

M-SPE-STD-007 Meters for Non-Urban Water Supply

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Version No.	Document No.	Document Owner:	Approval Date:	Document Approver:	Page:
3	SPE-00347	Principal Engineering Standards and Assurance	07/01/2025	General Manager Engineering	2 of 19

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Contents

1.	Purpose	4
2.	Scope	4
3.	Technical Requirements	5
3.1.	Water Meter.....	5
3.2.	Pressure Class.....	6
3.3.	Meter Installation.....	6
3.4.	Straight Pipe Lengths	6
3.5.	Layout and Assets	7
3.6.	Pipework and Connections (Meters ≤ DN300).....	10
3.7.	Pipework and Connections (Meters > DN300).....	11
3.8.	Valves	11
3.9.	Electrical and Communications	11
3.9.1.	Irrigation Meters.....	11
3.9.2.	Non-Irrigation Meters.....	11
3.9.3.	General	12
3.10.	Meter Site.....	12
3.11.	System Configuration Considerations	12
3.12.	Validation	13
3.13.	Operation and Maintenance Documentation	13
4.	Definitions and Abbreviations	14
5.	Roles and Responsibilities	15
6.	References and Related Materials	15
7.	Changes from previous version	18

Version No.	Document No.	Document Owner:	Approval Date:	Document Approver:	Page:
3	SPE-00347	Principal Engineering Standards and Assurance	07/01/2025	General Manager Engineering	3 of 19

This document is the property of Seqwater. It must not be copied or reproduced in any way whatsoever without the authority of Seqwater. This document is uncontrolled when printed. An electronic database manages and stores the controlled version.

1. Purpose

This document is part of a suite of Seqwater Engineering Standards which are in alignment with the Seqwater Quality Management System. Their purpose is to provide a consistent approach to the development, modification, and management of Seqwater infrastructure that is fit for purpose, economic over the life of the asset, and meets Seqwater Work Health and Safety obligations.

The intention of this specification is to meet the Queensland Water Regulation 2016 and the Queensland interim water meter standard for non-urban metering.

This document must be used in conjunction with the documents it references to assist in ensuring fit for purpose infrastructure. This Standard Specification is not intended to be relied on solely for design, supply, and installation works; advice from specialist engineers and/or manufacturers may be required on a case-by-case basis.

Meters for non-urban water supply are those used for metering raw water extracted under an access entitlement, including raw water extraction for drinking water production. This entitlement can be either a water allocation, licence, or permit issued by DLGWV.

The majority of applications for this Standard Specification relate to metering of irrigation water; however, it is intended that it be used for all applicable non-urban water metering installations managed and owned by Seqwater. For irrigation installations, this specification is only applicable to the Seqwater owned portion of the installation which is typically the installed section from the start of the inlet straight section to and including the isolation valve. Refer to **Error! Reference source not found.** and Figure 4 for typical installations.

2. Scope

This Standard Specification applies to all Seqwater employees, contractors, suppliers, and consultants working for or on behalf of Seqwater unless otherwise stated. It applies to all new assets and to all existing assets undergoing refurbishment or modification. It must be used in conjunction with other relevant Seqwater Engineering Standards and project specific documents to define the technical requirements for infrastructure design and construction.

Where single or discrete components of an existing non-compliant system are to be replaced, refurbished, or modified, this standard should not automatically be applied to the entire system retrospectively, however consideration should be given, in consultation with relevant stakeholders, to the extent of the application of the standard outside of the components requiring replacement, refurbishment or modification, to ensure safe, economic, and fit for purpose infrastructure.

Seqwater Engineering Standards detail Seqwater's minimum requirements and recommendations to provide infrastructure that will be fit for purpose, and safe to operate and maintain. However, compliance with these requirements and recommendations does not remove, and cannot be relied on as meeting, the designer's overarching responsibility for ensuring infrastructure designed is fit for purpose and safe to construct, operate, maintain, and demolish. The designer must exercise appropriate due diligence to identify and manage hazards so far as is reasonably practicable.

Version No.	Document No.	Document Owner:	Approval Date:	Document Approver:	Page:
3	SPE-00347	Principal Engineering Standards and Assurance	07/01/2025	General Manager Engineering	4 of 19

Designers must also ensure compliance with relevant Australian Legislation, Standards, Codes and Guidelines (including those produced by Water Services Association of Australia). Where no Australian Standard exists for a particular application, work must conform to the most current version of an industry accepted international standard.

Deviation from meeting the minimum requirements in this Standard Specification requires written agreement from Seqwater as per the deviation process detailed in Procedure *X-PRO-STD-008 Asset Standards Management and Application*. That process includes completion of an *X-TMP-STD-022 Asset Standards Deviation Request Form* and submission by the Seqwater Project Representative to the Seqwater Engineering Mailbox. Where noted in this Standard Specification that Seqwater approval, agreement, or acceptance shall/must be sought, such approval, agreement or acceptance must be gained through the Seqwater Asset Standard Deviation process, as outlined above.

Responsibility for ensuring compliance with Seqwater Engineering Standards lies with those engaged in the management and execution of design, construction, and modification of Seqwater infrastructure. This includes modifications to the functional design of the infrastructure including technical changes made which would extend an asset outside of its design operating envelope and/or approved operation and maintenance practices.

Any ambiguities or conflicts identified between specific requirements within this Standard and project documents, another Seqwater Engineering Standard or Australian Legislation, Standards, Codes or Guidelines, these must be brought to the attention of the Seqwater Document Owner, via the Engineering Mailbox, for clarification. Where it is proposed to proceed without meeting the requirements of this standard, agreement must be obtained via the Deviation Process, as outlined above.

Seqwater undertakes regular updates of its Engineering Standards. Before utilising this Engineering Standard, the complete list of Seqwater Engineering Standards should be reviewed to ensure currency and applicability of standards to be applied to the works. These can be accessed on the Waternet Engineering and Asset Standards page or using the REX Saved Search "Engineering Standards Controlled Documents by CD Owner".

3. Technical Requirements

The meter and installation must comply with Seqwater Standard Specifications *M-SPE-STD-001, General Mechanical Specification*, *E-SPE-STD-001, Electrical Design and Construction*, and *I-SPE-STD-013, Control System Design and Construction*, in addition to the requirements within this specification.

3.1. Water Meter

All water meters must be NMI M 10 pattern approved as a minimum except for meters used for raw water extraction by Seqwater for drinking water production or meters greater than DN400. These meters shall be either NMI M 10 or NMI R49 (or equivalent) pattern approved Electromagnetic Flow Meters.

The meter selected must be specified by the Manufacturer as suitable for measurement in the relevant metering application and water quality with Electromagnetic flow meters being preferred due to their high accuracy, telemetry capabilities and 20+ years design life.

Meters shall be suitable for the maximum and minimum flows, pressures, forces, temperatures, and other duty conditions.

Version No.	Document No.	Document Owner:	Approval Date:	Document Approver:	Page:
3	SPE-00347	Principal Engineering Standards and Assurance	07/01/2025	General Manager Engineering	5 of 19

Meters must be rated to operate within 0.1 to 30°C (T30 temperature class) at a minimum. Water meters approved with a T30 temperature class must also comply with a limiting condition of 50°C as specified in *NMI M10*.

Meters must be suitable for the operating environment (e.g., UV exposure, severe weather, etc.) and have a minimum ingress protection rating of IP68 in accordance with AS 60529.

Meters subjected to direct sunlight containing LCD displays with a hinged or removable plastic cover over the display, must have a suitable, robust, metallic sunshade installed above the meter to protect the display.

The electronics of the meter must have a metrological tamper proof seal to protect the electronic unit from being removed and the factory setup parameters from being changed. Breaking of this seal will require the meter to be revalidated by the meter manufacturer. The housing of the meter's transmitter must have provision for a utility seal, (steel twisted wire and steel crimp) to prevent unauthorised access to the meter's transmitter and battery removal. The utility seal must be fitted to the meter by the certified meter validator after the meter installation has been validated, or the transmitter has been accessed to change the battery, or similar, by the certified meter validator.

The meter display must be in metric units, with readings in ML unless otherwise specified.

Meters must have a clearly identifiable Manufacturer's serial number and pattern approval number securely attached or imprinted.

Where applicable, meters must include an arrow cast into the meter body indicating the required direction of flow through the meter.

3.2. Pressure Class

The pressure class of the Seqwater owned section of the meter installation, including all pipework and associated fittings must be PN16 minimum or have a minimum, temperature de-rated pressure rating equivalent to, or higher than the system design pressure, as determined by a full system hydrodynamic analysis considering all transient system operating pressures.

3.3. Meter Installation

While this document provides minimum installation and layout requirements for electromagnetic meters, it is important that all aspects of the installation be specifically designed and commissioned with consideration of the site requirements, constraints, and conditions as detailed in the meter Manufacturer's requirements, AS 4747.5, the *Queensland interim water meter standard for non-urban metering* and the *water meter installer and validator guide for non-urban water meters*.

3.4. Straight Pipe Lengths

There must be a minimum straight pipe length of 5 x pipe diameters upstream of the meter and 3 x pipe diameters downstream of the meter, unless a greater number of straight lengths are required as part of any NMI M 10 pattern approval or recommended by the Meter Manufacturer. Upstream and downstream pipe lengths must be straight rigid pipe with uniform and circular cross section within +/- 5% of the internal diameter of the meter. There must be no valves, bends, strainers, reducers, branches, or other fittings placed within the upstream and downstream straight pipe lengths.

If required due to site constraints, installations may have less than the above minimum straight pipe lengths, provided that the installed meter's NMI M 10 pattern approval explicitly allows for the proposed straight pipe lengths and the meter Manufacturer confirms, in writing, that the proposed meter installation will meet the

Version No.	Document No.	Document Owner:	Approval Date:	Document Approver:	Page:
3	SPE-00347	Principal Engineering Standards and Assurance	07/01/2025	General Manager Engineering	6 of 19

required MPE. An approved deviation per *X-PRO-STD-008*, with supporting justification, is required for any proposed reduced straight pipe length installation.

Straight pipe lengths more than the above minimum may be required dependent on the specific installation. The need for this should be based on the meter's pattern approval requirements (if applicable) and Manufacturer's recommendations backed by empirical volumetric testing data. In the absence of this information, AS 4747.5 Appendix B nominates preferences for good practice installations to minimise the effect of various types of disturbances, which should be adhered to. Examples of where increased straight pipe lengths may be required include, but are not limited to, installations where there is: an upstream pump, strainer, valve (isolation or control), multiple elbows in plane, multiple elbows out of plane or expanded or reduced pipe diameter.

An example of where the pattern approval requirements are greater than the general installation requirements specified above, can be found in the pattern approval NMI M10 14-3-57 for the Bermad Turbo IR-M. These requirements are: If all bends are in a single plain and the installation includes a minimum 3 X DN rise and fall pipe prior to the flow meter, then 5 x DN upstream and 0 x DN downstream straight pipe lengths are required with a fully open butterfly valve immediately prior to the inlet straight pipes. If there are any valves, bends, strainers, reducers, branches, or other fittings placed upstream of the flow meter, then 150 x DN upstream and 5 x DN downstream straight pipe lengths are required. For full details of the installation requirements for this meter, refer to the NMI pattern approval via the following link, [NMI 14/3/57](#).

3.5. Layout and Assets

Meters must be installed above ground, unless otherwise approved via a deviation. Examples of where above ground installation may not be practicable in some cases include, but are not limited to, meters gravity fed from channels or large meters (> DN300).

Direct buried flow meters and associated valves are not acceptable. Any flow meter and/or associated valves below ground level must be within a suitable concrete, concrete composite or HDPE pit with a class B minimum cover. Suitable drainage of the pit must be provided, or the pit is to be fully sealed to prevent ingress. A dismantling joint must be included within the pit to enable maintenance and removal of the equipment. The proposed pit design must be submitted with a deviation for a below ground installation. For meters greater than DN550, the pit must conform to *D-DWG-STD-029, Flow Meter Pit (DN600 and Larger) General Arrangement*.

To ensure that the meter will always run full and that there is no effect from entrapped air, the meter must not be installed at a local high point or on a downward sloping pipe section. In order to ensure the meter is not at a local high point, there must be a section of pipe, after the meter, where the bottom of the pipe section is above the top of the meter (refer to Figure 1). Any air at the flow meter must be able to freely move to the local high point. The local high point must be downstream of the meter. Figure 1 and Figure 2 below shows examples of acceptable and unacceptable layouts in relation to the above identified issues. Note that the layouts in these figures are intended to clarify the above requirements and do not show all assets required for the installation.

Version No.	Document No.	Document Owner:	Approval Date:	Document Approver:	Page:
3	SPE-00347	Principal Engineering Standards and Assurance	07/01/2025	General Manager Engineering	7 of 19

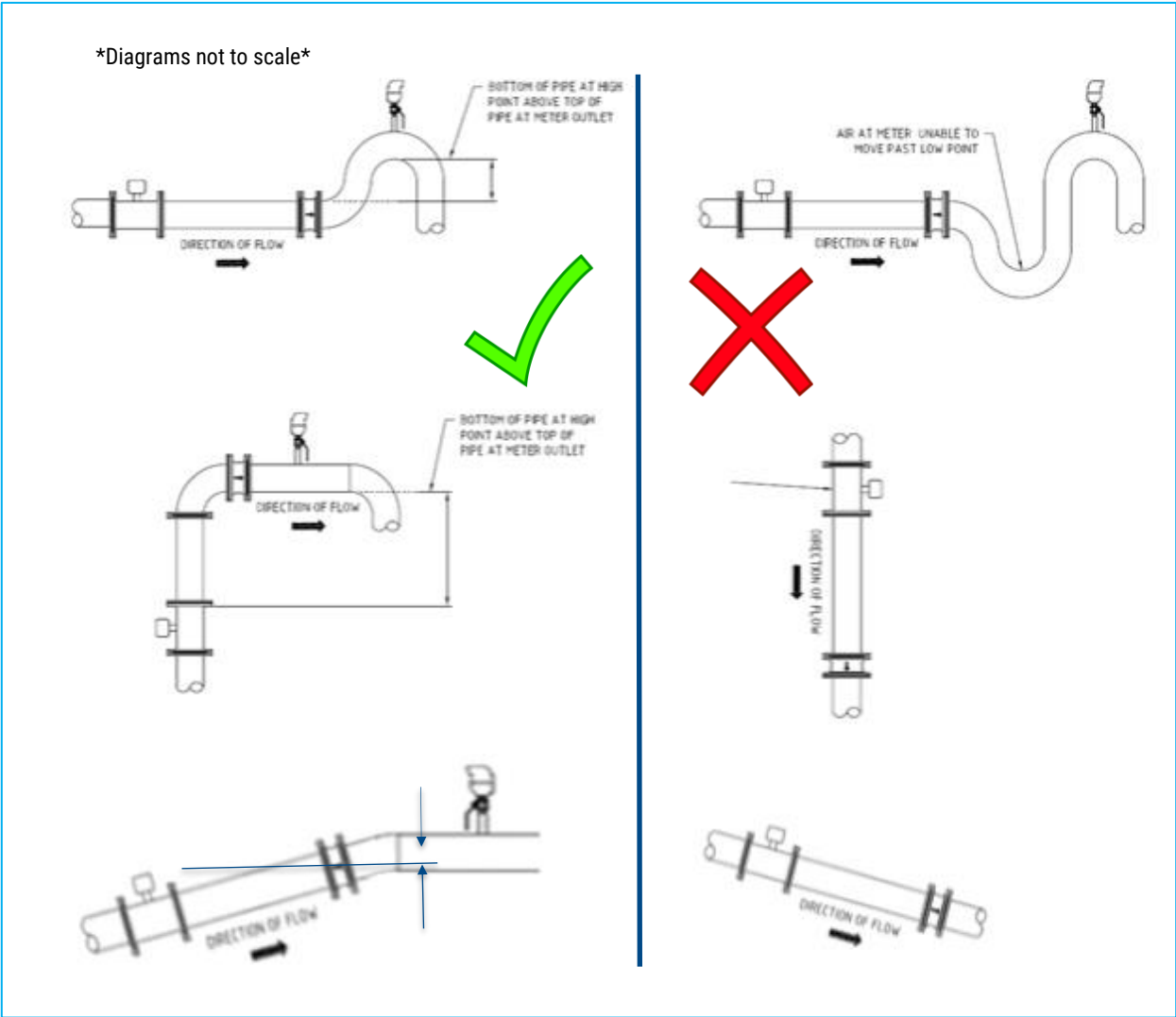


Figure 1 – Acceptable Examples

Figure 2 – Unacceptable Examples

Subject to manufacturer’s recommendations, it is acceptable to install meters in either a horizontal or vertical orientation (as per Figure 1).

The overall installation height (i.e., highest point) should be less than 1700 mm or a clearance height for the irrigator’s equipment, whichever is lower, to ensure that meter reading and/or maintenance does not require an access platform or ladder and to prevent a collision with irrigation equipment.

For installations where readings are taken directly from the meter, the read-out should be a minimum height of 600 mm above ground level to facilitate meter reading. The read-out numbers must be horizontal for vertical installations.

The meter sensing axis relative to any upstream bend(s) must be as per the Manufacturer’s requirements.

Where required to facilitate future asset replacement and maintenance, a means of local isolation must be provided downstream of the meter and non-return valve (if installed). The need to install an isolation valve at the site is based on the pipeline system design and requirements. Valves should be installed above ground where practicable.

Version No.	Document No.	Document Owner:	Approval Date:	Document Approver:	Page:
3	SPE-00347	Principal Engineering Standards and Assurance	07/01/2025	General Manager Engineering	8 of 19

Any customer supplied flow control valve shall be installed downstream of the Seqwater installation. (Seqwater installations do not include flow control valves)

A non-return valve shall be installed within the Seqwater installation, unless there is no possibility of syphoning or reverse flow past the meter due to the pipeline system design. The non-return valve may be installed either side of the up or down stream straight pipe lengths, but not within.

An automatic air release valve and dedicated isolating valve must be provided at the local high point, and any air at the flow meter must be able to freely move to that local high point. Where the meter is installed horizontally, the meter and adjacent pipework must be inclined at a minimum nominal grade of 1:200 towards the air release point to assist in expelling of air.

Dependant on the raw water source, the installation of a strainer or sand filter prior to the flow meter, to protect the meter from stones, sand, and fibrous material, should be considered to minimise any damage, wear or abrasion of the flow meter internal components and maximise the life of the meter.

Flange connections must be included on above ground or in-pit pipework to facilitate dismantling for future meter replacement and maintenance. Refer to Section **Error! Reference source not found.** and **Error! Reference source not found.** for further details related to flange connections.

Suitable restraint and support must be provided to mitigate any potential movement of the installation. As appropriate this shall include a slab or pit (with embedded puddle flanges), pipe supports and buried pipe restraints such as thrust blocks and/or bracing. All restraint and support must be designed to suit operating pressures and site ground conditions.

Figure 3 – Above Ground Electromagnetic Flow Meter Installation General Arrangement (Vertical Orientation Option)

and **Error! Reference source not found.** shows the preferred layout for vertical and horizontal electromagnetic flow meter installations, incorporating the above specified assets. Due to height constraints, vertical meter installation will likely only be possible for meters < DN125. Where the meter is to be installed in the horizontal orientation, the installation must conform to the arrangements shown in Figure 1. Note that figures provided show layout only and are not to scale; final design must be undertaken by a qualified person. Any installation that varies from the general arrangements shown in

Figure 3 – Above Ground Electromagnetic Flow Meter Installation General Arrangement (Vertical Orientation Option)

and **Error! Reference source not found.** must be submitted to Seqwater for review.

Version No.	Document No.	Document Owner:	Approval Date:	Document Approver:	Page:
3	SPE-00347	Principal Engineering Standards and Assurance	07/01/2025	General Manager Engineering	9 of 19

Notes:

- Diagram not to scale
- Do not use this diagram without referring to Section 6.3

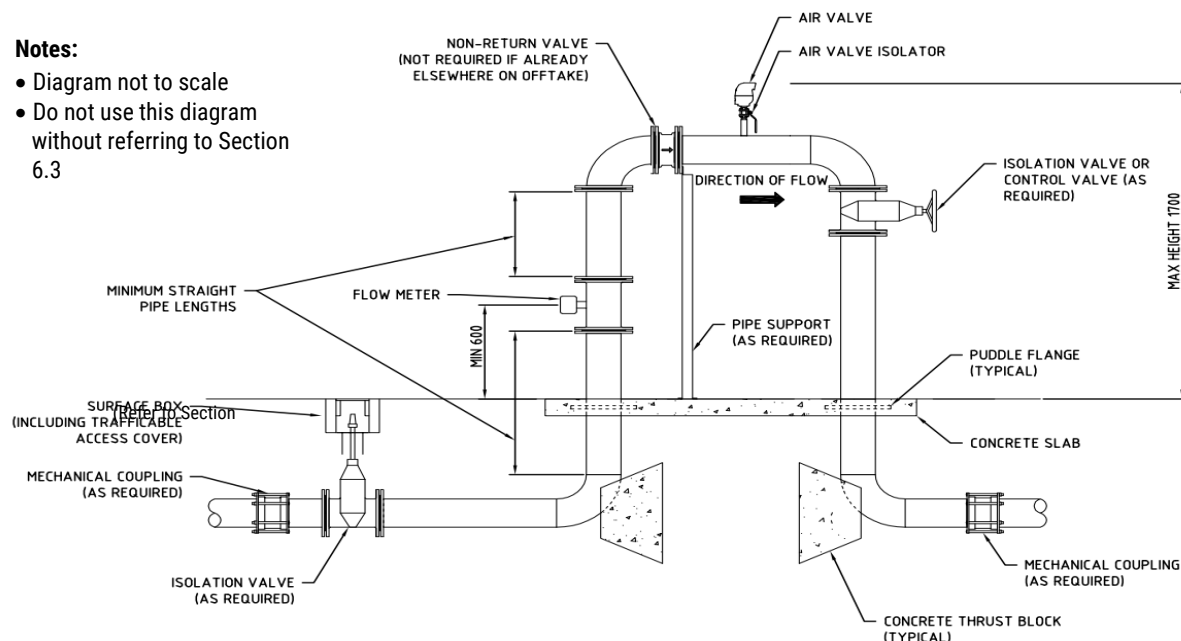


Figure 3 – Above Ground Electromagnetic Flow Meter Installation General Arrangement (Vertical Orientation Option)

Notes:

- Diagram not to scale
- Do not use this diagram without referring to Section 6.3

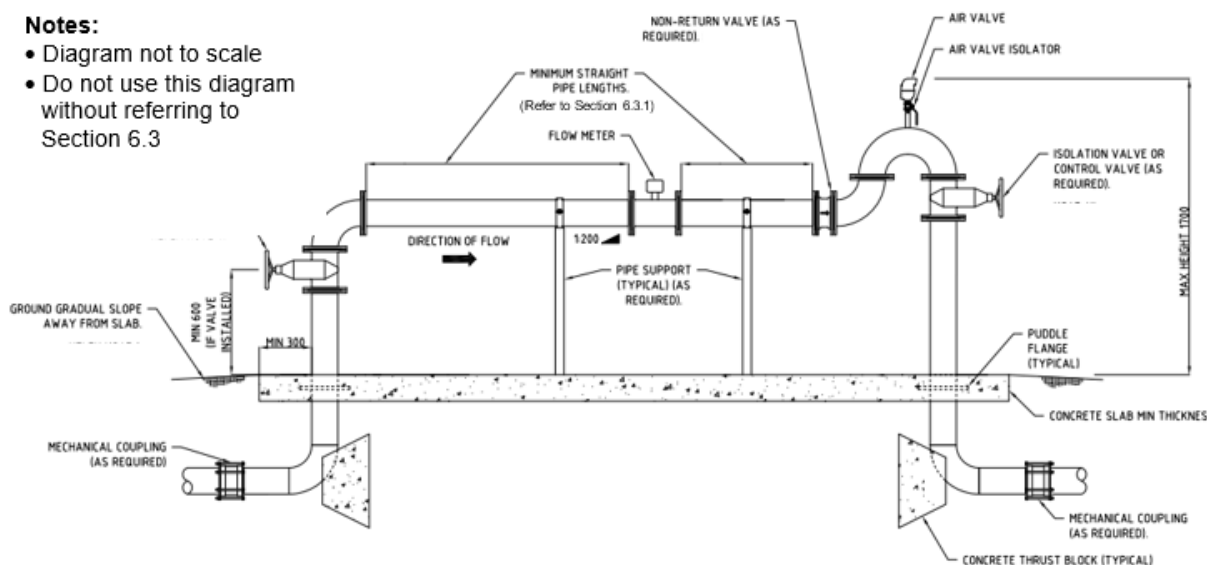


Figure 4 – Above Ground Electromagnetic Flow Meter Installation General Arrangement (Horizontal Orientation Option)

3.6. Pipework and Connections (Meters $\leq$ DN300)

This section applies to meters $\leq$ DN300. Unless recommended otherwise by the Manufacturer, the following pipe materials are accepted for the meter installations:

Stainless steel grade 316 (minimum schedule 10s). This is the preferred material for all new and updated installation.

Version No.	Document No.	Document Owner:	Approval Date:	Document Approver:	Page:
3	SPE-00347	Principal Engineering Standards and Assurance	07/01/2025	General Manager Engineering	10 of 19

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Internally epoxy lined mild steel (minimum schedule 40). A suitable external pipe coating per WSA 201 must be provided.

Internally epoxy lined ductile iron. A suitable external pipe coating per WSA 201 must be provided.

Hot dip galvanised carbon steel pipe is not acceptable for new installations and should be replaced with accepted materials described above if an existing installation is being updated or is not in good condition. However, it may be acceptable within an existing installation, provided that the pipe and coating is still in good condition and the galvanised coating is repaired per AS 4680 for any modified/welded areas where the galvanising has been removed or compromised.

The end connection flanges to the meter and pipework must be in accordance with AS 4087 PN16 unless a higher-pressure class is required.

All bends must be long radius type bends.

Buried couplings and buried hot dip galvanised mild steel pipe must be wrapped with a protective tape system designed for the corrosion protection of pipelines. The installer must comply with all written recommendations by the Manufacturer regarding application of the protective tape system.

Generally, bolt and nut sets shall be 316 stainless steel, grade A4-70 minimum. Hot dip galvanised carbon steel bolt and nut sets must be used in combination with hot dip galvanised carbon steel pipework and flanges. Where a joint includes dissimilar materials, suitable 316 stainless steel bolts and nut sets shall be used with suitable galvanic isolation per WSA 201 section 7.18.

All bolts, nuts and washers must comply with AS1110 and AS1112 and AS1237. The threaded length of bolts must be such that after the joints are made, the bolt must protrude through the nut by at least two threads, but not by more than ten.

Flange bolt torques, and tightening sequences, must be in accordance with AS4087 or relevant flange specification requirements.

Flange gaskets must comply with WSA 109.

Welding and protective coating reinstatement must comply with the relevant Australian Standards.

3.7. Pipework and Connections (Meters > DN300)

Pipework and connections must be in accordance with M-SPE-STD-001 General Mechanical Specification.

3.8. Valves

Valves supplied as part of the meter installation must comply with M-SPE-STD-003 Valves for Water Applications, in addition to any requirements within this document. All valves supplied by Seqwater, particularly Air Valves, must be suitable for raw water applications and be suitable for the operating conditions.

3.9. Electrical and Communications

3.9.1. Irrigation Meters

All meters shall be battery powered with a minimum battery life of 5 years in service when operating in typical SEQ ambient conditions with data transmission to a data logger and/or telemetry device. The meter display must include an indication of battery condition to indicate remaining battery life. The meter must provide the means for battery replacement without the loss of any data

Version No.	Document No.	Document Owner:	Approval Date:	Document Approver:	Page:
3	SPE-00347	Principal Engineering Standards and Assurance	07/01/2025	General Manager Engineering	11 of 19

The meter must have the capability to produce a meter reading as an electronic output and must be capable of being fitted with an electronic data logger and/or automatic reading device that will allow remote reading of the meter (i.e. telemetry). Data transmission frequency should be optimized to meet requirements and minimize the draw on the flow meter battery so minimum battery life is achieved.

The Meter communications output capability should include, at a minimum,

- Total flow
- Instantaneous flow
- Battery condition
- Fault Alarm

3.9.2. Non-Irrigation Meters

Flow meters shall operate from a 24VDC power supply and be supported by a 24VDC uninterruptable power supply (UPS).

All flow totalisations must use the flowmeter to perform totalisation and achieve a maximum transmission error of $\pm 0.5\%$ between the transmitter and the facilities PLC and/or SCADA system. The use of a PLC or other devices to perform flow totalisation by means of flow integration or pulse quantity totalisation is not acceptable for license/billing purposes.

Where the flow meter is used for license/billing revenue purposes, a suitable fieldbus connection shall be used for instantaneous and total flow. Where the meter is also used for plant control and/or monitoring, an additional 4-20mA signal is required for Instantaneous flow. In both instances, a digital meter fault alarm is also required.

If there is possibility of reverse flow, then both the instantaneous and total flow shall be reported and totalised in both directions. This may be achieved via a digital output or assigning a polarity to each flow direction, with normal flow direction being +ve. In this case, the fault alarm is optional.

3.9.3. General

Where any flow meter is not installed in accordance with this specification, only manual totalisation readings, taken directly from the flow meter display, may be used for license/billing revenue purposes.

If the installation includes a remote mounted transmitter, then the cable length between the sensor and the transmitter shall be as short as practicable. The cable length shall be no more than 50m or the maximum cable length specified by the flow meter manufacturer for the actual measured fluid conductivity.

Electrical and control systems shall comply with *E-SPE-STD-001, Electrical Design and Construction* and *I-SPE-STD-013 Control System Design and Construction*.

Where a requirement under this Standard Specification conflicts with a requirement from a specification in the above list, the requirement within this Standard Specification shall apply.

3.10. Meter Site

The meter location shall be mutually agreed between the water entitlement holder and Seqwater, prior to site works commencing.

Per the Seqwater, Water Supply contract, the customer is responsible for the meters site, and access to it must, at all times, be safe and kept clear of:

- Oil, grease, noxious fumes, and hazardous materials
- Long grass, overgrown vegetation, and loose soil

Version No.	Document No.	Document Owner:	Approval Date:	Document Approver:	Page:
3	SPE-00347	Principal Engineering Standards and Assurance	07/01/2025	General Manager Engineering	12 of 19

- Hazardous machinery and equipment

Consideration should be given to protecting assets from external damage (e.g. due to cattle) where applicable. A fence and gate around the meter installation may be a practicable option in some cases.

3.11. System Configuration Considerations

There are specific raw water extraction system configurations which may (or will) effect the accuracy of water entitlement extraction metering. Where an installation does not conform with the requirements set out below, then the installation shall be made compliant during replacement or any update. The identified potential configurations and accepted approach to each are summarised below:

- **Water (or other liquid) which is not from an entitlement extraction point added to the pipeline prior to the meter.** Examples of this include, but are not necessarily limited to, treatment plant recycle streams and chemical injection.
 - If the volume of added liquid is greater than 1% of the actual volume of water drawn from the entitlement extraction point over the reportable period, the additional liquid stream must be measured by a dedicated meter. Minor volume additions (i.e. < 1% volume) are considered acceptable because extraction volume will be over-reported, which is not a risk in terms of resource management.
 - The dedicated meter for the additional flow must be compliant with this Standard Specification.
 - The meter reading for any added liquid shall be subtracted from the primary meter to calculate the total report entitlement extraction.
 - Any chemical injection point shall be after the Seqwater installation.
- **Off takes from pipeline prior to the meter.**
 - Any off take must be measured by a dedicated meter.
 - The meter for each off take must be compliant with this Standard Specification.
 - The meter readings from off takes shall be added to the primary meter to calculate the total report entitlement extraction.
- **Meter is located far away from the extraction point**, i.e. more than a few hundred meters.
 - This is permitted with prior approval from the Certified Meter Validator, however, the meter should be located as close as practicable to the extraction point to limit intentional or unintentional additions between the extraction point and the meter.
 - The primary identified risk is that if leaks in the pipeline between the extraction point and the meter are not detected, this could result in intentional or unintentional unmetered extraction. It is assumed that any significant leak would be noticed due to ground effects or a visible leak. It is the responsibility of the asset owner to maintain the pipework in good working condition.
- **The meter used to measure entitlement extraction is on the output side of an asset, and there is potential for raw water to be lost, removed from the asset.** Examples of assets include, but are not necessarily limited to, water treatment plants, raw water storage tanks and off-stream storages (ponds, lakes etc.).
 - This is not permitted as this arrangement may under-measure raw water extraction by an uncertain and/or variable percentage.
- **Extraction from multiple separate water sources measured by a single meter.**
 - Where extraction is from multiple separate entitlements, water from each entitlement needs to be measured and reported separately. I.e., multiple meters are required.

Version No.	Document No.	Document Owner:	Approval Date:	Document Approver:	Page:
3	SPE-00347	Principal Engineering Standards and Assurance	07/01/2025	General Manager Engineering	13 of 19

- Multiple offtakes on a single entitlement connected on a ring main may be fitted with one meter on the discharge of the ring main subject to an approved deviation.

3.12. Validation

The completed meter installation shall be validated by a certified meter validator who must certify that the meter is suited to the conditions and has been installed in accordance with this Standard Specification. The meter validation certificate must be issued to Seqwater and the entitlement holder.

As appropriate, persons undertaking meter installation, commissioning and validation activities are to hold certification under the national scheme developed by Irrigation Australia Limited (IAL) on behalf of the Commonwealth Government.

Note: on-going validation and maintenance requirements are not a part of this Standard however the scheduled maintenance requirements of AS4747 should be applied.

3.13. Operation and Maintenance Documentation

All meters must be supplied with factory acceptance and calibration certificates to verify performance and functions are as specified.

An Operation and Maintenance (O&M) Manual must be supplied for all equipment.

For assets which will be owned and managed by Seqwater at the completion of works, asset details must be submitted in accordance with *X-PRO-STD-010 Asset information instruction for project managers, contractors, and suppliers*.

4. Definitions and Abbreviations

Table 1 Definitions and Abbreviations

Term	Definitions
AS	Australian Standard (published by Standards Australia)
Certified Meter Validator	A person who is accredited by Irrigation Australia Limited as a certified meter validator. (Catchment and Dams Operations Supervisors in irrigation scheme areas are certified)
Contractor	An entity engaged by Seqwater to undertake work in accordance with an agreed contract with a defined scope of work.
DLGWV	Department of Local Government, Water and Volunteers
DN	Nominal diameter
ESA	Engineering Standards and Assurance
IAL	Irrigation Australia Limited
Manufacturer / Supplier / Vendor / Original Equipment Manufacturer (OEM)	The entity that manufacturers or supplies equipment to meet the specifications of the Contractor.
MPE	Maximum permissible error
NMI	National Measurement Institute, Australia

Version No.	Document No.	Document Owner:	Approval Date:	Document Approver:	Page:
3	SPE-00347	Principal Engineering Standards and Assurance	07/01/2025	General Manager Engineering	14 of 19

This document is the property of Seqwater. It must not be copied or reproduced in any way whatsoever without the authority of Seqwater. This document is uncontrolled when printed. An electronic database manages and stores the controlled version.

Term	Definitions
Non-urban water	Raw water extracted under an entitlement. This entitlement can be either a water allocation, licence, or permit issued by DLGWV.
Owner / Principal / Seqwater	The entity that engages the Contractor to undertake the work and takes custody of the outcome. The Owner may delegate responsibilities to other entities to act on its behalf (e.g. a consultant).
PN	Nominal pressure
REX	Seqwater Electronic Document and Records Management System.
Scope of Works	The scope of works document forms part of a business case and /or project contract, including supporting design documentation
SEQ	Southeast Queensland
Seqwater Approval / Agreement / Acceptance	Written sign-off gained via the deviation process, as detailed in X-PRO-STD-008 Asset Standards Management and Application Procedure.
Seqwater Engineering Standard	Includes Standard Procedures and Standard Specifications and associated supporting documents such as Standard Drawings, Guidelines, Lists, Datasheets, Manuals, Registers, and Templates.
Seqwater Installation	The Seqwater owned portion of the installation which is typically the installed section from the start of the inlet straight section to and including the isolation valve.
Seqwater Representative	The person empowered by Seqwater to provide advice on behalf of Seqwater. i.e. engaging officer for contractor works, project manager for internal works or irrigation team for billing and licence advice
shall / must	Indicates a mandatory requirement.
should	Indicates a recommendation.
Standard Specification / Specification	Technical Standard Specification M-SPE-STD-007, Meters for Non-Urban Water Supply
Water meter	An instrument intended to measure continuously, memorise, and display the volume of water passing through the measurement element or transducer at metering conditions. In this Standard Specification, a water meter is also referred to as a 'meter'
WSAA	Water Services Association of Australia

5. Roles and Responsibilities

Table 2 Roles and Responsibilities

Role	Responsibility
General Manager Engineering	Accountable for implementation and management of this Standard.
Leaders	In addition to the responsibilities of a worker, ensure compliance with this Standard Specification by those they lead.

Version No.	Document No.	Document Owner:	Approval Date:	Document Approver:	Page:
3	SPE-00347	Principal Engineering Standards and Assurance	07/01/2025	General Manager Engineering	15 of 19

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Role	Responsibility
Principal Engineering Standards and Assurance	Responsible for implementation and management of this Standard. Accountable and responsible for receipt and management of drawings.
Seqwater Project Manager	Accountable and responsible for implementation of this Standard as a whole. Some works may be delegated as appropriate.
Workers / Employees	Be aware of and comply with this Standard Specification.

6. References and Related Materials

The documents listed in Table 3 below, and the requirements therein, are relevant to this Standard Specification. In their latest editions, these documents form a part of this document. Note that this is not an exhaustive list of documents relevant to the works.

Seqwater undertakes regular updates of its Engineering Standards. Before utilising this document, the complete list of Seqwater Engineering Standards should be reviewed to ensure currency and applicability for the proposed works.

Table 3 References and Related Material

Description	Location
D-DWG-STD-015 Typical Irrigation Meter Installation Standard Drawing	REX & Waternet
D-DWG-STD-029 Flowmeter Pit (600 DN and Larger) General Arrangement Standard Drawing	REX & Waternet
PRO-01617 Engineering Standard X-PRO-STD-009 Engineering Design, Construction, Operation and Maintenance Procedure	REX
PRO-01845 Engineering Standard M-PRO-STD-001 Commissioning of Electromagnetic Flow Meters for Potable Water Procedure	REX
PRO-01872 Engineering Standard X-PRO-STD-002 Engineering Drawing Numbers Procedure	REX
PRO-01873 Engineering Standard X-PRO-STD-001 Asset Standards Document Classification and Naming Structure Procedure	REX
PRO-01874 Engineering Standard X-PRO-STD-004 Development and Review of Asset Standards Procedure	REX
PRO-02140 Engineering Standard X-PRO-STD-013 Engineering Technical Hazard Study Procedure	REX
PRO-02187 Engineering Standard X-PRO-STD-007 Drawing and Spatial Data Standards Procedure	REX
PRO-02190 Asset Strategy and Planning - X-PRO-STD-006 Equipment Numbering and Naming Convention Procedure	REX
PRO-02205 Engineering Standard X-PRO-STD-008 Asset Standards Management and Application Procedure	REX
PRO-02234 Management of Change (Technical) Procedure	REX

Version No.	Document No.	Document Owner:	Approval Date:	Document Approver:	Page:
3	SPE-00347	Principal Engineering Standards and Assurance	07/01/2025	General Manager Engineering	16 of 19

This document is the property of Seqwater. It must not be copied or reproduced in any way whatsoever without the authority of Seqwater. This document is uncontrolled when printed. An electronic database manages and stores the controlled version.

Description	Location
REG-01074 Engineering Standard X-LST-STD-001 Seqwater Preferred Equipment Register	REX
SPE-00323 Engineering Standard M-SPE-STD-003 Valves for Water Applications	REX
SPE-00352 Engineering Standard E-SPE-STD-001 Electrical Design and Construction	REX
SPE-00361 Engineering Standard I-SPE-STD-013 Control Systems Design and Construction	REX
SPE-00367 Engineering Standard M-SPE-STD-001 General Mechanical	REX
TEM-00153 Engineering Standard M-TMP-STD-003 Electromagnetic Flow Meter Commissioning Inspection and Test Plan Template	REX
TEM-00224 Engineering Standard X-TMP-STD-022 Asset Standards Deviation Request Template	REX
AS 1110 ISO metric hexagon bolts and screws Australian and International Standards Web Service	Intertek Inform
AS 1112 ISO metric hexagon nuts Australian and International Standards Web Service	Intertek Inform
AS 1237 Plain washers for metric bolts, screws and nuts for general purposes Australian and International Standards Web Service	Intertek Inform
AS 1318 Industrial safety colour code Australian and International Standards Web Service	Intertek Inform
AS 1319 Safety signs for the occupational environment Australian and International Standards Web Service	Intertek Inform
AS 2638.2 Gate valves for waterworks purposes - Resilient seated Australian and International Standards Web Service	Intertek Inform
AS 3000 Electrical Installations. (Wiring Rules) Australian and International Standards Web Service	Intertek Inform
AS 4087 Metallic flanges for waterworks purposes Australian and International Standards Web Service	Intertek Inform
AS 4312 Atmospheric Corrosivity Zones in Australia Australian and International Standards Web Service	Intertek Inform
AS 4680 Hot dip galvanised (zinc) coatings on fabricated ferrous articles Australian and International Standards Web Service	Intertek Inform
AS 4747.2 Meters for non-urban water supply - Technical requirements for closed conduit meters fully charged Australian and International Standards Web Service	Intertek Inform
AS 4747.5 Meters for non-urban water supply - Installation and commissioning of closed conduit meters fully charged Australian and International Standards Web Service	Intertek Inform
AS 4747.8 Meters for non-urban water supply - In-service compliance for non-urban water meters Australian and International Standards Web Service	Intertek Inform

Version No.	Document No.	Document Owner:	Approval Date:	Document Approver:	Page:
3	SPE-00347	Principal Engineering Standards and Assurance	07/01/2025	General Manager Engineering	17 of 19

This document is the property of Seqwater. It must not be copied or reproduced in any way whatsoever without the authority of Seqwater. This document is uncontrolled when printed. An electronic database manages and stores the controlled version.

Description	Location
AS 4794 Non-return valves - Swing check and tilting disc Australian and International Standards Web Service	Intertek Inform
AS 4795.1 Butterfly valves for waterworks purposes - Wafer and lugged. Australian and International Standards Web Service	Intertek Inform
AS 5830.1 In-line ball valves for use in plumbing water supply systems - Metal-bodied Australian and International Standards Web Service	Intertek Inform
AS 60529 Degrees of protection provided by enclosures (IP Code) Australian and International Standards Web Service	Intertek Inform
E.P Act Environment Protection Act (QLD)	Queensland Legislation
NMI M 10 Meters Intended for the Metering of Water in Full Flowing Pipes	National Measurement Institute
WHS Act Work Health and Safety Act	Federal Legislation
WSA 03 Water Supply Code of Australia	Water Services Association of Australia
WSA 109 Industry standard for flanged gaskets and O-rings	Water Services Association of Australia
WSA 201 Manual for Selection and Application of Protective Coatings	Water Services Association of Australia
WSS/2014/1170 QLD interim water meter standard for non-urban metering	Department of Local Government, Water and Volunteers
Queensland Water Regulation 2016	Queensland Legislation

7. Changes from previous version

This Standard Specification will be regularly reviewed in accordance with the requirements of the Seqwater Controlled Document Management Procedure. Reviews will include consideration of suggestions for alteration or improvement made in accordance with Seqwater Procedure X-PRO-STD-004 Development and Review of Asset Standards. Changes made from the previous version are summarised in Table 4 below.

Version No.	Document No.	Document Owner:	Approval Date:	Document Approver:	Page:
3	SPE-00347	Principal Engineering Standards and Assurance	07/01/2025	General Manager Engineering	18 of 19

This document is the property of Seqwater. It must not be copied or reproduced in any way whatsoever without the authority of Seqwater. This document is uncontrolled when printed. An electronic database manages and stores the controlled version.

Table 4 Changes from previous version

Section Number	Change
All	Re formatted to latest specification template
1	QLD interim water meter standard added and Seqwater owned portion of the installation added.
6	I-SPE-STD-013 added
3.1	Mandatory Electromagnetic meter requirement removed. NMI M10 pattern approval mandatory. Electromagnetic meter with NMI M10 or NMI R49 pattern approval are mandatory for Seqwater water extraction meters and meters > DN400. Paragraphs 3, 4 and 5 removed due to mandatory NMI M10 pattern approval. Sun shade requirement added. ML unit requirement added. Paddle Wheel meter installation requirements added,
3.2	Updated to include design pressure.
3.3	Installation and commissioning standards updated
3.4	Reduced straight pipe deviation requirements added
3.5	Direct buried assets are not acceptable and pit requirements added, signal cable moved to 6.9, Figure 6.1 updated to include inclined installation. Vertical and horizontal installations clarified with minimum height for readout, non-return and flow control valve position clarified,
3.6	HDPE pipe removed and Hot Dipped Galvanised pipe updated. Grade A4-70 SS bolts added, flange tightening changed to AS 4087.
3.7	Change to only refer to M-SPE-STD-001
3.8	Change to only refer to M-SPE-STD-003
3.9	New section added for electrical and control requirements.
3.11	Dot points updated to clarify requirements
3.12	Validation by a certified validator updated and maintenance requirements suggested to AS 4747
4, Table 1	Certified Meter Validator added, SOW and Seqwater Representative definition revised.
6, Table 3	D-DWG-STD-015, I-SPE-STD-013 and X-LST-STD-001, AS 4680 and WSA 201 added

Version No.	Document No.	Document Owner:	Approval Date:	Document Approver:	Page:
3	SPE-00347	Principal Engineering Standards and Assurance	07/01/2025	General Manager Engineering	19 of 19