

**PART 6: WATER SUPPLY****SCOPE**

This part of the Standards sets out the engineering requirements for the supply of water associated with land development projects, including performance criteria, methods for design and construction, standard details and material specifications.

**600.1 Strategic Vision**

The strategic vision for Rodney District Council with regard to drinking water is:

- To ensure that adequate and secure community supplies of potable water are provided for all existing and projected commercial, industrial and domestic purposes;
- To encourage the use of effective water conservation practices and to minimise waste;
- To ensure that adequate water supplies are available for fire fighting purposes;

**600.2 Performance Criteria**

- Meet all standards and criteria of the District Plan and any Regional Plan;
- Provide for fire fighting requirements;
- Provide good quality potable water;
- Cater for the whole of the design catchment;
- Provide for future development;
- Be compatible with connecting networks;
- Be easily maintained;
- Withstand design loads;
- All designs are subject to final approval from the Engineer;

**600.3 Documents Referred to in this Section**

- New Zealand Fire Services Fire Fighting Water Suppliers Code of Practice SNZ PAS 4509: 2003.
- NZS 4442-1988 Welded steel pipes and fittings for water, sewage and medium pressure gas.
- AS 2280: 2004– Ductile iron pressure pipes and fittings and its amendments.
- AS/NZS 4129:2008 – Fittings for polyethylene (PE) pipes for pressure applications.
- AS/NZS 4130:2003 – Polyethylene (PE) pipes for pressure applications.
- AS/NZS 4131:2003 – Polyethylene (PE) compounds for pressure pipes and fittings.
- AS/NZS 2566:1998 – Buried flexible pipelines – structural design.
- AS/NZS 2566, 1 Supplementary 1 1998 Commentary.
- AS/NZS 2566.2:2002 Installation.
- NZS/BS 750:1984 – Specification for underground fire hydrants and surface box frames and covers and its amendments.
- NZS 4501:1972 – Code of practice for the location marking of fire hydrants and its amendments.
- NZS/BS 5163:1986 – Specification for predominantly key operated cast iron gate valves for waterworks purposes and its amendments.
- RDC General Bylaw 1998 Water Supply – Chapter 11.
- BS 5154:1991 – Specification for copper alloy globe, globe stop and check, check and gate valves.

- AS/NZS 4331.1:1995 – Steel flanges.
- AS/NZS 4331.2:1995 – Castiron flanges.
- AS/NZS 4331.3:1995 – copper alloy and composite flanges.
- NZS 4515:2008 Fire Sprinkler Systems for Residential Occupancies.
- NZS 4517:2008 Fire Sprinkler Systems for Houses.
- NZS 4541:2008 Automatic Fire Sprinkler Systems.

## 601 GENERAL

- 601.1** Developments outside the water supply areas identified in Council's Water Supply Asset Management Plan shall not be connected to the public water supply reticulation unless prior written approval has been obtained from the **Engineer**.
- 601.2** The water supply system shall be designed to cater for the existing and expected future demand as provided for in the District Plan including fire fighting supply and domestic, commercial and industrial consumption.
- 601.3** Privately owned water supply systems shall be self-sufficient where practicable (i.e., not reliant on taking water from the public systems) including for fire fighting supply and domestic, commercial and industrial consumption. Where this is not practicable, approval shall be obtained from the Engineer for the additional demand on the public systems.
- 601.4** The water supply reticulation shall be designed to suit both the existing and planned wider reticulation network to the satisfaction of the **Engineer**.

## 602 DESIGN BASIS

### 602.1 General

- 602.1.1** The **Engineer** shall have the right to specify the diameters and materials to be used for the principal water mains within the development. The designer should consult the **Engineer** prior to commencing design.
- 602.1.2** The Developer shall, at his cost, obtain from Rodney District Council the working pressure at the point of connection, and use this as the basis for the design.
- 602.1.3** In instances where adequate pressure is not available to service the residential development, the Developer shall make provision for header tanks or booster pumps.

### 602.2 Pressure and Flow

- 602.2.1** The minimum water pressure shall be 300 kPa where practicable. The **Engineer's** prior written approval shall be obtained for pressures less than this.
- 602.2.2** The maximum water pressure shall be 800 kPa where practicable. The Engineer's prior written approval shall be obtained for pressures greater than this.
- 602.2.3** The water supply reticulation shall be designed to provide for annual, seasonal, and peak demands utilising the available pressures in the existing mains.
- 602.2.4** For domestic demand, an Average Day Demand of not less than 220 litres / person / day at the property (meter) shall be used with peak factors determined in accordance NZS 4404, Land Development and Subdivision Engineering.
- 602.2.5** For commercial, industrial and other non-domestic types of water demand, specific design is required and shall be approved by the **Engineer**.

### 602.3 Fire Fighting Supply

- 602.3.1** The water supply reticulation shall be designed to meet the requirements of the New Zealand Fire Service Fire Fighting Water Suppliers Code of Practice SNZ PAS 4509: 2003 (the Fire Code).
- 602.3.2** Where inadequate pressure or flow is available from the public system to meet the requirements of the Fire Code, the developer shall provide additional storage and pumping to meet the requirements of the Code at the **Developer's** expense.

**603 RETICULATION**

**603.1 Pipe Working Pressures**

**603.1.1** Working pressure classes are as follows:

**Table 6.1 Working Pressure Pipe Classes**

| Class of Pipe | Maximum Working Pressure |      |
|---------------|--------------------------|------|
|               | Metre/head               | kPa  |
| <b>PN12</b>   | 120                      | 1200 |
| <b>PN15</b>   | 150                      | 1500 |
| <b>PN16</b>   | 160                      | 1600 |

**603.1.2** Pipes or fittings of less than PN12 shall not be used, unless the Engineer's approval is obtained.

**603.1.3** The **Developer** shall provide calculations and or model by a Chartered Professional Engineer experienced in water supply reticulation design (if requested by the **Engineer**, which proves:

- The ability of the water supply reticulation and water sources to meet the new development demand;
- 50mm rider main shall be provided in parallel with the principal main 200mm and over;
- Dead end principal water mains are not permitted unless specifically approved by the Engineer. Rider mains shall be connected to and supply from a principal main at both ends;
- Water mains over 200mm diameter (or others deemed to be "trunk mains") shall not have consumer connections made to them unless approved by the **Engineer**;
- For large developments the **Engineer** may require two supplies into the development for security of supply;
- Water mains under road crossings shall be a minimum of 100mm diameter and may be required to be laid in a PVC duct to facilitate future maintenance.

**603.1.4** The layout of water mains shall provide for the efficient provision of both fire protection and individual metering to all properties within the District.

**603.1.5** A principal (fire fighting) main fitted with fire hydrants shall be laid on one side of all roads. Two principal mains may be required on some main routes such as dual carriageways. To supply lots on the other side of the road, a rider main shall be laid on that side, together with a ducted rider main in jointly owned access ways serving 3 or more dwellings.

**603.1.6** The water mains shall normally be laid continuously from one street intersection to the next, being supplied with water at each end without being cross connected to the main on the other side of the street between these points. The rider main on cul-de-sac roads shall extend on from the end of the principal main around the head of the cul-de-sac and up the other side of the road to the next road intersection.

**603.1.7** The reticulation design shall take into account continued accessibility of the water mains and fire hydrants for maintenance and operation purposes.

**603.1.8** The depth of the existing system shall be ascertained to align the new reticulation along the boundary splay where a new reticulation is to connect to an existing system.

**603.1.9** A water main of not less than 100mm diameter (ID) fitted with fire hydrants (hereinafter referred to as the principal main) shall be laid on one side of all through roads and one side of every cul-de-sac to within 65m of the end of the cul-de-sac, subject to the requirements of Section 608.2 regarding hydrant spacing.

**603.1.10** In industrial and commercial areas, fire mains shall be sized according to demand, but shall be at least 150mm diameter (ID) and laid on each side of the road.

**604 ALIGNMENT OF WATER MAINS****604.1 Position in Road**

**604.1.1** The location of a water main in the road shall conform to Rodney District Council Drawing Number 18000 Sheet 3.31.2 & 6.1.

In areas of steep terrain, such that the area of the road between the footpath and the boundary is normally too steep for top soiling and grassing or for any form of vehicular access, the water main may be laid either under the footpath (assuming that in such cases the footpath is next to the kerb) or under the carriageway.

**604.1.2** If the water main crosses under the carriageway, it shall be at right angles to the carriageway.

**604.1.3** If the water main is under the carriageway, it shall be on an alignment at a prescribed distance from the kerb face based on a combined layout for all underground services in the road. The Engineer's approval is required prior to proceeding.

**604.1.4** In Private Ways, ROW & Private Roads the water main should be laid within the grass verge.

**604.1.5** Where a main is laid down a right of way, a scour valve shall be provided at the end.

**604.2 Setting Out**

**604.2.1** Where the alignment is governed by the road boundary, the water mains are to be laid with reference to permanent land transfer pegs or temporary boundary marks placed by the registered surveyor responsible for the final land transfer pegging.

**604.2.2** Laying by reference to the kerb line should only be carried out where the surveyor has confirmed that it is the correct designed distance from the land transfer peg positions.

**604.2.3** Laying tolerances shall be up to 50mm on straight roads, and up to 100mm on curves. Any problems due to misalignment shall be resolved by the Developer to the satisfaction of the **Engineer** and other underground service authorities.

**604.2.4** All exposed pipe ends shall be kept capped during construction and following the disinfection process to prevent contamination and/or blockages.

**604.3 Public Fire Mains on Private Property**

**604.3.1** Should Council require, for the purpose of fire protection, a public fire main shall be laid within large privately owned residential, commercial or industrial complexes. An easement shall be provided in favour of the Council to allow access and repairs to the main at all times.

**605 INTERSECTIONS**

**605.1** Intersection details shall be as per Council Drawing Number 18000 Sheet 6.1.

**605.2** Where the principal water main is to be laid around a corner, 45° or similar bends should be used. Council Drawing Number 18000 Sheet 6.1 sets out the general principles, including the positioning of the valves.

**606 WATER MAINS WITH FIRE HYDRANTS (PRINCIPAL MAINS)****606.1 General**

**606.1.1** Principal mains shall not be less than 100mm internal diameter.

**606.1.2** Fire hydrants shall be placed on principle mains only.

**606.1.3** Principal water mains shall be designed with consideration of maximum pressure of the water supply reticulation and soil conditions.

**606.1.4** The minimum pipe class shall be suitable for a working pressure of 1200 kPa or 120m head.

**606.1.5** Where the water main is to be laid in potentially unstable ground, or above ground (pipe bridge), or in other special cases, the pipe material shall be designed with respect to the particular conditions and shall be subject to the **Engineer's** approval.

**606.2 Pipe Standards**

606.2.1 The following pipes may be used for principal mains, providing they comply with the relevant New Zealand Standard:

**Table 6.2 Pipe Standards for Principal Mains**

| Pipe                    | Standard               |
|-------------------------|------------------------|
| Steel (arc butt welded) | NZS 4442               |
| Ductile Iron            | AS 2280                |
| Polyethylene            | ASNZS 4130, ASNZS 4131 |

**606.3 Acceptability of Pipe Materials**

606.3.1 Asbestos cement pipes are not permitted.

606.3.2 Concrete lined steel pipes may be required in potentially unstable ground, for lengths of exposed pipe, or in other special cases, and should be the subject of specific design. Except where corrosive ground conditions exist, concrete lined steel pipes may be laid under road carriageways and access ways to industrial and commercial premises.

606.3.3 Galvanised steel pipes shall not be used.

606.3.4 Ductile Iron (cast iron) pipes may be appropriate for lengths of exposed pipe, or in other special cases. Their use shall require specific approval by the **Engineer**. All cast iron pipes or fittings shall be concrete or epoxy lined.

606.3.5 The installation shall be to AS 2032 and AS/NZS 2566 with particular attention to the anchoring of valves, hydrants and bends against displacement in operation.

606.3.6 Polyethylene (PE) pipes shall be to AS4130 1993. PE pipes for in ground installation shall be blue in colour unless permitted otherwise by the **Engineer**. All fittings shall comply with WIS 4-32-04/1988.

606.3.7 Polyethylene Pipe (PE) must be stored, transported and handled in accordance with the requirements of NZS/AS 4130 and the manufacturer's recommendations

**606.4 Pipe Pressure Classes**

606.4.1 All principal mains for water mains shall be not less than 12 PN (1200kPa) although a higher class shall be used if necessary to provide for the maximum working pressures in the area in which they are to be laid.

**606.5 Pipe Jointing**

**606.5.1 Jointing of Polyethylene Pipes**

606.5.1.1 Electrofusion welding is permitted and must comply with the minimum RDC requirements as per Appendix M Polyethylene Pipe Welding Requirements

606.5.1.2 Polyethylene pipes shall be joined to metallic flanged fittings by a PE stub flange and backing ring. Other jointing methods such as fully end-load resistant mechanical joints may be used in exceptional circumstances, subject to prior written approval of the **Engineer** for each case.

606.5.2 Electrofusion couplers and fittings shall comply with the international 39.5 volt system and shall be manufactured to comply with AS/NZS 4129:2000 Fittings for polyethylene (PE) pipes for pressure applications. Electrofusion welded tapping bands are not permitted.

**606.5.3 Butt Fusion Welds**

606.5.3.1 Butt fusion welding is permitted on PE pipe sizes of 125mm. And greater and must comply with the minimum RDC requirements as per Appendix M Polyethylene Pipe Welding Requirements.

**606.5.4 Jointing of Ductile Iron Pipes**

606.5.4.1 Ductile iron fittings such as tees, hydrant tees, crosses, tapers, blank caps, bends and gibaults shall be manufactured to AS/NZS 2280:1999.

- 606.5.4.2** All ductile iron fittings shall be protected with a thermal bonded coating to comply with AS/NZS 4158:1996 or be externally bitumen coated and internally cement lined to comply with AS/NZS 2280:1995 and/or be Council approved.
- 606.5.4.3** Where adjacent ductile iron “specials” and fittings are used they shall be flanged and bolted together to form a single unit. Refer to Figure 6.1 for an example.
- 606.5.4.4** All joints on pipes and fittings shall comply to the following:
  - Bolts, Washers and Nuts in joints shall be 316 stainless steel (a nickel or molybdenum based anti-galling lubricant (e.g. molybond) shall be used when installing stainless steel nuts and bolts) OR hot dipped galvanised mild steel with a thermal bonded coating to AS/NZS 4158:2004.

Spigot and Socket Rubber Ring Joints shall be factory made:

  - Ductile Iron AS/NZS 2280:1999 (Tyton joint or equivalent),

Flanged joints to be manufactured to AS 4087 PN 16.

Welded joints are to be a welded butt joint with a welding band or welded socket and spigot joints.

The welded joints of steel pipe and bolts, washers and nuts in joints shall be protected with one of the following:

  - Polyken Synergy or Polyken YG111 Wrapping;
  - Denso Petrolatum System;
  - Denso Colour Tape (Blue);

Gibault joints shall comply with Rodney District Council approval. Where gibaults are used on CLMS pipes the concrete lining shall be adequately repaired to protect the condition of the pipe and the water supply.
- 606.5.4.5** Lubricants for all Rubber Ring Joints shall contain an anti-bactericidal agent approved for potable water use.
- 606.5.4.6** The maximum deflection at any joint shall be 1.5 degrees. 1.5 degree deflection is equivalent to a 150mm offset for a 6m length.
- 606.5.4.7** For trenchless piping the pipes shall be polyethylene (PE). Joints shall be carried out in accordance to manufacturers' recommendations and the requirements of this document.
- 606.5.4.8** An approved bactericidal lubricant shall be used on all joints.
- 606.5.4.9** Solvent jointed pipes are not permitted.

**607 RIDER MAINS**

**607.1 Pipe Sizes**

**607.1.1** Rider mains shall be 50mm minimum internal diameter (DN63, PE 80B polyethylene). Table 6.7 sets out the maximum number of domestic connections that may be permitted to be served by a rider main.

**Table 6.3 Rider Mains – Maximum Number of Dwelling Units to be Served**

| High Pressure Areas |                  | Medium Pressure Areas |                  | Low Pressure Areas |                  |
|---------------------|------------------|-----------------------|------------------|--------------------|------------------|
| One-ended Supply    | Two-ended Supply | One-ended Supply      | Two-ended Supply | One-ended Supply   | Two-ended Supply |
| 20                  | 40               | 15                    | 30               | 7                  | 15               |

- High-pressure means normal working pressure in the principal mains other than when fire fighting, usually not more than 800 kPa;
- Medium-pressure means normal principal main working pressure usually 800 kPa to 300 kPa;
- Low-pressure means normal principal main working pressure usually below 300 kPa;

- 607.1.2 Rider mains shall be installed within grassed service berm areas.
- 607.1.3 Rider mains in residential private ways shall have an internal diameter of 50mm and be installed in a duct and access chamber system in accordance with Council Drawing 18000 Sheet 6.2 to serve a maximum of 12 households on a single ended feed.
- 607.1.4 Rider mains for residential areas serving more than 40 household units and rider mains for industrial areas shall have a minimum internal diameter of 100mm and comply in all respects with the requirements for principal mains.
- 607.1.5 The layout and valving of a rider main shall suit the flushing of the rider main through the nearest hydrant. Where this is not possible, a flushing point may be required.

## 607.2 Pipe and Duct Material

- 607.2.1 50mm internal diameter rider mains shall be constructed of MDPE, PE80B, manufactured to AS/NZS 4130:1997 with a pressure rating of PN 12.5, SDR11 and coloured blue.
- 607.2.2 Rider mains of 100mm internal diameter shall comply with accepted pipe materials for principal mains.
- 607.2.3 The ducting on private ways shall be 100mm internal diameter constructed of either:
- SN6 uPVC to AS/NZS 1260:2002, or
  - SDR 17 MDPE to AS/NZS 4130:2003
- 607.2.4 Use of other pipes will only be permitted in special circumstances and will require the specific approval from the **Engineer**.

## 608 HYDRANTS

### 608.1 Hydrant Type

- 608.1.1 All principal water mains shall be provided with hydrants for fire fighting, air release and for maintenance purposes. Hydrants are also required at the end of all principal mains on a dead end unless discretion otherwise is given by the **Engineer**.
- 608.1.2 Hydrant shall be manufactured from ductile iron conforming to NZS/AS1831 resilient seated screw-down type and conforming to the requirement of NZS/BS 750. Hydrant shall be nylon coated or fusion bonded epoxy coated inside and out. All coating shall be blue in colour.
- 608.1.3 All hydrants shall be clockwise closing.
- 608.1.4 Hydrants shall be tall pattern except where the **Engineer** may approve or require the short pattern (squat hydrant).
- 608.1.5 No drain hole is permitted in the casting on the outlet side of the valve.
- 608.1.6 An adequate concrete down thrust block shall be provided to each hydrant (refer Council Drawing Number 18000 Sheet 6.2).

### 608.2 Hydrant Spacing

- 608.2.1 Fire hydrants shall be installed on all principal mains in accordance to the requirements of NZS PAS 4509:20 New Zealand Fire Service Fire Fighting Water Supplies Code of Practice.
- 608.2.2 Hydrants shall be spaced at not more than 90m intervals on each side of industrial and commercial areas of fire risk Classes W4 & W5 and not more than 135m on one side of residential areas of fire risk Classes W3.
- 608.2.3 In cul-de-sac or other terminal roads the last hydrant shall be not more than 65m from the end of the road.
- 608.2.4 Where houses or residential units are situated on private ways, there shall be a hydrant within 135m of the rear of any site, measured along the run-of-hose.
- 608.2.5 Where a residential private way is more than 65m long a hydrant shall be sited at the road end of the private way or on the other side of the road immediately opposite the entrance.
- 608.2.6 If necessary a 100mm diameter (ID) principal main shall be constructed and a hydrant placed within the private way in order to ensure the rear of any site is within 135m of a hydrant.
- 608.2.7 Hydrants must be readily accessible for fire appliances and should generally be positioned near road intersections, and not less than 6m from any building.

**608.2.8** Single end feed 100mm diameter fire mains longer than 250m shall only be used with the approval of the **Engineer**.

### **608.3 Hydrant Installation**

**608.3.1** Hydrant tees shall be nylon coated or fusion bonded epoxy coated and flanged if laid next to other fittings. Otherwise flexible joints are permitted (gibault or rubber ring).

**608.3.2** Nylon coated or fusion bonded epoxy coated hydrant riser shall be used where necessary, in order to ensure that the top of the spindle is between 250mm and 300mm below finished surface level.

### **608.4 Hydrant Boxes**

**608.4.1** The manufacture and installation of hydrant boxes shall be to NZS/BS 750, and installed on precast concrete risers. The concrete risers must be interlocked to prevent movement. Where located in grass berms, hydrant boxes shall have a minimum 150mm x 150mm cross section concrete surround.

**608.4.2** Hydrant surface boxes in carriageways and under vehicle crossings shall be of a heavy duty type.

### **608.5 Location Marking of Fire Hydrants**

**608.5.1** The location marking of the fire hydrants shall be to SNZ PAS 4509:2003 New Zealand Fire Service Fire Fighting Water Supplies Code of Practice.

**608.5.2** A dual blue raised reflectorised pavement marker (cats eyes) shall be placed on centre line of the road in line with the hydrant location to indicate that a Fire Hydrant (at right angle to the centre line) is located in the road or berm area.

**608.5.3** Where practical to install, an appropriate coloured indicator post shall be of an approved type, set vertically in the ground within 230mm of the lot boundary and immediately opposite the hydrant which it indicates. Each post shall be firmly set to a depth below ground level of at least one third of its overall height, and shall bear the inscribed letter 'H'. Hydrant indicator posts shall be coloured yellow. PVC posts shall have a pin at least 200mm long through a hole near the bottom end to make removal difficult.

**608.5.4** A yellow isosceles triangle (TNZ M7 Roadmarking Yellow) of "600mm side length" pointing perpendicular to the hydrant shall be painted 150mm from the Centre of the Road on the side of the hydrant location. Hydrant yellow to Protective Paints Ltd Way Code 880-403 or Resene M7-W and or equivalent approved by the **Engineer**.

## **609 VALVES**

### **609.1 Sluice Valves**

**609.1.1** The valves on all principal water mains larger than 100mm NB shall comply with AS /NZ 2638:2: 2002 and shall be resilient seat type anticlockwise closing with non-rising spindle.

**609.1.2** The body of the valve (inside and out) shall be nylon coated or fusion bonded epoxy coated. All coating shall be blue in colour. Valves shall be flanged when laid next to another cast iron fitting or when required by the **Engineer**. 'On line' valves may be spigotted to take flexible joints, (gibault or rubber ring).

**609.1.3** Valves shall be set so that the spindle is truly vertical. Bolted Joints shall be wrapped with a wrapping system to the **Engineer's** approval.

**609.1.4** A concrete pad shall be installed under the valve to prevent the possibility of settlement due to the weight of the valve or cluster of valves which could cause undue stress on the adjoining pipework. A cluster of valves shall be supported on a common concrete slab reinforced with mesh.

### **609.2 Peet Valves**

**609.2.1** Resilient seated peet valves shall be installed on rider mains. Peet valves shall be constructed from ductile iron and in compliance with AS/NZS 2638:2: 2002 and will include specific connections for joining to the standards 63mm OD PE pipes.

**609.2.2** The hand wheel shall be constructed of either heat insulating nylon or cast/ductile iron. Cast aluminium or painted pressed steel hand wheels are not permitted.

- 609.3 Air Release Valves and Scour Valves**
- 609.3.1** These shall be either a hydrant or a 20mm NB diameter ferrule. A permanent cover is required for the latter. Automatic air release valves shall be provided where required by the Engineer, and positioned so that ground water cannot enter the main at negative pressure.
- 609.3.2** The permanent valve box for air release valves must be capable of enabling sufficient air to enter or escape from the enclosure without inhibiting the airflow performance of the air valve. The selection of the air valve shall be based on its airflow capacity being capable of protecting the pipeline and not be based on the size of the nominal bore of the air release valve to pipeline connection.
- 609.3.3** Scour valves shall be installed at low points or to facilitate draining of water main where required by the **Engineer**.
- 609.4 Pressure Zone Valve Assembly**
- 609.4.1 Positioning of Valves**
- 609.4.1.1** Valves shall generally be placed on two of the three legs leading from each tee intersection. Where required by the **Engineer**, 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 Council Drawing Number 18000 Sheet 6.1).
- 609.4.1.2** Generally the valve arrangement shall be capable to isolate sections of no more than 50 dwellings.
- 609.4.1.3** Line valves shall be installed where the distance between other control valves exceeds 250m.
- 609.4.2 Valve Boxes**
- 609.4.2.1** Where circular or square boxes are used, the rim should be clearly notched at two opposite points, and these notches aligned with the direction of the water main. Where oblong boxes are used, they should be aligned with the water main. Where located in grass berm valve boxes shall have a minimum 100mm concrete surround, cast insitu or precast.
- 609.4.2.2** A single section of 150mm diameter uPVC pipe shall be used as a riser with a circular surface Box.
- 609.4.2.3** All SV valves shall have square valve lids and all Peet valves shall have circular valve lids.
- 609.4.3 Valve Indicator Posts**
- 609.4.3.1** The position of all valves on fire mains and rider mains shall be indicated by means of appropriate coloured indicator posts, except that the posts shall bear the inscribed letters 'SV' or 'PV' to indicate either sluice valves or 'peet' (gate) valves. Valve indicator posts shall be painted blue.
- 609.4.3.2** A blue isosceles triangle of 300mm side length pointing to the valve shall be painted on all sealed roads adjacent to the channel edge.
- 609.4.3.3** Closed valves (zone valves) and scour valves shall be painted red.
- 609.4.3.4** Valve marker posts are not required where the valve is located in a concrete and asphalt footpath or in centre business areas.
- 609.4.4 Butterfly Valves**
- 609.4.4.1** Butterfly valves are not permitted.
- 610 DEPTH OF WATER MAINS**
- 610.1** Both principal mains and rider mains shall have the following minimum cover, except in circumstances requiring special protection. Greater depth shall be provided if required by the **Engineer**:
- Depth of pipes installed by Open Trenching:
- Under grass berms and footpaths: top of pipe 600mm below finished surface, except where a common trench is used. Refer Council Drawing Number 18000 Sheet 3.31 for cover details.

- Under carriageways: top of pipe 900mm below finished surface level at the lowest point over the pipe.

Depth of pipes installed by Directional Drilling:

- Under grass berms and footpaths: top of pipe 600mm below finished surface, except where a common trench is used. Refer Council Drawing Number 18000 Sheet 3.31 for cover details.
- Under carriageways: top of pipe 900mm below finished surface level at the lowest point over the pipe.

**Note: The maximum depth of water main shall not be more than 1200mm unless approved by the Engineer.**

**610.2** Metallic detector tape shall be installed within 200 - 400mm of the surface for all mains of 50mm diameter or greater for pipes installed by open trenching. No metallic tape is required for steel mains, only normal blue warning tape shall be installed.

**610.3** 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 give the necessary cover over valve and hydrant spindles.

**610.4** Service connection pipes shall have minimum cover of 350mm.

#### **610.5 Open Excavation**

**610.5.1** Where it is impractical to thrust or bore under the sealed area, the contractor shall, with the approval of the **Engineer**, sawcut along the edges of the proposed trench in continuous straight lines parallel to the pipeline.

Trenches shall be excavated in straight lines, or in even curves between bends and fittings, and the trench bottom shall be trimmed to an even level and grade, free from soft spots, rocks and other debris before pipe laying is commenced.

#### **611 PIPE BEDDING**

**611.1** Water main pipes shall be bedded on suitable fine granular material and in accordance with the Code of Practice for Working on the Road. Scoria AP7 shall be used as bedding and cushion material for all water mains laid by open trenching including drill pits, service connections and connection points. All water mains under the carriageway shall have sand or fine granular bedding and surround. Fine sand and freely flowing sand is not permitted.

**611.2** The same bedding and surround shall also be used in rock country or where the trenching has brought out hard lumpy clay. There shall be no sharp stones or large clay lumps in the bedding or surround. Each pipe shall be laid so that the barrel of the pipe is supported for 60° to 90° of its circumference along its entire length. The bottom of the trench shall be cut out to sufficient size to permit jointing of the pipes, and all pipes shall be supported upon their barrels only.

**611.3** All mains installed by trenching shall be thoroughly bedded, haunched and surrounded as detailed on Council Drawing 18000 Sheet 6.6. In all cases the manufacturer's recommendations for pipe storage, handling, protection and laying techniques shall be followed.

**Note: PE supplied in coils will spiral if unrolled in an uncontrolled manner, making uniform bedding difficult to achieve.**

**611.4** When a main is to go under an existing road trenchless installation methods shall be used unless a Road opening Notice is issued.

**611.5** The entry of clay, bedding, runoff and other foreign material into the pipeline shall be avoided by the use of end caps and diligence during the construction phase.

**611.6** Pipes subjected to heavy loadings shall be subject to specific design and must be approved by the **Engineer**.

#### **612 DRILLING**

**612.1** The term "drilling" shall include drilling, boring, hydraulic or pneumatic thrusting (e.g. Grundomat), moling, and similar methods, but shall not include pipe cracking. Where drilling

has been specified, open trenching or other methods will only be permitted where the Contractor has demonstrated to the **Engineer** satisfaction that drilling methods are not practical.

- 612.2** The water main under vehicle crossings, footpaths, carriageways and in the vicinity of tree roots shall be drilled to keep the disruption of access to properties and damage to surfaces and vegetation to a minimum.
- 612.3** The Contractor's drilling equipment shall be capable of drilling minimum curve radius of 35m. Curves with radius less than 35m shall not be drilled.
- 612.4** The Contractor shall mark out the proposed drilling alignment using approved paint and methodology. Unless unforeseen obstructions are encountered, the water main shall be installed in straight runs or smooth curves, and the centre line of the installed water main shall not deviate more than  $\pm 50$  mm of horizontal and vertical alignment.
- 612.5** Depth of thrusts / drilling shall be as mentioned under clause 6.11.1. The pipes shall be installed in a straight line or smooth curve. The alignment deviation from design for both vertical and horizontal shall not exceed 150mm.
- 612.6** Before drilling starts, the Contractor shall provide for the **Engineer** approval, details of the proposed operators' qualifications (copies of certificates etc.) and experience that is relevant to the proposed equipment, method and pipe.
- 612.7** All underground services that cross under or over the proposed drilling alignment shall be located, identified, exposed, and kept exposed until the drilling run has been successfully completed.
- 612.8** Installation of the pipe is usually a two – stage operation. A pilot hole is first drilled along the required path, and the bore is then back-reamed to a larger diameter to accommodate the pipe. During the second pullback stage, the product pipe is attached to the reamer by means of swivel connector, and is pulled into the enlarged bore as the drill string is withdrawn. In difficult ground conditions, or where the bore enlargement is considerable, there may be one or more intermediate reaming stages during which the bore is increased progressively.
- 612.9** Reaming devices and an approved drilling fluid, e.g. bentonite/water or polymer mud, or approved methods shall be used to prevent upheaval of the ground surface. The Contractor shall repair all damage caused to the surface above the drilling route, or to the existing services, (regardless of condition) at no cost to Council.
- 612.10** Contractors have to secure their water needs for the drilling operation by tankers, no water supply from the public water supply shall be permitted.
- 612.11** The reaming diameter shall be at least 25% greater than the actual outside diameter of the new pipe.
- 612.12** It is the Contractor's responsibility to ensure that pipes are not subject to excessive pulling loads.

### **613 OPEN TRENCHING**

- 613.1** The minimum trench width (measured at the pipe level) shall be in accordance with the table in Rodney District Council Standard Drawings No. 6.6, 6.7, 6.8, 6.9 and 6.10.
- 613.2** Pipes installed by open trenching shall be supported for the entire length on a firm even bed and shall be installed on straight grades or smooth curves, always provided that the manufacturer's recommended maximum deflection angle between adjoining pipes is not exceeded (for rigid or socket/ spigot jointed pipes) and the minimum bend radius is not exceeded.
- 613.3** The bedding and backfilling material shall be in accordance with Council Drawing No.18000; 6.6, 6.7, 6.8, 6.9". An approved "detectable" warning tape shall be installed between 200mm and 300mm below the finished surface level, directly over the pipe centre line.
- 613.4** Pipe material to be used for open trenching shall be either PE pipes or Ductile Iron Pipes (DI).

**614 PIPE FITTINGS**

- 614.1** Pipe fittings such as tees, hydrant tees, crosses, tapers, hydrant risers, blank caps, plugs, bends of various degrees, made of ductile iron, shall be nylon coated or fusion bonded epoxy coated in accordance with AS 4158, unless otherwise approved by the Engineer. Where polyethylene pipe is used their respective purpose made fittings may be used and must comply with AS/NZS 4129:2000.
- 614.2** The use of fittings of any other material shall be subject to the approval of the **Engineer**.
- 614.3** All joints, bends, tees, crosses, tapes, risers, connections, blank caps and other fittings shall be manufactured designed and constructed to withstand 12 bar working pressure.
- 614.4** Flanges shall be in accordance with AS4087 Class 16.
- 614.5** Cast iron fittings will be cast from high quality grey iron coated with a proven corrosion preventative compound applied after adequate preparation.
- 614.6** Flanges shall be to table D of NZS 4331. Fittings laid adjacent to other fittings shall have flanged joints, or flexible joints where permitted (gibault or rubber ring).

**615 ANCHOR OR THRUST BLOCKS**

- 615.1** Cast in-situ concrete anchor blocks shall be provided for non- continuous pipes greater than 50mm diameter at all points where an unbalanced hydraulic force exists. This includes tees, bends, end caps, hydrants, valves and at any other position as required. Where continuous PE pipes are installed, anchor blocks are required when connecting pipe works of different materials or fitting with flexible joints and to support valves and hydrants
- 615.2** 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 17.5 MPa at 28 days.
- 615.3** A protective membrane to protect abrasive damage to the water main should be provided between the pipe (irrespective of the pipe material) and the concrete anchor and thrust blocks.

**616 CONNECTIONS TO PRIVATE PROPERTY****616.1 Residential Free Standing Unit Developments**

- 616.1.1** The subdivision connections shall be located:
- Adjacent to each other for front lots wherever possible;
  - At least 100mm clear of other utility connections;
  - At least 300mm clear of any future driveways;
  - At least 300mm clear of, but close to, the projection of the side boundary;
- 616.1.2** The location of the subdivision connections shall be marked by a single saw cut, at least 5mm deep, across the top of the kerb and a 300mm length of kerb painted with Rodney District Council approved blue acrylic paint.
- 616.2 Multi-Unit and Multi-Level Developments**
- 616.2.1** Multi-units are buildings having more than one independent unit within the same single level building structure. Multi-level units are multi-unit buildings having more than one level.
- 616.2.2** All units in multi-unit and multi-level developments shall be serviced by individual meters and shall be accessible from street level. Meter banks may be used with specific approval by the **Engineer**.
- 616.3 Commercial and Industrial Developments**
- 616.3.1** In non-residential developments and residential developments where the water main already exists, the service connections may be installed after the subdivision stage in accordance with Council Drawings 18000 Sheet 6.3 and 6.4.

**616.4 Service Connection Ducts**

**616.4.1** Where service connection will pass under proposed formations such as private ways, a 50mm duct shall be provided. A 100mm internal diameter duct shall be installed to road islands for an irrigation connection. All ducts shall terminate clear of future driveways.

**616.5 Size of Metered Service Connection**

**616.5.1** All standard water meter service connections shall be a minimum of 20mm NB.

**Note: Meter connections larger than 20mm NB diameter shall be subject to the approval of the Engineer. The applicant may be required to present hydraulic calculations supporting the choice of meter supply to the Engineer for approval.**

**616.5.2** All meters shall be installed in road reserve unless otherwise approved by the Engineer.

**616.5.3** Non standard connections are considered as either or any of the following:

- Where the proposed water meter location is more than 30m away from an existing water main;
- Where the meter connection required is larger than 20mm NB;

In each of the above cases, a request of a quotation to have the work carried out shall be made.

**616.6 Tapping Bands and Ferrules**

**616.6.1** The metered service connection comprises of tapping band and ferrule, service pipe, gate valve, water meter with accessories, non- return valve and meter box.

**616.6.2** Each service connection to a principal main or rider main shall be by means of a tapping band and a ferrule with the flow of water controlled by a screwed brass plug. The tapping band for each service connection shall generally be perpendicular to the meter location.

**616.6.3** The tapping band for each service connection shall be sited at the central point of the front boundary or on the house side of, and clear, of the driveway to rear lots unless otherwise requested by applicant.

**616.6.4** Tapping bands and ferrules shall be made of LG2 gunmetal of similar appropriate metal, MDPE is not permitted.

**616.7 Service Connection Pipes**

**616.7.1** Metered service connection pipes shall be blue PE80 of minimum size 20mm NB AS/NZS 4130. The size of the pipe shall depend on the pressure available in the water main and the water supply demand of the building.

**616.7.2** Service ducts shall be installed to accommodate the proposed service connection under the sealed private access way where the rider main is situated on the opposite side of the lot to be served. This duct will be marked for future location by means of a blue painted saw cut installed on both sides of the sealed access way.

**616.7.3** Only approved water supply fittings and pipe inserts shall be used and jointing shall be carried out in accordance with the manufacturer's instructions.

**616.7.4** Galvanised steel pipes are not permitted.

**616.8 Gate Valves**

**616.8.1** A standard 20 mm gate valve shall be installed within the water meter box and before the meter. The valve shall be constructed from dezincification resistant (DR) brass. The manufacture shall be in accordance with the materials and requirements of AS 1628 and suitable for PN16.

**616.8.2** Valves shall be clockwise closing operated by a hand wheel made either from heat insulating nylon or cast ductile iron. Coated aluminium or press steel hand wheels will not be permitted.

**616.9 Meter Box**

**616.9.1** Standard meter boxes (for use on grass berm) shall be rectangular with minimum dimensions 200 mm x 300mm clear access, and be at least 200mm deep. The meter box material shall be blue or black Polyethylene.

**616.9.2** Heavy duty meter boxes (under vehicular traffic) shall be designed and constructed in special cases.

**616.9.3** Where three or more meters are to be installed side by side, a purpose – built housing of permanent material shall be constructed, if requested by the **Engineer**.

**616.10 Water Meters**

**616.10.1** Meters installed shall be suitable for cold water and shall conform to the Class ‘C’ classification under ISO 4064/BS 5728 – Parts 1 & 2.

**616.10.2** The size of the meter installed shall be the same size as the service connection unless otherwise approved by the **Engineer**. Meter installation shall be in accordance with manufacturer’s recommendations.

**616.10.3** Water meters shall only be installed by Network Service Provider or an approved subcontractor.

**616.11 Non Return Valve**

**616.11.1** Each residential service connection of 20mm NB diameter shall have one single spring, barrel type inline non-return valve installed. The device shall be reliable, corrosion resistant and shall be installed on the customer’s side of the meter instead of the meter tailpiece. The valve shall be constructed from disinfected resistant (DR) brass and approved by the Engineer.

**616.12 Backflow Prevention Device**

**616.12.1** All properties shall comply with RDC’s current Backflow Prevention Process Manual, and as directed by the Backflow Prevention Manager. This includes, but is not limited to, full compliance with the Building Act 2004, Health (Drinking Water) Amendment Act 2007, and General Bylaw Chapter 11-Water Supply.

**616.13 Fire Sprinkler Connection**

**616.13.1** A fire sprinkler connection shall comply with the relevant New Zealand Standard, as below:

- NZS 4515:2008 Fire Sprinkler Systems for Residential Occupancies;
- NZS 4517:2008 Fire Sprinkler Systems for Houses;
- NZS 4541:2008 Automatic Fire Sprinkler Systems.

**617 TESTING AND ACCEPTANCE**

**617.1 Pressure Testing**

**617.1.1** All pipes shall be subjected to an acceptance pressure test after laying and jointing. No connection of a permanent nature between new water main and the existing reticulation shall be made before pressure testing. The acceptance test shall be observed by the **Engineer/ Engineer’s Representative**. The Contractor shall successfully pre-test the line before requesting an acceptance test.

**617.1.2** All necessary apparatus for testing shall be supplied by the Contractor. The section to be tested shall be capped or flanged off at either end, and at any branches which it is desired to test separated. The blanked off ends and all bends, tees, crosses, etc shall be securely strutted or otherwise prevented from movement, before applying any pressure. Each individual pipe shall be anchored against movement by backfilling between joints if laid by open trenching.

**617.1.3** The pressure during the test shall be monitored by an approved pressure gauge with marked intervals of not more than 10kPa, and an accuracy of +/- 5% at the test pressure(s). The Contractor shall provide a calibration certificate from an IANZ approved testing laboratory for the pressure gauge to the **Engineer’s Representative** satisfaction.

**617.1.4** The specified test pressure is to be applied to the lowest point of elevation in the section. If the pressure recording gauge is not located at the lowest point, a correction may be required if there is a significant difference in elevations.

**617.1.5** The following requirements shall be fulfilled when pressure tests are carried out:

**617.1.6** The reticulation shall withstand a maximum pressure of 1200 kPa measured at the lowest point of the section under test or 1.5 times the working pressure at any point in the system, whichever is the greater. The test procedure shall be: For all pipe materials except PE - the test pressure shall be maintained for 15 minutes and during the period of the test; the leakage shall not exceed one litre per ten millimetres of pipe diameter per kilometre length of pipeline per hour.

**617.2 For PE Pipes**

**617.2.1** The following procedure may be used only for the testing of polyethylene pipelines:

Whilst the normal procedures followed and precautions taken for hydrostatic pressure testing of completed pipe work apply equally to polyethylene systems, some variations are necessary because of the mechanical properties of polyethylene (PE).

Test pressures must be limited to 1½ times the rated pressure and reduced accordingly if the latest water temperature is above 20°C.

**Test Method 1**

This simple test is a useful method of checking relatively short, small diameter mains, i.e. smaller than 125mm OD and shorter than 75m. It is essential that all air be vented.

1. Apply a selected test pressure, not exceeding the limits given above.
2. Maintain this pressure for 30 minutes (additional pumping may be required to compensate).
3. Check for any obvious leaks.
4. After 30 minutes reduce this pressure rapidly by bleeding water from the system to a nominal pressure of approximately 2 bars (200 kPa) at the test gauge.
5. Record pressure gauge readings at convenient times for up to an hour after the pressure has been reduced (say 5 minute intervals).

In a leak free system, the gauge pressure would be expected to rise from its reduced setting due to the polyethylene attempting to contract to its original diameter. The system should then retain this slightly higher pressure.

If the pressure does not rise, or falls after an initial rise, then a leak must be suspected.

This test is a simple Pass/Fail test, the degree to which the response of the polyethylene affects the gauge pressure being dependent on several system parameters (eg pipe diameter, length of test section, etc).

**Test Method 2**

Test Method 2 involves calculating the rate at which the test pressure decays and used for large diameter or long lengths of pipes i.e. 125mm OD and greater and lengths longer than 75m.

The duration of the test should be limited to 1 hour.

1. When the main is fully charged and all air vented the system should be allowed to stabilise before the test procedure begins.
2. Pressure should be applied at a constant rate and the time  $t_L$  taken from the start of pressurisation to attainment of test pressure must be recorded.
3. Readings of pressure decay at time intervals in minutes must be taken and recorded.
4. The first such reading  $P_1$  is taken at a decay time  $t_1$  equal to or greater than  $t_L$ .
5. The second reading  $P_2$  is taken at a decay time  $t_2$  equal to or greater than  $5 \times t_L$ .

$$\text{Calculate } N1 = (\log_e P1 - \log_e P2) / (\log_e t2 - \log_e t1)$$

which should be between 0.04 and 0.12. If  $N1$  is greater than 0.25, then an unacceptable leak is indicated.

6. A third reading  $P_3$  is taken at a decay time  $t_3$  equal or greater than  $15 \times t_L$ .

$$\text{Calculate } N2 = (\log_e P2 - \log_e P3) / (\log_e t3 - \log_e t2)$$

If  $N2 > 0.25$  an unacceptable leak is indicated.

If the ratio  $N1 / N2$  is less than 0.8

An unacceptable leak is indicated.

Any test carried out on replacement water mains, shall include all service lines up to the gate valve at the metering point; and the contractor shall include in his rate for testing, any plugs or stoppers necessary to overcome leakage at gate valves, if this occurs.

## **618 BACKFILLING AND REINSTATEMENT**

### **618.1 Carriageways and Driveways**

**618.1.1** In general, open cutting of existing paved carriageways and existing paved driveways, will not be permitted where pipes can be horizontally bored or thrust under them. Paved surfaces include chip-seal, asphalt, concrete and paving stones.

**618.1.2** If open cutting cannot be avoided, saw-cuts shall be made along both edges of the trench in continuous lines parallel to the pipeline. Areas surfaced with paving stones will require careful dismantling and reinstatement. Trenches shall be reinstated using GAP65 from immediately above the pipe surround and compacted in layers not exceeding 150mm in depth. The depth of base course and type of seal shall conform to the standard of the existing road construction and to the **Engineer's** requirements.

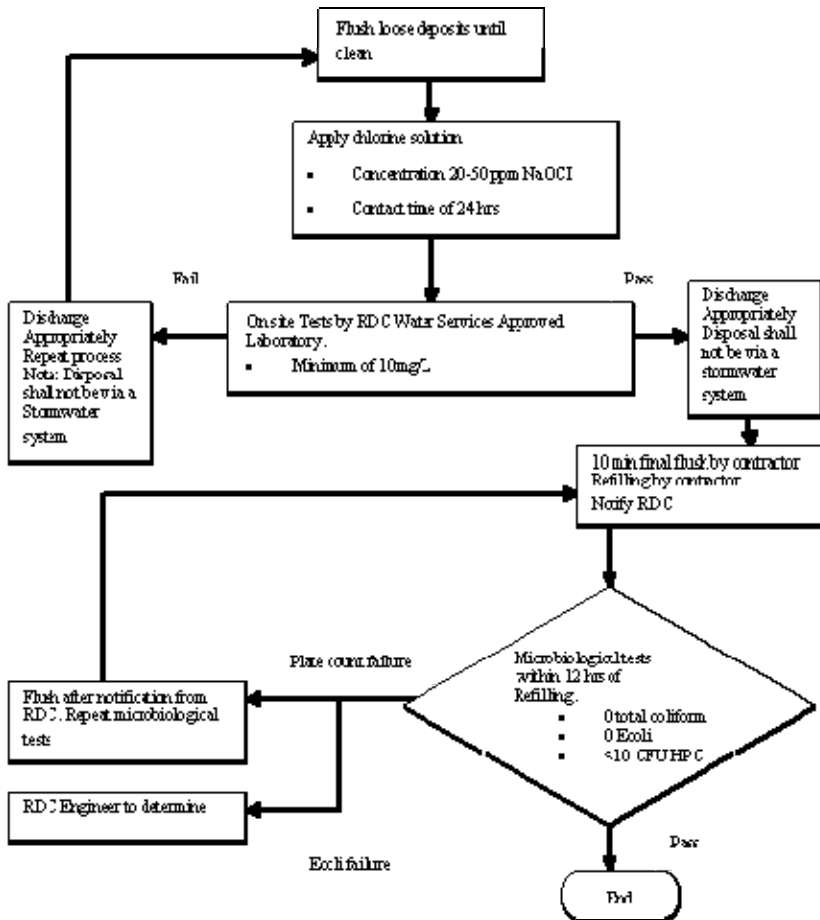
### **618.2 Berms**

**618.2.1** Pipe trenches under grass berms and footpaths shall be backfilled in accordance with the requirements of Council Drawing 18000 Sheet 6.7, 6.8, 6.9 and 6.10.

## **619 DISINFECTION**

**619.1** Before being put into service, all pipes, valves, house connections and other fittings shall be disinfected. The method to be adopted for Water Supply Disinfection shall be as per the following Disinfection Process Flowchart Figure 6.3. A certificate of Chlorination from a Council Water Services approved laboratory is to be provided to the **Engineer**. A minimum chlorine residual of 10ppm is required at the end of the contact time.

**619.2** Disinfection should be carried out and approved by the **Engineer** prior to the connection to the water main.

**Figure 6.3 Disinfection Process**

**619.3 Disinfection Procedure**

**619.3.1** Before being put into service, each section of new water main, including all fittings, shall be disinfected in accordance with the Water Supply Protection Regulation 1961. New water main will not be permitted to be connected to the reticulation network until all of the following requirements have been successfully completed, and copies of the successful test results have been received and approved by the **Engineer**.

**619.3.2** All chlorine and bacteriological testing shall be done by RDC approved laboratories. The Developer's Representative shall organise and pay for the testing, and forward copies of the results to the **Engineer** as soon as practical.

**619.3.3** The main shall be drained completely, then slowly filled with potable water that has been premixed, with sufficient free chlorine to produce a uniform concentration of between 20 parts per million (ppm) and 50ppm in the main. The chlorinated water shall be introduced at the lowest point of the section of main to be disinfected to ensure no air is trapped.

**619.3.4** The main shall be left full of this chlorinated water for a minimum of 24 hrs. The pH of the water shall also be recorded.

**619.3.5** After 24 hrs the residual chlorine must not be less than 10ppm. If the requirement is not achieved, the chlorination procedure shall be repeated. If the requirement is achieved, the main and service connection pipes shall then be flushed until the chlorine concentration of the water is less than or equal to 1.0ppm.

**619.4 Bacteriological Test**

**619.4.1** Following a successful chlorination procedure, the main shall be tested for the presence of E.Coli. One bacteriological test shall be carried out for every 300m of pipe disinfected.

- 619.4.2** The water shall be sampled immediately after the post chlorination flushing, i.e. after the main has been charged with fresh water with a chlorine concentration of less than 1.0ppm, and tested for the presence of E.Coli. The test will take approximately 24hrs. A satisfactory result is <1/100ml or an absent result. If this requirement is not achieved, the complete disinfection procedure shall be repeated and a further bacteriological test done until a satisfactory result is achieved.

**Note:** The **Developer or Engineer's Representative** shall arrange for Council's Network Service Provider to undertake the connection of the new main to the existing after he receives notification that the results of chlorination and bacteriological test that have been carried out are satisfactory. The coordination and arrangements need to be made prior to the chlorination and bacteriological tests so that the final connection can be made within 7 days of the successful test results.

**620 WATER MAINS TO BE KEPT CHARGED**

- 620.1** After any water main has been laid, tested and disinfected, it shall be kept continually charged with water, and under pressure. If the permanent connection to the existing reticulation is delayed by 7 days or longer a flush and resample shall be required. Further disinfection may be required at the discretion of the **Engineer**.

**621 CONNECTIONS TO EXISTING WATER RETICULATION**

- 621.1** After new reticulation has been tested and passed as satisfactory the physical work of connecting to the existing reticulation will be made by the Council's network service provider. All costs involved including shutdown costs (if any) shall be met by the Developer.

- 621.2** The procedures for application for connection to the public water supply are detailed in Council's Water Mains Check Flowchart. An application will not be permitted until the Engineer is satisfied that the testing requirements are met, a chlorination certificate is received, and As-Builts to Rodney District Council's standards have been approved by Council's GIS Department.

Council's network service provider will carry out all connections of new water mains to existing ones.

**621.1 The Developer's / Engineer's Representative Responsibilities**

- 621.1.1** The Developer's / Engineer's Representative will be responsible for the following (Note Developer applies to Developer funded works, Engineer's Representative applies to Council funded work):

- Liaison with the Council network service provider and co-ordination of shutdowns and connection timings. The Developer's / Engineer's Representative shall give the Council network service provider 3 weeks in advance notice of the intended shutdown and connection dates, followed by formal notification procedure outlined in the Water Supply Shutdown Procedure;
- Excavation to expose the existing water main, and provide enough space for the connection to be carried out without leaving exposed main at risk;
- Provide and install all fittings required to align the new water main with the existing (vertically and horizontally);
- All the Health and Safety aspects on site at the points of connections, this includes, but is not limited to, fulfilling the requirements of the Road Opening Notice (RON) and the Traffic Management Plan (TMP), the supply of fences and barricades, providing safe access to the pedestrian, etc;
- Backfilling the whole with the proper backfill material and in accordance with the specification;
- The removal of all excess material, spoil abandoned pipes and fittings;

- Reinstatement of all types of surfaces to the satisfaction of the Engineer and as per the requirements of Module One – Working on the Road;

**621.2 The Council's network service provider Responsibilities**

**621.2.1** Council network service provider will be responsible for the following:

- Supply all the fittings required to carry out the connection between the new and existing water mains;
- Install the anchor blocks required;
- Operate the valves (in open position) to re-liven the water mains including the new main;
- Ensure that all valves that were shut during the water shutdown are all back into fully open position;
- Flush the lines in accordance with the flushing procedures;

**622 SPECIAL MEASURES IN CORROSIVE SOIL**

**622.1** Corrosive soils are found in some parts of the District. If such soils are found special measures shall be taken to protect the main and fittings.

**623 SPECIAL MEASURES FOR PUMPING OR STORAGE OR BOTH**

**623.1** The provision of service storage or reticulation pumping installations or both together will normally be the responsibility of the Council.

**623.2** If pumping and/or storage is required wholly or principally to serve a specific development the provision of that pumping and/or storage shall be provided by the **Developer** and will be specifically designed to the satisfaction of the **Engineer**.