

# Water Metering Guidelines

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**VERSION 2.0**

**JUNE 2015**

This document contains relevant information in relation to the selection, installation and maintenance of water meters in TasWater's operating areas. Information within this document is to be used as a guide only. This document must be used in conjunction with TasWater's Water Metering Policy/s and associated standards.

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## 1. Introduction

These water meter guidelines have been introduced to provide consistency across the TasWater business area.

The guidelines will benefit the plumbing, building and development industries, including plumbers, designers, builders, developers, property owners, plumbing specialists and TasWater staff.

These guidelines should be read in conjunction with TasWater's Metering and Sub-Metering Policies.

## 2. Purpose

These guidelines document the necessary water metering and water servicing conditions required by TasWater for new developments, alterations to existing developments and existing water meter arrangements.

These guidelines are not a technical document and should be used as a guide and for illustrative purposes only.

Wherever possible, conditions have been standardised to assist the industry/customer. The water metering guidelines refer to standard development projects and apply to the majority of development proposals. Where these guidelines are inappropriate for a particular development, TasWater will determine the necessary requirements on a case-by-case basis.

## 3. Water Service Metering

TasWater requires the installation of an approved water meter to measure the volume of water supplied through each property service pipe to a parcel of land.

In addition to this water meter installation, additional meters known as "sub-meters" may be required to measure the volume of water supplied to certain types of "dwellings/occupancies" located within the parcel of land as well as possibly measuring water for certain purposes within a property i.e. water used for irrigation or vehicle washing facilities

Water meters, will be provided by TasWater and the water meter technology will be appropriate to the type of development, intended purpose and required flow rates. The costs associated with the supply of the meter/s will be in accordance with TasWater's Metering and Sub-Metering Policies.

TasWater will endeavour to provide the most effective water meter, however some water services (like fire services) will require a different water meter arrangement which will not impede water flow or introduce pressure losses. These water meter arrangements may be at a higher cost.

Note:

- All water meters must be a type approved by TasWater for the purpose of billing and be fit for purpose.
- All water meters to be owned and read by TasWater must be installed by TasWater
- Only water meters approved for horizontal installation shall be installed horizontally and must have a register at or near vertical to the horizontal axis of the water meter.
- Where specified by the manufacturer, straight lengths upstream and downstream must be installed.
- Where specified by the manufacturer that a strainer/dirt box be installed to protect the meter, this must be installed immediately before the upstream straight length or if a straight length is not recommended, immediately before the water meter.
- Wherever possible, pressure reducing valves shall be avoided upstream of meters and if required to protect the meter, must be installed upstream of the straight length or if a straight length is not recommended, at an approved distance upstream of the meter so as not to interfere with the metrology of the meter.

#### 4. Application Process

Applicants are required to submit a Development Services application form which is available on TasWater's website ([www.taswater.com.au](http://www.taswater.com.au)) or by contacting TasWater on 13MYWATER or 136992.

Completed application forms should be lodged with TasWater for assessment.

## 5. Definitions & Abbreviations

- 5.1 **Water meter** means a device, including equipment related to the device, for measuring the volume of water delivered to a property.
- 5.2 **Meter Assembly** means the pipework on the inlet and outlet side which encases the water meter including isolation valves and couplings.
- 5.3 **Sub-metering** means the installation of individual water meters to measure the volume of water supplied downstream of a master meter.
- 5.4 **Master meter** means a meter installed at the connection point that measures the total volume of water supplied to a strata scheme or a multi-unit property. A master meter may be connected to sub-meters.
- 5.5 **Sub-meter** means a water meter that measures individual usage of water downstream of a master meter. The minimum sub-meter size is nominally 20mm.
- 5.6 **Water Meter Manifold** means the installation of a single water connection from the TasWater, water main to the property boundary that has been sized appropriately and approved by TasWater. The connection then separates into several smaller diameter connections at the property boundary that allows for installation of a number of water meters for individual property/unit connection. (Refer Figures 1 & 2)
- 5.7 **Utility Room/Compound** means a cabinet/cupboard that houses water meter or sub-meter assemblies and associated equipment (Refer Figure 7).
- 5.8 **Dwelling (Residential)** means a self-contained building erected on the land of the property owner and is used or intended to be used as a separate residence. A dwelling must contain a minimum of kitchen, bathroom and sanitary facilities to be considered self-contained.
- 5.9 **Body corporate**<sup>1</sup> has the same meaning as in section 3 of the *Strata Titles Act 1998*:  
*a body corporate formed under this Act*
- 5.10 **Self Contained Occupancy Commercial/Industrial** has the same meaning as used by Council Valuers for producing valuations to determine municipal rates. The definition of the term has been developed by both Common Law and legislation, in accordance with the Valuation of Land Act 2001 and Local Government Act 1993. For the purpose of determining the appropriateness of water metering/provisioning for metering, a self-contained occupancy shall contain a tea sink, toilet and basin as a minimum. The occupants are not required to utilise common facilities outside the individual occupancy. All parent property general water connections are required to be metered in accordance with the requirements documented in these guidelines.

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<sup>1</sup> PART 6 - BODIES CORPORATE of the *Strata Titles Act 1998* provides more information on the body corporate

**5.11 Common property** has the same meaning as in section 3A of the *Strata Titles Act 1998*:

*(1) For the purposes of this Act, common property for a strata scheme or community development scheme consists of –*

- (a) all land within the scheme that is not within the boundaries of a lot; and*
- (b) all other property administered by the body corporate for the relevant scheme –*

*and, in a case where the roof of a building forms part of the common property, the guttering attached to the roof or part of the roof is taken to be included in the common property.*

*(2) The common property for a strata scheme or community development scheme does not include land designated for future development in the master plan for a staged development scheme or a community development scheme.*

**5.12 Boundary Backflow Containment** - Backflow is the reverse flow of liquid within a piped plumbing system. It may be caused from back siphonage, back-pressure or a combination of both. It can result in contaminants being drawn back into the Water Business' water supply through a cross connection. All general water connections to the water supply must provide for an appropriate containment backflow prevention device at the outlet of the master water meter, in accordance with the TasWater Boundary Backflow Containment Guidelines and all relevant Australian Standards.

A Boundary Backflow Containment device is required on all boundary connections. As a minimum, a non-testable Boundary Backflow Device is required. All DN20 and DN25 water meters shall incorporate non-testable Dual Check Valves. All connections  $\geq$  DN32 shall have a separate non-testable Dual Check Valve Boundary Backflow Device as a minimum.

Any Boundary Backflow Containment Device that vents to the atmosphere must be installed with a minimum clearance of 300mm between finished ground surface and the venting apparatus.

Some backflow manufactures recommend that a strainer is installed to protect the Backflow Containment Device. This should be installed downstream of the meter directly before the Backflow device and at a recommended distance so as not to interfere with the metrology of the water meter.

It is the customer's responsibility to supply, install and commission the Backflow Containment Device including ongoing maintenance and testing of the device.

For further information refer to TasWater's Boundary Backflow Containment Selection Guidelines.

**5.13 Single/double testable detector check valve (with metered low flow by-pass)** - is designed to prevent the unwanted reversal of flow from the fire service into TasWater's' water supply system. It also provides both customer and TasWater details of water usage through a fire service to. Low volumes are recorded on a 'by-pass water meter' which is read on a regular basis.

For further information refer to TasWater's Boundary Backflow Containment Guideline.

- 5.14 *Property service pipe* **means a** water pipe that supplies water from the reticulation main to the customer. The portion of the service pipe under the control of TasWater generally terminates at the outlet of the water meter (refer Figure 8).
- 5.15 *Reticulated water/sewer supply system* **means a** network of water/sewer mains, pump stations etc. owned and operated by the respective Water Business to provide the community's water and sewerage needs.
- 5.16 *TasWater (TW)* is the trading name for the Tasmanian Water and Sewerage Corporation Pty Ltd ABN 47 162 220 653.
- 5.17 *Dirt Box* - The dirt box is designed to protect cold water meters from the damaging effects of debris and foreign matter. A Dirt box if installed would be on the upstream side of the water meter in an easily accessible area for cleaning/maintaining. A dirt box is also commonly known as a 'strainer' in smaller diameter connections. The term dirt box is generally used for meters 50mm and above whereas strainers are used on meters up to and not including 50mm.
- 5.18 *Pressure reducing/pressure limiting valve* **is a** valve designed to cut off the flow of liquid at a certain pressure and maintain the downstream pressure at the required setting. These are installed on the downstream side of the water meter and are the responsibility of the property owner/occupier to maintain.
- 5.19 *TW Approved Products Catalogue* - TasWater's requirements are that all materials and products used within the hydraulic network be an approved product. The TW Approved Products Catalogue lists products approved for use within the TasWater Network.
- NOTE: The TW Approved Products Catalogue is still in the development stages. In its absence, TW has adopted the City West Water (CWW) Approved Products Catalogue which is available for viewing at [www.mrwa.com.au](http://www.mrwa.com.au)
- 5.20 **AMR** - Automatic Meter Reading is the technology of automatically collecting consumption data, diagnostic, and status data from water meters and transferring that data to a central database for billing, troubleshooting and analysing.
- 5.21 **MIU** is a Meter Interface Unit. The device fitted to the water meter that incorporates a radio unit to allow the AMR functionality to be obtained. The unit is generally battery powered and operates at a low radio frequency.

**5.22 Compound Meters** - A compound meter is used where high flow rates are necessary, but at times there are smaller rates of flow that still need to be accurately measured. Compound meters have two measuring elements and a check valve to regulate flow between them. At high flow rates, water is normally diverted primarily to the turbine part of the meter. When flow rates drop to where the turbine meter cannot measure accurately, a check valve closes to divert water to a smaller meter that can measure the lower flow rates accurately. The low flow meter is typically a multi-jet or positive displacement meter. By adding the registration of the high and low meter registers, the total consumption through the water meter can be calculated.

## 6. Relevant Standards and Reference Documents

The relevant standards and reference documents include, but are not limited to:

- TasWater's Customer Charter
- TasWater's Water Metering Policy
- TasWater Sub-Metering Policy
- TasWater Boundary Backflow Containment Selection Guidelines
- Water Services Association of Australia (WSAA) Sub-Metering Code of Practice
- National Measurement Act 1960
- National Measurement Regulations 1999
- AS3500 Plumbing Code of Australia
- Tasmanian Plumbing Code 2006
- AS/NZ 3500.1 Plumbing and Drainage – Water Services
- AS 3565 Meters for Water Supply
- AS 3565.4 Meters for Water Supply – In Service Compliance Testing
- NMI R49-1. Water Meters Intended for the Metering of Cold Potable Water and Hot Water
- AS 1851: 2005 Maintenance of Fire Protection Systems and Equipment
- Residential/Home Fire Sprinkler Services designed under the AS 2118.4 or AS 2118.5
- AS 2845.1 Water Supply – Backflow Prevention Devices - Materials, Design and Performance Requirements.
- AS 3996 Access Covers and Grates
- TasWater Standard Drawings.

## 7. Installation of Sub-Meters

Please refer to Sub-Metering Policy.



## 8. Water Meter Positioning

### *8.1 Positioning of Water Meters including Master Meters*

The positioning of Water Meters shall generally be as follows:

- The meter assembly shall be installed at the property boundary where the water service enters. The only exception to this is where approval has been given for each lot/unit to have an independent water service connected to TasWater's service/main and there is no common usage. This is commonly referred to as "meters connected to a manifold".
- The Water Meter assembly must be within two meters of the title boundary that abuts the water main.
- The Water Meter assembly must be fitted at right angles to the water main, in line with the tapping. (Alteration to this configuration is subject to approval by TasWater).
- Above ground Water Meter assemblies must be fully supported with minimum ground clearance of 150mm, and should be not greater than 300mm from finished ground level to the base of the water meter assembly (where the Boundary Backflow Containment Device is a Reduced Pressure Zone type, a minimum 300mm to the device vent is required).
- Below ground Water Meter assemblies must be fully supported with a minimum clearance of 150mm between the base of the pit and base of the water meter assembly.
  - Pits must be self-draining. Pit lid construction is to be fabricated from a non-metallic product and should meet trafficable load rating as per AS 3996.
- The water meter assembly must not be encased in concrete surrounds.
- Water Meters must be readily accessible for reading, maintenance and replacement.
- Water meters can be installed in utility rooms or meter cabinets located within a common access area and are readily accessible, subject to TasWater's approval.

### *8.2 Positioning of Sub-Meters*

The positioning of Sub-Meters shall generally be as follows:

- The unit number must be indicated or tagged on the service pipe near the water meter so that it is clearly visible.
- AMR water meters can be installed inside secured areas of main buildings provided that the following conditions are met:
  - Sub-meters are installed in areas that provide optimum line of site advantage from closest street frontage to sub-meter installation point.
  - Provide for unfettered access to enable reading, testing, inspection, maintenance and exchange without impediment and shall be kept clear of obstructions at all times.
  - In high rise or vertical complexes the sub-meters may be located in a purpose designed meter utility room/compound or service duct/meter box which is located in a common area on each floor. (Refer Figure 7)

- Sub-Meters that are installed in approved cupboards or areas where water leakage may cause damage or nuisance must be fitted with stop valves on the Upstream and Downstream side of the meter.
- Sub-Meter cupboards or areas where water leakage may cause damage or nuisance must be fitted with a drain to allow free drainage of and water spillage or leakage.
- Where it is proposed that meters are installed within a fire hose reel cabinet the design shall comply with AS/NZ 1221 ensuring that the meter/assemblies do not interfere with the operation of the hose reel in an emergency.
- Subject to TasWater's approval, water meters are to be strategically located to allow optimum performance of radio signal so that meters can be read remotely from maximum distances.
- Where sub-meters are installed, it is the customers' responsibility to maintain access accessibility and ensure that the sub-meter installation is maintained to TasWater installation standards in relation to location and depth. This is particularly important if the customer intends landscaping, concreting or undertaking any other land improvements.
- Water meter/s must **not** be located:
  - Inside of units/apartments
  - Near or in an electrical cabinet or electrical control room.
  - Within ceiling cavities of common access areas
  - Provision for the water meters must be:
    - No less than 150mm above the finished floor level
    - No greater than 1.6m above the finished floor level where the water meters can be accessed unassisted by a ladder or other equipment (unless otherwise approved by the relevant Water Business in writing)
    - With a minimum clearance above the centre of each pipe of 250mm
    - With a minimum clearance of 150mm between the centre of each pipe and any wall or door
    - Separate isolating valves adjacent to each water meter installation in accordance with AS/NZS3500 must be provided noting that an additional isolating valve is required on the outlet side of water meters where removal of the water meter may result in water damage to the building or excessive water wastage.

### *8.3 Water Meter Pits (for meters 32mm and above)*

It must be demonstrated to the satisfaction of TasWater that all options to install the water meter above ground have been adequately explored. Where approval has been granted by the TasWater allowing Water Meter or Sub-Meter installations to be installed in pits, the following conditions must be adhered to.

- Be constructed in an impervious material and be of a standard adequate to the location it is to be installed.
- Have a lid which can be safely and easily removed by one person.

- In trafficable areas, must provide for a cover adequate to the loads experienced as well as access for reading (i.e. trap door)
- Should a meter pit have a trap door fitted for reading purposes, the trap door must be fitted in a position directly over the top of the meter index so that the water meter can be read without entering the pit.
- Provide adequate space around the water meter (within the pit) for maintenance and replacement. Provide a minimum clearance around and behind flanges to allow ease of maintenance activities.
- Be drained to prevent the pit retaining water (i.e. connected to the storm water system).
- The owner of the pit is responsible to maintain the pit in good order, conforming to the above requirements at all time and is responsible for any costs applicable.
- A pit located outside of the title boundary and/or on Council property requires the property owner to gain appropriate approval prior to the installation of the pit.
- Any metallic lid must have penetrations for lifting purposes and may be required to have additional penetrations to enable (MIU) radio signal transmission.

NOTE:

- Aesthetics is not considered a valid reason to locate a water meter in a pit.
- Any Boundary Backflow Containment Devices that vent to the atmosphere must not be installed in pits (AS/NZS3500.1:200 and TW Boundary Backflow Containment Selection Guidelines).

#### 8.4 Water meter boxes (for meters 20mm and 25mm)

Water meter boxes must comply with TasWater's requirements and:

- Water meter boxes must be installed on a minimum 50mm thickness of self-draining aggregate to prevent the pit retaining water.
- Water meter boxes installed in walkways or footpath outside of the property boundary must satisfy Local Municipal requirements and comply with AS3996. (Refer Appendix A)
- All water meter box lids must have a non-slip pattern
- Plastic water meter box lids must be UV stabilised.
- Water meter pit lids must be attached to the pit with a length of stainless steel braided wire of such length to enable removal of lid without restriction.
- Any metallic lid must have penetrations for lifting purposes and may be required to have additional penetrations to enable MIU signal

## 9. Protection of Water Meters

In order to provide protection for water meters, TasWater may require the installation of a water meter cage to be installed.

In such cases the cages must conform to the following requirements:

- Must have a gate which can be safely and easily opened by one person. If lockable, a standard industry key or TasWater key must be able to open the lock.
- Provide adequate space around the water meter (within the cage) for maintenance and or exchange of the water meter.
- The property owner is the owner of the cage and is responsible for the maintenance and safekeeping of the cage.
- Cages located on Council property require the property owner to gain the necessary approvals prior to the installation of the cage.
- In some cases it may be applicable to install safety bollards to protect the cage.

## 10. Water Meter and Property Service Sizing

### *10.1 Sizing of Water Meters and Property Service Pipes*

All water meter sizes are to comply with relevant standards. For large residential and non-residential developments, the size of the property service pipe and water meter is to be determined by the property owner or authorised agent. The owner or applicant is responsible to ensure pressure and flows will be adequate and sustainable. This may require the owner/applicant to engage the services of a Registered Plumber or Hydraulic Consultant.

The sizing of a residential boundary water meter and the associated property service connection shall be determined by using the 'flow rates and loading unit table' and 'probable instantaneous demand table' set out in AS/NZS3500.1 Section 3 – Sizing of Water Services.

When sizing the service consideration should be given to the on-property pipework, surface elevations, boundary water meter, strainer, backflow losses and the dynamic pressures in the reticulation system.

The minimum size of a boundary water meter excluding any fire service provisions shall not be less than the table below.

For existing properties requiring up-sizing or down-sizing of property connections, an application to alter the connection must be submitted to TasWater.

Refer to Table 1 for guidance on the minimum sizing of the water meter.

Table 1

Minimum Size*	Maximum No. of Dwellings
DN20	1
DN25	2-4
DN32	5-8
DN40	9-15
DN50	As per Registered Plumber/ Hydraulic Consultant
DN65	As per Registered Plumber/ Hydraulic Consultant
DN80	As per Registered Plumber/ Hydraulic Consultant
DN100	As per Registered Plumber/ Hydraulic Consultant

### 10.2 Selection of Water Meters

The selection of the size and type of water meter will be dependent on the required flow rates nominated by the applicant and the intended use of the development.

All water meters used by TasWater for billing purposes are to be of an approved type supplied by TasWater (*Refer to TW Approved Products Catalogue*).

## 11. AMR (Automatic Meter Read) Water Meters or Remote Water Meters

AMR or Remote Water Meters are to be installed, at the owners' expense. Where pre-arranged access would no longer be necessary in order for TasWater to read the water meter, it is now no longer acceptable for the customer to supply keys and codes to access any new development. For existing properties it is at TasWater's discretion to obtain/retain keys and access codes.

- Water meters with AMR must be installed in all new developments.
- When applicable, water meters must have a minimum 100mm distance between the centre of the pipe and any wall and a minimum 250mm distance between the centres of the pipes of each meter assembly.

- AMR water meters must not be located inside the units/apartments, or within the ceiling, wall or floor cavities of common access areas.

## 12. Haemodialysis Connections

All installations for haemodialysis connections MUST be registered with TasWater and be blue in colour in accordance with Section 12 of AS/NZS3500.1-2003 Plumbing and drainage Part1: Water services

## 13. Other Related Issues

### *13.1 Water Meter Ownership*

Water meters are supplied by TasWater upon payment of all fee/s (where applicable) in accordance with TasWater's Water Metering and Sub-Metering Policies. Once fitted the water meter remains the property of TasWater and is maintained and replaced periodically at no cost to the owner unless the owner has altered the water meter surrounds and accessibility to the water meter.

### *13.2 Damaged, Missing and Stolen Water Meters*

The owner/applicant is required to notify TasWater as soon as any damage or theft of the water meter has occurred.

If the water meter is damaged, stolen or missing, it will be replaced by TasWater.

A fee for the supply and installation of the replacement water meter and any associated works may be charged.

### *13.3 Removal of Water Meters*

No person shall remove a water meter or alter its position unless that person has first obtained written permission from the TasWater. Water meters removed by unauthorised persons are not to be re-used as per the National Measurement Act 1960 (18GA, 18GD, 18GE & 18GK) unless the meter has been verified by a NATA accredited testing facility.

### *13.4 Return of Water Meters*

Any water meter that has been removed from service, either through meter exchange, service disconnection, property redevelopment or damage must be returned to TasWater.

### 13.5 Grouped Water Meters

Where grouped water meters are to be located for multi-unit developments, the owners'/applicants' corporate is responsible to ensure that each sub-meter is always tagged with the corresponding unit number (*refer section 7.2*).

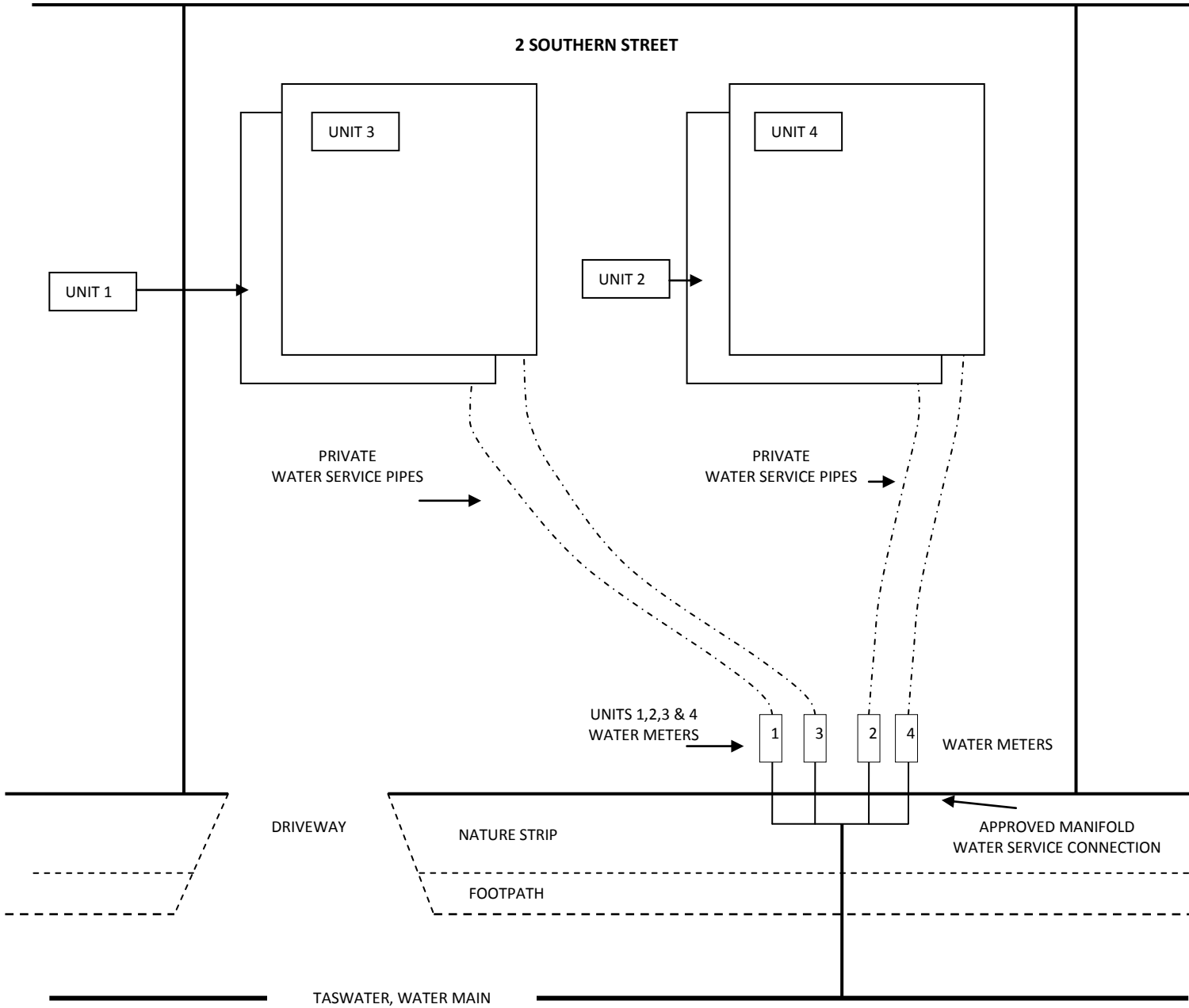
## 14. Fire Services

Water metering of fire services will be assessed on the type, size and use of the development.

Typically:

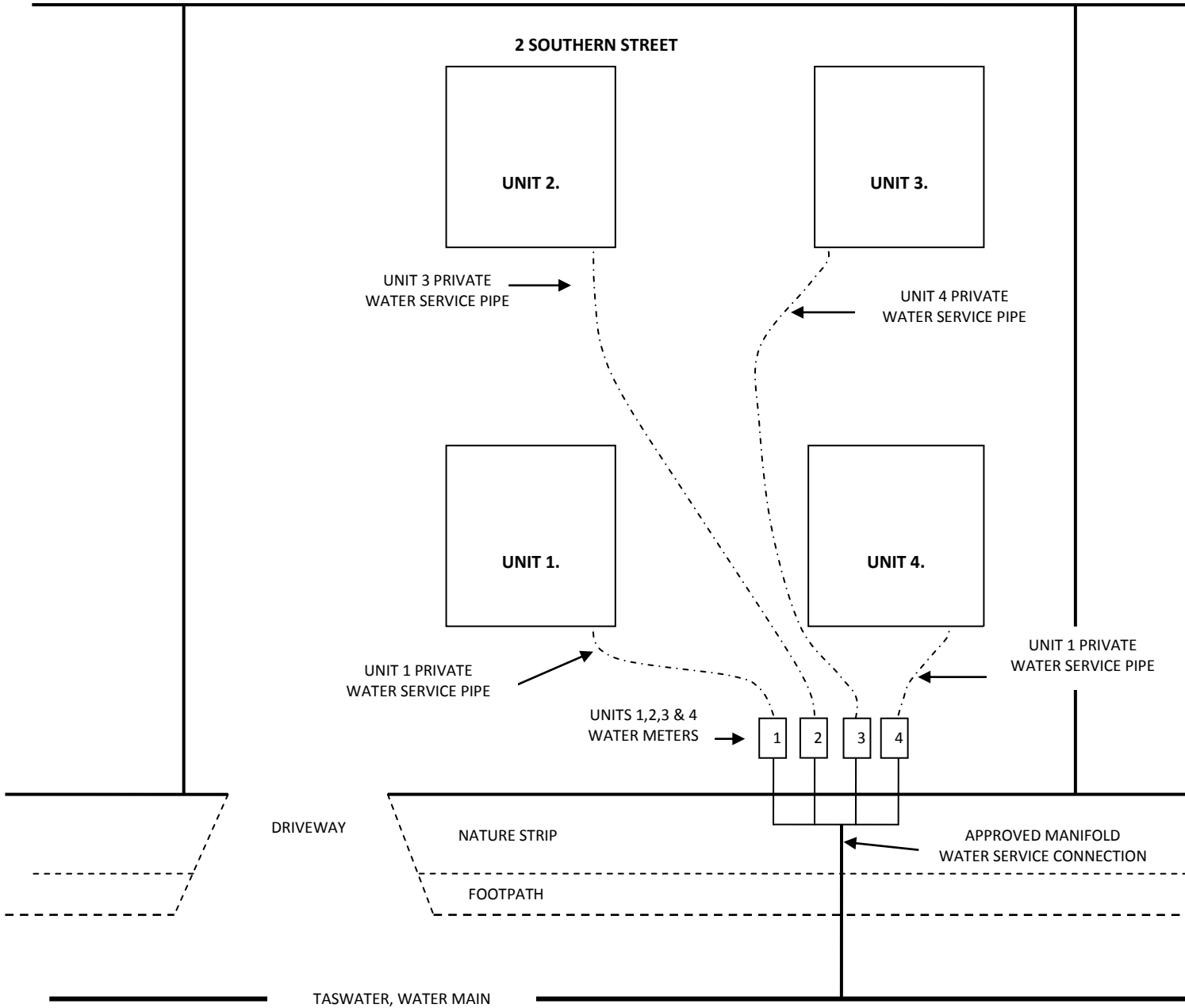
- Fire Hose Reels must be metered and are generally supplied via the metered water service to the property.
- Hydrant Services must be fitted with a Boundary Backflow Containment Device. A WaterMark approved Single Detector Check Valve with 50kPa spring rating and appropriately sized By-Pass water meter for Low Hazard or a Double Detector Check Valve with appropriately sized By-Pass water meter for Medium Hazard. By-Pass water meters will be supplied by TasWater at the developer's cost. (Refer TasWater Boundary Backflow Containment Guidelines)
- Residential/Home Fire Sprinkler Services designed under AS2118.4 or AS2118.5 which utilises a low volume of water will be assessed individually by TasWater.
- Fire systems that are designed and installed to AS2118.1 will be assessed individually by the relevant Water Business. Most of these installations may require a Magnetic Flow Meter to be installed.
- The test water flows associated with Automatic Fire Sprinkler Systems are required to be metered. Where the fire service is above 50mm, the water supply for general purpose is to be connected off the fire service prior to the fire service water meter and separately metered.

15. FIGURE 1 – WATER METER MANIFOLD CONNECTION  
FIGURE 1.

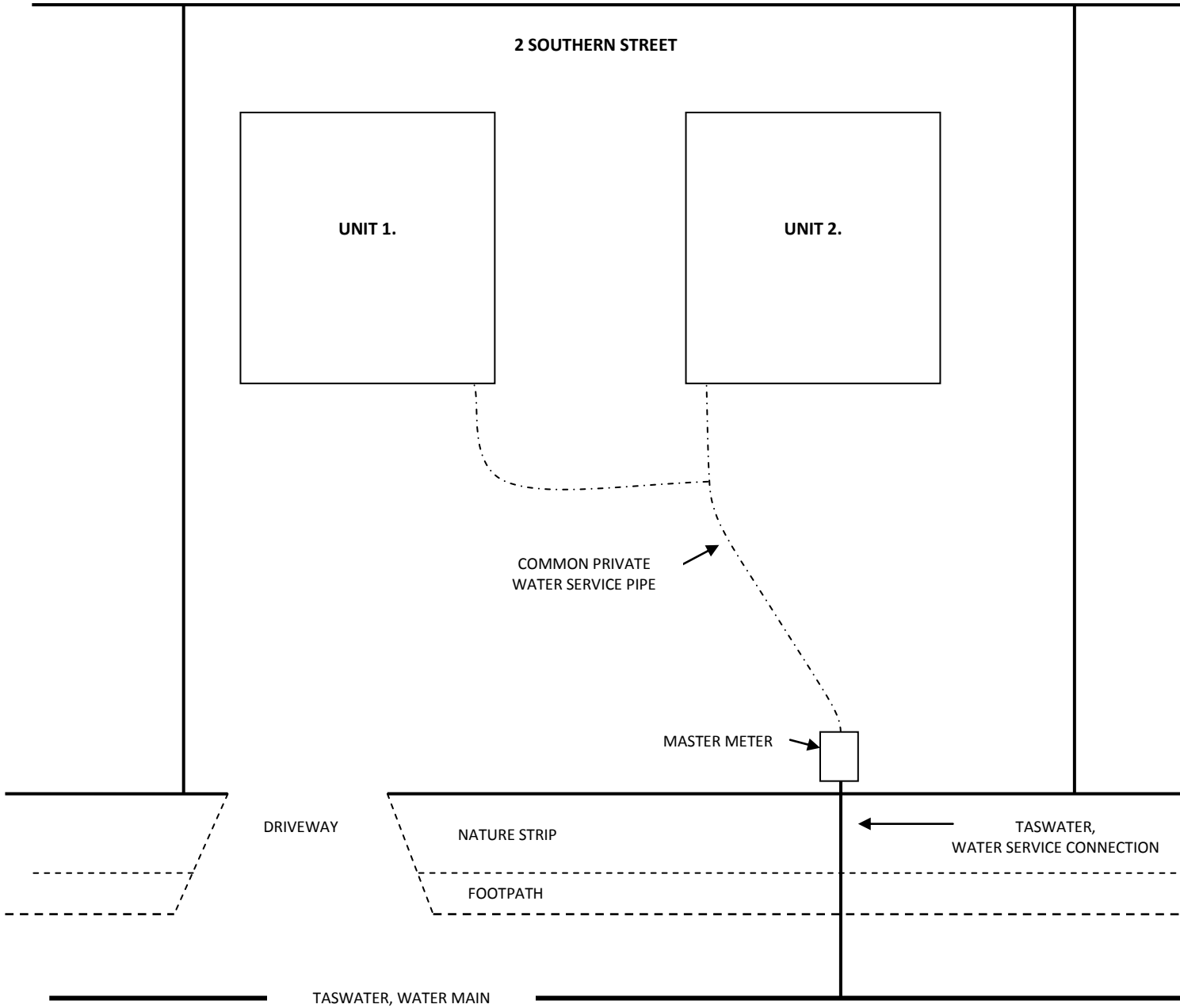




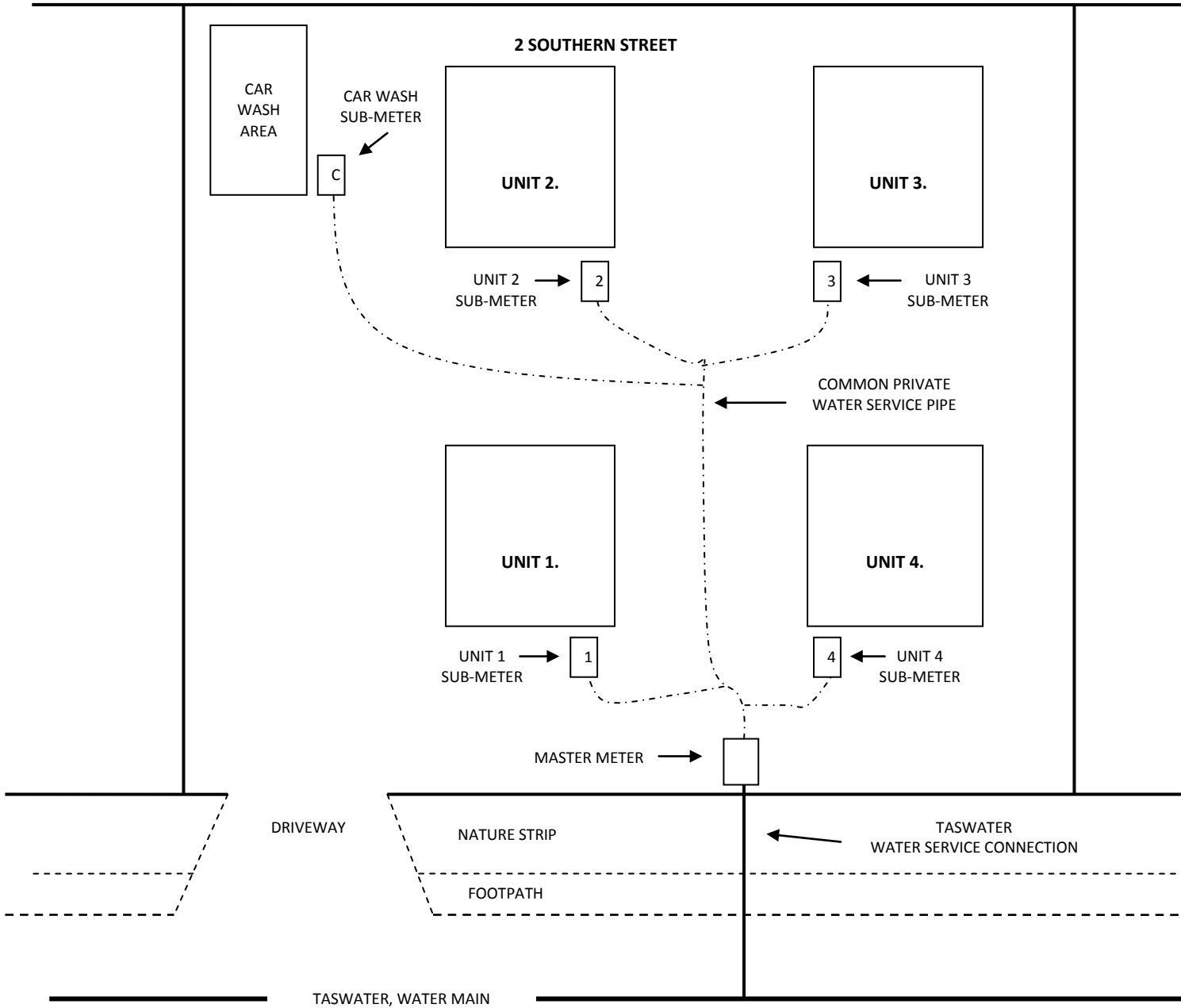
16. FIGURE 2 – WATER METER MANIFOLD CONNECTION



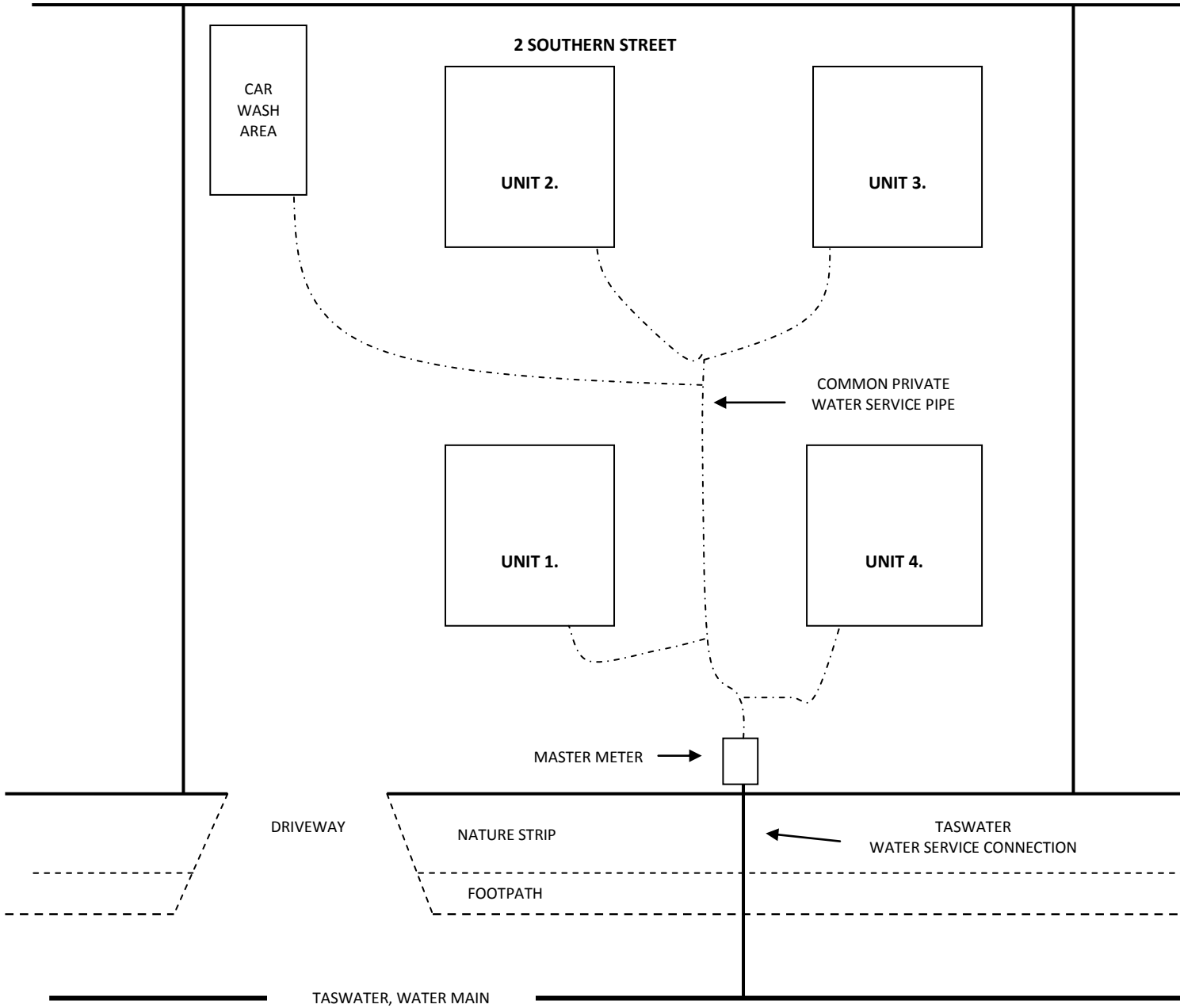
17. FIGURE 3 – BOUNDARY METER



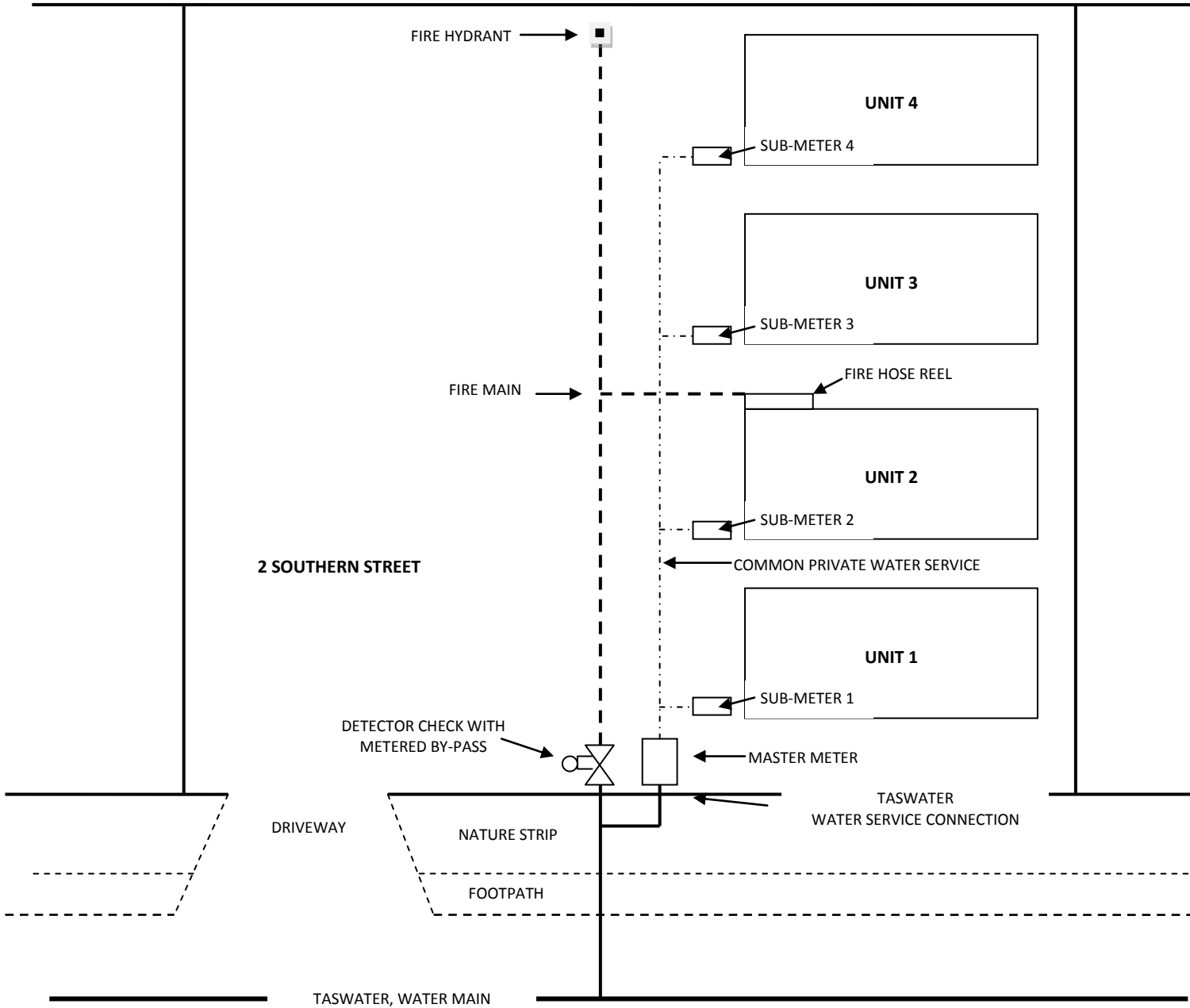
18. FIGURE 4 – SUB-METERING WITH COMMON PROPERTY – SUB METER C IS OPTIONAL



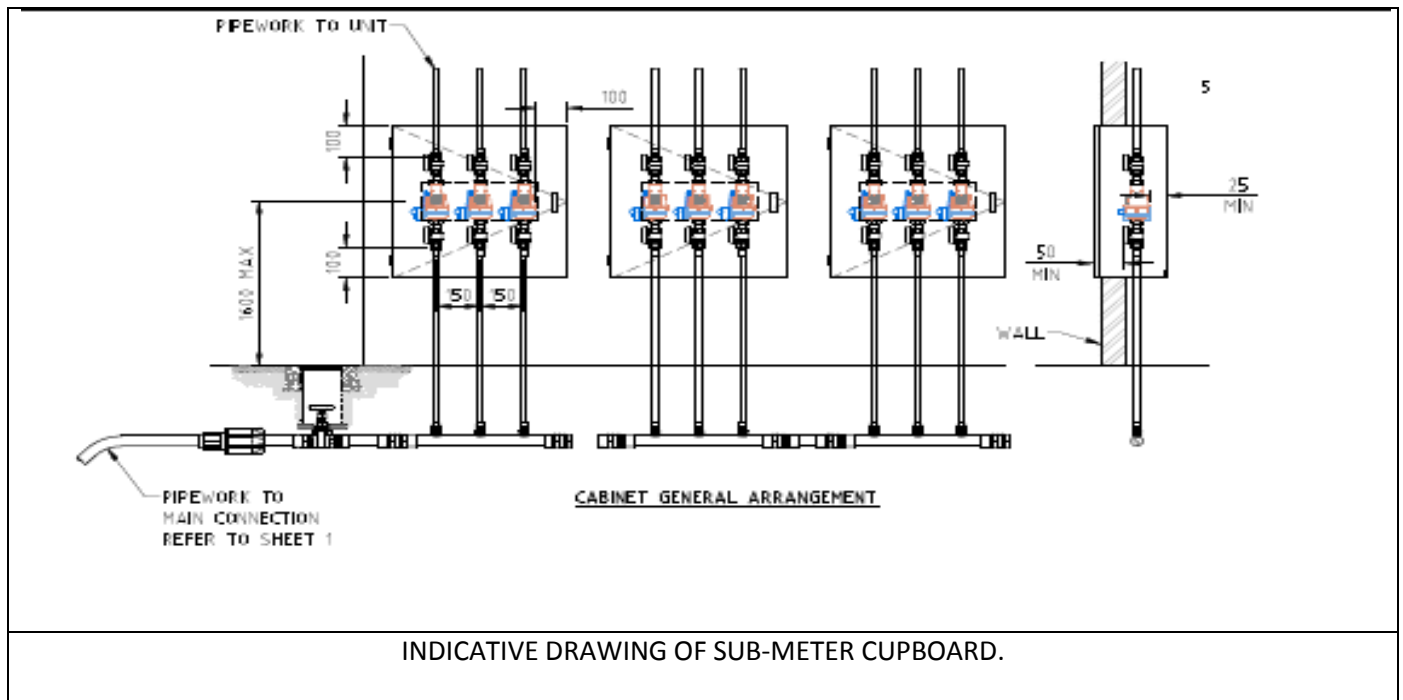
19. FIGURE 5 – BOUNDARY METER ONLY



20. FIGURE 6 - SUB-METERING INCLUDING FIRE MAIN



## 21. FIGURE 7 – DRAWING OF SUB-METER CUPBOARD

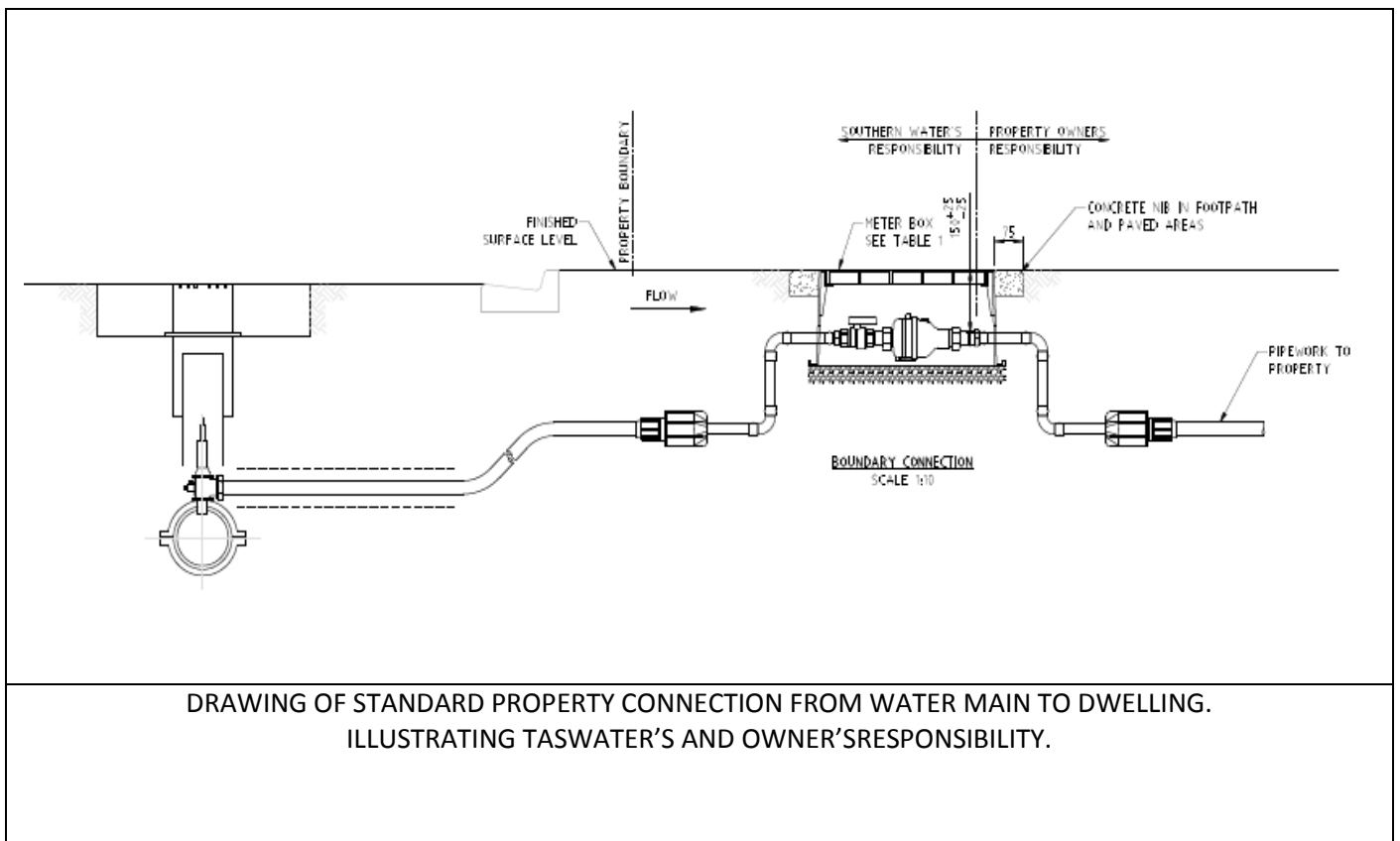


Sub-meter cupboards shall be designed such that:






- There is a minimum 150mm gap, perpendicular to the direction of the pipes, between sub-meters.
- There is a minimum 100mm gap between the outermost valves and the edges of the cupboard.
- The sub-meters are easily accessible and readable from floor level of common property, unassisted by ladder or other equipment. Maximum height for the higher of either the centreline of the sub-meters or the top of the sub-metering assembly = 1.6m.
- There is no need for a person performing normal maintenance duties to enter into the cupboard. (i.e. The cupboard must not be classified as a confined space for entry purposes). Where meters are located in a utility room, adequate ventilation must be provided.
- A minimum of 2 square metres is available in front of the cupboard as free working space.
- Adequate lighting is available during daylight hours.
- There is sufficient room for the cupboard door(s) to swing open completely and provision for them to be held open.
- The cupboard shall have a minimum 100mm bund if it is located inside a building.
- The cupboard shall be sufficiently water proof and drained to prevent seepage into the surrounding building structure in the event of a leak.
- The cupboard door are to be fabricated from a non-metallic product, preferable to have either glass or Perspex viewing port to enable easy viewing of meter assembly without opening doors.
- The cupboard does not need to be locked, but must be fitted with a latch where a double padlock can be fitted in the future if required.

- If the Body Corporate/applicant determines that the cupboard is to be locked, a TasWater padlock is to be used to allow TasWater access to the cupboard at all times.
- Sub-meter cupboards shall be strategically located to enable best maximum range for AMR (Best option is by locating sub-meter cupboard so that the TasWater meter reader can automatically read the meters from the closest road frontage without having to enter to complex).

22. FIGURE 8 – STANDARD RESIDENTIAL PROPERTY DRAWING



## 23. APPENDIX A –LOAD RATINGS FOR PITS AND GRATES

	CLASS RATING	TYPICAL USE	NOMINAL WHEEL LOAD (kg)		SERVICEABILITY DESIGN LOAD (kN)		ULTIMATE LIMIT STATE DESIGN LOAD (kN)	
			AS3996	WSAA	AS3996	WSAA	AS3996	WSAA
	A	Footways and areas accessible only to pedestrians and pedal cyclists	330	330	6.7	6.7	10	10
	B	Footways that may be mounted by a vehicle or livestock, and light tracker paths	2670	2670	53	54	80	82
	C	Malls and pedestrians areas open to slow moving commercial vehicles	5000	5000	100	100	150	150
	D	Carriageways of roads and areas open to commercial vehicles	8000	7000	140	160	210	240
	E	General docks and aircraft pavements	13700	13700	267	280	400	420
	F	Docks and aircraft pavements subjects to high wheel loads	20000	20000	400	410	600	615
	G	Docks and aircraft pavements subject to very high wheel loads	30000	30000	600	600	900	900