

1. Water Supply CONTENTS

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A MINIMUM REQUIREMENTS

- A.1** The water supply system shall be capable of serving the entire urban supply district for land use likely to prevail during the economic life of the system. This economic life shall not be less than 50 years.
- A.2** The subdivision and development shall be designed and constructed with a piped water supply system adequate for fire fighting purposes, together with individual connections to each intended building site, residential or commercial unit, tenancy or allotment with adequate domestic/commercial capacity.
- A.3** Developments that occur in areas within the Municipal Urban limit without adjoining water and wastewater services may be required to contribute to the costs of making those services available to the property in addition to the network Growth Charge.
- A.4** Developments that occur in rural areas outside the Metropolitan Urban Limits will be required to pay a rural NGC. This will be calculated on a case by case basis depending on the nature of services provided by Manukau Water Limited.

B MEANS OF COMPLIANCE

1.B.1 Design Standards

1.B.1.1 Minimum Flows

The minimum flows, as shown in Table A, shall be used for design purposes.

1.B.1.1.1

Type of Development	Fire Flow (l/s)	Domestic Consumption (Peak Hourly Flow) (l/s/ha)
Residential (Based on 50 Persons/ha)	25	0.60
Other residential (>50 persons/ha)	50	≥0.60 Specific calculations required
Schools, small shopping areas	50	0.60
Suburban Commercial Industrial Areas, Neighbourhood Centres	100	1.00
Town Centres, Large Commercial Complex & Industrial Sites	200	2.00

1.B.1.2 Peak Hourly and Fire Flow

1.B.1.2.1 The system shall be designed to satisfy the following two criteria:
Fire flow plus 50% of the peak hourly flow with a minimum residual pressure of 100kPa at the hydrants (the minimum flow from any one hydrant being approximately 30L/s),

- i) Peak hourly domestic flow with a minimum residual pressure of 300kPa at the highest point in the supply district.

1.B.1.2.2 In order to co-ordinate the supply network on an urban supply district basis, Manukau Water Limited will undertake overall network analysis of the system. Information on the likely feeder main sizes within a supply district will be made available on request to Manukau Water Limited.

1.B.2 RETICULATION LAYOUT**1.B.2.1 Layout**

1.B.2.1.1 The layout of watermains shall provide for the efficient provision of both fire protection and individual metering to all properties within the City.

1.B.2.1.2 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.

1.B.2.1.3 The water mains shall normally be laid continually 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.

1.B.2.1.4 The reticulation design shall take into account continued accessibility of the watermains and fire hydrants for maintenance and operation purposes.

1.B.2.1.5 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.

1.B.2.2 Minimum and Maximum Cover

1.B.2.2.1 Principal and rider mains shall have minimum cover from the finished ground level of:

- i) 600mm in berm areas,
- ii) 900mm under carriageways.

1.B.2.2.2 All watermains shall have a maximum cover from the finished ground level of 1m unless specific approval is given by Manukau Water Limited.

1.B.2.3 Position in Street

1.B.2.3.1 All watermains shall be located in the rear berm area at a distance of 1.1m from and parallel to the legal boundary. Drawing [DW5](#), [DW6](#) and [DW7](#) configurations shall be used at road intersections. The maximum out of alignment tolerance acceptable is 50mm on straights and 100mm on bends.

1.B.2.3.2 An approved metallic detection tape shall be laid along the pipe alignment on all road

crossings and where dispensation is granted to install a watermain in a non-standard location.

1.B.2.4 Public Fire Mains on Private Property

1.B.2.4.1 Should Manukau Water Limited 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 Manukau Water Limited to allow access and repairs to the main at all times.

1.B.2.5 Multi-Unit and Multi-Level Developments

1.B.2.5.1 Multi-units are non freestanding buildings. Multi-level units are buildings with separate titles on more than one floor.

1.B.2.5.2 Water meter connections to all multi-unit developments shall be accessible from the street level.

1.B.2.5.3 The fire and rider main may have to be extended into privately owned sites to service multi-unit developments.

1.B.2.5.4 Rider mains on private ways shall be installed by means of duct and access chamber system in accordance with [drawing DW1](#) in:

- i) Residential developments of 5 or more rear lot units or 6 or more front lot units,
- ii) Industrial and commercial developments with 6 or more units. Refer to C1,
- iii) Situations where by virtue of the layout of access and possible buildings it is desirable to provide a public water supply.

Otherwise, each unit shall have an individual connection from the watermain.

[C1](#)

[Drawing W1 may have to be modified to suit circumstances on some commercial and industrial developments.](#)

1.B.2.5.5 The 675mm diameter concrete access chamber specified on drawing DW1 is not applicable in situations where:

- i) The depth to the bottom of the rider main is greater than 500mm,
- ii) The number of service connections is greater than four,
- iii) A water main of diameter 100mm or more is located in private paved ways.

In these situations, specific design and approval shall be required for an alternative access chamber system.

1.B.2.5.6 Multi-units shall be serviced by individual meters. Meter banks may be used with specific approval by Manukau Water Limited. All meters shall be so positioned to ensure easy and efficient reading of the gauge.

1.B.2.5.7 Multi-level units with 3 or more levels shall use water meter bank(s) in accordance with drawings [DW26](#) and [DW27](#).

1.B.2.5.8 Bulk meters may be used on multi level units with 4 levels or more. Specific approval by Manukau Water Limited shall be required.

1.B.3 PRINCIPAL MAINS

1.B.3.1 Size of Principal Mains

1.B.3.1.1 Principal mains fitted with fire hydrants shall have an internal diameter not less than 100mm. The outside diameter of all principal mains shall comply with Table B and C.

Internal Diameter (mm)	Nominal Size (mm)	Outside Diameter (mm)
*100	100	121.9 ± 0.6
*150	150	177.3 ± 0.9
*200	200	232.2 ± 1.2
250	250	286.0 ± 1.4
300	300	345.4 ± 1.7

Table B:

Diameters of all *uPVC, *mPVC, Ductile Iron and Concrete Lined Steel mains. Nominal size is based on internal diameter

Internal Diameter (mm)	Nominal Size (mm)	Outside Diameter (mm)
100	125	125
150	180	180
200	250	250
250	315	315

Table C:

Diameters of all MDPE (PE80) mains. Nominal size is based on outside diameter.

1.B.3.2 Pipe Pressure Classes

- 1.B.3.2.1 All principal mains and fittings shall be designed and manufactured to a working pressure of 1200kPa (PN12) or better. A working pressure of 1600kPa (PN16) shall be required for mPVC pipes and fittings.

1.B.3.3 Accepted Pipe Materials

- 1.B.3.3.1 Principal mains constructed with the following materials will be accepted:

- i) **uPVC** manufactured to AS/ NZS 1477:1999 Series II with a pressure rating of PN12, coloured blue,
- ii) **Ductile Iron**, class K9 or PN 35, manufactured to AS/NZS 2280:2004 concrete lined and externally painted with a bituminous coating.
 - (a) Where laid underground by open trench the pipe shall have a loose polyethylene protective sleeve to AS3680:1989 and applied in accordance with AS 3681
 - (b) Where laid underground by drilling the pipe shall be protected similar to concrete lined steel pipe as described in (iii) of clause 1.B.3.3.2.

- iii) **mPVC** to comply with Manukau Water Limited approval. Pressure rating of PN16, coloured blue.

- 1.B.3.3.2 For specific applications the following materials may also be considered:

- i) **MDPE**, PE80B manufactured to AS/NZS 4130:2003 with a pressure rating of PN12.5, SDR 11, coloured blue. See Table C,
- ii) **HOBAS**, SN10000 manufactured to AS 3571:1989, with a pressure rating of PN12.5.
- iii) **Concrete Lined Steel** manufactured to NZS 4442:1988. The pipe is to be protected with one of the following when the pipe is buried:
 - (a) an external High Density Polyethylene Sleeve, 'Black Jacket' to comply with AS 1518, OR
 - (b) "Polyken Synergy" wrapping, OR
 - (c) "Polyken YG111" wrapping.

For pipes above ground and pipe bridges a zinc metal spray sealed with vinyl or epoxy coating, to comply with AS/NZS 2312:2002 is needed. Joints shall be welded.

1.B.3.3.3 The use of uPVC, mPVC and MDPE pipe may not be permitted in the following situations:

- i) Principal mains larger than 200mm.
- ii) Crossings of road carriageways that is 12.2m wide or greater.
- iii) Reticulation in fully paved areas.
- iv) In close proximity to petrol stations or potential petrol station site.
- v) In industrial/commercial locations where there is a likelihood of large amounts of a product being used or produced that may infiltrate through the pipe wall. (E.g. solvents).

1.B.3.4 Pipe Fittings

1.B.3.4.1 Fittings such as tees, hydrant tees, crosses, tapers, blank caps, bends and gibaults shall be Ductile Iron and be manufactured to AS/NZS 2280:2004 or be Manukau Water Limited approved with approved external protection.

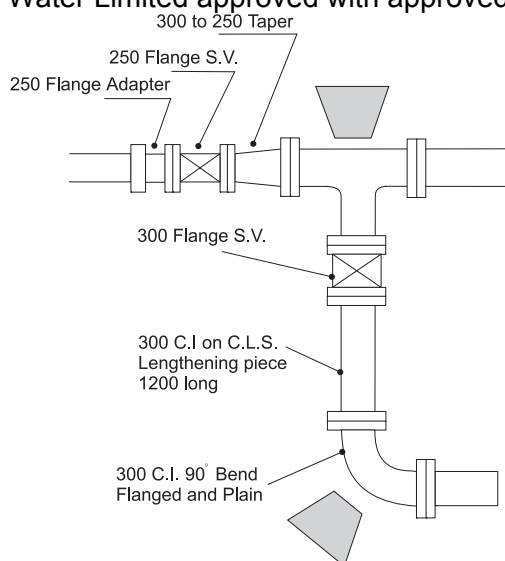


Fig.1

1.B.3.4.2 Manukau Water Limited approved uPVC bends, tees and end caps will be permitted where they are not in direct contact with two cast iron or ductile iron fittings.

1.B.3.4.3 All fittings (except uPVC) shall be protected with a thermal bonded coating to comply with AS/NZS 4158:2003, or be externally bitumen coated and internally cement lined to comply with AS/NZS 2280:2004, and/or be Manukau Water Limited approved.

1.B.3.4.4 Adjacent "specials" and fittings shall be flanged and bolted together to form a single unit. Stand alone fittings shall be, where possible, socket jointed to avoid the use of "gibault jointing". Refer to figure 1 for an example.

1.B.3.4.5 Two gibault joints may be used for cutting into existing pipe systems. Gibault joints (multi purpose couplings/clamps) shall be Manukau Water Limited approved.

1.B.3.4.6 Where the pipe length between two gibault joints is equal or less than 1m, each gibault joint shall be anchored in place with kerb block anchors. See figure 2.

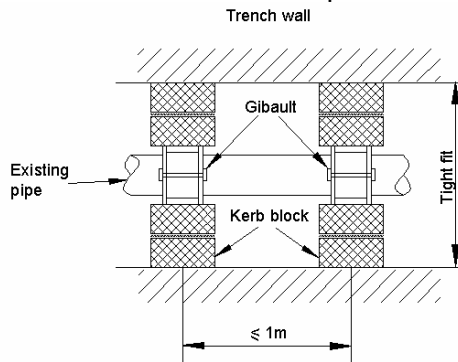
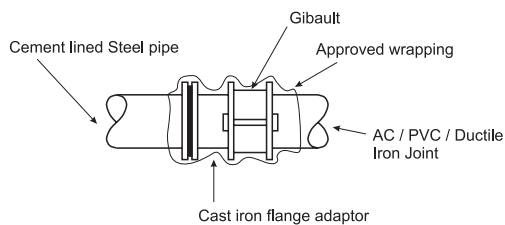


Fig.2

1.B.3.5 Pipe Joints

1.B.3.5.1 All joints on pipes and fittings shall comply to the following:

- i) **Bolts, Washers and Nuts** in joints shall be: 316 stainless steel (A nickel or molybdenum based anti-galling lubricant (eg 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 4158:2003
- ii) **Spigot and Socket Rubber Ring Joints** shall be factory made:
 - (a) uPVC to AS/ NZS 1477:1999 or mPVC to AS/NZS 4765:2000,
 - (b) Ductile Iron AS/NZS 2280:2004 (Tyton joint or equivalent),
- iii) **Flanged joints** to be manufactured to AS 4087 PN 16,
- iv) **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 shall be protected with one of the following:
 - (a) Polyken Synergy or Polyken YG111 Wrapping,
 - (b) Denso Petrolatum System,
 - (c) Denso Colour Tape (Blue),
- v) **Gibault joints** shall comply with Manukau Water Limited approval and shall not be used on steel pipes. Steel to AC, PVC or Ductile Iron shall be joined as shown in figure 3 with an approved wrapping or Green Sleeve wrap.
- vi) **MDPE joints** Any jointing method other than mechanical is to be detailed upon application. Any mechanical fitting used must be Manukau Water Limited approved.



STEEL TO AC, PVC or DUCTILE IRON JOINT

Fig.3

1.B.3.5.2 Lubricants for all Rubber Ring Joints shall contain an anti-bactericidal agent approved

for potable water use.

- 1.B.3.5.3** The minimum radius on which uPVC and mPVC pipes may be installed is shown on Table D.

Internal Diameter (mm)	Minimum Radius Z(m)
100	30.5
150	44
200	60

Table D

- 1.B.3.5.4** The maximum deflection at any joint shall be 1.5 degrees. Refer to C2.

C2

1.5 degree deflection is equivalent to a 150mm offset for a 6m length

1.B.3.6 Thrusting of Mains

- 1.B.3.6.1** Materials that can be thrust are mPVC, uPVC, MDPE, Ductile Iron, and Concrete Lined Steel (provided all external protection requirements are met). If the thrust length is greater than 20m, butt weld jointed MDPE must be used. When the pipe is being drawn through the thrust hole the leading end shall be sealed to prevent clay and dirt getting into the pipe.

1.B.4 RIDER MAINS

1.B.4.1 Size of Rider Mains

- 1.B.4.1.1** Rider mains for residential areas shall have an internal diameter of not less than 50mm and serve up to 40 household units on a double-ended feed. Such rider mains shall be installed within grassed service berm areas.

- 1.B.4.1.2** 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 [drawing DW1](#) to serve a maximum of 12 households on a single ended feed.

- 1.B.4.1.3** 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.

- 1.B.4.1.4** 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.

1.B.4.2 Pipe and Duct Material

- 1.B.4.2.1** 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. Diameters for 50mm rider mains shall comply with Table E.

Internal Diameter (mm)	Nominal Size (mm)	Outside Diameter (mm)
50	63	63

Table E

- 1.B.4.2.2** Rider mains of 100mm internal diameter shall comply with accepted pipe materials for principal mains.
- 1.B.4.2.3** The ducting on private ways shall be 100mm internal diameter constructed of either:
- i) SN6 uPVC to AS/NZS 1260:2002, or
 - ii) SDR 17 MDPE to AS/NZS 4130:2003.
- 1.B.4.3 Joints**
- 1.B.4.3.1** Joints on rider mains of 50mm internal diameter shall only be Manukau Water Limited approved mechanical compression bends, tees, couplers and adapters. Connections of rider mains to principal mains shall be in accordance with drawings [DW2](#) or [DW3](#).
- 1.B.4.3.2** Joints on 100mm internal diameter rider mains shall comply with the requirements for principal mains.
- 1.B.5 BEDDING & ANCHORAGE**
- 1.B.5.1 Bedding**
- 1.B.5.1.1** All mains installed by trenching shall be thoroughly bedded, haunched and surrounded as detailed on [drawing DW4](#). Other forms of installation utilising trenchless technology will be considered on a specific approval basis. In all cases the manufacturer's recommendations for pipe storage, handling, protection and laying techniques shall be followed. Refer to C3.
- C3*
MDPE supplied in coils will spiral if unrolled in an uncontrolled manner, making uniform bedding difficult to achieve.
- 1.B.5.1.2** When a main is to go under an existing road trenchless installation methods shall be used unless an open cut permit is issued.
- 1.B.5.1.3** 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.

1.B.5.2 Anchorage

- 1.B.5.2.1** Cast insitu concrete anchor blocks shall be provided at all points where an unbalanced thrust occurs. Such anchors are to be designed according to the soil bearing capacity and installed so as not to impair access to bolts or fittings. All concrete shall be a minimum of 17.5MPa at 28 days and shall never encase the fitting. For anchoring of PVC and MDPE bends refer to C4 and figure 4.

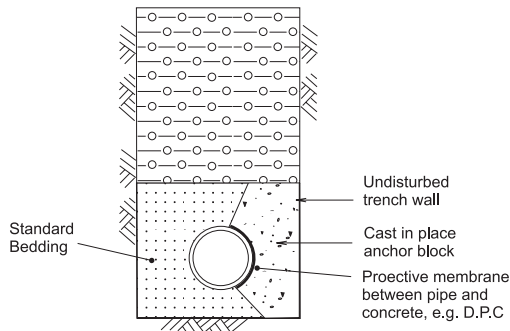


Figure.4

C4

The anchor of PVC bends shall extend for the length of the bend and shall have a maximum 180 degree encasement of the pipe. There shall be an insulating membrane between the concrete and pipe.

1.B.6 SERVICE CONNECTIONS

1.B.6.1 Residential Free Standing Unit Developments

- 1.B.6.1.1** A vertical portion of the service connections, from the fire or rider main to the ball valve, complying with drawing [DW8](#), shall be provided at the time of subdivision development on all residential free standing unit developments where a proposed watermain is being constructed. This requirement shall not apply to existing public watermains.

- 1.B.6.1.2** The subdivision connections shall be located:

- i) Adjacent to each other for front lots wherever possible,
- ii) At least 100mm clear of other utility connections,
- iii) At least 300mm clear of any future driveways,
- iv) At least 300mm clear of, but close to, the projection of the side boundary.

- 1.B.6.1.3** 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 100mm length of kerb painted with Manukau Water Limited approved blue acrylic paint.

1.B.6.2 Residential Multi-Unit Developments

- 1.B.6.2.1** Multi-units shall be serviced in accordance with 1.B.2.5. Meter banks in accordance with drawings [DW26](#) and [DW27](#) may be used with specific approval of Manukau Water Limited.

1.B.6.2.2 Multi-level units with 3 or more levels shall be connected from the meter banks.

1.B.6.3 Commercial and Industrial Developments

1.B.6.3.1 In non-residential developments and residential developments where the watermain already exists, the service connections may be installed after the subdivision stage in accordance with drawing [DW9](#). **All non-residential developments shall have backflow prevention devices fitted to the meter. Refer [MW47](#) and [MW48](#) for meter box and set up details.**

1.B.6.4 Service Connection Ducts

1.B.6.4.1 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. Refer to drawing [DW1](#).

1.B.6.4.2 The location of service connection ducts shall be marked by a single saw cut, at least 5mm deep, across the top of the kerb and a 100mm length of kerb painted with Manukau Water Limited approved black acrylic paint.

1.B.6.5 Fire Connection

1.B.6.5.1 Where a private hydrant or a private hydrant in combination with a fire sprinkler system is required, a separate connection in accordance with standard drawing [DW14](#) and complying with the requirements of Clauses 1.B.6.5.2 to 1.B.6.5.7 shall be used.
[C5](#)

Note: The single detector check valve by the property boundary serves only to detect unauthorised usage and leakages. A single detector check valve is not a backflow preventer.

1.B.6.5.2 These requirements are not applicable to domestic fire sprinklers that form part of the domestic plumbing system.

1.B.6.5.3 A written approval from Manukau Water Limited shall be required prior to connecting a fire sprinkler system to the public water supply. When seeking approval, applicants shall indicate their flow and pressure requirements. After carrying out an analysis of the system performance in accordance with section 1.B.1 of the Engineering Quality Standards, Manukau Water Limited shall advise the applicants whether the requested flow and pressure is likely to be maintained in the future and give a size of connection. Refer to [C6](#).

[C6](#)

System capacity analysis for fire sprinkler applications is done accordingly:

Fire flow = Private hydrant flow (25 l/s)

+ Fire sprinkler flow

If not, Manukau Water Limited shall advise the applicant about the likely flows and pressures and give a size of connection. Manukau Water Limited does not guarantee consistency of flows and pressures for the existing or future water supply.

1.B.6.5.4 Devices, pipe materials, joints and fittings shall comply with the water supply section

of the Design and Material Standards or be Manukau Water Limited approved.

- 1.B.6.5.5** Connections to public watermain shall follow normal ALC procedure. The applicants shall be responsible for the payment of all costs involved with the ALC hook up. Refer to C7.

C7

Application forms and information regarding connecting a fire sprinkler system can be obtained by contacting the ALC Customer Services Officer of Manukau Water Limited.

- 1.B.6.5.6** Designers of fire protection systems may test the water mains to assess the level of flow and pressures within the area. A hydrant permit shall not be required for this purpose.

- 1.B.6.5.7** An inspection of the system shall be conducted by Manukau Water Limited prior to connecting the fire sprinkler to the live watermain. The inspection shall be from the watermain up to and including the single detector check valve within the chamber. Applicants are required to give at least 24 hours notice for the inspection to be carried out.

1.B.6.6 Meter Boxes

- 1.B.6.6.1** All meters shall be provided with a Manukau Water Limited approved surface box. The plastic box shall be marked 'WATER METER' on a dark green cover. Meter boxes in concrete driveways shall be Manukau Water Limited approved cast iron meter boxes marked 'WM' on the cover.

- 1.B.6.6.2** The top of all meter surface boxes shall finish flush with the final ground surface.

1.B.7 HYDRANTS

1.B.7.1 Purpose and Type

- 1.B.7.1.1** All principal watermains 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.

- 1.B.7.1.2** All hydrants shall be Manukau Water Limited approved clockwise closing hydrants.

1.B.7.2 Installation

- 1.B.7.2.1** Hydrants shall be mounted on an approved socketed hydrant tee, with risers if necessary. The top of the hydrant spindle shall lie between 100-250mm from the finished surface level.

- 1.B.7.2.2** All cast and ductile iron components used to connect the hydrants shall be Manukau Water Limited approved and have a protective coating complying with AS/NZS 4158:1996. Bolts, nuts and washers used on the installation shall be 316 stainless steel.

1.B.7.3 Location and Spacing

- 1.B.7.3.1** Fire hydrants shall be readily accessible to fire fighting appliances. The fire hydrants

shall be located away from parking areas and clear of access paths for fire fighting appliances.

1.B.7.3.2 Spacing for hydrants shall comply with the following:

- i) Maximum spacing between hydrants in residential areas - 135m,
- ii) Maximum spacing between hydrants in industrial/commercial areas - 90m,
- iii) Maximum distance from the end of a terminating street - 36m,
- iv) Maximum length of private way before a hydrant is to be located opposite its entrance - 60m,
- v) Maximum spacing between residential buildings and hydrant - 135m,
- vi) Maximum spacing between industrial/ commercial buildings and hydrants - 90m,
- vii) Minimum distance of 6m from all buildings.

1.B.7.4 Hydrant Boxes

1.B.7.4.1 All hydrants shall be provided with a Manukau Water Limited approved surface box. The box shall be set on approved precast concrete sections placed at the level of the hydrant base flange in such a way as to prevent the direct transfer of loads to the principal main.

1.B.7.4.2 The top of all hydrant surface boxes shall finish flush with the final ground surface.

1.B.7.5 Hydrant Markers

1.B.7.5.1 All hydrants shall be identified by:

- i) Hydrants boxes painted with yellow Manukau Water Limited approved acrylic paint, and
- ii) A "H" cut into the top surface of the kerb and a 300mm length of kerb painted with yellow Manukau Water Limited approved acrylic paint at that point, and
- iii) Manukau Water Limited approved solid yellow thermoplastic triangle, dimensioned to NZS 4501:1972 figure 2 installed on the road close to the centreline. The shade of yellow acrylic paint shall match that of the road triangle.

1.B.8 VALVES

1.B.8.1 Purpose and Type

1.B.8.1.1 Valves shall be required on all public watermains to isolate sections of the water supply reticulation for repair and maintenance purposes. Valves on watermains 100mm diameter and more shall be Manukau Water Limited approved Resilient Seated anti clockwise closing sluice valves. Valves on rider mains shall be Manukau Water Limited approved clockwise closing gate valves.

1.B.8.2 Location

1.B.8.2.1 Generally valves shall be located on all branches off each tee or cross and sited in the berm area adjoining the boundary cut off at street intersections in accordance with drawings [DW5](#), [DW6](#) and [DW7](#).

1.B.8.2.2 Generally the valve arrangement shall be capable to isolate sections of no more than 50 dwellings.

1.B.8.2.3 The maximum spacing between valves shall be 500m.

1.B.8.3 Valve Boxes

1.B.8.3.1 All valves shall be provided with Manukau Water Limited approved surface box and a section of 150mm diameter uPVC ducting pipe from the valve bonnet to 80mm below the finished surface. The duct shall be class SN8 to AS/NZS 1260:1999 installed in such a way as to prevent the direct transfer of any loads to the main. Refer to figure 5. A valve key extension shall be required where the distance between the ground level and the top of the valve (χ on figure 5) is greater than 900mm.

- (i) In all commercial, industrial, new subdivisions/developments and paved/ concrete surface area, only cast iron valve boxes ([MW-2](#)) shall be used.
- (ii) Plastic valve boxes may be used for maintenance or watermain replacement works in grassed berms in residential areas.

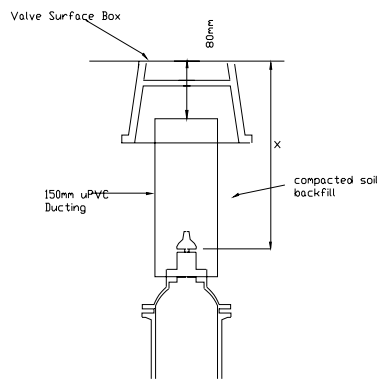


Figure 5

1.B.8.3.2 The top of all valve boxes shall finish flush with the final ground surface.

1.B.8.4 Valve Markers

All valves shall be identified by:

1.B.8.4.1

- i) Valve boxes painted with white Manukau Water Limited approved acrylic paint, and
- ii) A “V” cut into the top surface of the kerb (refer to figure 6 and C8) and a 300mm length of kerb painted with white Manukau Water Limited approved acrylic paint at the point.

C8

Kerb markings may be installed by a saw cut if a minimum width and depth of 5mm is provided which extends the full width of the kerb.

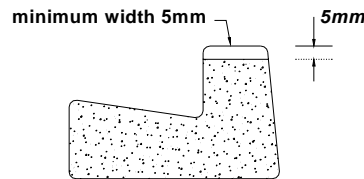


Figure 6

1.B.9 TESTING AND ACCEPTANCE

1.B.9.1 WATER SUPPLY AS-BUILT REQUIREMENTS

The as-built plan is to be submitted by the sub-dividers representative to the Manukau Water Limited field officer at the final testing. They shall submit 5 x A3 sized copies to a scale that is clear to read and not less than 1:1000 and shall contain the following information:

1.B.9.1.1

The Title Plan boundaries and Lot numbers,

1.B.9.1.2

All existing and new water supply lines. All new lines to be coloured “Green”,

1.B.9.1.3

All services shall be labelled with:

- a) Pipe nominal internal diameter in mm (NB/. PE pipes to show OD)
- b) Pipe material e.g. uPVC, mPVC, MDPE, DI, CLS etc.
- c) Each Fire Hydrant/Sluice Valve/Peat Valve etc to be identified as new or existing e.g. FH1, SV2, EXPV1 etc.
- d) Depth to soffit for all non-standard installations,

1.B.9.1.4

Relevant surface structures,

1.B.9.1.5

Schedule of coordinates for all features including Fire Hydrants, Sluice Valves, Peat Valves, Pressure Relief Valves, Scour Valves etc as well as all bends/channel of direction. Schedule of coordinates to 0.1 metres in terms of NZDG2000,

1.B.9.1.6

Dimension from boundary every 50m or where there is any deviation from

standard location.

1.B.9.1.7 Certification of “As-builts” to be by a Chartered Professional Engineer or NZIS Registered Surveyor. This is to be recorded on the as-built to confirm accuracy within normal acceptable engineering and surveying tolerances. As-built prepared by a person holding a NZ Certificate in Engineering/Surveying or a person working under the direction of a Chartered Professional Engineer or NZIS Registered Surveyor will only be accepted.

1.B.9.2 Pressure Testing

1.B.9.2.1 A pressure test and visual inspection shall be carried out in the presence of the Manukau Water Limited representative after backfilling is completed. The developer shall supply all necessary apparatus for the test.

1.B.9.2.2 For all pipe materials, the reticulation shall withstand a hydrostatic pressure of 1400 kPa for 15 minutes without any drop in pressure when measured at the lowest point.

1.B.9.2.3 MDPE pipes not meeting requirements of clause 1.B.9.2.2 would pass the pressure test if the following criterion is met:

- i) The pressure measured on the test gauge shall be rapidly lowered to 300kPa by opening the release valve at the extremity of the system under test. When 300kPa is reached the valve shall be shut off and the pressure on the test gauge must increase by 150kPa (i.e. reach 450kPa) within 10 minutes.

1.B.9.3 Inspection

1.B.9.3.1 At the time of the pressure testing sections of the main, fittings and anchor blocks may be required to be uncovered for inspection by the Manukau Water Limited representative.

1.B.9.4 Disinfection of Watermains

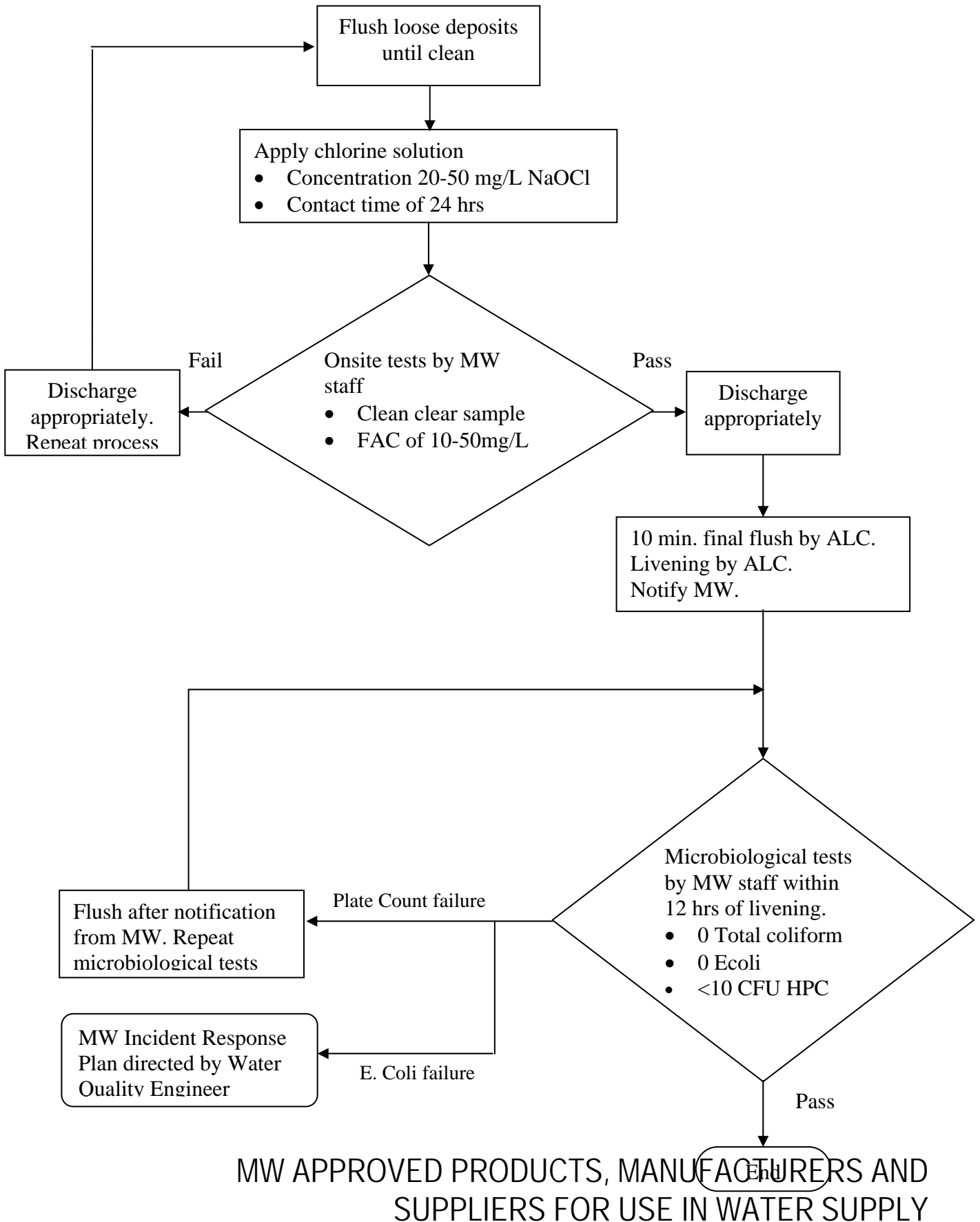
1.B.9.4.1 Following the successful hydrostatic pressure test, the new watermain shall be disinfected in accordance with the [“Water Reticulation Disinfection Code of Practice”](#).

1.B.9.4.2 The key stages of the disinfection process are indicated in Figure 7. Details are available in the code. Refer to C10.

C10

The latest update of the Water Reticulation Disinfection Code of Practice is available on www.manukauwater.co.nz.

Disinfection Process for New Mains





APPLICATIONS

DRAWING NUMBER	PRODUCT	MANUFACTURER	SUPPLIER
no drawing	PTFE Packing - Aquafion 325 and LRCM 227 - Sepro ML 2225 and ML 2254	N & P Industries	James Walker;
no drawing	Valve Rubber Stem Cone	N & P Industries	James Walker;
no drawing	Polyurethane Hydrant Washers	N & P Industries	James Walker;
no drawing	Rubber Gaskets for Flanges (Neoprene or EDPM or Nitrile Rubber)	N & P Industries	James Walker;
no drawing	HiBuild 1000 Acrylic Paint (Colour codes: White, blue, black and road marking yellow to mark valves, service connections, ducts and fire hydrants respectively)	Paint Plus	
no drawing	Glass Reinforced Polypropylene Hex Nipple	Philmac	
no drawing	Check Valves for Watermeter Connections Spring Check Valve	- ADR Check Valve - Bugatti D/R Brass	Arthur D Riley (15mm & 20mm); Kelco Products (25mm)
MW-1	Cast Iron Hydrant Box	Surecast Metals	Hygrade / Humes & Hynds;
MW-2	Cast Iron Valve Box	Surecast Metals	Hygrade / Humes & Hynds;
MW-3	Reinforced Concrete Hydrant Box Concrete Surrounds	Humes; Urban Stone Ltd.; Waiuku Precast Concrete Hansen Enterprises; Hynds Terratain; Telecrete NZ Ltd.; Urban Stone Ltd.; Waiuku Precast Concrete	
MW-4	Hot Dipped Galvanised Lid for 1050Ø Riser Chamber		
MW-5	Sluice Valves - Series 21 - Blakeborough SF - John Seal	Aqua Gas; Gillies; John Valves;	

	<ul style="list-style-type: none"> - Combi - T Model 434 - Siam - Resilient Seated Valves 406 Norcast <ul style="list-style-type: none"> - Hawle Elypso Model - Hydravalve and 	Hawle; Obevalves; Crevet	Humes
MW-6	Copper Alloy Brass Fittings Hex Reducing Bush	Spartan Engineering; Mason Engineers NZ Ltd.	
MW-7	Tapping Bands Self Tapping Ferrule & Strap	Giltech Precision Castings; Milnes; Talbot	
MW-8	Gate Valves - Fig ASH <ul style="list-style-type: none"> - 1070/125 (UK) - Fig 1070M (Australia) - 125 (US) - A59M Maxiflo - CIM 70/BSCR 	Kitz; Pegler; Pegler Hattersly; Grinnell;	Hydroflow Asmuss Plastic Systems
MW-9	Fire Hydrants	Gillies;	Humes; Tyco
MW-10	Hawle Service Valves	Hawle	Humes
MW-11	Hansen Threaded Pipe Fittings	Hansen Products NZ Ltd.	
MW-12	Ductile Iron Fittings	Gillies;	Humes; Tyco Water
MW-13	Pushfit Fittings	Hawle	Hygrade
MW-13A	Compression Fittings	Philmac	
MW-14	Hot Dipped Galvanised Meter Boxes		
MW-15	Philmac Metric PE Fittings	Philmac	
MW-16	Plasson 40 and 50mm Fittings	Iplex Pipelines	
MW-17	Double Check Valves 20-50mm	Wilkins Watts Ames	MacDonald Industries; Hydroflow;
MW-18	Post formed uPVC Watermain Bends	Solo Plastics	
MW-19	Hawle Combi Valves	Hawle	Humes
MW-20	Hot Dipped Galvanised Meter Boxes		
MW-21	MDPE Ridermain Fittings	Alprene Esse-Bi Plastic George Fischer	Asmuss Plastic Systems Hydroflow PPI Corporation
MW-22	mPVC Watermain Pipe	Iplex Pipelines; Keyplas Ltd.; Marley NZ Ltd.	
MW-23	Ball Valves for Watermeter Connections	Bugatti	Hydroflow

MW-24	Blue Brute Fittings	Iplex Pipelines	
MW-25	Milnes Self Tapping Ferrule	Keyplas Ltd.	
MW-26	Single Detector Check Valves	Ames Watts Wilkins Febco.	Hydroflow; RMC; MacDonald Industries FCX Taylors
MW-27	Talbot Plastic Self Tapping Ferrule Straps	Talbot Marley NZ	AB Products
MW-28	Talbot Gunmetal Ferrule and Self Tapping Ferrule Straps	Talbot Marley NZ	AB Products
MW-29	Reduced Pressure Zone Devices 20-150mm	Wilkins Watts Ames	MacDonald Industries Hydroflow
MW-30	HDPE/Polypropylene Water Meter and Valve Boxes	Draper Enterprises; Acuflo Industries	
MW-31	Thermoplastic Triangle Hydrant Markers	Road Mark Systems Kelco Prod.	
MW-32	Mechanical Pipe Fittings For Polyethylene	Asmuss Plastic Systems	Humes
MW-33	Kent PSM-T Watermeter	Kent	Arthur D. Rilely
MW-34	3000V Combination Watermeter	Kent	Arthur D. Rilely
MW-35	Helix 4000 Watermeter	Kent	Arthur D. Rilely
MW-37	Sensus WCD Watermeter	Sensus	Deeco Services Ltd.
MW-38	Ball Valves 15-50mm	Bugatti	
MW-40	Sensus Meitwin 3 in 1 Watermeter	Sensus	Deeco Services
MW-41	Socam 620 Inline Watermeter	Sensus	Deeco Services
MW-42	Sensus WP-IR Watermeter	Sensus	Deeco Services
MW-43	Cosmos WPD Watermeter	Invensys	Deeco Services
MW-44	Top Entry Strainers	Invensys Kent.	Deeco Services. Arther D.Riley Ltd
MW-45	Cast Iron Water Meter Box		Hygrade Hynds & Humes
MW-46	Light Duty Containment Devices	H ₂ O Backflow Prevention	
MW-47	Hot Dipped Galvanised Containment Device Boxes	Backflow Prevention Services Ltd.	
MW-48	Containment Device Components		
MWR-1	Stainless Steel Pipe Tapping and Repair Clamps - Kawandah - Straub Repair Coupling		Wangaratta Industries/CTS; Richard Klinger Ltd.
MWR-2	Compression Couplings	Riken; Philmac	
MWR-3	Multi Purpose Couplings / Clamps	Viking Johnson; Asmuss Plastic	Humes; Tyco;

		Systems	
MWR-4	Bugatti Brass Ball Valves and Telescopic Couplers	Bugatti	Hydroflow