# Revised Standard Requirements for Supply and Installation of Advanced Metering Infrastructure (AMI) Outstation (for Wired Smart Water Meters)

The Advanced Metering Infrastructure (AMI) system (formerly named as Automatic Meter Reading (AMR) system) for water supply shall be able to provide the Water Authority (WA) with timely and historical metering data, status outputs and alert signals where applicable for operation and monitoring of the smart water meters. The part of the infrastructure for the wired M-Bus meters consists of AMI Outstations and AMI Master Station. The AMI Master Station and the smart water meters, including master meters and check meters (if any) will be provided by the WA. The land Purchaser/Grantee shall supply (except smart water meters), install and commission the AMI Outstation according to the following requirements and any other requirements as specified by the WA from time to time.

1. AMI Outstation

An AMI Outstation shall be designed to collect the metering data from the smart water meters and transmit to the AMI Master Station at the WA. The requirements of the key components of the AMI Outstation shall be as follows:

a. <u>Smart water meters</u>

Smart water meters will be provided by the WA for installation by land Purchaser/Grantee. Based on the water consumption of customers, the smart water meters shall be of mechanical, electromagnetic (EM) type or other types as deemed appropriate by the WA.

- i. The mechanical water meter shall be equipped with a meter interfacing unit (MIU) capable of recording and storing the meter readings and status in its internal memory with date and time stamps. The stored metering data shall be transmitted and stored in a data concentration unit (DCU) via the hard-wired Meter-Bus (M-Bus) communication protocol.
- ii. The EM water meter shall be equipped with a converter capable of generating electric pulse output for AMI application. A pulse-to-M-Bus converter for interfacing of metering data in pulses with DCU in M-Bus protocol shall be required and provided by the land Purchaser/Grantee at his own expense. The metering data shall be transmitted and stored in the DCU via the hard-wired M-Bus communication protocol.
- b. Data Concentration Unit (DCU)

The DCU shall be provided by the land Purchaser/Grantee at his own expense to serve as the M-Bus master of the M-Bus network, which is designed to collect metering data at a programmable interval from the MIUs of mechanical meters and/or the signal converter of EM water meters connected to the network. The metering data stored in non-volatile memory of the DCU shall be transmitted to the AMI Master Station via communication network. Additional DCU shall be provided, when necessary, to serve all the smart water meters.

- c. Not used.
- d. <u>Communication Equipment</u> Communication equipment shall be provided by the land Purchaser/Grantee at his own

expense to facilitate the communication and data transmission between the AMI Outstation and the AMI Master Station.

e. Cabling Facilities and Works

A complete cabling system shall be provided by the land Purchaser/Grantee at his own expense. It shall consist of supply, installation, connection and termination of power cables, control cables and communication network cables including associated conduits to all equipment. The Works shall be completed by competent workers of the trade.

f. Backup Battery Unit

A battery charger and backup battery unit shall be provided by the land Purchaser/Grantee at his own expense. It shall provide the backup power to the system when the input power source is interrupted.

#### 2. Data Transmission

Communication network services for the AMI Outstation shall be provided by the land Purchaser/Grantee at his own expense to enable the AMI Outstation to securely communicate with the AMI Master Station for data transmission through cable/mobile (e.g. 3G/4G/5G) broadband communication networks or other means as deemed appropriate by the WA for Testing and Commissioning (T&C) and operation of the AMI Outstation before and after handing over of the system to the WA.

#### 3. <u>Electricity Power Supply</u>

A 220V 50Hz a.c. power supply shall be provided by the land Purchaser/Grantee at his own expense at all necessary locations for operation of the AMI Outstation. The land Purchaser/Grantee shall continue to provide the power supply at his own expense before and after handing over of the system to the WA.

## 4. <u>Testing and Commissioning (T&C)</u>

Each individual item and equipment of the AMI Outstation shall be checked and tested to ensure that it performs in accordance with the specified requirements and is in satisfactory working conditions. Final acceptance test for full function of the AMI Outstation including successful data transmission to the AMI Master Station shall be arranged and conducted by the land Purchaser/Grantee to the satisfaction of the WA. The final acceptance test shall be completed on or before the Building Covenant date or the date of Occupation Permit whichever is applicable.

## 5. System Transfer for Operation and Maintenance

Upon successful commissioning of the AMI Outstation by the land Purchaser/Grantee to the satisfaction of the WA, when requested by the WA, the whole system including all the smart water meters and the associated MIUs, DCU(s), cabling system, associated equipment and communication network shall be handed over to the WA for operation and maintenance.

6. <u>Warranty</u>

All the equipment supplied and installed by the land Purchaser/Grantee shall be subject to a warranty against defects and workmanship for 24 months from the handing over date of the AMI Outstation to the WA.

## 7. Submissions

a. An AMI Outstation proposal detailing the design, layout and equipment for building up the AMI Outstation shall be submitted to the WA for approval prior to commencement of

installation work.

- b. A Testing and Commissioning procedure shall be agreed with the WA prior to commencement of testing and commissioning work.
- c. An Operation and Maintenance manual complete with all necessary documentation, catalogues, drawings, reports, test certificates and T&C records shall be submitted to the WA for approval prior to handing over of the system.
- 8. Civil Work Requirements
  - a. At least two cable conduits shall be provided to run through the water meter room of each floor and terminate to a 150mm(w) x 150mm(h) x 75mm(d) adaptable box for installing M-Bus and network communication cables.
  - b. The AMI panel shall be installed in one of the meter rooms (hereinafter called AMI equipment room) which is situated on the ground floor, or near and above the ground floor. If more than one AMI panel is provided, the panels shall be suitably distributed and located to minimise the cable length between the smart water meters and the AMI panel.
  - c. If a cellular router or modem is used for Internet connection but the router or modem cannot be installed above ground, a 20mm spare conduit shall be provided between the AMI panel concerned and the nearest possible location facing the open air on the ground. The conduit shall be terminated to a 75mm x 75mm switch box with cover 2,000 mm above ground level.
  - d. A 220V 50Hz a.c. power supply through a metal-clad switched 13A fuse spur unit with pilot light and a wall space of 800mm(w) x 1,000mm(h) having front clearance of at least 900mm for mounting an AMI panel with its power supply equipment shall be provided.
  - e. Should the requirements specified in (d) above not be met in the water meter room(s), a covered and lockable area on the same floor of the respective meter room shall be provided for mounting the AMI panel instead.
  - f. All concealed conduits shall be either Class 4 hot-dipped galvanised steel or heavy duty PVC conduits. Concealed PVC conduits installed within concrete or brick walls and floor slabs shall have concrete, cement or plaster cover of thickness not less than 30 mm to prevent penetration of cables inside the conduits by nails, screws or alike.
  - g. The installation location of the AMI panel, battery charger panel, battery panel and any other auxiliary equipment shall be easily accessible to facilitate operation and maintenance. AMI panels and auxiliary equipment shall not be installed under any pipework.
  - h. The maximum distance between the M-Bus terminal box to each smart water meter shall be 1.5 metres. Additional M-Bus terminal boxes shall be provided as necessary.
  - i. All panels, devices, conduits, trunkings, surface boxes and components forming part of the AMI outstation shall be properly identified using labels, color coding or other means agreed with the WSD.
  - j. Other requirements as specified in WSD Standard Specification E-89-01.

## 9. <u>Reference Documents</u>

The land Purchaser/Grantee shall further note "Introduction of the AMI System in WSD", "Typical Drawings for the Supply and Installation of AMI Outstation" and "Standard Specification for AMI Outstation" issued by the WA, which can be obtained via the following website, in relation to the AMI Outstation(s):

http://www.wsd.gov.hk/en/plumbing-engineering/index.html