



# *Government Gazette*

of the State of

New South Wales

**Number 218—Electricity and Water**

**Friday, 14 June 2024**

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**ENERGY AND UTILITIES ADMINISTRATION (ENERGY CONTRIBUTIONS)  
ORDER 2024**

*Energy and Utilities Administration Act 1987*

I, Penny Sharpe, Minister for Climate Change and Minister for Energy, with the concurrence of the Hon Daniel Mookhey MLC, Treasurer, make the following Order under section 34J of the *Energy and Utilities Administration Act 1987*.

Dated 6 JUNE 2024



The Hon Penny Sharpe MLC  
Minister for Climate Change, Minister for Energy

**Explanatory note**

Section 34J of the *Energy and Utilities Administration Act 1987* provides that the Minister may, by order published in the Gazette, require any one or more licensed distributors to make an annual contribution for a specified financial year to the Climate Change Fund. The purpose of this Order is to require defined licensed distributors to make an annual contribution to the Climate Change Fund for the financial year commencing 1 July 2024.

## 1. Name of Order

This Order is the Energy and Utilities Administration (Energy Contributions) Order 2024.

## 2. Commencement

This Order commences and takes effect on the date that it is published in the Gazette.

## 3. Interpretation

The Explanatory Note to this Order does not form part of the Order.

## 4. Definitions

**Climate Change Fund** means the Climate Change Fund established under section 34E of the *Energy and Utilities Administration Act 1987*.

**licensed distributor** means a licensed distributor listed in column 1 of Schedule 1.

## 5. Annual contribution

- (1) A licensed distributor is required to make an annual contribution to the Climate Change Fund for the financial year commencing 1 July 2024.
- (2) The amount of the annual contribution to be paid by a licensed distributor is as set out in column 2 of Schedule 1.

## 6. Time for payment

The annual contribution is to be paid by quarterly instalments (each being equal to one-fourth of the annual contribution payable) on or before the first day of August 2024, November 2024, February 2025, and May 2025.

### Schedule 1

#### Column 1

#### Column 2

#### Licensed distributor

#### Contribution for 2024-25

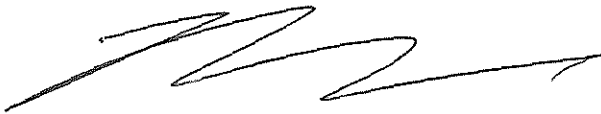
Ausgrid	\$139,518,616
Endeavour Energy	\$96,628,207
Essential Energy	\$61,255,634

**ENERGY AND UTILITIES ADMINISTRATION (WATER CONTRIBUTIONS)  
ORDER 2024**

*Energy and Utilities Administration Act 1987*

I, Penny Sharpe, Minister for Climate Change and Minister for Energy, with the concurrence of the Hon. Rose Jackson MLC, Minister for Water, make the following Order under section 34J of the *Energy and Utilities Administration Act 1987*.

Dated 6 JUNE 2024



The Hon Penny Sharpe MLC  
Minister for Climate Change, Minister for Energy

**Explanatory note**

Section 34J of the *Energy and Utilities Administration Act 1987* provides that the Minister may, by order published in the Gazette, require any one or more State water agencies to make an annual contribution for a specified financial year to the Climate Change Fund. The purpose of this Order is to require Sydney Water Corporation, a State water agency, to make an annual contribution to the Climate Change Fund for the financial year commencing 1 July 2024.

## 1. Name of Order

This Order is the Energy and Utilities Administration (Energy Contributions) Order 2024.

## 2. Commencement

This Order commences and takes effect on the date that it is published in the Gazette.

## 3. Interpretation

The Explanatory Note to this Order does not form part of the Order.

## 4. Definitions

**Climate Change Fund** means the Climate Change Fund established under section 34E of the *Energy and Utilities Administration Act 1987*.

**State water agency** means the State water agency listed in column 1 of Schedule 1.

## 5. Annual contribution

- (1) The State water agency is required to make an annual contribution to the Climate Change Fund for the financial year commencing 1 July 2024.
- (2) The amount of the annual contribution to be paid by the State water agency is as set out in column 2 of Schedule 1.

## 6. Time for payment

The annual contribution is to be paid by quarterly instalments (each being equal to one-fourth of the annual contribution payable) on or before the first day of August 2024, November 2024, February 2025, and May 2025.

## Schedule 1

Column 1	Column 2
State water agency	Contribution for 2024-25
Sydney Water Corporation	\$3.55 million

## METERING EQUIPMENT (STORAGE) STANDARDS 2024

under the

### WATER MANAGEMENT (GENERAL) REGULATION 2018

I, Ashraf El-Sherbini, Executive Director, Water Operations and Resilience, Water Group, by delegation from the Minister administering the *Water Management Act 2000*, approve the metering equipment standards listed in Column 2 of the table below, pursuant to the corresponding provisions of the *Water Management (General) Regulation 2018*, listed in Column 3 of the table below—

<b>Column 1</b>	<b>Column 2</b>	<b>Column 3</b>
<b>Schedule</b>	<b>Name of standard</b>	<b>Provision</b>
1	Storage Metering Equipment Standard	Clause 228 of the <i>Water Management (General) Regulation 2018</i>
2	Survey Benchmark Standard	Clause 228 of the <i>Water Management (General) Regulation 2018</i>
3	Storage Curve Standard	Clause 238L (9) of the <i>Water Management (General) Regulation 2018</i>
4	Secondary Metering Device Standard	Clause 228 of the <i>Water Management (General) Regulation 2018</i>

Dated

6 June 2024

Ashraf El-Sherbini  
Executive Director, Water Operations and Resilience, Water Group  
Department of Climate Change, Energy, the Environment and Water  
By delegation

#### **Explanatory note**

These standards are made under clauses 228 and 238L(9) of the *Water Management (General) Regulation 2018*. The object of these standards is to specify the metering equipment standards for particular water supply work approvals. Specifically, the standards relate to storage metering equipment and maintenance, survey benchmarks, storage curves and secondary metering devices.

Holders of water supply work approvals subject to a mandatory floodplain condition imposed under clause 238B of the *Water Management (General) Regulation 2018* must comply with these metering equipment standards.

# METERING EQUIPMENT (STORAGE) STANDARDS 2024

under the

## WATER MANAGEMENT (GENERAL) REGULATION 2018

### 1 Name of this instrument

This instrument is the *Metering Equipment Standards 2024*.

### 2 Commencement

This instrument commences on the day on which it is published in the NSW Government Gazette.

### 3 Repeal

The *Metering Equipment Standards 2023* published in Government Gazette No 512 – Electricity and Water, dated 3 November 2023, is repealed.

### 4 Definitions

(a) In this instrument—

**accredited facility** means National Association of Testing Authorities accredited laboratory.

**Act** means the *Water Management Act 2000*.

**AHD** means Australian Height Datum which is the datum surface approximating mean sea level that was adopted by the National Mapping Council of Australia in May 1971, as prescribed by the *Surveying and Spatial Information Regulation 2017*.

**AHD 71** means the Australian Height Datum 1971 and is the official national vertical datum for Australia.

**approval holder**, for an approved work, means the holder of the water supply work approval relating to the approved work.

**approved data logging and telemetry specifications** means the data logging and telemetry specifications approved by the Minister under clause 10 of Schedule 8 of the Regulation, as in force from time to time.

**approved work** means a water supply work for which a water supply work approval has been granted.

**AS/NZS** means Australian/New Zealand Standards developed by Standards Australia.

**AUSPOS** means Geoscience Australia's free online Global Positioning System processing service that uses the International GNSS Service network station data and products to compute precise coordinates.

**CORSnet–NSW** means the network of Continuously Operating Reference Stations (CORS). This network of permanent GNSS stations enables subscribers to obtain precise positioning across NSW.

**Class LC levelling** means the same as the definition in the Standards and Practices for Control Surveys (SP1) Version 1.7, Section 3.2.1 published by the Intergovernmental Committee on Surveying and Mapping.

**DAS** means the NSW Government's data acquisition service that acquires data from metering equipment.

**Department** means the NSW Department of Climate Change, Energy, the Environment and Water.

**GNSS** means global navigation satellite system.

**installation Type 1 storage meter** means an approved storage meter with a radar sensor or level measurement sensor that measures the water level from above the storage surface, constructed on an elevated platform with an approved LID.

**installation Type 2 storage meter** means an approved storage meter with a vented submersible pressure sensor or a level sensor that measures the water level from below the storage surface, constructed on an elevated platform with an approved LID.

**installation Type 3 storage meter** means an approved level measurement sensor that is constructed in a method approved by the Minister and is listed on the Department's website with an approved LID.

**LiDAR** means Light Detection and Ranging technology used to determine distance to a surface using laser pulses. Distance is computed by measuring the time delay between transmission and detection of the reflected signal.

**LID** means a local intelligence device, such as a telemetry enabled data logger, or other telemetry-capable field device, which is able to connect to a meter and telemeter data to the DAS.

**mAHD** means the elevation in meters with respect to the AHD.

**MGA** means Map Grid of Australia and has the same meaning as it has in clause 5 of the *Surveying and Spatial Information Regulation 2017*.

**measuring point** means the point where a sensor sends or receives measurement information. For example, for radar sensors the measuring point is the 'face' or 'head' of the radar sensor.

**PSM** means permanent survey mark.

**PVC** means polyvinyl chloride.

**Regulation** means the *Water Management (General) Regulation 2018*.

**storage** means any purpose-built dam or reservoir or natural basin that is nominated on a floodplain harvesting access licence to take water.

**storage metering equipment**, for a water supply work, means metering equipment that measures the surface level of water in the work.

**storage gauge board** means a board used to indicate the depth of water in a storage.

**uPVC** means unplasticised polyvinyl chloride.

**UV** means ultraviolet.

- (b) Unless otherwise defined in this instrument, words and expressions that are used in the Act or Regulation have the same meaning in this instrument.

**Note—**

The terms **adopted storage curve**, **point-of-intake metering equipment**, **secondary metering device**, **storage curve** and **storage metering equipment** are defined in the Regulation. The term **duly qualified person** is defined in the Act and further defined in the Regulation.

- (c) Unless otherwise defined in this instrument, words and expressions that are used in the *Surveying and Spatial Information Act 2002* and the *Surveying and Spatial Information Regulation 2017* have the same meaning in this instrument.

## 5 Standards

- (a) The storage metering equipment standard is set out in Schedule 1.



- (b) The survey benchmark standard is set out in Schedule 2.
- (c) The storage curve standard is set out in Schedule 3.
- (d) The secondary metering device standard is set out in Schedule 4.

**Schedule 1**  
**Storage Metering Equipment Standard**

**1 Storage metering equipment requirements**

Storage metering equipment must—

- (a) include a water level sensor. The range of this sensor must be, at a minimum, equal to the depth of the storage,
- (b) measure the level of water using the water level sensor. The accuracy of the water level measurement must be within  $\pm 10$  millimetres for the full range of water level within the storage,
- (c) have a signal output direct from the water level sensor. This output must be in a digital (SDI-12/Modbus) format,
- (d) be able to be tested against a reference meter from an accredited facility, being a reference meter with known measurement parameters,
- (e) contain a feature to enable the adjustment of the sensor's operational settings,
- (f) be able to record and report calibration factor adjustments,
- (g) operate on nominal 12-volt direct current supply,
- (h) operate on less than 20 milliamperes average current draw,
- (i) be DAS (data logger and telemetry unit) compatible. This compatibility must comply with—
  - (i) the relevant floodplain harvesting measurement parameters of the DAS, and
  - (ii) the approved data logging and telemetry specifications,
- (j) be able to operate in a temperature range of between -5 degrees Celsius to +50 degrees Celsius,
- (k) be an installation Type 1 storage meter, installation, Type 2 storage meter or installation Type 3 storage meter.

**2 Storage metering equipment materials**

Storage metering equipment must comply with all the following—

- (a) materials must have a life expectancy of at least 10 years,
- (b) fixings must be non-corrosive, including (but not limited to) screws, nuts, bolts, brackets, mounting poles, frames,
- (c) screws and bolts must have locknuts or spring washers,
- (d) commercially galvanised steel products which are cut, ground, or drilled must be coated in cold galvanising paint,
- (e) electrical insulating materials must be used to prevent contact between dissimilar metals,
- (f) materials must be suitable for the specific water type where those materials are partly or fully submerged in water,
- (g) materials and components must be suitable to operate in an ambient temperature range of -5 degrees Celsius to +50 degrees Celsius,

- (h) UV stabilised plastic style enclosures and fittings must be used,
- (i) heat shields must be used on all sides of metal enclosures, except on the bottom of the enclosures,
- (j) enclosures and components must have a minimum Ingress Protection Code of 65 water and dust rating,
- (k) enclosures supporting vented pressure sensors must use a water breather membrane and/or desiccant system to reduce possible moisture ingress to transducer vent,
- (l) anti-roosting devices must be installed on solar panels, sensor support arms, LID enclosures and other surfaces where birds may roost, but without posing work health and safety issues, and
- (m) conduits—
  - (i) must use heavy duty PVC for all electrical cabling,
  - (ii) must be supported by double sided galvanised steel saddles spaced at least 400mm apart, and
  - (iii) may be a uPVC conduit connecting the submersible pressure sensor to the enclosure.

### 3 Installation Type 1 storage meters

**Note—**

See Figure 1 to this Schedule for a diagram of an installation Type 1 storage meter.

- (1) An installation Type 1 storage meter must have a radar sensor that—
  - (a) is installed as close as practical to the storage low point,
  - (b) where possible, installed such as to minimise the impact of waves,
  - (c) taking into account the radar beam angle, the radar head must be located to prevent beam interference at all depths from any structures or inlet/outlet water flow and turbulence,
  - (d) is enclosed to prevent tampering and damage,
  - (e) is installed clear of any debris that may flow from the inlet and outlet pipes,
  - (f) has arm hinges or arm support brackets designed to return the sensor measuring point to the exact original position following any maintenance,
  - (g) has a measuring point that is flush with the base of the protective covering Or at a known and specified distance from the protective covering.
- (2) An installation Type 1 storage meter must have a LID installation that—
  - (a) is housed in an enclosure which—
    - (i) is resilient to insect and water ingress,
    - (ii) has a mechanism to remove vapour from the enclosure such as a water membrane breather system,
    - (iii) has bird proof braiding on any exposed cables,
    - (iv) has heat shields installed, and
    - (v) has a door tamper-switch installed or a locking mechanism to which tamper seals can be fitted,
  - (b) is securely supported on a structure or post to minimise movement and vibrations,

- (c) if supported on a post the specifications for the post must be—
    - (i) constructed using a pipe with a hollow section with a width or diameter of at least 75mm,
    - (ii) made of a minimum 3mm thick heavy-duty galvanised steel, and
    - (iii) mounted outside of the walkway to allow both safe and unobstructed pedestrian movement and safe and unobstructed access to the enclosure,
  - (d) has a uPVC conduit protecting the cable that connects the radar sensor to the enclosure, which is supported by double sided galvanised steel saddles spaced at least 400mm apart.
- (3) An installation Type 1 storage meter must have tamper evident seals installed—
- (a) through the padlock provision on the LID enclosure door, and
  - (b) where the radar sensor arm support bracket first meets the elevated platform.

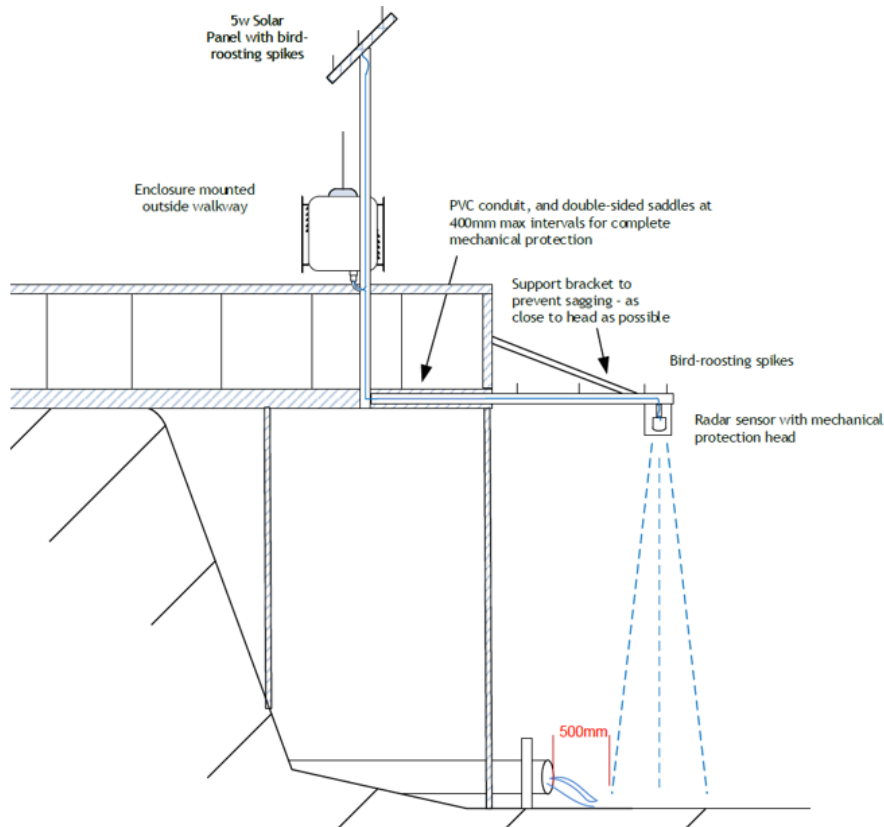


Figure 1— Installation type 1 storage meter - elevated platform with a radar sensor for storage metering.

#### 4 Installation Type 2 storage meters

**Note—**

See Figure 2 to this Schedule for a diagram of an installation Type 2 storage meter.

- (1) An installation Type 2 storage meter must have a submersible pressure sensor that is installed—
  - (a) as close to the storage low point as practical,
  - (b) clear of storage inlet and outlet pipes,
  - (c) clear of any debris that may flow from the inlet and outlet pipes,

- (d) in a position to minimise the impact of waves,
  - (e) with no sharp bends in the sensor cable that might restrict air flow in the vent tubes,
  - (f) with no low points in the sensor cable line where moisture may pool in the vent tubes,
  - (g) within a stillage pipe that—
    - (i) is secured to an elevated platform post,
    - (ii) is secured vertically,
    - (iii) terminates 50mm from the storage floor,
    - (iv) has a vented endcap to allow the free flow of water, and
    - (v) has a minimum of 6.0 mm drainage holes at least every 300 mm for the lower 2.0 m of the stillage pipe to permit the free passage of water through the pipe.
- (2) To establish the level of the pressure transducer, an installation Type 2 storage meter must be able to be placed (and replaced) at an identifiable location within the stillage pipe, as close as possible to the lowest expected water level.
- (3) An installation Type 2 storage meter must have a LID installation that—
- (a) is housed in an enclosure which—
    - (i) is resilient to insect and water ingress,
    - (ii) uses water membrane breather and/or desiccant systems to reduce the chances of ingress of moisture to the vent tube,
    - (iii) has bird proof braiding on any exposed cables,
    - (iv) has heat shields installed, and
    - (v) has a door tamper-switch installed or a locking mechanism to which tamper seals can be fitted,
  - (b) is securely supported on a structure or post to minimise movement and vibrations,
  - (c) if supported on a post the specifications for the post must be—
    - (i) constructed using a thick heavy-duty galvanised steel tube with a minimum 3mm thickness,
    - (ii) have a width/diameter of at least 75 mm, and
    - (iii) mounted outside of the walkway to allow safe and unobstructed pedestrian movement whilst also allowing access to the enclosure,
  - (d) has a uPVC conduit protecting the cable that connects the submersible pressure sensor to the enclosure supported by double sided galvanised steel saddles spaced at least 400mm apart.
- (4) An installation Type 2 storage meter must have tamper evident seals installed—
- (a) through the padlock provision on the LID enclosure door,
  - (b) through the top endcap and bottom endcap of the stillage pipe, and
  - (c) where the conduit meets the elevated platform.

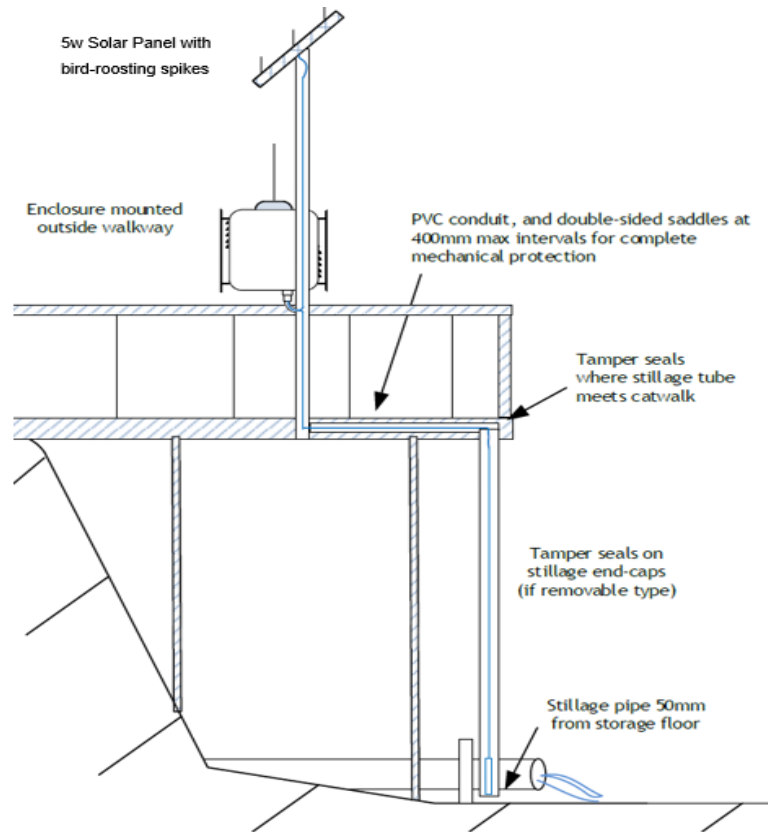


Figure 2— Installation Type 2 storage meter - elevated platform with a submersible pressure sensor for storage metering.

## 5 Storage metering maintenance standard

- (1) The requirements specified in Table 1 are the maintenance requirements applying to an installation Type 1 storage meter or installation type 3 storage meter that measures water level from above the storage.
- (2) The requirements specified in Table 2 are the maintenance requirements applying to an installation Type 2 storage meter and installation Type 3 storage meter that measures water level from below the storage.
- (3) The requirements specified in Table 3 are the maintenance requirements applying to storage gauge boards.
- (4) Each maintenance requirement specified in Column 1 of Table 1 and Table 2 that is adjacent to a tick (✓) in Column 2 of those tables must be carried out when necessary to ensure that the metering equipment is operating accurately and correctly, by—
  - (a) the authority holder, except if the activity affects or will affect the metrology of the meter or requires the removal of a tamper evident seal, or
  - (b) a duly qualified person.
- (5) Each maintenance requirement specified in Column 1 of Table 1 and Table 3 that is adjacent to a tick (✓) in Column 3 of that Table must be carried out every 5 years by a duly qualified person to ensure that the metering equipment is operating accurately and correctly.

- (6) Each maintenance requirement specified in Column 1 of Table 2 that is adjacent to a tick (✓) in Column 3 of that table must be carried out every 3 years by a duly qualified person to ensure that the metering equipment is operating accurately and correctly.

**Table 1— Maintenance requirements for an installation Type 1 or installation Type 3 storage meter that measures water level from above the storage**

Column 1	Column 2	Column 3
	Frequency	
	At any time when necessary (by the authority holder or a duly qualified person)	Every 5 years (by a duly qualified person)
1. General cleaning and housekeeping, sensor head clear of obstructions and insect nests, cleaning solar panel, clear away debris, excess soil, check for vermin issues/damage and check that site is weed free.	✓	✓
2. Check sensor mount, supporting brackets, anti-roosting spikes cabling and conduit and other fittings on the elevated platform for structural integrity.	✓	✓
3. Check that site is work health and safety compliant - ensure that the site is safe for employees, contractors or visitors to inspect or perform work at the metering site.	✓	✓
4. Externally check the telemetry cabinet for insect ingress and ensure vents are clear.	✓	✓
5. Internally check the telemetry cabinet for ingress of any bugs or insects and confirm breather is serviceable.		✓
6. Check integrity of the telemetry pole, solar panel, antenna, LID enclosure and the fence around it (if required).	✓	✓
7. Verify the integrity of tamper-evident seals on sensor, bracketry/bolts and LID enclosure.	✓	✓
8. Verify all system batteries and solar panel are working correctly and change batteries if required.		✓
9. Confirm level sensor is located at its calibrated height benchmark.		✓
10. Check condition of external electrical cables.	✓	✓
11. Record the water level reading AHD and compare it with— a. the level sensor reading in the DAS. b. the secondary level sensor reading in the cloud were applicable	✓	✓
12. Complete any other inspections and basic maintenance as per the level sensor and LID manufacturer's requirements (if specified).	✓	✓
13. Check LID tamper alarms are visible in the DAS - battery level, sensor level, communications signal strength, enclosure open tamper event.		✓
14. Electronic validation - check software version, electronic check against internal reference source that is set at the time of calibration (as per manufacturer's requirements).		✓
15. Check for signal transfer between sensor and data logger.		✓

16. Examine the data on the DAS for any sudden changes in level, unexplained spikes or discrepancies between the DAS data and manual readings.	✓	
17. Perform level testing (in situ accuracy testing to ensure sensor is operating within +/-10mm).		✓
18. Check survey benchmarks to ensure that they have remained within their accuracy tolerance range.		✓
19. Produce a routine maintenance report that covers all items for this device.	✓	✓
20. Complete the storage meter validation certification form after completing all maintenance activities for this device.		✓

**Table 2— Maintenance requirements for an installation Type 2 storage meter and installation Type 3 storage meter that measures water level from below the storage**

Column 1	Column 2	Column 3
Maintenance Requirements	Frequency	
	At any time when necessary (by the authority holder or a duly qualified person)	Every 3 years (by a duly qualified person)
1. General cleaning and housekeeping, stillage tube not damaged and clear of obstructions and insect nests, cleaning solar panel, clear away debris, excess soil, check for vermin issues/damage and check that site is weed free.	✓	✓
2. Check stillage tube mountings and supporting brackets, cabling and conduit and other fittings on the elevated platform for structural integrity.	✓	✓
3. Check that site is work health and safety compliant - ensure that the site is safe for employees, contractors or visitors to inspect or perform work at the metering site.	✓	✓
4. Externally check the telemetry cabinet for insect ingress and ensure vents are clear.	✓	✓
5. Internally check the telemetry cabinet for insect ingress and confirm breather is serviceable.		✓
5. Check integrity of the telemetry pole, solar panel and anti-roosting spikes, antenna, LID enclosure and the fence around it (if required).	✓	✓
6. Verify the integrity of tamper-evident seals on stillage tube, bracketry, and LID enclosure.	✓	✓
7. Verify all system batteries and solar panel are working correctly and change batteries if required.		✓
8. Confirm level sensor is located at its calibrated height relative to the benchmark if the storage is low enough.		✓
9. Inspect the sensor desiccant and replace when required as specified by the manufacturer.		✓
10. Check the sensor head is clear of mud and silt and located correctly if the storage level is low enough.	✓	✓
11. Check condition of external electrical cables.	✓	✓
12. Record the water level reading AHD and compare it with the pressure sensor level reading in the DAS.	✓	✓



13. Complete any other inspections and basic maintenance as per the pressure sensor and LID manufacturer's requirements (if specified).	✓	✓
14. Check LID tamper alarms are visible in the DAS - battery level, sensor level, communications signal strength, enclosure open tamper event.		✓
15. Raise submersible sensor through the stillage tube and check condition and ensure stillage tube holes are clear.		✓
16. Change LID solar battery, if required.		✓
17. Electronic validation - check software version, electronic check against internal reference source that is set at the time of calibration (as per manufacturer's requirements).		✓
18. Check for signal transfer between pressure sensor and data logger.		✓
19. Examine the data on the DAS for any sudden changes in level, unexplained spikes or discrepancies between the DAS data and manual readings.	✓	
20. Perform level testing (in situ accuracy testing to ensure pressure sensor is operating within +/-10mm).		✓
21. Check survey benchmarks to ensure they have remained within their accuracy tolerance range.		✓
22. Produce a routine maintenance report that covers all items for this device.	✓	✓
23. Complete the storage meter validation certification form after completing all maintenance activities for this device.		✓

**Table 3— Maintenance requirements for storage gauge boards**

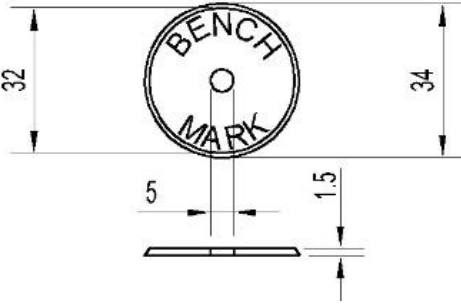
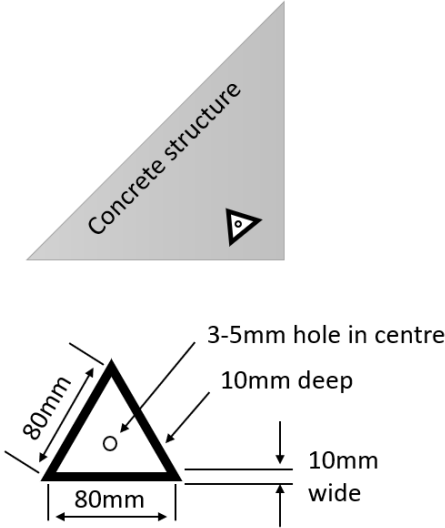
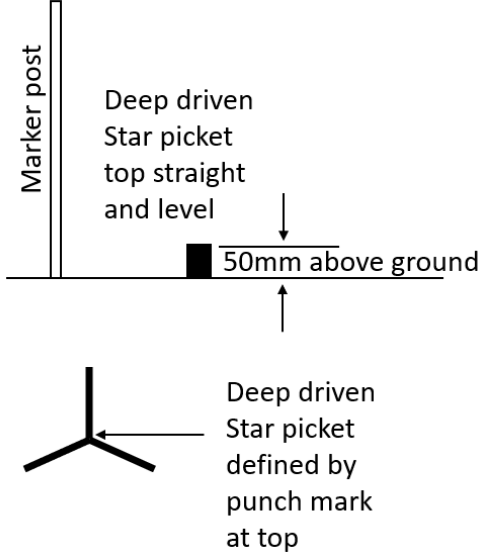
Column 1	Column 2	Column 3
Maintenance Requirements	Frequency	
	At any time when necessary (by the authority holder or a duly qualified person)	Every 5 years (by a duly qualified person)
1. General cleaning and housekeeping; gauge board is not damaged, clear away mud/silt, debris, excess soil, check that site is weed free.	✓	✓
2. Check structural integrity of— - Concrete footing or foundation structure (such as an elevated platform or headwall) - Mounting fasteners and/or welds - Corrosion of board or support structure and other associated fittings within the installation.	✓	✓
3. Verify the integrity of tamper-evident seals.	✓	✓
4. Verify the legibility and deterioration of the gauge board markings and numbering, and discolouration of the board background.	✓	✓
7. Check gauge board is in reference to the benchmark.	✓	✓
8. Check survey benchmarks to ensure they have remained within their accuracy tolerance range.		✓
8. Recalibrate gauge board to survey benchmark if needed (i.e., water level differs by +/-10mm).		✓
9. Produce a routine maintenance report that covers all items for this device.	✓	✓

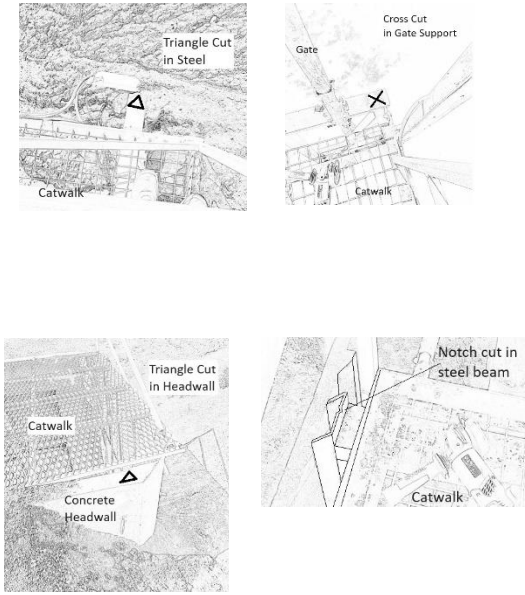
10. Complete the secondary equipment metering validation certification form after completing all maintenance activities for this device.		✓
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**Schedule 2**  
**Survey benchmark standard**

- 1 Survey benchmarks must be referenced to MGA2020 coordinates, MGA zone and AHD 71 heights.
- 2 At least three survey benchmarks are required to be installed as close as practical to the on-farm storage —
  - (a) one primary survey benchmark,
    - (i) can be used for multiple storages, on condition that accuracy is maintained at item 7.
  - (b) two or more secondary survey benchmarks,
    - (i) more than three secondary survey benchmarks if option 2(a)(i) is used.
- 3 The following GNSS observation methods must be used to establish the primary survey benchmark —
  - (a) METHOD 1 — AUSPOS —
    - (i) minimum occupation 4 hours (or longer if deemed necessary until the stated accuracies are achieved),
  - (b) METHOD 2 — post processed static baselines using CORSnet–NSW or other State continuous operating reference stations —
    - (i) five or more continuous operating reference stations must be used to introduce redundancy into the survey,
    - (ii) minimum occupation 1.5 hours (or longer if deemed necessary until the stated accuracies are achieved),
    - (iii) processing and adjusting the baselines being measured through GNSS processing and least squares adjustment packages respectively is required, and
    - (iv) be familiar with the user’s guide for continuous operating reference stations as per State surveying requirements.
- 4 The secondary survey benchmarks are to be established using real time kinematics (RTK) and survey levelling techniques recognised in Part B, Section 2 of the Standards and Practices for Control Surveys (SP1v1.7), to transfer AHD levels and GDA2020 coordinates between the primary and secondary benchmarks.
- 5 Survey benchmarks must use a survey mark that meets the requirements of a survey mark type set out in the following table —

Survey mark type	Image of mark
(a) Type 17—"Benchmark" token must— <ol style="list-style-type: none"> <li>(i) be a non-corrodible token at least 32mm in diameter and 1.5mm thick with a 5mm hole in the centre, with "BENCH MARK" permanently stamped, engraved or etched on the upper surface,</li> </ol>	

<ul style="list-style-type: none"> <li>(ii) be secured using a non-corrodible nail, spike, rivet or screw, and</li> <li>(iii) be permanently painted and coloured so that it is highly visible, clearly identifiable and easily located.</li> </ul>	<p>Dimensions are in millimetres</p> 
<p>(b) Type 18—Chiselled triangle must—</p> <ul style="list-style-type: none"> <li>(i) be an equilateral triangle with sides at a maximum of 80mm long, 10mm wide and 10mm deep and chiselled into concrete,</li> <li>(ii) be permanently painted and coloured so it is highly visible, clearly identifiable, and easily located.</li> </ul>	
<p>(c) Type 19—deep driven steel star picket fence post must—</p> <ul style="list-style-type: none"> <li>(i) be identified with a marker post,</li> <li>(ii) have a punch mark made by a centre punch tool or similar tool at the top,</li> <li>(iii) have a top that is straight and level, and</li> <li>(iv) be permanently painted and coloured so it is highly visible, clearly identifiable, and easily located.</li> </ul>	

<p>(d) Type 20 –mark on steel structure must—</p> <p>(i) be an embedded mark that is easily identified being a cross, triangle, a notch, or screw that is obvious and distinguishable from the surrounds,</p> <p>(ii) have an image supplied, and</p> <p>(iii) be permanently painted and coloured, so it is highly visible, clearly identifiable, and easily located.</p>	
<p>(e) Any survey mark approved under Schedule 4 of the <i>Surveying and Spatial Regulation 2017</i> must be installed as per the Surveyor General’s Directions, including its coordination and level.</p>	<p>See Schedule 4 of the <i>Surveying and Spatial Regulation 2017</i></p>

6 All surveys carried out under this standard must use the survey codes set out in the following table—

	Point description	Code
(i)	PSM benchmark “xxxxx” = mark number from SCIMS	PMxxxxx, MMxxxxx, MMxxxxx
(ii)	Temporary benchmark “x” = next number available	TBMx
(iii)	Survey benchmark	BM1, BM2, BM3, BMx
(iii)	Ground surface for LiDAR comparison. Four flat sites external to dam/storage	LGS1, LGS2, LGS3, LGS4
(iv)	Dam water level (current)	DWL1, DWL2
(v)	Dam wall top	DTOPGS
(vi)	Dam (full supply) top water level	DTOPWL
(vii)	Dam lowest point (near outlet)	DLP
(viii)	Dam primary meter (survey by class LC levelling)	DMETERP

(ix)	Dam secondary meter/s (survey by class LC levelling)	DMETERSx
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- 7 Survey benchmark coordinates and heights must achieve a positional uncertainty equal to, or better than (at the 95% confidence level) —
- (a)  $\pm 30$  mm horizontal,
  - (b)  $\pm 50$  mm vertical (for Method 1 - AUSPOS, vertical accuracy must be met for ellipsoidal heights), and
  - (c)  $\pm 10$  mm relative vertical accuracy between the survey benchmarks of any one storage.

**Schedule 3**  
**Storage curve standard**

- 1 A storage curve must be developed from a volumetric or LiDAR survey of the storage that is referenced to AHD levels and MGA2020 coordinates.
- 2 A non-LiDAR based volumetric survey of a storage undertaken after 1 November 2020 must—
  - (a) use the survey codes set out in the following table—

	<b>Point description</b>	<b>Survey Code</b>
(i)	PSM benchmarks “xxxxx” = mark number from SCIMS	PMxxxxx, MMxxxxx, MMxxxxx
(ii)	Temporary benchmark (if needed)	TBM <sub>x</sub>
(iii)	Survey benchmark	BM1, BM2, BM3, BM <sub>x</sub>
(iv)	Embankment internal crest	EMB_IC
(v)	Embankment external crest	EMB_EC
(vi)	Embankment internal toe	EMB_ITOE
(vii)	Dam (full supply) top water level	DTOPWL
(viii)	Dam lowest point (near outlet)	DLP
(ix)	Existing surface	ES
(x)	Change of grade	CG
(xi)	Borrow pit batter top	BPTOP
(xii)	Borrow pit batter toe	BPTOE
(xiii)	Structure invert	IL
(xiv)	Dam primary meter (optional)	DMETERP
(xv)	Dam secondary meter/s (optional)	DMETERS <sub>x</sub>

(xvi)	Dam water level current (at specified time and date)	WL1, WL2
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(b) be presented on a survey storage plan which must include all the following—

- (i) storage ID,
- (ii) storage location,
- (iii) survey benchmark ID,
- (iv) north point,
- (v) survey method,
- (vi) ground surveyed point locations,
- (vii) level annotation for key infrastructure levels (e.g., pipe inverts),
- (viii) contours of at least 0.5m intervals,
- (ix) location of embankment longitudinal section,
- (x) coordinates of the storage centroid – easting, northings and MGA zone, and
- (xi) temporary local farm benchmarks.

(c) be presented on a longitudinal section which must include —

- (i) embankment longitudinal section profile,
- (ii) chainages at intervals of no more than 100m,
- (iii) design freeboard,
- (iv) storage full supply level,
- (v) existing crest levels, and
- (vi) design crest level.

3 The storage curve produced must show—

- (a) reduced level in mAHD in 10cm increments from storage base to storage crest level,
- (b) storage volume in megalitres, and
- (c) storage surface area in Ha.



**Schedule 4**  
**Secondary metering device standard**

- 1 The following devices are approved as secondary metering devices—
  - (a) a storage gauge board that meets the requirements of this standard,
  - (b) storage metering equipment, as approved on the Department’s website, that have been assessed to meet the requirements of Schedule 1, with the exception to requiring approved data logging and telemetry specifications.
- 2 A storage gauge board must—
  - (a) be in a single or in a multiple staged configuration,
  - (b) comply with the requirements in section 7.1 of Australian Standard AS 3778.6.5,
  - (c) be constructed from durable material resistant to corrosion in alternating wet and dry environments with legible, unambiguous markings resistant to wear and fading,
  - (d) have 0.01m (10mm), 0.1m (100mm) and 1.0m measurement increments to allow a full reading to be undertaken (except for gauge boards installed before 1 November 2020, which may have only 100mm measurement increments),
    - (i) boards installed before 1 November 2020 with 100mm measurement increments will need to be replaced with gauge plates that match the current standard by 31 December 2025,
  - (e) have successive 0.01m (10mm) incremental alternating black and white strips on a white background,
  - (f) have a width, increment markers and numbering of a size that can be read easily from a location that can be safely accessed on an elevated platform or storage embankment.
- 3 A storage gauge board must—
  - (a) dependent on storage conditions, be set at the lowest accessible level in the storage,
    - (i) gauge boards can be installed in increments as conditions permit until such time as the full range of water levels from storage floor to full supply level is covered,
    - (ii) be installed with a height range and lowest gauge board value such that there are no negative water levels produced,
  - (b) be in a location that can be easily and safely accessed for maintenance and readings during wet weather or flooding events,
  - (c) measure from the lowest accessible floor level in the storage to the top of the storage embankment level,
  - (d) be secure, stable, and must not be able to move without intervention,
  - (e) be levelled in and related to mAHD for each gauge board,
  - (f) be installed in a vertical position,
  - (g) be fitted with at least one tamper evident seal on securing fasteners on each gauge board,
  - (h) for multiple staged storage gauge boards—

- (i) be located so that the highest, or last, increment is accurately levelled and aligned to the lowest, or first, increment on each successive (higher) board, and
  - (ii) have the bottom of the gauge board at the floor of the storage set such that the lowest gauge height is greater than 0.00 m.
- 4 A storage gauge board must—
  - (a) be referenced to an AHD levelled survey benchmark,
  - (b) have the MGA2020 coordinates of the gauge board determined, and
  - (c) for multiple staged gauge boards only—
    - (i) have as a minimum, the gauge board level reading on the topmost gauge board levelled to m AHD, all subsequent gauge boards must be levelled to this gauge board,
    - (ii) have the MGA2020 coordinates of the topmost gauge board determined,
    - (iii) have the topmost level on the top gauge board selected such that the level of bottom of the lowest gauge board will be greater than 0.00m.