NSW metering implementation plan

under the National Framework for Non-Urban Water Metering
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Introduction

Context

Consistent with the objectives and requirements of the National Water Initiative (NWI) Agreement, and the agreement of the Council of Australian Governments (COAG) on 9 December 2009, NSW is expanding metering of water extraction, and implementing the National Framework For Non-Urban Water Metering in rural NSW. This is designed to lift the standard and scope of rural water extraction measurement to a level commensurate with the high value of the resource to towns, irrigators, industry and the environment. It involves the expansion of metering to many areas and types of water extraction currently not metered, and the implementation of new National Water Meter Standards (NWMS) and the national Metrological Assurance Framework (MAF).

The NWI provides a strategy for improving water resource management across Australia. In relation to water meters, paragraphs 87 and 88 of the Agreement specify requirements for national metering standards and a nationally consistent framework for water metering and measurement:

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.

88. Recognising that information available from metering needs to be practical, credible and reliable, the Parties agree to develop by 2006 and apply by 2007:
   i. a national meter specification;
   ii. national meter standards specifying the installation of meters in conjunction with the meter specification; and
   iii. national standards for ancillary data collection systems associated with meters.

While metering is common in urban water supply systems, and standards are well established, the same is not true for non-urban water supply. In NSW there are tens of thousands of pumps, bores and other diversion works taking substantial quantities of water from rivers and aquifers, only a portion of which are metered. Where meters are in place, the accuracy and reliability of metering is highly variable. The situation is similar in other states.

Recognising that requirements for urban and non-urban water meters differ due to highly variable installation configurations and operating conditions in non-urban environments, the National Framework For Non-Urban Water Metering provides for:

- national standards for non-urban water meter construction, installation and maintenance
- a Metrological Assurance Framework, to ensure meters comply with these standards on an ongoing basis
- public reporting requirements
- implementation by states and territories using national measurement legislation and state/territory water legislation
- transitional arrangements, allowing for phased replacement of non-complying meters over a 10 year period.

National non-urban water metering standards were prepared for the first time and publicly released in 2008, at the same time as the draft National Framework For Non-Urban Water Metering was released for public comment. The final National Framework was approved by COAG on 9 Dec 2009.
Responsibility for implementing the National Framework lies jointly with the Commonwealth and state/territory governments.

As part of its $12.9 billion Water for the Future Program, the Commonwealth Government has agreed in principle to provide funding for upgrade of metering in the Murray Darling Basin. In its announcement of 3 July 2008, COAG stated that:

Up to $221 million will be provided to upgrade the accuracy of water metering [in the NSW Murray-Darling Basin], which is essential to the management of water resources. Most of these funds will be directed at metering groundwater and unregulated streams ($131 million) and the remaining $90 million will be used to replace existing customer-owned meters with State Water-owned meters.

This metering upgrade project is one of four projects that together comprise the NSW Sustaining the Basin Program, the others projects being irrigated farm modernisation ($300 million), piping of stock and domestic water supply systems ($137 million) and healthy floodplains ($50 million).

Additionally, on 20 May 2009, the Commonwealth Government announced an investment of $28.6 m to install or upgrade meters in the Hawkesbury Nepean as part of a $77.4 million funding package to help restore the health of the river.

Benefits of enhanced metering

The expansion and improved quality of water metering will:

- improve protection of water entitlements and environmental water, through improved compliance with entitlements, allocations and access conditions, benefiting all water extractors
- open up water allocation trading in unregulated river and groundwater systems
- enable flow event sharing to be established where appropriate
- enable the implementation of two part tariffs, including a consumption based fee component, thereby providing greater equity in cost sharing
- support on-farm investment and operational enhancements to achieve more water and energy efficient water extraction and distribution
- improve capacity to identify and obtain river system water savings
- support water plan development and review
- enable the protection of environmental flows passing down rivers
- improve public and investor confidence in the management of water and the integrity of the water entitlements systems.

National trade measurement system

The national trade measurement system is defined by provisions of the National Measurement Act 1960 (Cth) and the Uniform Trade Measurement Legislation – and their relevant Regulations. The national trade measurement system provides a legal and administrative framework for regulating the accuracy of measurement instruments used for trade. In the national trade measurement framework, ‘use for trade’ in relation to a measuring instrument is defined section 3 of the National Measurement Act 1960 as:

- in relation to a measuring instrument, means use of the measuring instrument for either or both of the following purposes:
  (a) determining the consideration in respect of a transaction;
  (b) determining the amount of a tax.
The national trade measurement system in Australia is jointly managed by the Commonwealth and States/Territories, although COAG agreed at its 12 April 2007 meeting to transfer all trade measurement roles, powers and functions to the Commonwealth on 1 July 2010. The Commonwealth’s role in national trade measurement system is defined by provisions of the *National Measurement Act 1960* and *National Measurement Regulations 1999* to include:

- develop standards for pattern approval and initial verification testing of measuring instruments
- develop uniform testing procedure for re-verification measuring instruments or uniform testing procedures
- approve the design or pattern of measuring instruments submitted by manufacturers against the national standards
- appointing measurement laboratories to undertake pattern approval and initial verification testing
- coordinate national policy.

The jurisdictional trade measurement agencies administer a compliance regime involving inspection and certifying of individual trade measurement instruments to ensure there is a reasonable probability they are in compliance with the national requirements for pattern approved and verified instruments. The task of inspection and certification involves:

- appointing licensees (private organisations) to inspect, in-situ test and certify (mark) that measurement instruments in use for trade conform with pattern approval, initial verification and re-verification requirements (and to report non-compliance)
- conducting (random and occasional) inspections to confirm that owners of measuring instruments used in trade have the accuracy of their equipment regularly certified and to audit and monitor the work of certification licensees
- setting re-verification guidelines including testing requirements, the frequency of re-verification and requirements for re-verification after modification or repairs to a measuring instrument
- education and consultation with owners of measuring instruments
- enforcing compliance including issuing warnings and infringement notices for breaches of the law; responding to consumer complaints, etc.

**Application to non-urban water metering**

Non-urban metering falls within the definition of ‘use for trade’ when meters are employed for volumetric billing or water allocation accounting purposes. Relevant types of water use clearly include:

- irrigation district farm meter outlets
- NSW water licence holders with volumetric water licences.

Effectively, all non-urban water meters are currently exempted by regulation from the provisions of national trade measurement system. However, the framework could be used to ‘regulate’ the standards of non-urban metering, by lifting the relevant exemptions in the utility metering provisions of the *National Measurement Regulations 1999*.

A trade measurement environment requires regular field checks of measurement accuracy. However investigation by the interstate Metering Expert Group of currently available in-situ volumetric verification techniques indicated that the compliance requirements of trade legislation, which are more

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suited to such things as retail weight scales, would be practically difficult to implement for rural water meters. For this reason COAG has instead chosen to implement a separate Metrologic Assurance Framework for non-urban water metering utilising state/territory water legislation. This is supported by pattern approval management by the National Measurement Institute (NMI) and development of installation and maintenance standards by Standards Australia.

National Metrological Assurance Framework

The National Framework For Non-Urban Water Metering sets out a national Metrologic Assurance Framework to ensure an acceptable level of confidence in meter performance. Under the MAF all non-urban meters shall be:

1. Pattern approved by the National Measurement Institute where available
2. Laboratory verified by a Verifying Authority under the National Measurement Act 1960 (Cth), prior to installation
3. Suited to the intended purpose, installation configuration and operating conditions
4. Installed in compliance with the Pattern Approval certificate and the appropriate Australian Standards
5. Validated by a certified validator after installation and before water is taken through the meter under an entitlement
6. Maintained periodically in accordance with the Pattern Approval certificate and relevant Australian Standards or Technical Specifications (e.g. ATS 4747)
7. Periodically validated by a certified validator on an ongoing basis
8. Able to provide an acceptable level of confidence without in situ verification that performance of the meter is within the maximum permissible limits of error (±5%) in field conditions
9. Re-verified (either in a laboratory or in situ when and where practical and preferred) by a Verifying Authority or certified licensee under the National Measurement Act 1960 (Cth) following maintenance affecting the metrological performance of the meter
10. Audited on a regular basis by water service providers, government agencies or independent auditors in accordance with implementation plans.

Pattern approval and initial verification

Development of the non-urban water metering standards commenced in 2005. The NMI and Standards Australia established a technical committee to draft the standards in consultation with non-urban water industry. The NMI released the following standards in 2008:

- NMI M 10: Meters intended for the metering of water in full flowing pipes.
- NMI M 11: Meters intended for the metering of water in open channels and partially filled pipes.

The maximum permissible measurement error of ±5% in-situ is common to full flowing pipes and open channel meter standards. The standards describe the pattern approval tests to be carried out on meter models and the initial verification testing regimes for production meters (that are usually applied by meter manufacturers) before the meters are put into service.²

² It is noted that initial verification may also occur after a meter has been installed, but it is common practice for water service providers to require meters to initially verified by manufacturers before supply.
Pattern approval requires a sample of a meter model to be tested in an NMI authorised testing laboratory. The test results are submitted by the meter vendor to the NMI who then issues a pattern approval certificate. The pattern approval certificate provides a description of the meter, the requirements for initial verification testing and the installation requirements (where these are known to affect the accuracy and stability of the measuring element).

The NMI standard requires meters to be subject to an initial verification test before being put into service. In contrast to pattern approval where only one or a sample of meters is tested, initial verification requires testing of every meter supplied. Verification can only be performed in the national measurement system by a verifying authority (appointed by the NMI) or a trade measurement inspector (or a licensed certifier) appointed by a jurisdictional trade measurement agency under the Uniform Trade Measurement Legislation. To account for any impact of the installation on the accuracy of non-urban meters, verification of the full meter installation may be required.

Design, installation, maintenance and in-service compliance

The NMI standards are complemented by technical specifications for non-urban water meters that are being developed by Standards Australia. The ATS 4747 series covers non-urban water meter installation and in-service compliance. While the NMI standards specifically deal with metrologic performance (i.e. accuracy and consistency of measurement), ATS 4747 extends to cover standards for

- meter design, including materials, display and output of metered volumes, environmental endurance and required documentation
- meter installation, including placement and minimising hydraulic disturbances
- meter maintenance and in-service compliance.

It is expected that after a review following two years of use the ATS 4747 series will be re-made as an Australian Standard.

Implementing the Metrologic Assurance Framework

The National Framework for Non-Urban Water Metering also sets out how the MAF is to be implemented. Under this framework, the NMI and Standards Australia are responsible for developing and maintaining standards and uniform testing procedures, and the NMI is responsible for appointing measurement laboratories to undertake pattern approval and initial verification testing, and for pattern approval of meters.

Each jurisdiction is required to develop an implementation plan for how it will implement the MAF. Jurisdictions are required to provide two-yearly, public reports on progress with implementation.

The National Framework also sets out agreed transitional arrangements, allowing for phased replacement of non-complying meters over a 10 year period, and exemptions from standards in specified circumstances.

Purpose of this plan

This plan sets out how the MAF will be implemented in NSW, and how the NSW Government plans to expand the metering of extraction of water from rivers and aquifers throughout the state.

The implementation plan may be subject to revision in the future as more information becomes available, and more certainty is obtained about the delivery of the Federally-funded programs, the capability of meter supplies and installers, and the performance of water service providers.
Objectives

Expansion of metering

In terms of geographic coverage, it is intended that eventually metering of non-urban water extraction will apply to all of NSW, covering extraction of water from regulated rivers, unregulated rivers and aquifers, and delivery of water within rural irrigation and water supply schemes.

Metering can apply to any approved works (e.g. pumps, bores or other means recorded on a Water Management Act 2000 approval or a Water Act 1912 licence) that are installed and capable of extraction or diversion of water, regardless of whether water is currently being taken or not, and in particular cases works used for extraction of water under basic landholder water rights (BLR). It also can apply to water delivery points within rural irrigation and water supply schemes.

There is to be no differentiation of application of metering based on purpose of water use or type of water source. Metering can apply to:

- Extraction of water from rivers, aquifers, farm dams, or on a floodplain.
- Extraction or delivery of water for any purpose, including irrigation, stock and domestic, industrial, recreation, town water supply etc.

However this does not mean that all water extraction in each area will be metered. Metering will apply to the extent needed for resource management, operations, water trading and protection of water rights, based on consideration of risk and cost effectiveness. In particular, metering of small volumes, up to thresholds that will vary from area to area, may not be required.

Metering of particular cases where it is physically impractical to install a meter will not be required. In these cases, which are expected to be few in number, best available alternative arrangements for measuring or estimating water extraction will be used.

Metering of basic landholder water rights water extraction will not apply, except in specific, rare cases where meters may be required for compliance with statutory reasonable use guidelines or directions aimed at addressing localised or case specific problems with equitable sharing of water.

As a general rule, the objective of metering is to have a sufficient proportion of extraction metered so as to properly address resource management, operations, water trading and protection of water rights, using a risk-based approach. It is expected that each area will have 95% or more of water extraction metered, with the remaining water extraction estimated by other means.

Additionally any water extractor who is not required to have a meter because of small size of work, may voluntary elect to be metered in order to be allowed to buy or sell water allocations or for any other reason.

Implementation of the National Metrologic Assurance Framework

The primary objective of the MAF is to provide an acceptable level of confidence that measurement performance of all non-urban water meters under in situ conditions is within maximum permissible limits of error of ±5% by July 2020.

To achieve this, meters will be either:

- pattern approved, verified, selected, installed and validated prior to use, in accordance with the NWMS and the MAF (compliant meters)
- of a design that has been pattern approved after the meter was installed, and the meter has been validated as being installed and working in accordance with the relevant pattern approval certificate (deemed compliant meters)
• demonstrated to operate within the required ±5% error limit by in situ verification (deemed compliant meters)

• compliant with an interim water meter standard approved by the NSW Commissioner for Water (deemed compliant meters)

• exempted from compliance by the NSW Commissioner for Water, on the basis of the meter being a best practice contemporary meter, where there are no available compliant or deemed compliant meters suitable for the situation (exempt meters).

The following supporting objectives apply.

1. All new meters installed from 1 July 2010 are to be either compliant, deemed compliant or exempt.

2. For existing meters:
   o Those that are deemed compliant will remain in place.
   o Largest bulk water meters: all non-compliant meters on works taking 5000 ML/year or more (during times when water availability is not restricted) from rivers are to be replaced with compliant meters, or with deemed compliant meters if no appropriate pattern approved meters are available at the time of replacement, by 30 June 2014.
   o Smaller bulk water meters: all other non-compliant meters taking water directly from any water source are to be replaced with compliant meters, or with deemed compliant meters if no appropriate pattern approved meters are available at the time of replacement, by 30 June 2016. This may be adjusted to synchronise with infrastructure upgrade programs in the Murray Darling Basin.
   o Meters in rural irrigation and water supply schemes: all non-compliant meters within rural irrigation and water supply schemes are to be replaced with compliant meters, or with deemed compliant meters if no appropriate pattern approved meters are available at the time of replacement, at the end of the expected life of the meter or by 30 June 2020, whichever occurs first.
   o Some may be exempted and allowed to remain in place, on the basis of the meter being a best practice contemporary meter, where there are no available compliant or deemed compliant meters suitable for the situation.

3. All meters installed from 1 July 2010 will be maintained and validated in accordance with NWMS and the MAF.

4. All meters installed prior to 1 July 2010 that are deemed to be compliant will, from the date of deemed compliance, be maintained and validated in accordance with NWMS and the MAF.

5. All meters that are exempted will be maintained and validated in accordance with NWMS and the MAF to the extent this is feasible.
Current non-urban metering status

Types of non-urban water metering in NSW

The NSW non-urban water sector can be divided into three categories for the purposes of metering policy:

- Licensed extractors, being those who extract water from surface or groundwater sources pursuant to a water licence.
- Rural irrigation and water supply scheme customers, being those who have rights to water within a bulk non-potable water supply scheme operated by a water service provider who is a licensed extractor.
- Non-licensed basic landholder rights, who have a defined right to take a limited amount of water for specific purposes without a licence.

Licensed extractors

The first category is water licence holders who extract water from rivers and groundwater systems. NSW water licence holders in this category include:

- River pumpers or groundwater extractors who take the water for irrigation, power generation, mining, industrial or other commercial purposes; or for stock and domestic purposes in those situations where basic landholder rights do not apply.
- Urban and town water supply authorities, in relation to bulk water diverted from rivers or aquifers. (Individual domestic and commercial consumers within an urban area may have a meter to measure consumption, but their meters are not within the scope of this program).
- Water service providers (e.g. irrigation corporations, private irrigation boards, trusts) who take water, and then supply it (without treatment) to irrigators and others within their water supply schemes.

In areas managed under the Water Management Act 2000, water licence holders are required to hold a separate approval for the works (pumps, bores etc) used to take water, whereas in areas managed under the Water Act 1912, the authorisation of the works is included in the water licence. Thus in Water Management Act 2000 areas meters are linked to works on water approvals. Water Act 1912 areas are in process of being converted to Water Management Act 2000 areas. When conversion is completed the Water Act 1912 will be repealed.

Within rural irrigation and water supply schemes

The second category is largely irrigation farm metering within privately-owned irrigation schemes consisting of networks of channels or pipes distributing water from a bulk offtakes. In most of these schemes there are existing meters in place, though many are old or poor accuracy.

The NSW government does not directly manage or regulate water metering standards within these schemes. Water meters are owned by the water service provider who operates the scheme (e.g. irrigation corporation, private irrigation board, trust). The water service provider develops and enforces internal metering policies, practices and procedures, with each scheme having its own set of policies, practices and procedures.
Basic landholder rights

The final category applies to water being taken under Basic Landholder Rights (BLR). Landholders are permitted under the *Water Management Act 2000*, sections 53-55, to take water for certain purposes without having to obtain a licence. There are three types of BLR:

- domestic and stock rights (for land bordering a river or overlying an aquifer);
- harvestable rights; which gives a landholder the right to construct and use farm dams up to a defined total capacity linked to property size and location, enabling use of 10% of the runoff from their land for any purpose, and
- native title water rights.

There are no explicit volume limits under basic landholder rights and extractors are not normally required to install a water meter. However, the *Water Management Act 2000* does specify limits to the types of water uses and/or impose other limitations that have the effect of limiting the volume of water that could be harvested or used. For example, ‘stock’ use does not include the use of water in connection with the raising of stock animals on an intensive commercial basis (s. 52(3)) and native title rights limit use to domestic and traditional purposes at the amount prescribed by the regulations (s. 55(3)). Statutory Reasonable Use Guidelines (s. 325) can provide further definition of the allowable use of water under BLR\(^3\).

As long as the extraction is under the BLR, there is no need for the landholder to hold a licence.

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\(^3\) These have yet to be gazetted.
Estimated meter numbers

Table 1 Licensed extraction

<table>
<thead>
<tr>
<th></th>
<th>Meterable sites</th>
<th>Sites with existing meters</th>
<th>% of extraction metered¹</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MURRAY DARLING BASIN</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regulated rivers</td>
<td>5,100</td>
<td>5,900</td>
<td>98%</td>
</tr>
<tr>
<td>Unregulated rivers</td>
<td>4,010</td>
<td>200</td>
<td>40%</td>
</tr>
<tr>
<td>Groundwater</td>
<td>4,900</td>
<td>2,900</td>
<td>51%</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>14,010</td>
<td>9,000</td>
<td>76%</td>
</tr>
<tr>
<td><strong>COASTAL BASINS</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regulated rivers</td>
<td>1,100</td>
<td>200</td>
<td>50%</td>
</tr>
<tr>
<td>Unregulated rivers</td>
<td>7,400</td>
<td>50</td>
<td>1%</td>
</tr>
<tr>
<td>Groundwater</td>
<td>2,700</td>
<td>50</td>
<td>2%</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>11,200</td>
<td>300</td>
<td>2%</td>
</tr>
<tr>
<td><strong>NSW TOTAL</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regulated rivers</td>
<td>6,200</td>
<td>6,100</td>
<td>98%</td>
</tr>
<tr>
<td>Unregulated rivers</td>
<td>11,410</td>
<td>250</td>
<td>29%</td>
</tr>
<tr>
<td>Groundwater</td>
<td>7,600</td>
<td>2,950</td>
<td>46%</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>25,210</td>
<td>9,300</td>
<td>60%</td>
</tr>
</tbody>
</table>

¹. Not the same as % of sites metered, because unmetered sites are generally smaller water extractors.

Table 2 Within rural irrigation and water supply schemes

<table>
<thead>
<tr>
<th></th>
<th>Farm outlet meters</th>
<th>Non-metered stock and domestic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Murray</td>
<td>3,920</td>
<td>5,045</td>
</tr>
<tr>
<td>Murrumbidgee</td>
<td>3,208</td>
<td>1,000</td>
</tr>
<tr>
<td>Coleambally</td>
<td>600</td>
<td>200</td>
</tr>
<tr>
<td>Western Murray</td>
<td>485</td>
<td>0</td>
</tr>
<tr>
<td>Others</td>
<td>500</td>
<td>0</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>8,713</td>
<td>6,245</td>
</tr>
</tbody>
</table>

Basic landholder water rights

No meters are in place or planned for works solely used for BLR.
Governance

Roles and responsibilities

Implementation of this NSW Metering Implementation Plan is the joint responsibility of the NSW Office of Water (NOW) and NSW State Water Corporation (SWC), under the overall direction of the NSW Commissioner for Water. SWC is responsible for managing implementation on regulated rivers and NOW is responsible for managing implementation on unregulated rivers and groundwater systems.

An interagency state metering taskforce is responsible for state-wide matters such as information systems, facilitation of certified service providers, and negotiations with water service providers. Area metering project teams will be established for each area where metering is rolled out.

NOW is responsible for preparation of regular reports on the status of metering in NSW as required under the National Framework For Non-Urban Water Metering. SWC will collate information for implementation of metering on regulated rivers for inclusion in the report. Water service providers will be required to prepare reports on metering under their control, for inclusion in state metering reports.

Project planning and management

The NSW Metering Projects Steering Committee will oversee development and periodic updating of detailed project plans for implementing aspects of this plan. Dedicated project managers will be responsibility for drafting these detailed plans, then implementing them once approved by the Steering Committee.

A detailed plan for installation of meters in the Hawkesbury Nepean area has already been drafted.

Detailed plans for upgrading and installing meters in the Murray Darling Basin, and for implementation of general supporting arrangements and all other measures, will be developed during the first half of 2010 at the same time as the business case is being prepared to satisfy due diligence evaluation of the notionally agreed $221 million grant from the Commonwealth for metering in the Basin.

Management of risks

The NSW Metering Projects Steering Committee will oversee management of risks as part of ongoing project management. An initial risk assessment is presented below.

Table 3 Initial risk assessment

<table>
<thead>
<tr>
<th>Risk</th>
<th>Likelihood</th>
<th>Consequence</th>
<th>Mitigation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meter demand exceeds supply from commercial market</td>
<td>High</td>
<td>Extreme</td>
<td>• Early consultation with meter manufacturers</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Manufacturer involvement with stakeholder consultation</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Early placement of meter orders based on most-likely numbers</td>
</tr>
<tr>
<td>Ability of meter manufacturers to meet requirements of National Water Meter Standards</td>
<td>Low</td>
<td>Extreme</td>
<td>• Early consultation with meter manufacturers</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Work with Fed govt to accelerate NATA testing capability</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Use interim standards to cover cases where pattern approved meters not available.</td>
</tr>
<tr>
<td>Risk</td>
<td>Likelihood</td>
<td>Consequence</td>
<td>Mitigation</td>
</tr>
<tr>
<td>---------------------------------------------------------------------</td>
<td>------------</td>
<td>-------------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Failure to gain IPART agreement to recover operation and maintenance costs from water extractors</td>
<td>Moderate</td>
<td>Extreme</td>
<td>• Preliminary discussions with IPART have indicated that the net increase in costs and charges associated with the operation and maintenance of the new water meters and telemetry may be recovered through a service charge</td>
</tr>
</tbody>
</table>
| Failure to amend legislation or other licence conditions to have legal powers to require conformance with national water meter standards | Low        | Major       | • Release of NSW Interim Water Meter Standards  
• Early consultation with stakeholders |
| Failure to engage community support                                  | High       | Moderate    | • Thorough community engagement as each area is rolled out. |
| Availability of suitable and cost effective communication links for telemetered sites | Moderate   | Moderate    | • Undertake independent consultancy to assess possibilities and to identify technology choices  
• Utilise alternatives to real-time telemetry where needed. |
| Inappropriate choice of meters                                       | Low        | Moderate    | • Engage independent consultants to assess technology choices  
• Use modular options to minimise change/upgrade cost |
| Delays in entitlement holder in undertaking pre-installation site preparation | High       | High        | • Move Government resources into pre-installation site preparation  
• Transfer greater cost to entitlement holder |
| Delay or problems with development of data management systems        | Moderate   | High        | • Allocate specific project funds and targets to data management systems |
| Unavailability of appropriately qualified/certified service providers | Moderate   | High        | • Work with potential service providers ahead of rollout in each area.  
• Certify a number of agency staff across the state for meter installation validation. |
| Investment wasted because of subsequent effects of buyouts or on-farm infrastructure upgrade programs. | Moderate   | Moderate    | • Ensure coordination of projects as each area is rolled out. |
Implementation for licensed extractors

The following approach applies to metering of licensed extractors of water. Metering of water extractors within rural irrigation and water supply schemes will be managed by the water service provider. How the government will help to facilitate this occurring is discussed later.

Roll-out of enhanced and expanded metering

Area by area implementation

Installation and upgrading of meters will be done on an area by area basis, until eventually the whole state is covered. The first area to be metered will be the Hawkesbury Nepean, where work has already commenced. Subsequent areas will be advised at a later date.

Responsibility and funding of meter installation or replacement

Currently, water extractors are responsible for purchasing and installing their meters. This will remain the case, except where government capital funding is made available, in which case the government will purchase and install the meters.

The Commonwealth Government is funding the roll-out of meters in two key areas of the State, namely:

- a $28.6 million dollar funded program of water meter installation in the Hawkesbury-Nepean catchment – this will involve the purchase and installation of up to 2000 state-of-the-art metering systems as well as a data management system for that catchment.
- a $221 million dollar metering program in the Murray-Darling Basin, to install meters in groundwater and unregulated water sources in the Murray-Darling Basin and to replace existing meters in regulated water sources (agreed in principle, subject to due diligence assessment to be completed by mid 2010).

The metering roll-out will be done in these areas first. Decisions on roll-out of metering in the remaining areas will be made at a later date.

Process for implementing metering in an area

The process for each area will be based on the following approach:

- Announce the commencement of metering upgrade in the area and consult with water extractors.
- Advise water extractors of proposed changes to licence/approval conditions relating to metering.
- Conduct surveys and site assessments of water supply works in relation to appropriate metering. Identify any meters that are already compliant or can be deemed to be compliant, and which will therefore not need to be replaced.
- Identify special considerations that may affect selection of meter type (e.g. water quality) and remote reading feasibility (e.g. coverage of mobile phone or radio networks).
- Determine threshold size for works required to be metered in the area, in consideration of resource management, operations, water trading and protection of water rights, based on risk and cost effectiveness considerations.
- Procure, install and validate meters. This will be done by the government where capital funding is available, as is the case for the Hawkesbury Nepean and is expected to apply in the Murray-Darling Basin. Otherwise this will be the responsibility of the water extractor.
• Declare the area to be metered and MAF compliant.

This work will be done according to the following principles:

• Design and installation will be done by persons appropriately qualified, and validation will be done by persons appropriately certified in accordance with a nationally recognised, industry-based certification scheme. Where the government does manage the process, they will generally be selected by competitive tender.

• Meters will be pattern approved, compliant with the NWMS. However, until suitable pattern approved meters become available, meters that comply with a NSW Interim Water Meter Standard will be acceptable. NSW Interim Water Meter Standards reflects the scope and intention of the NWMS.

• Affected water extractors will be advised and consulted during the process.

New or replacement meters in other areas

In areas where the area by area process of upgrading metering has yet to occur, individuals may elect to install meters of their own volition in order to gain access to a two-part tariff or for any other reason. They do so at their own cost.

In such cases, meters will still be required to be pattern approved (or in the absence of availability of pattern approved meters, comply with the NSW Interim Water Meter Standard) and be validated by a person appropriately certified in accordance with a nationally recognised, industry-based certification scheme.

Selection of meter technology

Types of metering equipment will be selected based on fitness for purpose and cost effectiveness. Options include mechanical meters, electro-magnetic meters and ultrasonic meters. It is likely that different technologies will apply to different situations. The government is developing guidelines for appropriate technologies for different situations that consider:

• operational requirements
• reliability
• specific site requirements
• size and nature of water supply works
• water quality
• life expectancy and overall life cycle cost.

Remote meter reading

As a general principle, meters installed by the government will have telemetry equipment attached to them allowing remote reading on a real-time, day-to-day basis or as required. Meter readings thus obtained will be stored in water accounting information systems.

Real-time remote access to meter readings provides for:

• Improved ability to manage flow sharing during events (where this is provided for in water sharing plans), so as to equitably share available water.
• Improved ability to ensure environmental flows are protected as they pass down river.
• Greater protection of water entitlements, particularly during times of shortage, by supporting more rapid detection of non-compliance with water allocations and conditions of access.
• More rapid detection of imminent or actual meter failure, so as to reduce inaccurate readings and downtime.
• Ability to improve water sharing using computerised methods based on real-time inputs.

There will be cases where remote meter reading is not practical. Identification of these will be part of the area by area roll out of metering, taking account of site by site assessments of the cost and feasibility of establishing remote access as compared to the risks to other entitlements and operational flow sharing.

Reconfiguration of water supply works

In some cases the installation of meters will require modification of water supply works to meet standards. For example there are minimum straight lengths of pipe required upstream and downstream of the meter, and minimum distances from pumps, to minimise turbulence which impacts accuracy of measurement. Also meters must be located so as to be accessible for reading, inspection and maintenance. These requirements are set out in the NWMS and in manufacturer specifications.

Where meters are installed by the government, any necessary reconfigurations will be done by contractors using capital funding associated with installing meters. This will be done in consultation with the water extractor, so as to ensure that it minimises impact on their ongoing operations.

Additionally, water extractors may choose to alter their pipe/channel configurations themselves so as to reduce the number of meters required, for example by joining pipes from two pumps into one pipe. This will reduce their ongoing meter costs.

Where the government installs the meter, if a water extractor desires later to reconfigure their water supply system in a way that affects the works in the vicinity of the meter, they will be required to advise the government and have the meter installation re-validated by an appropriately certified person. Should the reconfiguration change the works so that a different size or type of meter is required, the government will replace the meter and the water extractor will be required to pay an additional fee.

Privacy and use of meter readings

Meter readings, whether obtained through site visits, from the water extractor or through remote reading equipment, are private information. They are used by the government for resource management, compliance and operational purposes, and are not made available to the public.

Water extractors will have access to their own meter readings and water extraction information, but will not be able to view the individual information of neighbours or any others. Only accumulated aggregated information, which is not attributed to individuals, will be made available publicly.

Operation and maintenance of meters

Responsibility and funding of meter maintenance

Under current arrangements, water extractors are responsible for maintaining their meters. Where meters are installed by State Water Corporation, it will be responsible for the ongoing maintenance of the meter. In other areas, the NSW Office of Water can assume responsibility for operation and maintenance of meters on an area-by-area basis, or leave responsibility with the water extractor.4

The purpose of government authorities assuming responsibility for meter maintenance is to ensure that meters will be consistently operated and maintained in accordance with the MAF in the most cost effective manner.

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4 Some classes of meters may be exempted from government responsibility where it is determined that it is more efficient for the existing owners to retain responsibility. Examples of where this might apply are urban water utilities or power utilities.
effective way. It is common practice for urban water utilities, power utilities and rural water authorities in other states to be responsible for meters in order to ensure quality, consistency and provide for efficiencies of scale in meter management.

Where a NOW or SWC is responsible for meter maintenance, it will adopt best practice asset management. The meters will be managed as a ‘fleet’ so as to minimise costs, using bulk purchasing power. Servicing will be outsourced to certified service providers selected by competitive tender.

Water extractors will still be responsible to ensure that access to the meter is provided to allow reading, inspection and maintenance in a manner that complies with safe working legislation (Occupational Health and Safety Act, 2000 and the Electrical Safety Act, 1945). Specific guidelines will be developed as required.

As a general principle the government proposes to recover any ongoing costs it incurs for meter maintenance from water extractors through annual charges. This is discussed further in a later section.

**Meters for which the government is responsible**

Where a government authority is responsible for operation and maintenance of meters in an area, it will undertake this consistent with the MAF.

Operation and maintenance includes the following activities:

- Periodic reading and maintenance visits.
- Routine replacement of consumables such as batteries.
- Validation inspections.
- Repair of faults.
- Collection and recording of meter readings captured via data-logger, telemetry, site visit or water extractor report.
- Meter replacement at the end of life cycle.

A large proportion of this will be outsourced to suitably qualified contractors, who will be selected by competitive tender as part of the roll-out of metering in each area.

A maintenance plan will be developed by the government during 2010 for water meters under its direct control. The plan will include the following:

- Details of compliance checks as required by auditing, and reading programs
- Details of corrective, preventive and predictive maintenance schedules, budgets and associated procedures
- Details of predictive maintenance methods, lifecycle analysis techniques and associated procedures
- Identification of the resources that will undertake the maintenance, such as approved designated personnel or subcontractors, and the certifications held by team members and supervisors.

The maintenance plan will differentiate between:

- *Priority meters* – including meters with a capacity of 5000 ML/yr or greater, or otherwise identified as a priority meter for management purposes (e.g. meters on offtakes in areas at risk of resource depletion, meters on headworks and critical system distribution points)
- *Other meters* – including meters with a capacity less than 5000 ML/yr and not identified as priority meters.
Meters for which the water extractor is responsible

For those cases where meter maintenance remains the responsibility of the water extractor, all of the duties listed above, except for collection and recording of meter readings, will be managed by the water extractor. They will be required, through conditions of their water licence or approval, to do so in accordance with NWMS and the MAF, and to report annually to the government.

In particular the water extractor will be responsible for:

- Regular routine maintenance by a qualified person in accordance with maintenance requirements set out in meter pattern approvals and manufacturer documentation, and a written corrective and preventive maintenance schedule.
- Periodic validation inspections by certified inspectors.
- Repair of faults by certified persons.
- Re-verifications by certified persons after significant changes.
- Provision to NOW each year of reports including evidence (e.g. certificates) of compliance with maintenance and validation requirements.
- Meter replacement by a certified installer at the end of life cycle with a pattern approved meter.

Guidelines, forms and requirements for maintenance, validation and reporting will be prepared by the government and supplied to water extractors.

Meter failures

The water extractor has an obligation to advise the relevant government officer immediately they become aware of any damage done to the meter, either by accident, vandalism or by natural causes, or if the meter is in any way impaired or non-functional. It is an offence under the Act to take water while a meter is not operating, or not operating properly.

The government recognises that occasionally breakdowns will occur due to unanticipated events. In such cases the water extractor should act immediately to have the meter repaired by a certified person, or if the government is responsible for the meter, advise the relevant officer immediately they are aware of a problem. In such cases, the government may authorise a person to take water using a metered work while its metering equipment is not operating (or is not operating properly), subject to specific conditions and requirements, while repairs are undertaken.

However, the government will not be sympathetic to water extractors who do not take action over long periods to notify the relevant officer of broken government maintained meters, or to fix broken water meters where the water extractor has this responsibility.
Implementation within rural irrigation and water supply schemes

Within NSW there are many cases where water service providers operate schemes to take and distribute non-potable water to landholders. These include:

- Irrigations corporations, which are private companies or cooperatives that operate irrigation, stock and domestic water supply schemes that were originally established by the government. They hold water licences for the water they take at bulk offtakes. Landholders within their schemes have rights to have water delivered to them. There are 5 irrigation corporations, supplying close to 6000 farms in total.

- Private irrigation boards are likewise entities that operate schemes (private irrigation districts) to supply water to farms in their defined area of operations. There are seven of these in NSW, supplying a few hundred farms in total.

The NSW government does not directly manage or regulate water metering standards within these schemes. Water meters are managed by the water service provider who operates the scheme. The water service provider develops and enforces internal metering policies, practices and procedures.

Responsibility for metering under the NWI within these schemes will remain with the water service provider. The government metering roll-out program described previously does not apply within these schemes. However it is the intention of the NSW government that each water service provider should implement the NWMS and MAF within their area of operations.

Even though the meters within these schemes do not record extraction from rivers and aquifers, it is still important that the quality of metered deliveries be consistent with metering elsewhere.

Information on metered deliveries is gathered on a regular basis by the Bureau of Meteorology and will be used by the Australian Bureau of Statistics to compile national water accounts, showing not only the volumes of water extracted for different purposes in different areas, but also the volumes required to deliver the water and the economic returns. Consistency in measurement of volumes is essential to make this information useful for planning and resource management.

It is important for both the NSW and Commonwealth governments to have confidence in assessments of volumes used and required for conveyance of water within these schemes, for the purposes of review of water sharing plans and for investing in water system efficiency measures. Accurate metering is essential for this.

Benchmarking of water consumption and use is an important tool to assist and guide investment and management strategies. It is critical that there is confidence that the basis of the methods used to develop such benchmarks are consistent and reliable through all jurisdictions.

Efficiency of water delivery is a key tool to identify areas that need to be targeted in the future in regard to programs such as channel lining and system automation. Without accurate metering, such programs may be delivered in an inappropriate manner.

Consistent with national trade measurement legislation, it is also appropriate that metering used for billing and for measuring extraction of allocated water is of the same high standard as will apply outside of these schemes, to ensure equitable sharing of water and billing within the schemes.

Many of the water service providers are already upgrading their farm gate meters, or are considering doing so. In many cases they are able to apply for Commonwealth grants to undertake this work. The NSW government will discuss with each water service provider their plans for meeting the NWMS and MAF for meters and may put in place statutory obligations for them to implement these plans and report on progress, based on realistic timeframes and funding capacity. Alternatively the government
may recommend the current exemption from national trade measurement legislation be removed so that the metering within the schemes would fall under that arrangement.

It is the intent of the government that all meters within these schemes should be compliant or deemed compliant by July 2020 at the latest.
Supporting arrangements

Statutory enablement

Under the Water Act 1912 and the Water Management Act 2000 (as recently amended) the government has all the powers necessary to for it to install, operate and maintain meters in accordance with the NWMS and MAF where it chooses to, or to require water extractors to do so through conditions on licences and approvals. It also has the powers needed to require reporting and compliance with the NWMS and MAF.

Interim water meter standards

At the present time there are no meters that have been pattern approved, and in the initial period of this program, the number of meters that are pattern approved will be small. To enable the requirements of the NWI to be progressed, the MAF allows interim water meter standards to be approved by jurisdictions. Meters that comply with approved interim standards are deemed compliant under the MAF. The intention is that interim standards should as much as possible reflect the objectives and methods of NWMS and the MAF.

Interim standards may be prepared for different circumstances by different entities. In NSW, interim water meter standards are approved by the NSW Commissioner for Water. They may be prepared to address the following circumstances:

- New meters where pattern approved meters are not available, but contemporary meters can be shown to comply with the intent of NWMS and provide an acceptable level of confidence that they will perform within the maximum permissible limits of error in field conditions (±5%) through other means specified in the interim standard.
- Existing meters shown to comply with the intent of NWMS and provide an acceptable level of confidence that they will perform within the maximum permissible limits of error in field conditions (±5%) through other means specified in the interim standard.
- Existing meters installed compliant with pre-existing standards that were developed in good faith to meet the emerging national standards, in which case the interim standard reflects the pre-existing standard.

An acceptable interim standard is a combination of the meter technology, meter installation configuration and operation procedures that will likely achieve the required level of accuracy. It could be based on verified manufacturer specifications, similar Australian or international standards, or appropriate testing.

The government itself has already prepared an interim standard\(^5\) to cover common metering situations prior to the availability of pattern approved meters. This standard generally reflects the NWMS, but allows for an alternative to pattern approval through written evidence of compliance with the maximum error requirement by other means such as an internationally recognised overseas testing regime. It is expected that this will cover the majority of cases that will arise in the early stages of meter roll-out.

Additional interim standards may be developed over time. In particular water service providers may wish to draft and seek approval of interim standards for recently installed meters in rural irrigation and water supply schemes.

\(^5\) NSW Officer of Water, *NSW Interim Water Meter Standards*, 2 Oct 2009
Exempt meters
In some cases a meter can be exempted from compliance by the NSW Commissioner for Water, on the basis of the meter being a best practice contemporary meter, where there are no available compliant or deemed compliant meters suitable for the situation. Such cases are expected to be rare. They will be recorded as exempted in information systems, together with documentation of the basis for the exemption.

Testing facilities
The provision of testing facilities and equipment for pattern approval of meters is a national issue. The Commonwealth is currently working to facilitate the accreditation of facilities as verifying authorities under the *National Measurement Act 1960* to provide the pattern approval and verification capability envisioned under the MAF. To ensure sufficient facilities are accredited, Australian Government funding is being made available through *Water for the Future*, to upgrade existing water meter testing facilities to test non-urban water meter designs against the national water meter standards and seek accreditation through the National Association of Testing Authorities.

Supply of meters
With the roll-out of significant numbers of meters under this project there will be a large demand for pattern approved meters in NSW and across Australia.

In Australia at present, there are a dozen or more vendors competing in the market for rural water meters and a number have already commenced pattern approval testing. There is also strong market competition in the pressurised irrigation meter sector in sizes up to 600 mm. However, meter vendors may find it uneconomic to pattern approve meters across the full range of meter types and capacities which will be required in NSW.

Meters used in NSW that are unlikely to attract great vendor interest on the basis of potentially low sales volume of any one configuration of meter installation include: bulk offtake meters to irrigation districts; floodplain harvesting and large river diversion meters (>600 mm); and groundwater meters in areas with unusual water quality or operating environments.

The government will consult with meter vendors to determine if industry is willing and capable of delivering pattern approved models across the full range of meter types and sizes required in NSW; or, alternatively, to determine the likely range of meter types and sizes that will be supplied into the NSW market.

To assist meter vendors, the government will publish information about the likely quantity of meters to be purchased, the size of meters and the metering application and circulate to vendors once this information is available.

Certified installers and validators
A two day course is now available for the certification of persons in installing and validating rural water meters according to the NWMS. Certified persons are listed on the Irrigation Australia website (see [http://www.irrigation.org.au/index.cfm?/training-and-certification/certified-meter-installers](http://www.irrigation.org.au/index.cfm?/training-and-certification/certified-meter-installers)). With this in place persons across NSW will be able to readily obtain certification.

Most of the metering site assessment, installation and validation work in NSW will be undertaken by certified contractors from the private sector. There are at least five hundred businesses in regional NSW involved in irrigation and pump supply (based on a Yellow pages listing). With the ready availability of certification courses, it is expected that a substantial number of these persons will become certified to do this work.
The government will require that all work done on meters installed under government funded programs is done by appropriately certified persons. It will also be a requirement that water extractors make use of appropriately certified persons to install or maintain meters under their control.

A shortage of contractors to undertake metering work could be a problem in more remote locations or where the volume of work in a region is not high enough to justify the investment in training. To bridge this gap the government will have a number of agency staff certified to do this work.

**Information systems**

New information systems will be needed to collect, store and manage the large volume of meter readings, and the information needed for asset management and reporting under the MAF. These systems will be designed and built using capital funds in the early stages of the roll-out.

While aggregated water extraction information and asset management information will be publicly reported, information on an individual’s water meter and water extraction will be treated as private, and will be subject to appropriate NSW Government copyright arrangements. Water extractors will be provided with secured, internet-based access to that information to support their own operations.
Funding implementation

NOW estimates that, on average, new meter installations (including telemetry and associated works) will cost around $12,000 to $15,000 per site.

The Commonwealth Government has committed to providing $28.6 million to install or upgrade meters in the Hawkesbury Nepean as part of a $77.4 million funding package to help restore the health of the river. Subject to development of a detailed business case and due diligence assessment, the Commonwealth has also committed to provide $221 million for this work in the Murray Darling Basin. This funding is provided to upgrade or replace existing meters that are non-compliant with the NWMS, as well as to install new compliant meters at unmetered sites.

The remaining coastal regions of NSW are largely unmetered. It is estimated that the total capital cost to install meters in these regions is in the order of $50 million to $100 million.

Ongoing operation and management of meters in accordance with the MAF will include:

- Regular routine maintenance by a qualified person in accordance with maintenance requirements set out in meter pattern approvals and manufacturer documentation, and a written corrective and preventive maintenance schedule.
- Collection of meter readings and management of water extraction data.
- Costs of telemetry operation.
- Periodic validation inspections by certified inspectors.
- Repair of faults by certified persons.
- Re-verifications by certified persons after significant changes.

NOW commissioned a study to determine the expected costs associated with meter operation and maintenance in accordance with NWMS and the MAF. This study determined unit costs based on benchmarking of costs incurred by metering authorities and detailed analysis of the work required. The study found that the likely annual operating and maintenance costs range from $262 to $835 per meter per year, the higher costs usually being associated with sites where an electromagnetic meter and logger is installed, with telemetry capability being obtained through satellite technology. Based on the expected range of meters expected to be installed in the field, it is estimated that the average cost will be $426 per meter per year.

It is important to note that the implementation of the NWMS and MAF, plus the addition of telemetry, has expanded the cost of metering. The costs of higher standard meters, better installations, real time access to meter readings, improved maintenance and an ongoing validation program will be higher than the costs typically incurred by landholders managing their own meters in the past. This is the necessary price for improved water extraction data accuracy, reliability and accessibility, consistent with the much-increased value of water compared to decades ago.

The NSW government does not propose to recover from water extractors costs for meter installation that are funded by Commonwealth grants, nor does it propose to recover costs for depreciation of these meters.

The government does propose to recover from water extractors any on-going meter operation and maintenance costs it incurs. Additionally, when government installed meters reach the end of their life, it is proposed to recover the cost of meter replacement commencing at the time of replacement. Meters are expected to have a life of 10 years or more (25 years for electromagnetic meters), and telemetry equipment a life of 10 years.

In NSW, costs for bulk water services provided by NOW and SWC are subject to determinations by the Independent Pricing and Regulatory Tribunal of NSW (IPART), who determine the maximum
prices NOW and SWC can charge. In its December 2009 submission to IPART NOW foreshadowed that it would be proposing annual meter charges aimed at full cost recovery in three years time, in relation to areas where it has assumed responsibility for meter maintenance. In its September 2009 submission to IPART, SWC proposed to commence recovering maintenance costs for meters it installs commencing in the financial year after the meter is installed. IPART is currently considering these proposals and will be making its determination for the next three or four year period during mid 2010.

Within rural irrigation and water supply schemes, costs for upgrade/replacement of meters and maintenance of meters are likely to be of a similar level per meter as those described above. Some water service providers have already commenced the process of upgrading meters. Water service providers will determine how they cover the costs they incur to upgrade and maintain meters.
Audits and reports

Audits

Under the MAF, an audit refers to the collection and review of information relating, but not limited to:

- Meter details (numbers of licences/works, regions, meter types, sizes, ages, primary uses)
- Installation, condition inspections, corrective and preventative maintenance, reading, validation and verification (laboratory and in situ) activities
- Compliance activities
- Progress relating to complying with national standards
- Use of certified / trained personnel (where applicable)
- Compliance with documentary requirements of ATS 4747 (where applicable)
- Costs relating to new meters, existing meters and metering program management.

An audit does not include the undertaking of metering activities such as compliance inspections, maintenance, validations, or verifications themselves – an audit is a review of the metering activities undertaken during the audit period.

The government will record detailed audit information in the metering information system. Amongst other things, this system will record the following information for each meter:

- meter location and associated work approval
- meter make, model, size
- ancillary equipment (e.g. data logger, telemeter)
- date installed and cost, installer, date removed
- initial validation certificate, or evidence required for being deemed compliant under an interim water meter standard
- records of compliance activities, and non-compliances
- records of maintenance, alterations and repair activities, and whether such work required re-verification
- re-validations and re-verification certificates.

Agency staff or persons contracted to install, validate, undertake compliance checks, or maintain meters for which the government is responsible will be required to input this information into the information system on an ongoing basis.

In addition the government will maintain records of corrective and preventive maintenance schedules, budgets and associated procedures, as well as costs of operation and management of metering generally.

Water extractors who retain responsibility for their meters will be required to provide the above information (excepting information on compliance activities) to the government twice a year for meters on works taking more than 5000 ML/year, and annually for other meters. Forms and requirements for reporting will be prepared by the government and supplied to them. The information submitted will be input to the government metering information system.

Water service providers will be required to keep similar records for meters within water supply schemes under their control, and provide annual summary reports in accordance with forms and requirements specified by the government.
Reports

Commencing in the year 2010/11, the NSW government will prepare annual audit reports based primarily on information collected and stored in the metering information system, and information supplied by water service providers. Every two years a two year audit report will be prepared and published on NOW and SWC websites.

Details of the information to be compiled in these reports are presented in the appendix.
Glossary

Acronyms

- COAG: Council of Australian Governments
- IPART: Independent Pricing and Regulatory Tribunal
- MAF: Metrologic Assurance Framework
- NMI: National Measurement Institute
- NOW: NSW Office of Water
- NSW: New South Wales
- NWMS: National Water Meter Standards
- SWC: State Water Corporation

Terms

- Audit: A review of meter installations and operations undertaken by a water service provider, state/territory agency or certified person. Audits report on meter numbers and types, validation activities and overall meter performance and reliability.
- Certification scheme: A national scheme for certifying meter installers, maintainers, validators and inspectors, ensuring minimum levels of competency to carry out activities critical for meter performance in accordance with Australian Standards and best industry practices.
- Certified persons: A person certified by an accredited organisation to undertake meter installation, maintenance and validation activities in accordance with best industry practices and Australian Standards or Technical Specifications. Certified persons may include but are not limited to water service provider staff, State/Territory government officers and irrigation industry contractors.
- Compliant meter: A meter that is pattern approved, verified, selected, installed and validated prior to use, in accordance with the NWMS and the MAF.
- Contemporary meter: A meter or metering system that due to technical, practical and legislative limits is not of a pattern approved design, however still meets the performance and installation specifications of the relevant jurisdictional department or agency. To be used only when the metering requirements of a particular site are beyond the operating range and capacity of all available pattern approved meters.
<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
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<tbody>
<tr>
<td>Deemed compliant meter</td>
<td>A meter which has been either:</td>
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<td></td>
<td>• demonstrated to operate within a ±5% error limit by in-situ verification, or</td>
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<tr>
<td></td>
<td>• of a design that has been pattern approved after the meter was installed, and the meter has been validated as being installed and working in accordance with the relevant pattern approval certificate</td>
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<td></td>
<td>• demonstrated to be compliant with an interim water meter standard approved by the NSW Commissioner for Water.</td>
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<tr>
<td>Exempt meter</td>
<td>Meter exempted from compliance by the Commissioner for Water, on the basis of the meter being a best practice contemporary meter, where there are no available compliant or deemed compliant meters suitable for the situation.</td>
</tr>
<tr>
<td>In situ volumetric testing</td>
<td>Volumetric testing of the meter in its normal operating conditions by a certified person. Testing methods include in-line testing against a reference meter or in situ measurement using a known volume.</td>
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<td></td>
<td>In situ testing for validation purposes must be undertaken by a certified person in accordance with approved guidelines.</td>
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<td></td>
<td>In situ testing for verification purposes must be undertaken in accordance with approved guidelines by a verifying authority or certified licensee appointed under the National Measurement Act 1960.</td>
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<tr>
<td>Laboratory testing</td>
<td>Removal and testing of the meter in controlled conditions by a certified person.</td>
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<td></td>
<td>Laboratory testing for verification purposes must be undertaken in accordance with approved guidelines by a verifying authority appointed under the National Measurement Act 1960.</td>
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<tr>
<td>Maintenance</td>
<td>Periodic condition inspection and maintenance (or replacement) of the meter undertaken by a certified or non certified person in accordance with Australian Standards or Technical Specifications and/or guidelines approved by the relevant State/Territory Government.</td>
</tr>
<tr>
<td>Meter</td>
<td>A measuring device or system (including its component parts) used to measure the volume of water passing through a closed conduit or open channel over a known period.</td>
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<tr>
<td>Regulated river</td>
<td>River in which water availability is influenced by instream infrastructure such as dams or weirs.</td>
</tr>
<tr>
<td>Seal (anti-tampering)</td>
<td>A device attached to the meter, couplings and pipe work to prevent the meter from being removed, interfered or tampered with by unauthorised persons. The seal usually consists of stainless steel wire and ferrules joined by a sealing tool and marked with the name and/or logo of the relevant department or agency. The seal is not a verification mark.</td>
</tr>
<tr>
<td>Unregulated river</td>
<td>River in which water availability is not influenced by instream infrastructure such as dams or weirs.</td>
</tr>
</tbody>
</table>
Validation (post-installation and ongoing)  Mandatory inspection and/or testing of the meter and installation, undertaken by a certified validator to ensure the meter is pattern approved, laboratory verified, correctly installed and there is an acceptable level of confidence that it operates within the maximum permissible limits of error (±5%) allowable under in situ conditions. Inspection may include removal of the meter and an internal check of lead in / lead out pipes where necessary. Post-installation validation is an initial in situ inspection undertaken after a meter is installed, and may also include in situ volumetric testing where appropriate. Ongoing validation is undertaken at any time during the meter’s operating life and may include an inspection and/or in situ or laboratory volumetric testing where appropriate. Validation does not constitute verification in the meaning of the National Measurement Act 1960 or re-verification under trade measurement legislation.

Verification (in situ)  In situ volumetric testing after installation. Verification is testing in accordance with NMI approved procedures and is undertaken by a person appointed as a verifying authority or certified licensee under the National Measurement Act 1960, to ensure the meter operates within the maximum permissible limits of error specified by the National Measurement Regulations 1999 and complies with the pattern approval certificate.

Verification (laboratory)  Initial laboratory testing of the meter prior to installation, or laboratory testing after maintenance affecting the metrological performance of the meter. Laboratory verification is testing in accordance with NMI approved procedures and is undertaken by a person appointed as a verifying authority under the National Measurement Act 1960, to ensure the meter operates within the maximum permissible limits of error specified by the National Measurement Regulations 1999 and complies with the pattern approval certificate.

Verification mark  A mark placed on the meter by a verifying authority or certified licensee to indicate the meter has been verified and complies with the pattern approval certificate in accordance with national measurement legislation.

Verifying authority  A person appointed as a verifying authority under the National Measurement Act 1960.

Water service provider  A person or entity that owns, operates or controls the operation of works for the supply and delivery of rural water.
Appendix: Audit Report Template

NSW Non-urban Meter Audit Report

(as per specification in the National Framework For Non-Urban Water Metering, with adjustments for NSW circumstances)

2008 – 2009

Report summary

Audit period: Financial Year 01 July 08 – 30 June 09

Information provision

<table>
<thead>
<tr>
<th>Information provided</th>
<th>Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reports from Water Service Providers</td>
<td></td>
</tr>
<tr>
<td>Meter Statements from Entitlement Holders</td>
<td></td>
</tr>
</tbody>
</table>
## Completed operations

**Priority Meters – Open Channel**

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<thead>
<tr>
<th>Financial year 08 - 09</th>
<th>Unregulated rivers</th>
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**Total Meters End FY 08 - 09**

**Priority Meters – Closed Conduit**

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**Total Meters End FY 08 - 09**
### Other Meters – Open Channel

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</tbody>
</table>
Entitlements to be metered

Estimated meter requirements for the financial year 2009-10.

<table>
<thead>
<tr>
<th>Management Area</th>
<th>Total Entitlements</th>
<th>Entitlements to be Metered</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
<td>%</td>
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<tr>
<td>Total</td>
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</tbody>
</table>

Implementation Progress

Meters on unregulated river diversions
- Percentage of meters complying with pattern approval =
- Percentage of exempt meters (interim standards) =
- Percentage of priority meters requiring replacement =
- Percentage of priority meters requiring upgrade / replacement =

Meters on regulated river diversions
- Percentage of meters complying with pattern approval =
- Percentage of exempt meters (interim standards) =
- Percentage of priority meters requiring replacement =
- Percentage of priority meters requiring upgrade / replacement =
- Percentage of meters complying with pattern approval =

Meters in groundwater extractions
- Percentage of meters complying with pattern approval =
- Percentage of exempt meters (interim standards) =
- Percentage of priority meters requiring replacement =
- Percentage of priority meters requiring upgrade / replacement =
- Percentage of meters complying with pattern approval =

Meters in rural water supply schemes
- Percentage of meters complying with pattern approval =
- Percentage of exempt meters (interim standards) =
- Percentage of priority meters requiring replacement =
- Percentage of priority meters requiring upgrade / replacement =
- Percentage of meters complying with pattern approval =

***End of Summary***
Introduction

- General overview of non-urban meters across NSW
- Background on NWI and national/state implementation plan objectives
- Round-up of work undertaken during the financial year
- Major achievements and areas requiring improvement
- Progress against NWI, national and state implementation plans objectives
- Comments on the effectiveness of certification schemes.

Purpose and scope

The purpose of this report is to:

- Provide an overview of metering activities undertaken during the audit period
- Review overall meter performance, compliance and data provision outcomes
- Review progress of metering activities against the objectives the National Water Initiative Agreement [paragraphs 87, 88 and 89 (i)], and national and state implementation plans
- Identify areas requiring improvement to ensure consistent meter performance outcomes
- Identify practical and cost-effective opportunities to implement in situ verification
- Identify resource requirements for future metering activities.

This report applies to meters (including measuring devices, systems and their component parts) owned by entitlement holders, water service providers and the NSW Government, used for trade and/or related resource management activities in a non-urban setting.

The report does not apply to stream gauging stations or groundwater infrastructure used for resource monitoring purposes or meters used within urban supply and distribution systems.

Overview of metering activities for financial year

Information provision

- Overview of meter statements provided by entitlement holders (include localities / management areas)
- Overview of audit reports provided by water service providers and State Government (include schemes / management areas, organisations’ names, etc)
- Include further details of entitlement holder and WSP information in appendices if required

National certification scheme

- Assessment of effectiveness/ feasibility of certification scheme in supporting MAF objectives (where information is readily available to reporting agency)
- Resource/certification/training gaps
- Snapshot of staff, contractors and organisations holding certification as installers, maintainers and validators
Meters on unregulated rivers

Existing Meters

- Area by area snapshot:
  - Total numbers of meters and total numbers of water licences/water approvals
  - Breakdown by type, size and age
  - Primary uses (e.g. irrigation, industrial etc)

New Meters

- Rollouts under metering programs
- Area by area snapshot:
  - Total numbers of meters and total numbers of water licences/water approvals
  - Breakdown by type and size
  - Primary uses (e.g. irrigation, industrial etc)

Upgrade and Replacement

- Existing meters replaced and installations upgraded/reconfigured to comply with standards
- Replacement priorities
- Area by area snapshot:
  - Total numbers of meters and total numbers of water licences/water approvals
  - Breakdown by type and size
  - Primary uses (e.g. irrigation, industrial etc)

Maintenance

- Total number of maintenance activities requiring re-verification, meter size, type and primary use
- Total number of maintenance activities not requiring re-verification, meter size, type and primary use
- Total number of maintenance activities requiring re-validation, meter size, type and primary use
- Total number of maintenance activities not requiring re-validation, meter size, type and primary use
- Breakdown by types of maintenance (condition inspection, preventative, corrective, replacement)
- Outstanding maintenance

Validation Activities

- Total number of completed validations undertaken:
  - post installation
  - post maintenance
  - as compliance checks
- Results of collated validation certificates - meter size, type and primary use
- Outstanding validations
Verification Activities (where available)

- Total number of re-verifications (laboratory and/or in situ) in response to post-maintenance requests from entitlement holders or others - meter size, type, primary use, errors found, possible causes, corrective work undertaken
- In-situ Verification – ad hoc / program, developments, opportunities, challenges, errors found, possible causes, corrective work undertaken

Compliance Activities

- Total number of compliance checks undertaken - external visual checks; checks of seals, corrosion, leaks, correct version of software, materials and lining of pipe; internal visual checks
- Number of non-compliant meters and installations

Meters on regulated rivers

- As for meters on unregulated rivers.

Meters on groundwater

- As for meters on unregulated rivers.

Meters in rural water supply schemes

- As for meters on unregulated rivers.
Operational issues

- Data provision – overall outcomes for clients, resource management and NWI / BoM needs.
  Data issues requiring improvement
- Areas, meter types, installations and conditions requiring improved performance and reliability
- Outstanding Issues – outstanding validation, tests, replacements etc and reasons

Resources and costs

- Overview of the resources used and the costs incurred across the State for on-ground metering activities and administrative / supporting activities for the financial year. Separated into costs incurred by state agencies, private water service providers and water licence/approval holders.
- Cost broken down into broad areas such as:
  o Meter purchase, installation
  o Maintenance, validation and verification activities
  o Project management and administration
  o Certification of personnel
- Funding sources
  o State
  o Water licence/approval holders
  o Commonwealth

Water licences/water approvals to be metered

- Overview of numbers of water licences/water approvals by management area, percentage metered and explanation of difference
- Overview of notional volumes of entitlements metered and not metered.

Conclusion

- Do the metering activities indicate progress against the NWI, national and state implementation plan objectives?