SRW METER MANAGEMENT ACTION PLAN

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Contents

1 Executive Summary

The SRW Meter Action Plan profiles the current SRW meter fleet and documents the meter upgrade plan for Groundwater and Rivers meters. The meter upgrade plan for the three irrigation districts is part of their modernisation plans and is outside the scope of this plan.

The focus of the plan is on the design of the capital plan. This version includes other sections covering on-going management of meters and their data. These sections will require update after completion of the new version of the Victorian State policy and the national review of the Metrological Assurance Framework for meters. Both these reviews will be available in late 2020.

The Statement of Obligations (Section 7-4) specifies the requirement for Metering Action Plans. The metering expectations are set in the Victorian State metering policy (May 2014). A revised draft policy is currently near completion and this update will reflect the more recent national policy changes.

The MDBA Compact is the most recent national level document on metering and it sets the national expectations that will cascade to the State policy. The objectives of metering as specified in the Compact are:

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; and
v. The benefits of water measurement outweigh the costs

The State's metering policy has exclusions based on low licence volumes. The exclusion thresholds for metering exemption are:

- Less than 10 megalitres licence volume for surface water; or
- Less than 20 megalitres licence volume for groundwater.

The new draft policy adds two extra exclusion threshold for sites:

- that record the lowest 5% of water use in a water supply management system; and,
- where the costs are disproportionate to benefits.

Unless excluded, take and use sites need to have meters installed that are complaint with the national meter standard AS4747. Most of SRW's meters were in place before the first pattern approved meters became available in 2014 and most fail to meet the national standard.

The sites that fall below the State metering threshold may still need metering for compliance or other business reasons but to a metering standard set by SRW.

An analysis of the 2017/18 and 2018/19 data showed that for typical groundwater management areas:

- 20% of meters measure more than 55% of the water use;
- 35% to 60% meters measure more than 95% of the water use; and,
- 20% of meters have no use.

For typical surface water management areas, the pattern was:

- 20% of meters measure more than 55% of the water use;
- 40% to 60% meters measure more than 95% of the water use; and,
- 20% of meters have no use.

For the Macalister Irrigation District, the pattern was:

- 20% of meters measure more than 65% of the water use;
- 50% meters measure more than 95% of the water use; and,
- 30% of meters have no use.

The design of the metering program:

- Assigns priority to the water management areas by the ratio of use to licence volumes;
- Identifies sites in these areas that require metering under the State policy and ranks them by use to licence ratio; and,
- Limits the scale of the program to match with Water Plan 4 budgets.

The priority groundwater management areas (units) identified for metering in Water Plan 4 are: Giffard, Sale, Rosedale, Yarram, Bungaree and the Denison. These priority areas have 229 meters.

The priority surface water management areas identified for metering for metering in Water Plan 4 are the Mitchell and Latrobe Rivers. These priority areas have 287 meters.

2 Overview and background

2.1 Background

2.1.1 Historic metering situation

The metering requirements for non-urban water are set by the individual States. Under the national water reform agenda, a new national standard to standardize and improve metering, known as the Metrological Assurance Framework (MAF) was introduced in 2010.

The main elements of the MAF are:

- Selection of accurate meters;
  - meters can measure within +-5% insitu and they are fit for purpose for the site
- Meters are installed correctly;
  - Installation by duly qualified people to the metering standard (AS4747)
- Meters are maintained correctly;
  - On-going validation of meters installation for accuracy and appropriate maintenance by duly qualified people
- Adequate records, reporting and auditing;
  - Record keeping of installation and maintenance.
  - Annual reporting
  - Auditing of meters and processes

Customers in SRW's irrigation districts have always had metering. It is important for both operations and for billing. For SRW, the dominant irrigation meter is the relative low-cost Dethridge meter. On average this meter under-records flow by 8.6% (Hydro Environmental, 2008). Further its accuracy varies a lot between sites.

The recent irrigation modernization projects in the MID, WID and BMID have included replacement of Dethridge meters with accurate contemporary meters.

For groundwater and surface water customers, the obligation to meter most sites started after 2010 as part of national water reform agenda. Some higher risk areas had metering before 2010.

Meters provide data for water resource management assessments and for compliance of water take relative to the licence volume and conditions. The tariff structure for groundwater and rivers excludes a use component so meters are not used for billing.

The dominant meter type for SRW's take and use licences is the mechanical meter, that has a propeller or paddle wheel inside the pipe. More recent (post 2000) mechanical meters measure accurately (with +-5%) at the time of installation. However, their accuracy generally degrades with use, and it is difficult to validate the accuracy of these meters in-service. The degradation of mechanical meters results in under-recording of flows.

2.1.2 Statement of Obligations

Section 7-4 of the Statement of Obligations (DELWP, 2018) specifies the requirement for Metering Action Plans.

7-4 Corporations providing non-urban water supplies or delivery services must prepare and implement Metering Action Plans that comply with the Victorian Implementation Plan for the National Metering Standards for Non-Urban Water Meters.

2.1.3 Victorian State Metering Policy

The State Metering policy (DELWP, 2019) was set on 12 May 2014. A revised draft policy is currently near completion.

The State's metering policy has exclusions based on low licence volumes. The exclusion thresholds for metering exemption are:

- Less than 10 megalitres licence volume for surface water; or
- Less than 20 megalitres licence volume for groundwater.

The new draft policy adds an extra exclusion threshold for sites:

- that record the lowest 5% of water use in a water supply management system; and,
- where the costs are disproportionate to benefits.

There is a review of the non-urban water Metrological Assurance Framework (refer section 2.1.5). It is likely that the review outcomes will lead to some revision of the Victorian State policy in 2020 and to SRW's Meter Action Plan.

2.1.4 Metering objectives

The MDBA Compact is the most recent national level document on metering. Although this document is based on the Murray Darling it does set national expectations.

The objectives of metering as specified in the Compact are:

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; and v. The benefits of water measurement outweigh the costs.

2.1.5 MDBA Metrological Assurance Framework review

The MDBA is managing a project to review of the Metrological Assurance Framework (MAF) for non-urban metering (Commonwealth of Australia, 2009).

This review covers all States and will lead to a new MAF. This project is underway and due for completion on mid-2020.

The outcomes of the review are likely to lead to:

- Subsequent revision of State policies; and,
- Revision of Meter Action Plans (or equivalents) for Water Service Providers like SRW to fit with the State policies.

These revisions may relate to:

- New time frames;
- More detail on managing contemporary meters;
- More clarity on roles;
- More guidelines for Open Channel meters;
- More guidelines on assessing site conditions for Open Channel meters; and,
- Risk framework for setting metering priorities and thresholds – which will allow a more targeted approach to setting priorities and the timeframe to upgrade.

The purpose of the risk framework is to guide metering priorities and to ensure focus on the higher risk water resource management areas and individual sites.

Prior to the review commencing the MDBA released the - Best practice guidelines for minimum metering thresholds (MDBA, 2019). This document sets the framework for setting metering priorities.

2.2 Drivers and priorities to upgrade meter fleet

2.2.1 Overview

Designing the metering plan for non-urban water supplies has two main stages.

The first stage is selecting the sites to meter. The Victorian State policy species the minimum thresholds for metering in Victoria. SRW may set extra requirements based on business objectives such as billing or compliance.

Under the Victorian State policy, many low use and low risk sites do not need meters that are complaint with the national standard (AS4747). Low use sites may still need metering for compliance or other business reasons but to a standard set by SRW.

Figure 2-1 – Framework guiding selection of sites to meter

MAF Element	Key aspects	Requirements	Direct implications for SRW
Selection of site to meter	Framework set by State metering policy that fits with national requirements.	AS4747 meters required unless site exempt under policy. SRW to develop risk framework to guide priorities	Need to profile meter fleet based on exemption definitions. Develop risk framework (after high level design set by State) Develop plan to transition to meet meter standard

The second stage is to apply the MAF. This covers the selection, installation and maintenance of metered sites. For the sites that need metering under Victorian State policy, the assurance framework embeds the national standards.

The draft Victorian State policy is likely to come into effect later in 2020 and is the basis for this action plan.

Most of SRW's meters were in place before the first pattern approved meters became available in 2014. Further, there are still major gaps in the MAF for Open Channel meters – the most significant is that there are no pattern approved Open Channel meters.

The current date to upgrade the meter fleets to the MAF is by 30 June 2025. This date is currently under review by the Commonwealth. Figure 2-2 provides an overview of the framework, its requirements and the implications for SRW.

Figure 2-2 Overview of elements of Measurement Assurance Framework for sites that require AS4747 meter standard

MAF Element	Key aspects	Requirements	Direct implications for SRW
Selection of accurate meters	Meters can measure within +-5% insitu and they are fit for purpose for the site	Selection of pattern approved meters (NM 10 & NM11) to suit the site requirements	Targeted and staged replacement of meters with pattern approved meters. Market gap for open-channel meters
Meters are installed correctly	Installation by duly qualified people to the metering standard	The Australian standard (AS4747), manufacturers requirements and certified installers.	On-going training and certification of staff and contractors.
Meters are maintained correctly	On-going validation of meters installation for accuracy and appropriate maintenance by duly qualified people	AS4747 and meter manufacturers specify the requirements. Certified validators.	On-going training and certification of staff and contractors.
Adequate records, reporting and auditing	Record keeping of installation and maintenance.	Recording of key tasks, dates and personnel. Annual reporting	Some changes to databases and maintenance process.

MAF Element	Key aspects	Requirements	Direct implications for SRW
	Annual reporting Auditing of meters and processes	Periodic audits.	Set-up of reporting into statewide system The audit process is unspecified at this stage

Appendix A lists an extract from the draft Victorian Non-Urban Water Metering Policy, 2019 on the exemptions.

Under the Policy, the Victorian State government has issued draft Guidelines for Meter Action Plans, 2019. These define the circumstances where it is possible to vary the metering requirement. In summary, these circumstances cover where:

- Use is below a low-use threshold; and,
- The cost of metering is disproportionate to the benefits.

Appendix A lists the circumstances where the metering requirement can be varied and Section 7.2 details the selection process.

2.2.2 Categories of meters and the metering standards

The metering standards for non-urban water are specified for two main categories of meters:

- Closed Conduit meters; and,
- Open Channel meters.

*Figure **2-3 – Metering standards and the assurance framework for non-urban water metering***

Requirement	Documents
Overall measurement requirement	Measurement Assurance Framework [2009]
Measuring instruments are fit for purpose	NMI M 10 for Closed Conduit 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 Closed Conduit 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 (3rd) edition was in 2013]
Record-keeping to prove measurements are accurate	NMI retains records on meter testing for pattern approval AS4747 specifies the meter data to record

For closed conduit meters in the surface water and ground water areas the following table details the categories of variance to the policy and the numbers of meters for each category.

Figure 2-4 – Variance categories and numbers

Variance category	Number of GW meters	Number of SW meters	BEE's effected	Total sites
Sites in lowest 5% of usage and below minimum threshold – No Meter required.	1386	762	1800	2148
Sites in lowest 5% of usage and above minimum threshold – SRW choice as to metering.	308	135	245	443
TOTAL	1717	905	2045	2622

Of the identified sites listed above, SRW will make a business decision based on various criteria as to whether a Pattern Approved, Standard or no meter will be installed. As an example, in areas such as Deutgam where intensive management is required, a business decision to meter all sites with Pattern Approved meters may be made. Conversely a non-groundwater management area that historically requires minimal resource management may be possible to minimize metering as per the exemption rules.
Some sites may be uneconomical or simply impractical to meter even though policy dictates that they are (chronic iron bacteria or other water quality issue as examples). In these cases SRW will assume full utilization of the licence volume to calculate usage in the resource area. Other methods available to SRW are deemed usage by area for the industry, crop or commercial use that the site is licensed for.

2.2.3 Availability of pattern approved meters

The National Measurement Institute (NMI) maintains the register of a pattern approved meters. This includes meters seeking pattern approval. Often the NMI approve a family of meters in the one NMI document, and this covers a meter-model over a range of sizes.

The list of meters is available at the (National Measurement Institute, 2019) website. The Murray Basin Authority provides a useful summary of all the meters with pattern approval on their web site (MDB, 2020).

The market for Closed Conduit meters currently has eleven pattern approved meters.

The Open Channel pattern approved meter market is yet to exist.

2.2.4 Availability of certified meter installers and validators

Irrigation Australian provides training and certificates for Meter Installers and Validators (Irrigation Australia, 2019). Appendix B lists staff and contractors that are Certified Meter Installers and Validators.

2.2.5 Telemetry for Groundwater and Surface Water

The purpose of telemetry for groundwater and surface water is to provide remote metering reading to save costs and to provide ability to check for over-use. Meter reads are may be useful to check compliance with licence conditions and trades (caps), management of restrictions (such as rostering) and for longer term water resource management assessments. They are not used for billing.

The groundwater and surface water telemetry solution currently adopted involves:

- A Taggle module that reads pulses and sends the pulse data via a radio signal to a base station;
- A local base station that transmits bulk data to a host;
- Conversion of the pulse data to a volume; and
- Transfer of the data from the Taggle host site to the SRW portal.

The scope target for the Taggle project is to have 90% (4464) Groundwater and River meters connected to telemetry. The project roll-out has three main stages:

- Stage 1 connect 1,710 sites - COMPLETE
- Stage 2 connect 1,900 sites – 95% complete.
- Stage 3 connect remaining meter sites. The Stage 3 business case is currently being evaluated and once approved will take approximately 2 years to complete.

2.2.6 Telemetry for Irrigation Districts

The purpose of telemetry for irrigation is to:

- Interface with the ordering and water planning system;
- Remotely control automated outlets by sending orders;
- Remotely interface with automated control regulators in the channel system;
- Improve delivery performance by providing real-time feedback on flowrates, water levels;
- Improve delivery reliability by providing logging of automated gates elements such as battery, solar charge, gate position etc;
- Provide timely meter reads as inputs for seasonal water allocations and for billing; and,
- Provide remote metering reading and to provide ability to check for over-use.

The irrigation water telemetry solution currently adopted involves:

- For the MID, Rubicon's SCADA Connect system. This system is an integral part of Rubicon's Total Channel Control system. This connects to the automated outlets and interfaces with the water ordering and management system.
- For the WID and BMID, these areas are just starting to install a new SCADA system.

3 Business Context and Levels of Service

3.1 Water resource management areas

3.1.1 Groundwater management units

There are 34 groundwater management units (areas) plus a group called Unincorporated, which covers all bores located outside specific groundwater management areas. **Error! Reference source not found.** lists the meter and use summary for sites with meters – noting there are sites without meters, as their use was below the Victorian State thresholds at the time of metering. The table adopts the following use categories:

- >60% of licence volume = High Use
- 40% to 60% = Moderate Use
- 20% to 40% = Low Use

- < 20% = Very low use

Many sites do not have meters due to being exempt based on low licenses volumes under the Victorian State policy (Refer 2.1.3).

Figure 3-1 Groundwater Management Areas

Water System Source	Ent Vol	Ent Vol metered	Un - metered Vol	Ent Metered %	Avg metered use	No of meters	Metered use as % of licence vol	Use category
Giffard	5,689	5,577	111	98%	4,630	16	81%	High use
Sale	21,203	18,721	2,482	88%	15,995	105	75%	High use
Rosedale	13,018	12,197	821	94%	8,415	49	65%	High use
Yarram	25,688	24,400	1,287	95%	15,287	82	60%	Moderate use
Bungaree	5,293	5,045	248	95%	2,965	142	56%	Moderate use
Denison	18,499	10,664	7,835	58%	9,080	86	49%	Moderate use
Nepean	6,110	5,182	927	85%	2,913	75	48%	Moderate use
Glenormiston	2,636	2,439	198	93%	1,256	20	48%	Moderate use
Orbost	1,217	1,217	-	100%	541	5	44%	Moderate use
Moorabbin	2,624	2,327	297	89%	1,108	53	42%	Moderate use
SW Limestone	81,194	69,280	11,914	85%	34,089	564	42%	Moderate use
Condah	7,470	6,977	493	93%	2,902	39	39%	Low use
Portland	7,794	7,677	117	98%	2,531	7	32%	Low use
Glenelg	16,092	15,432	660	96%	5,214	53	32%	Low use
Colongulac	4,404	3,283	1,120	75%	1,393	30	32%	Low use
Koo Wee Rup	12,575	8,356	4,219	66%	3,603	182	29%	Low use
Wa De Lock	29,124	16,673	12,452	57%	8,330	149	29%	Low use
Tarwin	58	35	23	60%	16	1	27%	Low use
Warrion	14,075	8,774	5,301	62%	3,625	109	26%	Low use
Lancefield	1,378	1,264	114	92%	305	16	22%	Low use
Wandin Yallock	3,025	2,461	565	81%	651	179	22%	Low use
Moe	3,885	1,933	1,953	50%	813	28	21%	Low use
Wy Yung	7,462	6,972	490	93%	1,421	70	19%	Very low use
Unincorporated	71,485	42,668	28,816	60%	13,352	564	19%	Very low use
Cardigan	3,889	3,595	295	92%	683	12	18%	Very low use
Deutgam	5,082	4,201	881	83%	859	152	17%	Very low use
Paaratte	3,212	3,159	53	98%	301	1	9%	Very low use
Leongatha	1,803	1,418	385	79%	159	12	9%	Very low use
Corinella	662	598	64	90%	47	7	7%	Very low use
Frankston	2,212	979	1,233	44%	156	13	7%	Very low use
Stratford	877	392	485	45%	28	5	3%	Very low use
Jan Juc	4,250	250	4,000	6%	104	1	2%	Very low use
Newlingrook	1,958	1,932	26	99%	41	4	2%	Very low use
Cut Paw Paw	511	511	-	100%	9	3	2%	Very low use
Portland Coast	1,078	94	984	9%	-	3	0%	Very low use
Tarwin	58	-	58	0%	-	1	0%	Very low use
Total	387,588	296,681	90,907	77%	142,821	2,838	37%	

3.1.2 Surface water management areas

There are fifteen unregulated surface water management plus three regulated water systems (Werribee Macalister/Thomson and Latrobe. Figure 3-2 Summary of surface water management systems, lists the meter and use summary for sites with meters – noting there are sites without meters due to their use being below the Victorian State thresholds at the time of metering.

Figure 3-2 Summary of surface water management systems

Water System Source	Ent Vol	Ent Volume metered	Unmetered ent	Ent Metered %	Avg meter use	No of meters	Metered use as % of licence vol	Use category
Mitchell	6,385	11,497	4,888	70%	11,908	192	73%	High use
Moorabool	3,611	1,992	1,619	55%	1,143	66	32%	Low use
Latrobe	57,226	19,916	37,310	35%	16,513	441	29%	Low use
Snowy	3,985	2,974	1,011	75%	999	45	25%	Low use
Bunyip	20,564	11,257	9,307	55%	5,064	256	25%	Low use
Thom/Mac	17,237	6,334	10,903	37%	3,927	80	23%	Low use
Hopkins	11,490	6,502	4,989	57%	2,452	68	21%	Low use
Barwon	5,551	2,429	3,122	44%	919	62	17%	Very low use
Sth Gippsland	15,391	5,587	9,804	36%	2,536	158	16%	Very low use
Tambo	4,150	2,358	1,792	57%	606	37	15%	Very low use
Otway Coast	6,792	2,863	3,929	42%	830	51	12%	Very low use
East Gippsland	657	424	233	65%	57	5	9%	Very low use
Glenelg	1,002	652	350	65%	70	11	7%	Very low use
Maribyrnong	1,898	904	995	48%	112	23	6%	Very low use
Lake Corangamite	1,077	253	824	23%	44	7	4%	Very low use
Werribee	884	74	810	8%	8	2	1%	Very low use
Totals	167,900	76,014	91,885	45%	47,186	1,504		

3.1.3 Irrigation management areas

There are three irrigation areas. The Macalister Irrigation Area includes the Macalister Irrigation District plus the regulated diverters on the Macalister and Thomson Rivers. The Werribee Irrigation area includes the Werribee Irrigation District and regulated river diverters on the Werribee River. The Bacchus Marsh District is in the same Bulk Entitlement as the Werribee Irrigation Area. The Werribee Irrigation District differs from the others in that it supplies recycled water as well as river water.

Figure 3-3 Irrigation water shares

Water System	HRWS	LRWS
Macalister	144,074	68,878
Mid-Thomson	11,746	5,727
MID and Mid-Thomson	**155,820**	**74,605**
WID	13,825	4,450
BMID	6,289	2,013
WID and BMID	**20,114**	**6,463**

3.2 Strategic plans affecting metering

3.2.1 Irrigation modernisation plans

[This will be covered in a future update of the plan]

3.2.2 Irrigation reconfiguration plans

No parts of the irrigation systems have reconfiguration plans under Part 7A of the Water Act.

3.3 Risk framework for setting metering priorities

[This will be covered in a future update of the plan]

3.4 Management priorities for metering and telemetry

[This will be covered in a future update of the plan]

3.5 Levels of Service and reporting for customers, government and regulators

There is no specific level of service for customers to access metering readings.

The Victorian State Policy requires reporting on meters and water use.

4 Meter profile

4.1 Current groundwater meter profile

The following analysis uses SRW meter data combined with water use data extracted from the Victorian Water Register for the 2017/18 and 2018/19 seasons. The data only covers metered sites (Refer Figure 3-1).

Figure 4-1 shows the use profile for metered groundwater sites. The columns in orange highlights the large number of metered sites without any use and with use less than the 20 ML Victorian State Policy licence threshold that exempts metering.

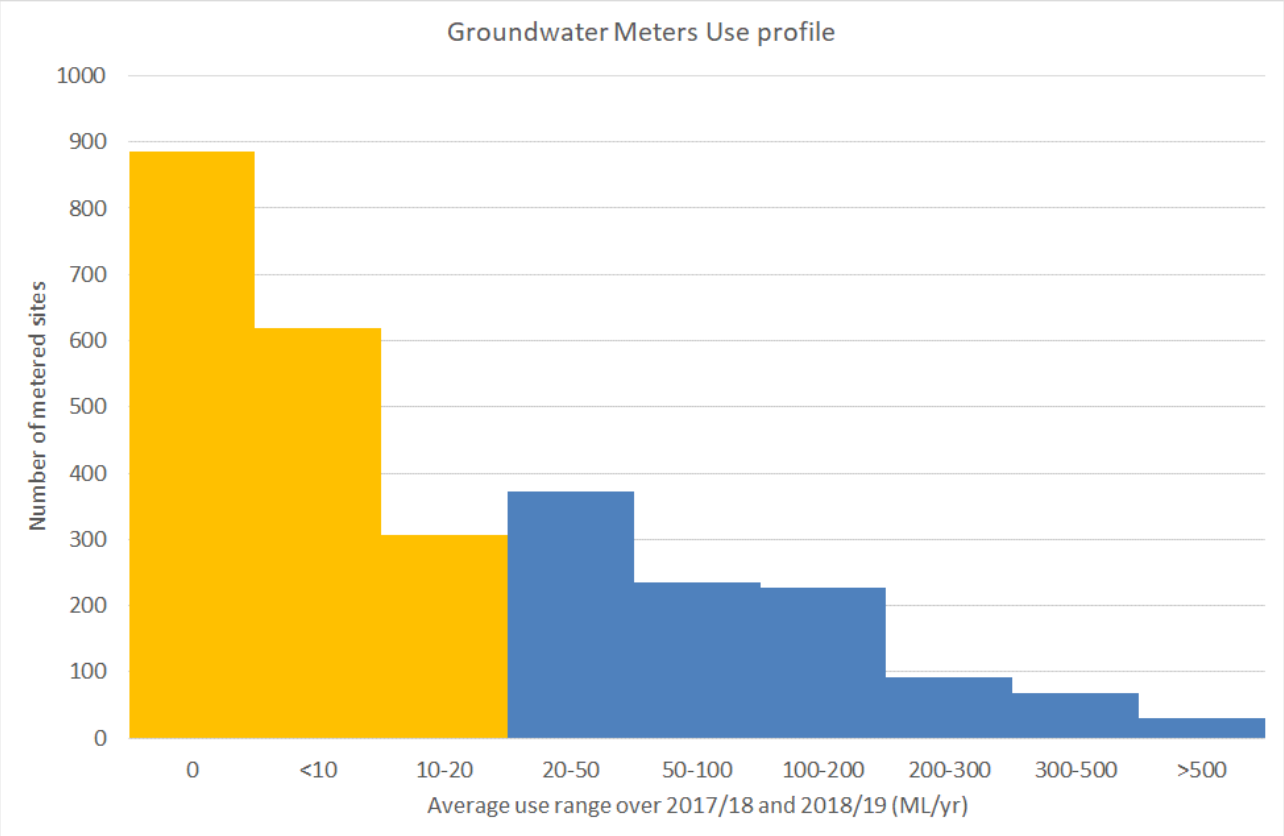


Figure 4-1 Metered groundwater sites average use profile for 2017/18 and 2018/19

Error! Reference source not found. Figure 4-2 Groundwater Meter v Use profiles shows three normalized profiles of the percent of meters versus the percent of water use in selected groundwater management areas. These patterns are representative of the other areas.

These graphs show for typical groundwater management areas:

- 20% of meters measure more than 55% of the water use;
- 35% to 60% meters measure more than 95% of the water use; and
- 20% of meters have no use.

Figure 4-3- Groundwater meter size profile shows the meter size profile including the number of meters and the cumulative volume recorded by the groundwater meter fleet.
The graph shows:

- The most common meter sizes are 80 mm, 100 mm and 150 mm
- The meter sizes that measure the most volume are 150 mm, 200 mm and 100 mm

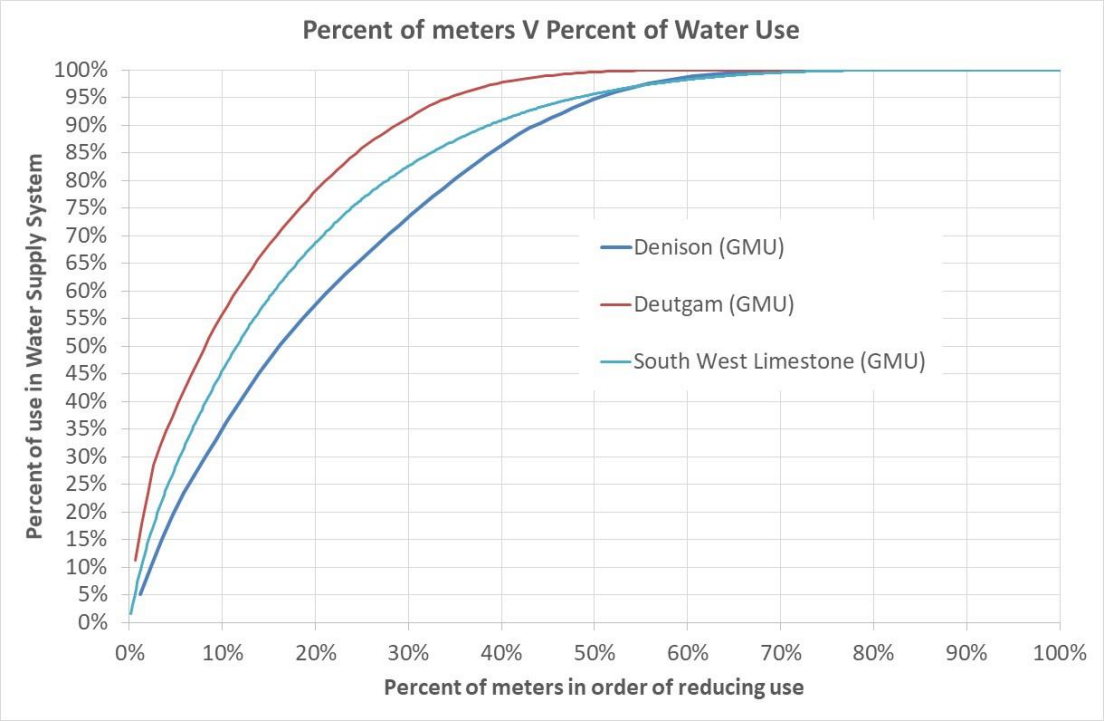


Figure 4-2 Groundwater Meter v Use profiles

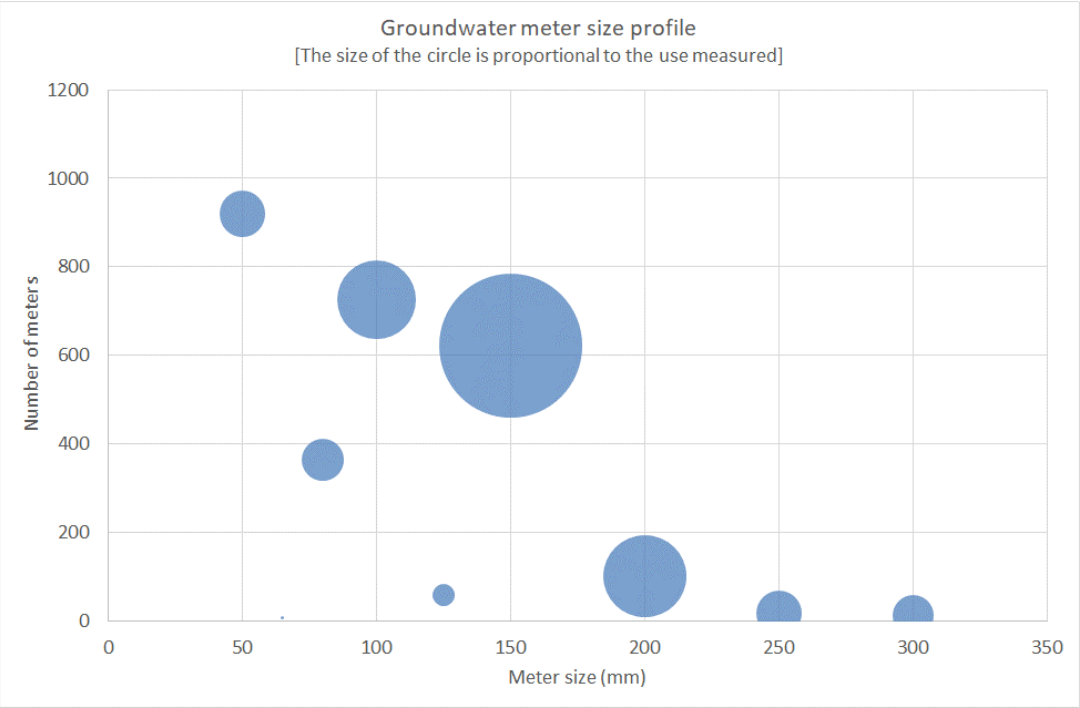


Figure 4-3- Groundwater meter size profile

4.2 Current surface water meter profile

The following analysis uses meter date provided combined with water use data extracted from the Victorian Water Register for the 2017/18 and 2018/19 seasons.

Figure 4-4 shows the use profile for metered groundwater sites. The columns in orange highlights the large number of sites without any use and with use less than 10 ML Victorian State Policy threshold that exempts metering.

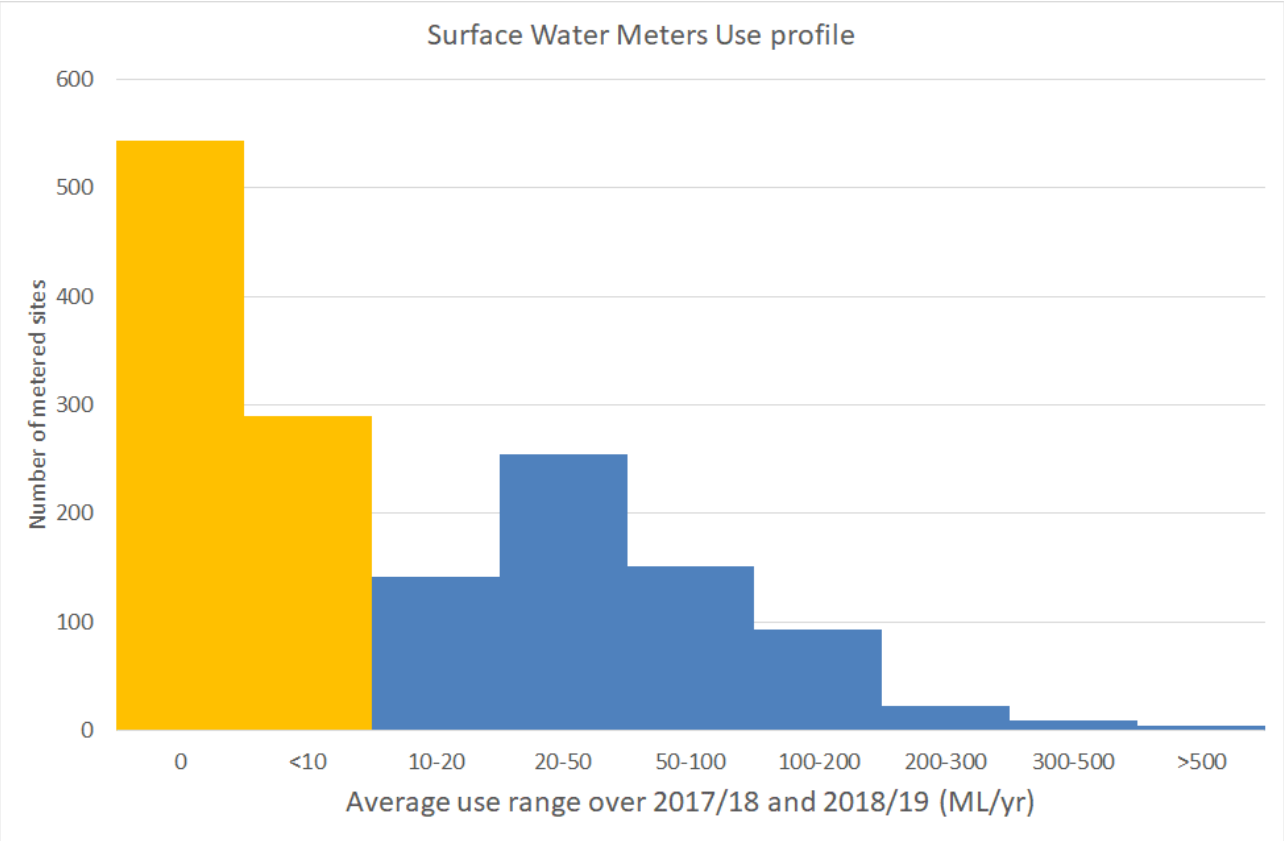


Figure 4-4 - Surface Water Metered Sites average use profile over 2017/18 and 2018/19

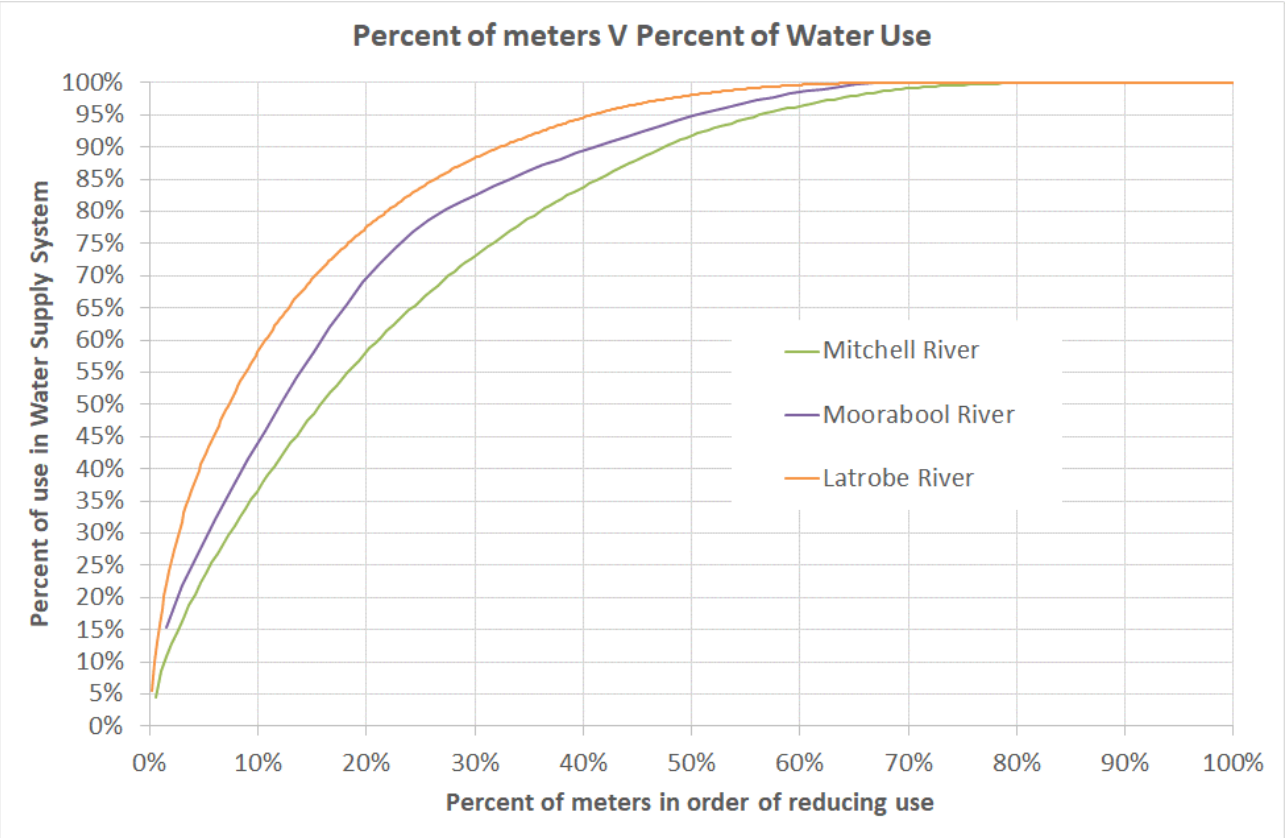


Figure 4-5 Surface Water Meters v Use Profiles

Figure 4-5 shows three normalized profiles of the percent of meters versus the percent of water use in the surface water management areas. These patterns are representative of the other areas.

These graphs show for typical surface water management areas:

- 20% of meters measure more than 55% of the water use;
- 40% to 60% meters measure more than 95% of the water use; and
- 20% of meters have no use.

Figure 4-6 shows the meter size profile including the number of meters and the cumulative volume recorded by the surface water meter fleet.

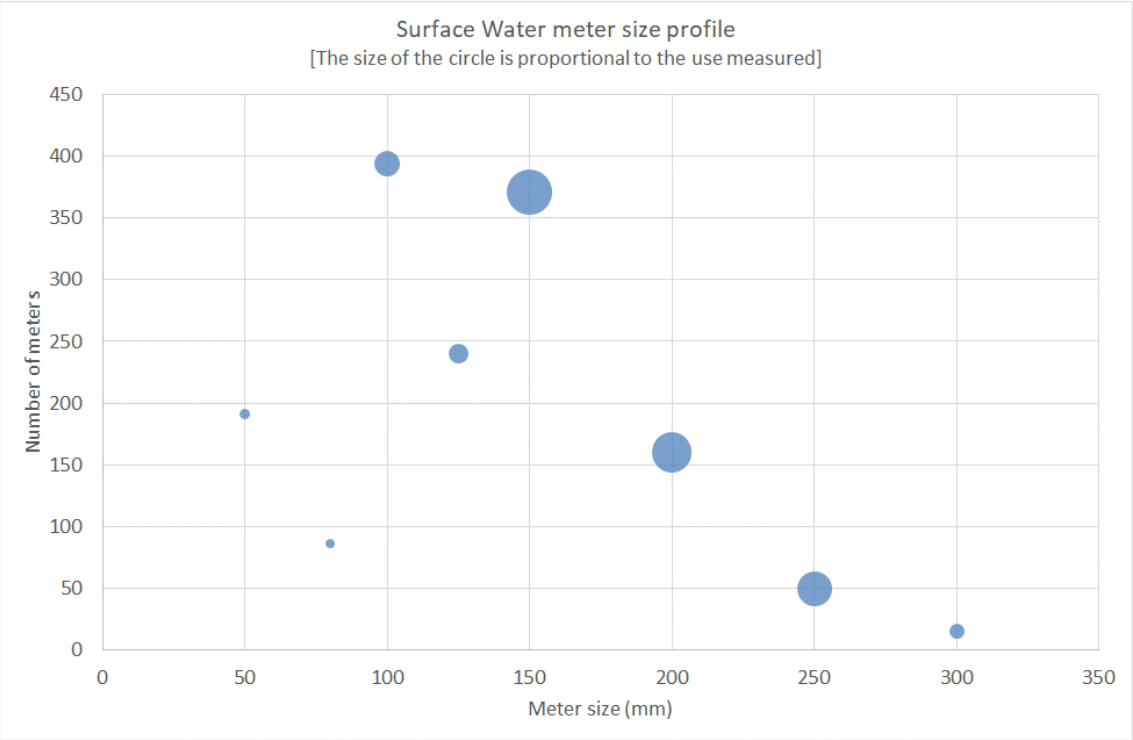


Figure 4-6 Surface Water Meter size profile

The graph shows:

- The most common meter sizes are 100 mm, 150 mm and 125 mm; and,
- The meter sizes that measure the most volume are 150 mm, 200 mm and 250 mm.

4.3 Current irrigation system meter profile

4.3.1 Source of irrigation meter data

The irrigation meter data derives from the water ordering system. In this system the WID and BMID records are combined. Due to this data structure the analysis matches this grouping. Further the WID and BMID data has significantly less detail on meter brands and types and this limits the analysis.

4.3.2 MID Meter Profile

Figure 4-7 Figure 4-5 Surface Water Meters v Use Profilesshows the normalized profile of the percent of meters versus the percent of water use for the MID. This graph shows for the MID:

- 20% of meters measure more than 65% of the water use;
- 50% meters measure more than 95% of the water use; and
- 30% of meters have no use.

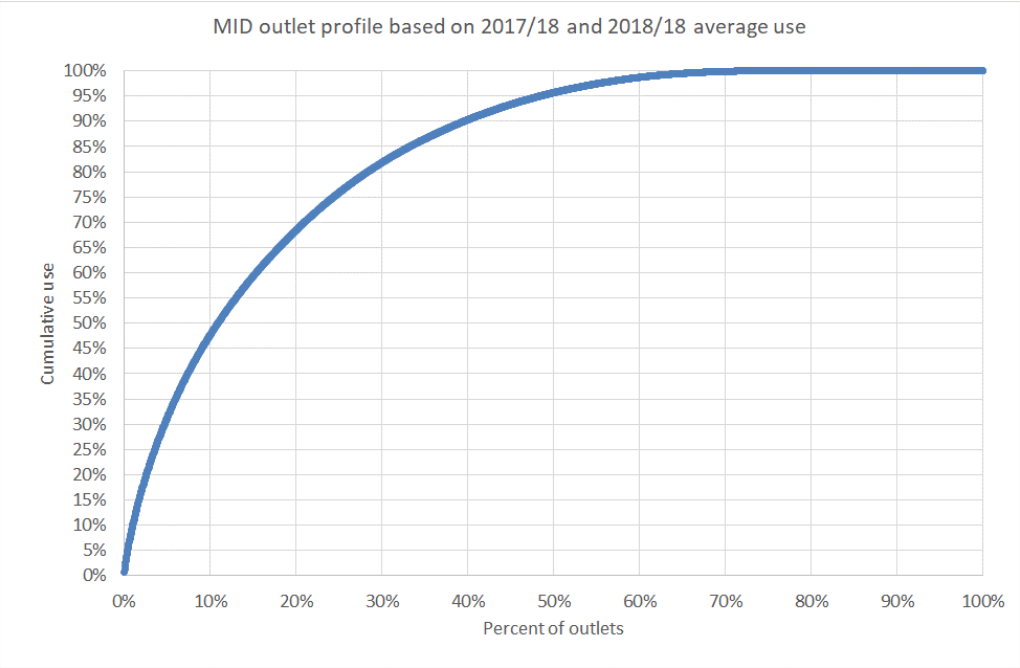


Figure 4-7 MID Meter use profile

Figure 4-8 shows the volume recorded by the different meter types in the MID. Contemporary meters (Rubicon meters and Magflows) measure 30% of the volume. The Dethridge outlets still measure most deliveries. Replacement of these meters would reduce system losses (due to under-recording) by about 8,000 ML.

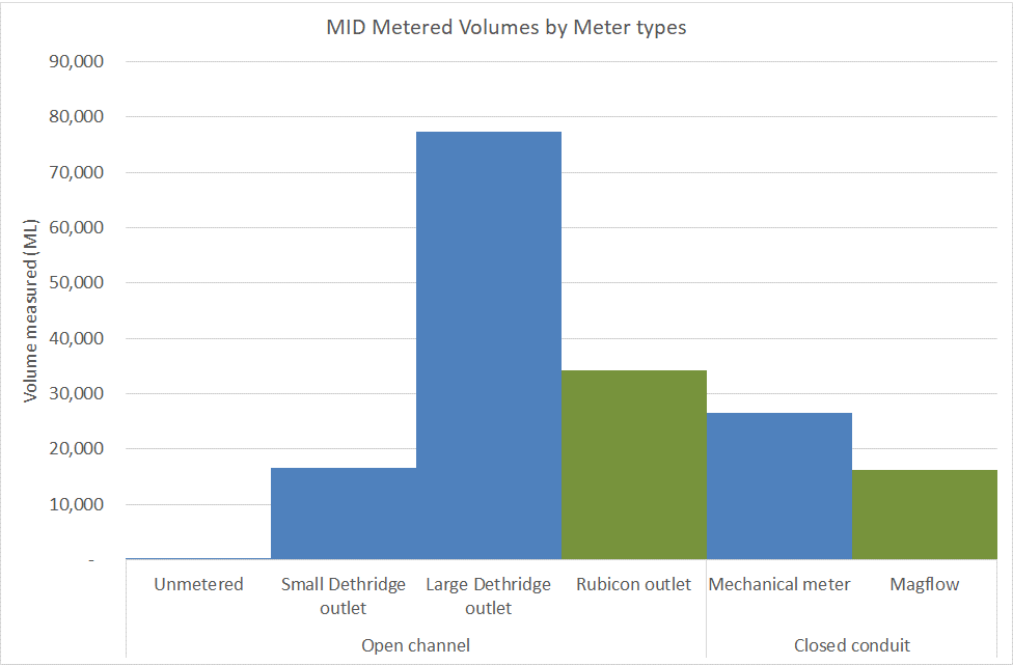


Figure 4-8 - MID meter profile by type

Figure 4-9 shows the normalized profiles of the percent of meters versus the percent of water use for the Macalister River, Rainbow Creek, Thomson River and Cowwarr Channel diverters. This graph shows:

- 20% of meters measure more than 65% of the water use;

- 50% meters measure more than 95% of the water use;
- 40% of meters have no use.

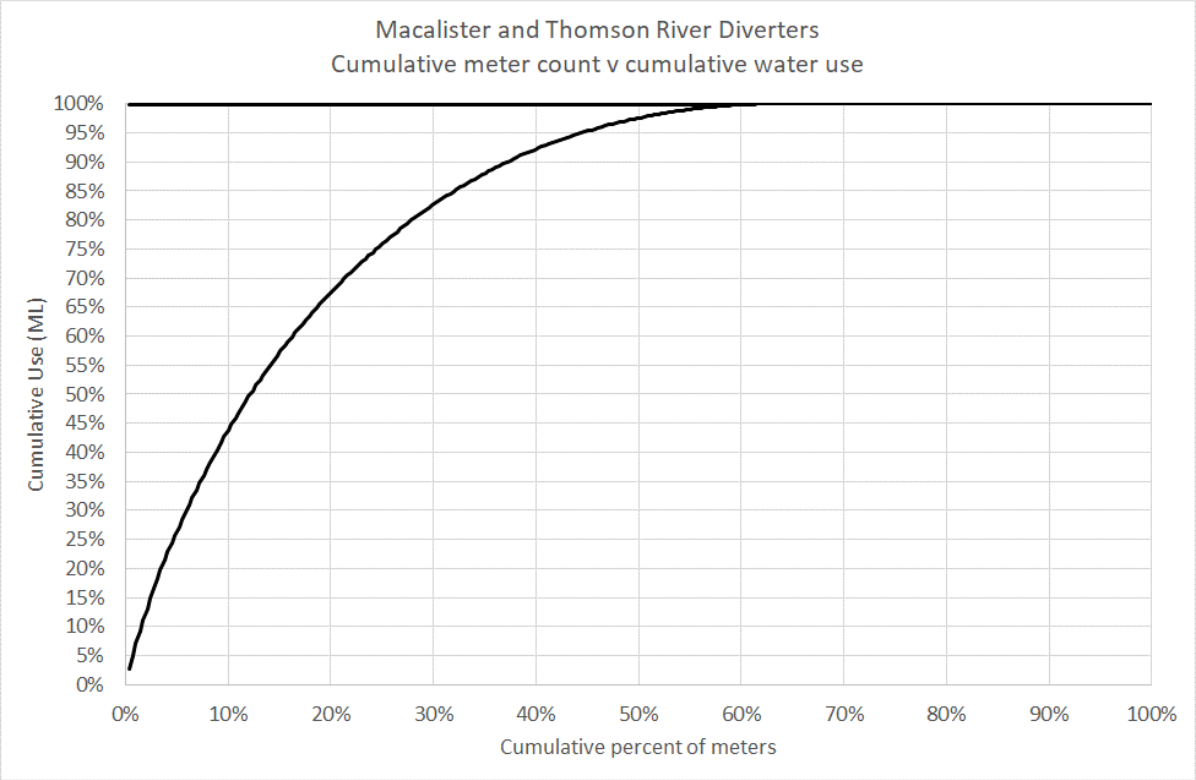


Figure 4-9 - Macalister and Thomson River Meter Profile

Mechanical meters record 95% of the meter use with the balance by Magflow meters. Most of these mechanical meters are the more modern Elster brand. These meters are not pattern approved but have reasonable accuracy when they are new.

4.3.3 WID and BMID Meter Profile

There is insufficient data to analyse the WID and BMID use.

Both the BMID and WID are well through the process of modernization. The modernisation includes replacing Dethridge outlets with contemporary meters.

4.4 Types of meters

4.4.1 Groundwater water and surface water meters

There is a significant range of meter brands and types in the meter fleet. Meters can be profiled as:

- External or internal, with external meters having no moving parts inside the pipe
- Technology used to measure flow such as Magflow, ultrasonic, propeller, turbine

The majority (82%) of the current measurement is by internal meters. With the introduction of the new metering standard AS4747 most manufacturers of internal meters have chosen not to seek pattern approval. This is because the on-going validation to the +-5% accuracy band is difficult to achieve with mechanical meters. With untreated water, meter elements for internal meters are subject to wear (e.g. propellers) and blockage and this can degrade the accuracy. The internal meter may be suitable where the water is clean and free of debris – which is the situation in some groundwater areas.

4.5 Age of meters

The average age of the current meter fleet is 10 years. Noting the nominal life for internal meters is 15 years.

5 Improvements to meter fleet

5.1 Upgrade of meters

5.1.1 General selection requirements

Under the AS47447 standard a complaint meter site requires:

- Selection of a pattern approved meter that is fit for purpose;
- Installation of the meter by a duly qualified person;
- Retaining a certificate of the installation;
- On-going maintenance of the meter in accordance with the manufacturer's guidelines and AS4747 requirements; and,
- Periodic validation to check that the meter is still fit for purpose by a duly qualified person.

Figure 5-1 provides a schematic of the meter site selection process based on the Victorian State policy. The minimal thresholds referred to in the policy are 20 ML licence volume for surface water and 10 ML licence volume for groundwater.

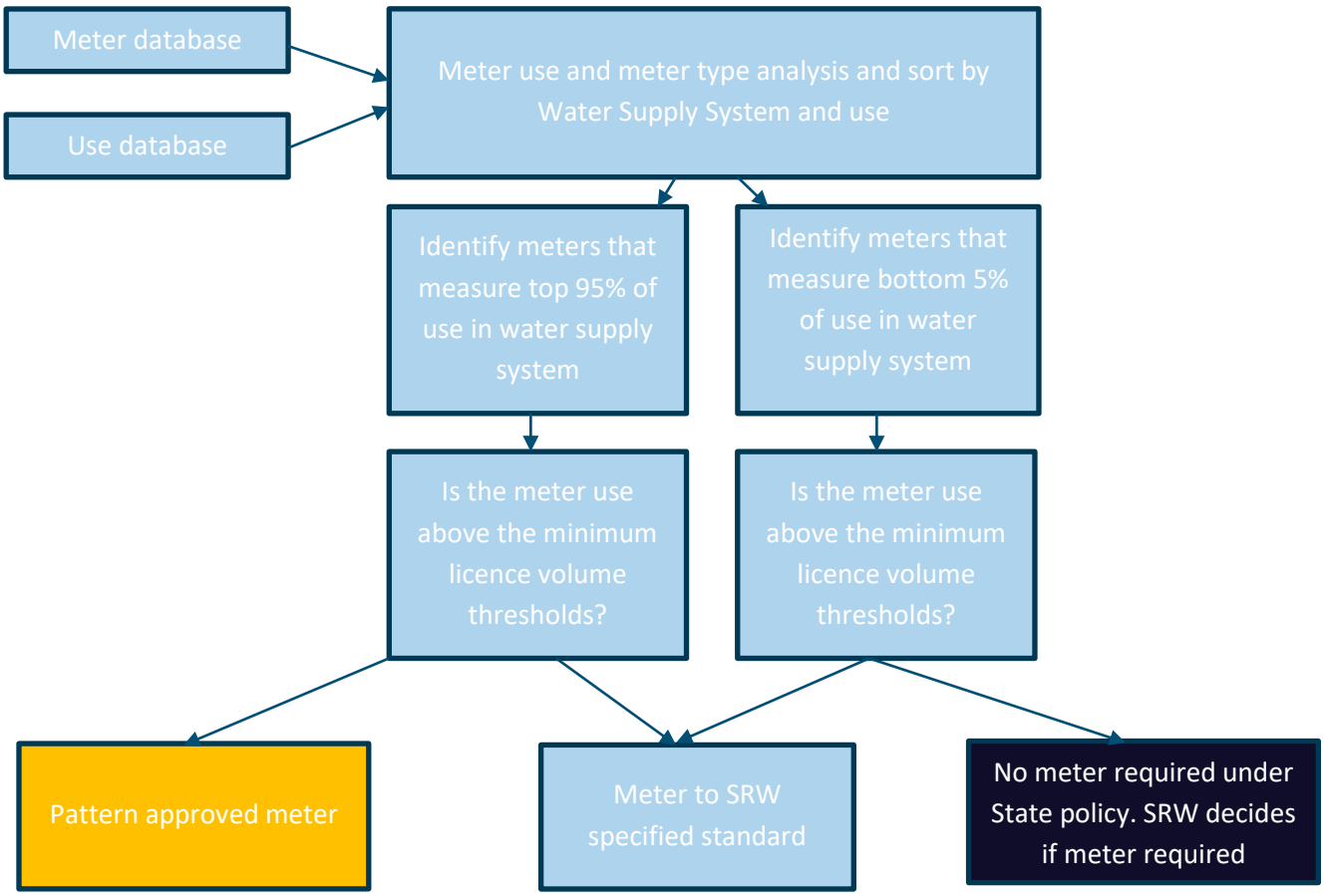


Figure 5-1 - Process to identify sites requiring pattern approved meters under Victorian State Policy

The sites identified as exempt under the Victorian State policy may keep their existing meters. These sites may continue to have meters based on business objectives. The business objectives that may result in a site having a meter may include:

- Required for operational reasons (for example roster management);
- The Local Management Plan identifies a metering need;
- Required for compliance reasons (to manage bans, restrictions or history of over-use); and,
- Trading equity.

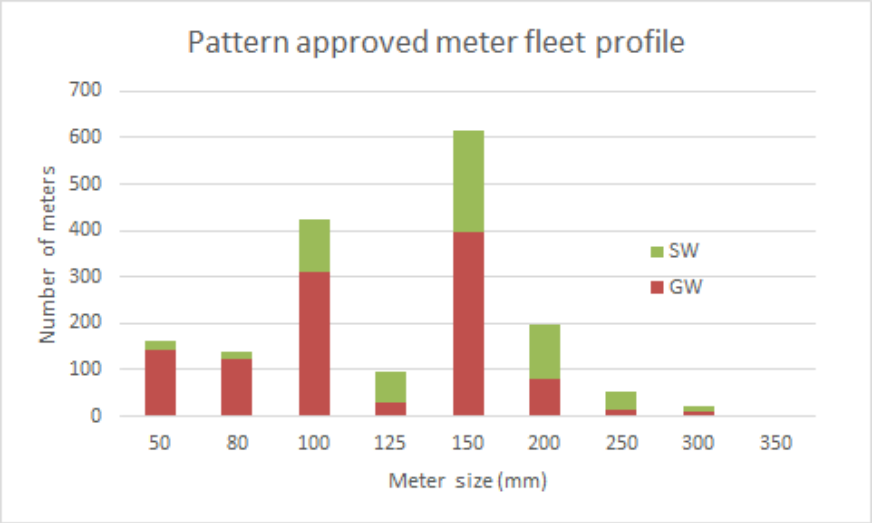
Without considering any SRW business objectives, the analysis identified 1,641 meters to upgrade to pattern approved meters. The analysis also shows the potential not to replace 49% of meters due to their low use. This decision would need to consider business objectives and use patterns over longer time periods.

Figure 5-2- Future groundwater and surface water meter requirements

Future meter requirement	Number of GW meters	Number of SW meters	Total
Pattern approved (already installed)	64	16	80
Pattern approved meter	1,054	587	1,641
Standard meter (already installed)	331	143	474
No meter (with meter already installed)	1,386	762	2,148
TOTAL	2,835	1,508	4,343

Error! Reference source not found. Figure 5-3 Profile of pattern approved meters for Groundwater and Surface Water shows the profile for the future pattern approved, which includes the 80 meters that already have pattern approval.

Figure 5-3 Profile of pattern approved meters for Groundwater and Surface Water



Section 7.8 looks at a range of possible investment programs to upgrade the metering.

5.1.2 Matching meter with site requirements

For Closed Conduit meter sites, important information includes:

Figure 5-4 Fit for use considerations for Closed Conduit meters

Factor	Considerations
Flow range	The typical flow range is important to check that the meter is fit for purpose.
Licence volume	Indicates potential for use
Expected annual use range	Indicates important for compliance (with license volume) and impact on others. Indication of how important meter durability maybe for the site
Site configuration	What is the site configuration with details on connection pipe details upstream and downstream (diameters, materials, structural condition, internal condition)? Location of control valves, bends, air-valves. Are there unusual flow conditions upstream and downstream of the meter that might result in the meter being unfit for purpose, for example, excessive swirl? Is air entrapment possible? Are vibrations from pumps that may affect the meter performance and its life likely? Is there a location for a strap-on verification meter?
Power supply for meter	Proposed source details: mains, battery, solar (noting solar will require checking on shading and orientation) What is the impact of loss of power supply? Can the pump operate if meter loses power?
Site access constraints and safety	General safety check and identification of gaps to improve
Water quality	Water salinity range, temperature and floating debris that affects the meter
Tampering history	Is there a history of tampering at this site and is there a need for additional precautions or controls?

5.1.3 Open Channel meter selection process

For Open Channel meter sites, important information includes:

- Water level range upstream and downstream of the meter;
- Flow patterns in the supplying channel, particularly the cross flow relative to the meter inlet flow direction;
- Proposed power supply source details: mains, battery, solar (noting solar will require checking on shading and orientation);
- Flow range;
- Water quality - including silt load, algae; and,
- Site access constraints and safety.

Individual site situations can make accurate metering difficult to implement. Factors that may impact on metering performance include:

- Unusual flow conditions upstream and downstream of the meter that might result in the meter being unfit for purpose;
- Weed growth upstream or downstream of the meters after the meter is installed;
- Water quality, including cumulative silt build-up, and floating debris that may affect the meter;
- Loss of power supply; and,
- Tampering.

5.1.4 Open Channel meter availability

As at January 2020, there are no open flowing meters that have pattern approval.

5.2 Improvements to meter management processes and systems

Figure 5-5 provides a summary of the improvements to SRW's management processes and systems to match the requirements of the Victorian State metering Policy.

Figure 5-5 Summary of improvements to meter management

Selection	Guidelines	Gaps	Indicative costs and benefits of closing gap
Selection of sites to meter	State policy – noting this is under review with another revision likely in 2020	1,641 metered sites to upgrade to pattern approved meters	$6.2 mill The benefits are very dependent on local water supply system risks
MAF Element	**Direct implications for SRW**	**Gaps**	**Indicative costs and benefits of closing gap**
Selection of accurate meters	Targeted and staged replacement of meters with pattern approved meters. Market gap for open-channel meters	Open Channel meters – there are no pattern approved meters. Formal selection process for sites. Rolling program with matching funding model.	Cost estimate requires risk assessment to refine scope and timing. Accurate meters will be beneficial in areas with high risks and where there are operational needs. Conversely there is little benefit in low risk areas.
Meters are installed correctly	On-going training and certification of staff and contractors.	Minor for Closed Conduit meters. Validation processes required for Open Channel meters.	On-going training and induction of new staff
Meters are maintained correctly	On-going training and certification of staff and contractors.	Formatisation of the validation process to closely match the AS4747 method	Record of maintenance tasks required
Adequate records, reporting and auditing	Some changes to databases and maintenance process.	Production and storing of installation certificates Production and storing of validation certificates.	This will streamline the on-going reporting and provide input for risk assessments and for asset management planning

	Set-up of reporting into statewide system The audit process is unspecified at this stage	Clean up of data such as field names, matching water register water supply systems.	

6 Current data management, analysis and reporting

6.1 Frequency of reporting data to the Victorian Water Register

Telemetered usage data reporting is currently managed manually and is quite time consuming. SRW will refine and further develop processes to achieve at least a weekly reporting regime of telemetered data in the 2020/2021 financial year. Manually obtained usage data is collected twice per year (January/February and end of season). This data is uploaded to the Water Register as soon as possible after processing is completed.

6.2 Meter type code reporting

Southern Rural Water will develop the current meter fleet database to include the ability to report all usage by meter type code in the 2020/2021 financial year. This will be in conjunction with DELWP's project to standardize all non-urban meter fleet recording and reporting.

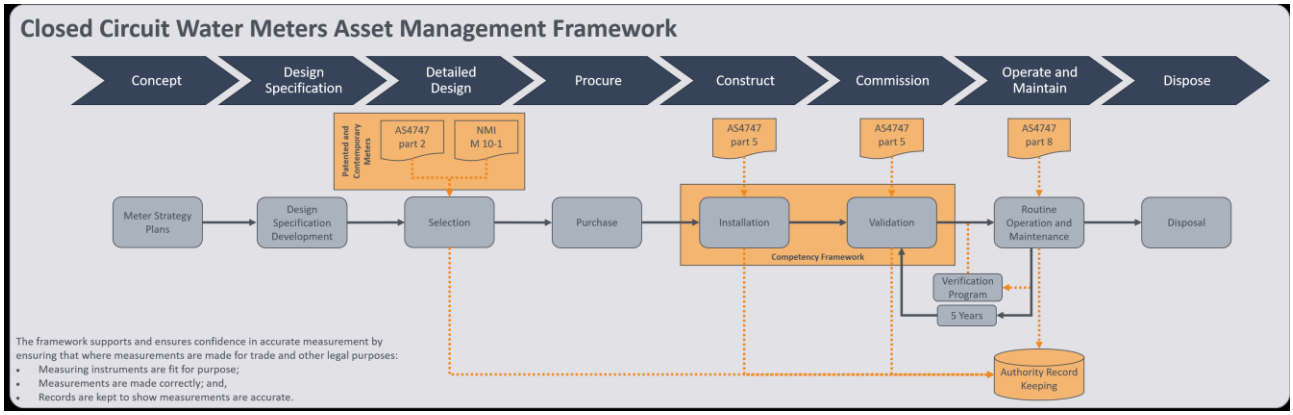
6.3 Meter fleet analysis trends

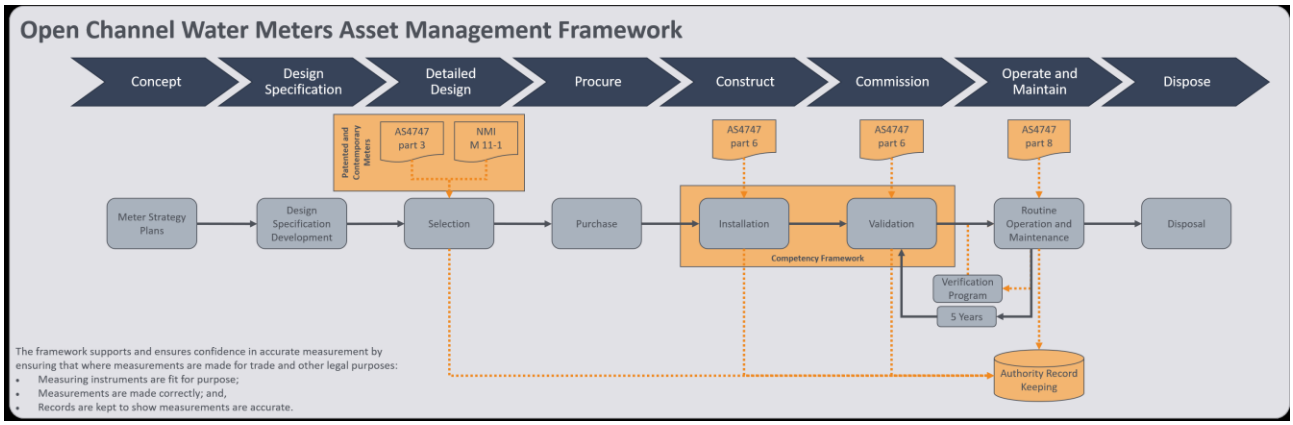
For future analysis.

7 Meter Lifecycle Management

7.1 Overview of meter lifecycle management

The following life-cycle diagrams show the main steps from developing Meter Action Plans through to disposal. The diagram shows the links with national standards.





7.2 Meter installation

AS4747 – Part 5 covers the installation requirements for full flowing meters and AS4747 – Part 6 covers the installation requirements for Open Channel meters.

For interim standard Open Channel meters, SRW will need to develop equivalent installation processes with supporting documents and record keeping and reference which system stores the work method instructions for the meters.

7.3 Meter maintenance

Section 2.7 of AS4747 – Part 8 covers the maintenance requirements for both meter categories.

Appendix C of AS4747, Part 8 is an informative section covering competencies and activities.

The standard adopts a categorization framework for maintenance activities as corrective, preventative or predictive.

7.4 Meter validation

Section 2.4 of AS4747 – Part 8 covers the validation requirements for both meter categories.

7.5 Meter verification

Section 2.5 and 2.6 of AS4747 – Part 8 covers the in-situ volumetric measurement and verification requirements for both meter categories.

Meter verification is a discretionary section of the standard. With current methods, these tests are not relatively expensive ($5,000+/site).

7.6 Telemetry

Telemetry may be added when the meter is first installed or be retrospectively added to installed meters.

7.7 Disposal and decommissioning plan

The disposal plan is to cover the disposal of the meter and the archival of meter use records with the meter manufacture-model used for the measurement.

7.8 Forward look capital program

7.8.1 Closed Conduit meter supply and install costs

The costs of programs will vary with project scale and factors such as the Australia dollar exchange rate, as most meters are manufactured overseas. The average unit rates used in this report will require review at the time of annual budget approvals.

Most of SRW's metering sites have had modifications to provide fit for purpose pipe configurations. The install budget estimates used for the program plan omits any allowance for site modifications.

The majority of pattern approved Closed Conduit meters are magnetic flow meters. One turbine meter has pattern approval and it has a lower supply cost for diameters 200 mm and less. The turbine meter is more susceptible to flow disturbances and to difficult water quality conditions – such as turbidity. Some sites will be unsuited to the use of turbine meter. The cost model makes some assumptions on the relative split between mechanical turbine flow meters and magnetic flow meters for meters 200 mm and less – as detailed in Appendix C. For meters 250 mm and greater the assumption is that all meters will be magnetic flow meters.

The average weighted unit cost for meter fleet replacements is $3,850 for groundwater and $4,210 for surface water.

Error! Reference source not found. lists the unit costs used to develop meter programs.

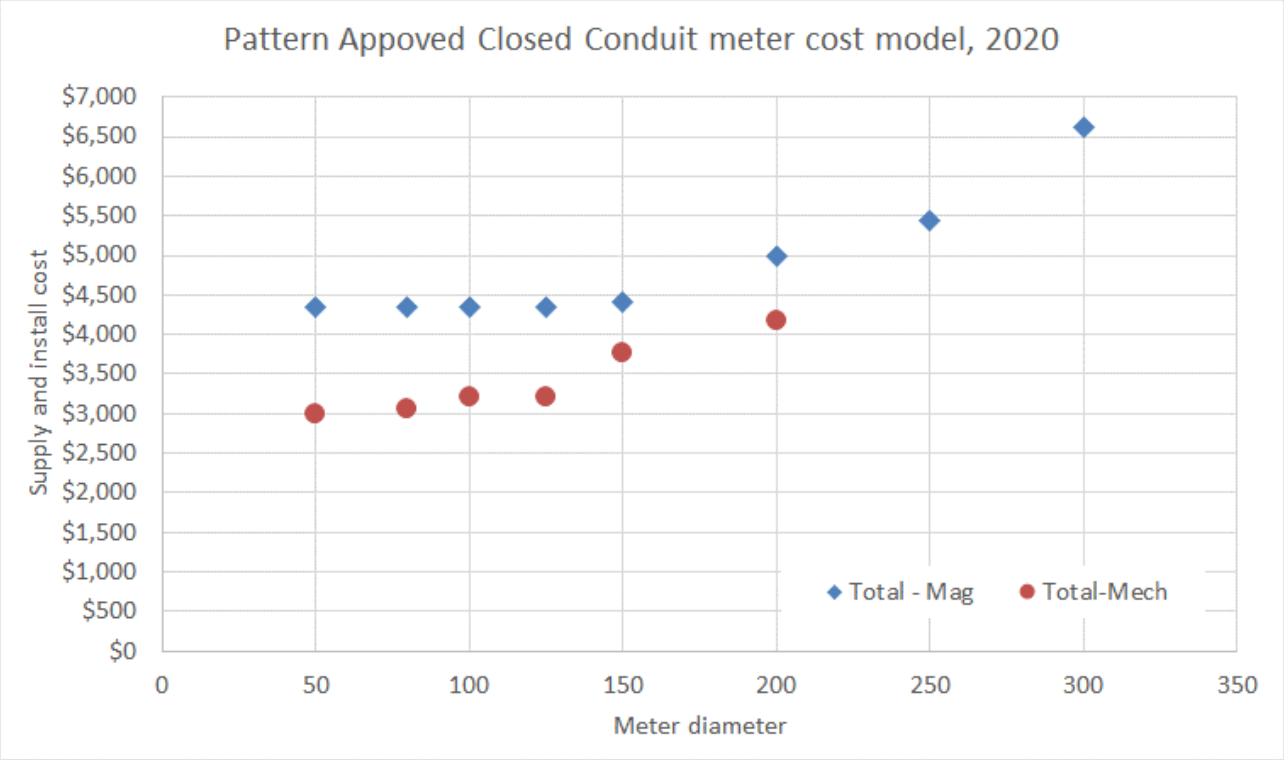


Figure 7-1Unit supply and install costs for Closed Conduit meters

7.8.2 Capital Setting Priorities

The MDBA publication Best practice guidelines for minimum metering thresholds (MDBA, 2019) sets the national framework for setting metering priorities. The future revision of the Victorian State metering policy will adopt this framework to specify Victorian State priorities.

Following is an extract from the guidelines on setting priorities.

- *In setting metering thresholds, Basin governments should take a risk-based approach that maximises the measurement of water taken, particularly for high-risk users, and avoids imposing undue costs, particularly for low-risk users.*
- *Risks that are relevant to setting the metering thresholds include risks to meeting the environmental, social, economic or cultural requirements for the water, in the local area and across the Basin.*

For the SRW program the proportion of use in a water supply management area is the selected proxy to set priorities. This prioritizes areas where the use is highest relative to the sum of the licence volumes. The use data covered the five seasons 2014/15 to 2018/19.

Figure 3-1 and Figure 3-2 list the groundwater and surface water management areas respectively sorted by use relative to the cap.

7.8.3 Water Plan 4 Metering Budget

Error! Reference source not found. following shows the current budget provisions for metering in Water Plan 4 for Groundwater and Rivers.

Figure 7-2 Groundwater and Rivers Meter Water Plan budget

Water management type	WP4 Budget	Expenditure, p7, 2019/20	Allowance for unplanned replacements	Budget for meter upgrades
Groundwater	$ 986,000	$ 92,000	$ 46,200	$ 847,800
Surface water	$ 1,108,000	$ 44,000	$ 46,200	$ 1,017,800
Total	$ 2,094,000	$ 136,000	$ 92,400	$ 1,865,600

7.8.4 Groundwater metering program

Figure 7-3 lists the metering program for the higher priority groundwater management areas. The estimated program cost is close to the available budget of $847,800. The program will require annual review to reflect changes in costs and possibly competing programs.

Figure 7-3 Groundwater Metering Program for Water Plan 4

Water Supply System	Number of meters	Forecast Cost
Giffard (GMU)	9	$ 44,274
Sale (GMU)	47	$ 211,601
Rosedale (GMU)	24	$ 104,197
Yarram (GMU)	35	$ 154,126
Bungaree (GMU)	71	$ 240,181
Denison (GMU)	43	$ 180,120
	229	$ 934,499

Appendix D lists the scope of the groundwater metering for Water Plan 4 and 5.

7.8.5 Surface water metering program

Table 7-1lists the metering program for the higher priority surface water management areas. The estimated program cost is greater than the available budget of $1,107,800. This will mean the LaTrobe program will only be partly completed in Water Plan 4. The program will require annual review to reflect changes in costs and possibly competing programs.

Table 7-1 Surface water metering program for Water Plan 4

Water Supply System	Number of meters	Forecast Cost
Mitchell	108	$ 474,048
Latrobe	179	$ 772,131
	287	$ 1,246,179

Appendix E lists the scope of the surface water metering for Water Plan 5.

8 Data management, analysis and reporting

8.1 Performance Measures

For each water management system report on:

- Proportion of water use measured by pattern approved meters
- Proportion of water measured by contemporary meters
- Proportion measured by other meters
- Proportion unmeasured

The Victoria State government has a project to create a statewide meter database that links with the Water Register. These reporting measures will follow the creation of the database and associated reporting tools.

Australian Inter-government agreement, 2018. Murray–Darling Basin Compliance Compact.
Commonwealth of Australia, 2009. National Framework for Non-urban Water Metering Policy Paper.
DELWP, W. and, 2019. Non-urban water metering [WWW Document]. Water Catchments. URL https://www.water.vic.gov.au/water-for-agriculture/non-urban-water-metering (accessed 11.6.19).
DELWP, W. and, 2018. Governance and planning [WWW Document]. Water Catchments. URL https://www.water.vic.gov.au/water-industry-and-customers/water-corporations (accessed 6.26.19).
Hydro Environmental, 2008. In-situ REVS Testing of Large Dethridge Meter outlets in the GMID.
Irrigation Australia, 2019. Certified Meter Installer and Validator - Irrigation Australia Limited [WWW Document]. URL https://www.irrigationaustralia.com.au/certification/certified-meter-installer (accessed 5.21.19).
MDBA, 2019. Best Practice guidelines for Minimum metering thresholds 5.

Appendix A Victorian non-urban water meter policy and guidelines

Full policy is available at:

https://www.water.vic.gov.au/water-for-agriculture/non-urban-water-metering

Extract from draft Victorian Metering Policy (2020)

Circumstances where the metering requirement can vary

The 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 Appendix A for 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 metering;
    - excessive costs imposed by site conditions;
    - adequate water measurement is provided by bulk water metering; and,
    - the site is in the bottom 5 per cent of water taken within a water resource management area.

The water corporation can continue with the current metering standard for sites that make up the lowest 5 per cent of water use in water resource management areas that have 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 metering 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 metering 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; and,
- 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 for estimating 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 from replacing interim standard meters by 2025. In these guidelines, interim standard meters are referred to as contemporary meters, since even by 2025 most

contemporary meters will still have significant residual lives, and in some cases may be the best meter available. The assurance benefits of such an upgrade are very small. Consequently, water corporations can plan to replace contemporary meters at the end of their service life with compliant meters.

Appendix B Certified Meter Installers and Validators

CMI_ID	First Name	Last Name	Start Date	Expiry Date
22545	Joshua	Hayward	6/09/2017	6/09/2020
21136	Justin	Brown	29/04/2013	30/09/2021
21288	Shane	Northway	29/04/2013	30/09/2021
20773	Greg	Bensted	29/10/2015	30/09/2021
20894	Frank	Mannuzza	29/10/2015	30/09/2021
20909	Anthony	Moulton	29/10/2015	30/09/2021
20940	Anthony	Sanders	29/10/2015	30/09/2021
20958	Lucas	Snow	29/10/2015	30/09/2021
20991	Kevin	Williams	29/10/2015	30/09/2021
20992	Gary	Wills	29/10/2015	30/09/2021
20889	Frank	Loges	29/10/2015	30/09/2021
20885	David	Lewis	29/10/2015	30/09/2021
20877	Luke	Krupa	29/10/2015	30/09/2021
20876	Nikolai	Kranjc	29/10/2015	30/09/2021
20836	Mathew	Grivas	29/10/2015	30/09/2021
20941	Warren	Santurini	29/10/2015	30/09/2021
20799	Frank	Crameri	29/10/2015	30/09/2021
22733	Alisha	Clark	27/11/2017	27/11/2019
22865	Chris	Pleydell	20/04/2018	20/04/2020
22923	Matthew	Weatherall	5/06/2018	5/06/2020
23065	Matthew	Stagg	5/08/2018	5/08/2020
23259	Simon	Allan	29/01/2019	29/01/2021
23390	Mick	Moore	7/03/2019	7/03/2021
23388	Anthony (Tony)	Salmons	7/03/2019	7/03/2021

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Version: 1, Version Date: 01/06/2021

Appendix C **Meter cost model**

The cost model is in a spreadsheet named WP4_meter_program_srw_v1.xlsx

Below are extracts from the spreadsheet.

Base Install Costs (enter inputs in C3..C15)

Item	Type	Unit	Quantity	Rate	Cost
Site plan and contact owner	labour	hrs	1	$100	$100
Travel to and from	labour	hrs	2	$100	$200
Travel to and from	vehicle	km	25	0.68	$17
Install	labour	hrs	8	$100	$800
Install	materials	item	1	$200	$200
Record-keeping	labour	hrs	2	$100	$150
Contract Overhead, PM		%	$1,467	25%	$367
SRW PM costs	labour	hrs	8	$65	$520
Contingency		%	$2,354	10%	$235
Corporate oncost		%	$2,589	5%	$129
					$2,619

Dia	50	80	100	125	150	200	250	300
Meter-Mag	$ 1,730	$ 1,730	$ 1,730	$ 1,730	$ 1,800	$ 2,234	$ 2,560	$ 3,476
Meter-Mech	$ 374	$ 450	$ 600	$ 600	$ 1,150	$ 1,420		
Cost diff	$ 1,356	$ 1,280	$ 1,130	$ 1,130	$ 650	$ 814		
Base Install costs	$ 2,619	$ 2,619	$ 2,619	$ 2,619	$ 2,619	$ 2,619	$ 2,619	$ 2,619
Install loading						5%	10%	20%
Total - Mag	$ 4,349	$ 4,349	$ 4,349	$ 4,349	$ 4,419	$ 4,984	$ 5,440	$ 6,618
Total-Mech	$ 2,993	$ 3,069	$ 3,219	$ 3,219	$ 3,769	$ 4,170		
Meter_choice	turb/mag	turb/mag	turb/mag	turb/mag	turb/mag	magflow	magflow	magflow
Mag %	10%	10%	25%	25%	50%	100%	100%	100%
Weighted cost	**$ 3,128**	**$ 3,197**	**$ 3,501**	**$ 3,501**	**$ 4,094**	**$ 4,984**	**$ 5,440**	**$ 6,618**
	rate_50_mm	rate_80_mm	rate_100_mm	rate_125_mm	rate_150_mm	rate_200_mm	rate_250_mm	rate_300_mm

GW_profile	**83**	**108**	**293**	**26**	**386**	**81**	**14**	**11**	1,002
SW_profile	**12**	**10**	**95**	**65**	**217**	**116**	**39**	**10**	564

$ 3,847	GW_weighted_avg
$ 4,210	SW_weighted_avg

Appendix D Scope of the groundwater metering for Water Plan 4 & 5

Water System Sour	meter_size 50	80	100	125	150	200	250	300	Grand Total	Cost Now
Giffard (GMU)	-	-	-	-	3	4	1	1	9	$ 44,274
Sale (GMU)	-	-	3	1	25	11	5	2	47	$ 211,601
Rosedale (GMU)	-	-	4	-	13	5	1	1	24	$ 104,197
Yarram (GMU)	-	1	4	-	17	10	2	1	35	$ 154,126
Bungaree (GMU)	7	19	36	9	-	-	-	-	71	$ 240,181
Denison (GMU)	1	-	4	-	32	4	1	1	43	$ 180,120
Nepean (GMU)	2	1	12	-	15	1	-	-	31	$ 117,853
Glenormiston (GMU)	-	-	3	-	4	-	1	-	8	$ 32,318
Orbost (GMU)	-	-	-	-	1	1	-	-	2	$ 9,077
Moorabbin (GMU)	3	7	8	-	1	-	-	-	19	$ 63,863
South West Limestone	19	21	62	7	132	25	2	2	270	$ 1,057,196
Condah (GMU)	-	-	-	-	12	-	-	-	12	$ 49,123
Portland (GMU)	-	-	-	-	-	-	-	2	2	$ 13,237
Glenelg (GMU)	-	-	1	-	33	2	-	1	37	$ 155,175
Colongulac (GMU)	1	1	3	1	4	2	-	-	12	$ 46,670
Koo Wee Rup (GMU)	5	9	17	4	7	2	-	-	44	$ 156,555
Wa De Lock (GMU)	6	1	17	-	34	7	-	-	65	$ 255,550
Warrion (GMU)	2	1	27	2	13	2	-	-	47	$ 174,168
Lancefield (GMU)	1	1	-	-	2	-	-	-	4	$ 14,512
Wandin Yallock (GMU)	6	3	-	-	-	-	-	-	9	$ 28,359
Moe (GMU)	1	2	2	-	5	1	-	-	11	$ 41,975
Wy Yung (GMU)	1	2	21	-	5	-	-	-	29	$ 103,512
Unincorporated (GMU	25	31	49	2	26	3	1	-	137	$ 482,678
Cardigan (GMU)	3	-	2	-	-	-	-	-	5	$ 16,387
Deutgam (GMU)	-	4	14	-	1	-	-	-	19	$ 65,895
Leongatha (GMU)	-	2	2	-	-	-	-	-	4	$ 13,395
Corinella (GMU)	-	1	-	-	-	-	-	-	1	$ 3,197
Frankston (GMU)	-	1	2	-	1	-	-	-	4	$ 14,292
Stratford (GMU)	-	-	-	-	-	1	-	-	1	$ 4,984
	83	**108**	**293**	**26**	**386**	**81**	**14**	**11**	**1,002**	
	$ 259,639	$ 345,231	$ 1,025,817	$ 91,028	$ 1,580,122	$ 403,664	$ 76,166	$ 72,801		$ 3,854,469

Water plan 4 existing budgets will complete meter replacements for Giffard, Sale, Rosedale, Yarram, Bungaree and Denison. This will leave approximately $2.7M to be considered in water plan 5 pricing submissions to complete the plan.

Appendix E Scope of Surface Water metering program for Water Plan 4 and 5

	meter_size								
Water System Sour	50	80	100	125	150	200	250	300	Grand Total	Cost
Mitchell	1	-	14	3	50	29	9	2	108	$ 474,048
Latrobe	1	1	20	40	52	39	20	6	179	$ 772,131
Moorabool	-	1	6	8	3	2	-	-	20	$ 74,459
Snowy	1	-	9	1	6	5	-	-	22	$ 87,618
Bunyip	3	4	15	1	43	12	4	1	83	$ 342,394
Thomson/Macalister	-	-	2	-	11	15	5	1	34	$ 160,605
Hopkins	-	-	7	1	11	3	-	-	22	$ 87,989
Barwon	1	-	6	2	8	2	-	-	19	$ 73,853
South Gippsland	4	3	9	6	16	8	1	-	47	$ 185,425
Tambo	-	-	-	-	7	1	-	-	8	$ 33,639
Otway Coast	1	-	5	3	6	-	-	-	15	$ 55,698
East Gippsland	-	-	-	-	1	-	-	-	1	$ 4,094
Glenelg	-	1	-	-	1	-	-	-	2	$ 7,290
Maribyrnong	-	-	2	-	1	-	-	-	3	$ 11,096
Lake Corangamite	-	-	-	-	1	-	-	-	1	$ 4,094
	12	10	95	65	217	116	39	10	564	$ 2,374,431

Water plan 4 existing budgets will complete meter replacements for Mitchell and Latrobe. This will leave approximately $1.12M to be considered in water plan 5 pricing submissions to complete the plan.