



DS7 – Water Supply

Contents

DS7	Water Supply.....	2
7.1	Minimum Requirements.....	2
7.2	Level of Service.....	2
7.3	Creation of Water Easement in Gross.....	3
7.4	General Design Standards.....	3
7.4.1	Water Demand and Pressure.....	3
7.4.2	Reticulation Layout.....	5
7.4.3	Alignment of Water Mains.....	5
7.4.4	Alignment at Intersections.....	6
7.4.5	Depth of Watermains.....	6
7.4.6	Trench Widths.....	6
7.4.7	Saline and Contaminated Areas.....	7
7.4.8	Trenchless Techniques.....	7
7.5	Water Mains.....	7
7.5.1	General.....	7
7.5.2	Principal Mains.....	7
7.5.3	Rider Mains.....	8
7.6	Connection of Rider Main to Principal Main.....	8
7.7	Hydrants.....	8
7.7.1	Hydrant Spacing.....	8
7.8	Valves.....	10
7.8.1	Sluice Valves.....	10
7.8.2	Gate Valves (also known as peet valves).....	10
7.8.3	Air Release Valves and Scour Valves.....	10
7.8.4	Positioning of Valves.....	10
7.8.5	Pressure zone dividing valves.....	11
7.8.6	Secure Service Connections.....	11
7.9	Anchor or Thrust Blocks.....	11
7.10	Connections to Private Property.....	12
7.10.1	Point of Supply to Consumer.....	12
7.10.2	Service Connection Pipes.....	13
7.10.3	Service Connections Testing.....	13
7.10.4	Backflow Protection.....	13
7.10.5	Tapping Bands.....	14
7.11	Special Measures in Corrosive Soils.....	14
7.12	Special Measures for Pumping and Storage.....	14



DS7 Water Supply

7.1 Minimum Requirements

For all developments, a water supply system shall be installed, in accordance with the District Plan and the Code.

All allotments shall be provided with a water supply connection which shall be 20mm internal diameter. All water supply connections require application to and approval by Council.

Developments without access to a public supply must be served by a privately owned water supply which satisfies all legislation and guidelines, including but not limited to, drinking water standards, Building Act and the New Zealand Fire Service Code of Practice; SNZ PAS 4509:2008 and subsequent amendments, to the satisfaction of the New Zealand Fire Service.

Backflow prevention, complying with the Ministry for Health (Drinking Water) Amendment Act 2007. The N.Z. Building Code, Clause G12 and the water supply bylaws, shall be provided for all connections.

Pipe systems greater than 375mm diameter require specific design and approval from Council.

The design life of the system shall be not less than 60 years.

All pipe installation shall be designed to meet pipe manufacturer's specifications and this Code.

7.2 Level of Service

All water supply reticulation shall be to a Water Supply Classification W3, or such higher classification as appropriate in terms of the New Zealand Fire Service Firefighting Water Supplies Code of Practice, SNZ PAS 4509:2008 and subsequent amendments.

The minimum firefighting residential running water pressure shall be 100 kPa (10m head of water) at any hydrant.

The minimum working residential water pressure, in other than firefighting conditions, shall be 300 kPa (30m head of water) at the point of supply (known as a high level public service zone).

In high level areas above the 60m contour where a high level public supply zone does not exist, as in areas within a 30m elevation of a Council reservoir, a pumping station shall be provided to supply an elevated storage reservoir with the approval of the Authorised Officer.



Supply to the high level area shall be by gravity from the elevated storage reservoir. Where available land is insufficient for a Council reservoir to be constructed and there will be public water supply to properties at less than 30m head pressure, the property owners shall provide a privately owned on site storage and booster pump system for domestic purposes only. This will include the installation of backflow device, flow restrictor, water meter and toby manifold at the property boundary.

7.3 Creation of Water Easement in Gross

7.3.1 Council requires that all water pipelines which are to be vested in Council, other than those located in drainage reserves, or road reserves, are protected by a Water Easement in Gross which is to be drawn up and registered against the titles of the individual properties by the developer at the developer's expense.

7.4 General Design Standards

7.4.1 Water Demand and Pressure

i. Design

All reticulations systems shall be designed in accordance with NZS 4404 and the following criteria.

- For the purposes of this Code, design incorporates demand assessment, peak flow analysis, hydraulic design, minimum and maximum working pressures, network analysis, head loss, pipe construction, testing of proposed systems and pressures, fire flow analysis, pressure management, valving, system analysis. NZS 4404 guidelines shall be used as the design basis.
- Council reserves the right to specify the size of the principal and rider watermains within the development where it deems departure from any standard is required.

ii. Domestic Supply

The development pipe network shall be designed to provide for annual, seasonal and peak demand utilizing the available pressures in the existing mains.

- The design shall provide for an annual average domestic demand of 220l/head/day with a peak hour flow of five times this amount.
- A population density 15 houses/ha ocr (3) = 45 persons/ha shall be used as the basis for the design of domestic flows in urban areas.



- It is the responsibility of the Consent Holder's Representative to confirm what supply capacities are available to serve the proposed development.

iii. **Commercial and Industrial Supply**

The water supply demand for activities in commercial and industrial areas shall be calculated and specifically allowed for in the design and shall not be less than shown in Table 1 below.

Table 7.1

Type of Development	Consumption (peak hourly flow)
Residential (based on 45 persons / hectare)	0.64 l/sec/ha
Schools, small hospitals, rest homes, small shopping areas	1 l/sec/ha
Suburban industrial and commercial areas, high rise in residential H, large schools and hospitals	1.5 l/sec/ha
Large commercial and industrial development	2 l/sec/ha

iv. **Firefighting Supply**

The water reticulation shall comply with the requirements of the New Zealand Fire Service Firefighting Water Supplies Code of Practice SNZ PAS 4509 and shall meet all the code requirements including firefighting flows, running pressure and the spacing and close proximity rules of hydrants, together with any additional requirements set out in this code.

Unless stated otherwise in the Council's condition for the development, the fire risk classification shall be as shown in SNZ PAS 4509.

v. **Working Pressures**

The Council shall, where available, provide details of the pressures and flows at the point or points of connection to the existing reticulation which will be used for design purposes. Where this information is not available, the developer shall engage a Council approved contractor to undertake tests at the nearest hydrant(s) to the point of connection.

The Council has the right to specify the diameters to be used for the principal watermains within the development. Water reticulation design shall provide capacity for future development of land beyond the proposed subdivision, and the existing reticulation shall be assessed and upgraded where necessary and required by the Authorised Officer to cater for both the proposed and future development.

The operating pressure shall be limited as per Table 7.2 below.



Table 7.2

Allowable operating pressure (Head)	Residential pressure (Head)	Industrial
Maximum	900 kPa (90m)	900 kPa (90m)
Minimum	300 kPa (30m)	300 kPa (30m)

vi. **Non-Council Supply**

In order to meet its obligations under the Building Act and Health Act, all developments that are not required to connect to a Council supply must provide details of the source, capacity and quality of the existing (Where applicable) and proposed water supply.

7.4.2 Reticulation Layout

- i. A principal watermain of not less than 100mm diameter fitted with fire hydrants shall be laid on one side of all through roads and one side of every cul-de-sac to the end of the cul-de-sac to cater for the requirements of Clause 7.7.1 regarding hydrant spacing.
- ii. A rider main of not less than 50mm diameter shall be laid along the road frontage of all lots not fronted by a principal main.
- iii. An additional rider main of not less than 50mm diameter shall be laid to provide service connections where the principal main is 250mm diameter or larger.
- iv. Rider mains shall be connected to principal mains at both ends, except for privateways and single road crossings (in the case of infill subdivisions) where a single connection to the principle main is acceptable. A 25mm scour valve shall be constructed at the terminal point of the rider main.
- v. In the case of arterial roads, principal mains are to be laid on both sides of the road.
- vi. In industrial and commercial areas the pipe sizes shall be adequate for the demand and firefighting flows/pressure. The minimum requirements shall be not less than a 150mm diameter principal main on one side of the road, with an additional principal main on the other side.

7.4.3 Alignment of Water Mains

- i. The position of watermains in the street shall nominally be 1.8m from the property boundary as shown in accordance with the drawings provided in the Construction specification.



- ii. There shall be a minimum separation of 500mm, measured horizontally, between the watermain and any other service laid parallel to it. in accordance with the drawings provided in the Construction specification.
- iii. All cases where these standard layouts cannot be achieved a proposed alternative engineering design shall be referred to the Authorising Officer for engineering plan approval prior to installation.
- iv. Trees, manholes and similar structures shall not be positioned in berms where they will interfere with the standard alignment of the watermain, unless approval is given by the Authorising Officer.

7.4.4 Alignment at Intersections

- i. The alignment of water mains at street intersections shall be designed in accordance with the drawings provided in the Construction specification.

7.4.5 Depth of Watermains

Both principal and rider mains shall have the following minimum cover, except in circumstances requiring additional protection. Greater depth may only be provided if approved by the Authorising Officer.

- i. Under grass berms and footpaths
Top of pipe at least 800mm below finished surface (maximum 1.20m).
- ii. Under carriageways
Top of pipe at least 1.0m below finished surface level. (Maximum 1.20m).
- iii. The sections of main adjacent to a carriageway crossing shall be deepened to allow the required cover under the carriageway without the provision of vertical bends. Similar provisions shall be made to give the necessary cover over valve spindles, i.e. 350mm cover in accordance with the drawings provided in the Construction specification
- iv. Service Connections
Service connection pipes shall have 350mm (\pm 50mm) cover through the meter box in accordance with the drawings provided in the Construction specification

7.4.6 Trench Widths

- i. Pipe trench width design considerations shall be based on the minimum side clearances details in the NZS 4404, Appendix A, Drawing CM-001.



7.4.7 Saline and Contaminated Areas

Where a reticulation main is to be located on or near saline soil or other contaminated land Council will require the following information:

- i. Options to de-contaminate or de salinate the area
- ii. Selection of appropriate pipeline materials and jointing techniques to maintain water quality
- iii. Selection of pipeline materials to achieve the required life expectancy of the pipeline
- iv. Safety of construction and maintenance personnel
- v. Special pipeline maintenance considerations
- vi. Soils testing to confirm nature of contaminant

7.4.8 Trenchless Techniques

Trenchless technology may be required by Council for alignments in the following areas:

- i. Environmentally sensitive areas
- ii. Built-up or congested areas to minimize disruption and reinstatement
- iii. Railway and major road crossings
- iv. Significant vegetation
- v. General streets and vehicle crossings

The following details including location of access pits and exit points will be submitted to Council for approval:

- i. Clearances from services and obstructions
- ii. The depth at which the pipeline is to be laid to ensure minimum cover is maintained
- iii. The pipe support and ground compaction
- iv. How pipes will be protected from damage during the work
- v. Any assessed risk to abutting surface and underground structures
- vi. Approval from third parties (e.g. OnTrack)

7.5 Water Mains

7.5.1 General

All pipes for water mains shall have a minimum rating of PN9 (Class C). Specific designs may require a higher pressure rating at the discretion of the Authorising Officer.

7.5.2 Principal Mains

Principal mains shall be not less than 100mm internal diameter in residential areas and not less than 150mm internal diameter in commercial/industrial areas.



Table 7.3

PN	Class	Maximum Working Pressure	
		Metres of Head	kPa
9	C	90	900
12	D	120	1200
15	E	150	1500

7.5.3 Rider Mains

- i. All rider mains shall not be less than 50mm internal diameter.
- ii. Where single fed flushing points with a suitable backflow protection device shall be installed at the end of 50mm diameter rider mains (see NZS 4404 Appendix A Drawing WS-002).

7.6 Connection of Rider Main to Principal Main

- i. Where a rider main is to be extended at right angles to a principal main, this shall normally be connected with a ductile iron tee with a female threaded branch (or an elongated gibault joint, tapped) and with a 50mm diameter or greater resilient seated sluice valve, as shown in the drawings.
- ii. Where a rider main is to be extended along the same alignment beyond the end of the principal main, it shall normally be connected with a ductile iron tee (or elongated gibault joint) with an anchored blank end plate, and with a vertical socket and right angle brass bend, as shown in the drawings.
- iii. In all cases this pipe should be well anchored by compaction along its length and terminated with a blank end gibault and an adequate concrete anchor block.

7.7 Hydrants

7.7.1 Hydrant Spacing

Hydrants shall be spaced at intervals not exceeding the following:

- Residential areas 135 metres
- Commercial and industrial areas 90 metres

Note: The distance shall be measured along the route which a fire hose would normally be laid.



- i. Notwithstanding the above spacings, hydrants are to comply with the New Zealand Fire Service Firefighting Water Supplies Code of Practice SNZ PAS 4509 and subsequent amendments.
- ii. In addition, every building platform serviced by hydrants within the street, under construction, shall be within 135m (walking route not radially) of a hydrant. For the purposes of this requirement, a building platform means any part of a front, corner or through site and that part of a rear site which does not include the access strip.
- iii. In cul-de-sac or other terminal streets the last hydrant shall be at the end of the main which shall be at the turning head.
- iv. All houses or residential units, whether road frontage, or driveways off private ways, shall be a hydrant within 135m of any house or unit.
- v. Where a residential private way is more than 65m long a hydrant shall as a minimum be sited at the street end of the private way in order to ensure each house or unit is within 135m of a hydrant.
- vi. Where necessary a 100mm diameter principal main shall be constructed and a hydrant placed within the private way in order to ensure each house or unit is within 135m of a hydrant. This main shall be accepted as public reticulation by Council and protected by an appropriate easement to allow access for maintenance etc.
- vii. Hydrants must be readily accessible for fire appliances and should generally be positioned near street intersections and not placed within 6m from any building, unless authorised by Council and the Chief Fire Officer.
- viii. Hydrants may only be offset into the roadway in commercial areas with the approval of the Authorised Officer.
- ix. Hydrants should be located wherever practicable within the berms and shall avoid conflict with vehicle crossings.
- x. Additional to fire fighting requirements, hydrants shall be located at:
 - a. High points on reticulation mains to:
 - release air during charging, or
 - allow air to enter the main when dewatering, or
 - facilitate manual release of any build up of air where automatic combination air valves are not installed.
 - b. Localised low points on water mains to drain the water main where scour valves are not installed.
 - c. Where a scour valve is not provided at the end of any main 100mm or greater.



7.8 Valves

7.8.1 Sluice Valves

The valves on the principal main shall be resilient seated, anti-clockwise closing to AS/NZS 2638.2.2003 (pressure rated 1600 kPa). Valves shall have a drip tight seal upon closure and allow a full bore flow in the open position.

Valves shall be flanged when laid next to another fitting. In line valves may be spigotted or socketed to take flexible joints (gibault or Z joint). Coatings shall be Nylon/Epoxy to AS/NZS 4158.2003.

All sluice valves 100mm diameter and larger shall be strapped to a concrete anchor block with stainless steel angles.

7.8.2 Gate Valves (also known as peet valves)

Gate valves may only be used on pipelines less than 50mm diameter. Gate valve shall be to BS 5154 or AS 1628. Resilient seated sluice valves as in 7.8.1 above shall be used on pipeline 50mm diameter and greater.

7.8.3 Air Release Valves and Scour Valves

Watermains shall be laid to grade in order to prevent local undulations. Air release valves are to be installed at high points. Scour valves are to be installed at low points or alternatively a hydrant can act as a scour valve.

All dead end mains or one-ended rider mains shall be fitted with permanent scour valves complete with valve box and marker posts, in accordance with the drawings provided in the Construction specification and discharge to a stormwater flowpath or other stormwater system with the approval of the Authorised Officer. These components shall be designed and installed in accordance with NZS 4404 Part 6.

7.8.4 Positioning of Valves

The maximum distance between isolating valves on mains:

- i. with services connections shall be 500m
- ii. without services connections shall be 1000m

Valves shall generally be placed on two of the three legs leading from each tee intersection. Where required by the Authorised Officer valves shall be placed on all three legs if this is necessary in



order to limit the number of houses without water in the event of a shutdown. (Refer to the drawings provided in the Construction specification)

Wherever practicable, valves shall be located in berms. On new watermains, valves shall be located at junctions with existing mains and at intervals not exceeding 500m along the main. Rider mains shall have valves at both ends of the rider main immediately adjacent to the principal main. Valves shall be located as close to the principal main as possible.

Valves shall be specifically located with a view to minimise disruption of supply to consumers and sufficient valves shall be provided to satisfy this requirement. No more than 30 dwellings shall be isolated together.

7.8.5 Pressure zone dividing valves

Pressure zone dividing valves and hydrants shall be installed as shown on the drawings provided in the Construction specification with the approval of the Engineer/Authorised Officer.

7.8.6 Secure Service Connections

Additional valves shall be provided at a service connection to a customer requiring a greater security of supply such as hospitals and large industrial or commercial developments.

See the drawings provided in the Construction specification for typical arrangements to facilitate partial isolation of the main while maintaining supply to the customer.

7.9 Anchor or Thrust Blocks

- i. Cast in-situ concrete anchor blocks shall be provided at all points including bends, tees, pipe reducers, valves, dead (blank) ends and hydrants points where an unbalanced thrust occurs on mains exceeding 50mm ID.
- ii. The design of anchor or thrust blocks shall be based on the bearing value of the site soil conditions, except that the maximum value used shall be 75 kPa. Anchor or Thrust block shall be designed in accordance with NZS 4404 including Appendix A Drawing WS4 and WS5.
- iii. A protective non compressible membrane to prevent abrasive damage to the water main shall be provided between the pipe (irrespective of the pipe material) and the concrete anchor and thrust blocks.
- iv. Taper reducers (to be long tapers only) shall be secured with an adequate concrete anchored block.



- v. Anchor blocks shall be poured against clean undisturbed natural material.
- vi. Thrust blocks at bends shall not fully encase the bend and shall make contact with the bend for at least three pipe diameters.

7.10 Connections to Private Property

7.10.1 Point of Supply to Consumer

The point of supply to the consumer is as determined by Council policy on metering of supply presented in the current Council's current Water Supply System Bylaw and related regulations.

Every separable dwelling or tenancy shall have its own manifold incorporating a toby valve at the point of supply. The following practice shall be followed:

- i. In front lots (or dwelling units with individual street frontage) the service connection shall be at the street boundary. The service pipe shall be terminated 300mm on the street side of the front boundary and next to the electricity and telephone connections with a manifold incorporating a toby valve, a dual check valve (backflow preventer), a Class C meter and a toby box designed in accordance with the drawings provided in the Construction specification
- ii. Back lots (or dwelling units without individual street frontage) of up to two dwelling units shall have separate service connections at the street frontage, as in (i) above. The terminal ends shall be clearly pegged.
- ii. In private ways serving more than:
 - 3 rural lots; or
 - 6 urban lots/units
 - A 50mm diameter rider main shall be laid in the Right of Way with separate service connections off the rider way for each lot or dwelling. The rider main maybe connected to a principle main if laid in the private way for fire fighting compliance. (Refer to the drawings provided in the Construction specification).
 - A 25mm scour valve and backflow prevention shall be installed at the terminal end of the rider main.
 - The connection toby valve is to be within the right of way, adjacent to the lot served. The rider main, up to the point of supply, is to have easements in favour of Council over them. in accordance with the drawings provided in the Construction specification.
- iv. The service connection is to have 500mm cover (± 50 mm) tapered up from the main to within 500mm of the edge of the meter box and raise to 350mm cover through the meter box.



- v. Body Corporate and Multi Unit developments shall either construct internal water mains and individual connections as per standard “greenfields subdivisional development” and vest these with easements in Council or install a bulk supply meter and backflow at the road frontage plus individual meters on the internal connections and retain supply in Body Corporate ownership. Refer to Council – Water Supply Bylaw for further details.
- vi. Each Industrial / Commercial lot shall have the point of metered supply service connection located as per (i) and (ii) above except that for connections larger than 20mm diameter the backflow prevention system shall be located as near as practical to the property side of the boundary / R.O.W. (as applicable) and as close as practicable to the metered supply. The nature of backflow device required is to be in accordance with Clause 7.10.4 below.
- vii. Connections to existing water reticulation mains shall be undertaken in accordance with the Water Supply Bylaw.

Note: For locations for point of supply see the drawings provided in the Construction specification.

7.10.2 Service Connection Pipes

Service connections to individual dwellings shall be 20mm ID, 12 bar, polyethylene. Connections of larger diameter and / or different materials may be used if approved by the Authorised Officer.

The designer shall take into account head losses in serving building sites over long distances for service connections especially in rural or rural residential areas.

7.10.3 Service Connections Testing

The connections shall be tested in conjunction with the mains tests, where laid with the main. Service connections shall be laid at right angles to the boundary in accordance with the drawings provided in the Construction specification.

7.10.4 Backflow Protection

Backflow protection is required at the Point of Supply and as near as practical to the boundary. Any above ground device (Reduced Pressure Zone) is to be installed parallel to and immediately inside the front boundary.

The level of protection is determined after surveying the occupancy of the property and to clause 3.3 “Cross Connection Hazards” in “The Approved Document for New Zealand Building Code” clause G12, Water Supply, Second Edition.

The design shall be in accordance with the drawings provided in the Construction specification and shall make reference to which type is applicable.



7.10.5 Tapping Bands

Each service connection to a principal main or rider main shall be by means of a tapping band.

The tapping band for each service connection shall be sited adjacent to the electricity and telephone connections, close to a side boundary, but not perpendicular to the toby. It shall be at the house side of, and clear of all driveways. A minimum of 500mm horizontal separation from the power and Telecom connection junction boxes shall be maintained.

7.11 Special Measures in Corrosive Soils

- i. Corrosive soils are found in some parts of the Districts. The Authorising Officer shall advise which areas require special attention, especially in saline soils.
- ii. All bolts, nuts and washers shall be of aluminium bronze and fittings shall be of gun metal or of stainless steel. No galvanized or mild steel or brass fittings or bolts and nuts shall be used.

7.12 Special Measures for Pumping and Storage

- i. The provisions of service storage or reticulation pumping installations or both together will be vested in Council.
- ii. If storage is required wholly or principally to serve a specific development the provision of that storage shall be by the consent holder.
 - The consent holder shall provide 24 hour storage equal to the maximum daily demand, plus firefighting storage requirements.
 - Minimum three day storage shall be provided by the consent holder in all rural and rural-residential subdivisions. Note: Council does not guarantee continuity of supply.
 - Storage reservoirs or tanks shall be constructed in concrete, treated steel or PE, with all-weather accessways, telemetry and depth monitoring in accordance with Council conditions and approval.
- iii. In some circumstances, timber tanks may be accepted by the Authorising Officer following receipt and acceptance of the full life cycle costs. Design approval from Council shall be required.