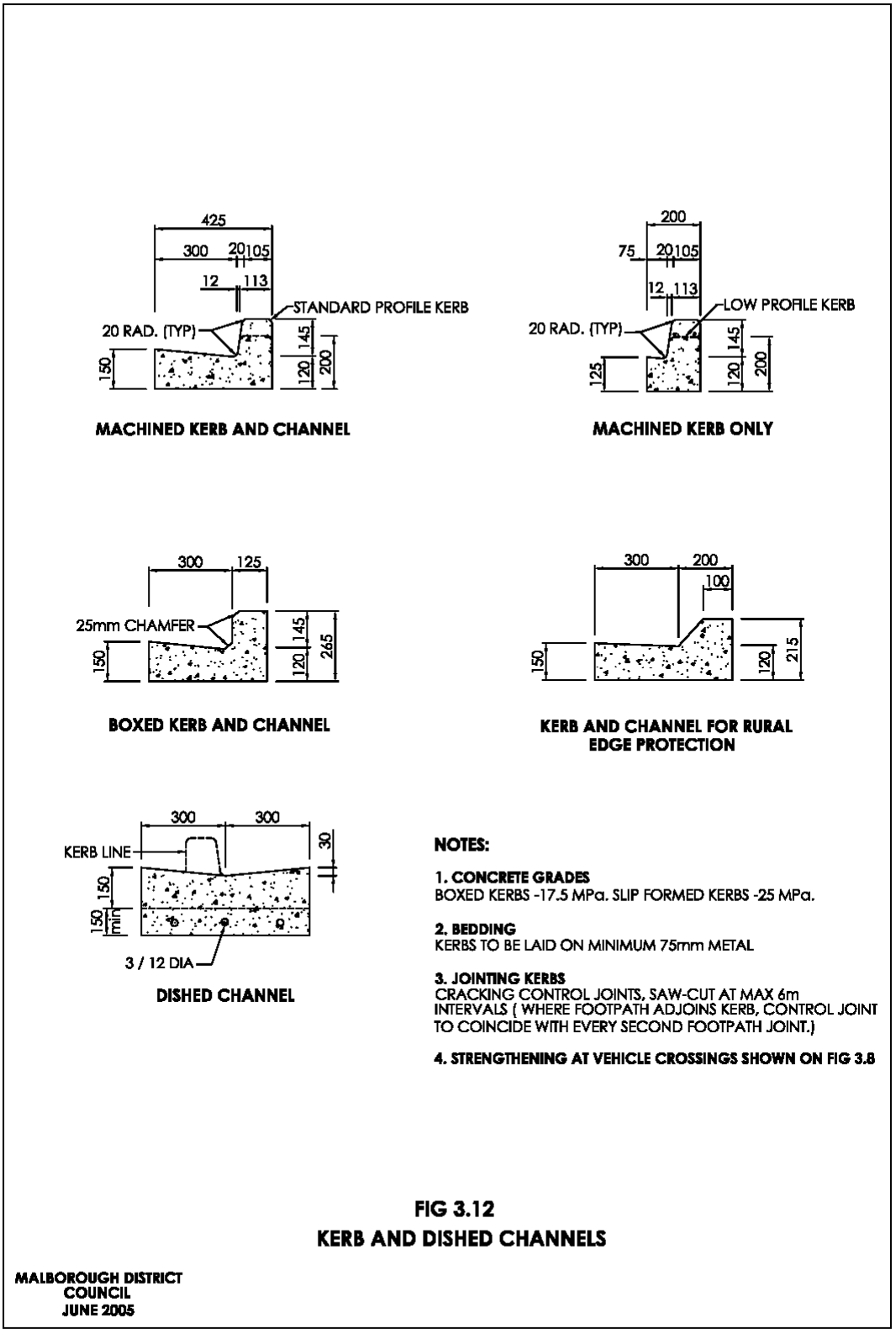
Sumps used in all public places shall comply with the TA's current standard details.

On footpaths and accessways, kerb or driveway or right of way type sumps shall be used. Figure 3.13 shows an acceptable detail for a driveway or right of way sump. A flat channel or yard sump and various styles of hillside sump are shown in figures 3.14, ~~3.15, 3.16~~ and~~,~~ 3.17 ~~and 3.18~~.

~~A double back entry sump for road low points is shown in figure 3.19~~.

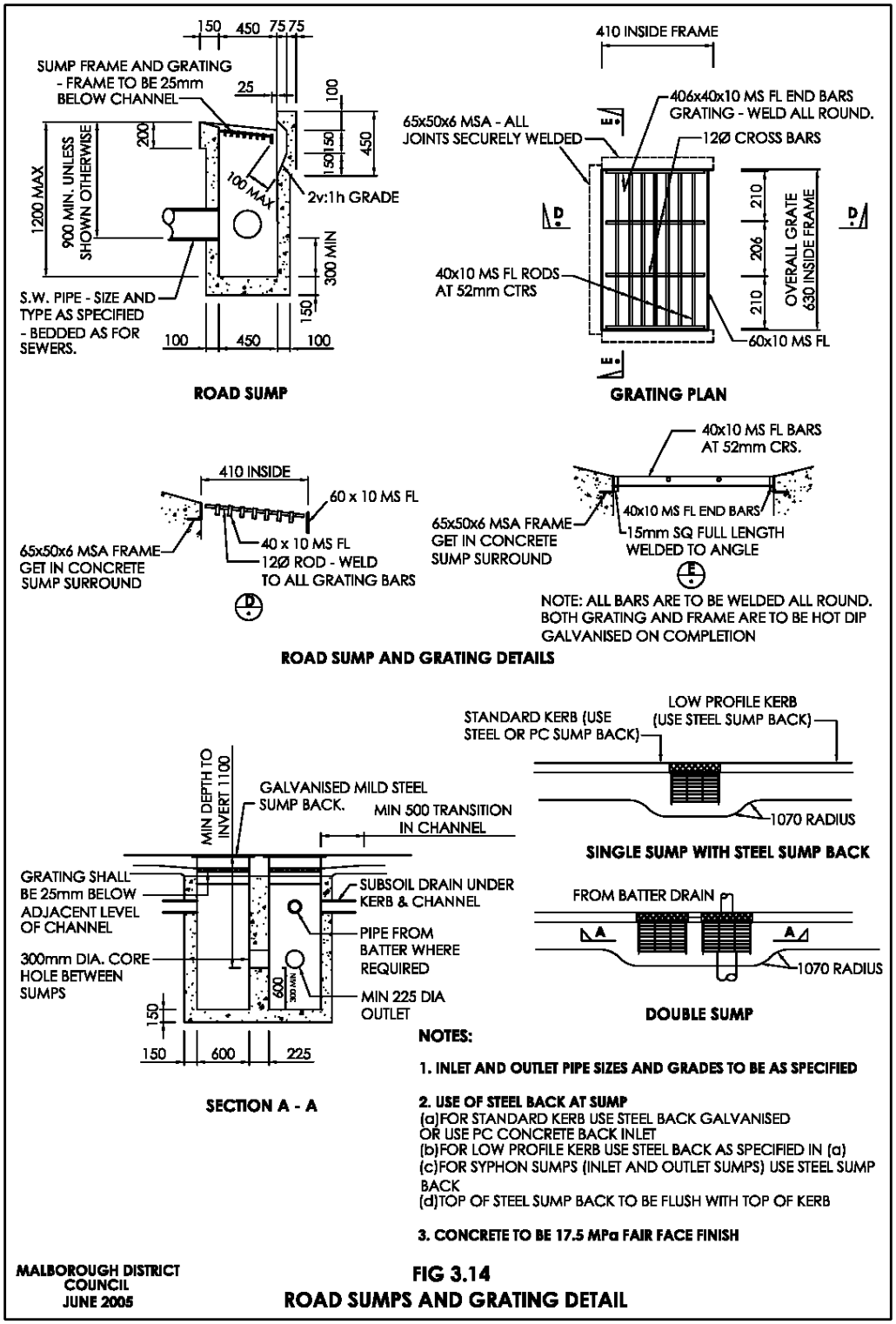
Trapped sumps shall be used where discharge to a soakpit is permitted.

25. Replace *Figure 3.12 – Kerb and dished channels* p 75 as follows:



~~Figure 3.12 – Kerbs and dished channels~~

26. Replace *Figure 3.14 – Flat channel or yard sump* p 77 with *Figure 3.14 Road Sumps and Grating Detail* as follows:



~~**Figure 3.14 – Flat channel or yard sump**~~

27. Delete *Figure 3.15 – Hillside sump* p 78; and *Figure 3.16 – Add on to back entry sump for hill side situations* p 79*.*

Figures 3.15 and 3.16 are not applicable to the Marlborough situation.

~~Figure 3.15 – Hillside sump~~

~~Figure 3.16 – Add-on to back-entry sump for hillside situations.~~

28. Delete Figure 3.18 – Special entry to double sump in hillside channel p 81; and Figure 3.19 Double back entry sump for road low points p 82.

~~Figure 3.18 – Special entry to double sump in hillside channel.~~

~~Figure 3.19 – Double back-entry sump for road low points.~~

Refer to amendment 30 below for new figure 3.19.

29. Clause *3.4.2.3 Basecourse (c)* p 83 is amended as follows:

3.4.2.3 *Basecourse*

The thickness of the basecourse layer when used with other metal aggregate layers shall not be less than 100 mm.

Acceptable basecourse specifications are:

(a) TNZ M/4, (all passing 40 mm – AP40)

This is a high quality material to be used for all roads of arterial class;

or

(b) TNZ approved regional basecourse

This is a slightly lower quality material than TNZ M/4. It may be used for roads of collector class;

or

(c) Local basecourses acceptable to the TA and TNZ

They may be used for non industrial/commercial roads of local class and footpaths, kerb crossings, shared accessways etc. Acceptable local AP40 basecourse envelope and particle size distribution limits are specified in figure 3.19 and table 3.6A.

30. Insert *Table 3.6A – Particle Size Distribution Envelope Limits for an Individual Sample* and *Figure 3.19 Local AP40 Basecourse Envelope* as follows:

Table 3.6A – Particle Size Distribution Envelope Limits for an Individual Sample

Test Sieve Aperture (mm)	Max and Min Allowable Percentage Weight Passing		
	TNZ AP40 Lower	Local AP40 Lower	TNZ and Local AP40 Upper
0.075	0	0	7
0.15	0	0	10
0.3	3	3	14
0.6	7	7	19
1.18	12	11	25
2.36	19	18	33
4.75	28	27	43
9.5	43	41	57
19	66	63	81
37.5	100	100	100

Sand equivalent shall not be less than 30

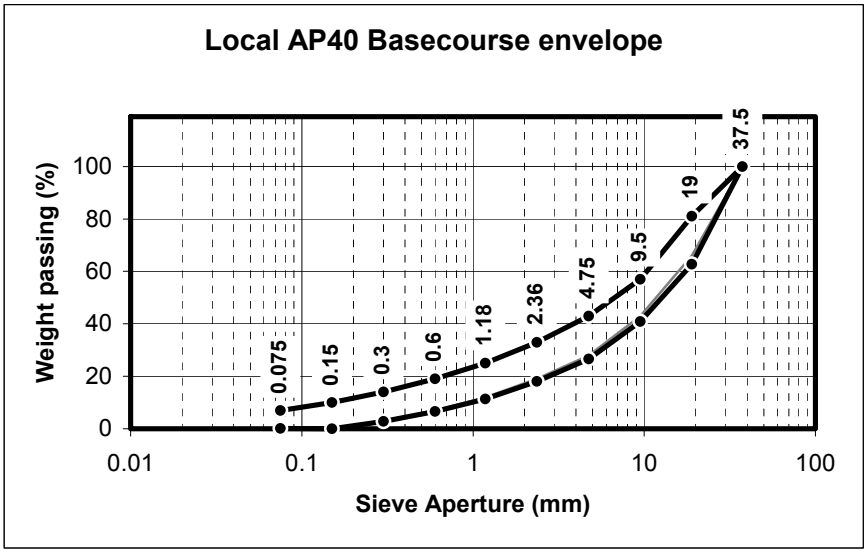


Figure 3.19 Local AP40 Basecourse Envelope

31. Amend *Table 3.7 – Minimum surfacing standards* p 84 as follows:

Table 3.7 – Minimum surfacing standards

Facility	Minimum surfacing
Residential cul-de-sac head	Segmental concrete pavers, concrete, 30 mm asphaltic concrete
Public carparks (excl. parallel parks)	Segmental concrete pavers, concrete, 30 mm asphaltic concrete
Industrial/commercial road cul de sac head	Segmental concrete pavers, concrete, 50 mm asphaltic concrete
Traffic islands and bus stops	Segmental concrete pavers, concrete, 50 mm asphaltic concrete

32. Clause *3.4.4.2 Double wet lock coat* p 85 is deleted as follows:

3.4.4.2 *Double wet lock coat*

This clause has been deleted

~~First and second seals may be constructed in one operation with asphaltic cutback to TNZ M/1 and P/3 specifications.~~

~~The binder application rate for the seals shall be designed to suit the conditions and chip size.~~

~~Acceptable and compatible chip sizes are:~~

~~Local roads First coat: grade 4, second coat: grade 6~~

~~Other roads First coat: grade 3, second coat: grade 5 or 6.~~

33. Clause *3.4.16 Berms and landscaping* p 89 is amended as follows:

3.4.16 *Berms and landscaping*

Berms shall be formed after all other works have been completed. The topsoil shall be free of weeds, stones and other foreign matter and shall be graded to footpath edge, provide a minimum seed bed of 100mm of loam topsoil compacted and shall finish 15 mm above footpath level to allow for settlement. The base material must be capable of allowing

root penetration and sustaining healthy growth.

After topsoiling, the berm shall be sown with Duraturf germinator or club choice grass seed ~~that conforms with the following mix proportions~~ unless the ~~TA~~ Council specifies an alternative seed mixture. The berms shall be given a single application of fertilizer of 3 parts superphosphate and one part sulphate of ammonia applied at a rate of 110kg/ha.~~:~~

~~4 parts by weight Perennial Ryegrass;~~

~~2 parts by weight Chewing's Fescue;~~

~~1 part by weight Browntop;~~

~~1 part by weight Crested Dog's tail~~.

Berms shall be sown and maintained mown free of weeds for the contract maintenance period.

A sward coverage of not less than 90 % shall be achieved within one month of sowing and before completion documentation will be accepted for processing by the TA.

Any landscaping within the road reserve shall be in accordance with Part 7 of this Standard.

34. Clause *4.1 Scope* p 92 is amended as follows:

4.1 Scope

This Part of the Standard covers the design and construction requirements of stormwater drainage works for land development and subdivision. While the emphasis in this Standard is on piped stormwater drainage networks, unlike other infrastructural networks such as water supply and wastewater, opportunities exist with stormwater drainage design to utilize or replicate the natural drainage system. Grassed swales, natural or artificial waterways, ponds and wetlands, for example, may in certain circumstances be not only part of the stormwater drainage system, but also a preferred solution especially if low impact on receiving waters downstream is critical.

The stormwater drainage system serves ~~two~~ three purposes: the conveyance of storm surface run-off with minimal flood damage, minimal contamination of receiving waters and groundwater control. ~~Both~~ These aspects need to be considered in design and achieved with minimal adverse effects on the environment.

NOTE: THIS CODE ONLY CONTAINS REQUIREMENTS AND STANDARDS RELATING TO PIPED STORMWATER. ADDITIONAL CONSIDERATIONS AND REQUIREMENTS APPLY TO THE USE OF WATERWAYS FOR STORMWATER DRAINAGE.

RESOURCE CONSENTS:

In addition to the requirements of this Code, developments may require resource consents under the Resource Management Act 1991 and Council Resource Management Plans:

A where there is a discharge of stormwater into a waterway including temporary discharges during construction.

B where any structure is proposed within a waterway or within the bed of a river or stream

C where any modification of a waterway or of the bed of a river or stream is proposed

PRIOR TO DESIGNING ANY STORMWATER SYSTEM CHECK WITH THE COUNCIL TO ASCERTAIN WHAT RESOURCE CONSENTS ARE REQUIRED

OUTFALLS

Prior to designing any stormwater system appropriate outfall levels of the primary pipe and secondary flowpaths must be determined in consultation with the Council.

35. Clause *4.2.3, Local authorities' requirements* p 92 is amended as follows:

4.2.3 *Local authorities' requirements*

The requirements of Council's Resource Management Plans ~~relevant regional and district plans~~ relating to stormwater drainage shall be met. ~~Regional plan requirements will generally be limited to effects on the natural environment~~. Relevant bylaws, if any, shall also be met.

C4.2.3

The division of responsibilities between territorial authorities and regional councils is set out in the Resource Management Act. The TA exercises control over works including drainage works associated with land development and subdivision. Approval of drainage works is required from the TA. Natural water quantity and quality, damming and diversion, and natural hazard risk management are controlled by the regional council .NOTE: The Marlborough District Council is a unitary authority having both district and regional council functions.

Authorization of the effects of drainage activities is required from the ~~regional~~ Ccouncil. ~~Activities with minor effects may be permitted by a rule in the regional plan (for example, the discharge of clean stormwater to natural water is sometimes permitted subject to conditions). Other activities require specific resource consent from the regional council.~~

36. Clause *4.2.3.1, Authorization from the regional council* p 93 is amended as follows:

4.2.3.1 *Authorization from the regional council*

Authorization will be required from the ~~regional c~~Council for the discharge of stormwater unless the discharge is to an existing stormwater drainage system and meets any conditions which apply to the existing system. ~~However, territorial authorities have a responsibility to manage land and adverse effects under s. 31 of the Resource Management Act.~~

Other activities often associated with stormwater drainage works which must be authorized by the ~~regional c~~Council include: the diversion of natural water during construction work, the permanent diversion of natural water as a consequence of the development, activities in the bed or on the banks of a natural waterway, and damming waterways.

The discharge of clean stormwater and other activities where effects are considered minor may be authorized as a permitted activity subject to certain conditions in the ~~regional~~ Councils resource management plans. Authorization may also be by way of a comprehensive consent held for a large area or entire catchment.

In other circumstances site specific discharge permits and water permits must be obtained. Resource consent issues can be complex and the consent process long. The advice of the ~~regional c~~Council should be sought from consent officers at the earliest stage of planning for stormwater drainage works.

37. Clause *4.3.1.1, Approval process for stormwater drainage systems* p 95 is amended as follows:

4.3.1.1 *Approval process for stormwater drainage works*

New stormwater drainage systems generally require ~~approval~~ authorisation from the ~~TA and authorization from the regional c~~Council. Authorization may be by way of a permitted activity or rule in ~~a regional~~ the Councils resource management plans or discharge permit. ~~A discharge permit is generally required for medium to large subdivisions (e.g., 50 lots or more) and when significant water quantity and quality issues need to be addressed~~.

In these circumstances it is good practice:

(a) To consult with authorizing officers from ~~both~~ the Services (subdivisions), Rivers and Drainage (water

related) and Regulatory Department (consents) ~~-~~sections of the Council ~~regional and district councils~~ prior to consent application;

(b) For ~~regional and district~~ councils to process subdivision and water-related resource consents simultaneously and deal with land and water issues ~~at a joint hearing pursuant to s.102 of the RMA~~through a combined resource consent application.

38. Clause *4.3.2.4 Secondary flow paths* p 97 is amended follows:

4.3.2.4 *Secondary flow paths*

Lots shall generally be shaped such that they fall towards roadways which may be used as secondary flow paths.

Where secondary flow paths cannot, with good design, be kept on roads they should be kept on public land such as accessways, parks, and reserves or designated by legal easements where over private land. The location of the secondary flow paths shall be clearly delineated on plans held by the asset owner to ensure that their effectiveness is maintained.

~~Secondary flow paths shall be~~ Secondary flow paths through private land and accessways shall be formed of concrete or hotmix for ease of maintenance and ~~designed~~ so that erosion or land instability caused by the secondary flows will not occur. Where necessary the design shall incorporate special measures to protect the land against such events.

Ponding or secondary flow on roads shall be limited in height and velocity such that the carriageway is passable.

The secondary flow path sizing and location shall be supported by adequate analysis to show:

(a) That it is of adequate capacity to cope with the design volumes;

(b) That it discharges to a location that does not detrimentally affect others and can safely dissipate via a controlled disposal system as the storm peak passes.

At critical culverts and at other critical structures the secondary flow path under conditions of total inlet blockage shall be considered in design.

The ~~regional c~~Council should be consulted to confirm the required design standards.

39. *Table 4.1 – minimum AEP for design storms* p 98 is amended as follows:

Table 4.1 – Minimum AEP for design storms

Function	**AEP** (%)	**Return period** (years)
Primary protection – satisfied by an appropriate sized pipe or waterway network.		
Rural and rural residential areas	20	5
~~Residential Areas~~	~~20~~	~~5~~
~~Commercial and Industrial Areas~~	~~20~~	~~5~~
~~All areas where no secondary flow path is available~~	~~1~~	~~100~~
Residential, commercial and industrial areas		
a) Minimum design standard	20	5
b) Culdesacs and Streets without alternative access	10	10
c) All areas where no secondary flow path is available	2	50
Secondary protection – satisfied by a combination of the primary protection system and appropriately designed secondary flow paths, controlled flood plains and setting of appropriate building levels.	1	100
In all cases a secondary flow path to an existing secondary flow path or stream as recognized and accepted by Council shall be provided. Note that the accepted basis for evaluation of rainfall frequencies and intensities may change from time to time e.g. climate change impacts.		

C4.3.2.5.1

Consultation with the TA on protection standards is essential.

The TA may not require secondary protection for sports grounds or children's playgrounds, for example.

The New Zealand Building Code (NZBC) specifies that surface water resulting from a 2 % AEP storm event shall not enter buildings. This clause applies to new housing, communal residential and communal non-residential buildings.

Development levels may be set higher than NZBC requirements. Some regional councils interpret "inundation" under the Resource Management Act as set by the 1 % event. TAs should consider setting

development levels appropriate to their district's circumstances through the district plan process.

40. Clause *4.3.2.5.2 Freeboard* p 99 and *C4.3.2.5.2* p 99 are deleted as follows:

4.3.2.5.2 *Freeboard*

This clause has been deleted. Requirements for freeboard are dealt with through building consent. Requirements for freeboard are associated with waterway management which the Council wishes to retain the responsibility for.

~~The minimum freeboard height additional to the computed flood protection level shall be as follows or as specified in the TA's district plan:~~

~~**Freeboard**~~	~~**Minimum height**~~
~~Habitable building floors~~	~~0.5 m~~
~~Commercial and industrial buildings~~	~~0.3 m~~

~~***C4.3.2.5.2***~~

~~***Freeboard is a provision for flood level design estimate imprecision, construction tolerances and natural phenomena (e.g. waves, debris, aggradations, channel transition and bend effects) not explicitly included in the calculations.***~~

~~***Freeboard requirements are related to local conditions. The TA should be consulted on appropriate freeboard for accessory buildings, sports grounds and children's playgrounds.***~~

~~***A minimum freeboard height of 0.5 m is generally applicable but should be increased for sites adjoining steep, rough channels and may be reduced for sites adjoining tranquil ponds.***~~

41. Clause *4.3.3.1 Location and alignment of stormwater mains* p 100 is amended as follows:

4.3.3.1 *Location and alignment of stormwater mains*

The ~~preferred~~ location for stormwater pipeline mains shall be at the discretion of the Council ~~within the road reserve (but not under the crown of the carriageway) or within other public land.~~

A straight alignment between manholes (MHs) is preferred, but curvature on the pipeline is acceptable provided that pipe curvature and joint deflections are within the limits of the

manufacturer's recommendations and a reverse gradient does not occur at any point along the invert of the pipe.

Refer to 5.3.2.5 and 5.3.2.6 of this Standard for further guidance on curved alignments for stormwater pipelines.

42. *Table 4.2 Acceptable pipe materials* p 101 is amended as follows:

Table 4.2 – Acceptable pipe materials

Pipe materials	Standard applicable	Stormwater	Wastewater	Water supply	Comments
VC	AS 1741	✓	✓	–	Has benefits for particularly aggressive wastes or ground conditions
uPVC to (Class SN8 or 16 as required by TA)	AS/NZS 1260	✓	✓	–	For gravity pipes
PE	AS/NZS 4130	✓	✓	✓	
uPVC	AS/NZS 1477	–	✓	✓ PN12 only	For pressure pipes
mPVC	AS/NZS 4765	–	✓	✓ PN12 only	Generally pressure pipes
GRP	AS/NZS 4256.3	–	~~✓~~	~~✓~~	Lightweight. Resists many aggressive wastes in wastewater applications
RRJ reinforced concrete	NZS 7649	✓	–	–	Sometimes used for waste water pressure lines but subject to hydrogen sulphide attack
Spiral welded steel	NZS 4442	✓	✓	~~✓~~	Internal linings include concrete, epoxy, bitumen

					and galvanizing
Ductile iron pipe	AS/NZS 2280	✓	✓	✓	Generally suspended pipes and high structural loadings
Corrugated aluminium pipe	AS/NZS 2041	~~✓~~	–	–	Not acceptable to some TAs. Generally of short length (culverts etc.). Joints need consideration in fine soils with high water tables. Invert may need lining.
Corrugated steel pipe	AS/NZS 2041 NZS 4405 NZS 4406	✓	–	–	Not acceptable to some TAs. Generally only for short length(culverts etc.). Joints need consideration in fine soils & high water tables. Invert may need lining to extend life.
Grey iron	AS/NZS 2544	–	~~✓~~	~~✓~~	Generally special fittings pump stations etc.
ABS	AS 3518.1 AS 3518.2	–	✓	✓	Generally limited to pump stations, manifolds etc.

43. Clause *4.3.3.4 Pipeline connections* p 102 is amended as follows:

4.3.3.4 *Pipeline connections*

Minor pipelines are generally connected to major pipelines through MHs. Modern pipe materials, however, facilitate the efficient jointing and laying of pipelines. Direct connection of minor pipelines to major pipelines is acceptable provided it is either through a suitable junction (i.e. a prefabricated and welded junction for large PVC diameter); or through a saddle

provided the diameter of the minor pipeline is not greater than half the diameter of the major pipeline and the distance from the connection to the closest inspection point is not greater than 11 m. (Refer to 4.3.7.2 for further guidance).

Where a Y junction is necessary only prefabricated Y junctions shall be acceptable.

Factors to consider are hydraulic efficiency, ease of access for maintenance, and pipeline strength and durability in determining the appropriate method of connection.

44. Clause *4.3.3.5 Minimum pipe sizes* p 102 is amended as follows:

4.3.3.5 *Minimum pipe sizes*

Minimum pipe sizes unless otherwise specified shall be:

Sump outlets –	~~200~~ 225 mm internal diameter
Stormwater mains –	~~300~~ 150 mm internal diameter unless upstream of sumps.

45. Clause *4.3.3.6 Minimum cover* p102 is amended as follows:

4.3.3.6 *Minimum cover*

Pipelines shall have minimum cover in accordance with the TA or utility owner's requirements, taking into account factors such as the need to access the utility for future connection, surface loading, foreseeable changes to surface levels, any required resistance to physical damage, relationship ot other underground assets, future access to the asset, any excessive loadings, any need for casings or slabbing etc. ~~Where the TA does not have specific requirements, the minimum covers as described in AS/NZS 2566 may be used.~~

Traffic Areas	750mm cover
Non-Traffic Areas	600mm cover

Note: Covers to pipelines shall always exceed the recommendations of pipe suppliers.

C4.3.3.6

AS/NZS 2566 allows covers which would not be acceptable to many New Zealand TAs.

46. Clause *4.3.5 Waterways* p 105 is amended as follows:

4.3.5 *Waterways*

NOTE: THIS CODE ONLY CONTAINS REQUIREMENTS AND STANDARDS RELATING TO PIPED STORMWATER. ADDITIONAL CONSIDERATIONS AND REQUIREMENTS APPLY TO THE USE OF WATERWAYS FOR STORMWATER DRAINAGE.

RESOURCE CONSENTS:

In addition to the requirements of this Code, developments may require resource consents under the Resource Management Act 1991 and Council Resource Management Plans:

A where there is a discharge of stormwater into a waterway including temporary discharges during construction.

B where any structure is proposed within a waterway or within the bed of a river or stream

C where any modification of a waterway or of the bed of a river or stream is proposed

PRIOR TO DESIGNING ANY STORMWATER SYSTEM CHECK WITH THE COUNCIL TO ASCERTAIN WHAT RESOURCE CONSENTS ARE REQUIRED.

47. Clause *4.3.5.1 Constructed waterways* p 105 is deleted as follows:

4.3.5.1 *Constructed waterways*

This clause has been deleted, because the Council wishes to retain responsibility.

~~Constructed waterways shall be designed to meet the aesthetic and amenity criteria of the TA.~~

~~Access shall be provided along at least one side of any waterway to provide for maintenance, taking into account the "reach" of cleaning machinery. Berms and banks shall be vegetated and laid at slopes that are stable, not prone to scour in flood flows and are able to be maintained by the TA. Constructed waterways, which will be maintained by the TA, shall be protected by easement or be in public ownership.~~

48. Clause *4.3.5.2 Natural waterways* p 105 is deleted as follows:

4.3.5.2 *Natural waterways*

This clause has been deleted, because the Council wishes to retain responsibility.

~~The piping or filling in of natural waterways should be avoided. The natural features and amenity values of highly modified natural waterways should be restored and enhanced respectively. Authorization will be required from local authorities.~~

~~Public reserves should be created around significant natural waterways.~~

49. Clause *4.3.6 Water quantity and quality control* p 106 is deleted as follows:

4.3.6 Water quantity and quality control

This clause has been deleted, because the Council wishes to retain responsibility.

~~Operations and maintenance guidelines shall be provided for any water quantity and/or quality control structures and formed features such as ponds. The guidelines should describe the design objectives of the structure, describe all major features, explain operations such as recommended means of sediment removal and disposal, identify key design criteria, and identify on-going management and maintenance requirements such as plant establishment, vegetation control and nuisance control.~~

50. Clause *4.3.7 Connection to the public system* p 106 is amended as follows:

4.3.7 Connection to the public pipe network ~~system~~

51. Clause *4.3.8.1 Approved outfall* p 107 is amended as follows:

4.3.8.1 *Approved outfall*

The approved outfall for piped stormwater drainage from development and subdivision shall be the public stormwater drainage system or an approved alternative stormwater disposal system. The outfall levels are to be determined in consultation with the Council. If a connection or capacity is

not available, direct discharge to a waterway or the sea may be approved subject to the following conditions:

(a) A suitable outfall and dissipating structure shall be constructed at the outlet to ensure no erosion occurs in the immediate vicinity of the waterway;

(b) No obstruction which will impede the natural flow shall be placed in the channel;

(c) The discharge is authorized by the ~~regional~~ Council.

52. Clause *4.3.8.2 Soak pits* p 107 is amended as follows:

4.3.8.2 *Soak pits*

Stormwater soakpits may be used for developments in rural areas or for residential developments in urban areas if connection to the public system is not feasible and soil conditions are suitable for soakage. For guidance on disposal of soak pits refer to E1/VM1 of the Approved Document for Clause E1 of the NZBC. Soakpits shall be designed to allow easy access for maintenance and located so that access by maintenance machinery is available.

A geotechnical assessment shall be carried out when large-scale use of soak pits is under consideration.

A discharge permit may be required from the ~~regional~~ Council for discharge to soakage.

53. Clause *4.3.12.3 Sizing of the stormwater drainage system* and Clause *4.3.12.3.3 Determination of water surface profiles* p 109 are amended as follows:

4.3.12.3 *Sizing of the stormwater drainage system*

Refer to E1/VM1 for pipe, culvert, and open channel hydraulics~~.~~ and table 6.1.

4.3.12.3.3 *Determination of water surface profiles*

Stormwater drainage systems shall be designed by calculating or computer modelling backwater profiles from an ~~appropriate~~ outfall water level determined with the Council through the discharge permit process. On steep gradients both inlet control and hydraulic grade line analysis shall be used and the more severe relevant condition adopted for design purposes. For pipe networks at MHs and other nodes, water levels computed at design flow shall not exceed finished ground level while allowing existing and future

connections to function satisfactorily.

In principle, each step in the determination of a water surface profile involves calculating a water level upstream (h_2) for a given value of discharge and a given start water level downstream (h_1).

This can be represented as:

$h_2 + V_2^2 / 2\,g = h_1 + V_1^2 / 2\,g + H_f + H_e$

where V is velocity,

H_f is head loss due to boundary resistance within the reach (for pipes, unit head loss is read from Manning's flow charts, for example),

H_e is head loss within the reach due to changes in cross section and alignment (refer to table 4.3 for loss coefficients).

An example of stormwater system analysis including a backwater calculation is provided in figures 4.2, 4.3 and table 4.4.

C4.3.12.3.3

Note that stormwater pipelines generally operate in a surcharged condition at full design flow. Pipe diameters chosen on the basis of pipe flow graphs such as figure 4.1 of E1/VM1, using pipeline gradient rather than hydraulic grade line slope, are likely to be unnecessarily large for free outfall conditions.

54. Clause *4.3.12.3.4 Outfall water levels* p114 is deleted and amended as follows:

4.3.12.3.4 Outfall water levels

Outfall water levels shall be determined in consultation with the Council or through the discharge consent process.

~~The TA will provide the start water level at the point of connection to the public stormwater system.~~

~~When a tributary drain or a waterway flows into a much larger drain or a much larger waterway, the peak flows generally do not coincide. Backwater profiles should produce satisfactory water levels when assessed as follows:~~

~~(a) Set the tributary AEP;~~

~~(b) Determine the tributary design duration D;~~

~~(c) For duration D and AEP determine tributary catchment run-off Q_{trib};~~

~~(d) Determine receiving waterway peak water level at AEP in (a) above;~~

~~(e) Starting with the level from (d) above determine the tributary water profile at a flow of 75 % of Q_{trib};~~

~~(f) Determine the receiving waterway mean annual flood water level;~~

~~(g) Starting with the level from (f) above determine tributary water profile at flow Q_{trib};~~

~~(h) Select the higher of the two profiles determined for design purposes.~~

~~Similarly, for tidal outfalls, peak flow may or may not coincide with extreme high tide levels. A full dynamic analysis and probability assessment may be necessary.~~

~~Alternatively, consideration of the following two scenarios may be sufficient:~~

~~(i) An outfall water level of mean high water for peak design flow conditions; and/or~~

~~(ii) A 10 % AEP extreme high tide outfall water level for half peak design flow conditions.~~

~~In addition, sea level rise should be considered and a precautionary design approach adopted.~~

55. Clause *4.3.12.5 Waterways* p 115 is deleted as follows:

4.3.12.5 *Waterways*

This clause has been deleted

56. Clause *4.3.12.5.1 Manning's 'n'* p 115 is amended as follows:

4.3.12.5.1 *Manning's 'n'*

Refer also to Table 6.1 for Roughness values of stormwater pipes.

Waterway capacity shall be determined from Manning's formula (refer to E1/VM1). Conservatively high values of Manning's 'n' should be selected from table 3, E1/VM1 reproduced as table 4.5 to provide a generous cross section area which allows for the flow resistance effects of margin and bank plants retained or provided for amenity and ecological benefits.

C4.3.12.5.1

Refer to "Roughness Characteristics of New Zealand Rivers" by D.M. Hicks and P.D. Mason (1991) for further guidance on the selection of Manning's 'n' values. This handbook

emphasizes that the Manning's 'n' values can vary significantly with flow and the selected value should be based on the graphs of Manning's 'n' versus discharge presented for each site.

57. Clause *4.3.12.6 Outlets* p 116 is amended as follows:

4.3.12.6 *Outlets*

Discharges of stormwater into a waterway may require resource consent from the Council. In addition structures in waterways or on the beds of streams or rivers may require resource consent.

Where pipes discharge onto land or into a waterway outlet, structures shall be designed to dissipate energy and minimize erosion or land instability. The design shall ensure non-scouring velocities at the point of discharge. Acceptable outlet velocities will depend on soil conditions, but should not exceed 2 m/s without specific provision for energy dissipation and velocity reduction.

58. Clause *4.3.12.7 Stormwater quality control* p 116 is amended as follows:

4.3.12.7 *Stormwater quality control*

Discharges of stormwater into a waterway may require resource consent from the Council. In addition structures in waterways or on the beds of streams or rivers may require resource consent.

A 75 % contaminant removal efficiency is recommended as a best practicable option (BPO) for stormwater treatment devices.

For small, impervious catchments (e.g., supermarket car parks) a high proportion of contaminant accumulated between storms is discharged early in the run-off hydrograph (i.e. the first flush).

Stormwater treatment devices which capture at least the first 10 mm to 15 mm of run-off (depending on local climate) are acceptable as a BPO.

Design in accordance with ARC Technical Publication No. 10 *Stormwater treatment devices* is recommended.

59. Clause *5.3.5.1 Design Flow* p 124 is amended as follows:

5.3.5.1 *Design flow*

The design flow comprises domestic wastewater, industrial wastewater, infiltration and direct ingress of stormwater.

The design flow shall be calculated by the method nominated by the TA. In the absence of information from the TA the following design parameters are recommended:

(a) Residential flows

(i) Average dry weather flow of ~~80 to~~ 250 litres per day per person

(ii) Dry weather diurnal PF of 2.5

(iii) Dilution/infiltration factor of ~~2~~3 for wet weather

(iv) Number of people per dwelling 2.5 to 3.5.

60. Clause 5.3.5.2 *Hydraulic design of pipelines* p 124 is amended as follows:

5.3.5.2 *Hydraulic design of pipelines*

The hydraulic design of wastewater pipes should be based on either the Colebrook-White formula or the Manning formula.

The coefficients to be applied to the various materials are shown in table ~~5.3.~~ 6.1.

61. *Table 5.3 – Coefficients for gravity lines* p 125 is deleted as follows:

~~**Table 5.3 – Coefficients for gravity lines**~~

62. *Table 5.4 – Minimum pipe sizes for wastewater reticulation and property connections* p 125 is amended as follows:

Table 5.4 – Minimum pipe sizes for wastewater reticulation and property connections

Pipe	Minimum size DN
Connection servicing ~~1~~ 2 dwelling units	100
Connection servicing more than ~~1~~ 2 dwelling units	150
Connection servicing commercial and industrial lots	
Reticulation servicing residential lots	

63. *Table 5.5 Minimum grades for wastewater pipes* p 126 is amended as follows:

Table 5.5 – Minimum grades for wastewater pipes

Pipe size DN	Absolute minimum grade (%)
150 less than 6 lots	~~0.55~~ 0.67
150 6 or more lots	0.5
225	0.33
300	0.25

64. *Table 5.6 Minimum grades for property connections and permanent ends* p 126 is amended as follows:

Table 5.6 – Minimum grades for property connections and permanent ends

Situation	Minimum grade (%)
DN 100 property connections	~~1.65~~ 1.25
DN 150 property connections	~~1.20~~ 1.00
Permanent upstream ends of DN 150, 225 and 300 pipes in residential areas with population ≤20 persons	1.00

65. *Table 5.7 Acceptable MH, MS and TMS options for wastewater reticulation* p 127 is amended as follows:

Table 5.7 – Acceptable MH, MS and TMS options for wastewater reticulation

Application	**Acceptable options**[1]		
	MH	MS	TMS
Intersection of pipes[2]	YES	NO	NO
Change of pipe grade at same level	YES	YES for DN 150 pipe only and using vertical bend	NO
Change of grade at different level	YES MH with internal/external drops	NO	NO
Change in pipe size	YES MH is the only option	NO	NO
Change in horizontal direction	YES within permissible deflection at MH	YES MS prefabricated units or MS used with horizontal bends of max 33^{o} deflection	YES for DN ~~150~~ 100 pipe only
Change of pipe material	YES	NO	NO
Permanent end of a main[3]	YES	YES	~~YES~~ NO
Pressure main discharge point	YES MH is the only option and must include a vent	NO	NO

NOTE –

(1) Where personnel entry is required down to the level of the pipe, a MH is the only option.

(2) This table refers to reticulation mains. DN 100 connections can be made to any maintenance structure or, using a proprietary junction, at any point along the main.

(3) Some TAs permit the use of London Junction or Rodding Eye at the end of the main, but it is recommended that TMSs are used.

66. *Table 5.9 Minimum internal fall through MH joining pipes of same diameter* p 129 is replaced with the following:

Table 5.9 – Minimum internal fall through MH joining pipes of same diameter

Deflection angle at MH Degrees (°)	**Minimum Internal Fall**						
0 – 30	**40mm**	**+**	**Vertical height calculated from ½ length of haunched channel at gradient of Incoming pipe (mm)**	**+**	**Vertical height calculated from ½ length of haunched channel at gradient of Outgoing pipe (mm)**	**=**	**Total Internal Fall thru Manhole (mm)**
30 – 60	**55mm**	**+**		**+**		**=**	
60 - 120	**85mm**	**+**		**+**		**=**	

Unless other wise approved by Council.

67. Clause 5.3.10 *Pumping stations and pressure mains* p 135 is amended as follows:

5.3.10 *Pumping stations and pressure mains*

Where pumping stations and pressure mains are required to service a development they shall be designed and installed in accordance with the standards of the TA. If the TA has no applicable standards, then they shall be designed in accordance with WSA 04.

Emergency overflow storage shall be provided at all new sewage pump stations, and where required by Council, at existing sewage pump stations that will service the subdivision or development.

The storage volume shall be achieved by:

(a) Increasing the diameter or depth of the pump station wet well while ensuring solids deposition does not occur in operation; or

(b) Increasing the diameter of the terminal manhole while ensuring solids deposition does not occur in operation; or

(c) Installing a separate storage chamber; or

(d) A combination of the above

Capacity in the sewer network shall not be included in the overflow storage capacity available in manholes with the system at Peak Wet Weather Design Flow (PWWF) and as determined by modelling. The lowest invert level on a separate storage chamber is to be above the invert level of the terminal manhole.

The upper sewage level in any storage system is to be below ground level such that no overflows will occur in the pump station catchment when no pumps are operating and when the influent flow is 2 x ADWF (average drop weather flow) and is distributed uniformly across the catchment.

The capacity of the pump station and/or pumping main is not to be reduced by virtue of the provision of overflow storage.

Overflow storage systems are to be designed so as not to cause odour nuisance and to resist the effects of corrosion. Open storage is not permitted.

Overflow storage systems are to be designed so as to not require regular cleaning.

Safe man access is to be provided to overflow storage systems.

First overflow points are to be established in terms of location and reduced level under the following conditions:

(i) ADWF and no pumps operating.

(ii) PWWF and no pumps operating.

(iii) PWWF and pump(s) operating at station capacity.

68. Insert Clause 5.4.1 General under Clause 5.4 *Construction* p 135 as follows:

5.4 Construction

5.4.1 *General*

Refer to 4.4.1, 4.4.2, 4.4.3 and 4.4.4 for construction requirements for wastewater pipelines.

69. Insert Clause 5.4.2 *Manhole connections* under Clause 5.4 Construction p 135 as follows:

5.4.2 *Manhole connections*

PVC sewers of all diameters are to be connected to manholes using a vitrified clay manhole short specially adapted to PVC solid wall SN16 rubber ring socket.

70. Insert Clause 5.4.3 *Below ground structures* under Clause 5.4 Construction p 135 as follows:

5.4.3 *Below ground structures*

Manholes, pump station wet wells and other below ground structures are to have specifically designed clamping systems to ensure the integrity of all joints due to lateral forces that may occur from earthquakes. If metal fastenings are to be used then they must be 316 grade stainless steel.

71. Clause 6.3.8.3 *Fire flows provided by existing reticulation system* is inserted on p143 as follows:

6.3.8.3. *Fire-hydrant flow provided by reticulation systems*

Fire hazard categories depend upon the use and management of individual buildings. However the flows listed below have been selected to cater for the common cases and provide known flows for the design of fire cell and sprinkler systems by building fire-system designers.

The water reticulation system design shall be designed to provide the following fire flows

Urban Residential Zones:	W3	25 L/s for 0.5 hr, from a maximum of 2 hydrants
Commercial Zones:	W4	50 L/s for 1.0 hr, from a maximum of 3 hydrants

Industrial Zones: W5 100 L/s for 1.5 hrs, from a maximum of 4 hydrants

The flows outlined above are the minimum required for each zone.

Note: W3, W4 & W5 are the Fire Supply Classification as per SNZ PAS 4509. SNZ PAS 4509 identifies further Fire Supply Classifications based on floor area and these shall be complied with where new buildings have been proposed.

Fire flows to be in addition to peak-hour design flows & be delivered with a minimum residual head at the hydrant of 10m. Half the flow must be delivered within 135m of the building site and the balance within 270m of the building site.

Hydrant spacing and layout and other requirements shall comply with the minimum requirements of SNZ PAS 4509:2003 NZ Fire Service Fire Fighting Water Supplies Code of Practice.

72. Clause 6.3.8.4 *Fire sprinkler systems* on p 143 is inserted as follows:

6.3.8.4. *Fire sprinkler systems*

Where a subdivision is to cater for sprinkler systems, extra design work must be carried out to ensure that the pipe sizes are adequate to deliver the flows and pressures in accordance with the appropriate NZ standard, e.g for houses, NZS 4517:2002.

The following **minimum** requirements shall apply in residential zones:

Rider main: 1 size large than would otherwise be needed.

Service connection: 2 sizes larger than would otherwise be needed.

73. Clause 6.3.9.3 Peak *flows* p 144 is amended as follows:

6.3.9.3 *Peak flows*

Water demands vary on a regional basis depending on a variety of climatic conditions and consumer usage patterns. The Council is ~~TA should be~~ able to provide historically based demand information appropriate for design. Where peak demands are required for the design of a distribution system, the value shall be calculated from the following formulae:

Peak Day Demand (over a 12-month period) = Average Day Demand x PF

Unless specified otherwise by the TA:

(a) PF = 1.5 for populations over 10,000;

(b) PF = 2 for populations below 2,000.

(between by interpolation)

Peak Hourly Demand = Average Hourly Demand (on peak day) x PF (over a 24-hour period)

Unless specified otherwise by the TA:

(a) PF = 2 for populations over 10,000;

(b) PF = 5 for populations below 2,000.

(c) Higher PFs for special circumstances including:

- **Branched (in non-networked) lines or systems**
- **Smaller populations (eg less than 250)**
- **Areas with less diversity (eg Rural Residential subdivision with large life-style houses all with large landscaping and lawns with automatic sprinkler systems)**
- **Areas which are designed to cater for domestic fire sprinklers and thus 10 minute peaks (at the service connections).**

Where PFs which cater for shorter and synchronized peaks need to be used for design, Figure 6.0 is included as a guide.

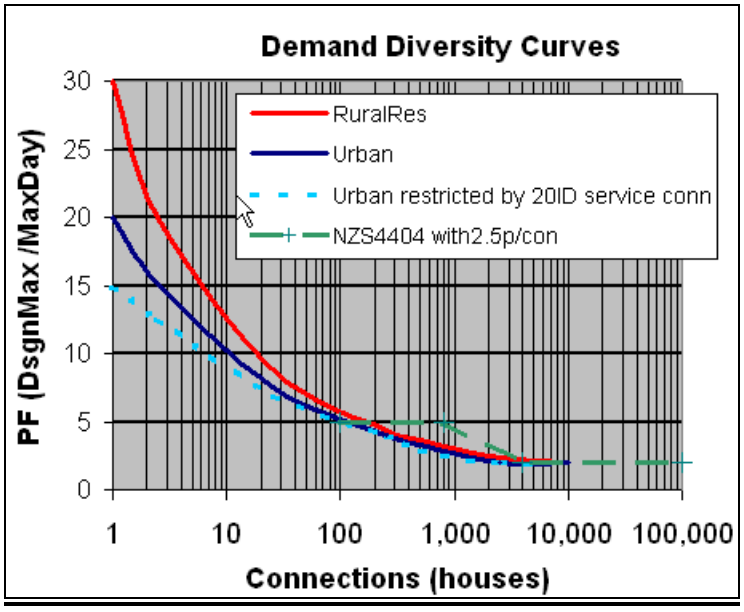


Figure 6.0 – Demand Diversity Curves

74. *Clause 6.3.9.4.1 Hydraulic roughness values* p 144 is amended as follows and Table 6.1 *Hydraulic roughness values* p 145 is replaced with the following:

6.3.9.4.1 *Hydraulic roughness values*

The hydraulic roughness values considered in the analysis shall take account of the pipe material proposed, all fittings and other secondary head losses and the expected increase in roughness over the life of the pipe. The designer should check with the TA to ascertain if it has any requirements to use a specific formula and or roughness coefficients. If there are no specific requirements then it is recommended that the ~~Colebrook White~~Hazen Williams formula is used for water supply. ~~If the designer uses Manning or Hazen Williams~~ The coefficients in table 6.1 are ~~recommended.~~the smoothest values to be used.

Table 6.1 – Hydraulic roughness values

PIPE	**Situation**	**k (mm)**	**Chw**	**n**	**Notes**
Plastic	Water Supply	0.3	120	0.011	Allows for aging over the life of the pipe
ConcLined	Water Supply	1.0	100	0.013	Allows for aging over the life of the pipe
Plastic	Storm Water	3	90	0.014	Allows for aging and for some sand & grit
Concrete & ConcLined	Storm Water	5	80	0.016	Allows for aging and for some sand and grit
Plastic	Waste Water	1.5	100	0.013	Allows for aging and for some sliming
Concrete & ConcLined and Clay	Waste Water	3	90	0.014	Allows for aging and for some sliming

NOTE –

(1) The roughness of poorly lined (or unlined) Iron or steel pipes can deteriorate significantly with time if linings get damaged. For modelling or back analysis of existing systems obtain pipe samples where possible and calibrate assumptions against measured flows and heads.

(2) Manufacturers' design charts may be based on smoother pipe assumptions than these (e.g. K = .003) but such charts usually assume "as-new" laboratory conditions and ignore such effects as tappings, tees, valves etc. and the effects of aging during the life of the pipe.

(3) The designer must judge when it is appropriate to analyse all bends and fittings specifically

(4) k and n are normally for pipes to DN300

(5) (5) k (mm) as in Colebrook-White formula

n as in Mannings equation

Chw = Coefficient in Hazen Williams Formula

75. Figure 6.1 *Conceptual hydraulic operation of a gravity main* p146 is replaced with the following

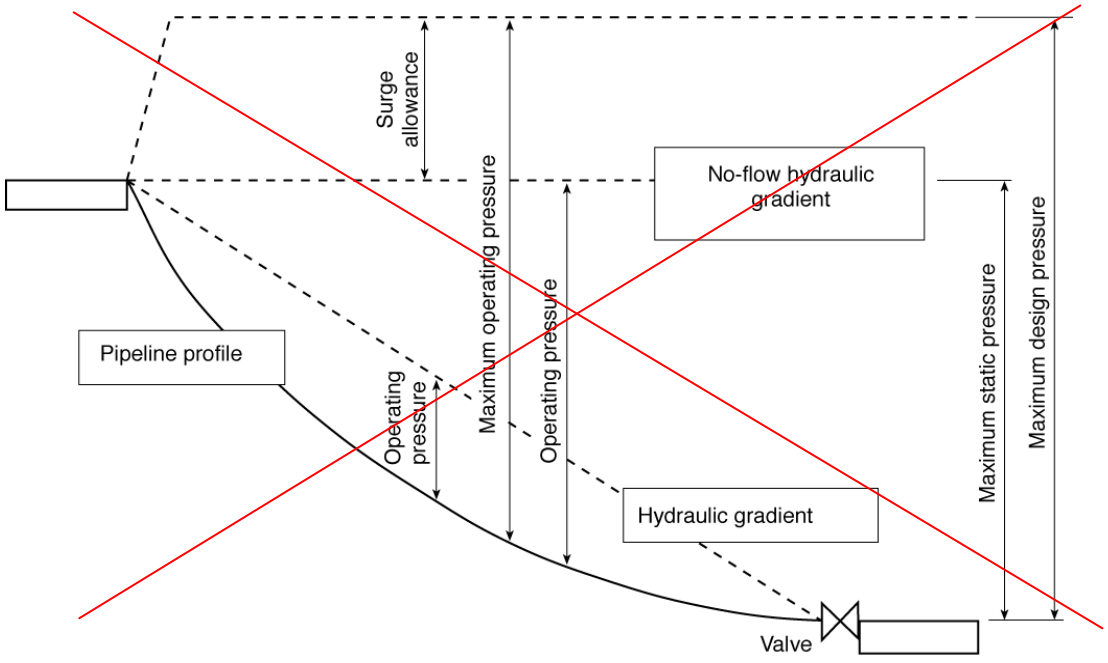
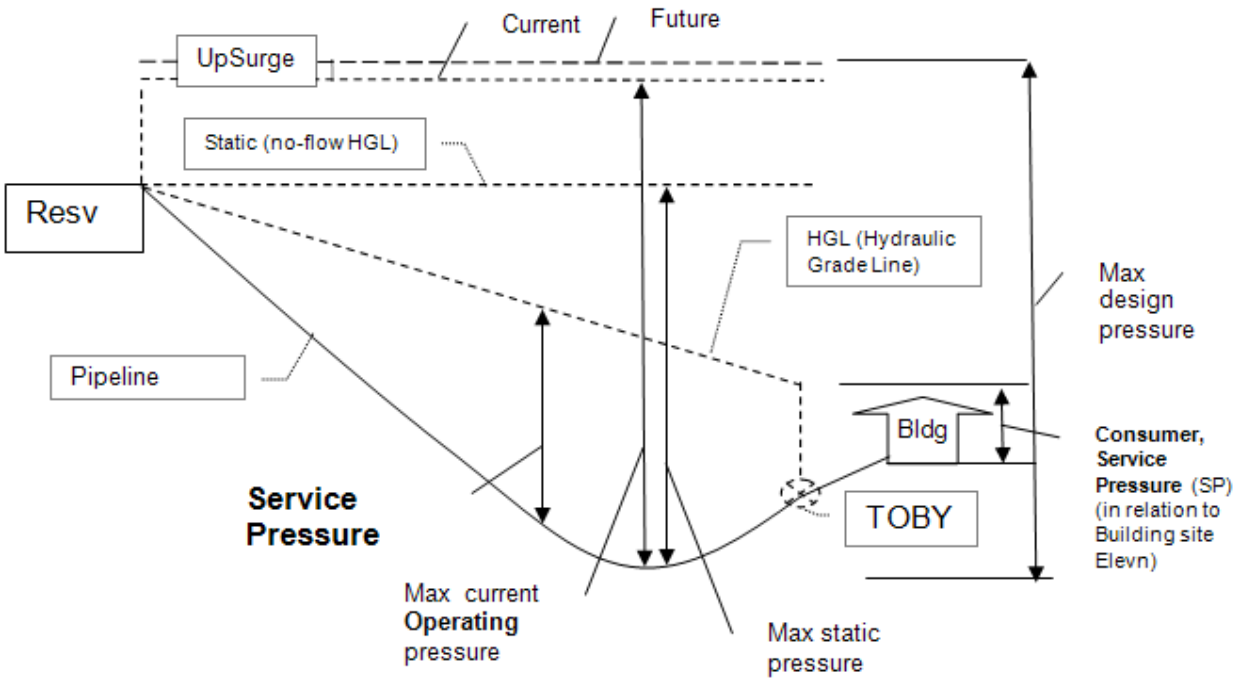


Figure 6.1 – Conceptual hydraulic operation of a gravity main



76. Clause 6.3.9.6.2 Operating pressure/working pressure p 147 is amended as follows:

6.3.9.6.2 *Operating pressure/working pressure*

The terms operating pressure and working pressure may be used interchangeably.

Operating pressure is the actual pressure within a system during its operation. It includes the combined pressures of static head, pumping and surges.

The operating pressure will vary within the system and over time under the influence of hydraulic losses and transient surges. Operating pressure is dependent on system variables such as the preceding length of pipe, the number and geometry of fittings, the actual flow rate, pumping starts and stops and valve closures. The operating pressure at any location of the pipeline shall not exceed the design pressure for that location.

The operating pressure shall not exceed the ~~re~~rated pressure class/rating or the operating pressure limit of the pipeline components at that location.

77. Clause 6.3.10.1 *General* p 149 is amended as follows:

6.3.10.1 *General*

Water mains are usually located in the street. The location shall be specified by the TA, within the street or space allocation nominated by the road controlling authority. Where approved by the TA water mains may be located in private property or public reserve. Easements may be required. Trees and structures should not be positioned where they will interfere with the standard alignment of water mains.

Water mains should:

(a) Be aligned parallel to property boundaries; where less than 100 DN, and parallel with kerb and channels for 100mm and above

(b) Should not traverse steep gradients; and

(c) Should be located to maintain adequate clearance from structures and other infrastructure.

78. Clause 6.3.10.3 *Water mains in easements* p 149 is amended as follows:

6.3.10.3 *Water mains in easements*

~~Subject to the approval of the TA, water mains may be located within an appropriately sized and registered easement in accordance with the TA's requirements.~~

Watermains shall only be laid within road, reserve, pedestrian walkways and rights of way. Easements through privately owned property will not be accepted.

There will be exceptional circumstances where water mains must be laid within private land. These shall be at the approval of Council at Council's discretion.

79. Clause 6.3.10.5 *Water mains near trees* p 150 is amended as follows:

6.3.10.5 *Water mains near trees*

Special consideration shall be given to the location of water mains adjacent to mature trees. Mains shall be located 5m from a tree trunk or at the dripline of the tree, whichever is the greater.

80. Clause 6.3.11.8.1 *Thrust blocks* p 154 is amended as follows:

6.3.11.8.1 *Thrust blocks*

Thrust blocks shall be designed to resist the total unbalanced thrust and transmit all load to the adjacent ground. Calculation of the unbalanced thrust shall be based on 1.5 x the maximum design pressure~~, or as otherwise specified by the TA~~.

Typical contact areas for selected soil conditions and pipe sizes are shown in Appendix A drawings WS-004 and WS-005.

Thrust blocks for temporary works shall be designed to the requirements for permanent thrust blocks.

For pipelines with design pressures exceeding 1.3 MPa, and pipelines > DN 375, see WSA 03.

81. Table 6.2 *Clearances between water mains and underground services* p 155 is amended as follows:

Table 6.2 – Clearances between water mains and underground services

Utility (Existing service)	**Minimum horizontal clearance** (mm)		**Minimum vertical clearance**(1) (mm)
	New main size		
	DN [200	**DN >200**	
Water mains DN >375	600	600	500
Water mains ≤DN 375	300(2)	600	150
Gas mains	300(2)	600	150
Telecommunications conduits and cables	300(2)	600	150
Electricity conduits and cables	~~500~~ 1000	1000	225
Stormwater mains	300(2)	600	150(3)
Wastewater pipes	1000/600(4)	1000/600(4)	500(3)
Kerbs (where possible)	150	600(5)	150

82. Clause 6.4.2.1 *Gate valves* p 157 is amended as follows:

6.4.2.1 *Gate valves*

Gate valves are not acceptable

~~Valves shall have anti-clockwise rotation of the input spindle for closure, unless otherwise specified by the TA. Gate valves DN ≤50 (commonly called peat valves) shall be clockwise closing unless otherwise specified by the TA.~~

~~Buried gate valves shall be operated from above ground and shall be designed to facilitate the use of a standard key and bar. An extension spindle shall be incorporated as necessary to ensure the top of the spindle is 350 mm below the FSL.~~

83. Clause 6.4.2.3.*Stop valves for reticulation mains* p 158 is amended as follows:

6.4.2.3 *Stop valves for reticulation mains*

In the reticulation network, in-line stop valves are used to limit the size of the shut-off area when a main is taken out of service for operational purposes.

~~Stop valves DN ≥80 shall be gate valves.~~ ~~In-line stop valves shall be the same diameter as the reticulation main.~~

In-line stop valves shall have an ND which is similar to the ID of the reticulation main. For mains less than or equal to 70ID diaphragm valves shall be used, and for larger sizes anti-clockwise closing plastic coated 'sluice' valve shall be used. In both cases the valves must be Council approved. Bypasses shall be installed in all pipelines larger than 300 ID.

84. Figure 6.4 Secure connection p 160, add the following note

Note: Example (3) of Figure 6.4 can only be used if the specific connection is approved by the TA and only if a RPZD backflow preventer is installed on each connection

85. Clause 6.4.2.7 *Toby Valves p162* is inserted as follows:

6.4.2.7 Toby Valves (Stop Valves for service lines)

Toby valves shall have a nominal diameter approximately the same as the ID of the service connection pipeline and be diaphragm type to the approval of Council or stainless steel ¼ turn ball valves.

86. *Clause 6.5.6 Hydrant location marking* p 163 is inserted as follows:

6.5.6 *Hydrant location marking*

The marking of hydrants shall be in accordance with NZS4501:1972

87. Clause 6.11 *Means of compliance with this standard* p 168 is amended as follows:

6.11 *~~Means of~~ Guide to Compliance with this Standard*

Unless the TA has its own specific levels of service and or specific design criteria the following may be used as ~~means of~~ guide to compliance with this Standard. However, in all cases the designer must ensure that the design provides capacity and characteristics that meets the minimum requirement defined elsewhere in this standard by the TA.

88. Clause 6.11.2 *Minimum pipe sizes* p 168 is amended as follows:

6.11.2 *Minimum internal pipe sizes*

Minimum pipe diameters (mm) shall be as follows:

(a) ~~DN~~ 50 for rider mains in residential zones;

(b) ~~DN~~ 100 for residential zones;

(c) ~~DN 150~~140 for industrial or commercial zones.

(d) 140 for mains in residential cul-de-sac when more than 200 metres from head of cul-de-sac and a dead end main is being used (i.e. not a looped or linked main shown in Figure 6.6).

(e) 20 for ordinary residential service connections

(f) 25 for residential sections service connections which do not have a street frontage.

The TA may also specify minimum pipe diameters for other identified areas such as CBDs.

89. Clause 6.11.3 *Allowable operating pressure (heads)* and Table 6.5 *Operating pressure limits* p 168 are amended as follows:

6.11.3 *Allowable ~~operating~~ servicepressure (heads)*

The ~~opreating~~ service pressure (see 6.3.9.6) shall be as per table 6.5

Table 6.5 – ~~Operating p~~Pressure limits

Allowable ~~operating~~service pressure ~~(head)~~	**~~Residential~~Service pressure ~~(Head)~~**	**~~Industrial/commercial pressure (Head)~~**	**Operating (including surges) pressure**
Maximum	~~800 kPa (80 m)~~ 1100 kPa for Picton, Havelock, & Awatere: 800 kPa elsewhere	~~800 kPa (80 m)~~	1200 kPa for Picton, Havelock, & Awatere: 900 kPa elsewhere
Minimum	~~200 kPa (20 m)~~ 300 kPa except, 150KPa for rural areas and the Wairau Valley township	~~250 kPa (25 m)~~	100 kPa

The minimum/maximum service pressures (SP) shall be at the Toby; unless specified by the TA for a specific area or supply (eg for house platforms which are a considerable distance above/below the Toby). ~~shall be measured at the building platform on the site.~~

Units: 1m pressure head may be taken as 10kPa

The **Design Pressure** (ie including future allowances) must at all times be within the safe limits of the components involved.

90. Clause 6.11.4 *Minimum flows* p 168 is amended as follows:

6.11.4 *Minimum flows*

The minimum flow shall be:

(a) 25 L/min for normal residential sites (measured into a test-bucket located at the service connection) for up to 5 houses at any one time, and at peak demand periods;

(b) As specified in SNZ PAS 4509.

91. Clause 6.11.5 *Minimum water demand* p 168 is amended as follows:

6.11.5 *Minimum water demand*

unless specifically specified otherwise,

The minimum peak domestic demand shall be based on:

(a) Peak ~~D~~daily consumption of ~~250 L/p/day;~~ (in m^3/day per section)

- 4.0 for Blenheim, Picton
- 5.0 for hot, dry, windy or higher areas of Blenheim & Picton
- 5.0 for Renwick
- 4.0 for other rural townships & sounds residential
- 5.0 for Rural Residential domestic* (plus 50l/ha/day

allowance for stock)

* domestic demand means house plus adjacent gardens and lawns

(b) Peak hour factor of 5 (applied to the average flow rate on a peak day), except that for less than 100 sections (connections) PF as per clause 6.3.9.3 of NZS4404:2004.

For commercial and industrial zones

- The same figures as listed above for domestic demand except that where the section size is greater than 800m^2 the figures shall be used as m^3/day per 800m^2. For areas where wet industries are permissible, or likely, an extra allowance must be made, and discussed with the TA.

92. Table 6.6 – *Empirical guide for minimum principal main sizing* p 169 is amended as follows:

Table 6.6 – Empirical guide for minimum principal main sizing

Nominal diameter of main DN	**Capacity of main (single direction feed only)** **Residential** (lots)	**Rural residential** (lots)	~~**General/light industrial** (ha)~~	~~**High usage industrial** (ha)~~
100	~~40~~20	~~10~~5		
150	160	125	~~23~~	
200	400	290	~~52~~	~~10~~
225	550	370	~~66~~	~~18~~
250	650	~~470~~	~~84~~	~~24~~
300	1000	670	~~120~~	~~35~~
~~375~~	~~1600~~	~~1070~~	~~195~~	~~55~~

For commercial and industrial zones no guidelines are provided because of the requirements for fire flow &/or special layouts.

93. Table 6.7 – *Empirical guide for sizing rider mains* p 169 is amended as follows:

Table 6.7 – Empirical guide for sizing rider mains

	DN 50 Rider mains
Minimum Service Pressure	**Max no. of dwelling units**

	One end supply	**Two end supply**
High > 600 kPa	20	40
Medium 400-600 kPa	15	30
Low < 400 kPa	7	15

(this table may only be used when service connections start within 25m of the start of the Rider Main and are spaced at not more than 25m intervals)

94. Table 6.8 – *Stop valve spacing criteria* p 170 is amended as follows:

Table 6.8 – Stop valve spacing criteria

Water main size DN **(nominal)**	**Maximum number of property service connections ~~(nominal)~~**	**Maximum spacing** (m)
[150	40	300*
~~200-300~~150-300	100	750
~~375~~301-375	150	1000
376 As approved by Council		

* In rural areas, the maximum spacing is 500 m.

95. Clause *7.2.2 Compatibility with engineering design* p 172 is amended as follows:

7.2.2 *Compatibility with engineering design*

Landscape design should be considered in the early stages of a development to ensure that any landscape conditions and objectives are compatible with subsequent engineering design and works. Landscape design is intended to enhance the character and environment of a development, to strengthen existing neighbourhood character and unify those areas into an integrated district. While ~~L~~landscape design is not~~, however,~~ compulsory for all developments street landscaping is required where any new roading is to be established. Landscape and subdivision design needs to take into account principles to promote personal safety (refer 7.2.7). Landscape design~~and~~ must be assessed in accordance with the scale of the development, identification of positive effects that landscaping may

provide and local conditions.

96. Clause *7.2.7 Safer Design Guidelines* p 173 is inserted as follows:

7.2.7 *Safer Design Guidelines*

The following principles should be considered in any landscape design to promote Crime Prevention through Environmental Design (CPTED)

(i) Maintain clear sightlines

(ii) Provide for safe movement, good connection and access

(iii) Provide for mixed use and activities that promote public use

(iv) Define ownership between public, private and communal space

(v) Prevent unwanted access to private space

(vi) Well-maintained landscaping and designed to discourage vandalism.

97. Clause *7.3.1.2* p 173 is amended as follows:

7.3.1.2

The minimum separation and site distances referred to in figures 7.1 and 7.2 should be observed for tree and shrub planting. These distances are guidelines and may have to be increased or reduced depending on the road geometry. Consultation with the Council is required on the necessary separations and site distances.

98. Clause *7.3.2.2* p 176 is amended as follows:

7.3.2.2 The minimum planting size of a landscape tree is 1.8-2~~5~~ m tall at the time of planting unless the local conditions of a site require consideration of alternatives, e.g., an exposed site may require small, well-hardened trees.

99. Clause *7.3.3.1* p 176 is amended as follows:

7.3.3.1 Species are to be selected with regard to overall composition, low maintenance and longevity and should comply with the TA's planting policies. Appendix E contains a list of species which are unsuitable for street trees within Marlborough District. ~~The TA should maintain a register of suitable species for local conditions.~~

100. Clause *7.3.5.1* p 177 is amended as follows:

7.3.5.1 Landscaping structures include (but are not limited to) sculptures, walls, fences, screens, bollards, entranceways, posts, etc., and could be made from materials such as concrete, brick, stone, rock and timber. The design of the landscape must be considered as an integral part of the development and surroundings to fulfil both functional and aesthetic requirements. Durability and maintenance requirements must be considered. Council approval is required for any landscaping and structures on Council land or land to vest in Council.

101. Clause 7.4.1.2 p 177 is amended as follows:

7.4.1.2 The developer is responsible (and may be bonded) for the routine maintenance and replacement of the planting including dead wooding, weed control, mulching, replacing dead trees, shrubs and plants and watering for a period of 12 ~~18~~ months from the time of acceptance of as-built landscape plans by the TA or issue of a s. 224 certificate under the Resource Management Act 1991, whichever is later.

102. Clause *7.4.4.1* p 178 is amended as follows:

7.4.4.1 Mulch shall be cambium grade bark mulch. Bark mulch must be clean, free of sawdust and dirt and with individual pieces no larger than 100 mm. Mulch for gardens and shrubberies shall be 75mm final depth without a weed mat and 50mm final depth with a biodegradable weed mat.~~a uniform 100 mm in final depth~~. Edges shall hold mulch without spillage.

103. Clauses under *7.4.7 Pruning* p 181-182 are deleted as follows:

7.4.7 *Pruning*

~~**7.4.7.1** Trees should be selected and located to minimize ongoing pruning costs and requirements. Pruning should be carried out on shrubs to maintain a high standard of presentation, display, and plant vigour. Paths, roads and all other accessways should be kept clear of excess growth. Pruning is also necessary to ensure signs are not obscured.~~

~~**7.4.7.2** All weak, dead, diseased and damaged growth should be~~

~~removed, and pruning carried out to maintain the desired shape and size.~~

~~**7.4.7.3** Pruning should not be carried out during leaf burst or leaf fall.~~

~~**7.4.7.4** The following pruning techniques (for shrubs only) should be employed where appropriate:~~

~~(a) Tips to be pinched or purged as appropriate for species to give desired shape and size;~~

~~(b) Form pruning of young plants to ensure compact form and shape;~~

~~(c) Undercutting of groundcovers at edges generally;~~

~~(d) Plants are to be pruned so that they do not smother neighbouring plants.~~

~~**7.4.7.5** Pruning to provide adequate sight visibility at intersections and driveways is required. This is to ensure the safety of pedestrians and motorists (see figure 7.2).~~

~~**7.4.7.6** Spent flower heads should be removed including but not limited to the following species: Agapanthus, flax, grass species and Arthropodium.~~

~~**7.4.7.7** All future pruning of street trees, once planted, shall be undertaken by a suitably qualified arborist/horticulturist. All pruning shall be undertaken to recognized arboricultural practices.~~

~~***C7.4.7.7***~~

~~***For recommended arboricultural practices refer to "Modern Arboriculture" by Alex Shigo, and for guidelines to promote the natural form and habit of individual species refer to "Sunset Pruning Handbook", published by Sunset Books.***~~

104. Clause *7.4.8 Restoration and tidy up* p 182 is amended as follows:

7.4.8 *Restoration<u>, maintenance</u> and tidy up*

105. Clause *7.4.8.5* p 182 is inserted as follows:

7.4.8.5 <u>The developer is responsible for the routine maintenance and replacement of the planting, lawns and associated works, including dead wooding, weed control, mulching, replacing dead trees, shrubs</u>

and plants and watering for an establishment period of 12 months from acceptance of the as-built plans or issue of the section 224 certificate, whichever is later.

106. Clause *8.2.4* p 184 is amended as follows:

8.2.4 ~~All reserves are to be fenced to surveyed and pegged boundaries.~~ Reserves will be subject to a fencing covenant such that the Council is not liable for fencing or associated costs.

107. Clause *8.2.5* p 184 is inserted as follows:

8.2.5 Vesting of recreation reserves shall be in accordance with Council's Open Space Strategy. Generally reserves will be required to be unencumbered and provided with services to the boundary.

108. Clause *8.2.6 Esplanade reserves* p 184 is inserted as follows:

8.2.6 Esplanade reserves shall be designed and developed in consultation with the Council

109. Clause *8.3.4 Existing trees* p 185 is amended as follows:

8.3.4 *Existing trees*

All existing trees on the reserves ~~shall be inspected by an experienced arborist, prior to development plans being prepared and suitable healthy trees retained~~ will be retained where practical. Prior to vesting any required arboricultural maintenance shall be undertaken by an approved arborist.

~~Existing T~~trees to be retained are to be protected during earthworks and reserve development by temporary fencing 1 m beyond the drip line of the tree.

110. Clause *8.3.5 Park furniture/structures* p 185 is amended as follows:

8.3.5 *Park furniture/structures/irrigation/lighting/paths*

Proposed park furniture or structures shall be shown on the reserve development plan for approval. All park furniture or structures shall be robust, maintenance free, able to be safely used by the public and treated with an approved graffiti guard.

Structures, including but not limited to seats, pergolas, sculptures,

walls, fences, screens, bollards entrance posts etc., could be constructed from materials such as concrete, bricks, stone, rock and treated timber. The design of any landscape features must be considered as an integral part of the reserve and its surroundings to fulfil both functional and aesthetic requirements.

Structures not exempt under the Building Act 1991 shall only be constructed on receipt of a building consent.

Playground equipment shall comply with NZS 5828:2004 *Specification for Playground ~~and Playground Equipment~~ Equipment and Surfacing* and the SNZ - *General ~~New Zealand~~ Playground Equipment ~~Safety Manual~~and Surfacing Handbook 2006*.

All irrigation shall be designed and installed in accordance with NZS5103

111. Clause *8.3.7 Presentation of reserves* p 185 is amended as follows:

8.3.7 *Presentation of reserves*

Land to be vested for reserves purposes shall as a minimum meet the following general requirements:

(a) The land is to be free of noxious weeds, tree stumps (above ground) and other specified vegetation;

(b) All previous fences, farm utilities etc., building remains, and rubbish are to be removed or disposed of to the satisfaction of the TA;

(c) Land is to be accessible for tractor-mounted mowing equipment, and is to have an established turf type seed grass cover;

(d) All boundaries are to be surveyed and clearly pegged;

(e) Any rights of way or easements are to be formalized at no cost to the TA;

(f) Any proposed landscape planting or furniture/structures shall be approved by the Council and shall be completed to the Council's satisfaction.

(g) Be unencumbered

112. Clause *B1 Testing of steel and PVC pipes in Appendix B* p 212 is amended as follows:

B1 Testing of steel and PVC pipes

A successful pressure test is required prior to the water main being allowed to be connected to the existing water supply system.

Before joints are covered, but after anchor blocks are completed, each section of the reticulation, together with all specials and fittings

connected thereto including service connections shall be tested by the developer or contractor in the presence of the authorized officer or his representative. The test shall be carried out, and all necessary apparatus supplied, by the subdividing owner or contractor. The reticulation shall withstand a pressure of ~~1400~~ 1350 kPa measured at the lowest point of the section under test, or 1.5 times the working pressure at any point in the system, whichever is the greater. The pressure shall be maintained for a period of 15 min, and during which time there shall be zero leakage i.e. no drop in pressure.~~, the leakage shall not exceed one litre per 10 mm of pipe diameter per k length of pipe under test per hour.~~

Before arranging a connection to the existing reticulation, the authorized officer may require a similar test after completion of backfilling to any other adjoining works which may affect the existing water reticulation.

The contractor shall make arrangements for bleeding air during the charging of the mains, and for flushing after chlorinating.

113. Appendix *E Unsuitable Street Trees* p 217 is inserted as follows:

APPENDIX E
UNSUITABLE STREET TREES

Scientific Name	**Common Name**	**Major Problems**
Acer negundo	Box Elder	Seeds
Acer pseudoplatanus	Sycamore	Seeds
Aesculus hippocastanum	Horse Chestnut	Roots, nuts, dense wide crown
Alnus glutinosa	Alder	Root Damage
Arbutus unedo	Strawberry Tree	Fruit, shade
Camellia japonica	Camellia	Visibility problems for traffic
Eucalyptus spp – most	Gums	Shading, root damage, debris
Gleditzia tricanthos	Honey Locust	Wind damage
Hoheria sextylosa	Lacebark	Gall disease
Juglans regia	Walnut	Nuts, leaves
Malus spp.	Crab Apples	Disease, fruit
Maytenus boaria	Mayten	Suckers
Melia spp.	Bead Tree	Fruit drop
Pittosporum egenoides	Lemonwood	Shading causing frost patches
Pittosporum tenufolium	Kohuhu	Shading causing frost patches
Platanus hispanica (acerifolia)	London Plane	Anthracnose disease (causes small branches to be shed)
Populus spp.	Poplars	Root damage, fluff, sticky bud deposits
Psuedopanax Spp.	Lancewood	Wind damage
Racosperma (Acacia) sapp	Wattles	Wind damage, shading, short lived, galls
Robinia pseudoacacia	Black Locust	Wind damage
Robinia spp.		Wind damaged and root stock problems
Salix spp.	Willow	Root and wind damage
Sorbus aucuparia	Rowan	Disease
Tilla x europaea	Common Lime	Drops honeydew (aphids), suckers
Ulmus procera	English Elm	Roots
Betula sp	Birch	Drops honeydew (aphids)
Albizzia	Silk Tree	Root damage (no narrow berm)