

This is a preview. Click [here](#) to purchase the full publication.

COMMITTEE REPRESENTATION

This Standard was prepared under the supervision of the P 4404 Committee the Standards Council established under the Standards Act 1988.

The committee consisted of representatives of the following:

Nominating Organisation	Committee Member
Association of Consulting Engineers New Zealand	Brian Kouvelis
Ingenium	Chris Pepper
Institution of Professional Engineers New Zealand	Mark Apeldoorn
Local Government New Zealand	Dale Wills
Ministry for the Environment	Yvonne Weeber
New Zealand Institute of Surveyors	Brett Gawn (Chair)
New Zealand Planning Institute	Keith Hall
New Zealand Transport Agency	Bill Greenwood
New Zealand Utilities Advisory Group	Ian Cox
Plastics New Zealand	Frank O'Callaghan
Road Controlling Authorities Forum New Zealand Inc.	Neil Johnstone
Urban Design Forum	Greg McBride
Water New Zealand	John Palmer

ACKNOWLEDGEMENT

Standards New Zealand gratefully acknowledges the contribution of time and expertise from all those involved in developing this Standard. Standards New Zealand also gratefully acknowledges the drawings provided by Waitakere City Council that formed the basis for figures 3.6(A) to 3.6(C), Kapiti Coast District Council for figure 3.14, UK Department for Transport for figure 3.2, and Water Services Association of Australia for Appendices A and B.

Cover image courtesy Justin Borgueta and Harrison Grierson.

COPYRIGHT

The copyright of this document is the property of the Standards Council. Except for the schedules, and the standard construction drawings in Appendix B, which are copyright waived, no part of the text may be reproduced by photocopying or by any other means without the prior written approval of the Chief Executive Officer of Standards New Zealand unless the circumstances are covered by Part III of the Copyright Act 1994.

Standards New Zealand will vigorously defend the copyright in this Standard. Every person who breaches Standards New Zealand's copyright may be liable to a fine not exceeding \$50,000 or to imprisonment for a term not to exceed 3 months. If there has been a flagrant breach of copyright, Standards New Zealand may also seek additional damages from the infringing party, in addition to obtaining injunctive relief and an account of profits.

Published by Standards New Zealand, the trading arm of the Standards Council, Private Bag 2439, Wellington 6140. Telephone (04) 498 5990, Fax (04) 498 5994, Website <http://www.standards.co.nz>.

AMENDMENTS			
No.	Date of issue	Description	Entered by, and date
1	October 2010	Table 3.2 – replaced. Some images were incorrectly shown. Each is now numbered. Table 5.6 – Water mains column correction to read 500 for minimum vertical clearance. Appendix E – Figure E23 now shows correct image; title to match table 3.2. Update reference to Utilities Access Act 2010. 6.3.16 – clause numbers corrected. Appendix B – CM-005 'Clearance' corrected.	

New Zealand Standard

Land Development and Subdivision Infrastructure

Superseding NZS 4404:2004

ISBN 978-1-86975-132-6

NOTES

This is a preview. Click [here](#) to purchase the full publication.

Contents

Committee representation.....	IFC
Acknowledgement.....	IFC
Copyright.....	IFC
Referenced documents.....	11
Related documents	17
Latest revisions	19
Review of Standards.....	19
Foreword	20
Outcome statement.....	21

Section

1 GENERAL REQUIREMENTS AND PROCEDURES	23
1.1 Scope	23
1.2 Interpretation	23
1.2.1 General	23
1.2.2 Definitions	24
1.2.3 Abbreviations.....	27
1.3 Context.....	30
1.3.1 Resource Management Act.....	30
1.3.2 Historic Places Act.....	31
1.3.3 Building Act.....	31
1.3.4 Other legislation.....	31
1.4 Low impact design	32
1.5 Climate change	32
1.6 Urban design protocol.....	32
1.7 Requirements for design and construction	33
1.7.1 Investigation and design.....	33
1.7.2 Construction	33
1.8 Approval of design and construction	33
1.8.1 Documents to be submitted for design approval.....	33
1.8.2 Drawings.....	34
1.8.3 Design basis for documents submitted for approval	35
1.8.4 Approval of design	36
1.8.5 Notification of contracts and phases of construction.....	36
1.8.6 Supervision of construction	37
1.8.7 Connecting to existing services.....	37
1.8.8 Testing	37
1.8.9 Maintenance	38
1.8.10 Completion documentation.....	38
1.8.11 Approval of uncompleted work	38
1.9 Bonds and charges	39
1.9.1 Uncompleted works	39



2	EARTHWORKS AND GEOTECHNICAL REQUIREMENTS.....	45
2.1	Scope	45
2.2	General	45
2.2.1	Objective.....	45
2.2.2	Referenced documents	46
2.2.3	Local authorities' requirements.....	46
2.2.4	Geotechnical requirements.....	46
2.3	Design	47
2.3.1	Design factors.....	47
2.3.2	Preliminary site evaluation.....	47
2.3.3	Landform selection	49
2.3.4	Stability criteria	50
2.3.5	Special soil types.....	50
2.3.6	Compaction standards for fill material	51
2.3.7	Erosion, sediment, and dust control	51
2.3.8	Seismic considerations.....	52
2.4	Approval of proposed works	52
2.5	Construction.....	52
2.6	Final documentation.....	52
2.6.1	Geotechnical completion report	52
2.6.2	As-built drawings for earthworks and subsoil drains	53
3	ROADS	56
3.1	Scope	56
3.2	General	56
3.2.1	Objective.....	56
3.2.2	Related Standards and guidelines.....	56
3.2.3	Road purpose	56
3.2.4	Place and link context.....	57
3.2.5	Network connectivity	60
3.2.6	Design and access statement	61
3.2.7	Road safety audit.....	61
3.3	Design	62
3.3.1	Design requirements.....	62
3.3.2	Road geometric design.....	64
3.3.3	Pavement structural design	78
3.3.4	Safety barrier provisions	80
3.3.5	Target operating speed.....	80
3.3.6	Parking, passing, and loading	81
3.3.7	Intersection and alignment design.....	81
3.3.8	No-exit roads	82
3.3.9	Bus stops	82
3.3.10	Special road and footpath provisions near places of assembly.....	82

3.3.11	Footpaths, accessways, cycle paths, and berms	82
3.3.12	Traffic signs, marking, and road furniture	84
3.3.13	Trees and landscaping	84
3.3.14	Road lighting	84
3.3.15	Bridges and culverts	85
3.3.16	Private ways, private roads, and other private accesses ..	85
3.3.17	Crossings.....	89
3.3.18	Fencing	89
3.3.19	Road run-off.....	90
3.4	Construction.....	104
3.4.1	Introduction	104
3.4.2	Materials for flexible pavements	104
3.4.3	Road surfacing.....	105
3.4.4	Road surfacing materials.....	106
3.4.5	Subgrade checking.....	108
3.4.6	Spreading and compaction of metal course aggregates ..	108
3.4.7	Sub-base	108
3.4.8	Basecourse.....	108
3.4.9	Maintenance of basecourse	109
3.4.10	Basecourse preparation for surfacing	109
3.4.11	Deflection testing prior to surfacing	109
3.4.12	Surfacing specification	110
3.4.13	Bitumen application rate	110
3.4.14	Footpaths and cycle paths.....	110
3.4.15	Kerb and channel.....	111
3.4.16	Berms and landscaping	111
3.4.17	Surface finish and tolerances on kerbs, paths, and accessways	112
3.4.18	Progress inspections	112
3.4.19	Installation of traffic services, road furniture, benchmarks ..	112
3.4.20	As-built and completion documentation	112
4	STORMWATER.....	113
4.1	Scope	113
4.2	General	113
4.2.1	Objectives	113
4.2.2	Legislation and guidance manuals	113
4.2.3	Local authorities' requirements.....	114
4.2.4	Catchment management planning.....	114
4.2.5	Effects of land use on receiving waters	115
4.2.6	System components	115
4.2.7	Catchments and off-site effects.....	115
4.2.8	Water quality	116
4.2.9	Climate change	116

4.3	Design	116
4.3.1	Design life	116
4.3.2	Structure plan	116
4.3.3	Future development.....	117
4.3.4	System design	117
4.3.5	Design criteria.....	117
4.3.6	Stormwater pumping.....	121
4.3.7	Low impact design.....	122
4.3.8	Natural and constructed waterways	126
4.3.9	Pipelines and culverts.....	127
4.3.10	Manholes	129
4.3.11	Connection to the public system.....	131
4.3.12	Connection of lateral pipelines to public mains	131
4.4	Approval of proposed infrastructure.....	132
4.4.1	Approval process.....	132
4.4.2	Information to be provided.....	132
4.5	Construction.....	133
4.5.1	Pipeline construction	133
4.5.2	Trenching	133
4.5.3	Reinstatement.....	133
4.5.4	Inspection and acceptance.....	133
5	WASTEWATER.....	134
5.1	Scope	134
5.2	General	134
5.2.1	Objectives	134
5.2.2	Referenced documents and relevant guidelines	134
5.3	Design	135
5.3.1	Design life	135
5.3.2	Structure plan	135
5.3.3	Future development.....	135
5.3.4	System design	135
5.3.5	Design criteria.....	136
5.3.6	Structural design.....	139
5.3.7	System layout	141
5.3.8	Maintenance structures	144
5.3.9	Venting.....	150
5.3.10	Connections.....	150
5.3.11	Pumping stations and pressure mains	151
5.3.12	Pressure sewers and vacuum sewers	151
5.3.13	On-site wastewater treatment and disposal	151
5.4	Approval of proposed infrastructure.....	152
5.4.1	Approval process.....	152
5.4.2	Information to be provided.....	152

5.5	Construction.....	152
5.5.1	Pipeline construction	152
5.5.2	Trenching	152
5.5.3	Reinstatement.....	152
5.5.4	Inspection and acceptance.....	153
5.5.5	Leakage testing of gravity pipelines	153
5.5.6	Leakage testing of pressurised sewers	153
6	WATER SUPPLY.....	154
6.1	Scope	154
6.2	General requirements	154
6.2.1	Objectives.....	154
6.2.2	Referenced documents and relevant guidelines	155
6.3	Design	155
6.3.1	Design life	155
6.3.2	Structure plan	155
6.3.3	Future development.....	155
6.3.4	System design	155
6.3.5	Design criteria.....	156
6.3.6	Water quality	159
6.3.7	Flow velocities	160
6.3.8	System layout	160
6.3.9	Clearances.....	163
6.3.10	Pipe selection	164
6.3.11	Fire flow	166
6.3.12	Structural design.....	166
6.3.13	Reservoirs and pumping stations	169
6.3.14	Valves	169
6.3.15	Hydrants.....	175
6.3.16	Connections.....	176
6.3.17	Termination points	176
6.4	Approval of proposed infrastructure.....	178
6.4.1	Approval process.....	178
6.4.2	Information to be provided.....	178
6.5	Construction.....	179
6.5.1	Excavation	179
6.5.2	Embedment	179
6.5.3	Backfilling and reinstatement	179
6.5.4	Pressure testing of water mains	180
6.5.5	Disinfection of water mains.....	180
6.5.6	Discharge of testing water	180
6.5.7	Water sampling	180

7	LANDSCAPE	181
7.1	Scope	181
7.2	General	181
7.2.1	Approval.....	181
7.2.2	Environmentally-responsive design.....	181
7.2.3	Reserves and land protection covenants	181
7.2.4	Ecological, functional, and aesthetic opportunities	182
7.2.5	Landscape and planting opportunities	182
7.3	Design	183
7.3.1	Location	183
7.3.2	Reserve location and layout	183
7.3.3	Existing vegetation and trees	183
7.3.4	New trees and road geometry	184
7.3.5	Planted grass areas, berms, swales, or rain gardens	184
7.3.6	Species selection.....	184
7.3.7	Quality control.....	184
7.3.8	Landscaping structures	185
7.3.9	Fencing of reserves	185
7.3.10	Planting period and irrigation.....	185
7.4	Construction and maintenance	186
7.4.1	Introduction.....	186
7.4.2	Soil and fertility	186
7.4.3	Weeds and litter control.....	186
7.4.4	Planting grass areas.....	186
7.4.5	Mulch	187
7.4.6	Specimen tree planting.....	188
7.4.7	General amenity planting.....	189
7.4.8	Revegetation planting and existing vegetation.....	189
7.4.9	Swales, rain gardens, wetlands, and riparian margins planting	189
7.4.10	Pruning.....	189
7.4.11	Maintenance	190
8	NETWORK UTILITY SERVICES	191
8.1	Scope	191
8.2	General	191
8.2.1	Legislation.....	191
8.2.2	Definitions	191
8.2.3	Context.....	191
8.3	Design	192
8.3.1	Plans	192
8.3.2	Utilities above ground	193
8.4	Construction.....	193
8.4.1	Underground cabling	193
8.4.2	Materials	193