

| Hamilton City Development Manual | |
|--|------------------------------|
| Volume 2 : Design Guide | Part 6 — Water Supply |
| Authorised by : Water & Waste Services Manager | Page 1 of 7 |

PART 6 : WATER SUPPLY

6.1 INTRODUCTION

This Manual sets out the basic design principles for the provision of reticulation for the supply of water. While some construction information is included for completeness, detailed information on construction standards can be found in the Council Standard Specifications (Volume 3).

6.2 GENERAL

6.2.1 Design Life

The water supply system shall have a design life of not less than 100 years for in-ground pipeline components.

6.2.3 Level of Service

The design of the reticulation shall be such that a water supply connection can be readily provided to the 'front' of each allotment (i.e. where the driveway will be installed).

The water supply reticulation shall comply with the New Zealand Fire Service Fire Fighting Water Supplies Code of Practice (SNZ PAS 4509:2003 and subsequent amendments) and shall be a minimum Class W3 (see also Clause 6.4.4).

For fire fighting, the minimum residual running water pressure shall be 100 kPa (1 atmosphere, 10m head of water) at any hydrant.

The working residual water pressure, in other than fire fighting conditions, shall be 100 kPa (1 atmosphere, 10m head of water) at the ground level at the building site in each lot. Designers may be limited by the water pressure available and Council will consider the implications of any such limitations in assessing the engineering plans with the possible outcome that special water supply conditions may apply to the affected properties.

Individual rainwater tanks, individual privately owned bores, wells or restricted supply, may adequately serve isolated small subdivisions in rural settings (Future Urban Zone). Adequate fire protection in accordance with the NZ Standards and acceptable to the NZ Fire service is required.

Note that rural trickle feed water supply schemes are not required to provide fire fighting capacity.

6.3 REFERENCED DOCUMENTS AND STANDARDS

6.3.1 Referenced Documents

- New Zealand Fire Service Fire Fighting Water Supplies Code of Practice (SNZ PAS 4509:2003)
- Council Standard Technical Specifications (Volume 3)
- Council Standard Drawings (Volume 3)

| Hamilton City Development Manual | |
|--|------------------------------|
| Volume 2 : Design Guide | Part 6 — Water Supply |
| Authorised by : Water & Waste Services Manager | Page 2 of 7 |

- Hamilton City Council District Plan
- Hamilton City Council Water Supply Bylaw 2008

6.3.2 Standards

AS/NZS 2566.1: 1988 Buried Flexible Pipelines — Structural Design
AS/NZS 2566.1 Supp 1:1988 Buried Flexible Pipelines - Structure Design — Commentary.
AS 2032:1977 COP for Installation of uPVC Pipe Systems
AS/NZS 2280:1995 Ductile Iron Pipes and Fittings
AS/NZS 2033:1980 Installation of Polyethylene Pipe Supplies

SNZ/PAS 4509:2003 : New Zealand Fire Service Fire Fighting Water Supplies Code of Practice; with the clarification that the minimum flow for a single hydrant shall be 25 litres/second.

6.4 DESIGN REQUIREMENTS

6.4.1 Water Demand and Pressure

The water supply system shall be designed for the worst case flow and pressure requirements. In most subdivision design, the fire fighting requirements will control the design. The designed network should be checked to ensure that the annual, seasonal and peak demands are met using the available pressures in existing mains. Calculations supporting the proposed design are required.

6.4.2 Domestic Supply

The design shall provide for a domestic demand of 260 litre/person/day with a peak flow rate of five times this amount. A population density of 45 persons per hectare shall be the basis of the design.

6.4.3 Commercial and Industrial Supply

The water demand for commercial and industrial areas shall be analysed and specifically allowed for in the design.

6.4.4 Fire Fighting Supply

The water reticulation shall be designed to comply with the requirements SNZ/PAS 4509:2003 : New Zealand Fire Service Fire Fighting Water Supplies Code of Practice. Designs shall meet the code requirements with regard to fire fighting flows, running pressure and the spacing of hydrants, together with any additional requirements set out herein, including storage where applicable. In addition to compliance with SNZ/PAS 4509:2003 designs shall provide for a minimum flow to each hydrant of 25 litres/sec flowing as a single hydrant test with residual flow pressure of 100 kPa.

Unless stated otherwise in a subdivision, land-use or building consent, the minimum fire fighting water supply classification shall be as follows:

- detached or semi-detached housing in suburban areas W3
- schools, local suburban shopping areas and equivalent development W4

| Hamilton City Development Manual | |
|--|------------------------------|
| Volume 2 : Design Guide | Part 6 — Water Supply |
| Authorised by : Water & Waste Services Manager | Page 3 of 7 |

- commercial and industrial areas

W5

6.4.5 Design Basis

Details of the working pressure or pressures at the point or points of connection to the existing reticulation can be obtained from Council. These details shall be used for design purposes.

6.4.6 Pipe Working Pressures

The minimum acceptable pipe class in the Hamilton City Water Supply Area is PN12.

6.5 RETICULATION LAYOUT

A water main of a minimum of 150 mm nominal bore fitted with fire hydrants (hereinafter referred to as the principal main) shall be laid and on one side of all through-streets and one side of every cul-de-sac to the head of the cul-de-sac, subject to the requirements for hydrant spacing and required flow.

A rider main shall be laid to the road frontage of all lots not fronted by a principal main. Rider main street crossings shall be kept to a minimum.

In the case of arterial and dual carriageway streets, principal mains may be required to be laid on both sides of the street.

In order to provide Fire Fighting Water Supplies in excess of the W3 standard, principal mains shall be laid on both sides of the street (note: generally in Hamilton a 150NB pipeline barely provides adequate flow to 2 hydrants flowing simultaneously from the same pipeline). To provide sufficient flow for fire fighting, principal mains may need to be larger than the minimum 150 mm nominal bore; this will depend on the proximity of trunk water mains and the adequacy of the selected pipe size may need to be proved with reticulation flow modelling. At street intersections the arrangement of pipe connections shall spread fire fighting flow rates to both sides of the adjoining street.

For reticulation layout requirements in participating districts refer to Volume 5 Part 6.

6.6 ALIGNMENT OF WATER MAINS IN STREET

The standard position of water mains in the street shall be in the roadway berm and 1.5 m behind the kerb face. Where water mains cannot be laid in the standard alignment, an alternative alignment showing the relative locations of all services shall be designed and proposed with the engineering plans.

6.7 INTERSECTIONS

At street intersections, 90 degree tees or 90 degree bends are preferred rather than two 45 degree bends (refer to Drawing TS622 for standard layout at intersections).

| Hamilton City Development Manual | |
|--|-----------------------|
| Volume 2 : Design Guide | Part 6 — Water Supply |
| Authorised by : Water & Waste Services Manager | Page 4 of 7 |

Pipes used in design shall comply with the relevant Standard and the Council Standard Technical Specifications: Part 6, Section A.

6.8 RIDER MAINS

Rider mains shall be 63 mm OD MDPE. Table 6.2 below sets out the maximum number of domestic connections permitted to be served by a rider main.

Table 6.2
Rider Mains : Service Connections
Maximum number of dwelling units (service connections)

| Medium-Pressure areas (1) | | Low Pressure areas (2) | |
|---|----------------|------------------------|----------------|
| One-end Supply | Two-end Supply | One-end Supply | Two-end supply |
| 15 | 30 | 7 | 15 |
| <i>Notes:</i> | | | |
| (1) Medium-pressure means sites located below 45m Moturiki Datum. | | | |
| (2) Low-pressure means sites located above 45m Moturiki Datum. | | | |

Rider mains with supply from only one end shall have a flushing valve at the terminal end (refer to Drawing No. TS626).

6.9 HYDRANTS

6.9.1 Type

Hydrants shall be to the Standard Technical Specifications for Water (Volume 3, Section A.)

6.9.2 Spacing

Hydrants shall be spaced at intervals not exceeding the following:

- Residential areas 135 m
- Commercial and industrial areas 90 m (on each side of the road).

In a cul-de-sac or in other terminal streets, the last hydrant shall be not more than 65 m from the end of the street measured at the property boundary.

Where houses or residential units are situated on private ways, there shall be a hydrant within 135 metres of any house or unit.

Where a residential private way is more than 65 metres long, a hydrant shall be sited at the street end of the private way or on the other side of the street immediately opposite the entrance.

If necessary, a principal main shall be constructed and a hydrant placed within the private way in order to ensure each house or unit is within 135 m of a hydrant.

Hydrants should be located clear of property entranceways (in the grassed roadway berm).

| Hamilton City Development Manual | |
|--|------------------------------|
| Volume 2 : Design Guide | Part 6 — Water Supply |
| Authorised by : Water & Waste Services Manager | Page 5 of 7 |

In new developments, where formation of property entranceways are deferred until construction of the buildings, hydrants should be located in the centre of the street frontage to avoid the most likely location of the entranceways along side boundaries.

In addition to hydrant spacing for fire fighting, hydrants shall be positioned at high points to facilitate flushing air from the mains and at low points to facilitate flushing sediment from the mains.

Hydrants shall be placed within hydrant boxes designed in accordance with the Council Standard Drawings (Volume 3). The location of the hydrants shall be marked in accordance with the Standard Technical Specifications and Drawings (Volume 3).

6.10 VALVES

Valves shall be installed as necessary to permit isolation of sections of the pipe network for maintenance purposes. The spacing and location of valves shall be such as to limit the number of dwellings affected by a shutdown to no more than 30.

Valves shall be placed on at least two of the three legs leading from each tee intersection. The maximum spacing of valves shall be 250 m.

Air release valves are not normally required on principal mains. Automatic air release valves shall be installed when required by Council; they must be positioned so that ground water cannot enter the main should it become depressurised.

6.11 DEPTH OF WATER MAINS

Both principal mains and rider mains shall have the following minimum cover. Greater depths may be required by specific design of the system:

- | | | |
|-----------------------------------|-------------------|--------|
| • Under grass berms and footpaths | : Principal mains | 750 mm |
| | : Rider mains | 500 mm |
| • Under carriageways | : Principal mains | 900 mm |
| | : Rider mains | 600 mm |

The sections of main adjacent to a carriageway crossing shall be gradually deepened, to allow the required cover under the carriageway without the provision of vertical bends. Similar provision shall be made to ensure the necessary cover over valve and hydrant spindles.

Service connection pipes shall have a minimum cover of 350 mm.

6.12 ANCHOR OR THRUST BLOCKS

Concrete anchor blocks shall be provided on mains exceeding 50 mm diameter at all points where an external thrust occurs.

| Hamilton City Development Manual | |
|--|------------------------------|
| Volume 2 : Design Guide | Part 6 — Water Supply |
| Authorised by : Water & Waste Services Manager | Page 6 of 7 |

The design of anchor blocks shall be based on the allowable bearing capacity of the site soil conditions, except that the maximum value used shall be 75 kPa. The inner face of the block shall not be of a lesser thickness than the diameter of the fittings, and shall be constructed so as not to impair access to the bolts on the fittings. Concrete shall have a minimum compressive strength of 17.5MPa at 28 days.

6.13 CONNECTIONS TO PRIVATE PROPERTY

6.13.1 Point of Supply to Consumer

The point of supply to the consumer is shown on Drawing TS627 (Volume 3). The following practices are deemed acceptable and should be followed:

- No service connections need be provided by a subdivider to industrial or commercial properties.
- A single service connection in residential subdivisions shall be provided to all lots. Council does not permit lots to be served by multiple connections.
- No water supply pipes shall pass between one lot and another except where lots are amalgamated under one rating assessment (refer HCC Water Supply Bylaw 2008).
- Services shall be located at the centre of each front lot or close to one side boundary of the accessways to rear lots (refer to Council Standard Drawings — Volume 3).

For location requirements in district areas, refer to Volume 5, Part 6.

- The service connection shall have a gate valve under a toby box located in the road reserve, 300mm from the boundary and the supply connection be extended 300mm inside the boundary (refer to Drawings TS622 and TS627).

6.13.2 Services In Accessways, Access Lots, or Right of Ways

The following shall apply:

- a) Where there are 2 or more services in a common right of way an appropriately sized manifold box and lid is to be used to house up to 4 service connections per box. The manifold box shall be located in the right of way clear of vehicle traffic movements (refer to Drawing TS629 for connection details).
- b) Where 5 or more service connections will be required in an access lot or right of way, a single pipe shall be used, subject to the following design criteria:
 - Pipework shall be 63mm OD MDPE unless fire fighting requirements control the design.
 - Service pipes crossing the access lot shall be 25 mm OD MDPE and shall be placed in 50mm internal diameter ducts.
 - The supply pipe shall be designed to be in the grass berm.

| Hamilton City Development Manual | |
|--|------------------------------|
| Volume 2 : Design Guide | Part 6 — Water Supply |
| Authorised by : Water & Waste Services Manager | Page 7 of 7 |

- Service connections, meters (where applicable), manifold boxes and gate valves shall be laid and marked in accordance with Drawing TS627 (Volume 3).
- The supply pipe shall have a flushing valve of minimum 50mm internal diameter at the furthest point from the reticulation (refer to Drawing TS626 — Volume 3).
- Metallic detector tape, laid directly above the supply pipe at a maximum depth of 200mm is required where, the alignment of the pipe is not clearly defined as a straight line between valve box lids and, in other circumstances as required by Council.
- An "Easement in Gross" shall be granted in favour of the Council to allow access for maintenance of the pipe.
- The Council's responsibility for maintenance of the supply pipes shall cease at the boundary to each individual lot.

c) For specific requirements in district areas refer to Volume 5, Part 6.

6.13.3 Diameter of service connections

All service pipes, and associated fittings shall normally be 20 mm internal diameter. In elevated areas where there is a low pressure supply, a 25 mm diameter connection and fittings shall be required where site elevation is above 45m Moturiki or an access leg is over 45m length.

6.13.4 Connections for fire fighting

Refer to the Hamilton City Council Water Supply Bylaw 2008 for acceptable pipe and fitting arrangements for fire fighting water supply.

For requirements in district areas refer to Volume 5, Part 6.

6.13.5 Connections to Unit Title Developments

Council does not own or operate pipelines on private property. While Unit Title developments are required to conform to service connection layouts described in Clause 6.13 this is in order to facilitate for subsequent sub-division should this be required as a future development of the site.

Isolation valves for individual units (required under Clause 5.4.1 of the Building Act Compliance Document G12 Water Supplies) shall be located outside of the building platform.