

## 8. WATER SUPPLY AND RETICULATION

### 8.1 General

This section covers the Kaipara District Council requirements for the design and construction of water supply services and associated structures.

Water supply reticulation shall comply with Council bylaws and Council's particular requirements for each water supply system.

Design and construction should be in accordance in NZS4404:2010 Part 6 and the following standards and guidelines.

Design and Quality Assurance shall comply with Sections 1 to 3 of these standards.

#### 8.1.1 Council Systems

Council operates water supply systems in the following areas:

- Dargaville
- Baylys Beach
- Glinks Gully
- Ruawai
- Maungaturoto

The following requirements shall be met:

- (a) Where subdivision or land development is within the area served by a Council system or an extension to a Council system is proposed, the written approval of Council's Asset Manager shall be obtained and provided with the application to confirm that the Council water supply system can be extended to serve the subdivision or development.

#### 8.1.2 Vesting and Easements

The following requirements shall be met:

- (a) All water pipelines and pump stations serving more than five properties shall be vested with Council unless a management entity to own operate and maintain the system has been Approved by Council.
- (b) Water systems to be vested with Council that are not contained within Roads shall be within reserves to vest or easements in gross in favour of Council. The minimum width of the land to vest or easement shall be 3.0m.
- (c) Where a private water pipe crosses a neighbouring property, an easement shall be provided in favour of the servient lot.
- (d) Any water pump stations servicing more than one property shall be on their own separate lot and vested in Council or, where a management entity has been Approved by Council to serve a number of lots, a separate lot owned by the management entity.

## 8.2 Design Requirements

The following requirements shall be met:

- (a) Water supplies to all developments shall meet the requirements of the Building Act.
- (b) Reticulated water supplies to all developments shall:
  - (i) Include an isolation valve installed immediately after the meter on every new connection.
  - (ii) Have an approved backflow preventer installed on every new commercial or industrial connection.
  - (iii) Be adequate for fighting purposes in accordance with NZ Fire Service's Code of Practice SNZ PAS 4509:2008.

*Guidance note:*

*Where the existing supply is insufficient the Developer shall be responsible for the upgrading of the existing reticulation up to the nearest 150mm supply (or trunk component whichever is the closest). Where the headworks are insufficient the extent of additional works required should be referred to Council's Asset Manager prior to the formal lodgment of the subdivision or development proposal.*

### 8.2.1 Fire Fighting Supply Requirements

The fire risk classifications shall be as follows:

**Table 8.1: Fire Fighting Supply Requirements**

Risk Class	Details	Flow (l/s)	Minimum Number of Hydrants
B	Congested Business areas containing multi-storey buildings, large department stores, extensive shopping malls, factories, commercial and office property, theatres, cinemas and bulk liquid fuel terminals etc:	200	5
C	Concentrated built up areas not falling within class B, areas of multiple industrial risk, large schools, large colleges, and large hospitals etc:	100	4
D	Business areas not falling within classes B or C	50	3
E	Any area within a fire district that has a reticulated water supply and does not have risks that would place it into classes B, C or D including detached and semi-detached household units	25	2
Isolated Risks	Any isolated risks within an area with a lower water supply classification should be classed at a level appropriate to the risk.		

*Guidance Notes:*

1. *An isolated risk within a reticulated area that has a significantly higher fire risk category than the surrounding area may use auxiliary water to make up the balance of the water supply required. When this is done the auxiliary supply should provide the required flow for 1 hour and access to that water should be available within 90 m of the risk. Hydrants, connections and access to the auxiliary supply should be provided to the standard required by the local New Zealand Fire Service Area Commander.*

2. *An isolated risk classified B, C, D within an unreticulated area, should have sufficient auxiliary water provided to meet the required flow for 1 hour and access to this auxiliary water should be available within 90m of the risk. Hydrants, connections and access to the auxiliary supply should be provided to the standard required by the Fire Fighting Code.*
3. *The minimum standard of water supply for firefighting should be as set out in the Table 6. The required flow should be obtained from the maximum number of fire hydrants as scheduled within a 270m radius of any fire risk.*
4. *The minimum fire fighting residual running water pressure should be 100 kPa at any fire hydrant. The minimum working residual water pressure, in other than fire fighting conditions, shall be 300 kPa at the ground level of the building site in each lot.*

### 8.3 Reticulated Water Supply Systems

The requirements of clauses 8.1.1 to 8.3.10 shall be met.

#### 8.3.1 Minimum Pipe Sizes

The reticulation shall be sized appropriate to the service being provided. Minimum acceptable sizes are shown in Table 8.2:

**Table 8.2: Minimum Water Supply Pipe Size**

Pipe Type	Minimum Diameter (mm)	Meter Size
Principal Main	400	50
Rider Main	50	40
Service Connection	Large 25	20
	Medium 20	15
	Small 15	15

#### 8.3.2 Pipe Location Depth

- (a) A principal main fitted with fire hydrants shall be laid on one side of all through streets and one side of every dead-end road. Principal mains shall be laid both sides of roads which service large developed areas so that supply can be maintained to that area if one of the pipes breaks or is otherwise shut down. Appropriate valves shall be installed so that breakages in either main can be isolated and supply maintained to the area.
- (b) A rider main shall be laid along the road frontage of all lots not fronted by a principal main, including cul-de-sac heads, and shall be designed as ring mains.
- (c) Service connection pipes shall have minimum cover of not less than 600 mm in carriageways and not less than 350 mm under footpaths and Berms terminating at a depth of 225 mm at the boundary. The sections of pipe adjacent to a carriageway crossing shall be gradually deepened, to allow the required cover under the carriageway without provision of vertical bends.
- (d) Where possible, all water mains should be laid at a higher level than sewers to avoid cross contamination, and shall not be laid in the same trench as sewers or stormwater drains, nor pass through manholes.

### 8.3.3 Pipe Materials

- (a) Pipes shall be:
- PVC-U pipe AS/NZS1477:2006, PVC-O to AS / NZS 4441 or PVC-M to AS / NZS 4765:2007
  - PE 80 or PE 100 pipe to AS/NZS 4130:2009 or
  - steel (concrete lined and externally wrapped) to NZS4442:1988.
- (b) Low Density Polyethylene pipe (Alkathene) or any PE pipe not fully compliant with AS / NZS 4130 shall not be used.
- (c) UPVC pipe sections shall be joined by solvent cementing for under DN50 diameter pipes and rubber ring jointed for DN50 diameter and over. PE pipe shall have electrofusion jointing. Steel pipes shall be welded.

### 8.3.4 Pipe Protection, Bedding and Backfill

All pipe bedding and protection shall be in accordance with manufacturer's recommendations and as per Drawings CM-001 and CM -002 in NZS 4404.

### 8.3.5 Hydrants

- (a) Fire hydrants shall be clockwise closing, screw-down type in accordance with BS 750, and shall wherever practicable be medium or tall pattern.
- (b) Hydrants shall be fixed opposite the common boundaries of lots and spaced at intervals not exceeding 135m within residential areas and 90m within Business zones. The terminal hydrant shall be within 135m radius of the furthest portion of any building site. Where necessary a 100mm diameter principal main shall be constructed within a private road to ensure coverage.
- (c) Fire hydrants shall be readily accessible for fire appliances and should generally be positioned near street and private way intersections and not less than 6.0m from any buildings.
- (d) Hydrant risers shall be used where necessary to ensure that the top of the spindle is not less than 175mm or greater than 250mm below finished surface level. Hydrants are required at all dead ends and low points to enable mains flushing if a normal washout cannot be fitted.
- (e) The location of fire hydrants shall be marked with yellow plastic marker posts which are fixed 225 mm from the street boundary at the closest point to and facing the hydrant, with the top of post 600 mm above finished ground level. A concrete mowing strip 150 mm wide shall surround the post and the distance between marker and hydrant in metres (bottom number) shall be stencilled in black paint at the top of the post. For maximum night visibility, a blue raised pavement marker shall be installed on the road centreline at each hydrant location.

### 8.3.6 Tapping Bands

- (a) All tapping bands shall provide a total encirclement of the pipe and shall be able to be installed without shutting down the pipe.
- (b) Tapping bands on uPVC pipes shall be of an approved Gunmetal, aluminium-bronze, or ductile iron type, or other materials to AS / NZS 4793 approved by the Council and complying with the manufacturer's recommendations. Tapping bands on other pipes shall be specifically designed.

### 8.3.7 Valves

- (a) Gate valves in accordance with AS/NZS 2638.2:2011 shall be used on principal mains. They shall be resilient seated valves with thermoplastic polymer 'Levasint' or equivalent coating, suitable for working pressures up to 1600 kPa and also complying with the following requirements:

- (i) They shall be anti-clockwise closing, and shall be provided with cast iron spindle caps.
  - (ii) The stem material shall be Grade 431 stainless Steel in accordance with AS2837 with an integral thrust collar.
  - (iii) The wedge shall be cast in Ductile Iron and fully encapsulated in an approved synthetic rubber. Partially coated wedges are not acceptable.
  - (iv) The valve body, bonnet and top castings shall be manufactured from ductile iron and fully enveloped with a fusion powder coating, applied by the fluidised bed technique, conforming to AS 4158. Alternatively, components may be manufactured from an approved corrosion resistant material without protective coatings.
  - (v) All external fasteners shall be Denso system wrapped.
  - (vi) The stem seal shall be effected by a minimum of two "O" rings, which are able to be replaced under full working pressure.
- (b) Peet valves used on rider mains shall be in accordance with NZS/BS 5163
  - (c) Butterfly valves or plug-type valves (including ball valves) shall not be used.
  - (d) All valves shall be designed so that they can be opened and closed manually by a single person with a spanner in not more than one minute.
  - (e) A permanent spindle extension to the ground surface shall be provided on valves which are more than 500 mm deep.
  - (f) Air release valves shall be installed at all changes of gradients in pipes on which there are no service connections. They shall be either an accordingly designed fire hydrant or a 20 mm diameter ferrule. A permanent cover is required for all ferrules.
  - (g) All air release valves shall have isolating gate valves installed between themselves and the pipeline, and shall be positioned such that water cannot enter the pipeline through them at negative pressure. The air release system on all pipelines shall be designed so that the pipes can be both filled and emptied within one hour without being damaged.
  - (h) Where scouring of mains is needed as a frequent operation, a connection to the stormwater system shall be provided from scour points. Automatic air release valves shall be provided and positioned so that ground water cannot enter the main at negative pressure.
  - (i) Valves located at intersections shall be fixed on all legs of a tee or cross installation and shall be located in the Berm areas free of the carriageway.
  - (j) The position of all valves on water mains shall be indicated by a white plastic indicator post to the Council's approval bearing the inscribed letters 'SV', 'PV' in black to indicate either sluice valve or peet valve respectively.

### **8.3.8 Anchor or Thrust Blocks**

- (a) Cast in-situ concrete anchor blocks shall be provided at all points where an unbalanced thrust occurs on mains exceeding 50mm ID.
- (b) The design of anchor blocks shall be based on the bearing value 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 so constructed as not to impair access to the bolts on the fittings. Concrete shall have a minimum compressive strength of 20 MPa at 28 days (A typical anchor block is shown in drawing S39).
- (c) 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.

### 8.3.9 Service Connections

- (a) A service connection shall be provided for each single lot or Household Equivalent with individual street frontage. The valve shall be covered with a short length of 100 mm diameter pipe slotted above the connection pipe and protruding 50 mm above ground level. Connections shall be in uPVC pipe in accordance with AS/NZS 1477:2006 or PE 80 PE pipe coloured blue or with Blue outer extruded skin, to AS / NZS 4130, unless otherwise approved.
- (b) Service connections to be located within Road reserve and no less than 300mm from section boundary.
- (c) All service connections shall include backflow prevention in accordance with the NZ Building Code Approved Documents G12.
- (d) Service connections to households shall be a minimum of 20 mm in diameter. For multiple connections refer Drawing S35.
- (e) Industrial areas, the connections shall not be made until the Building Consent stage, to ensure that the backflow prevention is appropriate.
- (f) For private ways and private roads, a single connection, with size determined as for a rider main shall be provided to within 250 mm of the public Road boundary. Separate connections shall then be provided to each lot from that boundary. Where appropriate, because of the number and length of connections required, or to provide for firefighting coverage where the furthestmost building side is greater than 135 m from the public Road, approval may be given for reticulation of the private way or Road. In such cases, an easement in favour of Council over the private way or Road will be required.
- (g) Connections to a principal main or rider main shall be with a tapping band and a ferrule with the flow of water controlled by a screwed brass plug. They shall be at right angles to the lot frontage, shall be generally central on the front boundary and clear of driveways.
- (h) Where water is supplied via a rider main located in the same general area as a principal main then the number of service connections able to connect to the rider main as given in Table 8.3 (working pressures other than when fire fighting)

**Table 8.3: Maximum Allowable Numbers of Service Connections**

Principal Main Working Pressure	<400 kPa		400 – 600 kPa		>600 kPa	
	1 – Main Connect	2 – Main Connects	1 – Main Connect	2 – Main Connects	1 – Main Connect	2 – Main Connects
Maximum number of domestic service Connections	7	15	15	30	20	40

- (i) The physical work of connecting to the existing reticulation after the new reticulation has been tested and passed as satisfactory shall have prior approval of the Council before onsite work commences. Connection shall only be made by Council-approved contractors at the Consent Holder's expense.
- (j) Upon connection the new reticulation shall be flushed to the satisfaction of the Council, and then left operational.
- (k) The position of the service connection shall be marked on the kerb top with a 125 mm square of blue paint; in addition, a notch 12 mm wide and 12 mm deep shall be cut in the top of the kerb before painting.



### **8.3.10 Service Storage**

All new or upgraded service storage reservoirs shall completely isolate the water from the ground, be covered and have sufficient storage to supply the Ultimate Development in its catchment for 24 hours at the required pressure.

### **8.4 Disinfection and Testing**

- (a) Prior to commissioning, all pipes, valves, service connections, storage reservoirs and other fittings shall be pressure tested and disinfected.
- (b) Disinfection of new pipes carried out using the process set out in the Ministry of Health's Guidelines for Drinking Water Quality Management in New Zealand (Chapter 3).
- (c) Service storage reservoirs shall be disinfected by spraying or inundating all internal services (including the ceiling) with water which has a minimum 5 grams per cubic metre of free available chlorine. The reservoir shall then be filled with water.
- (d) On completion of the disinfection, water samples shall be taken from the far end of all trunk water pipes and from at least 3 separate locations inside any new storage reservoirs. The water samples shall be completely free of faecal coliform bacteria and the Free Available Chlorine concentration shall be between 0.2 and 5 grams per cubic metre.
- (e) Before joints, fittings and specials are covered, but after anchor blocks are completed, each section of the reticulation shall be pressure tested. The section of reticulation to be tested shall be filled with potable water at least 24 hours before the test and all free air expelled. With all permanent valves open, the test section shall be pumped up to a pressure 1.5 times the working pressure or the safe working pressure of the pipe at any point in the system, whichever is less. A calibrated pressure gauge shall be installed at the lowest practicable point in the reticulation.
- (f) The test section shall stand, without makeup pressure, for one hour and shall show no evidence of leaks following visual inspection, and the pressure drop shall not exceed 10% of the test pressure.
- (g) Notwithstanding any sub-sections of the new reticulation which are pressure tested, the entire reticulation shall be tested on its completion.
- (h) Once it has passed all tests, the new reticulation shall be kept continuously charged with water under pressure.