

# Preparing non-urban water meter action plans

Guidelines for water corporations



## Acknowledgment

We acknowledge and respect Victorian Traditional Owners as the original custodians of Victoria's land and waters, their unique ability to care for Country and deep spiritual connection to it. We honour Elders past and present whose knowledge and wisdom has ensured the continuation of culture and traditional practices.

We are committed to genuinely partner, and meaningfully engage, with Victoria's Traditional Owners and Aboriginal communities to support the protection of Country, the maintenance of spiritual and cultural practices and their broader aspirations in the 21st century and beyond.



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# Introduction

Under the Murray-Darling Basin Compliance Compact, the Victorian Government has committed to issue these guidelines for preparing non-urban meter actions plans to water corporations with rural customers.

These guidelines are to assist the water corporations to develop their non-urban metering action plans and are to be read in conjunction with the Victorian Government Policy for Non-urban Water Metering, which includes a glossary of terms.

Most supply points in Victoria are metered. Approximately 85% of the 2019 Victorian non-urban meter fleet was installed before any pattern approved meters were available.

The typical use patterns in water resource management areas are very uneven with:

- the top 40% use sites often accounting for 80% of use
- the bottom 30% use sites accounting for less than 5% of use.

Figure 1 provides real examples of meter use patterns for several water resource management areas.

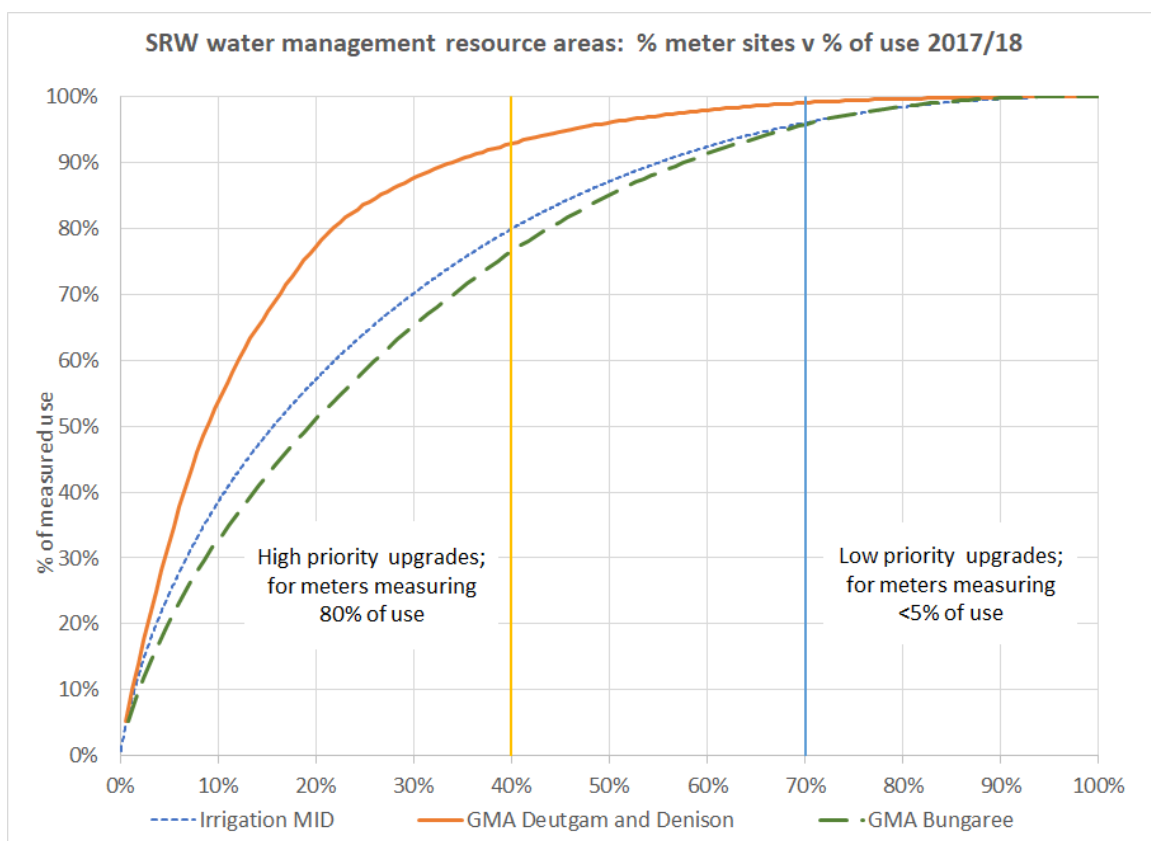


Figure 1 - Example meter fleet profile based on their use

Figure 1 highlights the diminishing benefits for water resource management objectives for metering the lowest 5% of meters.

## Victorian water corporations delivering non-urban water

There are six water corporations that supply and deliver water to most non-urban water customers in Victoria. Of these, Southern Rural Water and Melbourne Water service customers exclusively outside the Murray-Darling Basin. Grampians Wimmera Mallee Water also services some groundwater customers outside the Basin and their surface water is disconnected from the Murray River.

The water corporations act as regulators of the Victorian non-urban water sector under powers and functions delegated by the Minister or provided directly under the *Water Act 1989*. These activities include the extraction of water from rivers, waterways and channel systems for irrigation, commercial and licensed domestic and stock purposes as well as water supply, drainage and salinity mitigation services (DELWP, 2018).

Part 7-4 of the Statement of Obligations (General), issued under the *Water Industry Act 1994*, requires water corporations that undertake non-urban metering to do so in accordance with the State's policies and plans. This guideline together with the Policy on Metering for Non-urban Water sets the obligations for the Part 7-4 of the Statement of Obligations.

Attachment A provides some history on the development of the national non-urban water metering framework.

## Circumstances where the metering requirement can be varied

Victoria's Policy for Non-urban Water Metering states that, apart from the circumstances where the metering requirement can be varied:

- new or upgraded extraction sites are to be metered with an AS4747-compliant meter
- meters on existing extraction sites that meet an interim standard are to be replaced at the end of their operational life with an AS4747 compliant meter
- meters that do not comply with interim standards or with AS4747 should be replaced by June 2025.

The cost of metering is high compared to the opportunity cost of water and is much higher than it is for urban water. The ratio of costs is very dependent on sites and water resource circumstances.

The cost of metering of take-and-use sites with full flowing pipe meters is of the order of \$4,000/site to \$10,000 depending on the meter size and the site modifications required. Adding telemetry can increase the site cost from \$500/site to \$10,000/site depending on the sophistication of the telemetry and the communication options. The typical service life for full flowing pipe meters is 15 to 20 years.

The cost to initially install open channel meters, that generally comes with telemetry and automated control, is of the order of \$45,000+/site as they usually require significant civil works. Future replacement of open channel meters is of the order of \$15,000 to \$25,000. The design service life for open channel meters is in the range of 30 to 40 years.

The Metrological Assurance Framework (MAF) provides for the relevant jurisdictional government department or agency to exempt meters from the accuracy standard. The Compact restates the State's power to specify exemptions and requires the State to publish its justification of the exemptions on the relevant state agency website.

Under this framework, the State's allowable exemptions are for circumstances where water resource management risks are manageable, and the costs are disproportionate to the benefits – see Victoria's non-urban water metering policy.

The low use exemption thresholds are:

- an existing surface water licence less than or equal to 10 ML per year or an annual use limit of 10 ML per year or less under a water-use licence or water-use registration

- an existing groundwater licence less than or equal to 20 ML
- in either of the above, a lesser volumetric threshold set by the water corporation
- sites where the costs are disproportionate to benefits, including but not limited to:
  - where the site is not in use as it's not equipped with a pump or physically cannot operate
  - the low frequency or low annual volume of take (ten-year average less than 10 ML/year and no annual use > 20 ML) do not require a meter
  - excessive costs imposed by site conditions
  - adequate water measurement is provided by the bulk water meter, or
  - the bottom 5 per cent of sites based on use within a water resource management area. Unless these sites are in a higher risk resource area, basic metering is adequate to fulfil water management objectives under the National Water Initiative

The water corporation can continue with the current metering standard for sites that make up the lowest 5 per cent of water use in a water resource management area that has regular use and require metering.

For sites where the costs are disproportionate to benefits, the water corporation is to demonstrate and document that the benefits of metering, or of meter to an AS4747 standard, are too low to justify the cost, and that water management risks remain manageable. This would involve considering:

- The full cost of the meter and the average trade value of the water over the life of the meter in the specific water resource management area
- The benefit and costs of alternative options to quantify the use
- How to assure the management of water resource risks.

Where water corporations decide that it is not necessary to meter certain users of a defined resource, the corporation's reasons and alternative method to estimate the take can be documented in a management plan that is publicly available. The method of estimation should be based on an adequate sample of similar metered customers. Otherwise, the reasons are to be detailed in the application approval documents for individual entitlement holders.

The State does not require water corporations to replace interim standard meters by 2025.

Interim standard meters (also referred to as contemporary meters) meet the accuracy objective and at many sites will still have significant residual life at 2025. For open channel meters sites interim or contemporary meters may be still the only option to install as there are no pattern approved meters. The assurance benefits of upgrading interim or contemporary meters before the end of their service life are very small.

Water corporations can plan to replace contemporary meters at the end of their service life with compliant meters.

# Meter action plans

Rural water corporations are required under their Statement of Obligations to develop non-urban meter action plans. The plans identify their current meter fleet profile relative to the measurement requirements and specify the authorities' current processes to select, inspect, validate, maintain and replace meters and their improvement actions.

## Plan content and authorisation

The content of the action plans should include as a minimum the elements outlined in Table 2 below. The relevant Executive Manager or the Managing Director is to authorise the plan.

Water corporations should where practicable use the template provided by DELWP for the plan.

**Table 1 - Non-urban water meter action plan content**

No	Item	Description
1	Introduction	Overview of the purpose and scope of the metering action plan.
2	Business Context	Provides business context relevant to current metering requirements and to future metering upgrades and their timing.
3	Processes to assure accurate meters	An outline of the processes used for selection, installation and initial validation and for the on-going maintenance, validation and verification of meters.
4	Meter data management	Overview of the data collected, and the systems and databases used to transfer and store meter data.
5	Meter fleet profile	For each water resource management area, summarise the volumes measured by meters of different compliance categories plus the metered volume that has telemetry.
6	Meter investment plan and finances	This is a summary of the rolling 5-year capital upgrade plan for meter replacements.
	Appendix A	List of staff and relevant contractors that are Certified Meter installers and Validators
	Appendix B	Meter statistics

## Business Context

The plan is to provide the business context relevant to the metering. This may include such items as:

- Areas that are being modernised or that have modernisation upgrade plans
- Areas either planned or under investigation for reconfiguration, including termination of services
- Water systems with a significant reduction in reliability and water use, resulting in only the occasional use of water
- Water system statistics on use trends relative to entitlements or licences caps and on trading within and out of the water resource area
- Higher risk water resource areas that have experienced sustainability risks such as seawater intrusion, overuse, problems with unauthorised use, compliance challenges on customer use.

- Water systems that require regulatory compliance checks or have a history of breaches of water management rules – such as managing environmental flows
- A schedule of individual users that have an entitlement or licence greater than 5,000 ML

## Processes to assure meter accuracy

All meters require processes to assure accuracy. The following section in the guideline has adopted an asset management approach as this provides an established process to manage assets.

### Asset management for meters

As an asset sub-class, meters require:

- Strategy
- Design specifications
- Procurement
- Construction
- Commission
- Operation and maintenance
- Disposal and
- Record keeping

Figure 2 shows an asset management framework for meter management with cross-references for the relevant AS4747 standards.

The plan is to specify either the asset class management plan for meters or provide relevant cross-references to other water plans that provide the content.

The plan is to document the internal processes:

- to implement AS4747 requirements
- to implement similar requirements to AS4747 for Contemporary meters
- for other meters.

### Meter maintenance

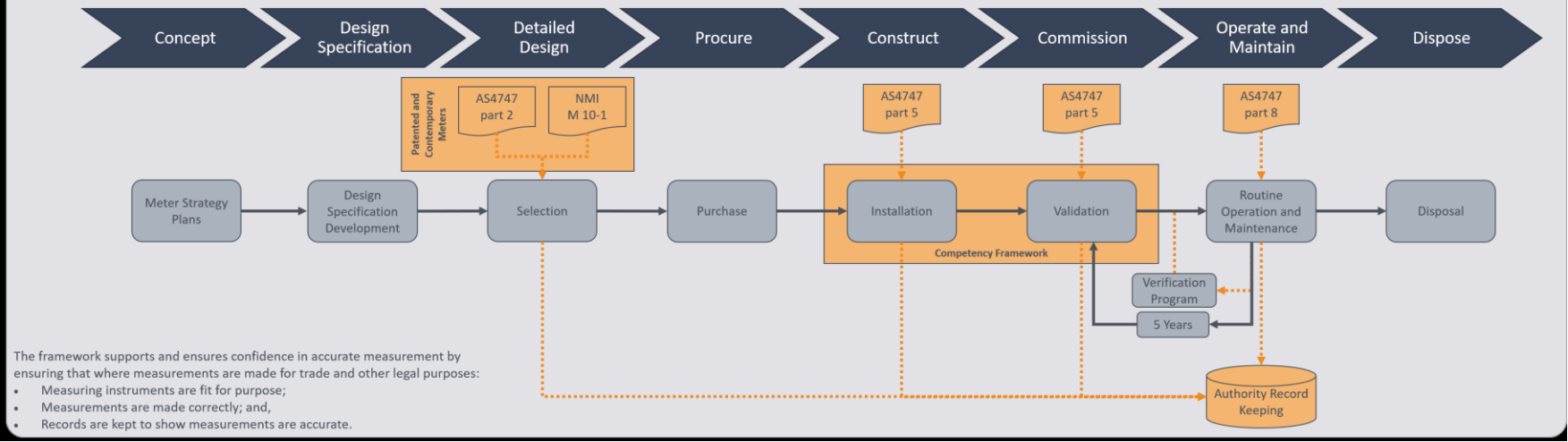
The plan is to include a typical maintenance schedule for each meter sub-class. This need not be at the level of each make and model but should account for differences in measurement technology for example Magnetic flow meters. The schedule is to group tasks by preventive, corrective and predictive maintenance categories to match the AS4747 terminology.

### Meter validation

The plan is to include the schedules to validate the meters by certified validators. AS4747 – Part 8 specifies the requirement and Attachment B provides an example of a possible schedule.



### Closed Circuit Water Meters Asset Management Framework



### Open Channel Water Meters Asset Management Framework

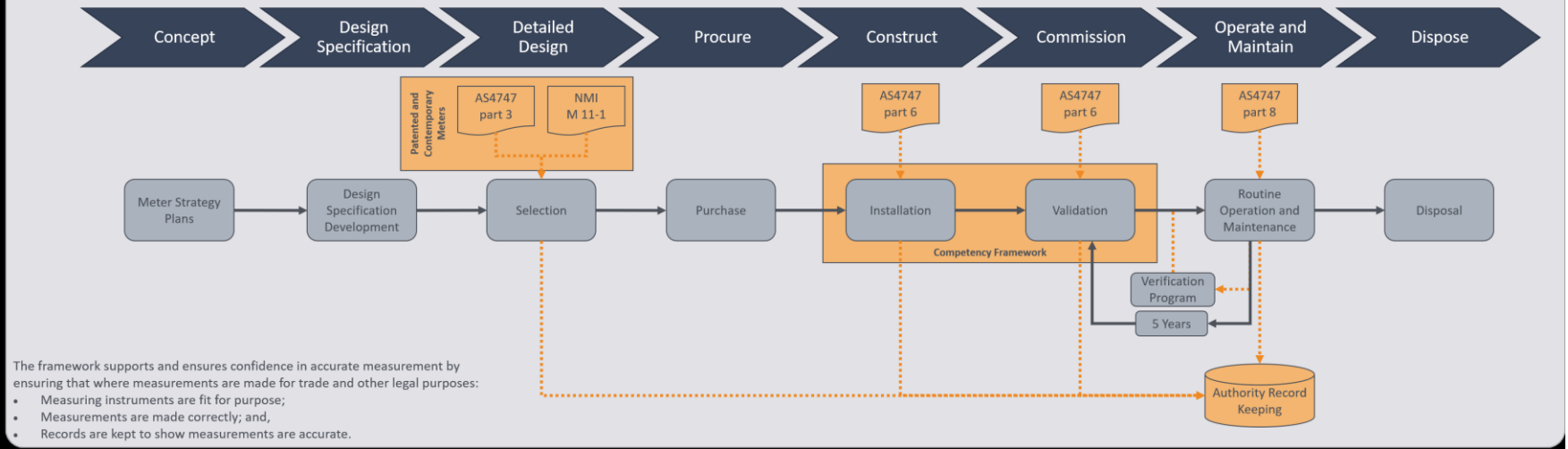


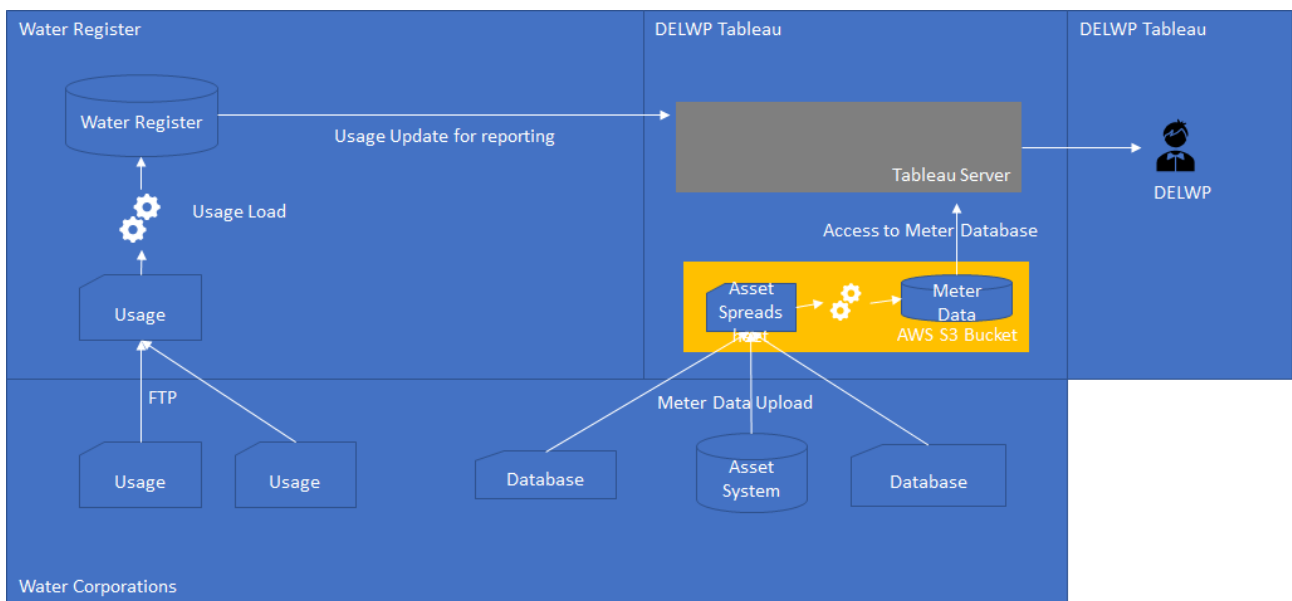
Figure 2 - Asset management framework for meters

## Meter data management

DELWP will establish and maintain a central meter database that can link with the Water Register. This will enable linking of the meter with the data already in the Water Register. This approach will allow DELWP to produce summary statistics at various groupings with a focus on meters that are 50mm nominal diameter or greater:

- Volumes measured by different meter compliance categories
- Change in meter fleet profile over time,

Figure 3 shows a schematic of the data flow and link with the Water Register.



**Figure 3 - Meter data transfer schematic**

This system will fulfil the reporting requirements under the Compact Action 3.7.

This approach will require the Water Corporations to collate and send files to DELWP that have the fields specified in Appendix B of the Victorian Non-urban Water Metering Policy **Error! Reference source not found.**

For the water corporation overall and for each water resource management area, the plan is to summarise the volumes measured by meters by meter compliance code. Appendix A provides an example presentation.

The summary is to include the number of meters for each water resource management area that requires an accurate meter but does not have either a compliant or contemporary meter.

## Telemetry

The longer-term plan for meters is to connect them to telemetry. The action plan is to include:

- Statement on the number and water resource areas with telemetry for the meters
- Outline of the investment framework and the assumptions used to decide where and when to add telemetry considering:
  - Cost-effectiveness and

- Compliance requirements

## Investment program

The investment program is to document the priority setting method used to design the program to upgrade the meter fleet over time to have:

- AS4747 compliant meters or:
- Contemporary meters, where AS4747 are unavailable or unfeasible or
- alternative measurement standard; and
- telemetry for either cost-effectiveness or compliance reasons

The capital program is to include a rolling five-year forward look capital program plus details on the budget and expenditure over the previous five years and to cross-reference the Water Plan periods.

# Attachment A - Background to the national metering framework

The general scope (circumstances) for non-urban water metering was established in s87 of the National Water Initiative in 2004.

87. *The Parties agree that generally metering should be undertaken on a consistent basis in the following circumstances:*
- i) *for categories of entitlements identified in a water planning process as requiring metering;*
  - ii) *where water access entitlements are traded;*
  - iii) *in an area where there are disputes over the sharing of available water;*
  - iv) *where new entitlements are issued; or*
  - v) *where there is a community demand.*

The 2004 NMI established the requirement for national standards and the general expectation for metering of non-urban water. Subsequently, standards were established in 2009 through the Measurement Assurance Framework (MAF).

The MAF's primary objective is to: *provide an acceptable level of confidence that measurement performance under in situ conditions is within the maximum permissible limits of error of  $\pm 5\%$ .*

The MAF is supported by meter standards specified by the National Measurement Institute and by AS4747 that covers the installation, validation, maintenance and verification of meters.

There are two main meter categories in these standards are:

- meters for full-flowing pipes which *measure the actual volume of water flowing through fully charged, closed conduits;* and
- meters for open channel situations which *measure the actual volume of water flowing through open channels and partially filled closed conduits*

Table 1 summarises the assurance framework for meters:

**Table 2 - Assurance framework for non-urban water meters**

Requirement	Documents
Overall measurement requirement	Measurement Assurance Framework [2009]
Measuring instruments are fit for purpose	NMI M 10 for full flowing pipe meters [2010] and NMI M 11 for open channel meters [2009] Approved meters are called - pattern approved
Measurements are made correctly	AS 4747 – Sections 1, 2, 5 & 8 for full flowing pipe meters AS4747 – Sections 1, 3, 6 & 8 for open channel meters These standards include the requirement for duly qualified personnel for most tasks – called Certified Installers and Validators. AS4747 first edition was 2008 and the current 93 <sup>rd</sup> edition was in 2013]
Record-keeping to prove measurements are accurate	NMI retains records on meter testing for pattern approval AS4747 specifies the data to record

The MDB Compliance Compact in 2018 specified the following metering objectives:

*The objectives of metering water take are to ensure that:*

- i. The take of water can be accurately and reliably determined*
- ii. Meters used to measure water take are auditable, verifiable and accurate*
- iii. Data from meters can be easily communicated to relevant authorities and is able to be incorporated into state licensing systems (including compliance)*
- iv. Mandatory requirements and resources are targeted to higher risk users (that is those that have a greater capacity to take water) and high-risk water systems*
- v. The benefits of water measurement outweigh the costs*
- vi. The framework is simple to understand, comply with, administer and enforce*

# Attachment B: Example validation schedule

The following table sets out the required meter validation schedules, noting that this will often be combined with maintenance tasks.

**Table A1: Validation Schedule Content**

Activity	Interval year(s)
Annual inspection and maintenance as required <sup>1</sup>	1 (suggested)
Validation (as per AS4747-Part 8)	5 (mandated)
Validation tasks may include: <ul style="list-style-type: none"> <li>• Physical check of the meter</li> <li>• Check on configurable parameters</li> <li>• Check on error detection conditions and log</li> <li>• Undertake system diagnostic check</li> </ul>	
Complete validation form and certificate by certificate meter validator	

Note 1 – The suggested frequency for annual inspection and maintenance is one year in AS4747-Part 8. The objective is to provide metrological assurance of in-service performance. If the Water Corporation is to adopt a longer maintenance frequency than one year for some meters, then in the plan it is to specify the controls to assure performance and to support this with relevant context and data for these meters.

AS47474 -Part 8 – Appendix B provides an example list of validation records.

Some of the validation tasks may be completed and logged remotely using the telemetry system. The generic process for these remote testing processes requires approval by a certified meter validator.

The schedule is to indicate which validation tasks are completed remotely.