Part 9: Utilities

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9.1 Referenced Documents

Planning and Policy

- The *Christchurch District Plan (District Plan)* www.districtplan.ccc.govt.nz
- Electricity Act (1992)
- Resource Management (*National Environmental Standards for Telecommunication Facilities*) Regulations (2008) www.legislation.govt.nz/regulation/public/2008/0299/latest/DLM1576701.html

Design

- NZUAG *The National Code of Practice for Utilities' Access to the Transport Corridors* nzuag.katipo.co.nz/wp-content/uploads/2018/02/NZUAG-Code.pdf
- New Zealand *Code of Practice for Electrical Safe Distances* NZECP 34: 2001 www.transpower.co.nz/resources/new-zealand-electrical-code-practice-electrical-safe-distances-nzecp-34

Construction

- Christchurch City Council Civil Engineering *Construction Standard Specifications Parts 1-7* (*CSS*) www.ccc.govt.nz/consents-and-licences/construction-requirements/construction-standard-specifications/download-the-css/

Where a conflict exists between any Standard and the specific requirements outlined in the Infrastructure Design Standard (IDS), the IDS takes preference (at the discretion of the Council).

9.2 Introduction

This Part discusses issues that must be considered for any developer installing utilities that will not be maintained or owned by the Council. The design requirements of the utilities themselves are not covered here but can be obtained from the individual operators. To achieve good outcomes, view *The National Code of Practice for Utilities' Access to the Transport Corridors* on the working road-share and the objectives agreed by the industries.

9.2.1 Council requirements

The requirements for the provision and installation of utilities are set out in the *District Plan*.

Ensure that the appropriate resource consents are obtained for work in the vicinity of protected trees and that the work is carried out in accordance with *CSS: Part 1* clause 19.0 – Protection of Natural Assets and Habitats.

9.3 Quality Assurance Requirements and Records

Provide the information detailed in Part 3: Quality Assurance and the *Construction Standard Specifications (CSS)*, during design and throughout construction.

9.4 Network Utility Operator Requirements

Ensure that the design and construction of any network to be adopted by a utility operator complies with their standards.

Electrical design standards are written by individual electrical utility operators to comply with the requirements of the Electricity Act and its associated Regulations. There is a degree of consistency due to the continuous nature of the network.

Telecommunications design standards are also written by telecommunication utility operators. The telecommunications network is a series of separate networks with some interconnection. The design and construction standards can vary between the different operators.

Details of network utility operators can be found at www.ccc.govt.nz/consents-and-licences/construction-requirements/network-utility-operators/.

9.5 Utility Design

Design all services to be installed on bridges and culverts to enhance the visual qualities of the site. Refer to *WWDG* Part B clause 13.2 - Bridges and culverts for utility design at bridges and culverts.

9.5.1 Service plans

Use the latest service plans when preparing engineering drawings. Be aware that connections to properties from any service or utility may not be shown. There may also be differences between utility digital data and utility paper plans.

9.5.2 Location of utilities

Consider the following when planning the layout of a development:

> utility services are generally installed parallel to road or legal boundaries;

> laterals are perpendicular to the main supply and configured to service two lots, wherever possible;

> boundary boxes and distribution pillars are installed together on a boundary junction and clear of likely vehicle access;

> allow for maintenance access.

Minimise the cross-sectional area occupied by utility services through detailing shared trenches where practicable, to allow for possible future utility reticulation. Also consider the possible location of future cabinets in service strips or footpaths.

Discuss major reticulation and its potential for significant traffic disruption at an early stage with Council.

Consider the following when planning the location and design of structures and their corresponding utility lots:

> place and design them to minimise adverse visual impact by integrating them with the design of hard and soft landscaping;

> design to minimise the potential for damage to the structure from vandalism;

> reduce their impact on traffic movement;

> structures must not reduce vehicle sight distances and should not interrupt pedestrian movement;

Using streetlight poles to display artworks (Spencer St)

> ensure that they do not compromise property rights or access;

> provide access to the structure.

Refer to the *National Environmental Standards for Telecommunication Facilities* for further information regarding telecommunications cabinets.

Some structures may contribute to the environment if designed to enhance the neighbourhood character.

Consult comprehensively with the relevant network utility operators regarding the location of utilities and the spacing and final location of the structures. Refer to clause 10.5.3 – Utilities (Reserves, Streetscape and Open Spaces) before considering locating utilities in reserves.

9.5.3 Typical services layout and clearances

There are specific working clearances required between different utility services. Confirm these clearances with the network utility operators before deciding on any utility layout or trench detail.

Table 1 Crossing utility clearances - outside to outside

	preferred location	vacuum sewer	water main	HV power	LV power	gravity sewer	storm water	water submain	phone	gas
pressure >110Ø sewer ≤110Ø	path	n/a	100	50	50	50	50	100	50	50
vacuum sewer	c/way		100	100	100	100	100	100	100	100
watermain	c/way			150	100	100	100	n/a	100	100
HV power	berm/path				n/a	500	500	150		
LV power	berm/path							100		
gravity sewer	c/way						50	100	50	50
stormwater	c/way							100	50	50
water submain	path								100	100
phone	berm/path									
gas	berm									

both services likely to be in berm/path

both services likely to be in carriageway

Table 2 Parallel utility clearances - outside to outside

	preferred location	vacuum sewer	water main	HV power	LV power	gravity sewer	storm water	water submain	phone	gas
pressure >110Ø sewer ≤110Ø	path	n/a	1000 600	450	450	450	450	450	450	450
vacuum sewer	c/way		600	600	600	600	600	600	600	500
watermain	c/way			1000	300	1000	450	n/a	450	450
HV power	berm/path				300	1000	1000	300	300	300
LV power	berm/path					500		300	300	300
gravity sewer	c/way						1000	300	1000	1000
stormwater	c/way							300	500	500
water submain	path								300	300
phone	berm/path								300	150
gas	berm									

both services likely to be in berm/path

both services likely to be in carriageway

Note:

1) Where the clearances in Table 1 or 2 cannot be achieved, provide a non-conformance Report, in accordance with clause 3.7.1 – Control of non-conforming work (Quality Assurance)

2) Ducts may be suitable where clearances are unavailable.

3) Where the crossing clearance is under 200mm, consider the use of alternative fillers to metalcourse, due to difficulties in compaction.

Consider the proximity of overhead power lines: design infrastructure to provide the clearances required in the *Code of Practice for Electrical Safe Distances*. Refer to *The National Code of Practice for Utilities' Access to the Transport Corridors* and *CSS: Part 1* where working around trees. Clause 10.9.11 - Location of trees in streets details root barrier requirements to protect underground power cables.

Typically, the utilities are installed as indicated:

> gravity sewer located centrally in the road or right of way formation.

> vacuum sewer located between 2.0m and 5.0m from the road centreline.

> pressure sewer system pipes located 0.6m to 1.5m from the road boundary.

> stormwater located between the sewer and 1.5m inside the kerb or directly under the kerb and channel.

> watermains located between 2.0m and 2.5m off the kerb in the carriageway.

> submains located 150mm off the property boundary.

> electricity located 0.6m to 2.1m from the road boundary, and 0.6m away from the legal boundary in a right of way.

- telecommunications located at a convenient offset. Locate as the final option in the carriageway.
- gas located at a convenient offset, preferably within the berm. If this is not practicable, locate it under the path or, as the final option, in the carriageway.

Where possible, locate service covers outside of potential cycle lanes and preferably outside of wheel tracks. Locate vacuum collection chambers outside of the carriageway where possible or otherwise in the carriageway within 2.5m of the kerb.

New parallel reticulation services must cross as close as practicable to 45°.

9.5.4 Network reticulation

The telecommunications layout is not usually designed until the electricity layout is substantially complete - this is an economic decision as the layouts are inter-related and, in land developments, service trenches are shared wherever possible. Ensure that power is provided to telecommunication cabinets, cable television cabinets and amplifiers.

Ensure that drawings sent to the utility designer and the network utility operator show all the existing services. Ideally, these drawings should be the approved subdivision consent or engineering drawings. This reduces the likelihood of conflicts between existing and new services and increases the cost-efficiency of service provision.

9.5.5 Above-ground utilities

Locate above-ground utilities within legal road to provide the clear zone required by clause 8.15.10 – Clear zones (Roading). Locate street light columns in accordance with clauses 11.4.6 – Column locations (Lighting). In addition to clear zone distances within the 50km/hr speed environment, locate new utilities clear of the footpath, at least 1.0m away from kerb cutdowns and at least 0.7m behind the kerb.

9.6 CONSTRUCTION

9.6.1 Proposed installation method

There are various methods of installing underground services. These include open trenching, directional drilling, pipe bursting, sliplining, pipe ramming and thrusting. Refer to Part 6: Wastewater Drainage for further information.

Factors that may affect the choice include the ground conditions, disruption to traffic, presence of trees, site safety, the availability of Council blue ducts and redundant services, e.g. old gas mains or their offsets.

When the intention is to lay a number of utilities in a common trench, ensure the minimum covers and separation distances for each utility in the trench cross-section are obtained.

9.6.2 Installing new reticulation within legal roads

Wherever utility services are installed along existing legal roads, obtain a Network Service Operators Works Access Permit (WAP) from the Council for that work, unless the works form part of an approved roading design. Apply for a Corridor Access Request (CAR) at www.beforeudig.co.nz. Typically, the WAP is obtained after the utility reticulation layouts are confirmed.

If granted, the WAP defines the Council's requirements for the restoration of the construction within the legal road and any constraints on the permitted hours of work within that road. To avoid possible conflicts, ensure that the requirements of the WAP are included in any contract documentation. Also refer to *Guide for Safety with Underground Services*.

9.6.3 Pipe depths

Minimum and maximum covers specified elsewhere in the IDS are summarised in Table 3 and Table 4. Where values are not provided, use the manufacturer's specifications or values from the relevant installation standard.

Table 3 Installation depths

Installation depth for material types (m)	within c/way		Other trafficked areas		untrafficked areas	
	min	max	min	max	min	max
Rising, vacuum and PSS main			0.75	1.5	0.75	1.5
PSS and vacuum sewer laterals			0.6	1.5	0.45	1.5
wastewater gravity plastic (LRI ≤2)	0.75	3.5	0.6	3.5	0.5	3.5
wastewater gravity other (LRI ≤2)		3.5		3.5		3.5
wastewater gravity plastic (LRI >2)	0.75	5.0 or 3.0 below watertable	0.6	5.0 or 3.0 below watertable	0.5	5.0 or 3.0 below watertable
wastewater gravity other (LRI >2)		5.0 or 3.0 below watertable		5.0 or 3.0 below watertable		5.0 or 3.0 below watertable
stormwater gravity concrete						
stormwater gravity plastic	0.75		0.6		0.5	
watermain ≥100mm			0.75	1.1	0.75	1.1
water submain <100mm (metal)			0.5	0.7	0.3	0.7
water submain <100mm (plastic)			0.6	0.7	0.45	0.7

Note: 1) New watermains are 150mm minimum diameter.

Table 4 Installation depths in reserves

Installation depth for material types (m)	Trafficked areas		untrafficked areas	
	min	max	min	max
Enable cables			0.5	
water submain <100mm (metal)	0.5	0.7	0.5	0.7
water submain <100mm (plastic)	0.6	0.7	0.5	0.7

9.6.4 Backfill

Bedding materials should comply with the network utility operator's requirements.

Specify backfill materials individually. The material used must be capable of achieving the backfill compaction requirements set out in CSS: Part 1 clause 29.0 – Backfilling. The WAP specifies the final surfacing to the excavation. Refer to the *National Code of Practice for Utilities' Access to the Transport Corridors* for further information.