

Guide to Application for Water Supply

(November 2020 version)



Water Supplies Department

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LIST OF ABBREVIATION

Abbreviations used in this booklet are as follows:-

AP	Authorised Person
AWS	Application for Water Supply
DMC	Document Management Centre
DPD	N,N-Diethyl-p-phenylenediamine sulphate
EMSD	Electrical and Mechanical Services Department
FSD	Fire Services Department
FWCT	Fresh Water Cooling Tower
LA	Licensing Authority
LP	Licensed Plumber
MiC	Modular Integrated Construction
OSC	One Stop Centre
PDPS	Penalty and Demerit Point System
VPLD	Vertical Plumbing Line Diagram
WA	Water Authority
WWO	Waterworks Ordinance
WWR	Waterworks Regulations
WSD	Water Supplies Department

Preface

Under Waterworks Ordinance, approval from the Water Authority is required in order to construct, install, alter or remove a plumbing installation. This guide is specially prepared to provide information to applicants, Authorised Persons (APs) and Licensed Plumbers (LPs) regarding the submission requirement at different stage of a plumbing works project.

This guide book should be read in conjunction with the Waterworks Ordinance (Cap 102), the Waterworks Regulations (Cap 102A), the Technical Requirements for Plumbing Works in Buildings and Circular Letters issued by Water Supplies Department.

Latest version of relevant forms for water supply applications can be found in WSD website,

<http://www.wsd.gov.hk/en/application-public-forms/index.html>

Applicants of Water Supply, APs and LPs should always be aware of the anti-corruption laws and avoid to contravene them during their course of works. For details, please refer to the website of Independent Commission Against Corruption at <http://www.icac.org.hk/>. Applicants, APs and LPs shall also aware of the legal requirements mentioned in “Integrity and Corruption Prevention Guide on Managing Relationship with Public Servants” which can be accessed at https://www.icac.org.hk/filemanager/en/Content_216/ps.pdf.

1. General

1.1. Role of Water Authority on Checking of Plumbing Proposal

Plumbing installation that receives water supply from the Waterworks has to comply with the waterworks requirements under the provision of the Waterworks Ordinance (Cap 102), the Waterworks Regulations (Cap 102A), the Technical Requirements for Plumbing Works in Buildings and Water Supplies Department Circular Letters. Approval from the Water Authority (“WA”) is required in order to construct, install, alter or remove a fire service or inside service, except for works of a minor nature.

1.2. Works of a Minor Nature

Pursuant to Section 14 of the Waterworks Ordinance (WWO), a person must not construct, install, alter, or remove a fire service or inside service unless the Water Authority (WA) has granted a written permission for it. The WA may grant the written permission on application of a licensed plumber. Besides, Section 15 of the WWO also stipulates that, a person who is not a designated person must not carry out the construction, installation, maintenance, alteration, repair or removal of a fire service or inside service (i.e. specified plumbing works).

The WA may waive the requirement of permission under Section 14 of the WWO in the case of alterations to a fire service or inside service which are, in his opinion, of a minor nature. Moreover, under Section 15 of the WWO, a person who is not a designated person may carry out specified plumbing works if the works are alterations or repairs to a fire service or inside service that are, in the opinion of the WA, of a minor nature.

Alterations to a fire service or inside service must not be considered as of a minor nature if the alterations would, in the opinion of the WA, adversely affect the efficiency of the fire service or inside service in providing a reliable and adequate supply of water; or quality of the water. In the opinion of the WA, examples of alterations or repairs to inside services or fire services satisfying the following 5 conditions are considered as works of a minor nature:

- (1) do not change the purpose of supply (e.g. from domestic purpose to trade

- purpose¹) or the existing usage (e.g. from fire fighting to vehicle washing or internal cleansing in building, from irrigation to air-conditioning) of the plumbing installation already approved by the WA;
- (2) do not change from the indirect supply of the plumbing installation already approved by the WA to direct supply;
 - (3) do not require dismantling and reinstallation of the water meter installed by the WA;
 - (4) do not involve soldering for connecting copper pipes; and
 - (5) do not require provision of backflow preventive devices for water using apparatus or water filter.

A. At the inside service solely serving an individual flat/unit within a building	Examples
i. Replacement of pipes or fittings ²	Within a domestic flat, a shop unit or an office <ul style="list-style-type: none"> - Replacement of pipes or fittings - Replacement of a water closet and its flushing cistern - Replacement of a water heater, provided that the type of water heater does not change
ii. Repairs to leaking pipes or fittings	<ul style="list-style-type: none"> - Rewashing of an existing tap - Tightening joints of leaking pipe - Fixing components of leaking fitting
iii. Insertions or taking-out of valves along the existing pipeline within the same flat/unit	<ul style="list-style-type: none"> - Insertion of a gate valve along the existing pipeline between a kitchen and a bathroom within a domestic flat
iv. Extensions or reductions of the existing pipeline with additions of a new tap/new valves or abandonment of	Within a domestic flat, a shop unit or an office

¹ “Domestic purpose” means a purpose connected solely with the occupation of a dwelling-house and does not include a purpose connected with a garden, lawn, playground or swimming pool appurtenant to a dwelling-house. “Trade purpose” means water supplied for use for any purpose connected with a trade, manufacture or business, other than a construction purpose, shipping purpose or domestic purpose.

² “Fitting” means any apparatus, cistern, cock, equipment, machinery, material, tank, tap, valve and any appliance or device other than a meter installed by the WA, which is installed or used in a fire service or inside service.

some existing taps/valves within the same flat/unit supplying a single additional draw-off point, appliance or device, provided that the draw-off point, appliance or device does not require the installation of a storage tank	<ul style="list-style-type: none"> - Extension of the existing pipeline to supply the single additional draw-off point - Shortening and plugging of an existing pipeline supplying a tap - Extension of the existing pipeline to supply a water using apparatus such as washing machine/dish-washing machine or water filter
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B. At the inside service or fire service within a building/lot boundary (other than A)	Examples
i. Replacement of pipes or fittings of length not exceeding 3 metres	<ul style="list-style-type: none"> - Replacement of about 2-metre long corroded/leaking pipe, valve, cock, tank or defective pumpset in communal pipe of inside service or fire service within a building
ii. Repairs to leaking pipes or fittings	<ul style="list-style-type: none"> - Rewashing of an existing tap - Tightening joints of leaking pipe - Fixing components of leaking fitting

Minor alterations and repairs to inside services or fire services shall conform to waterworks requirement in respect of quality of workmanship and material. It is in the interest of the consumer/agent that in case of doubt to notify the WA of his intention, so that the WA can give advice to the consumer/agent.

1.3. Not Receiving Water Supply from the Water Authority

Plumbing installation that is not to receive water supply from the waterworks does not need the approval of the Water Authority. However, it is advisable for the plumbing installation to follow the Waterworks requirements such that when a supply from the Waterworks becomes necessary, the modification of the plumbing installation to comply with the Waterworks requirements will be minimized.

2. Fundamental Principles/Items Considered by Water Authority in Plumbing Proposal

A plumbing proposal would involve the submissions of different types of drawings and documents. Among them, the vertical plumbing line diagram (VPLD) should form the basis for the design and essential information summarized in **Appendix 1B** shall be presented in the VPLD. The fundamental principles/items considered by the Water Authority (WA) in Plumbing Proposal include ensuring water safety, preventing contamination, preventing misuse, preventing waste and meter arrangement. Plumbing designers/applicants are responsible to ensure that a plumbing proposal is in full compliance with the requirements in Waterworks Ordinance, Waterworks Regulations and “Technical Requirement for Plumbing Works in Buildings”³. Before submission of a plumbing proposal after the completion of design, the applicants, the Authorised Persons or the Licensed Plumbers shall carry out a self check to ensure that technical requirements as stipulated in the Technical Requirements for Plumbing Works in Buildings are complied with in the design by completing the Checklist for Vetting Plumbing Proposal (**Appendix 1**). The completed and duly signed checklist should be submitted together with Form WWO 542 for new building projects.

3. Submission Requirements at Proposal Stage

3.1. Pre-Submission Enquiry

Before submission of plumbing proposal, the Authorised Person (AP) for a plumbing works project may submit Form WWO 132 for obtaining from the WA information as are relevant to the design of the plumbing. The WA will as far as practical provide the information to the applicant such as location and size of connection points, water main, water pressures, single or double-end fed supply.

When applying for water supplies to new development, the application should include both fresh and flushing water supply system unless there is a reliable private source to serve flushing purposes. For the existing developments presently not provided with government flushing supply, the relevant consumer may apply to WA for flushing supply. The plumbing installations of the internal flushing supply systems should

³ Technical Requirements for Plumbing Works in Buildings can be obtained from the following website: <https://www.wsd.gov.hk/en/plumbing-engineering/requirements-for-plumbing-installation/technical-requirements-for-plumbing-works-in-bldgs/index.html>

fully comply with Section 4.3 of the “Technical Requirements for Plumbing Works in Buildings” before government flushing supply will be provided.

(From Circular Letter No. 1/99)

3.2. Submission of Plumbing Proposal

3.2.1. Documents to be Included in the Submission

A table showing the submission requirements for different types of application at different stages is in **Appendix 2**. Applicants should submit Application Form WWO 542 (06/2020) together with plumbing proposal and supplementary information as listed in **Appendix 2**.

To ensure that a complete set of the required supporting documents are enclosed in an application upon first submission, relevant document list⁴ will have to be submitted together with Form WWO 542 (06/2020) in each new application. The applicant should use the appropriate document list relevant to the type of application and make sure that the required documents have been included in the submission by putting a tick (“✓”) against the relevant box in the document list for each supporting document included in the submission. At the same time, each supporting document submitted must have a covering sheet⁵ printed with the title of the supporting document in the document list for checking by the DMC. An application without a relevant document list or with inadequate labelling of the supporting documents for checking of the completeness of the submission will not be accepted and will be returned to the applicant by the DMC.

Applications with drawings should be submitted by hand or by mail to WSD DMC at 43/F Immigration Tower, Wan Chai directly. For applications without drawings, they can be submitted by hand or by mail to DMC, or through the email or fax to WSD. The submission once accepted, whether approved or not, will not be returned to the applicant.

(From WSD Circular Letter No. 2/2020)

⁴ The document lists are available at https://www.wsd.gov.hk/en/plumbing-engineering/requirements-for-plumbing-installation/wsd-circular-letters/index_id_493.html

⁵ A sample of the cover sheet is available at https://www.wsd.gov.hk/en/plumbing-engineering/requirements-for-plumbing-installation/wsd-circular-letters/index_id_493.html

3.2.1A. Pipes and Fittings to be Installed

For all new applications of village type houses and separate metering, Form WWO 1149 (list of pipes and fittings intended to be installed) shall be submitted together with Form WWO 542 for early processing. Applicants may refer to Section 4.1.1. for the details of preparing Form WWO 1149.

For applications other than village type houses and separate metering (e.g. new buildings), the applicants may choose to submit Form WWO 1149 together with Form WWO 542 or to submit Form WWO 1149 prior to the commencement of the plumbing works (i.e. when submitting Part I & II of Form WWO 46). (Please refer to Section 4.1.1. for details).

3.2.2. Drawing Submission Standard

3.2.2.1. General Standards

- (a) One set of drawing should be submitted.
- (b) Each drawing should bear a unique drawing number.
- (c) The version of a drawing should be annotated by suffix (Rev.A), (Rev.B) etc. to the drawing number.
- (d) The drawing title should describe clearly the contents of the drawing.
- (e) A suitably numbered or graphic scale should be provided, corresponding to the scale of the plan;
- (f) At least one drawing should carry a legend of all markings and symbols shown or used, preferably on the right hand side of the plan;
- (g) Lettering and numbering should not be covered by heavy hatching, dark shading or dark colouring;
- (h) Drawings shall be properly prepared to ensure legibility, consistency and completeness.

3.2.2.2. Drawing Index

The Plumbing Proposal should be accompanied by a Drawing Index, if more than one drawing is submitted. The Drawing Index shall include the drawing number, the description of the drawing, the version and the date of drawing prepared/amended.

3.2.2.3. Drawing Sizes

A0 1189 mm x 841 mm

A1 841 mm x 594 mm

A2 594 mm x 420 mm

A3 420 mm x 297 mm

A4 297 mm x 210 mm

The dimensions are those of the outside edges of the sheet. A border is normally drawn inside the dimensions (limiting the actual drafting area). Plan sizes larger than A0 should be avoided. All drawings shall be folded to a plan size not exceeding the A4 size (i.e. 297 mm by 210 mm) and in such a way to display the drawing numbers and drawing titles.

3.2.2.4. Borders

Unused minimum borders should be provided on all 4 sides of an original as follows:

A0 - 20 mm

A1 - 20 mm

A2 - 10 mm

A3 - 10 mm

A4 - 10 mm

3.2.2.5. Standard Drawing Symbols

The drawing symbols (e.g. taps, valve, pumps, meter, etc) should be standardized as far as practicable. The list of drawing symbols showing in **Fig 1** should be adopted.

3.2.2.6. Standard Line Type

For consistency in the use of line type, the line type as shown in **Fig 1** should be adopted.

3.2.3. Submission Requirements of Site Location Plan and Connection Layout Plan for Village Type House Applications

The LP responsible for the plumbing proposal should in general be well acquainted with the actual environment and site condition in the vicinity of the proposed village type house. Therefore, it will be appropriate for the responsible LP to propose a feasible pipe alignment from the nearby existing government main to the village type house for obtaining water supply. The Site Location Plan and Connection Layout Plan of AWS for new village type houses shall comply with the following submission requirements:

(a) Site Location Plan

Site Location Plan shall adopt the Lot Index Plan⁶ issued by Lands Department in the scale of not less than 1:1000 to show the location (including demarcation district no. and lot no.) and lot boundary of the village type house development. The proposed location of the meter box shall also be marked on the Plan. The Site Location Plan submitted shall be accepted as satisfying the submission requirement for both “Site location plan not less than 1:1000” and “Location of meter room/box” stipulated in **Appendix 2**.

(b) Connection Layout Plan

Connection Layout Plan shall contain the following information:

- (i) the boundary of the new village type house and the concerned land lot boundary;
- (ii) all WSD mains available in the vicinity of the new village type house;
- (iii) the proposed locations of supply point, connection point, and alignment of connection pipe on government lands between

⁶ Other plans containing similar information in Lot Index Plan are also acceptable.

- (iv) the proposed supply point and proposed connection point; the proposed alignment and size of the private connecting pipe between the proposed connection point and the new village type house if the proposed connection point is not located at the lot boundary of the new village type house; and
- (v) state whether the consent of the relevant private land owner(s) has been obtained if the connection pipe in (iv) above has to be laid across other private land lots.

Examples of the Connection Layout Plans are provided in **Appendix 27**. The WA will make use of the information provided by the LP in the Connection Layout Plan to assess the feasibility of the proposed locations of supply point and connection point and provide alternative locations if the proposed locations are considered not feasible.

An LP can submit the “WSD Mains Record Plan Acquisition Form” attached in **Appendix 28** to obtain information on the WSD mains available in the vicinity of the new village type house. WSD mains record will be provided to the applicant within 8 working days upon receipt of the acquisition form and payment of the required charges.

(From WSD Circular Letter No. 6/2019)

3.3. Plumbing Proposal for Online Replumbing Works

Aging plumbing works require refurbishment and replacement. The most favourable method for carrying out these re-plumbing works is to install a new plumbing installation in the vicinity of the existing plumbing installation before the existing plumbing installation is dismantled. Due to limited space for accommodating the new plumbing installation in some cases, some re-plumbing works may be carried out along the existing alignment by directly replacing the existing plumbing installation with the new plumbing installation (i.e. online re-plumbing method). The following paragraphs stipulate the additional documents to be submitted, other than the documents as described in the previous section, in relation to application for fresh water online replumbing works in occupied buildings. In this connection, the applicants shall indicate in their vertical plumbing line diagram the extent of the online replumbing works. Workflow for on-line replumbing works is at **Appendix 3**.

3.3.1. Control on Pipe Fittings and Pipe Jointing Methods

The applicants shall specify the details of jointing method(s) when they submit their applications for water supply via plumbing proposal. The responsible LPs shall follow the pretreatment protocol as set out in **Appendix 10** to pretreat fittings⁷ before installation, or adopt fittings with low metal leaching rate⁸ (such as fitting under Voluntary Low Metal Leaching Rate Pipes and Fittings Scheme “GA*”) for the online replumbing works. List of “GA*” fittings can be found at <https://ga.wsd.gov.hk/en>.

3.3.2. Temporary Water Supply Arrangement

Temporary water supply arrangement for drinking and cooking purposes shall be put in place during construction stage of these online re-plumbing works until approval of the whole re-plumbing works by the WA. A publicly accessible clean water source shall be provided. It can be in the form of metered standpipe, provision of water filters or distribution of bottled water, etc. The applicants are required to submit a proposal on temporary water supply arrangement for drinking and cooking purposes when they submit their Form WWO 542. Apart from detailing the arrangement on supplying water for drinking and cooking purposes during the construction stage, the proposal shall also explain the arrangement on notifying/alerting the affected consumers not to use tap water for drinking and cooking purposes until subsequent notification of the approval of the whole re-plumbing works by the WA.

Regarding the temporary water supply arrangement and arrangement to notify the consumers, the applicants can make use of the template form at **Appendix 4** as submission for the approval of WA (to be submitted together with Form WWO542). If the applicants opt to provide metered standpipe for provision of temporary water supply, they shall submit Form WWO 1155 for that purpose. The type of services for the water meter on the metered standpipe shall be as follows:

⁷ Only fittings (including taps) with copper alloy inner surfaces which will be in contact with potable water shall be required for pretreatment.

⁸ Low metal leaching rate metallic plumbing products shall possess supporting document/test report to prove compliance with an Australian/New Zealand Standard AS/NZS 4020. For details please refer to https://www.wsd.gov.hk/filemanager/common/licensed_plumbers/ga_star_scheme_e.pdf

Type of premises within the scope of re-plumbing works	Type of services for the water meter on the metered standpipe
Domestic buildings (Without any non-domestic use)	Domestic supply
Non-domestic buildings	<p>Non-domestic supply</p> <p><u>Case A:</u> If the re-plumbing works involve premises of Restaurant, Food Manufacturing and Beverage Industries, the classification code of the trade paying the highest Trade Effluent Surcharge (after reduction percentage) will be adopted.</p> <p><u>Case B:</u> If the works re-plumbing works premises other than Restaurant, Food Manufacturing and Beverage Industries, the classification code of “999998 – miscellaneous services/vacant” shall be used.</p> <p>Please refer to the booklet “Classification of Water Consumer Accounts” for the classification code. Please refer to the DSD website⁹ for the trade effluent surcharge and the reduction percentage of the water supplied.</p>
Domestic cum non-domestic buildings	Non-domestic supply unless separate metered supplies for domestic and non-domestic parts of the buildings can be provided.

3.3.3. Replacement of Old Meters in Conjunction with Replumbing

The Water Authority would like to replace the old meters of the buildings in conjunction with the replumbing works. For better co-ordination of work, it is considered more appropriate to have the meter replacement works to be carried out by the same licensed plumber engaged in the replumbing works. In our approval to the application for replumbing works, the licensed plumber will be invited to carry out the meter replacement works and our District staff will inform the licensed plumber of the detailed arrangement.

⁹ http://www.dsd.gov.hk/TC/Sewage_Services_Charging_Scheme/Sewage_Services_Charges/index.html

3.4. Plumbing Proposal for Fresh Water Cooling Towers

Prior to installation of the fresh water cooling towers (FWCT), the contractors should apply for participation in the “Fresh Water Cooling Towers Scheme” (FWCT Scheme) operated by the Electrical and Mechanical Services Department (EMSD). If the design of the FWCT meets the requirements of EMSD, the EMSD will accept it into FWCT Scheme and notify the WSD accordingly for processing the application for supply of water to the FWCT. The contractors should also advise their clients to ensure compliance with all other relevant legislative requirements, e.g. the provisions of the Building Ordinance” regarding structural support of the FWCT.

However, if the design of the FWCT cannot meet the prescribed requirements, the WSD will not permit the use of mains water for supply to the FWCT. Any person who constructs an inside service for supply of mains water to the FWCT without the permission of the WSD is in contravention of Section 14(1) of the Waterworks Ordinance. Also, any consumer who uses main water for supply to the FWCT without prior permission of the WSD is in contravention of Regulation 13(a) of the Waterworks Regulations. The WSD will consider taking prosecution action against the offender and may disconnect water supply to the unauthorized FWCT. The Licensed Plumbers/Consumers are thus reminded not to illegally connect mains water for supply to the FWCT if they cannot fully comply with the relevant requirements. The Licensed Plumbers/Consumers should consider adopting the use of other suitable types of air conditioning systems to avoid contravening the government legislation.

3.5. Plumbing Proposal for Fire Service

The Director of Fire Services is responsible for approving proposals for installations of or alterations to fire services. The fire service in a building such as the choice of the fire-fighting system and its capacity must satisfy the requirements of the Fire Services Department (FSD). Only the plumbing system of the fire service is subject to the requirements of the Water Authority (WA).

For installations which are to be connected to government mains, the method of supply and the materials used must be subject to the approval of the WA and their installation should comply with the Waterworks requirements. The fire service should be designed to guard against contamination, waste and misuse.

3.5.1. Improved Sprinkler Systems

To facilitate meeting the licensing requirement, the FSD allows adoption of alternative proposals to a sprinkler system, i.e., the installation of improvised sprinkler systems with direct connection to government water mains or a connection from existing fire hydrant/hose reel systems.

To apply for water supply for an improvised sprinkler system, applicants can make enquiries to WSD on water pressure and connection point, and submit applications to FSD for the eligibility for installation of improvised sprinkler systems in parallel. On receiving enquiries for water pressure and connection point from the applicants, WSD will provide the information as soon as possible.

WSD will process an AWS for an improvised sprinkler system whether or not FSD's endorsement on the eligibility for its installation has been given. WSD will give a conditional approval to the applicant's plumbing proposal upon completion of the vetting. If the applicant has engaged a LP at the time of the submission of the plumbing proposal, the LP engaged can choose to submit the application for commencement of plumbing works (i.e. WWO 46 Part I and II) together with the plumbing proposal. However, WSD will only grant a written permission to proceed with construction of the proposed plumbing works after the applicant has obtained FSD's endorsement on the eligibility for installation.

(From WSD Circular Letter No. 5/2019)

3.6. Submission of Calculation and Estimation of Consumption Flow Rates for High Draw-Off Rate Non-domestic Water Supply

For high draw-off rate non-domestic water supply as listed in **Appendix 5**, the Applicant is required to provide a breakdown of the estimated water usage to justify the estimated daily consumption together with the plumbing proposal to the WA. The Applicant is also required to state the maximum flow rate, i.e. the hourly draw-off rate in m³/hr, of the pipe connection to the water meter and submit calculation for verifying the required size of the pipe connection to the water meter.

The purpose of submitting the above information is for the WA's information and reference with respect to the selection of meter size and checking on adequacy of water

supply in existing water supply network. The Applicant should ensure the completeness and correctness of calculation before submitting to the WA. The WA will neither check the correctness of the calculation nor give approval for the calculation. Acceptance of the submission by the WA will not release the Applicant's obligations from complying with the relevant requirements in Waterworks Ordinance and Waterworks Regulations for changing of the meter in future if so determined by the WA.

3.7. Amendment or Modification of Proposal

3.7.1. Amendments or Modification Made by the Applicants

If amendment to the plumbing proposal is required, the details of all the amendments shall be listed in a separate note and the amendments shall be highlighted or coloured in the drawings for easy identification. The drawing index, in particular the version of the drawing and the date of amendment shall be updated. Submission of amendment in the form of part-plan or loose sketch shall not be accepted. The applicant should follow the submission channel stipulated in Section 3.2.1. The submission, whether approved or not, will not be returned to the applicant. Once approved, no details in the submission shall be altered without the written approval of the WA.

3.7.2. Minor Amendment

To facilitate processing of plumbing proposal which are considered by WA as minor amendments, the applicant or his representative would be invited by WSD staff by phone to make minor amendments to the documents or drawings, or supplement documents with covering letter with applicant's signature, in WSD Office within five working days after the date of the call. The amendment(s) or supplement(s) should be authenticated by applicant's signature. The phone call invitation will be confirmed by an email, if email address is available, to the applicant.

If applicant cannot show up for amendment, the applicant can send an authorisation letter to WSD to allow his/her representative to amend the drawings on his/her behalf. Applicants/representatives fail to show up within five working days after the phone call should be considered as giving up the chance of minor amendment in person. The application will be rejected in writing and re-submission through the submission channel stipulated in section 3.2.1 will then be required.

3.8. Charges

Demand note on water deposit, charges, such as the connection work, administrative cost for the provision of water meters, and etc. would be issued to Applicant upon approval of the plumbing proposal. Applicant should settle all payment before effecting the water supply or the commencement of connection works (if any).

3.8.1. Excavation Permit Fee under the Land Ordinance (Miscellaneous Provision)

According to Chapter 28 Land (Miscellaneous Provisions) Ordinance, any person who wishes to make any excavation in unleased land must apply for an excavation permit. Under the Ordinance, a fee is required for the excavation permit. To recover the cost, the Water Authority will issue a separate demand note on the estimated excavation permit fees to applicants. This demand note is subject to adjustment according to the actual final excavation permit fees incurred for the work.

3.9. Authorizing Private Developers/Authorized Persons to Undertake Water Supply Connection Works

Developers and Authorised Persons may now employ approved contractors to carry out water supply connection works under the Helping Business Programme. This Scheme improves developer's control of their development programmes. A trial scheme involving projects on Hong Kong Island in 1998 has proved that the issue of Occupation Permits could be advanced by up to three months.

An unified application form ‘HBP1 – Application for Technical Audit of Drainage/Water Supply Connection Works Carried Out by a Member of the Public’ and the Practitioner's Guidelines on the scheme can be found in Development Bureau’s website¹⁰.

¹⁰ https://www.devb.gov.hk/en/construction_sector_matters/contractors/helping_business/index.html

3.10. Delink Approvals for Plumbing Proposals from Designation of Connection Point for Village Type Houses Applications

The approval of plumbing proposal is delinked from the designation of connection point including obtaining written consent of land owner(s) to lay connection pipes on private lands of a third party. Depending on the progress of processing plumbing proposals and determining the location of connection points, the WA may give approval to the plumbing proposal and advise the location of the connection point separately or in one go. Plumbing proposals would be approved without having to wait for the finalization of the location of the connection point, hence allowing the applicants to have an early start of any preparatory work relating to the plumbing proposal.

If the proposed connection point falls within private land and the connection is to be made by WSD, written consent from the owner(s) of the private land concerned must be obtained through the applicant prior to the commencement of the connection works. If written consent from relevant land owner(s) is not readily available, the connection point may be provisionally determined by the WA subject to the necessary consent being obtained later. The applicant should submit the consent as soon as possible afterward.

(From WSD Circular Letter No. 6/2018)

3.11. Applications for Early Connection for Temporary Water Supplies for Construction Sites

As early as possible before the commencement of a construction contract, the developer or AP can submit the Form WWO 542 with a plan showing the proposed location and size of the pipeworks at the boundary of the construction site to apply for an early connection to government mains for future temporary water supply to the construction site.

Once the application for early connection for temporary water supply is approved by the Water Authority, an approval letter together with the demand note for connection fee will be issued to the applicant. The connection works for extending the government water mains to the proposed connection point would be carried out by WSD once the

payment for connection fee is received

When a contractor applies for temporary water supply to the construction site after the award of the construction contract, the application shall be submitted together with a written authorization issued by the developer or AP authorizing the contractor to make use of the early connection for temporary water supply installed under previous approval with relevant ASN quoted in the written authorization. In this case, the contractor will not be required to pay any connection fee for the temporary water supply.

If no application for temporary water supply is received from the contractor of the relevant construction site within 6 months after WSD's completion of the early connection works, WSD will consider that the early connection applied by the developer or AP is no longer required and WSD will abandon the connection point to avoid risks of unlawful taking of water through the connection. WSD will notify the developer or AP before taking this action. Extension of the 6 months period may be allowed with sufficient justification from the developer or AP.

(From WSD Circular Letter No. 5/2018)

3.12. Plumbing Proposal for Projects Adopting Modular Integrated Construction (MiC)¹¹ Method

The requirements stipulated in paragraphs 3.12, 4.1.3, 4.2A, 4.3.2A and 4.3.3A are only applicable to MiC projects with plumbing installations to be constructed off-site in a MiC factory. For MiC projects in which all plumbing installations are constructed in-situ at the building site in Hong Kong, the procedures and requirements for applications for water supply will be the same as normal new building projects.

For MiC projects with plumbing installations to be constructed off-site in a MiC factory, the Applicant for water supply shall provide the following additional information in the plumbing proposal.

- i. A **section** shall be included in the plumbing proposal to be submitted with Form WWO 542 clearly **specifying the part of the plumbing installations (plumbing**

¹¹ Modular Integrated Construction (MiC) refers to a construction whereby free-standing integrated modules (completed with finishes, fixtures and fittings) are manufactured in a MiC factory and then transported to site for installation for the new building.

works) to be constructed off-site in a MiC factory. The extent of the plumbing installations to be constructed in the MiC factory should also be clearly indicated in the Vertical Plumbing Line Diagram, and other documents of the plumbing proposal as appropriate.

- ii. **A supervision plan of the construction of the plumbing installations at the MiC factory** shall be submitted before the commencement of the works **for agreement by the Water Authority (WA).** The supervision plan shall specify the name, the qualification proof, the supervision frequency and the supervision period of the supervision personnel to ensure that there will be adequate supervision for the plumbing works in the MiC factory. It shall also contain the name, the address, the responsible contact person and the contact means of the MiC factory. The details of the supervision plan shall be determined based on the extent and complexity of the plumbing works. In general, the responsible Licensed Plumber (LP) who submit the Form WWO 46 for the plumbing works to be constructed in the MiC factory shall visit the MiC factory at least once a week to oversee and inspect the plumbing works, and continuous supervision of the plumbing works in the MiC factory shall be provided by a Registered Plumbing Worker (RPW)¹².

(From WSD Circular Letter No. 2/2019)

3.13. Electronic Submission for Applications for Water Supplies in New Village Type Houses using Pre-approved Standard Plumbing Design Drawings

3.13.1. Pre-approved Standard Plumbing Design Drawings (“Standard Plumbing Designs”)

Some LP associations/institutions have developed a number of commonly used plumbing designs for village type houses including standard VPLD and standard meter box arrangements, and have obtained pre-approval from the WA confirming the compliance of these plumbing designs with statutory and WA requirements. A list of the standard plumbing designs for village type houses is given in **Appendix 29** and drawings of the standard designs could be found at the official websites of relevant LP

¹² As defined in Part 1 of the Schedule of the Waterworks Ordinance.

associations/institutions as given in **Appendix 30**.

3.13.2.Electronic Submission

Applicants and LPs who adopt standard plumbing designs as their plumbing proposal may submit AWS by emails using the “**Plumbing Proposal Form for e-submission**” given in **Appendix 31** in lieu of submission by post or in person. Submissions of AWS for village type houses by emails is only allowed for plumbing proposals using standard plumbing designs. All AWS of village type houses not using standard plumbing design shall be submitted by post or in person.

3.13.3.Requirements for e-submission

Applicants and LPs who choose to submit relevant applications for water supplies by electronic means are required to submit their applications with all the necessary supporting documents as listed in **Appendix 2** (among which the Vertical Plumbing Line Diagram and meter box arrangement shall be replaced by the “Plumbing Proposal Form for e-submission” given in **Appendix 31**) by email to the following dedicated email address for receiving e-submission:

awsvillagehouse@wsd.gov.hk

Applicants and LPs shall note the following requirements when using e-submission:

- (a) The subject of the submission email shall contain “AWS Submission for Village Type Houses at (Premises address)”;
- (b) Form WWO 542 (06/2020) and relevant Document List¹³ with all the supporting documents required;
- (c) All supporting documents shall be in the format specified as follows:

¹³ Please refer to Section 3.2.1 for details of the Document List requirement.

Required submission documents	Acceptable electronic format			
	Dimension size	File format	Minimum resolution	Colour
1. Form WWO 542	N/A	PDF, JPG, TIF, PNG	300 × 300dpi	Black and White or Colour
2. Copy of Business Registration (for company applicant)/Copy of HKID Card (for individual applicant)				
3. Plumbing proposal for e-submission Form (see Appendix 31)				
4. Form WWO 1149				
5. Site Location Plan ¹⁴	A3 (maximum)			Colour
6. Connection Layout Plan ¹⁴				
7. Other optional documents ¹⁵				

- (d) Each submission documents shall be attached as separate files in an email. A sample email is provided at **Appendix 32** for reference;
- (e) The file name of submission documents should contain alphabets and numbers only. Chinese characters or special symbols as a file name should not be used in e-submission documents;
- (f) The email size of an e-submission including the attachments shall not exceed 25MB.

The **Plumbing Proposal for e-Submission Form** is provided at **Appendix 31**. The electronic fillable format of the form can be downloaded at the following WSD website which also provides other relevant information:

<https://www.wsd.gov.hk/en/customer-services/application-for-water-supply/index.html>

Applicants and LPs shall note that only provision of relevant drawing number of the standard plumbing design is needed. Copies of the standard design drawings should **not** be submitted since the WA had already pre-approved the drawings.

¹⁴ Please refer to Section 3.2.3 for the required information for inclusion on the plan.

¹⁵ Other optional documents such as consent letter from relevant landlord is required if proposed connecting points falls within other private land and the connection is to be made by WSD.

Upon receipt of an AWS through e-submission, subject to the checking of the completeness and format of the submitted documents, the WSD will send an acknowledgment email via the email address of the sender. Applications without all the required supporting documents or submission not following the specified format stated above will be rejected. Subsequent re-submission of supplementary information in the proposal stage and submission of Form WWO 46 can also be submitted to the dedicated email address stated above. For re-submissions and submission of Form WWO 46, applicants and LPs shall specify the type of submission and quote the ASN No. (if available) in the email. A sample of such email is provided at **Appendix 33**. The dedicated email address is for e-submission only, enquiry of the status of application case using the dedicated email address is not allowed and responded.

Applicants and LPs who wish to adopt standard plumbing designs as their plumbing proposal of new village type houses but opt not to submit via electronic means are also required to fill in and submit the **Plumbing Proposal e-Submission Form at Appendix 31** together with the Form WWO 542 and all the necessary submission documents to WSD in person or by mail to the Document Management Centre. Applicants and LPs should **not** submit hard copy of the standard plumbing design drawings in their applications, failing which the plumbing proposal will not be processed as a standard plumbing design.

(From WSD Circular Letter No. 7/2019)

3.14. Electronic Submission of Applications for Water Supplies for Selected Business Trades and Other Simple Cases of Separate Metering

To enhance the efficiency of processing AWS for selected business trades and other simple cases of Separate Metering not involving new connection points to the Government water supply system, the WSD allows electronic submission for the following types of applications such that applicants may choose to submit such AWS by emails to the following dedicated email address (e-submission) in lieu of submission in person or by post:

Description *	Dedicated email address
Restaurants – Chinese (641100)	awssimpleapp@wsd.gov.hk
Restaurants – non-Chinese (641200)	
Restaurants – fast food shops (641300)	
Restaurants – other eating places (641998)	
Barber & beauty shops (959198)	
Laundries (952000)	
Separate Metering	

* The no. shown in parenthesis is the Classification Code of Water Accounts of selected business trades

All the e-submissions shall meet the following format requirements:

- (a) The subject of the submission email shall specify clearly the type of submission (e.g. “AWS Submission for Restaurants at (Premises address)”);
- (b) Form WWO 542 and relevant Document List¹⁶ with all the supporting documents required shall be submitted in PDF, JPG, TIF or PNG format with a minimum resolution of 300x300 dpi. Drawings shall be in colour;
- (c) Each submission document shall be submitted as a separate file in the email;
- (d) The file name of submission documents should contain alphabets and numbers only. Chinese characters or special symbols as a file name should not be used in the file names of e-submission documents;
- (e) The email size of an e-submission including attachments shall not exceed 25MB;

A sample of the e-submission is given in **Appendix 34**. Upon receipt of an AWS through e-submission, subject to the checking of the completeness and format of the submitted documents, the WSD will send an acknowledgment email via the email address of the sender. Applications without all the required supporting documents or

¹⁶ Please refer to Section 3.2.1 for details of the Document List requirement.

submission not following the specified format stated above will be rejected.

Subsequent re-submission of supplementary information in the proposal stage can also be submitted to the dedicated email address stated above. All re-submissions shall use exactly the same title as the first submission and shall quote the ASN No. of the case in the email.

(From WSD Circular Letters No. 5/2020)

4. Submission Requirements at Construction Stage

Flowcharts showing the submission requirements at Construction Stage are provided at **Appendix 6**.

4.1. Before Commencement of Work

Before commencement of work, the licensed plumber (LP) employed by the applicant, i.e. the responsible LP, should seek the approval of the Water Authority (WA) for commencement of works by submitting Parts I, II of WWO 46 and Form WWO 1149 (only for applications other than village type houses and separate metering which have not submitted this form together with Form WWO 542). Part I shall also be signed by the Authorized Person for new building projects. WWO46 (excluding explanatory notes) can be mailed or faxed to the WA.

When signing Form WWO 46, the licensed plumber and the Authorized Person (if applicable) shall certify that all the pipes and fittings to be installed and materials to be used for the construction, installation, alteration or removal (construction etc.) of the Approved Plumbing Works shall be as prescribed by the Waterworks Regulations, Cap. 102A.

If the submission is in order, the WA will issue Part III of Form WWO 46 with a copy of Parts I and II of Form WWO 46. Upon receiving the Part III of Form WWO46, the LP can commence the plumbing works.

4.1.1. Preparation of List of Pipes and Fittings to be Installed (Form WWO 1149)

Pipes and fittings to be reported in Form WWO 1149 are listed in WSD website.¹⁷

To facilitate preparation of the submissions, WSD has provided a function in its webpage¹⁸ for the applicants to search and select the pipes and fittings with valid GA and directly convert to the required format for Form WWO 1149. The prepared Form WWO 1149 can be downloaded for printing and signing and subsequent submission to the WA.

If pipes and fittings with low metal leaching rate¹⁹ other than those under Voluntary General Acceptance Star (“GA*”) Scheme are adopted in the plumbing works, the responsible LP is required to provide such details as well as the test report(s)/certificate(s) showing their compliance in the submission of Form WWO 1149 to the WA.

4.1.2. Not Used

4.1.3. Submission of Additional Information for Projects Adopting MiC Method

If any part of the plumbing installations constructed by MiC method will be covered up in the MiC factory, such that the plumbing installations will not be exposable for inspection and non-destructive tests at the building site upon delivery of the MiC modules to the building site in Hong Kong, the following additional details shall be submitted to the WA **for information** before the commencement of plumbing works in the MiC factory:

- iii. **Shop drawings** showing details of the plumbing installations in the MiC modules that will be covered up in the MiC factory.

¹⁷ https://www.wsd.gov.hk/filemanager/en/share/pdf/pipes_and_fittings_to_be_reported_in_wwo1149_e.pdf

¹⁸ <http://ga.wsd.gov.hk/en>

¹⁹ Low metal leaching rate metallic plumbing products shall possess supporting document/test report to prove compliance with an Australian/New Zealand Standard AS/NZS 4020. For details please refer to https://www.wsd.gov.hk/filemanager/common/licensed_plumbers/ga_star_scheme_e.pdf

- iv. **Production schedule** of the MiC modules in particular the production schedule of the plumbing works in the MiC modules and the corresponding inspection schedule for the plumbing works to be covered up in the MiC modules at the MiC factory for the WA to arrange for interim inspection of the plumbing installations by his Inspection Agent before the concealed parts are covered up in the MiC factory.

(From WSD Circular Letter No. 2/2019)

4.1.4. Mandatory Lead Check for Soldering Materials in Pipe-fittings with Integral Solder Ring upon delivery to Site

Currently, non-destructive lead checks for solder joints of copper pipes and fittings will be carried out by the Water Authority during inspection of completed inside service as detailed in **Appendix 12**. However, it is difficult to carry out lead checks on solder joints of copper pipe-fittings with integral solder rings after completion of the plumbing works since proper melting of solder of individual joint to expose the solder materials for lead check will depend on workmanship and it may not be possible to test some of the completed solder joints. To enhance the control of lead content in the soldering materials of pipe-fittings with integral solder rings to be used in plumbing projects, all pipe-fittings integrated with solder materials shall undergo random lead checks upon delivery to site prior to installation in projects. The WSD has consulted the Technical Committee on Plumbing on the above lead check requirement

Upon delivery of pipe-fittings with integral solder materials to site, samples shall be taken randomly by the Plumbing Contractor/Licensed Plumber²⁰ from each batch of such pipe-fittings under the same GA Reference Number²¹ for conducting lead check on soldering materials prior to using that subject batch in plumbing installations. The number of samples to be taken for lead check will depend on the overall batch size. Pipe-fittings of different sizes and types under the same GA Reference Number delivered to site on the same date can be regarded as one batch for the purpose of sampling for lead check, i.e. minimum 1% of the total number of fittings (for all types and sizes in the batch) with a max of 10 samples. Pipe-fittings of different GA

²⁰ For smaller scale of works not involving any plumbing contractor, the responsible Licensed Plumber may carry out the required lead check of integral solder pipe-fittings upon delivery to site.

²¹ Random lead check for soldering materials in pipe-fittings with integral solder ring also applies to those to be used in prefabrication works, such as the Modular Integrated Construction (MiC). Hence, the same steps of random sampling and lead check shall also be taken on the pipe-fittings upon delivery to site before their use in the prefabrication work.

Reference Numbers are regarded as different batches even if they are delivered to site on the same date. All the samples in a batch shall pass the lead check before the batch shall be allowed to be used in the project.

Testing requirement of soldering materials stipulated above is to check the lead-free requirement of the test sample with reference to BS EN ISO 9453:2014. This can be done by either the lead tester kit, the XRF analyzer, or the chemical composition analysis²² as appropriate.

Current non-destructive lead checks for solder joints of copper pipe-fittings to be carried out by the Water Authority during inspection of completed inside service will NOT apply to those joints of pipe-fittings with integral solder rings that have passed the lead checks prior to installation.

The responsibilities of relevant stakeholders are given below:-

Plumbing Contractor/Licensed Plumber

- (i) To arrange and carry out random lead check for each batch of pipe-fittings with integral soldering materials as detailed above upon delivery to site.
- (ii) To reject the whole batch of delivered materials back to the Material Supplier if any of the samples fails the lead check.
- (iii) To properly keep the batch delivery inventory record and the corresponding lead check test results with record photos of every batch of pipe-fittings with integral solder materials for subsequent inspections by the Water Authority when requested.

(From WSD Circular Letter No. 4/2020)

4.2. Collection of Water Meters

In order to shorten the time required for the meter installation process so that water supply can be effected as early as possible, water meters will be installed by licensed plumbers for all water supply applications for new buildings and new village houses. For water supply applications in connection with re-occupation of an existing premises

²² Chemical composition analysis shall be carried out by a local laboratory accredited by the Hong Kong Laboratory Accreditation Scheme (“HOKLAS”) under the Category – “Construction Materials” and Subcategory – “Metallic materials”.

for which no modification of inside services is required (i.e. re-fixing cases), meters shall remain to be installed by the Water Authority.

The administrative procedures for licensed plumbers to install water meters are detailed in the following sections.

4.2.1. Collection of Large Quantity of Water Meters (200 or more)

- (i) At the time of submitting Parts I & II of Form WWO46, AP/LP is required to submit a meter acquisition programme giving the number and size of water meters and the time that the meters are expected to be available for installation.
- (ii) AP/LP will receive a reply letter. If the programme is not acceptable, it should be revised and re-submitted for consideration.
- (iii) AP/LP need to confirm the acquisition of each batch of water meters in writing at least three weeks before the proposed date of collection of the meters.
- (iv) AP/LP will then receive a reply letter (Form WWO465) giving the arrangement and contact staff for collection of the water meters. AP/LP will also receive an Undertaking (Form WWO466) for completion and return when he collects the meters.
- (v) AP/LP should make appointment with staff stipulated in Form WWO 465 to obtain “Collection Note” as well as the softcopy and/or hardcopy of the Meter Installation Table.
- (vi) AP/LP should bring along the “Collection Note” together with the duly completed Undertaking (Form WWO466) to the designated WSD Regional Stores to collect the water meters. AP/LP or his authorized representative is required to sign on the Stock Issue Note with the company chop and hand in the duly completed Undertaking (Form WWO466) at the time of collecting the meters.
- (vii) LP should return the softcopy and/or hardcopy of the completed Meter Installation Table to the Document Management Centre at 43/F Immigration Centre 7 Gloucester Road Wanchai Hong Kong after satisfactorily completed the commissioning requirements (See Section 4.4).. The initial readings of the water meters shall be the readings after the systematic flushing had been satisfactorily completed.

4.2.2. Collection of Small Quantity of Water Meters (Less than 200)

- (i) LP can proceed to make appointment with staff stipulated in approval letter to obtain “Collection Note” as well as the softcopy and/or hardcopy of the Meter Installation Table after receiving Part III of Form WWO46.
- (ii) AP/LP should bring along the “Collection Note” together with the duly completed Undertaking (Form WWO466) to the designated WSD Regional Stores to collect the water meters. AP/LP or his authorized representative is required to sign on the Stock Issue Note with the company chop and hand in the duly completed Undertaking (Form WWO466) at the time of collecting the meters.
- (iii) LP should return the softcopy and/or hardcopy of the completed Meter Installation Table to the Document Management Centre at 43/F Immigration Centre 7 Gloucester Road Wanchai Hong Kong after satisfactorily completed the commissioning requirements (See Section 4.4). The initial readings of the water meters shall be the readings after the systematic flushing had been satisfactorily completed.

4.2.3. Installation of Flow Restrictor for Temporary Construction Supply

For temporary construction supply, a condition will be imposed by the WA in the approval letter to restrict the hourly draw-off rate for the temporary construction water supply according to the flow rate estimated in Section 3.6. The WA may require for the installation of a flow restrictor, by means of a stainless steel orifice plate at the downstream of the water meter (**Appendix 22**) to restrict the draw-off rate to below the “permanent flow rate” of the allocated meter size (**Appendix 23**). The Applicant/LP is required to make all necessary plumbing arrangements in the inside services, including the provision and installation of a flow restrictor together with the pipework fittings as indicated in the typical details (**Appendix 22**) as determined by the WA, unless otherwise stated in the approval letter.

The LP should submit a duly completed Data Sheet of Flow Restrictor (**Appendix 24**) together with Parts I and II of Form WWO 46 (For the avoidance of doubt, the flow restrictor is not required to be included in the Form WWO 1149). The Applicant/LP is required to make all necessary arrangements for inspection on the installation of the flow restrictor during the interim/final inspection by the WA. Upon satisfying with the installation of the flow restrictor, WSD will provide a security wire and seal for installation in relevant pipes/fittings by the LP under the witness of WSD staff. Any unsatisfactory performance of the Applicant/LP in this aspect may cause delay in

issuance of WWO 46 Part V by the WA.

Nonetheless, the WA may consider changing the meter size and/or demand the Applicant/LP to change the orifice diameter of flow restrictor if the WA is satisfied that the actual draw-off rate detected on site has or is likely to be outside the measurable range of the allocated water meter (i.e. from “transitional flow rate” to “overload flow rate”). The Applicant/LP should make all necessary plumbing arrangements in the inside services at his own cost for the installation of the replacement meter and the provision and installation of replacement flow restrictor of revised size to suit.

(From WSD Circular Letter No. 7/2017)

4.2.4. Collection and Installation of Security Seals

When collecting water meters, for installation in new plumbing installations LPs will be required to collect security seal at the Regional Stores for each water meter of size 40mm or above as shown in the Collection Note.

Upon installation of security seals, LPs should take record photos of each seal installed and submit them together with the Meter Installation Table (**Appendix 35**) to WSD indicating the serial number of the seal installed for each meter for checking.

(From WSD Circular Letter No. 9/2019)

4.2.A. Supervision of Plumbing Works in Projects Adopting MiC Method

The responsible LP shall ensure that adequate supervision is provided for the plumbing works in the MiC factory in accordance with the supervision plan agreed by the WSD mentioned in paragraph 3.12 above. Proper supervision records shall be kept including the date and time of inspection and supervision of the plumbing works conducted by LP and RPW. The supervision records shall be submitted to the WA for inspection when required and the WA will assign agent to carry out audit checks of the supervision records at the MiC factory if considered necessary. A sample supervision record is at **Appendix 26** for reference. The responsible LP will be required to declare that plumbing works carried out in the MiC factory have been supervised according to the supervision plan.

(From WSD Circular Letter No. 2/2019)

4.3. Inspections

4.3.1. Submission of Part IV of Form WWO46 Requesting for Inspection of Works

Water supply will only be effected after the inside service / fire service has been checked in order and the necessary commissioning requirements such as satisfactory water sampling test results are fulfilled. After completion of plumbing works, the licensed plumber concerned is required to report completion to the Water Authority (WA) and requests the WA to inspect the completed works via the submission of Form WWO46 Part IV together with a copy of Parts I, II and III. The inspection will be an interim inspection when the completed works are only part of the plumbing works such as underground pipeworks or an inside service or a fire service to be concealed. On the other hand, when the completed works are the whole of the plumbing works, the inspection conducted by the WA will be a final inspection.

4.3.1.1. Submission of Typical Pipe Alignment Plans and As-built Drawings

Typical pipe alignment plans of the completed works under inspection which show the jointing methods, pipe materials and size should be submitted together with Part IV of Form WWO46 by the Licensed Plumber to facilitate the planning of inspection and approval by the WA.

As-built records showing the pipe alignment of the underground or at grade pipe outside building, e.g. from connection point to the pump room or sump tank, shall be submitted together with Part IV of Form WWO46 (If the plumbing works are reported completion under several Parts IV of Form WWO46, the last Part IV of Form WWO46 should be referred). The standards for submission of as-built records are set out in **Appendix 8**. As-built records of inside services/fire services within buildings shall also be submitted in the form of VPLD of the completed works.

4.3.1.2. Submissions related to Systematic Flushing in Unoccupied Buildings and Pretreatment of Fittings in Occupied Buildings (including Online Re-plumbing Works)

For newly installed inside service for fresh water (excluding fresh water for flushing

and fire service supply purposes) in unoccupied buildings, the LP is required to submit to the WA an undertaking of carrying out the systematic flushing using the form in **Appendix 9** together with Form WWO 46 Part IV for final inspection.

For newly installed inside services for fresh water purposes in occupied buildings (including online re-plumbing works), for which the implementation of systematic flushing is generally considered not practicable, the responsible LPs are required to arrange for pretreatment of fittings using the pretreatment protocol as set out in **Appendix 10** or shall adopt fittings with low metal leaching rate²³. If pretreatment of fittings is adopted, the responsible LP is required to submit a confirmation to the WA using the form in **Appendix 11** that the new fittings, where applicable, have been pre-treated. This confirmation should be submitted to the WA together with the Form WWO 46 Part IV for final inspection.

4.3.1.3. Submissions of Test Records of Lead Checks for Soldering Materials in Pipe-fitting with Integral Solder Ring

Following the lead check carried out in accordance with Section. 4.1.4, the LP is required to obtain relevant test records from plumbing contractor where necessary and submit the test records of lead checks for each batch of pipe-fittings with integral soldering materials (including such pipe-fittings used in prefabrication works) to Water Authority together with Form WWO 46 Part IV.

(From WSD Circular Letter No. 4/2020)

4.3.2. Interim Inspections

The responsible LP shall report completion of underground/concealed plumbing works by Form WWO 46 Part IV for inspection by the WA before the works are covered up. WA will inform the LP about the arrangement of interim inspection to be carried out.

During interim inspections, the WA will use checklists to record findings. The LP or his authorised representative attending the inspection shall sign the checklist and he may make a copy of the checklist for retention if he so wishes.

²³ Low metal leaching rate metallic plumbing products shall possess supporting document/test report to prove compliance with an Australian/New Zealand Standard AS/NZS 4020. For details please refer to https://www.wsd.gov.hk/filemanager/common/licensed_plumbers/ga_star_scheme_e.pdf

During an interim inspection of plumbing works of any new building project, the WA may, apart from inspecting the part of the plumbing works reported as completed, also inspect other parts of the plumbing works not reported as completed but found on site, for the purpose of early detection of defects. Defects found in other parts of the plumbing works not reported as completed are not subject to the Penalty and Demerit Point System (PDPS) (Section 4.3.5 refers).

4.3.2A. Interim Inspection of Plumbing Works in Projects Adopting MiC Method

For plumbing installations to be covered up in the MiC factory, the WA will arrange an Inspection Agent to carry out interim inspection in the MiC factory before the concealed parts of the plumbing installation are covered up to ensure that they comply in all respects with the provisions of the Waterworks Ordinance (WVO) / Waterworks Regulations (WWR) and all prevailing requirements of the WA²⁴. The Inspection Agent will conduct inspections and carry out non-destructive tests for the plumbing installations. The responsible LP or his/her representative shall be present in all interim inspections such that any noncompliance identified during the inspections could be immediately communicated to the LP or his/her representative for rectification. If the plumbing installations to be covered up are in order, the Inspection Agent will also advise the LP or his/her representative on the spot.

The responsible LP shall coordinate and liaise with the Inspection Agent of the WA regarding the exact inspection dates of the plumbing installations to be covered up at the MiC factory. The responsible LP is not required to submit Form WVO 46 Part IV to WA for arranging interim inspection. If the inspection frequency so warrants, the responsible LP may be required to arrange a working place in the MiC factory for the Inspection Agent to field its resident staff for conducting interim inspection.

(From WSD Circular Letter No. 2/2019)

4.3.3. Final Inspections

Given that WSD's final inspections shall include but not limited to carrying out spot-

²⁴ Inspection will cover including but not limited to the aspects of material and size of pipes and fittings as well as their jointing method.

check of the pipes and fittings at the premises and taking water samples at random locations of the Approved Plumbing Works, attention of the licensed plumber is drawn to the licensed plumber's duty to construct of the Approved Plumbing Works covered by the submitted Form WWO 46 in compliance with the approved plumbing proposals and the Waterworks Ordinance and Regulations.

Furthermore, neither the approval of the plumbing proposals nor the granting of the connection to the main and the installation of the part of the fire service or inside service on land held by the Government shall be construed as a ratification of any contravention of any of the provisions of the Waterworks Ordinance or the Waterworks Regulations.

To facilitate WA's inspection of an inside service or a fire service, the LP shall provide a sample board on site for new building projects where at least one building has more than 3 storeys. The sample board shall display samples of taps, shower mixers, valves, and pipes listed in the Form WWO 1149 as well as solder materials if used. Relevant certificates/testing reports/catalogues as appropriate are also required to be provided together with the sample board. The LP shall upon request provide for the WA's inspection relevant supporting documents for the pipes and fittings as listed in the Form WWO 1149 (such as delivery notes, purchase order, product certificate or confirmation from relevant suppliers/distributors stating the place of origin of the pipes, fittings and solder materials).

During final inspection, the WA will use checklists to record findings. The LP or his authorised representative attending the inspection shall sign the checklist and he may make a copy of the checklist for retention if he so wishes.

For the final inspection of plumbing works of all new building projects except those relatively simple ones involving just one detached village type house, the LP being the person responsible for the completed plumbing works shall attend the final inspection such that defects found by the WA can be brought to the immediate attention of the LP. After the identified defects have been rectified, the LP should report to WA in writing the completion of rectification. WA will arrange further inspection.

4.3.3A. Final Inspection and Commissioning Requirements of Plumbing Works in Projects Adopting MiC Method

Applicant for water supply of a MiC project shall, as for all other plumbing projects, be required to submit Form WWO 46 Part IV upon completion of the plumbing works at

the building site in Hong Kong. Upon receipt of Form WWO 46 Part IV, the WA will conduct final inspection of the completed plumbing installations at the building site. Approval of plumbing works of the MiC project will be granted by the WA subject to:

- i. satisfactory results of the final inspection stated in Section 4.3.3. above by the WA at the building site;
- ii. satisfactory results of the interim inspections carried out by the Inspection Agent of the WA on the concealed parts of the plumbing works before they are covered up in the MiC factory as stated in Part C above (in which case no opening up of concealed plumbing works for inspection will be required at the building site); and
- iii. the commissioning requirements specified in Section 4.4 being complied with.

(From WSD Circular Letter No. 2/2019)

4.3.4. Non-Destructive Test for Solder Joints

During inspection of the inside service, non-destructive tests of lead content for solder joints selected by the WA shall be carried out according to the requirement set out in **Appendix 12**.

4.3.5. Defects Found in an Inspection and the Penalty and Demerit Point System (PDPS)

WA operates a PDPS to assess the performance of LPs when conducting interim, re-inspections or final inspections²⁵ (“inspection”) of plumbing works since 1 October 2019 to replace the previous Point Penalty System (PPS).

Under the PDPS, defects found and recorded in an inspection will be categorized into

²⁵ The PDPS is also applicable to inspections for plumbing works which have joined the Scheme on Voluntary Submission of Inspection Checklist in Section 4.3.6 of the Guide to Application for Water Supply. However, it is not applicable to Random Inspection of New Plumbing Works during Construction Stage in Section 8 of the Guide to Application for Water Supply.

two types: (a) contravention of WWO / WWR and (b) non-compliance with WA's requirements. As such, the revised Form WWO 1008 will include two parts (i.e. Part A and Part B). Part A is for plumbing defects in contravention of WWO/WWR, whereas Part B is for plumbing defects not in compliance with the WA's requirements. For each inspection, penalty points will be given for contravention of the WWO/WWR (defects in Part A) and demerit points will be given for non-compliance with WA's requirements (defects in Part B) as identified during the inspection.

During an inspection of the completed plumbing works, the findings of the inspection will be recorded in the inspection checklist and photos will be taken on contravention of the WWO / WWR and non-compliance with the WA's requirements. Contravention of the WWO / WWR and non-compliance with the WA's requirements identified in the inspection will be brought to the attention of the responsible LP or his representative who has attended the inspection. The responsible LP (or his representative in his absence) is required to sign on the completed checklists recording the findings of the inspection.

Each contravention of the WWO / WWR or non-compliance with the WA's requirements recorded in the checklists will be marked against the relevant item(s) in Part A or Part B of the revised Form WWO 1008. The completed Form WWO 1008 and the inspection checklists (without inspection photos) will be sent to the responsible LP to formally notify him of the result of the inspection for his rectification within 5 working days after the inspection.

If the LP disagrees with a Form WWO1008 issued to the LP, the LP may submit an appeal to the Senior Engineer (Region) concerned with substantiation within 14 days from the date of the WA's letter issuing the WWO1008. The concerned Senior Engineer (Region) will conduct investigation, including conducting interviews with the LP as necessary, and inform the LP of his decision.

(From WSD Circular Letter No. 8/2019)

4.3.6. Scheme on Voluntary Submission of Inspection Checklist

The Licensed Plumber (LP) who opts to join the Scheme should arrange self-inspection of the plumbing works, and submit necessary inspection certificates and inspection checklists²⁶ corresponding to the type of inspection as follows:

²⁶ The blank inspection checklists can be downloaded from the WSD's webpage at:

4.3.6.1. Interim Inspection of Underground Pipes

The procedures for voluntary submission of interim inspection checklist for underground pipes are set out in **Appendix 13**. The LP is required to submit the documents as set out in **Part A of Appendix 13** together with the Form WWO 46 Part IV and the WSD will process the submission according to procedures set out in **Part B of Appendix 13**. The inspection certificate in the form of **Appendix 14** has to be certified by qualified person with qualification set out in section 4.3.6.3. The Scheme does not cover interim inspection on concealed pipes above ground.

4.3.6.2. Final Inspection

The procedures for voluntary submission of final inspection checklist are set out in **Appendix 15**. The LP is required to submit the documents as set out in **Part A of Appendix 15** and the WSD will process the submission according to procedures set out in **Part B of Appendix 15**. The inspection certificate in the form of **Appendix 16** has to be certified by qualified person with qualification set out in section 4.3.6.3.

4.3.6.3. Qualified Person

The persons with the following qualifications are qualified to certify the inspection certificate:

- Registered Profession Engineer²⁷ (building services) [RPE(BSS)];
- Corporate member of the Hong Kong Institution of Engineers in building services discipline [MHKIE in (BSS)];
- Registered Profession Engineer (mechanical) [RPE(MCL)] with 2 years of relevant post-qualification experience in BS installation; or
- Corporate member of the Hong Kong Institution of Engineers in mechanical discipline [MHKIE in (MCL)] with 2 years of relevant post-qualification experience in BS installation.

The RPE(MCL) and MHKIE in (MCL) should provide curriculum vitae, certificate of Employment or the like to demonstrate his attainment of sufficient relevant experience. WSD will conduct audit check on the document provided by RPE(MCL) and MHKIE

<https://www.wsd.gov.hk/en/plumbing-engineering/information-for-licensed-plumbers/index.html>

²⁷ Registered professional engineer as defined in the Engineers Registration Ordinance (Cap 409).

in MCL.

4.3.6.4. Enhancement on the Arrangement of Final Inspection of Plumbing Works

Final inspections will be conducted for all cases. To further streamline the workflow under the Scheme, the final inspection arrangement for plumbing works under the Scheme is enhanced. The WSD will issue “Notification of the Selected Locations for Voluntary Submission of Final Inspection Checklists” (Notification) to the concerned LP and make appointment for final inspection within 7 working days of receipt of WWO46 Part IV. The WSD commits to conduct final inspections for at least 70% of the cases within 14 working days from the date of making appointment or, if final inspection cannot be arranged by the LP within 14 working days, on a date mutually agreed when making appointment with the LP, provided that the final inspection checklists by the LP are submitted within 7 working days from the date of issue of the Notification and the checklists prepared are satisfactory.

4.4. Commissioning Requirements

After satisfactory completion of final inspection including conducting non-destructive tests for solder joints, the WA will issue the Form WWO 46 Part V(a). The building contractor/LP is then required to follow the commissioning requirements as detailed below for effecting water supply.

4.4.1. Fresh Water Supply for New Buildings and New Village Type Houses (excluding Fresh Water Flushing and Fire Service Supply)

After satisfactory completion of final inspection including conducting non-destructive tests for solder joints, the WA will issue the Form WWO 46 Part V(a). The building contractor/LP is then required to carry out systematic flushing using the protocol stated in **Appendix 17**. (There is no need for the building contractor/LP to wait for the issue of Form WWO 46 Part V(a) before proceeding with the systematic flushing.) During the systematic flushing, the LP is required to keep record of systematic flushing carried out using the form in **Appendix 18 for village type house projects and Appendix 18A for new building projects**. The building contractor/LP shall then cleanse and disinfect the fresh water inside services according to the guidelines in Part (A) of

Appendix 25. To ensure that the newly constructed fresh water inside services have been adequately cleansed, disinfected and flushed, water sampling for testing shall be carried out according to the requirements as stipulated in **Appendix 19**.

4.4.1A. Fresh Water Flushing and Fire Service Supply for New Buildings

The building contractor/LP shall cleanse and disinfect the connection point of fresh water flushing and fire service system according to the guidelines in Part (A) of **Appendix 25**. Water sampling for testing shall be carried out according to the requirements as stipulated in **Appendix 19**.

4.4.2. Fresh Water Supply for Occupied Buildings and Occupied Village Type Houses (excluding Fresh Water Flushing and Fire Service Supply)

After satisfactory completion of final inspection including conducting non-destructive tests for solder joints, the building contractor/LP shall cleanse and disinfect the pipes and fittings of the installed plumbing works for the potable water inside services either offsite or in-situ according to the guidelines in Part (B) of **Appendix 25**. (There is no need for the building contractor/LP to wait for the issue of Form WWO 46 Part V(a) before proceeding to the cleansing and disinfection.) The building contractor/LP shall carry out water sampling for testing according to the requirements as stipulated in **Appendix 19**.

4.4.3. Submission of Water Sampling Test Reports

The LP shall arrange with the accredited laboratories or the Water Science Division of WSD to send all the test reports for the water sampling tests directly to the WA via email and with a copy to the LP. The LP is not required to submit the test report to WA. The test reports should include the address of the premises, location of samples with photos, ASN number and CCID of the application case. Details of the email addresses per section are available at WSD website²⁸. When the water sampling test reports indicating all water samples comply with the acceptance criteria stated, the WA will issue Form WWO 46 Part V(b).

²⁸https://www.wsd.gov.hk/filemanager/en/content_1205/contact_list_for_new_application_case_status_enquiry.pdf

4.4.4. Retesting Arrangement

If the result(s) of the water sampling test(s) fails to comply with any of the acceptance criterion, the building contractor/LP should carry out remedial works such as rectification of the plumbing works, cleansing, disinfection or flushing as appropriate for the part(s) of potable water inside services represented by the failed sample(s) and collect further water sample(s) at the same location(s) of failed sample(s) for retesting.

Please refer to **Appendix 19** for the retesting arrangement.

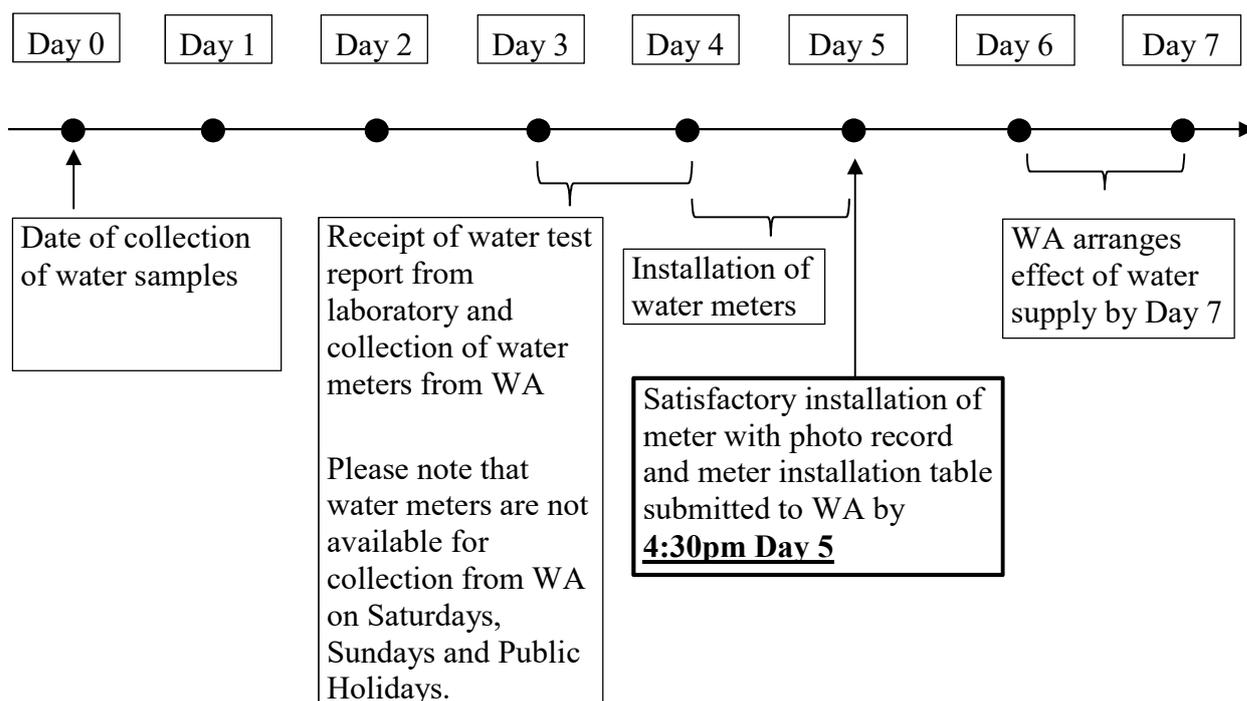
4.5. Effect of Water Supply

When (i) the water test reports indicating all water samples are within the acceptance criteria, (ii) the record of systematic flushing in **Appendix 18 or 18A**, and (iii) completed Meter Installation Table with meter readings recorded after completion of systematic flushing are received by the WA (for those plumbing works where systematic flushing is required and generally practicable), the WA will issue Form WWO 46 Part V(b). Upon the issue of Form WWO 46 Part V(b), the WA will effect water supply within seven days after the date of water sampling with satisfactory results at the connection point (the 7-day requirement). Form WWO 1005 will be issued upon request after water supply is effected.

4.5.1. Workflow for Effecting Water Supply to New Village Type Houses

Water meters will be available for collection by the LP upon receipt of satisfactory test report issued by the laboratory for commissioning water sampling tests by the WA (Section 4.4.3. refers). The concerned LP shall proceed to collect water meters from the designated WSD Regional Stores as soon as possible after receipt of the water test report and shall install the water meters at the village houses as soon as possible.

If the LP can install the water meters and submit to the WA relevant photo records and meter installation table showing satisfactory installation of the water meters before 4:30pm on Day 5 after the collection of water samples, the WA will arrange to effect water supply on or before Day 7 to fulfil the “7-day requirement”. Workflow of the abovementioned arrangement is illustrated below:



The LP shall submit the photo records and meter installation tables to the respective Regional Office of WSD through the following email addresses:

Regional Office	Email Address
Hong Kong & Island Region (except Lantau)	wsd_hk_cs@wsd.gov.hk
Hong Kong & Island Region (Lantau only)	wsd_lantau_cs@wsd.gov.hk
Kowloon Region	wsd_k_cs@wsd.gov.hk
New Territories East Region	wsd_nte_cs@wsd.gov.hk
New Territories West Region	wsd_ntw_cs@wsd.gov.hk

The WA will acknowledge receipt of records received through these email addresses.

4.5.2. On Site Water Test for Effecting Water Supply to New Village Type Houses

If the “7-day requirement” for effecting water supply cannot be met for new village type houses, the LP can adopt a simple on site water test in lieu of laboratory water test to allow early effecting of water supply.

If satisfactory installation of meters with record cannot be completed/submitted to the WA before 4:30pm on Day 5, the concerned LP is required to flush at the connection point by at least 3 volumes of water in the concerned pipe to ensure that all the stagnant water in the concerned pipe is replaced by fresh water with sufficient residual chlorine. To ensure that there is sufficient flushing, the LP is required to conduct water test using N,N-Diethyl-p-phenylenediamine sulphate (DPD) No. 1 tablet (viz. DPD water test) on site after carrying out the flushing detailed as follows:

- a) Dissolving a DPD No. 1 tablet in about 20 millilitres of flushed water sample collected from the connection point (crush the tablet if necessary). Development of a pink coloration indicates presence of free residual chlorine and hence sufficiency of flushing. DPD No. 1 tablet will be supplied by WSD and can be collected by LP from the responsible Regional Offices.
- b) The LP shall take video record on site for the whole process of the DPD water test conducted, including collection of water samples and the development of pink solution in one go. The video shall also include information such as date, time and village house location of the DPD water test conducted. Furthermore, the pink solution shall be recorded against a white background in order to easily distinguish the colour of solution from the background.
- c) If the pink coloration fails to develop, flushing and DPD water test shall be repeated until the pink coloration can be detected.

After successful completion of the DPD water test, the LP shall submit the video record of the DPD water test together with records of satisfactory installation of meters and meter installation table to the WA through the relevant email address stated in paragraph 4.5.1.1 above. The WA will arrange to effect water supply within 7 days after the date of flushing.

The WSD will carry out random spot check on the flushing and DPD water tests carried out by the LP on site.

(From WSD Circular Letter No. 1/2019)

4.6. Collecting Water Samples of Longer Stagnation Time for Data Acquisition and Evaluation

To enable WSD to evaluate the feasibility of adopting longer stagnation water sampling tests as acceptance criteria in the long run, WSD will randomly select new plumbing works to collect longer stagnation samples (or water samples taken from potable water inside services that has been left stagnant for up to 24 hours) at sampling locations selected by WSD for carrying out water sampling test. WSD will inform building contractor and LP if his plumbing works are suitable for collecting such samples. Subject to agreement of the building contractor/LP, they shall make necessary arrangement to facilitate WSD to collect the samples for water sampling tests upon the WSD's notification. All the sampling and testing of longer stagnation samples will be carried out by WSD. The results of the longer stagnation samples are for WSD's reference only.

4.7. Online Re-plumbing Works

A flowchart showing the workflow for online re-plumbing works is at **Appendix 3**. Additional requirements during construction and inspection stage of online re-plumbing works are as follows:

4.7.1. Control on Pipes and Fittings

Please refer to the Section 3.3.1 and 4.3.1.2 for the requirements on the pipes and fittings.

4.7.2. Temporary Resumption of Water Supply for Purposes other than Drinking and Cooking

Water supply will be temporarily suspended during online re-plumbing works and temporarily resumed after completion of each section of works for purposes other than drinking and cooking. For any application for water supply to be temporarily resumed after completion of the section of works, the responsible LP or his representative is required to submit the form in **Appendix 20** together with relevant site photos including specific photos showing the relevant pipes or fittings concerned in the completed section of works to the WA via email/WhatsApp message to the responsible Regional

office of WSD before 11:30am (for section of works completed in the morning session) or 4:30pm (for section of works completed in the afternoon session). Details of the email addresses/WhatsApp Nos. of our Regional offices are available at WSD website.²⁹

Unless the responsible LP or his representative receives a notification from the WA not to resume water supply via email/WhatsApp message before 12:30pm (for section of works completed in the morning session) or 5:30pm (for section of works completed in the afternoon session), water supply can be temporarily resumed on the same day after sending the Submission for the completed section of works to the WA. Despite the temporary resumption of water supply for the completed section of works, the responsible LP will still be responsible for the satisfactory completion of the whole re-plumbing works and shall apply for inspection and approval of the whole re-plumbing works upon its full completion.

4.7.3. Additional Submissions for Use of Soldering

For each section of completed works, the responsible LP or his representative shall conduct non-destructive test of lead content at one newly completed solder joint and include the photo record(s) of such test(s) in the submission to WA for temporary resumption of water supply for the concerned completed section of works using the form in **Appendix 20**. The responsible LP shall also keep record of the result of the non-destructive test conducted for inspection by the WA upon request until issuance of WWO 46 Part V for the works. This requirement does not apply to the use of fittings with integral solder ring in these online re-plumbing works.

4.7.4. Control Measures Taken by the WA on Re-plumbing works

For online re-plumbing works required to follow the enhanced workflow, the WA will initiate random inspection of these online re-plumbing works during their construction. The responsible LP shall obtain necessary consent for entry to the site before commencement of the re-plumbing works to facilitate the WA to carry out such random inspection. During the random inspection, if the WA finds that the applicants fail to implement the temporary water supply arrangement and/or the responsible LPs fail to

²⁹https://www.wsd.gov.hk/filemanager/en/content_1205/contact_list_for_new_application_case_status_enquiry.pdf

conduct the necessary non-destructive test for use of soldering, the applicants would have in fact failed to comply with the approval conditions for the Approved Plumbing Works and the WA will consider to withdraw the permission for proceeding with the Approved Plumbing Works given under WWO 46 Part III until necessary rectification works have been carried out.

4.7.5. Supporting Documents to be submitted with Form WWO46 Part IV

The responsible LPs shall also take sufficient relevant site photos (showing the records of daily pre-treatment of fittings, temporary water supply arrangement and non-destructive test conducted for completed solder joints, if applicable) which shall be submitted to the WA together with Form WWO 46 Part IV as supporting documents when the responsible LPs apply for WA's inspection and approval of the whole completed re-plumbing works. If the relevant supporting documents cannot be produced, the relevant parties shall take appropriate remedial actions as required by the WA for obtaining approval of the completed re-plumbing works. For example, if record of non-destructive test conducted for completed solder joints cannot be produced, additional completed solder joints will be selected by the WA for conducting the non-destructive test of lead content during final inspection.

4.8. Change of LPs after Submission of Form WWO46

When there is a change of LP, a fresh submission of Form WWO46 Parts I and II duly signed by parties concerned including the Applicant, the AP and the new LP together with a copy of the previously approved Form WWO46 and Form WWO 1149 are required to be made to the WA as soon as possible. For the avoidance of doubt, the change of LP by itself does not require submission of the plumbing proposal or Form WWO 1149 if there is no change to these submissions previously made to the WA.

5. Application for Temporary Water Supply for Systematic Flushing

To facilitate the implementation of the systematic flushing protocol, the WSD introduces the following arrangement for the LPs to apply for provision of temporary water supply when water supply has not yet been effected:-

5.1. Buildings

- (1) LP submits one Form WWO 542 for water supply to buildings and another Form WWO 542 for “Temporary Meter for Systematic Flushing” (flushing meter) to WSD;
- (2) The LP reports partial completion (Form WWO 46 Part IV) for the sections of inside service for drinking water purposes from the connection to the sump tank as well as the parts with direct water supply, if any;
- (3) WSD will then carry out inspection on these completed sections;
- (4) If no irregularity is found in the inspection and with the support of satisfactory water sampling test results at the connection point, the LP can collect flushing meter and install it at master/check meter position. WSD will then effect water supply to the connection point for flushing purpose;
- (5) Upon completion of the remaining parts of the inside service, the LP will report completion to the WSD for the arrangement of a final inspection;
- (6) If no irregularity is found by the WSD and the water sampling tests for the remaining parts of inside service at the locations designated by WSD are satisfactory, LP can submit Form WWO 243 to terminate consumership of flushing meter with a record of its final meter reading. Form WWO 243 should only be specified with reason “changing to master meter” if flushing meter is installed at master meter position. (If the development is completed in phases, LP then submits another Form WWO 542 for another flushing meter for the next phase);
- (7) WSD will process Form WWO 243, remove the flushing meter if necessary and will issue Form WWO 46 Part V(a) to the LP accordingly if the above are completed in order.
- (8) The LP shall submit the completed Meter Installation Table showing the updated meter reading after carrying out the systematic flushing of the new plumbing works and before issuance of Form WWO 46 Part V(b)/Form WWO 1005 by WSD. The LP is also required to provide assistance to WSD for conducting the meters arrangement check.

5.2. Village Houses

- (1) LP submits one Form WWO 542 for water supply to new premises and another Form WWO 542 for “construction meter for flushing purpose” (flushing meter) to WSD and WSD will determine the appropriate type of meter required. In

general, a section of exposed pipe between meter box and the connection point should be designed for installing two non-return valves and the meter for flushing purpose;

- (2) The LP reports completion (Form WWO 46 Part IV) for the whole inside services for drinking water purposes for WSD's inspection;
- (3) WSD will then carry out final inspection on these completed inside services;
- (4) If no irregularity is found, WSD will issue Form WWO 46 Part V(a) to the LP. The LP can collect flushing meter and install it with double non-return valve arrangement on the exposed pipe between meter box and the connection point. WSD will then effect water supply to the connection point for flushing purpose;
- (5) LP conducts systematic flushing and arranges laboratory to take samples at the locations designated by WSD and connection point;
- (6) If the water sampling tests results are satisfactory, LP can submit Form WWO 243 to terminate consumership of flushing meter with a record of its final meter reading and return the flushing meter to WSD. If the development is completed in phases, LP then submits another WWO 542 for another flushing meter for the next phase.
- (7) WSD will process Form WWO 243, issue domestic water meters and will issue Form WWO 46 Part V(b) to the LP accordingly if the above are completed in order.

6. Application for Water Supply for Two-Storey Warehouse through One Stop Centre (OSC)

Applicant may apply for water supply for 2-storey warehouse through the One Stop Centre (OSC) operated under the Efficiency Office. The OSC is an option in addition to the existing channels of application. It aims to streamline the application process by setting a centralized office for receiving submissions of building plans and related applications (including technical audit for water supply connection works) and coordinating joint inspections for two-storey warehouses. Subject to satisfactory compliance with the Water Authority's requirements, water supply could be made available immediately during the joint and final inspection. For more details, please refer to the Efficiency Office's website³⁰.

³⁰ <http://www.effo.gov.hk/en/our-work/citizen-centric-services/one-stop-warehouse-construction-permits.html>

7. Provision of Sanitary Fitments and Fittings or Water Heaters in New Buildings

7.1. Sanitary Fitments and Fittings

In response to the recommendations of the Working Group on Construction Efficiency and Environment, the Building Authority (BA) issued Practice Note APP-114 (Formerly PNAP 245) “Waste Minimization – Provision of Fitments and Fittings in New Buildings”³¹ which allows, subject to certain conditions, sanitary fitments and fittings to be installed after the issue of the occupation permit. The Practice Note states that any Authorized Person (AP) who wishes to take advantage of this arrangement should provide details on the extent of the sanitary fitments and fittings to be installed after the issue of the occupation permit in the application together with an undertaking to BA to the effect that :-

- (a) the outstanding sanitary fitments and fittings will be installed prior to the actual occupation of the relevant part of the premises;
- (b) the outstanding sanitary fitments and fittings will be installed in accordance with the provisions of the Building (Standards of Sanitary fitments, Plumbing, Drainage Works and Latrines) Regulations and the requirements of the Water Authority (WA);
- (c) the outstanding sanitary fitments and fittings will be installed under the AP’s supervision by the registered general building contractor who will employ a licensed plumber (LP) for carrying out the plumbing works; and
- (d) the WA will be notified via the submission of Form WWO 46 of the installation of the outstanding plumbing fittings.

The following paragraphs outline the procedures the WA will take in processing the BA approved applications for installing certain sanitary fitments and fittings of the inside service after the issue of the occupation permit.

The BA will notify the WA of the approved applications together with a copy of the AP’s undertaking. Upon receipt of the notification, the WA will acknowledge receipt of the copy of the AP’s undertaking to the AP and will request the AP to confirm in writing together with vertical plumbing line diagrams (VPLD) which parts of the

³¹ For details of Practice Note APP-114, please visit BD’s website at <http://www.bd.gov.hk/english/documents/pnap/APP/APP114.pdf>

sanitary fitments and fittings of the inside service are proposed to be installed after the issue of the occupation permit. If the AP's proposal is in order, the WA will issue an acceptance letter to the AP.

Please note that for those inside service completed without final sanitary fitments and fittings installed, at least one tap with receptacle should be incorporated in each premises to facilitate checking of the water meter arrangement.

Upon completion of the inside service (without those parts of the sanitary fitments and fittings which will be installed after the issue of the occupation permit), the LP should submit via the AP to the WA

- (a) Part IV of Form WWO 46 notifying the WA of the completion of the relevant part of the inside service; or
- (b) submit Part I (in case the LP has not submitted this part before) and Part IV of Form WWO 46 notifying the WA of the completion of the relevant part of the inside service.

When the connections to the inside service of the premises are made and water supply becomes available, the WA will issue Form WWO 1005 (Certificate Regarding Water Supply Connection) to the AP upon request.

After the outstanding sanitary fitments and fittings of the inside service for a particular premises or a group of premises are installed, the LP is required to make a copy of the previously approved Form WWO 46 Part V(b) and submit it via the AP to the WA. The LP is required also to submit to the WA photographs certified by the AP as true records of the outstanding sanitary fitments and fittings of the inside service installed.

When all outstanding sanitary fitments and fittings of the inside service are installed, the AP is required to confirm in writing, together with a copy of the previously approved Form WWO 46 Part V(b), to the WA that all outstanding sanitary fitments and fittings of the inside service are installed in accordance with the requirements of the WA. If some or all outstanding sanitary fitments and fittings of the inside service remain outstanding one year after the issue of Form WWO 1005, the AP is required to give written explanation to the WA on why the outstanding sanitary fitments and fittings cannot be installed within the year and when they will be installed.

7.2. Water Heaters

The type of water heater to be installed shall be shown in the VPLD of the plumbing proposal for approval by the WA. The Water Authority (WA) may consider acceptance of plumbing installation and a supply to be given without heaters installed on the following conditions:-

- (a) If VPLD indicates that heaters will not be installed but plumbing details are shown to provide supply points for heaters, a written undertaking must be obtained from the architect/developer with full description of the type of heaters intended to be installed in future so that VPLD should be checked and approved to comply with Waterworks requirements for the installation of the particular heaters.
- (b) If heaters are shown on VPLD but cannot be installed in place ready for final inspection, an advance written undertaking should be obtained from the architect/developer giving a prescribed date for the heaters to be installed.
- (c) A warning plate should be secured in a proper and conspicuous place as near to the heater position as possible and etched with the following instruction in both English and Chinese:
 - “Only [*type of water heater*] water heaters should be installed.
Prior approval must be obtained from the Water Authority.”
 - “只准安裝[熱水器種類]熱水器，並須先向水務監督申請”

The WA may carry out re-inspections to the premises 6 months after the installation of meters to check if the correct type of heaters have been installed.

8. Random Inspection of New Plumbing Works during Construction Stage

To enhance the regulatory control on new plumbing installations, random inspection of plumbing works will be carried out by the Water Authority (WA) during the construction stage in addition to interim inspection and final inspection carried out under the Waterworks Regulations.

Under the scheme, a number of relevant new plumbing installations under construction

will be selected bimonthly for random inspection on a risk-based approach taking into account the risk factors and consequence of non-compliance. The risk factors include (i) the scale and nature of the projects; (ii) the workload, past performance, experience and Continuing Professional Development credits³² of the licensed plumbers (LPs) engaged; (iii) whether the plumbing contractors engaged are included in the “Plumbing Installation” category on the List of Approved Specialist Contractors for Public Works maintained by the Development Bureau or in the “Plumbing” category on the List of Registered Subcontractor maintained by the Construction Industry Council; and (iv) whether soldering/brazing materials are used.

For a new plumbing project selected for random inspection, the WA will contact the LP concerned about two weeks in advance of the scheduled date of the intended random inspection and ask the LP to advise about one week before the inspection whether (i) there are any plumbing works under construction available for inspection; (ii) the applicant / authorized person / main contractor agree to the WA’s entry into the site for inspection; (iii) he/she or representatives from the applicant / authorized person / main contractor will accompany the WA to carry out the inspection; and (iv) the scheduled date of the inspection can be confirmed.

During the inspection, plumbing materials found on site and plumbing works including the pipes, fittings and solder/brazed joints constructed/installed on site will be randomly selected for checking and non-destructive testing. The LP concerned will be notified of the irregularities identified for his/her rectification. In addition, site personnel carrying out plumbing works will be checked for compliance with Section 15 of the Waterworks Ordinance. Since it is not an acceptance inspection, the point penalty system is not applicable. A project, which has been selected for random inspection, will normally not be selected for conducting random inspection again within six months, subject to the number and seriousness of irregularities found during the inspection.

9. Not Used

³² Please refer to WSD Circular Letter No. 3/2016 “Voluntary Continuing Professional Development Scheme for Licensed Plumbers” for details.

Appendix 1: Checklist for Vetting Plumbing Proposals

Appendix 1: (1) Checklists for Vetting Plumbing Proposal - New Building

Cover Page

Address of Premises:

Name of Consumer:

Contact Tel. No.:

ASN No./CCID NO. (if applicable)

The plumbing proposal has been checked against the following checklists and all the technical requirements stated on the checklists have been taken into account in preparing the plumbing proposal.

- *Chapter 3 Meter
- *Chapter 4 Inside Service
- *Chapter 5 Fire Service
- *Chapter 6 Water Cisterns, Water Pumps and Other Miscellaneous
- *Chapter 7 Water Conservation

Checklists prepared by,
(Authorised Person or
person signing the drawings)

Signature: _____

Name: _____

**please delete whichever is not applicable*

Checklists for Vetting Plumbing Proposal - New Building

Chapter 3 - Metering

Type: S = Statutory Requirements
E = Essential for approval of works

Referring to the clauses in Technical Requirements for Plumbing Works in Buildings (TR). You may cross out the clauses if not applicable

^ Please ✓ as appropriate

	Type	Checked [^]	Remarks
<u>#3.1 General</u>			
<u>3.1.3</u>			
All domestic unit shall be separately metered	E	<input type="checkbox"/>	<input type="text"/>
<u>3.1.4</u>			
(a) Meter shall be sited in a meter room/box/chamber at convenient location in accessible communal area	E	<input type="checkbox"/>	<input type="text"/>
(b) For indirect supply system, the meter shall be sites in a meter room/box/chamber in accessible communal area at roof level or at other convenient locations	E	<input type="checkbox"/>	<input type="text"/>
<u>3.1.5</u>			
In case the meters are sited at roof level, and system pressure is lower than 15m, fullway gate valves shall be fitted before meter positions.	E	<input type="checkbox"/>	<input type="text"/>
<u>3.1.6</u>			
For connections up to and including 40 mm diameter, a loose jumper type stopcock shall be provided and placed with spindle in the vertical position at each meter position on the inlet side of the meter where the meter is not sited at roof level and where the pressure is considered adequate.	E	<input type="checkbox"/>	<input type="text"/>
<u>3.1.7</u>			
For connections larger than 40 mm diameter, a gate valve shall be provided before the meter position and a non-return or check valve fitted on the delivery side as close as possible to the meter.	E	<input type="checkbox"/>	<input type="text"/>
<u>3.1.8</u>			
For single jet meter and turbine meter installed in direct supply system, a strainer shall be installed upstream of the meter.	E	<input type="checkbox"/>	<input type="text"/>
<u>3.1.9 & 3.1.10</u>			
For salt water flushing supply,			
(a) a meter position shall be provided for the purpose of periodic checking of consumption. It should be close to the lot boundary and connection to the Government mains or close to the point of connection from internal distribution mains whichever is applicable.	E	<input type="checkbox"/>	<input type="text"/>
(b) stop valve shall be fitted at the inlet side of the meter position and a non-return or check valve shall be fitted on the delivery side as close as possible to the meter.	E	<input type="checkbox"/>	<input type="text"/>

3.1.11

Minimum meter size requirement for business in categories as shown Table 3.1.11.1 of TR shall be followed.

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3.1.12

With an aim to prevent tampering of water meters, security seals shall be installed for all newly installed meters of size 40mm or above.

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3.2 Meter Position

3.2.1 (General Requirements for Meter Positions)

3.2.1.1

The following practice should be adopted in plumbing works design for meter positions:-

(a) fitting at meter position shall facilitate easy installation and removal of the water meter without the need to work on other pipes.

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(b) when sump and pump system is adopted and the meters are sited on convenient locations at roof level, the sump and pump system (including a sump tank and a roof storage tank) shall be fitted before meter positions.

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3.2.1.2

(a) For 15mm meter

(i) 20mm x 15mm bushes, or reducers at both sides of the meter position

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(ii) 200mm (clear effective length) distance piece of 15mm tube placed in between

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(iii) a long screw connector is provided immediately after the brush or reducer at the delivery side

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(b) For all meter size,

(i) the meter position shall also be provided similarly to 15mm meter with corresponding fittings and appropriate sizes.

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(ii) the length of distance piece should be referred to Figure 4 of the TR

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3.2.1.3

If a section of copper pipe is used either before or after a water meter position, that section of copper pipe between the water meter position and the first pipe clamp shall be jointed by screwed or flanged joints or soldering/brazing joint.

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3.2.1.4

PVC-U fittings shall be used at the meter position if PVC-U materials are used as inside services. Brass/copper long screw (connector) shall be used at TMF position. Brass/copper fittings shall be used at the meter position if copper, lined galvanized steel or thermo-plastic materials are used as inside service.

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3.2.2 (Architectural and M&E Requirement for meter room)

3.2.2.1

All water meters, including vacant meter positions and check meter positions, shall be arranged in groups of more than one meter positions and housed in meter rooms / boxes / cabinet / chamber.

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3.2.2.2

(a) The meter rooms/boxes/cabinets/chambers shall be designed solely for housing water meters to protect them against exposure to weather, falling objects and other undue external interferences and to facilitate reading and maintenance of water meters.

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(b) When preparing VPLD submission, the applicant shall submit the layout and elevation plans of the meter rooms/boxes with dimensions, including the width and height of the entrances (door openings in case of meter boxes) for the Water Authority's approval.

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3.2.2.3

No other building services such as drainage systems, fire hoses, M&E installations (equipment, cables and ducting, etc.) shall pass through or be placed inside the meter rooms/meter boxes/master meter rooms except lighting, ventilation, drainage, and smart metering if required by the WA etc., solely to facilitate meter reading and maintenance of water meters.

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3.2.2.4

The following architectural requirements as illustrated in Fig. 41 & 42 of TR shall be met:-

(a) (i) For meter rooms, the minimum distance between the outward face of the meter group and the wall/door opening directly opposite the meter group shall be 1000mm and there shall be no obstacles in between.

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(a) (ii) If the door to the meter room is to be opened at an inward position and it is at the opposite side of the meter group, the minimum perpendicular distance between the outward face of the meter group and the door (the point on the door that is nearest to the meter group) when it is fully opened is 600mm

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(b) (i) Minimum clear width of the door entrance to the meter room is 800mm

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(b) (ii) Maximum clear height of the door entrance to the meter room is 2000mm

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(b) (iii) Maximum clear depth of meter boxes measured from the outside face is 800mm

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(c) An entrance located at communal area for safe, free, and uninterrupted access to the meter room/box/cabinet/chamber shall be provided.

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(d) (i) Checked all door(s) to the meter room/box/cabinet and confirmed no self-closing device on it.

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(d) (ii) The lock of the door to the meter room is located at a level between 0.9m to 1.1m above the finished floor level.

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(d) (iii) Door to the meter room is equipped with handle either in the form of long cylindrical or spherical shape. Covered or flat sectioned handles shall not be used.

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(e) Outside of the door(s) to the meter room/box is clearly marked 「水錶」, "Water Meters" in both Chinese and English of font size not less than 30mm

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(f) If there are more than one water meter room/box/cabinet inside a building block, master-key locks are used at all meter rooms/boxes/cabinets.

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(h) Meter rooms/boxes inside market/commercial complex are positioned in areas with clear access and with no obstruction.

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3.2.2.5

(a) (i) Minimum illumination at meter positions is 120 lux.

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(a) (ii) Minimum mechanical ventilation at the meter positions is 6 air-changes per hour.

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(b) Provision of adequate drainage inside the meter room and the meter box positioned at floor level

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3.2.3 (Permanent Display Board showing water meter details)3.2.3.1

(a) Upon completion of the water meter installation, the Licensed Plumber (LP) shall install a permanent display board at the wall/door inside the meter room/box.

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(b) Top of the board shall not be higher than 1800 mm above the floor level

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(c) Bottom of the board shall not be lower than 500 mm for an individual meter above the floor level

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(d) This display board is constructed of durable plastic or corrosion-resistant plate

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(e) Words in block letters and diagrams on the display board are in black on light colour background with font size of standardized font type and be not less than 18 points (i.e. 7 mm in height).

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(f) Details of this display board are submitted by the applicant as part of the VPLD

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3.2.4 (Mounting Height of Water Meters in Meter Rooms/Boxes)3.2.4.1

(a) For meters arranged in groups and meters installed inside meter boxes and cabinets, no meter position shall be lower than 300 mm nor higher than 1500 mm above the floor level

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(b) For projects where corridor meter arrangement is chosen and accepted, individual meter positions shall be at a suitable height not less than 750 mm but not more than 1500 mm above the floor level.

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(c) Minimum clearance should be provided for meters of trade supply according to Fig. 36.

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3.2.6 Location of Water Meter at Landscape Areas3.2.6.1

For a meter installed in a landscape area, it should be installed above ground level. In case the meter is installed in a meter box/cabinet, there shall be a proper working space in front of the meter box/cabinet with a clear working headroom not less than 2m.

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3.2.6.2

A safe pedestrian access to the meter position should be provided.

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3.3 Master Meter and Check Meter3.3.2 Principles of Master Meters Provision3.3.2.1

Subject to Clause 3.3.2.3, master meter(s) shall be provided to fresh water and TMF inside service and fire service of all new developments with more

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than 1 building block, regardless of the total length of underground buried and concealed pipes.

3.3.2.3

Master meters shall be provided to fresh water and TMF inside service and fire service in all new government premises (including developments with no building block and single block building), no matter the connecting water pipes are buried, exposed or laid in service trench (applicable to all new government premises with Form WWO 542 submitted to WSD on or after 1st January 2021).

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3.3.3 Sub-meters provision for buried fresh water inside service and fire service

3.3.3.2

(a) (i) Sub-meter chambers with check meter positions shall be provided at underground branch mains on a building-cluster basis except for developments with 5 or less building blocks of the same type only.

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(a) (ii) Each building-cluster shall not include more than 5 building blocks of the same type in general.

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(b) For typical configuration of master meter and sub-meter chambers in a multiple-block development, Fig. 24 of TR shall be referred.

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(c) For details of sub-meter chambers, Fig. 25 of TR shall be referred.

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3.3.3.3

The installation of sub-meter chambers for TMF inside service are not required.

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3.3.3.4

Construction of a separate sub-meter chamber at a branch main is not required if:

(i) the check meter room inside a building block is located less than one straight pipe length of 6m from the tee-connection; or

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(ii) all the pipework between the tee-connection and the building block is exposed.

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3.3.4 Arrangements of Master Meter

3.3.4.1

One master meter shall be installed for each FW/TMF/FS inlet pipe supplying a development site at the lot boundary irrespective of the number of connection points to the government mains.

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3.3.4.2

The master meter room/cabinet/box shall be preferably located at-grade where feasible. Otherwise, full justifications for non-compliance with such requirement shall be provided to the WA for consideration and approval.

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3.3.4.3

Standard master meter room/cabinet/box configuration for all new developments are shown in Figs. 26 to 31 of TR.

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3.3.4.4 to 3.3.4.6

(a) In general, a minimum straight pipe lengths immediately upstream and downstream of a master meter or check meter shall be provided to ensure accuracy of master meters and check meters.

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(b) (i) The upstream and downstream straight pipe length requirements for different type of meters shall not be less than the straight length requirement shown in Fig. 30 of TR..

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3.3.4.9

(a) Master meters of diameter less than or equal to 100mm could be housed in a box or cabinet as shown in Fig. 31 of TR.

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(b) A master meter room will be required for master meters larger than 100mm in diameter.

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3.3.4.10 to 3.3.4.12

(a) If the water main is to be laid underneath private roads which is scheduled to be handed over to government within 5 years after completion, master meters shall be installed for each FW/TMF/FS inlet pipe supplying each group of buildings/podia at their respective boundaries. On top of this, master meters are also required at the estate's boundary as illustrated in Fig. 24 of TR.

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(b) If the handover is scheduled beyond 5 years after completion, the said master meter positions mentioned in Clause 3.3.4.10 are still required, except the positions are temporarily bridged over by short pieces.

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3.3.4.12

Fire service needs to be separated from the potable supply right at the lot boundary.

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3.3.4.13

Architectural and M&E requirements for the master meter room shall comply with the requirements in Sections 3.2.2.4 and 3.2.2.5. However, applicant may request for relaxation of the requirement with justifications and flexibility may be allowed at the discretion of the Water Authority.

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3.3.4.14

A strainer shall be installed upstream of all master meter.

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3.3.4.15

For pressure monitoring, a pressure tapping point at the straight pipe after flange adapter to master meters of 50mm and above shall be provided as shown in Fig. 27, 28, 31 and 43. As an alternative, pressure tapping point provided on a flange ring after the straight pipe is also permitted. The connection details of pressure tapping point installed by other methods shall be provided to the WA for consideration and approval.

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3.3.5 Check Meter Requirement3.3.5.1E

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A check meter position shall be provided close to the end of the underground communal service supplying a building block for all fresh water and flushing water inside service and fire service.

3.3.5.2, 3.3.5.3 and 3.3.5.4

(a) The check meter position shall be located at accessible communal areas for ease of meter reading and maintenance at all times.

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(b) For check meter position to be mounted in a cabinet, horizontally perpendicular and longitudinal working clearances at each check meter position shall be provided. Table 3.3.5.3.1 stipulated the minimum horizontally perpendicular working clearance, meaning the shortest distance between the longitudinal centre line of the check meter position and a wall or any edge of a door when opened.

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(c) Minimum longitudinal working clearances of 200mm between both end of meter flanges of the check meter position and a wall or any obstruction

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Checklists for Vetting Plumbing Proposal - New Building**Chapter 4 - Inside Service**

Type: S = Statutory Requirements
E = Essential for approval of works

Referring to the clauses in Technical Requirements for Plumbing Works in Buildings (TR). You may cross out the clauses if not applicable

^ Please ✓ as appropriate

Type Checked^ Remarks

#4.1 Pipe & Fitting Materials***4.1.1 General****4.1.1.1**

Pipes and fittings shall conform to the relevant standards as listed in Part B of TR and the WWR.

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4.1.1.2

All plumbing works using soldering for connecting copper pipes shall require prior permission of the WA.

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4.1.2 Requirements of Minimum Pipe Sizes**4.1.2.1**

A pipe must not be less than 20mm in diameter, except that a branch pipe may be of 15mm or more in diameter if the pipe length is not longer than 3m and the pipe supplies only one draw-off point.

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4.1.3.1

A bend or curve must not be made in any pipe so as to diminish the waterway or alter the internal diameter of the pipe.

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4.2 Fresh Water Supply**4.2.1 General Requirements****4.2.1.1**

All fresh water supplies to inside service, including TMF, shall be metered.

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4.2.1.2

(a) All domestic supplies and concessionary supplies shall be separately metered.

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(b) For different applications of concessionary supplies, Section 4.2.5 of TR shall be referred.

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4.2.2 Supply Modes**4.2.2.1**

Fresh water supply to buildings with an overall height of less than or equal to 12m can be effected in one of the two following ways:

(a) direct supply system as illustrated in Fig. 5 in TR; or

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(b) indirect supply system, with a storage tank, a sump-and-pump system or a hydro-pneumatic pump system as illustrated in Fig. 5 and Fig. 6 in TR.

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4.2.2.2

Fresh water supply to buildings with an overall height of more than 12m shall be supplied solely by indirect supply systems as illustrated in Fig. 6 in TR (i.e. a sump and pump system, a hydro-pneumatic pump system) or any equivalent system as approved by the WA for all floors. [This clause is applicable to new applications with Form WWO 542 submitted on or after 1 January 2019 except for those applications which have Form WWO 132 submitted before 1 September 2018.]

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4.2.2.3

The minimum residual pressure for fresh water would be 15 to 20 meter head measured at the connection to the main. The fresh supply inside service should be designed to the minimum available residual pressure as advised by the WA.

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4.2.3 Backflow/ Cross-connection Prevention4.2.3.1 Protection of Water Supplies4.2.3.1.1

All water supply systems shall be designed, installed, and maintained in order to prevent contaminants from being introduced into the fresh water supply systems.

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4.2.3.1.2

No device or system that may cause contamination of a water supply shall be connected directly or indirectly to any part of an inside service without appropriate cross-connection prevention or backflow prevention control suitable for the level of hazard.

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4.2.3.2 Cross-Connection/Backflow Hazard Rating4.2.3.2.1

Cross-connections are rated using three degrees of hazard, namely:-

(a) High Hazard

Any condition, device or practice that, in connection with the water supply system, has the potential to cause death or serious health impact;

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(b) Medium Hazard

Any condition, device or practice that, in connection with the water supply system, has the potential to cause significant health impact; and

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(c) Low Hazard

Any condition, device or practice that, in connection with the water supply system, constitutes a nuisance but does not cause significant health impact.

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4.2.3.3 Provision of Backflow Prevention Devices4.2.3.3.1

(a) The fresh water supply shall be protected from the hazard(s) by installing appropriate device listed in Table 4.2.3.7.1.

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(b) Hazard ratings for some typical installations are listed in Table 4.2.3.7.2 for reference.

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4.2.3.3.2

Backflow prevention devices shall comply with the latest BS EN 1717 and all relevant standard(s) for the devices.

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4.2.3.4 Water Downstream of Backflow Prevention Device4.2.3.4.1

Piping conveying water downstream of backflow prevention device, installed for high or medium hazard protection, shall be clearly and permanently labelled 'WARNING! NOT FOR DRINKING' at every outlet.

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4.2.3.5 Commissioning and Maintenance4.2.3.5.2

If backflow prevention devices applicable to high hazard cases, e.g. backflow preventer/reduced pressure zone valve etc., they shall only be used with a maintenance program. If such program is unavailable, the backflow prevention devices shall not be fitted and break tank shall be provided.

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4.2.3.6 Backflow Prevention Device in Hot Water Systems4.2.3.6.1

The backflow prevention device used in hot water systems shall be suitable for the specific hot water installation.

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4.2.3.7 Backflow Prevention Device and Hazard Levels for Applications4.2.3.7.1

Tables 4.2.3.7.1 and 4.2.3.7.2 shall be referred commonly used backflow prevention devices and hazard levels for different applications. For concessionary water supplies, Clause 4.2.5.2 shall be referred.

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4.2.4 General Pipework Arrangement4.2.4.1

(a) All plumbing works between the lot boundary and any master meter or check meter positions shall be exposed or laid in a proper service trench/duct to facilitate inspection and repairs.

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(b) Adequate drainage shall be provided to remove water inside the trench/duct.

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4.2.4.2

If the connection is not laid in an exposed manner at the lot boundary, then it shall be laid inside underground service trench/duct with adequate cover. The underground/buried water mains should be laid with cover according to the latest required minimum depth of services and associated installations stipulated by Highways Department.

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4.2.4.3

No water pipe shall be embedded within load bearing structural elements in longitudinal direction. Such structural elements include, but not limited to, columns, beams and slabs. Screeding above slabs should not be considered as structural elements. Hence, water pipe embedded in screeding is acceptable. The water pipe in screeding shall be considered as embedded pipes.

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4.2.4.4

Vertical water pipes piercing through structural slabs and transfer plates; and horizontal water pipes piercing through beams, columns and structural walls shall be protected by sleeving or other suitable means.

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4.2.4.5

Tee-branch valve has been provided in

(a) all underground water pipes and for all communal inside service; and

(b) shall be located close to the main pipe

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4.2.4.6

(a) Sufficient cleansing taps shall be provided at each floors of car parks of a building

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(b) If it is not part of the cleansing supply system of the building, the cleansing supply at the car park shall be given from a fresh water cistern with a separate meter.

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4.2.4.7

No draw-off point in the inside services shall be subject to an excessive pressure of 6 bar or above.

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4.2.4.9 & 4.2.4.10

(a) For new sump and pump systems, a standby pumpset shall be provided.

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(b) The existing sump and pump system shall be provided with a standby pumpset unless this proves to be impracticable.

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4.2.5 Concessionary Usage of Mains Water4.2.5.1

Concession usage of mains water are for the purpose listed in Clause 4.2.5.2

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4.2.5.2

Compliance with the concessionary usages and requirements in this clause

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4.2.5.4

Draw-off tap that is freely accessible by the general public should be kept in an external protective box with using a tap external protective box with lock and key.

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4.2.5.4a

If an automatic irrigation system is used. Off-tank supply is required.

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4.2.5.5

Installation of water points for internal cleansing of open yards and for other miscellaneous domestic purposes in private houses of bungalow type or the like can be permitted as part of the domestic supply. This will not be taken as a concessionary supply. It is not necessary to install any receptacle for this type of water points.

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4.2.6 Metered Supply for Other Purposes4.2.6.2 Supply for Temporary Structures and Modified/Converted Structures4.2.6.2.2

The premises shall have separate access, proper drainage system and bear a proper postal address.

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4.2.6.3 Water Supply for Cooling / Air-conditioning / Humidification Purposes4.2.6.3.1

Water supply shall not be used for any heating, cooling or humidification purposes except with the approval of the WA.

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4.2.6.3.2

Either fresh or salt mains water supply may be given for cooling / air-conditioning / humidification purposes if the system designed belongs to one of the categories listed in Clause 4.2.6.3.2 in TR.

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4.2.6.3.3

The application of mains water in evaporative type plants for purposes other than industrial process is limited to those cases where the cooling / air-conditioning / humidification system(s) is/ are critical for normal operation. The type of evaporative plant used should be of an enclosed design, so that wastage of water due to splashing is prevented.

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4.2.6.3.4

Prior to the installation of the fresh water cooling towers, applicants should apply for participation in the 'Fresh Water Cooling Towers Scheme' (FWCT Scheme) for air-conditioning systems administered by the Electrical and Mechanical Services Department (EMSD). The participation in the FWCT Scheme should comply with the requirements stipulated in the 'Code of Practice for Fresh Water Cooling Towers' promulgated by EMSD and the requirements of WSD

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4.2.7 Hot Water Systems4.2.7.1 Non-Centralized Hot Water System4.2.7.1.1

When the factory test pressure of the heater is at least 1.5 times the maximum static pressure at the mains water supply point, non-pressure type heaters, cistern type water heaters, unvented electric thermal storage water heaters satisfying the requirements stipulated in Clauses 4.2.7.1.12 and instantaneous water heaters are permitted to be connected direct to the supply pipe without the necessity of providing storage.

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4.2.7.1.2

When the factory test pressure of the heater is less than 1.5 times the maximum static water pressure at the mains water supply point then, for premises on direct supply, a water heater must be supplied with water from a cold water cistern.

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4.2.7.1.3

A separate mains water storage cistern of 45 litres capacity shall be provided for each flat to supply such hot water apparatus in Clause 4.2.7.1.2.

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4.2.7.1.4

Pressure type thermal storage heaters other than unvented electric thermal storage water heaters satisfying the requirements stipulated in Clauses 4.2.7.1.12 shall be supplied from storage cisterns no matter what the pressure at inlet point should be, except these are installed in flats supplied through the indirect or sump and pump system.

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4.2.7.1.5

For premises on direct supply, a separate mains water storage cistern of 45 litres capacity shall be provided for each flat to supply such hot water apparatus in Clause 4.2.7.1.4.

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4.2.7.1.6

For flats supplied from the roof storage cistern of an indirect or sump and pump system, no separate storage for hot water apparatus will be required but the supply to the apparatus shall be by a separate down feed supplying the apparatus only unless the arrangement in Clause 4.2.7.1.7 is applied.

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4.2.7.1.7

If the flats on the indirect system are supplied through an oversized down feed pipe, the pipe supplying the hot water apparatus shall be branched from the down feed at a point above the top of the apparatus.

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4.2.7.1.8

When gas geysers are to be installed on the top floor of a building supplied through storage cisterns, gas geysers with low pressure governors should be installed when the head available is less than 5 metres to the highest hot water draw-off point.

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4.2.7.1.9

If mixing valves, water blenders or combination fittings are to be used, the cold water supply to these fixtures shall be drawn from the same source as is supplying the hot water apparatus. In order to provide a balanced pressure and to obviate the risk of scalding should the supply at the source fail or be restricted for any reason.

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4.2.7.1.10

All pressure type thermal storage heaters shall be provided with a vent or expansion pipe taken from its highest point and discharge in the atmosphere above the storage cistern at sufficient height to prevent a constant outflow of hot water therefrom except for unvented electric thermal storage water heaters satisfying the requirements stipulated in Clauses 4.2.7.1.12 and 4.2.7.1.13 of TR.

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4.2.7.1.11

A loose jumper type valve shall be fitted on the inlet of the water heater if a non-return valve is not incorporated in such water heater, but this requirement

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does not apply to an electric water heater of the thermal storage type satisfying the requirements stipulated in Clauses 4.2.7.1.12 and 4.2.7.1.13 of Part A of TR.

4.2.7.1.12

All unvented electric thermal storage water heaters shall comply with the safety requirements under the Electrical Products (Safety) Regulation (Cap. 406 sub. leg.)

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4.2.7.1.13

Every system incorporating an unvented electric water heater of the thermal storage type shall be provided with:-

(a) a supply pipe that branches off from the feed pipe at a point above the top of the water heater, or some other device to prevent the water from draining down from the water heater if there is a failure at the source of water supply;

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(b) an anti-vacuum valve or some other device to prevent heated water from being syphoned back to the supply pipe; and

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(c) a vessel to accommodate the expansion of heated water where that expansion is constrained by a non-return valve or some other device, incorporated at the inlet of the water heater.

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4.2.7.2 Centralized Hot Water System

4.2.7.2.1 & 4.2.7.2.2

(a) The cold water feed pipe from the roof storage cistern shall supply the hot water system only

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(b) The cold water feed pipe from sump tank with booster pump shall also be the same source for the hot water system.

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4.2.7.2.3

(a) If mixing valves, water blenders or combination fittings are to be used, the cold water supply to these fixtures shall be drawn by a separate down feed from the hot water storage cistern.

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(b) This outlet from storage tank shall be slightly lower than the feed to the hot water system in order to provide a balanced pressure and obviate the risk of scalding should the mains supply fail or be restricted.

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4.2.7.2.4

(a) All centralised hot water systems utilising a boiler and cylinder, or calorifer, shall be provided with an expansion pipe taken from the highest point of the cylinder or calorifer, or if a secondary circulation system, from the highest point of such system.

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(b) In either case the expansion pipe shall discharge to the atmosphere above the storage cistern at sufficient height to prevent a constant outflow of hot water therefrom.

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4.2.7.2.5

No safety valves, air valves or relief valves be used as a substitute or replacement for an expansion pipe.

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4.2.7.2.6

No control valve be installed on the expansion pipes between the highest point of the cylinder or calorifer, and the free end of such pipes

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4.2.7.2.7

When a centralised hot water system of the boiler /cylinder or calorifer type is installed, in addition to the vent pipe as required in Clause 4.2.7.2.4 of TR, A safety valve or pressure relief valve shall be provided to the boiler or to the primary flow pipe as close to the boiler as possible. Such valve shall be set to discharge when the pressure in the boiler exceeds 35kPa above that of the static pressure of the system.

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4.2.7.2.8

No tap or other means of drawing off water, (other than a screwed plug with a removable key for emptying the system for cleansing and repair), shall be connected to any part of the hot water system below the top of the hot water cylinder in such a way that the level of the water in cylinder can be lowered.

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4.2.7.2.9

In a hot water system comprising more than one storage cylinders at different levels, Clause 4.2.7.2.8 should read as applying to the lowest cylinder.

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4.2.7.2.10

To avoid wastage of water when repairs are being effected, a stop valve shall be fitted on the cold feed pipe at the outlet from the storage cistern.

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4.2.7.2.11

If the storage cylinder is installed in a lower floor, an additional stop valve shall be fitted near the inlet to the cylinder.

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4.2.7.2.12

Such stop valve shall have loose keys or hand-wheels which shall be kept in a safe place to prevent unauthorised interference.

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4.2.7.2.13

A screwed plug with a removable key shall be provided at the lower part of the system for the purpose of draining down or emptying the system.

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4.2.7.2.14

No stop valve shall be installed in the primary flow or return pipes except when a vent pipe is connected to the boiler and such installation shall only be made under skilled supervision.

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4.2.7.2.16

Installation of boilers/ steam boilers shall comply with the relevant Boilers and Pressure Vessels Regulations [HK Law Chapter 56].

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4.2.7.2.17

Temperature and pressure relief valve, air vent and vacuum breaker shall be provided to hot water storage tanks and calorifers.

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4.3 Flushing Water Supply4.3.1 Sources of Flushing Water Supply#4.3.1.1

For inside service using government water supply for flushing, it shall comply with the requirements of the WWO/WWR and that of the WA.

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4.3.2 Pipe and Fitting Materials4.3.2.1

All water tanks, pipes and fittings of flushing water systems must be of salt water resistant materials to the approval of the WA. Pipes and fittings shall conform to the relevant standards as listed in Part B of TR and the WWR.

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4.3.3 Metering Requirements4.3.3.1

All flushing water supply systems shall be separate water supply systems.

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4.3.3.3

Water meter shall be installed in each flushing system receiving a TMF supply. TMF flushing water supply would normally be given to the entire building t Requirements stipulated in Section 3 of this TR is applicable.

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4.3.4 Supply Modes

Flushing water supply to buildings with an overall height less than or equal to 12m can be effected in one of the two following ways:

(a) indirect supply system (with direct supply to roof storage tank) as illustrated in Fig. 14 in TR; or

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(b) indirect supply system, with a sump and pump system or a hydro-pneumatic pump system as illustrated in Fig. 14 in TR.

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4.3.4.2

Flushing water supply to buildings with an overall height of more than 12m shall be supplied solely by indirect supply systems with a sump and pump system as illustrated in Fig. 14 or any equivalent system as approved by the WA for all floors. [This clause is applicable to new applications with Form WWO 542 submitted on or after 1 January 2019 except those applications which have Form WWO 132 submitted before 1 September 2018.]

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4.3.4.3

The minimum residual pressure of salt water supply is 15 meter head measured at the connection to the main. The flushing supply inside service should be designed to the minimum residual pressure as advised by the WA.

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4.3.5 General Pipework Arrangement4.3.5.1

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Under the provision of Buildings Ordinance (Chapter 123), all new buildings shall be provided with a plumbing system to supply water for flushing purposes and every part of such plumbing system, including the storage tank, shall be constructed of such materials that are suitable for use with salt water.

4.3.5.2

A separate water storage tank shall be provided for flushing purpose

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4.3.5.3

The inlet pipe to the separate storage tank should not be less than 40 mm diameter; its portion before meter position shall be exposed or laid in a proper service duct and extended to the lot boundary.

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4.3.5.4

To facilitate meter installation, a meter position shall be provided in the communal area of the building as close to the fresh supply meters as possible. Regarding general requirements for meter positions, Section 3.2 of Part A of TR shall be referred.

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4.3.5.5

In case a temporary mains fresh water supply is proposed to be provided as the alternative source to augment an existing independent (not Government) supply, the storage tank for the flushing cistern shall be constructed in accordance with Fig. 15.

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4.3.5.6

No draw-off point in the inside services shall be subject to pressure of 6 bar or above.

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4.3.5.7

A tee-branch valve shall be provided for all underground flushing water pipes, and for all pipe serving more than one domestic or commercial unit.

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4.3.5.8

Concerning requirement for flushing water storage capacity, Clause 6.2.5 shall be referred.

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Checklists for Vetting Plumbing Proposal - New Building**Chapter 5 - Fire Service**

Type: S = Statutory Requirements
E = Essential for approval of works

Referring to the clauses in Technical Requirements for Plumbing Works in Buildings (TR). You may cross out the clauses if not applicable

^ Please ✓ as appropriate

	Type	Checked [^]	Remarks
<u>#5.1 General</u>			
<u>5.1.3</u>			
Plumbing systems using government water supply for fire services shall comply with the requirements of the WA.	E	<input type="checkbox"/>	<input type="checkbox"/>
<u>5.1.4</u>			
The use of water from fire service for purposes other than firefighting is prohibited.	S	<input type="checkbox"/>	<input type="checkbox"/>
<u>5.2 Metering Requirements</u>			
<u>5.2.1</u>			
Details of master meter and check meter positions shall be referred to Section 3.3.	E	<input type="checkbox"/>	<input type="checkbox"/>
<u>5.3 Pipe Materials</u>			
<u>5.3.1</u>			
Pipe and fittings shall conform to the relevant standards as listed in Part B of TR and the WWR.	E	<input type="checkbox"/>	<input type="checkbox"/>
<u>5.3.2</u>			
Consideration can be given for the use of wrought iron pipe and black steel pipe without being galvanized, upon application, for a fresh water fire service after a positive air break, i.e. fire service tank or sump tank.	E	<input type="checkbox"/>	<input type="checkbox"/>
<u>5.3.3</u>			
The materials for pipes and pipe fittings on a salt water fire service shall be capable of withstanding the corrosive effect of salt water.	E	<input type="checkbox"/>	<input type="checkbox"/>
<u>5.4 Supply Types and Arrangements</u>			
<u>5.4.1 General</u>			
<u>5.4.1.1 and 5.4.1.2</u>			
(a) Fire service supply may be from fresh water or salt water source. The supply must be from an independent connection, i.e. entirely independent of other water supply arrangements within the building or development concerned.	E	<input type="checkbox"/>	<input type="checkbox"/>
(b) For existing buildings, fire service installations obtaining water supply from existing fresh water tanks may be considered case-by-case by the WA and the Director of Fire Services.	E	<input type="checkbox"/>	<input type="checkbox"/>

5.4.1.4

(a) All plumbing works between the lot boundary and master/check meter positions shall be exposed or laid in a proper service trench/duct to facilitate inspection and repairs.

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(b) Adequate drainage shall be provided to remove water inside the trench/duct.

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5.4.1.5

If the connection is not laid in an exposed manner at the lot boundary, then it shall be laid inside underground service trench/duct with adequate cover. The underground/buried water mains should be laid with cover according to the latest required minimum depth of services and associated installations stipulated by Highways Department.

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5.4.1.6

A fullway gate valve and a non-return valve have to be installed on the fire services as close to the Government water supply connection as possible.

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5.4.2 Sprinkler/Drencher System5.4.2.2

Connection of Sprinkler / Drencher System

(a) For system situated in the recognised Waterworks unrestricted industrial supply, a dual connection from the Government unrestricted supply ring will be provided.

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(b) For a system outside the recognised Waterworks unrestricted industrial supply, twin connection, one from an unrestricted supply and one from a distribution will be provided.

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5.4.2.3

Where it is not practical to connect the fire services sprinkler / drencher system to an unrestricted supply main:

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Fire Services Department may require the provision of fire service tank to serve as secondary source for the fire service installation. Dependent upon Fire Services Department's requirements, a single or dual connection can be given to serve the fire service tank of secondary source.

5.4.2.4

Usage of supplies to fire services / drencher system

(a) No part of any fire service sprinkler / drencher system supplied from the Government mains shall be used for supplying any other services including other fire service installations, e.g. hose reels, except that a common suction tank can be used for both sprinkler / drencher and hose reel systems.

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(b) Any exemption from requirement in 15(a) should have the endorsement of the Director of Fire Services

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5.4.2.5

Where direct connections to sprinkler / drencher system are to be from the Government mains, an additional butterfly valve, without stop screw and lock nut on handle and strapped in open position, shall be installed at a point on the supply pipe before the fire service inlet and as close as possible to the control valves of the connections.

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5.4.2.6

FSD's endorsement shall be sought for the application for improvised sprinkler systems.

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5.4.3 Fire Hydrant/Hose Reel System5.4.3.1

(a) Supply to hydrant / fire hose reel outlet must not be fed directly from the Government mains.

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(b) Fire hose reel outlets

(i) Fire hose reel outlets shall be housed in glass-fronted cabinets secured under lock and key.

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(ii) The glass panel shall:

(1) be of a frangible type;

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(2) not exceed 1.5mm in thickness;

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(3) be of such size and design so as not to cause any undue obstruction to the free use of hose reel.

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(iii) A metal or plastic striker shall be provided in the vicinity of the cabinet

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5.4.3.2

(a) Common tank arrangements for fire-fighting and flushing or other purposes are not acceptable when a Government supply is involved.

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(b) Where a building is to be provided with a non-Government flushing supply and where it is proposed to feed the fire service from that supply, the developer is advised to install an independent fire service system if it is envisaged that the fire service system may require to be connected to the Government mains at a later stage.

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5.4.3.3

Warning message shall be securely fixed on or near every hose reel outlet and the message shall be easily visible by the occupier.

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5.4.5 Fire Service Ring Mains5.4.5.1

Fire service ring main in a large industrial complex shall be connected to an unrestricted supply main, if practical. In case this is not practical, a "dual" connection from the Government ring main shall be given.

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5.4.5.2

Fire service ring mains shall not be connected to or used for supplying any other service, except with the approval of the Water Authority.

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5.4.7 Installation of Sprinkler System for SCB/PCP and Composite Buildings5.4.7.2

For applications to install the improvised sprinkler systems stated in (b) and (c) in Clause 5.4.7.1, endorsement and referral from the FSD must be provided when applying for water supply from WSD.

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Checklists for Vetting Plumbing Proposal - New Building**Chapter 6 - Water Cisterns, Water Pumps and Other Miscellaneous**

Type: S = Statutory Requirements
E = Essential for approval of works

Referring to the clauses in Technical Requirements for Plumbing Works in Buildings (TR). You may cross out the clauses if not applicable

^ Please ✓ as appropriate

	Type	Checked [^]	Remarks
<u>#6.1 General</u>			
<u>6.1.1</u>			
No cistern for the storage of cold water shall be installed or used except with the permission in writing of the Water Authority who shall specify the maximum permitted capacity.	S	<input type="checkbox"/>	<input type="checkbox"/>
<u>6.1.2</u>			
No cistern for the storage of fresh water supplied from the waterworks shall, without the written permission of the WA, be so connected that it can be used for the storage of any water other than that supplied from the waterworks.	S	<input type="checkbox"/>	<input type="checkbox"/>
<u>6.2 Cold Water Cisterns (or Cold Water Tanks)</u>			
<u>6.2.1 Location</u>			
<u>6.2.1.1 Access for Maintenance and Inspection</u>			
<u>6.2.1.1.1</u>			
Water Storage Tanks shall be installed so that they are easily accessible for cleaning or repairs.	S	<input type="checkbox"/>	<input type="checkbox"/>
<u>6.2.1.1.2</u>			
Safe access shall be provided to all cisterns by means of a secure permanent ladder or readily available portable ladder.	S	<input type="checkbox"/>	<input type="checkbox"/>
<u>6.2.1.1.3</u>			
Where a cistern is installed inside a building and, due to limited headroom available, it is fixed with limited clearance from the ceiling or underside of the roof, a quickly detachable fitting must be used to enable it to be easily removed for cleansing and repair.	S	<input type="checkbox"/>	<input type="checkbox"/>
<u>6.2.1.1.4</u>			
For a water cisterns with top access, the access on top of the cisterns should have a minimum headroom of 800mm.	E	<input type="checkbox"/>	<input type="checkbox"/>
<u>6.2.1.2 Protection against Pollution of Potable Water by Non-Portable Meter</u>			
<u>6.2.1.2.1</u>			
If a cistern for non-potable water is placed adjoining to a cistern for potable water, a physical break must be provided between the cisterns, such that the walls and slabs of the cisterns are separated, however, tie beams linking the cisterns for structural requirements may be fitted and, if fitted, must be	S	<input type="checkbox"/>	<input type="checkbox"/>

constructed in a way that cross contamination of the cisterns via the tie beams is not possible.

6.2.2 Material Requirements

6.2.2.1

A cistern must be watertight, of adequate strength, properly supported and be made of concrete, stainless steel or fibre glass.

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6.2.2.2

For concrete fresh water cisterns/storage tank, all internal surface of floors, walls (to full height) and soffits of potable water storage cisterns should be lined with a non-toxic smooth finish.

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6.2.2.4

When fibreglass storage tank is to be used, prior approval by the Water Authority must be sought. Fibreglass storage cistern for potable water shall be of an approved type or certified to contain no toxic materials and suitable for storage of potable water.

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6.2.3 Cover for Water Tanks

6.2.3.1

A cistern must be so located as to minimize the risk of contamination of stored water and be fitted with a suitable close fitting lockable cover that is not airtight. The cover must be so positioned as to facilitate inspection and cleaning. The covers must be so positioned as to facilitate inspection and cleaning.

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6.2.3.2

(a) Every storage cistern shall have a lockable close fitting rigid cover secured by mechanical means which excludes light and the ingress of particles and / or insects from the cistern.

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(b) The cover shall be made of a material or materials which do not shatter or fragment when broken and which will not contaminate any condensate which may form on its underside or the stored water.

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(c) For the potable water storage cistern, the cover and its base frame shall possess double upstand edges interlocking one another to provide additional protection.

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6.2.3.3

Double sealed covers with locking devices shall be provided for all storage cisterns other than cisterns that provide supply solely for irrigation, flushing and fire-fighting. The double-sealed covers prevent the ingress of surface water.

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6.2.4 Installation Requirements for Inlet and Outlet Pipe

6.2.4.1.1

All outlet pipes from the storage cistern should, be positioned at the opposite side to the inlet supply pipe to prevent stagnation of water.

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6.2.4.2 Controlling Incoming Water Supply6.2.4.2.1

The inlet of a single cistern fed by a gravity supply must be fitted with a ball float valve and stop valve.

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6.2.4.2.2

(a) For ball float valves of a nominal diameter not exceeding 50mm, their valve bodies must be made of copper alloy or stainless steel.

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(b) For ball float valves of a nominal diameter exceeding 50mm, their valve bodies must be made of copper alloy, stainless steel, epoxy coated cast iron or epoxy coated ductile iron.

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6.2.4.2.3

(a) Floats for use with fresh water must be made of copper alloy or stainless steel.

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(b) Floats for use with salt water must be made of plastic or stainless steel.

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6.2.4.2.4

Ball float valves fitted to a cistern must have the size of the orifice, the size of the float and the length of the lever so proportioned to one another that, when the float is immersed to an extent not exceeding half its volume, the valve is watertight against the highest pressure at which the valve may be required to work.

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6.2.4.2.5

A ball float valve or float-operated valve fitted to a cistern must be

(a) securely fixed to the cistern above the waterline of the float of the valve, and

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(b) must be supported independently of the inlet pipe (unless the inlet pipe is itself rigid and securely fixed to the cistern), in a position that no part of the body of the valve is submerged when the cistern is charged to the overflowing level.

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6.2.4.2.6

(a) If a ball float valve or float-operated valve is provided with a pipe so arranged as to discharge water into a cistern below its overflowing level, an air hole must be provided in the outlet chamber of the valve above the overflowing level.

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(b) The air hole must be of a size sufficient to prevent syphonage of water back through the valve.

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6.2.4.2.7

Ball float valves must not be fitted to a cistern that is used to contain heated water.

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6.2.4.2.8

The inlet of a single cistern fed by a pumped supply must be fitted with an automatic control switch and without any stop valve.

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6.2.4.2.9

- (a) The ball valve or control switch shall shut off the supply when the water level is 25mm below the invert of the overflow pipe or the warning pipe if there exists one.
- (b) The invert of the inlet pipe or the face of the outlet nose of the ball valve shall be not less than 25mm above the top of the overflow pipe.

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6.2.4.2.10

- (a) In case of a mixed flushing water supplies, the water tank shall be fitted with a ball float valve with submerged float control and a fullway gate valve for controlling and isolating the inflow of mains supply respectively.
- (b) For other source of flushing water supply, a ball float valve and a fullway gate valve shall be provided.
- (c) Performance of the ball float valve shall meet the requirements specified in case of gravity supply.

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6.2.4.3 Outlet Water Pipes6.2.4.3.1

The invert of an outlet pipe from a water storage tank with capacity less than 5000 litres shall be at least 30 mm above the bottom of the tank; this distance shall be increased to 100 mm if the storage tank capacity is 5000 litres or more.

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6.2.4.3.2

A stop valve must be provided at the outlet of a cistern. and provision shall be made for a drain-off pipe to enable the cistern to be emptied.

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6.2.4.3.3

Fullway gate valves shall be used with as the stop valves in Cl. 6.2.4.3.2 at the outlet pipe of every water storage cistern. The drain-off pipe shall be properly plugged or adequate means shall be provided to prevent any unauthorized operation of the control valve at drain-off pipe. If the outlet of a flushing water cistern is of nominal size 50mm or below, a ball valve can be used to substitute the above gate valve.

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6.2.4.4 Overflow Pipes and Warning Pipes6.2.4.4.1

All overflow and warning pipes of potable water storage cisterns shall be constructed of corrosion-resisting material.

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6.2.4.4.2

An overflow pipe shall be at least one commercial size larger than the inlet pipe and shall in no case be less than 25 mm in diameter must be fitted to a cistern and be extended to terminate in a conspicuous position. The overflow pipe must not be connected to a drain or sewer or to the overflow pipe from another cistern.

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6.2.4.4.3

The position of discharge should be in a communal area easily visible and accessible by the occupants.

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6.2.4.4.4

If the overflow pipe is not extended to terminate in a conspicuous position, the overflow pipe shall be installed with an overflow alarm with signal transferred to a 24-hourly manned management office for timely notification. Full justifications for such arrangement shall be provided to the WA for consideration and approval.

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6.2.4.4.5

In case of mixed flushing water supply as shown in Fig. 15, the overflow shall be twice the diameter of largest inlet or of nominal diameter 40mm, whichever is greater.

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6.2.4.4.6

No part of the overflow pipe shall be submerged inside the storage tank

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6.2.4.4.7

A grating and a self-closing non-return flap shall be provided at the overflow pipe outside the storage tank.

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6.2.4.4.8

A warning pipe shall be installed in addition to an overflow pipe. A warning pipe can be of any size not less than 25 mm in diameter and shall comply with all other requirements of an overflow pipe.

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6.2.4.4.9

The warning pipes shall be installed at a level below the overflow pipe and shall be either extended to conspicuous location, i.e. outside of the building periphery for roof tank or outside the pump room for sump tank, or installed with signal transferred to a 24-hourly manned management office.

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6.2.5 Size of Storage Tanks for Flushing, Domestic and Trade/Commercial Water Uses6.2.5.1

The proportion of capacity of sump cistern to roof cistern is recommended to be in the order of 1:3. Otherwise, the designer shall demonstrate that the proposed ratio of sump cistern to roof cistern is capable of fulfilling the designed demand.

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6.2.5.2

The capacity of the flushing water storage shall be designed according to the criteria in Table 6.2.5.2.1 with a minimum capacity of 250 litres. [applicable to new applications with Form WWO 542 submitted on or after 1 January 2019 only.]

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6.2.5.3

Storage criteria for fresh water supply for domestic flats are given in Table 6.2.5.3.1.

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6.2.5.4

For industrial building:

(a) The entire internal services shall be supplied from storage cisterns with separate outlets / downpipes feeding independent systems to serve separately the industrial and processing purposes and the other general and ablution appliances.

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(b) These independence systems serving separately the industrial and processing purposes and the other general and ablution appliances should not be interconnected.

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6.2.5.5

The required capacity of storage tanks for industrial use is one-day demand.

E

6.2.5.6

For trade/commercial premises, the storage criteria for fresh water supply shall be designed according to the criteria in Table 6.2.5.6.1 and Sections 6.2.5.7 to 6.2.5.9 of TR. The criteria shall apply to building types not listed in this Section in TR, yet having similar functions. In addition, designers should avoid oversize or undersize of the storage of water tanks which may result in water quality problems. However, applicant may request for relaxation of the requirement with justifications and flexibility will be allowed by the WA if justified.

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6.2.5.8

For hospital, the required storage criterion is one day's consumption as given by the hospital authorities

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6.2.5.9

For boilers, the required storage criterion is given in the formula under this section in TR.

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6.2.6 Other Recommendation/Requirement

6.2.6.2

When the capacity of water cistern exceeds 5000 litres, adoption of twin-tank system is required. The applicability shall also be subject to factors such as availability of plant room space.

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6.2.6.3 to 6.2.6.5

(a) A set of inlet, outlet and associated overflow and drain pipes shall be provided to each cistern compartment.

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(b) Each inlet of a twin-cistern fed by a pumped supply must be fitted with an automatic control switch and a stop valve for temporary isolation purpose.

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(c) For water supplies other than pumped supply, this inlet shall comply with requirements stated in Clause 6.2.4.2.1 of Part A of TR.

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6.3 Water Pumps

6.3.1

(a) Where a sump-and-pump system is used, it shall be provided with a duplicate pumpset.

E

(b) The pumping capacity of the pumps shall not be less than the designed out-flow rate of the storage tank being supplied.

E

6.5 Pressure Reducing Valves

6.5.1

No part in the internal pipework and/or draw-off point shall be subject to excessive high pressure. In case of excessive high pressure, provision of break pressure tanks at a suitable level of the internal supply system would be a positive and viable means to reduce the water pressure. Alternatively, pressure reducing valves may be provided in lieu of break pressure tank.

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6.5.2

Whenever a pressure reducing valve is installed,

(a) a bypass arrangement shall be incorporated with the provision of a second pressure reducing valve, except for fire service installations, to enable isolation of any defective pressure reducing valve for repair and replacement when necessary;

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(b) A pressure indicator shall be provided for pressure monitoring and the associated pipes and fittings shall be able to withstand the maximum pressure that may arise upon the failure of the pressure reducing valve as far as practicable. Fault alarm shall be installed with signal transferred to a 24-hourly manned management office for timely notification, except for fire service installations.

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6.6 Stop Valves for Draw-off Points

6.6.1

Individual stop valves shall be provided at all draw-off points or at a series of draw-off points if situated close together.

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6.7 Water Taps

6.7.1 Application of Water Taps

6.7.1.1

When infra-red sensor operated automatic taps are used as inside services, a stop cock or gate valve must be installed at the upstream of each fitting for manual isolation of water supply.

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6.7.1.2

Self-closing taps, of non-concussive type and of approved pattern, or infra-red operated automatic taps, shall be used for the public or communal lavatory basins.

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6.7.1.3

Except with the written permission of the Water Authority, fitting with a threaded outlet, or any device facilitating the connecting of rubber hose or another type of flexible hose, must not be used.

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6.7.2 Installation Requirements for Sanitary Fixtures Supplied by Water Taps

6.7.2.1

All taps supplying baths, lavatory basins, sinks or similar apparatus shall have a stop valve fixed in a readily accessible position to control the supply to each fitting or branch pipe supplying a range of fittings.

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6.7.2.2

Every inlet to a bath, lavatory basin or sink shall be distinct from, and unconnected with, any outlet therefrom and every outlet for emptying such bath, lavatory basin or sink shall be provided with a well-fitting and easily accessible watertight plug or some other equally suitable apparatus.

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6.7.2.3

The level of the hot or cold water draw-off point to a bath, lavatory basin or sink shall be above the level of the overflow. In the absence of overflow in the fixtures, the top edge of the bath, basin or sink shall be considered instead.

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6.7.2.4

If water supply to any bidets, sitz bath, slop and sluicing sink or similar apparatus is liable to be submerged, the following shall be provided:-

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- (a) a storage cistern supplying water to such apparatus only;
- (b) a storage cistern for flushing purposes only; or
- (c) a hot water distribution system supplying such apparatus only.

6.8 Domestic Appliances

6.8.1 Water Purifiers/Filters

6.8.1.2

Domestic water purifiers/ filters must not be connected directly to the mains supply because of the possibility of contamination.

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6.8.1.3

When there is installation of any domestic filter or water filter incorporated in water using apparatuses (such as drinking fountain etc.), backflow prevention device shall be installed.

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6.8.1.4

Requirements for backflow prevention and written permission from the WA for typical types of water filters are summarized in Table 6.10.1.4.1.

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6.8.1.5

Sterilizers without or without attached filtering devices could be connected directly to the mains supply provided that backflow prevention device is provided upstream of the sterilizer such that there is no possibility of contaminating the mains supply.

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6.8.2 Washing Machines/Dishwashing Machines

6.8.2.2

Washing machines/ dishwashing machines with submerged inlets are considered to have high level of contamination hazard and must be installed with appropriate backflow prevention devices according to Table 4.2.3.7.1.

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6.10 Flushing Apparatus

6.10.1 General Requirements

6.10.1.2

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(a) A flushing cistern must in all cases be supplied from a cistern. Except with the written permission of the Water Authority, the cistern must not be used to supply any other apparatus, appliance or fitting.

(b) The cistern must be fitted with a suitable close fitting cover and provided with appropriate access to enable the cistern to be entered and cleaned.

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6.10.1.3

A trough water-closet or urinal must be fitted with a flushing cistern.

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6.10.1.4

A water-closet fitment or slop sink must be fitted with a flushing cistern. However, a pressure flushing valve may be installed for flushing without the provision of a flushing cistern if there is a suitable head of water.

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6.10.1.5

The internal diameter of flushing pipes shall:-

(a) in the case of water closet fitments, trough water closets and slop sinks, be not less than 30mm;

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(b) in the case of urinals (other than trough urinals), be not less than 15mm for each basin and stall; and

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(c) in the case of trough urinals, be not less than 15mm for every metre thereof.

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6.10.1.6

A flushing apparatus must be operated by mechanical means or a sensor. In the case of an automatic flushing apparatus, the method of control and the volume and frequency of the flushes must be designed to ensure adequate cleaning.

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6.10.2 Flushing Cisterns

6.10.2.1

(a) A flushing cistern must be fitted with a flushing device of the valveless syphonic or valve type.

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(b) A stop valve must be fixed in a readily accessible position so as to control the water supply to the cistern.

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6.10.2.2

A flushing cistern for a water-closet fitment or slop sink must be capable of giving a flush of not more than 15 litres of water on each occasion the fitment is used.

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6.10.2.3

The capacity of the flushing cistern in the case of trough water closets and urinals shall be approved by the WA subject to the discharge in the case of trough water closets being not less than 9 litres of water for every metre of the channel and the discharge in the case of urinal being not less than 4.5 litres of water for every basin or stall, or in the case of a trough urinal, every metre thereof.

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6.10.2.4

The WA would have no objection to accepting the use of flushing cisterns with discharge less than that required by the current regulations provided that the design flushing volume is compatible with the toilet bowl to ensure effective clearance of waste by a single flush and the flushing apparatus meets the requirements of the WA. [Ref. PNAP APP-99]

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6.10.2.5

A flushing cistern operated by mechanical means or a sensor must be fitted with a ball float valve that is arranged to refill the cistern within 2 minutes.

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6.10.2.6

Every flushing cistern shall have an overflow which shall discharge in a conspicuous location.

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6.10.2.8

The requirements on the use of valve type flushing cisterns are as follows:-

(a) The valve seal of the flushing device shall be easily replaceable.

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(b) A dual flush valve which is designed to give two different volumes of flush shall have a readily discernible method of actuating the flush at different volumes. Such method should be illustrated clearly and permanently displayed at the cistern nearby.

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(c) For dual flush devices, the reduced flushing volume shall not be more than two-thirds of the larger flushing volume.

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(d) The flushing devices must pass the 200,000-cycle endurance test.

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6.10.2.9

The components of all valve type flushing devices shall be of material that is suitable for the use of salt water

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6.10.2.10

For an existing building with permission to use government water supply for flushing purposes, any existing flushing apparatus found unsuitable shall be replaced with a proper apparatus as specified under Section 6.10.

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6.10.2.11

A filter which is readily accessible for inspection and cleaning shall be installed before a flushing valve. This filter can be replaced by a built-in strainer, which can be readily inspected and cleaned, in the flushing device.

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6.10.3 Flushing Valves (Flushometers)

6.10.3.1

The installation of flushing valves (flushometers) shall be permitted when the following requirements are fulfilled:-

(a) A filter/strainer shall be installed before a flushing valve or a group of flushing valves;

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(b) The cartridge and other valve components shall be easily replaceable.

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(c) Flushing valves shall be used within the range of working pressures specified by the manufacturer.

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(d) The flushing devices must pass the 200,000-cycle endurance test.

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- (e) An effective maintenance management system shall be provided for frequent inspection and cleaning of filters, i.e. normally only public toilets (administered by government, quasi-government bodies, hotel operators, commercial complex management offices etc.) will be considered E

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- (f) A plate etched with the name of the responsible party and the telephone number in both Chinese and English shall be provided to facilitate users to report defective flushing valves. Other effective arrangements may also be considered; and E

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- (g) Flushing valve shall be of water efficiency Grade 1 or Grade 2 under Water Efficiency Labelling Scheme (WELS). E

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6.10.3.2

The valve components shall be of material that is suitable for the use of salt water S

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6.10.3.3

For an existing building with permission to use mains water (fresh or salt) for flushing purposes, any existing flushing apparatus found unsuitable shall be replaced with a proper apparatus as specified under section 6.10 S

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6.11 Earthing**6.11.1**

Inside service as an earth electrode

- (a) The metal work of an inside service shall not be used as an earth electrode. E

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Checklists for Vetting Plumbing Proposal - New Building**Chapter 7 - Water Conservation**

Type: S = Statutory Requirements
E = Essential for approval of works

Referring to the clauses in Technical Requirements for Plumbing in Hong Kong (TR). You may cross out the clauses if not applicable

^ Please ✓ as appropriate

Type Checked^ Remarks

#7.1 General**7.1.1**

For all proposed plumbing works submitted using the Form WWO 46 for designated part of premises as listed below, the proposed products to be used for shower head for bathing, water tap and urinal flushing valve should comply with prescribed water efficiency grades registered under WELS.

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7.2 Minimum Flow Requirements for Fittings in Inside Service**7.2.1**

The minimum flow requirements for draw-off taps, single and combination taps shall conform to the specification in the relevant international standards. Relevant standards for respective tapware has been summarized in Part B of TR.

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7.3 Water Efficiency Requirements for Fittings in Inside Service (Circular Letter 2/2017)**7.3.1**

Subject to exemption stipulated in Section 7.5 of Part A of TR, designated products (showers for bathing, water taps and urinal flushing valves) of prescribed water efficiency requirements registered under WELS shall be used in the following designated part of premises:-

- (i) Kitchens of the domestic premises; and
- (ii) Bathrooms and toilets of all premises.

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7.3.2

The products shall comply with the prescribed water efficiency requirements in Table 7.3.2.1 of TR

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7.4 Alternatives to Application of WELS Products**7.4.1**

The flow controller shall be a registered product under WELS and shall be of appropriate water efficiency grade to form a 'combined' water saving device that meets the prescribed water efficiency requirements.

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Appendix 1: (2) Checklists for Vetting Plumbing Proposal - Village House

Cover Page

Address of

Premises: Name of

Consumer: Contact

Tel. No.:

ASN No./CCID NO. (if applicable)

The plumbing proposal has been checked against the following checklists and all the technical requirements stated on the checklists have been taken into account in preparing the plumbing proposal.

*Chapter3 Meter

*Chapter4 Inside Service

*Chapter6 Water Cisterns, Water Pumps and Other Miscellaneous

Checklists prepared by,
(Authorised Person or
person signing the drawings)

Signature: _____

Name: _____

**please delete whichever is not applicable*

Checklists for Vetting Plumbing Proposal - Village House**Chapter 3 - Metering**

Type: S = Statutory Requirements
E = Essential for approval of works

Referring to the clauses in Technical Requirements for Plumbing Works in Buildings(TR). You may cross out the clauses if not applicable

^ Please ✓ as appropriate

Type Checked^ Remarks

#3.1 General**3.1.3**

All domestic unit shall be separately metered

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3.1.4

Location of water meter

(a) For direct supply system, the meter shall be sited in a meter room/box/chamber at convenient location in accessible communal area

E

(b) For indirect supply system, the meter shall be sites in a meter room/box/chamber in accessible communal area at roof level or at other convenient locations

E

3.1.6

For connections up to and including 40 mm diameter, a loose jumper type stopcock shall be provided and placed with spindle in the vertical position at each meter position on the inlet side of the meter where the meter is not sited at roof level and where the pressure is considered adequate.

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3.1.9 & 3.1.10

For salt water flushing supply,

(a) a meter position shall be provided for the purpose of periodic checking of consumption. It should be close to the lot boundary and connection to the Government mains or close to the point of connection from internal distribution mains whichever is applicable.

E

(b) stop valve shall be fitted at the inlet side of the meter position and a non-return or check valve shall be fitted on the delivery side as close as possible to the meter.

E

3.1.12

With an aim to prevent tampering of water meters, security seals shall be installed for all newly installed meters of size 40mm or above.

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3.2 Meter Position**3.2.1 (General Requirements for Meter Position)****3.2.1.1**

The following practice should be adopted in plumbing works design for meter positions:-

(a) fitting at meter position shall facilitate easy installation and removal of the water meter without the need to work on other pipe

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3.2.1.2

(a) For 15mm meter

(i) 20mm x 15mm bushes, or reducers at both sides of the meter position

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(ii) 200mm (clear effective length) distance piece of 15mm tube placed in between

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(iii) a long screw connector is provided immediately after the brush or reducer at the delivery side

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(b) For all meter size,

(i) the meter position shall also be provided similarly to 15mm meter with corresponding fittings and appropriate sizes.

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(ii) the length of distance piece should be referred to Figure 4 of the TR

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3.2.1.3

If a section of copper pipe is used either before or after a water meter position, that section of copper pipe between the water meter position and the first pipe clamp shall be jointed by screwed or flanged joints or soldering/brazing copper couplers.

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3.2.1.4

uPVC fittings shall be used at the meter position if uPVC materials are used as inside services. Brass/copper long screw (connector) shall be used at TMF position. Brass/copper fittings shall be used at the meter position if copper, lined galvanized steel or thermo-plastic materials are used as inside service.

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3.2.2(Architectural and M&E Requirement for meter room)

3.2.2.1

All water meters, including vacant meter positions and check meter positions, shall be arranged in groups of more than one meter positions and housed in meter rooms / boxes / cabinet / chamber.

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3.2.2.2

(a) The meter rooms/boxes/cabinets/chambers shall be designed solely for housing water meters to protect them against exposure to weather, falling objects and other undue external interferences to facilitate reading and maintenance of water meters.

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(b) When preparing VPLD submission, the applicant shall submit the layout and elevation plans of the meter rooms/boxes with dimensions, including the width and height of the entrances (door openings in case of meter boxes) for the Water Authority's approval.

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3.2.2.3

No other building services such as drainage systems, fire hoses, M&E installations (equipment, cables and ducting, etc.) shall pass through or be placed inside the meter rooms/meter boxes/master meter rooms except lighting,

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ventilation, drainage, and smart metering if required by the WA etc., solely to facilitate meter reading and maintenance of water meters.

3.2.2.4

The following architectural requirements as illustrated in Fig. 41 & 42 in TR shall be met:-

(b) (iii) Maximum clear depth of meter boxes measured from the outside face is 800mm E

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(c) An entrance located at communal area for safe, free, and uninterrupted access to the meter room/box/cabinet/chamber shall be provided. E

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(d) (i) Checked all door(s) to the meter room/box/cabinet and confirmed no self-closing device on it. E

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(e) Outside of the door(s) to the meter room/box is clearly marked 「水錶」, "Water Meters" in both Chinese and English of font size not less than 30mm E

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(g) For village type buildings and similar, water meters shall be installed in meter room(s)/box(es)/cabinet(s) located at the boundary and shall be accessible from the public area. E

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3.2.2.5

(b) Provision of adequate drainage inside the meter room and the meter box positioned at floor level E

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3.2.4 (Mounting Height of Water Meters in Meter Rooms/Boxes)

3.2.4.1

(a) For meters arranged in groups and meters installed inside meter boxes and cabinets, no meter position shall be lower than 300 mm nor higher than 1500 mm above the floor level E

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3.2.6 Location of Water Meter at Landscape Areas

3.2.6.1

For a meter installed in a landscape area, it should be installed above ground level. In case the meter is installed in a meter box/cabinet, there shall be a proper working space in front of the meter box/cabinet with a clear working headroom not less than 2m. E

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3.2.6.2

A safe pedestrian access to the meter position should be provided. E

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3.3 Master Meter and Check Meter

3.3.2 Principles of Master Meters Provision

3.3.2.2

Subject to Clause 3.3.2.3, for single detached village type buildings and single block buildings, master meters will not be required but all pipework between the connection to the main and meter positions shall be exposed or laid in a proper service trench/duct, except that branch mains of less than one straight pipe length of 6 metres from tee-connection to a building block may be buried. E

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Checklists for Vetting Plumbing Proposal

Chapter 4 - Inside Service

Type: S = Statutory Requirements
E = Essential for approval of works

Referring to the clauses in Technical Requirements for Plumbing Works in Buildings (TR). You may cross out the clauses if not applicable

^ Please ✓ as appropriate

	Type	Checked [^]	Remark
<u>#4.1 Pipe & Fitting Materials</u>			
<u>4.1.1 General</u>			
<u>4.1.1.1</u>			
Pipes and fittings shall conform to the relevant standards as listed in Part B of TR and the WWR.	E	<input type="checkbox"/>	<input type="checkbox"/>
<u>4.1.2 Requirements of Minimum Pipe Sizes</u>			
<u>4.1.2.1</u>			
A pipe must not be less than 20mm in diameter, except that a branch pipe may be of 15mm or more in diameter if the pipe length is not longer than 3m and the pipe supplies only one draw-off point.	S	<input type="checkbox"/>	<input type="checkbox"/>
<u>4.2 Fresh Water Supply</u>			
<u>4.2.1 General Requirements</u>			
<u>4.2.1.1</u>			
All fresh water supplies to inside service , including TMF, shall be metered.	S	<input type="checkbox"/>	<input type="checkbox"/>
<u>4.2.1.2</u>			
(a) All domestic supplies and concessionary supplies shall be separately metered.	E	<input type="checkbox"/>	<input type="checkbox"/>
(b) For different applications of concessionary supplies, Section 4.2.5 of TR shall be referred.	E	<input type="checkbox"/>	<input type="checkbox"/>
<u>4.2.3 Backflow/ Cross-connection Prevention</u>			
<u>4.2.3.1 Protection of Water Supplies</u>			
<u>4.2.3.1.1</u>			
All water supply systems shall be designed, installed, and maintained in order to prevent contaminants from being introduced into the fresh water supply systems.	E	<input type="checkbox"/>	<input type="checkbox"/>
<u>4.2.3.1.2</u>			
No device or system that may cause contamination of a water supply shall be connected directly or indirectly to any part of an inside service without appropriate cross-connection prevention or backflow prevention control suitable for the level of hazard.	E	<input type="checkbox"/>	<input type="checkbox"/>

4.2.3.2 Cross-Connection/Backflow Hazard Rating4.2.3.2.1

Cross-connections are rated using three degrees of hazard, namely:-

(a) High Hazard

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Any condition, device or practice that, in connection with the water supply system, has the potential to cause death or serious health impact;

(b) Medium Hazard

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Any condition, device or practice that, in connection with the water supply system, has the potential to cause significant health impact; and

(c) Low Hazard

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Any condition, device or practice that, in connection with the water supply system, constitutes a nuisance but does not cause significant health impact.

4.2.3.3 Provision of Backflow Prevention Devices4.2.3.3.1

(a) The fresh water supply shall be protected from the hazard(s) by installing appropriate device listed in Table 4.2.3.7.1.

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(b) Hazard ratings for some typical installations are listed in Table 4.2.3.7.2 for reference.

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4.2.3.3.2

Backflow prevention devices shall comply with the latest BS EN 1717 and all relevant standard(s) for the devices.

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4.2.3.4 Water Downstream of Backflow Prevention Device4.2.3.4.1

Piping conveying water downstream of backflow prevention device, installed for high or medium hazard protection, shall be clearly and permanently labelled 'WARNING! NOT FOR DRINKING' at every outlet.

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4.2.3.5 Commissioning and Maintenance4.2.3.5.2

If backflow prevention devices applicable to high hazard cases, e.g. backflow preventer/reduced pressure zone valve etc., they shall only be used with a maintenance program. If such program is unavailable, the backflow prevention devices shall not be fitted and break tank shall be provided.

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4.2.3.6 Backflow Prevention Device in Hot Water Systems4.2.3.6.1

The backflow prevention device used in hot water systems shall be suitable for the specific hot water installation.

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4.2.3.7 Backflow Prevention Device and Hazard Levels for Applications

4.2.3.7.1

Tables 4.2.3.7.1 and 4.2.3.7.2 shall be referred commonly used backflow prevention devices and hazard levels for different applications. For concessionary water supplies, Clause 4.2.5.2 shall be referred.

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4.2.4 General Pipework Arrangement4.2.4.3

No water pipe shall be embedded within load bearing structural elements in longitudinal direction. Such structural elements include, but not limited to, columns, beams and slabs. Screeding above slabs should not be considered as structural elements. Hence, water pipe embedded in screeding is acceptable. The water pipe in screeding shall be considered as embedded pipes.

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4.2.4.4

Vertical water pipes piercing through structural slabs and transfer plates; and horizontal water pipes piercing through beams, columns and structural walls shall be protected by sleeving or other suitable means.

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4.2.4.5

Tee-branch valve has been provided in

- (a) all underground water pipes; and
- (b) and for all communal inside service

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4.2.4.7

No draw-off point in the inside services shall be subject to an excessive pressure of 6 bar or above.

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4.2.5 Concessionary Usage of Mains Water4.2.5.1

Concession usage of mains water are for the purpose listed in Clause 4.2.5.2

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4.2.5.2

Compliance with the concessionary usages and requirements in this clause

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4.2.5.5

Installation of water points for internal cleansing of open yards and for other miscellaneous domestic purposes in private houses of bungalow type or the like can be permitted as part of the domestic supply. This will not be taken as a concessionary supply. It is not necessary to install any receptacle for this type of water points.

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4.2.7 Hot Water Systems4.2.7.1 Non-Centralized Hot Water System4.2.7.1.1

When the factory test pressure of the heater is at least 1.5 times the maximum static pressure at the mains water supply point, non-pressure type heaters,

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cistern type water heaters, unvented electric thermal storage water heaters satisfying the requirements stipulated in Clauses 4.2.7.1.12 and instantaneous water heaters are permitted to be connected direct to the supply pipe without the necessity of providing storage.

4.2.7.1.2

When the factory test pressure of the heater is less than 1.5 times the maximum static water pressure at the mains water supply point then, for premises on direct supply, a water heater must be supplied with water from a cold water cistern.

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4.2.7.1.3

A separate mains water storage cistern of 45 litres capacity shall be provided for each flat to supply such hot water apparatus in Clause 4.2.7.1.2.

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4.2.7.1.4

Pressure type thermal storage heaters other than unvented electric thermal storage water heaters satisfying the requirements stipulated in Clauses 4.2.7.1.12 shall be supplied from storage cisterns no matter what the pressure at inlet point should be, except these are installed in flats supplied through the indirect or sump and pump system.

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4.2.7.1.5

For premises on direct supply, a separate mains water storage cistern of 45 litres capacity shall be provided for each flat to supply such hot water apparatus in Clause 4.2.7.1.4.

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4.2.7.1.6

For flats supplied from the roof storage cistern of an indirect or sump and pump system, no separate storage for hot water apparatus will be required but the supply to the apparatus shall be by a separate down feed supplying the apparatus only unless the arrangement in Clause 4.2.7.1.7 is applied.

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4.2.7.1.7

If the flats on the indirect system are supplied through an oversized down feed pipe, the pipe supplying the hot water apparatus shall be branched from the down feed at a point above the top of the apparatus.

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4.2.7.1.8

When gas geysers are to be installed on the top floor of a building supplied through storage cisterns, gas geysers with low pressure governors should be installed when the head available is less than 5 metres to the highest hot water draw-off point.

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4.2.7.1.9

If mixing valves, water blenders or combination fittings are to be used, the cold water supply to these fixtures shall be drawn from the same source as is supplying the hot water apparatus. In order to provide a balanced pressure

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and to obviate the risk of scalding should the supply at the source fail or be restricted for any reason.

4.2.7.1.10

All pressure type thermal storage heaters shall be provided with a vent or expansion pipe taken from its highest point and discharge in the atmosphere above the storage cistern at sufficient height to prevent a constant outflow of hot water therefrom except for unvented electric thermal storage water heaters satisfying the requirements stipulated in Clauses 4.2.7.1.12 and 4.2.7.1.13 of TR.

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4.2.7.1.11

A loose jumper type valve shall be fitted on the inlet of the water heater if a non-return valve is not incorporated in such water heater, but this requirement does not apply to an electric water heater of the thermal storage type satisfying the requirements stipulated in Clauses 4.2.7.1.12 and 4.2.7.1.13 of Part A of TR.

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4.2.7.1.12

All unvented electric thermal storage water heaters shall comply with the safety requirements under the Electrical Products (Safety) Regulation (Cap. 406 sub. leg.)

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4.2.7.1.13

Every system incorporating an unvented electric water heater of the thermal storage type shall be provided with:-

- (a) a supply pipe that branches off from the feed pipe at a point above the top of the water heater, or some other device to prevent the water from draining down from the water heater if there is a failure at the source of water supply;
- (b) an anti-vacuum valve or some other device to prevent heated water from being syphoned back to the supply pipe; and
- (c) a vessel to accommodate the expansion of heated water where that expansion is constrained by a non-return valve or some other device, incorporated at the inlet of the water heater.

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4.3 Flushing Water Supply

4.3.1 Sources of Flushing Water Supply

#4.3.1.1

For inside service using government water supply for flushing, it shall comply with the requirements of the WWO/WWR and that of the WA..

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4.3.2 Pipe and Fitting Materials

4.3.2.1

All water tanks , pipes and fittings of flushing water systems must be of salt water resistant materials to the approval of the WA. Pipes and fittings shall conform to the relevant standards as listed in Part B of TR and the WWR.

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4.3.3 Metering Requirements

4.3.3.1

All flushing water supply systems shall be separate water supply systems.

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4.3.3.3

Water meter shall be installed in each flushing system receiving a TMF supply. TMF flushing water supply would normally be given to the entire building Requirements stipulated in Section 3 of this TR is applicable.

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4.3.5 General Pipework Arrangement

4.3.5.1

Under the provision of Buildings Ordinance (Chapter 123), all new buildings shall be provided with a plumbing system to supply water for flushing purposes and every part of such plumbing system, including the storage tank, shall be constructed of such materials that are suitable for use with salt water.

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4.3.5.2

A separate water storage tank shall be provided for flushing purpose

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4.3.5.3

The inlet pipe to the separate storage tank should not be less than 40 mm diameter; its portion before meter position shall be exposed or laid in a proper service duct and extended to the lot boundary.

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4.3.5.4

To facilitate meter installation, a meter position shall be provided in the communal area of the building as close to the fresh supply meters as possible. Regarding general requirements for meter positions, Section 3.2 of Part A of TR shall be referred.

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4.3.5.5

In case a temporary mains fresh water supply is proposed to be provided as the alternative source to augment an existing independent (not Government) supply, the storage tank for the flushing cistern shall be constructed in accordance with Fig. 15.

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4.3.5.6

No draw-off point in the inside services shall be subject to pressure of 6 bar or above.

E

4.3.5.7

A tee-branch valve shall be provided for all underground flushing water pipes, flushing and for all pipes serving more than one domestic or commercial unit.

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4.3.5.8

Concerning requirement for flushing water storage capacity, Clause 6.2.5 E shall be referred.

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Checklists for Vetting Plumbing Proposal**Chapter 6 - Water Cisterns, Water Pumps and Other Miscellaneous**

Type: S = Statutory Requirements
E = Essential for approval of works

Referring to the clauses in Technical Requirements for Plumbing Works in Buildings(TR). You may cross out the clauses if not applicable

^ Please✓ as appropriate

Type Checked^ Remarks

#6.1 General**6.1.1**

No cistern for the storage of cold water shall be installed or used except with the permission in writing of the Water Authority who shall specify the maximum permitted capacity.

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6.1.2

No cistern for the storage of fresh water supplied from the waterworks shall, without the written permission of the WA, be so connected that it can be used for the storage of any water other than that supplied from the waterworks.

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6.2 Cold Water Cisterns (or Cold Water Tanks)**6.2.1 Location****6.2.1.1 Access for Maintenance and Inspection****6.2.1.1.1**

Water Storage Tanks shall be installed so that they are easily accessible for cleaning or repairs.

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6.2.1.1.2

Safe access shall be provided to all cisterns by means of a secure permanent ladder or readily available portable ladder.

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6.2.1.1.3

Where a cistern is installed inside a building and, due to limited headroom available, it is fixed with limited clearance from the ceiling or underside of the roof, a quickly detachable fitting must be used to enable it to be easily removed for cleansing and repair.

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6.2.1.1.4

For a water cisterns with top access, the access on top of the cisterns should have a minimum headroom of 800mm.

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6.2.2 Material Requirements6.2.2.1

A cistern must be watertight, of adequate strength, properly supported and be made of concrete, stainless steel or fibre glass.

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6.2.2.2

For concrete fresh water cisterns/storage tank, all internal surface of floors, walls (to full height) and soffits of potable water storage cisterns should be lined with a non-toxic smooth finish.

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6.2.2.4

When fibreglass storage tank is to be used, prior approval by the Water Authority must be sought. Fibreglass storage cistern for potable water shall be of an approved type or certified to contain no toxic materials and suitable for storage of potable water.

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6.2.3 Cover for Water Tanks6.2.3.1

A cistern must be so located as to minimize the risk of contamination of stored water and be fitted with a suitable close fittings lockable cover that is not airtight. The cover must be so positioned as to facilitate inspection and cleaning. The covers must be so positioned as to facilitate inspection and cleaning.

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6.2.3.2

(a) Every storage cistern shall have a lockable close fitting rigid cover secured by mechanical means which excludes light and the ingress of particles and / or insects from the cistern.

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(b) The cover shall be made of a material or materials which do not shatter or fragment when broken and which will not contaminate any condensate which may form on its underside or the stored water.

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6.2.4 Installation Requirements for Inlet and Outlet Pipe6.2.4.1.1

All outlet pipes from the storage cistern should, be positioned at the opposite side to the inlet supply pipe to prevent stagnation of water.

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6.2.4.2 Controlling Incoming Water Supply6.2.4.2.1

The inlet of a single cistern fed by a gravity supply must be fitted with a ball float valve and stop valve.

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6.2.4.2.2

(a) For ball float valves of a nominal diameter not exceeding 50mm, their valve bodies must be made of copper alloy or stainless steel.

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(b) For ball float valves of a nominal diameter exceeding 50mm, their valve bodies must be made of copper alloy, stainless steel, epoxy coated cast iron or epoxy coated ductile iron.

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6.2.4.2.3

(a) Floats for use with fresh water must be made of copper alloy or stainless steel. S

(b) Floats for use with salt water must be made of plastic or stainless steel. S

6.2.4.2.4

Ball float valves fitted to a cistern must have the size of the orifice, the size of the float and the length of the lever so proportioned to one another that, when the float is immersed to an extent not exceeding half its volume, the valve is watertight against the highest pressure at which the valve may be required to work. S

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6.2.4.2.5

A ball float valve or float-operated valve fitted to a cistern must be

(a) securely fixed to the cistern above the waterline of the float of the valve, and S

(b) must be supported independently of the inlet pipe (unless the inlet pipe is itself rigid and securely fixed to the cistern), in a position that no part of the body of the valve is submerged when the cistern is charged to the overflowing level. S

6.2.4.2.6

(a) If a ball float valve or float-operated valve is provided with a pipe so arranged as to discharge water into a cistern below its overflowing level, an air hole must be provided in the outlet chamber of the valve above the overflowing level. S

(b) The air hole must be of a size sufficient to prevent syphonage of water back through the valve. S

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6.2.4.2.7

Ball float valves must not be fitted to a cistern that is used to contain heated water. S

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6.2.4.2.8

The inlet of a single cistern fed by a pumped supply must be fitted with an automatic control switch and without any stop valve. S

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6.2.4.2.9

(a) The ball valve or control switch shall shut off the supply when the water level is 25mm below the invert of the overflow pipe or the warning pipe if there exists one. S

(b) The invert of the inlet pipe or the face of the outlet nose of the ball valve shall be not less than 25mm above the top of the overflow pipe. S

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6.2.4.2.10

(a) In case of a mixed flushing water supplies, the water tank shall be fitted with a ball float valve with submerged float control and a fullway gate valve for controlling and isolating the inflow of mains supply respectively. E

(b) For other source of flushing water supply, a ball float valve and a fullway gate valve shall be provided. E

(c) Performance of the ball float valve shall meet the requirements specified in case of gravity supply. E

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6.2.4.3 Outlet Water Pipes6.2.4.3.1

The invert of an outlet pipe from a water storage tank with capacity less than 5000 litres shall be at least 30 mm above the bottom of the tank; this distance shall be increased to 100 mm if the storage tank capacity is 5000 litres or more.

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6.2.4.3.2

A stop valve must be provided at the outlet of a cistern, and provision shall be made for a drain-off pipe to enable the cistern to be emptied.

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6.2.4.3.3

Fullway gate valves shall be used with as the stop valves in Cl. 6.2.4.3.2 at the outlet pipe of every water storage cistern. The drain-off pipe shall be properly plugged or adequate means shall be provided to prevent any unauthorized operation of the control valve at drain-off pipe. If the outlet of a flushing water cistern is of nominal size 50mm or below, a ball valve can be used to substitute the above gate valve.

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6.2.4.4 Overflow Pipes and Warning Pipes6.2.4.4.1

All overflow and warning pipes of potable water storage cisterns shall be constructed of corrosion-resisting material.

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6.2.4.4.2

The overflow pipe shall be at least one commercial size larger than the inlet pipe and shall in no case be less than 25 mm in diameter must be fitted to a cistern and be extended to terminate in a conspicuous position. The overflow pipe must not be connected to a drain or sewer or to the overflow pipe from another cistern.

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6.2.4.4.3

The position of discharge should be in a communal area easily visible and accessible by the occupants.

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6.2.4.4.4

If the overflow pipe is not extended to terminate in a conspicuous position, the overflow pipe shall be installed with an overflow alarm with signal transferred to a 24-hourly manned management office for timely notification. Full justifications for such arrangement shall be provided to the WA for consideration and approval.

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6.2.4.4.5

In case of mixed flushing water supply as shown in Fig. 15, the overflow shall be twice the diameter of largest inlet or of nominal diameter 40mm, whichever is greater.

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6.2.4.4.6

No part of the overflow pipe shall be submerged inside the storage tank

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6.2.4.4.7

A grating and a self-closing non-return flap shall be provided at the overflow pipe outside the storage tank.

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6.2.4.4.8

A warning pipe shall be installed in addition to an overflow pipe. A warning pipe can be of any size not less than 25 mm in diameter and shall comply with all other requirements of an overflow pipe.

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6.2.4.4.9

The warning pipes shall be installed at a level below the overflow pipe and shall be either extended to conspicuous location, i.e. outside of the building periphery for roof tank or outside the pump room for sump tank, or installed with signal transferred to a 24-hourly manned management office.

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6.2.5 Size of Storage Tanks for Flushing, Domestic and Trade/Commercial Water Uses6.2.5.1

The proportion of capacity of sump cistern to roof cistern is recommended to be in the order of 1:3. Otherwise, the designer shall demonstrate that the proposed ratio of sump cistern to roof cistern is capable of fulfilling the designed demand.

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6.2.5.2

The capacity of the flushing water roof cistern shall be designed according to the criteria in Table 6.2.5.2.1 with a minimum capacity of 250 litres. [applicable to new applications with Form WWO 542 submitted on or after 1 January 2019 only.]

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6.2.5.3

Storage criteria for fresh water supply for domestic flats is listed in Table 6.2.5.3.1.

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6.2.6 Other Recommendation/Requirement6.2.6.3 to 6.2.6.5

(a) A set of inlet, outlet and associated overflow and drain pipes shall be provided to each cistern compartment.

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(b) Each inlet of a twin-cistern fed by a pumped supply must be fitted with an automatic control switch and a stop valve for temporary isolation purpose.

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(c) For water supplies other than pumped supply, this inlet shall comply with requirements stated in Clause 6.2.4.2.1 of Part A of TR.

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6.5 Pressure Reducing Valves6.5.1

No part in the internal pipework and/or draw-off point shall be subject to excessive high pressure. In case of excessive high pressure, provision of break pressure tanks at a suitable level of the internal supply system would be a positive and viable means to reduce the water pressure. Alternatively, pressure reducing valves may be provided in lieu of break pressure tank.

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6.5.2

Whenever a pressure reducing valve is installed,

(a) a bypass arrangement shall be incorporated with the provision of a second pressure reducing valve, except for fire service installations, to enable isolation of any defective pressure reducing valve for repair and replacement when necessary;

(b) A pressure indicator shall be provided for pressure monitoring and the associated pipes and fittings shall be able to withstand the maximum pressure that may arise upon the failure of the pressure reducing valve as far as practicable. Fault alarm shall be installed with signal transferred to a 24-hourly manned management office for timely notification, except for fire service installations.

E E **6.6 Stop Valves for Draw-off Points****6.6.1**

Individual stop valves shall be provided at all draw-off points or at a series of draw-off points if situated close together.

E **6.7 Water Taps****6.7.1 Application of Water Taps****6.7.1.1**

When infra-red sensor operated automatic taps are used as inside services, a stop cock or gate valve must be installed at the upstream of each fitting for manual isolation of water supply.

E **6.7.1.2**

Self-closing taps, of non-concussive type and of approved pattern, or infra-red operated automatic taps, shall be used for the public or communal lavatory basins.

E **6.7.1.3**

Except with the written permission of the Water Authority, fitting with a threaded outlet, or any device facilitating the connecting of rubber hose or another type of flexible hose, must not be used.

S **6.7.2 Installation Requirements for Sanitary Fixtures Supplied by Water Taps****6.7.2.1**

All taps supplying baths, lavatory basins, sinks or similar apparatus shall have a stop valve fixed in a readily accessible position to control the supply to each fitting or branch pipe supplying a range of fittings.

S **6.7.2.2**

Every inlet to a bath, lavatory basin or sink shall be distinct from, and unconnected with, any outlet therefrom and every outlet for emptying such bath, lavatory basin or sink shall be provided with a well-fitting and easily accessible watertight plug or some other equally suitable apparatus.

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6.7.2.3

The level of the hot or cold water draw-off point to a bath, lavatory basin or sink shall be above the level of the overflow. In the absence of overflow in the fixtures, the top edge of the bath, basin or sink shall be considered instead.

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6.7.2.4

If water supply to any bidets, sitz bath, slop and sluicing sink or similar apparatus is liable to be submerged, the following shall be provided:-

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- (a) a storage cistern supplying water to such apparatus only;
- (b) a storage cistern for flushing purposes only; or
- (c) a hot water distribution system supplying such apparatus only.

6.8 Domestic Appliances**6.8.1 Water Purifiers/Filters**6.8.1.2

Domestic water purifiers/ filters must not be connected directly to the mains supply because of the possibility of contamination.

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6.8.1.3

When there is installation of any domestic filter or water filter incorporated in water using apparatuses (such as drinking fountain etc.), backflow prevention device shall be installed.

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6.8.1.4

Requirements for backflow prevention and written permission from the WA for typical types of water filters are summarized in Table 6.10.1.4.1.

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6.8.1.5

Sterilizers without or without attached filtering devices could be connected directly to the mains supply provided that backflow prevention device is provided upstream of the sterilizer such that there is no possibility of contaminating the mains supply.

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6.8.2 Washing Machines/Dishwashing Machines6.8.2.2

Washing machines/ dishwashing machines with submerged inlets are considered to have high level of contamination hazard and must be installed with appropriate backflow prevention devices according to Table 4.2.3.7.1.

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6.10 Flushing Apparatus**6.10.1 General Requirements**6.10.1.2

(a) A flushing cistern must in all cases be supplied from a cistern. Except with the written permission of the Water Authority, the cistern must not be used to supply any other apparatus, appliance or fitting.

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(b) The cistern must be fitted with a suitable close fitting cover and provided with appropriate access to enable the cistern to be entered and cleaned.

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6.10.1.3

A trough water-closet or urinal must be fitted with a flushing cistern.

S 6.10.1.4

A water-closet fitment or slop sink must be fitted with a flushing cistern. However, a pressure flushing valve may be installed for flushing without the provision of a flushing cistern if there is a suitable head of water.

S 6.10.1.5

The internal diameter of flushing pipes shall:-

(a) in the case of water closet fitments, trough water closets and slop sinks, be not less than 30mm;

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(b) in the case of urinals (other than trough urinals), be not less than 15mm for each basin and stall; and

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(c) in the case of trough urinals, be not less than 15mm for every metre thereof.

S 6.10.1.6

A flushing apparatus must be operated by mechanical means or a sensor. In the case of an automatic flushing apparatus, the method of control and the volume and frequency of the flushes must be designed to ensure adequate cleaning.

S 6.10.2 Flushing Cisterns6.10.2.1

(a) A flushing cistern must be fitted with a flushing device of the valveless syphonic or valve type.

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(b) A stop valve must be fixed in a readily accessible position so as to control the water supply to the cistern.

S 6.10.2.2

A flushing cistern for a water-closet fitment or slop sink must be capable of giving a flush of not more than 15 litres of water on each occasion the fitment is used.

S 6.10.2.3

The capacity of the flushing cistern in the case of trough water closets and urinals shall be approved by the WA subject to the discharge in the case of trough water closets being not less than 9 litres of water for every metre of the channel and the discharge in the case of urinal being not less than 4.5 litres of water for every basin or stall, or in the case of a trough urinal, every metre thereof.

S 6.10.2.4

The WA would have no objection to accepting the use of flushing cisterns with discharge less than that required by the current regulations provided that the design flushing volume is compatible with the toilet bowl to ensure effective clearance of waste by a single flush and the flushing apparatus meets the requirements of the WA. [Ref. PNAP APP-99]

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6.10.2.5

A flushing cistern operated by mechanical means or a sensor must be fitted with a ball float valve that is arranged to refill the cistern within 2 minutes.

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6.10.2.6

Every flushing cistern shall have an overflow which shall discharge in a conspicuous location.

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6.10.2.8

The requirements on the use of valve type flushing cisterns are as follows:-

(a) The valve seal of the flushing device shall be easily replaceable.

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(b) A dual flush valve which is designed to give two different volumes of flush shall have a readily discernible method of actuating the flush at different volumes. Such method should be illustrated clearly and permanently displayed at the cistern nearby.

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(c) For dual flush devices, the reduced flushing volume shall not be more than two-thirds of the larger flushing volume.

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(d) The flushing devices must pass the 200,000-cycle endurance test.

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6.10.2.9

The components of all valve type flushing devices shall be of material that is suitable for the use of salt water

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6.10.2.10

For an existing building with permission to use government water supply for flushing purposes, any existing flushing apparatus found unsuitable shall be replaced with a proper apparatus as specified under Section 6.10.

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6.10.2.11

A filter which is readily accessible for inspection and cleaning shall be installed before a flushing valve. This filter can be replaced by a built-in strainer, which can be readily inspected and cleaned, in the flushing device.

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6.10.3 Flushing Valves (Flushometers)6.10.3.1

The installation of flushing valves (flushometers) shall be permitted when the following requirements are fulfilled:-

(a) A filter/strainer shall be installed before a flushing valve or a group of flushing valves;

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(b) The cartridge and other valve components shall be easily replaceable.

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(c) Flushing valves shall be used within the range of working pressures specified by the manufacturer.

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(d) The flushing devices must pass the 200,000-cycle endurance test.

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(e) An effective maintenance management system shall be provided for frequent inspection and cleaning of filters, i.e. normally only public toilets (administered by government, quasi-government bodies, hotel operators, commercial complex management offices etc.) will be considered

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- (f) A plate etched with the name of the responsible party and the telephone number in both Chinese and English shall be provided to facilitate users to report defective flushing valves. Other effective arrangements may also be considered; and E

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- (g) Flushing valve shall be of water efficiency Grade 1 or Grade 2 under Water Efficiency Labelling Scheme (WELS). E

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6.10.3.2

- The valve components shall be of material that is suitable for the use of salt water S

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6.10.3.3

- For an existing building with permission to use mains water (fresh or salt) for flushing purposes, any existing flushing apparatus found unsuitable shall be replaced with a proper apparatus as specified under Section 6.10. S

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6.11 Earthing

6.11.1

Inside service as an earth electrode

- (a) The metal work of an inside service shall not be used as an earth electrode. E

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Appendix 1: (3) Checklists for Vetting Plumbing Proposal - Separate Meter

Cover Page

Address of Premises:

Name of Consumer:

Contact Tel. No.:

ASN No./CCID NO. (if applicable)

The plumbing proposal has been checked against the following checklists and all the technical requirements stated on the checklists have been taken into account in preparing the plumbing proposal.

*Chapter 3 Meter

*Chapter 4 Inside Service

*Chapter 6 Water Cisterns, Water Pumps and Other Miscellaneous

* please delete as appropriate

Checklists prepared by,
(Authorised Person or
person signing the drawings)

Signature: _____

Name: _____

**please delete whichever is not applicable*

Checklists for Vetting Plumbing Proposal - Separate Meter

Chapter 3 - Metering

Type: S = Statutory Requirements
E = Essential for approval of works

Referring to the clauses in Technical Requirements for Plumbing Works in Buildings(TR). You may cross out the clauses if not applicable

^ Please ✓ as appropriate

	Type	Checked^	Remarks
<u>#3.1 General</u>			
<u>3.1.4</u>			
(a) Meter shall be sited in a meter room/box/chamber at convenient location in accessible communal area	E	<input type="checkbox"/>	<input type="checkbox"/>
(b) For indirect supply system, the meter shall be sites in a meter room/box/chamber in accessible communal area at roof level or at other convenient locations	E	<input type="checkbox"/>	<input type="checkbox"/>
<u>3.1.6</u>			
For connections up to and including 40 mm diameter, a loose jumper type stopcock shall be provided and placed with spindle in the vertical position at each meter position on the inlet side of the meter where the meter is not sited at roof level and where the pressure is considered adequate.	E	<input type="checkbox"/>	<input type="checkbox"/>
<u>3.1.7</u>			
For connections larger than 40 mm diameter, a gate valve shall be provided before the meter position and a non-return or check valve fitted on the delivery side as close as possible to the meter.	E	<input type="checkbox"/>	<input type="checkbox"/>
<u>3.1.8</u>			
For single jet meter and turbine meter installed in direct supply system, a strainer shall be installed upstream of the meter.	E	<input type="checkbox"/>	<input type="checkbox"/>
<u>3.1.11</u>			
Minimum meter size requirement for business accounts as shown Table 3.1.11.1 of TR shall be followed.	E	<input type="checkbox"/>	<input type="checkbox"/>
<u>3.1.12</u>			
With an aim to prevent tampering of water meters, security seals shall be installed for all newly installed meters of size 40mm or above.	E	<input type="checkbox"/>	<input type="checkbox"/>
<u>3.2 Meter Position</u>			
<u>3.2.1 (General Requirements for Meter Position)</u>			
<u>3.2.1.1</u>			
The following practice should be adopted in plumbing works design for meter positions:-			
(a) fitting at meter position shall facilitate easy installation and removal of the water meter without the need to work on other pipe	E	<input type="checkbox"/>	<input type="checkbox"/>

3.2.1.2

(a) For 15mm meter

(i) 20mm x 15mm bushes, or reducers at both sides of the meter position

(ii) 200mm (clear effective length) distance piece of 15mm tube placed in between

(iv) a long screw connector is provided immediately after the brush or reducer at the delivery side

(b) For all meter size,

(i) the meter position shall also be provided similarly to 15mm meter with corresponding fittings and appropriate sizes.

(ii) the length of distance piece should be referred to Figure 4 of the TR

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3.2.1.3

If a section of copper pipe is used either before or after a water meter position, that section of copper pipe between the water meter position and the first pipe clamp shall be jointed by screwed or flanged joints or soldering/brazing copper couplers.

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3.2.1.4

PVC-U fittings shall be used at the meter position if PVC-U materials are used as inside services. Brass/copper long screw (connector) shall be used at TMF position. Brass/copper fittings shall be used at the meter position if copper, lined galvanized steel or thermo-plastic materials are used as inside service.

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3.2.2(Architectural and M&E Requirement for meter room)3.2.2.2

When preparing VPLD submission, the applicant shall submit the layout and elevation plans of the meter rooms/boxes with dimensions, including the width and height of the entrances (door openings in case of meter boxes) for the Water Authority's approval.

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3.2.4 (Mounting Height of Water Meters in Meter Rooms/Boxes)3.2.4.1

(a) For meters arranged in groups and meters installed inside meter boxes and cabinets, no meter position shall be lower than 300 mm nor higher than 1500 mm above the floor level

(b) For projects where corridor meter arrangement is chosen and accepted, individual meter positions shall be at a suitable height not less than 750 mm but not more than 1500 mm above the floor level.

(c) Minimum clearance should be provided for meters of trade supply according to Fig. 36.

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3.5 Separate Metering in Existing Premises3.5.1

The inside service shall be constructed from each flat to the existing common meter positions.

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3.5.2

In an occupied building,

(a) provide a temporary bypass arrangement as close to the delivery side of the meter as possible; and

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(b) the consumption of the temporary arrangement is measured by bulk meter.

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3.5.3

If part of an inside service is required to be retained as communal service, it is necessary to obtain an undertaking from the Developer/Owner, Management Committee, Landlords Association, Residents Association, Incorporated Owners, Mutual Aid Committee or an individual resident flat owner to accept responsibility for the common inside service from the connection to the main. If there is no consent for using the existing common inside service, a new connection is required for the conversion of some existing premises from a communal meter to separate meters and the new separate inside services become the responsibility of individual consumers.

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Checklists for Vetting Plumbing Proposal - Separate Meter**Chapter 4 - Inside Service**

Type: S = Statutory Requirements
E = Essential for approval of works

Referring to the clauses in Technical Requirements for Plumbing Works in Buildings(TR). You may cross out the clauses if not applicable

^ Please ✓ as appropriate

Type Checked^ Remarks

#4.1 Pipe & Fitting Materials**4.1.1 General****4.1.1.1**

Pipes and fittings shall conform to the relevant standards as listed in Part B of TR and the WWR.

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4.1.2 Requirements of Minimum Pipe Sizes**4.1.2.1**

A pipe must not be less than 20mm in diameter, except that a branch pipe may be of 15mm or more in diameter if the pipe length is not longer than 3m and the pipe supplies only one draw-off point.

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4.2 Fresh Water Supply**4.2.1 General Requirements****4.2.1.1**

All fresh water supplies to inside service, including TMF, shall be metered.

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4.2.1.2

(a) All domestic supplies and concessionary supplies shall be separately metered.

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(b) For different applications of concessionary supplies, Section 4.2.5 of TR shall be referred.

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4.2.3 Backflow/ Cross-connection Prevention**4.2.3.1 Protection of Water Supplies****4.2.3.1.1**

All water supply systems shall be designed, installed, and maintained in order to prevent contaminants from being introduced into the fresh water supply systems.

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4.2.3.1.2

No device or system that may cause contamination of a water supply shall be connected directly or indirectly to any part of an inside service without appropriate cross-connection prevention or backflow prevention control suitable for the level of hazard.

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4.2.3.2 Cross-Connection/Backflow Hazard Rating4.2.3.2.1

Cross-connections are rated using three degrees of hazard, namely:-

(a) High Hazard

Any condition, device or practice that, in connection with the water supply system, has the potential to cause death or serious health impact;

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(b) Medium Hazard

Any condition, device or practice that, in connection with the water supply system, has the potential to cause significant health impact; and

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(c) Low Hazard

Any condition, device or practice that, in connection with the water supply system, constitutes a nuisance but does not cause significant health impact.

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4.2.3.3 Provision of Backflow Prevention Devices4.2.3.3.1

(a) The fresh water supply shall be protected from the hazard(s) by installing appropriate device listed in Table 4.2.3.7.1.

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(b) Hazard ratings for some typical installations are listed in Table 4.2.3.7.2 for reference.

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4.2.3.3.2

Backflow prevention devices shall comply with the latest BS EN 1717 and all relevant standard(s) for the devices.

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4.2.3.4 Water Downstream of Backflow Prevention Device4.2.3.4.1

Piping conveying water downstream of backflow prevention device, installed for high or medium hazard protection, shall be clearly and permanently labelled 'WARNING! NOT FOR DRINKING' at every outlet.

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4.2.3.5 Commissioning and Maintenance4.2.3.5.2

If backflow prevention devices applicable to high hazard cases, e.g. backflow preventer/reduced pressure zone valve etc., they shall only be used with a maintenance program. If such program is unavailable, the backflow prevention devices shall not be fitted and break tank shall be provided.

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4.2.3.6 Backflow Prevention Device in Hot Water Systems4.2.3.6.1

The backflow prevention device used in hot water systems shall be suitable for the specific hot water installation.

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4.2.3.7 Backflow Prevention Device and Hazard Levels for Applications4.2.3.7.1

Tables 4.2.3.7.1 and 4.2.3.7.2 shall be referred commonly used backflow prevention devices and hazard levels for different applications. For concessionary water supplies, Clause 4.2.5.2 shall be referred.

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4.2.4 General Pipework Arrangement4.2.4.3

No water pipe shall be embedded within load bearing structural elements in longitudinal direction. Such structural elements include, but not limited to, columns, beams and slabs. Screeding above slabs should not be considered as structural elements. Hence, water pipe embedded in screeding is acceptable. The water pipe in screeding shall be considered as embedded pipes.

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4.2.4.4

Vertical water pipes piercing through structural slabs and transfer plates; and horizontal water pipes piercing through beams, columns and structural walls shall be protected by sleeving or other suitable means.

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4.2.4.5

Tee-branch valve has been provided in

(a) all underground water pipes; and

(b) shall be located close to main pipe

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4.2.4.7

No draw-off point in the inside services shall be subject to a excessive pressure of 6 bar and above.

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4.2.5 Concessionary Usage of Mains Water4.2.5.1

Concession usage of mains water are for the purpose listed in Clause 4.2.5.2

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4.2.5.2

Compliance with the concessionary usages and requirements in this clause

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4.2.5.4

Draw-off tap that is freely accessible by the general public should be kept in an external protective box with lock and key.

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4.2.5.4a

If an automatic irrigation system is used. Off-tank supply is required.

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4.2.6 Metered Supply for Other Purposes4.2.6.2 Supply for Temporary Structures and Modified/Converted Structures4.2.6.2.2

The premises shall have separate access, proper drainage system and bear a proper postal address.

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4.2.7 Hot Water Systems4.2.7.1 Non-Centralized Hot Water System4.2.7.1.1

When the factory test pressure of the heater is at least 1.5 times the maximum static pressure at the mains water supply point, non-pressure type heaters,

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cistern type water heaters, unvented electric thermal storage water heaters satisfying the requirements stipulated in Clauses 4.2.7.1.12 and instantaneous water heaters are permitted to be connected direct to the supply pipe without the necessity of providing storage.

4.2.7.1.2

When the factory test pressure of the heater is less than 1.5 times the maximum static water pressure at the mains water supply point then, for premises on direct supply, a water heater must be supplied with water from a cold water cistern.

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4.2.7.1.3

A separate mains water storage cistern of 45 litres capacity shall be provided for each flat to supply such hot water apparatus in Clause 4.2.7.1.2.

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4.2.7.1.4

Pressure type thermal storage heaters other than unvented electric thermal storage water heaters satisfying the requirements stipulated in Clauses 4.2.7.1.12 shall be supplied from storage cisterns no matter what the pressure at inlet point should be, except these are installed in flats supplied through the indirect or sump and pump system.

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4.2.7.1.5

For premises on direct supply, a separate mains water storage cistern of 45 litres capacity shall be provided for each flat to supply such hot water apparatus in Clause 4.2.7.1.4.

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4.2.7.1.6

For flats supplied from the roof storage cistern of an indirect or sump and pump system, no separate storage for hot water apparatus will be required but the supply to the apparatus shall be by a separate down feed supplying the apparatus only unless the arrangement in Clause 4.2.7.1.7 is applied.

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4.2.7.1.7

If the flats on the indirect system are supplied through an oversized down feed pipe, the pipe supplying the hot water apparatus shall be branched from the down feed at a point above the top of the apparatus.

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4.2.7.1.8

When gas geysers are to be installed on the top floor of a building supplied through storage cisterns, gas geysers with low pressure governors should be installed when the head available is less than 5 metres to the highest hot water draw-off point.

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4.2.7.1.9

If mixing valves, water blenders or combination fittings are to be used, the cold water supply to these fixtures shall be drawn from the same source as is supplying the hot water apparatus. In order to provide a balanced pressure and to obviate the risk of scalding should the supply at the source fail or be restricted for any reason.

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4.2.7.1.10

All pressure type thermal storage heaters shall be provided with a vent or expansion pipe taken from its highest point and discharge in the atmosphere above the storage cistern at sufficient height to prevent a constant outflow of hot water therefrom except for unvented electric thermal storage water heaters satisfying the requirements stipulated in Clauses 4.2.7.1.12 and 4.2.7.1.13 of TR.

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4.2.7.1.11

A loose jumper type valve shall be fitted on the inlet of the water heater if a non-return valve is not incorporated in such water heater, but this requirement does not apply to an electric water heater of the thermal storage type satisfying the requirements stipulated in Clauses 4.2.7.1.12 and 4.2.7.1.13 of Part A of TR.

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4.2.7.1.12

All unvented electric thermal storage water heaters shall comply with the safety requirements under the Electrical Products (Safety) Regulation (Cap. 406 sub. leg.)

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4.2.7.1.13

Every system incorporating an unvented electric water heater of the thermal storage type shall be provided with:-

(a) a supply pipe that branches off from the feed pipe at a point above the top of the water heater, or some other device to prevent the water from draining down from the water heater if there is a failure at the source of water supply;

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(b) an anti-vacuum valve or some other device to prevent heated water from being syphoned back to the supply pipe; and

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(c) a vessel to accommodate the expansion of heated water where that expansion is constrained by a non-return valve or some other device, incorporated at the inlet of the water heater.

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Checklists for Vetting Plumbing Proposal - Separate Meter**Chapter 6 - Water Cisterns, Water Pumps and Other Miscellaneous**

Type: S = Statutory Requirements
E = Essential for approval of works

Referring to the clauses in Technical Requirements for Plumbing Works in Buildings(TR). You may cross out the clauses if not applicable

^ Please ✓ as appropriate

	Type	Checked [^]	Remarks
<u>#6.1 General</u>			
<u>6.1.1</u>			
No cistern for the storage of cold water shall be installed or used except with the permission in writing of the Water Authority who shall specify the maximum permitted capacity.	S	<input type="checkbox"/>	<input type="checkbox"/>
<u>6.1.2</u>			
No cistern for the storage of fresh water supplied from the waterworks shall, without the written permission of the WA, be so connected that it can be used for the storage of any water other than that supplied from the waterworks.	S	<input type="checkbox"/>	<input type="checkbox"/>
<u>6.2 Cold Water Cisterns (or Cold Water Tanks)</u>			
<u>6.2.1 Location</u>			
<u>6.2.1.1 Access for Maintenance and Inspection</u>			
<u>6.2.1.1.1</u>			
Water Storage Tanks shall be installed so that they are easily accessible for cleaning or repairs.	S	<input type="checkbox"/>	<input type="checkbox"/>
<u>6.2.1.1.2</u>			
Safe access shall be provided to all cisterns by means of a secure permanent ladder or readily available portable ladder.	S	<input type="checkbox"/>	<input type="checkbox"/>
<u>6.2.1.1.3</u>			
Where a cistern is installed inside a building and, due to limited headroom available, it is fixed with limited clearance from the ceiling or underside of the roof, a quickly detachable fitting must be used to enable it to be easily removed for cleansing and repair.	S	<input type="checkbox"/>	<input type="checkbox"/>
<u>6.2.1.1.4</u>			
For a water cisterns with top access, the access on top of the cisterns should have a minimum headroom of 800mm.	E	<input type="checkbox"/>	<input type="checkbox"/>
<u>6.2.2 Material Requirements</u>			
<u>6.2.2.1</u>			
A cistern must be watertight, of adequate strength, properly supported and be made of concrete, stainless steel or fibre glass.	S	<input type="checkbox"/>	<input type="checkbox"/>

6.2.2.2

For concrete fresh water cisterns/storage tank, all internal surface of floors, walls (to full height) and soffits of potable water storage cisterns should be lined with a non-toxic smooth finish.

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6.2.2.4

When fibreglass storage tank is to be used, prior approval by the Water Authority must be sought. Fibreglass storage cistern for potable water shall be of an approved type or certified to contain no toxic materials and suitable for storage of potable water.

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6.2.3 Cover for Water Tanks6.2.3.1

A cistern must be so located as to minimize the risk of contamination of stored water and be fitted with a suitable close fittings lockable cover that is not airtight. The cover must be so positioned as to facilitate inspection and cleaning. The covers must be so positioned as to facilitate inspection and cleaning.

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6.2.3.2

(a) Every storage cistern shall have a lockable close fitting rigid cover secured by mechanical means which excludes light and the ingress of particles and / or insects from the cistern.

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(b) The cover shall be made of a material or materials which do not shatter or fragment when broken and which will not contaminate any condensate which may form on its underside or the stored water.

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(c) For the potable water storage cistern, the cover and its base frame shall possess double upstand edges interlocking one another to provide additional protection.

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6.2.3.3

Double sealed covers with locking devices shall be provided for all storage cisterns other than cisterns that provide supply solely for irrigation, flushing and fire-fighting. The double-sealed covers prevent the ingress of surface water.

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6.2.4 Installation Requirements for Inlet and Outlet Pipe6.2.4.1.1

All outlet pipes from the storage cistern should, be positioned at the opposite side to the inlet supply pipe to prevent stagnation of water.

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6.2.4.2 Controlling Incoming Water Supply6.2.4.2.1

The inlet of a single cistern fed by a gravity supply must be fitted with a ball float valve and stop valve.

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6.2.4.2.2

(a) For ball float valves of a nominal diameter not exceeding 50mm, their valve bodies must be made of copper alloy or stainless steel.

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(b) For ball float valves of a nominal diameter exceeding 50mm, their valve bodies must be made of copper alloy, stainless steel, epoxy coated cast iron or epoxy coated ductile iron.

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6.2.4.2.3

(a) Floats for use with fresh water must be made of copper alloy or stainless steel.

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6.2.4.2.4

Ball float valves fitted to a cistern must have the size of the orifice, the size of the float and the length of the lever so proportioned to one another that, when the float is immersed to an extent not exceeding half its volume, the valve is watertight against the highest pressure at which the valve may be required to work.

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6.2.4.2.5

A ball float valve or float-operated valve fitted to a cistern must be

(a) securely fixed to the cistern above the waterline of the float of the valve, and

(b) must be supported independently of the inlet pipe (unless the inlet pipe is itself rigid and securely fixed to the cistern), in a position that no part of the body of the valve is submerged when the cistern is charged to the overflowing level.

6.2.4.2.6

(a) If a ball float valve or float-operated valve is provided with a pipe so arranged as to discharge water into a cistern below its overflowing level, an air hole must be provided in the outlet chamber of the valve above the overflowing level.

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(b) The air hole must be of a size sufficient to prevent syphonage of water back through the valve.

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6.2.4.2.7

Ball float valves must not be fitted to a cistern that is used to contain heated water.

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6.2.4.2.8

The inlet of a single cistern fed by a pumped supply must be fitted with an automatic control switch and without any stop valve.

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6.2.4.2.9

(a) The ball valve or control switch shall shut off the supply when the water level is 25mm below the invert of the overflow pipe or the warning pipe if there exists one.

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(b) The invert of the inlet pipe or the face of the outlet nose of the ball valve shall be not less than 25mm above the top of the overflow pipe.

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6.2.4.2.10

(a) In case of a mixed flushing water supplies, the water tank shall be fitted with a ball float valve with submerged float control and a fullway gate valve for controlling and isolating the inflow of mains supply respectively.

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(c) Performance of the ball float valve shall meet the requirements specified in case of gravity supply.

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6.2.4.3 Outlet Water Pipes

6.2.4.3.1

The invert of an outlet pipe from a water storage tank with capacity less than 5000 litres shall be at least 30 mm above the bottom of the tank; this distance shall be increased to 100 mm if the storage tank capacity is 5000 litres or more.

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6.2.4.3.2

A stop valve must be provided at the outlet of a cistern. and provision shall be made for a drain-off pipe to enable the cistern to be emptied.

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6.2.4.3.3

Fullway gate valves shall be used with as the stop valves in Cl. 6.2.4.3.2 at the outlet pipe of every water storage cistern. The drain-off pipe shall be properly plugged or adequate means shall be provided to prevent any unauthorized operation of the control valve at drain-off pipe. If the outlet of a flushing water cistern is of nominal size 50mm or below, a ball valve can be used to substitute the above gate valve.

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6.2.4.4 Overflow Pipes and Warning Pipes

6.2.4.4.1

All overflow and warning pipes of potable water storage cisterns shall be constructed of corrosion-resisting material.

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6.2.4.4.2

The overflow pipe shall be at least one commercial size larger than the inlet pipe and shall in no case be less than 25 mm in diameter must be fitted to a cistern and be extended to terminate in a conspicuous position. The overflow pipe must not be connected to a drain or sewer or to the overflow pipe from another cistern.

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6.2.4.4.3

The position of discharge should be in a communal area easily visible and accessible by the occupants.

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6.2.4.4.4

If the overflow pipe is not extended to terminate in a conspicuous position, the overflow pipe shall be installed with an overflow alarm with signal transferred to a 24-hourly manned management office for timely notification. Full justifications for such arrangement shall be provided to the WA for consideration and approval.

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6.2.4.4.6

No part of the overflow pipe shall be submerged inside the storage tank

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6.2.4.4.7

A grating and a self-closing non-return flap shall be provided at the overflow pipe outside the storage tank.

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6.2.4.4.8

A warning pipe shall be installed in addition to an overflow pipe. A warning pipe can be of any size not less than 25 mm in diameter and shall comply with all other requirements of an overflow pipe.

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6.2.4.4.9

The warning pipes shall be installed at a level below the overflow pipe and shall be either extended to conspicuous location, i.e. outside of the building periphery for roof tank or outside the pump room for sump tank, or installed with signal transferred to a 24-hourly manned management office.

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6.2.5 Size of Storage Tanks for Flushing, Domestic and Trade/Commercial Water Uses6.2.5.1

The proportion of capacity of sump cistern to roof cistern is recommended to be in the order of 1:3. Otherwise, the designer shall demonstrate that the proposed ratio of sump cistern to roof cistern is capable of fulfilling the designed demand.

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6.2.5.2

The capacity of the flushing water storage shall be designed according to the criteria in Table 6.2.5.2.1 with a minimum capacity of 250 litres. [applicable to new applications with Form WWO 542 submitted on or after 1 January 2019 only.]

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6.2.5.3

Storage criteria for fresh water supply for domestic flats is listed in Table 6.2.5.3.1.

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6.2.5.4

For industrial building:

(a) The entire internal services shall be supplied from storage cisterns with separate outlets / downpipes feeding independent systems to serve separately the industrial and processing purposes and the other general and ablution appliances.

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(b) These independence systems serving separately the industrial and processing purposes and the other general and ablution appliances should not be interconnected.

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6.2.5.5

The required capacity of storage tanks for industrial use is one-day demand.

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6.2.5.6

For trade/commercial premises, the storage criteria for fresh water supply shall be designed according to the criteria in Table 6.2.5.6.1 and Sections 6.2.5.7 to 6.2.5.9 of TR. The criteria shall apply to building types not listed in this Section in TR, yet having similar functions. In addition, designers should avoid oversize or undersize of the storage of water tanks which may result in water quality problems. However, applicant may request for relaxation of the requirement with justifications and flexibility will be allowed by the WA if justified.

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6.2.5.8

For hospital, the required storage criterion is one day's consumption as given by the hospital authorities

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6.2.5.9

For boilers, the required storage criterion is given in the formula under this section in TR.

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6.2.6 Other Recommendation/Requirement6.2.6.2

When the capacity of water cistern exceeds 5000 litres, adoption of twin-tank system is required. The applicability shall also be subject to factors such as availability of plant room space.

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6.2.6.3 to 6.2.6.5

(a) A set of inlet, outlet and associated overflow and drain pipes shall be provided to each cistern compartment.

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(b) Each inlet of a twin-cistern fed by a pumped supply must be fitted with an automatic control switch and a stop valve for temporary isolation purpose.

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(c) For water supplies other than pumped supply, this inlet shall comply with requirements stated in Clause 6.2.4.2.1 of Part A of TR.

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6.5 Pressure Reducing Valves6.5.1

No part in the internal pipework and/or draw-off point shall be subject to excessive high pressure. In case of excessive high pressure, provision of break pressure tanks at a suitable level of the internal supply system would be a positive and viable means to reduce the water pressure. Alternatively, pressure reducing valves may be provided in lieu of break pressure tank.

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6.5.2

Whenever a pressure reducing valve is installed,

(a) a bypass arrangement shall be incorporated with the provision of a second pressure reducing valve, except for fire service installations, to enable isolation of any defective pressure reducing valve for repair and replacement when necessary;

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(b) A pressure indicator shall be provided for pressure monitoring and the associated pipes and fittings shall be able to withstand the maximum pressure that may arise upon the failure of the pressure reducing valve as far as practicable. Fault alarm shall be installed with signal transferred to a 24-hourly manned management office for timely notification, except for fire service installations.

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6.6 Stop Valves for Draw-off Points6.6.1

Individual stop valves shall be provided at all draw-off points or at a series of draw-off points if situated close together.

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6.7 Water Taps

6.7.1 Application of Water Taps

6.7.1.1

When infra-red sensor operated automatic taps are used as inside services, a stop cock or gate valve must be installed at the upstream of each fitting for manual isolation of water supply.

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6.7.1.2

Self-closing taps, of non-concussive type and of approved pattern, or infra-red operated automatic taps, shall be used for the public or communal lavatory basins.

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6.7.1.3

Except with the written permission of the Water Authority, fitting with a threaded outlet, or any device facilitating the connecting of rubber hose or another type of flexible hose, must not be used.

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6.7.2 Installation Requirements for Sanitary Fixtures Supplied by Water Taps

6.7.2.1

All taps supplying baths, lavatory basins, sinks or similar apparatus shall have a stop valve fixed in a readily accessible position to control the supply to each fitting or branch pipe supplying a range of fittings.

S

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6.7.2.2

Every inlet to a bath, lavatory basin or sink shall be distinct from, and unconnected with, any outlet therefrom and every outlet for emptying such bath, lavatory basin or sink shall be provided with a well-fitting and easily accessible watertight plug or some other equally suitable apparatus.

S

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6.7.2.3

The level of the hot or cold water draw-off point to a bath, lavatory basin or sink shall be above the level of the overflow. In the absence of overflow in the fixtures, the top edge of the bath, basin or sink shall be considered instead.

S

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6.7.2.4

If water supply to any bidets, sitz bath, slop and sluicing sink or similar apparatus is liable to be submerged, the following shall be provided:-

S

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- (a) a storage cistern supplying water to such apparatus only;
- (b) a storage cistern for flushing purposes only; or
- (c) a hot water distribution system supplying such apparatus only.

6.8 Domestic Appliances

6.8.1 Water Purifiers/Filters

6.8.1.2

Domestic water purifiers/ filters must not be connected directly to the mains supply because of the possibility of contamination.

E

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6.8.1.3

When there is installation of any domestic filter or water filter incorporated in water using apparatuses (such as drinking fountain etc.), backflow prevention device shall be installed.

E

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6.8.1.4

Requirements for backflow prevention and written permission from the WA for typical types of water filters are summarized in Table 6.10.1.4.1.

E

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6.8.1.5

Sterilizers without or without attached filtering devices could be connected directly to the mains supply provided that backflow prevention device is provided upstream of the sterilizer such that there is no possibility of contaminating the mains supply.

E

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6.8.2 Washing Machines/Dishwashing Machines6.8.2.2

Washing machines/ dishwashing machines with submerged inlets are considered to have high level of contamination hazard and must be installed with appropriate backflow prevention devices according to Table 4.2.3.7.1.

E

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6.11 Earthing6.11.1

Inside service as an earth electrode

(a) The metal work of an inside service shall not be used as an earth electrode.

E

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Appendix 1A: Not Used

Appendix 1B: Essential Information to be Presented in VPLD (Vertical Plumbing Line Diagrams)

I. Requirement for all Projects:

- ✓ Show locations of lot boundary;
- ✓ Show all draw off points and their locations;
- ✓ Show all pipes and their size and materials;
- ✓ Specify jointing methods of pipes;
- ✓ Specify pipes for cold/hot water and fresh/salt water;
- ✓ Show all valves, including Pressure Reducing Valve, Butterfly valves, non-return valves/check valves, strainer;
- ✓ Show position of meters /check meters and indicate their sizes;
- ✓ Show all water tanks/cisterns with their size and material;
- ✓ Show the receptacle of water point / draw-off point (i.e. Sink, Basin, Bath Tub, Shower Cubicle ...etc.);
- ✓ Show all pumps with their pump rate and head;
- ✓ Show all water using apparatus and information on the type of water using apparatus (e.g. type of water heater, kitchen equipment, drink dispenser, drinking fountain, washing machine (submerged inlet or non-submerged inlet), etc.);
- ✓ Show all waterworks fittings not covered above (e.g. boiler, calorifier, expansion vessel, float switch, etc.);
- ✓ Specify whether plumbing works between the lot boundary and any master meter or check meter positions are exposed or laid in a proper service trench/duct;
- ✓ Indicate the extent of underground buried pipes;
- ✓ Specify datum level of connection point, if applicable, and top of the buildings, which are required to determine the water supply mode (i.e. direct supply system or indirect supply system);
- ✓ Indicate proposed connection main, if participated in Helping Business Programme;
- ✓ Show a legend of all markings and symbols shown or used;
- ✓ Show the approximate dimensions of water storage cisterns and approximate levels of inlet water pipes, outlet water pipes, overflow pipes and warning pipes (if any) with respect to the bottom of the cisterns;
- ✓ Indicate location of overflow or warning pipe (if any) for the water tanks that discharge to conspicuous position / building periphery;
- ✓ Show the flow direction;
- ✓ Indicate the size of portable and flushing supply connections.

II. Additional Requirements for Specific Projects:

i. On-line Replumbing Works

- ✓ Specify extent of online re-plumbing works

ii. Project Adopting MiC (Modular Integrated Construction) Method

- ✓ Specify the part of the plumbing installations (plumbing works) to be constructed off-site in a MiC factory, if any.
- ✓ Specify the concealed parts, if any, of the plumbing installations.

iii. Addition & Alteration Works

- ✓ Provide the original supply mode and the upstream part of the existing system; and
- ✓ Clearly specify the part of inside services which are newly installed / to be demolished.

Appendix 2: Submission Requirements for Different Types of Application at Different Stages

(I) Proposal Stage

		A. New Building	B. Village Type House	C. Separate Metering	D. Reconnection of Meter	E. Replumbing		F. Temporary Water Supply for a Construction Site	G. Conversion to Salt Water for Flushing	H. Relocation of Meter	I. Enlargement of Meter	J. Others			
						1. On-line Replumbing	2. Off-line Replumbing					1. Food Business / Hydro-Vent	2. Improvised Fire Sprinkler System / Fire Hose Reel System / Fire Hydrant	3. Temporary Meter for Systematic Flushing	4. Types of Application not mentioned in this Table
Form WWO542															
1	Duly signed Form WWO542	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
2	Copy of BR (for company submission) or copy of ID card (for individual applicant)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Drawings															
3	<u>Site location plan in scale not less than 1:1000</u> – showing the location and boundary of the development	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
4	<u>Connection layout plan</u> – showing the alignment and size of the proposed connection pipes from the government main up to the development	✓	✓					✓	✓						O

5	<u>Underground pipes layout plan</u> – showing the proposed alignment and size of underground pipes to be laid in the development	✓	○			○	○	✓	✓			○	○		○
6	<u>Vertical plumbing line diagrams (VPLD)</u> – showing the draw off points, locations, pipe size, materials, valves, jointing methods and information on the type of water using apparatus	✓	✓	✓		✓	✓	✓	✓	✓		✓	✓		✓
7	<u>Building floor layout plan (if involving separate meter for trade purpose)</u> – showing the locations of these types of businesses and their respective meter position	○		○						✓		✓			○
8	Location of meter room/box	✓	✓	✓	✓	○	○	✓	✓	✓	✓	✓	✓	✓	○
9	Meter room layout/meter box details and meter position arrangement details	✓	✓	✓	✓	○	○	✓	✓	✓	✓	✓	✓	✓	○

Remarks: 1. Documents marked with a tick ["✓"] are mandatory to be submitted for new WWO 542 application.

2. Documents marked with a circle["○"] are optional to be submitted

(II) Before Commencement of Works (Form WWO46 Parts I&II)

		A. New Building	B. New Village House	Replumbing		Trade Supply		G. Temporary construction supply	H. Separate / Enlarge / relocate Meter
				C. online	D. offline	E. Food Production Business	F. Non-food production business		
1	Duly completed Form WWO46 Part I & II - with Applicant's signature - Chop for company applicant	✓ and AP's signature	✓	✓	✓	✓	✓	✓ and AP's signature	✓
2	Form WWO 1149 *	✓ ***		✓ ** ***	✓ ***	✓ ***	✓ ***	✓ ***	
3	Meter acquisition programme (for meter >200 nos.)	✓							
4	Catalogue of water using apparatus if any (except drinking fountain and water dispenser)	✓			✓	✓	✓		
5	Data sheet for flow restrictor							✓	
6	Supervision Plan for plumbing installations carried out at off-site MiC factory	✓ (for MiC project only)							
7	Shop Drawings and Production Schedule for plumbing installations to be concealed in MiC modules	✓ (for MiC project only)							

* Remarks: No GA Letter issued by WA is required to be enclosed in Form WWO 1149.

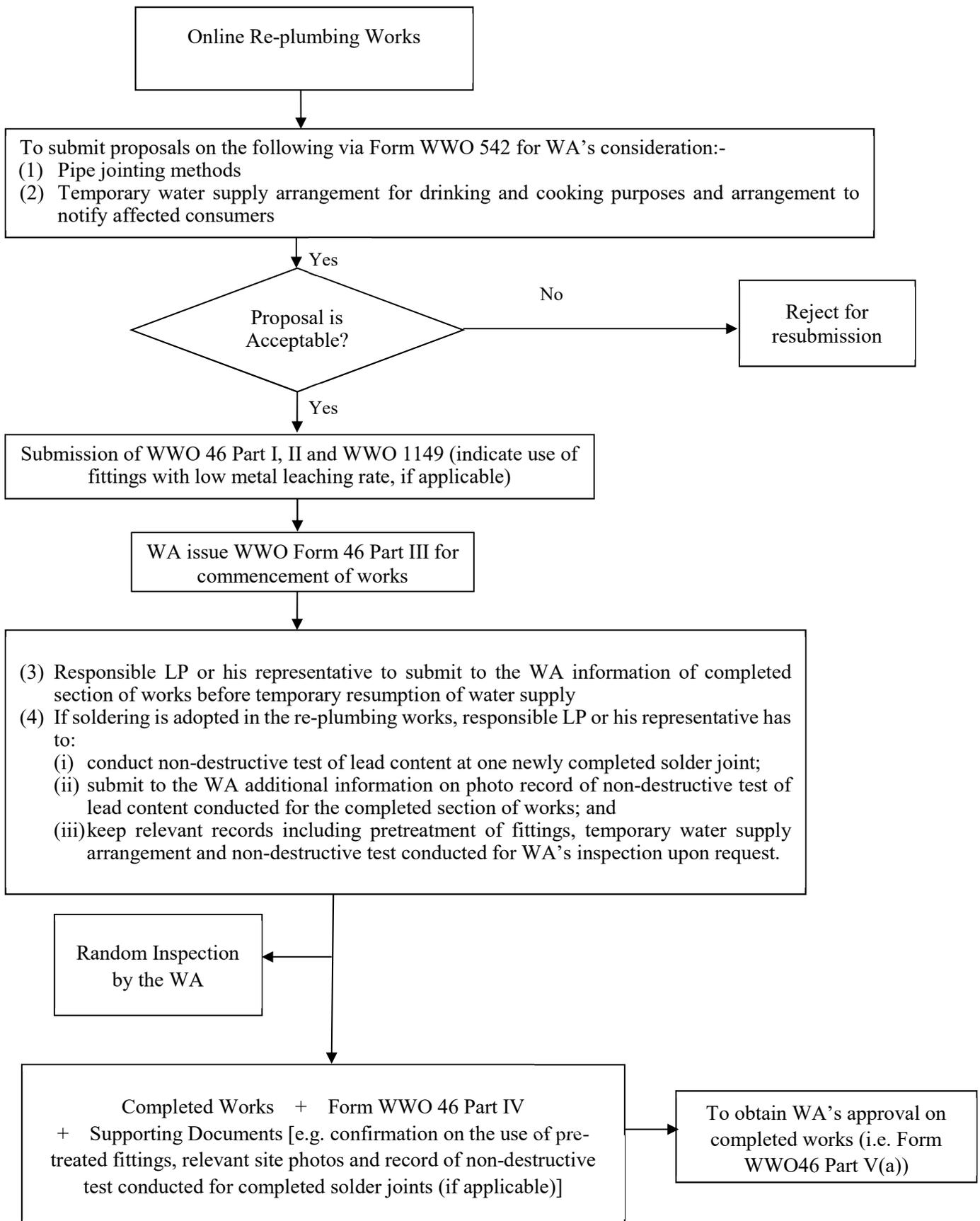
** Remarks: In addition to provide the details of pipe materials and fittings intended to be installed, applicants are required to provide the details of low metal leaching rate fittings if opt to use low metal leaching rate fittings (Test report(s)/certificate(s) to prove compliance with an Australian/New Zealand Standard AS/NZS 4020 are to be submitted if low metal leaching rate fittings under Voluntary Low Metal Leaching Rate Pipes and Fittings Scheme "GA*" are not adopted).

*** Applicable if the Form WWO 1149 is not submitted together with Form WWO 542 at proposal stage or there is no previously approved Form WWO 1149 for the plumbing works in the application. Please refer to Section 4.1.

(IV) After Issuance of Form WWO46 Part V(a)

		A. New Building	B. New Village House	Replumbing		Trade Supply		G. Temporary construction supply	H. Separate / Enlarge / relocate Meter
				C. online	D. offline	E. Food Production Business	F. Non-food production business		
1	WWO243 to terminate consumership of flushing meter and change to master meter if construction meter for flushing purpose is applied	✓							
2	Record of systematic flushing	✓ (Appendix 18A)	✓ (Appendix 18)						
3	Meter Installation Table	✓	✓						

Appendix 3: Workflow for Online Re-plumbing Works



Appendix 4: Proposed Arrangement for Temporary Water Supply and Notification of Consumers

I/We, the undersigned, being the occupier(s)/person(s) responsible for the management of the premises at the following service address:

hereby propose the temporary water supply and notification of consumers' arrangement for the online re-plumbing works to be carried out in the above address in accordance with the requirements stated in "Guide to Application for Water Supply" issued by Water Supplies Department as follows:

Temporary water supply arrangement

Means of arrangement: (Please tick at the appropriate box)

- Provision of metered standpipe (Submission of Form WWO 1155 for the metered standpipe is required)
- Provision of temporary water tanks
- Provision of filters¹ to consumers
- Provision of bottled water to consumers
- To provide a water taking point from a tap within the premises in which the supply to this tap is from a plumbing system that is independent from the plumbing system involving the online re-plumbing works
- To provide a water taking point from a tap within the premises in which filter¹ is to be installed on this tap
- Require the consumers to flush the water tap for 2 minutes before taking water for drinking and cooking purpose
- Not applicable as there will be no affected consumers.
- Others (Please briefly describe the arrangement): _____

Arrangement for Notification of consumers

Means of arrangement: (Please tick at the appropriate box)

- To post notice at conspicuous locations that can be seen by the customers within the buildings
- To send letter/notice to individual consumer
- Not applicable as there will be no affected consumers.
- Others (Please briefly describe the arrangement): _____

Date:

Consumer's signature/
Signature of authorized
person and company's
chop:

¹ the installation of filter shall comply with the WSD's requirements:
<http://www.wsd.gov.hk/en/faqs/index.html#8-139>

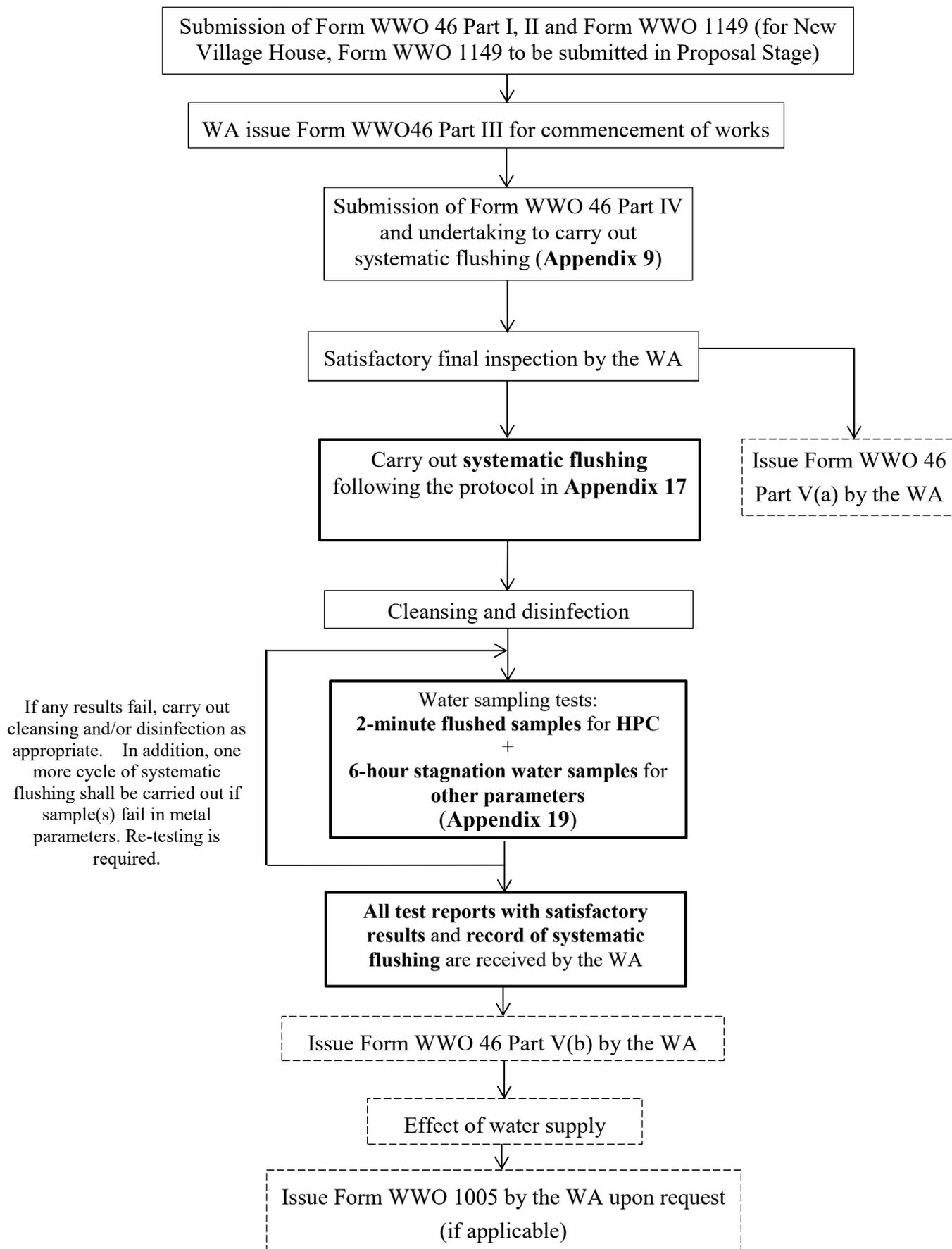
Appendix 5: List of High Draw-Off Rate Non-Domestic Water Supply 高取水量的非住宅用水列表

Business Account Categories: Classification code 商業用戶類別: 種類編碼	Description 說明 (see Classification of Water Consumer Accounts published in WSD website for details) (詳細說明參閱水務署網頁內水錶用戶分類)
Restaurants 餐館業:	
641100	restaurant – Chinese 餐館業 - 中式
641998	restaurant - other eating places 餐館業 - 其他飲食場所
641200	restaurant - non Chinese 餐館業 - 非中式
641300	restaurant - fast food shops 餐館業 - 快餐店
Construction 建築業:	
599998	construction, decoration, repair & maintenance 建築、裝修、維修和保養
Concessionary Supply (Private) 特許供水(私人):	
030030	cleansing & dust suppression for private use 私人清洗及去塵用水
030060	air conditioning for private use 私人空調設備
030040	gardens lawns and tennis courts for private use 私人花園、草坪及網球場
030020	private swimming pools & boating ponds 私人游泳池及泛舟池
Private Clubs & Institutions 私家會所和機構業:	
938887	private academic & sport institution 私立教育和體育機構
938889	private clubs institution and religious organizations 未有於別處分類的私立會所、機構和宗教組織

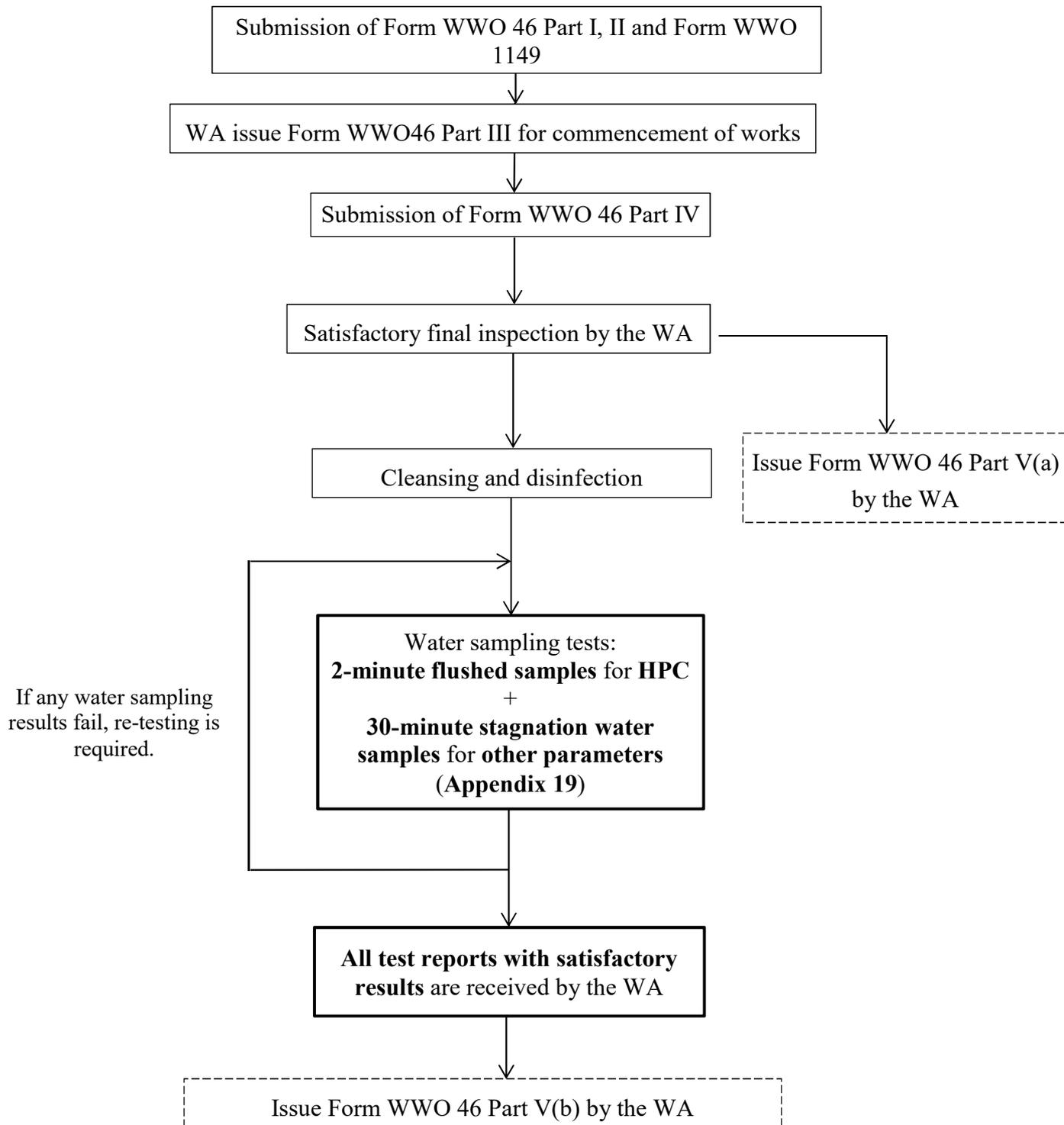
Appendix 6: Flowchart for the Submission Requirements at Construction

Stage

(A) Fresh Water Supply for New Buildings/ New Village Houses



(B) Fresh Water Supply for Occupied Buildings / Occupied Village Houses



Appendix 7: Not Used

Appendix 8: Standards for Submission of As-built Records of Inside Service and Fire Service Outside Building Structures

1. The as-built records/drawings of the inside service (IS) and fire service (FS) outside building structures shall be submitted to WSD. This normally refers to underground or exposed pipes from the connection at lot boundary up to the connection at building boundary. The records shall include details of the IS/FS and its associated facilities and structures such as valves, fittings, fire hydrants, chambers, concrete thrust blocks/surrounds and the like.
2. Standard formats for hard copy of the IS/FS records shall be as follows:
 - (a) Full size paper drawing prints showing the alignment of IS/FS with scale preferably in 1:200 or 1:500, but not smaller than 1:500.
 - (b) A4 size Annex A for information not shown in the drawing in item (a) above.
3. The drawings should contain the following information where appropriate:
 - (a) horizontal alignment and vertical profile;
 - (b) size and type of pipe material;
 - (c) crown level in metre above Principle Datum (mPD) at vertical bends and points on vertical alignment with change in crown level >300 mm, otherwise at intervals not exceeding 40 metres, and at points of change of horizontal alignment;
 - (d) locations of valves, air valves, washouts, fire hydrant etc.;
 - (e) pressure rating of water mains;
 - (f) cathodic protection, if any;
 - (g) pipe environment, i.e. underground, exposed, pipe in sleeve, pipe in trough, pipe in tunnel etc;
 - (h) extent of water mains protected by leakage collection system;
 - (i) extent of the shallow cover mains when the cover of a section is less than the applicable requirement of Highways Department;

4. In addition of hard copy, submission of electronic copy is also required for new buildings project and optional for other projects. The electronic copy shall be delivered in the following formats:

- (a) One set of drawings in AutoCAD (.dwg) or in Geographic Information System (GIS) format such as shapefile (.shp) format, personal geodatabase format or file geodatabase format;
- (b) One set of electronic copy in Acrobat (.pdf) format;
- (c) One set of Annex A in MS Word (.doc) format.

5. The electronic copy shall be stored in CD.

Annex A to Appendix 8**Information not shown in drawings:**

No.	Description	Content
1	Owner	
2	Date of Completion of Works	
3		
4		

Appendix 9: Undertaking of Carrying Out Systematic Flushing in New Plumbing Works

To the Water Authority,

We hereby undertake that systematic flushing will be carried out in the Approved Plumbing Works covered by Form WWO 46 Part IV (ASN No. _____) using the prescribed systematic flushing protocol set out in Appendix 17 of “Guide to Application for Water Supply” issued by Water Supplies Department.

Signature of Licensed Plumber

Name in full

Plumber’s License No.

Date: _____

Appendix 10: Pretreatment Protocol

The pretreatment protocol for new fittings before installation is set out below :

- (1) Immerse the fittings¹ in container(s) with water for 5 days.
- (2) The fittings need to be in fully open position to ensure their inner surfaces are completely immersed into water.
- (3) The water needs to be changed once every day with a simple flush of the fittings by water.
- (4) During the immersion of fittings, the container(s) shall be covered with lid(s) to maintain good hygiene.

¹ The pretreatment is only applicable to fittings (including taps) with copper alloy inner surfaces which will be in contact with potable water. Please be cautioned that immersion of the part of fittings containing iron should be avoided during the pretreatment.

Appendix 11: Confirmation on the Use of Pre-treated Fittings

To the Water Authority,

I hereby confirm that the fittings that are applicable for pretreatment and installed for the construction, installation, alteration or removal of the Approved Plumbing Works covered by the WWO 46 Part IV (ASN No. _____) in which this undertaking is attached to have been pre-treated using the pretreatment protocol as prescribed in Appendix 10 of “Guide to Application for Water Supply” issued by Water Supplies Department.

Signature of Licensed Plumber

Name in full

Plumber's Licence No.

Date: _____

Appendix 12: Guidelines for Solder Joint Sampling for Newly Constructed Fresh Water Inside Services

Type	For Each Building (Newly Constructed Fresh Water Inside Services)	For Each Building (Potable Water Inside Services in Occupied Buildings)
(a) Building of storeys ≥ 4	<p>During inspections of concealed pipes and fittings, two joints selected by representatives of the Water Authority for each inspection.</p> <p>During final inspection, two joints selected by representatives of the Water Authority for every five storeys, including :</p> <p>(i) One joint at communal pipes; and (ii) One joint in individual units.</p> <p>For four-storey buildings, two joints will be selected by representatives of the Water Authority, including:</p> <p>(i) one joint at communal pipes; and (ii) one joint in individual units.</p>	<p>During inspections of concealed pipes and fittings, three joints selected by representatives of the Water Authority for each inspection.</p> <p>During final inspection, three joints selected by representatives of the Water Authority for every five storeys, including :</p> <p>(iii) Two joints at communal pipes; and (iv) One joint in individual units.</p> <p>For four-storey buildings, three joints will be selected by representatives of the Water Authority, including:</p> <p>(iii) Two joints at communal pipes; and (iv) one joint in individual units.</p>
(b) Village House (c) Building of storeys < 4	Two joints selected by representatives of the Water Authority.	Three joints selected by representatives of the Water Authority.
(d) Separate Meter	One joint selected by representatives of the Water Authority.	Two joints selected by representatives of the Water Authority.

Remarks :

1. The method of non-destructive tests on solder joints shall be agreed by the Water Authority. The tests shall be arranged by the Licensed Plumber (LP) and witnessed by representatives of the Water Authority. The Water Authority may choose to carry out the test itself if considered necessary.
2. For non-compliance on solder joints sampled, the LP shall examine all the pipe joints in the concerned part of inside service and rectify the non-compliance. After the rectification works have been completed, the LP shall apply to the Water Authority for re-inspection of the concerned part of inside service. Sampling of the pipe joints shall be conducted for nondestructive testing in accordance with the above table.

Appendix 13: Procedures for Voluntary Submission of Interim Inspection Checklists on Underground Pipes

Part A

1. When submitting Form WWO 46 Part IV to apply for interim inspection, the LP shall include the following documents:
 - (i) a covering letter indicating the licensed plumber opts for the “**Voluntary Scheme**”;
 - (ii) a completed checklist for interim inspection (Colour photos attached to the inspection checklists shall be submitted in both hard copy and soft copy (in PDF format and supplied in a CD ROM));
 - (iii) a report on the hydraulic test as set out in **Annex to Appendix 13**;
 - (iv) a certificate of interim inspection in the form of **Appendix 14** certified by qualified certifying persons; and
 - (v) curriculum vitae, certificate, certificate of Employment or the like of the [RPE(MCL)/(BSS)] or MHKIE in (MCL)/(BSS) and his representative (if applicable) to demonstrate their attainment of sufficient qualification and relevant working experience.

Part B

2. Upon receipt of WWO46 Part IV and the documents mentioned in paragraph 1 above, WSD will make an appointment with the LP for interim inspection on a random basis. The licensed plumber will be notified whether the application is selected for inspection. In the event the application is not selected for inspection and the interim inspection checklists are checked with no apparent irregularity, the Water Authority will issue the approval for covering up the plumbing works.
3. In case the submission is of inferior quality in respect of completeness, correctness and clarity of the information provided, WSD may reject the inspection checklists. If the inspection checklist is rejected, WSD will notify LP the reasons of rejection and the LP is not allowed to re-submit the inspection checklists and the application will be handled as if it has not been submitted for voluntary submission of checklists.
4. The approval on the underground pipes or the notification that the interim inspection report is rejected shall be given to the licensed plumber within 7 working days of the receipt of WWO 46 Part IV. In case the application is selected for carrying out interim inspection, WSD will make an appointment with the LP for interim inspection within 7 working days of the receipt of WWO 46 Part IV. In case the inspection checklist submitted by the LP is rejected, WSD will make an appointment with the LP for interim inspection within 7 working days from the day on which the inspection checklist is rejected.
5. During the interim inspection of selected cases, WSD inspectorate would verify the “Inspection Results” of the submitted interim inspection checklists and record photos. Inspection will be carried out on items of the checklist inspected by the LP and certified by the qualified certifying persons, and on items not inspected by the LP on a random basis.
6. During the interim inspection, in case there is any disagreement on the “Inspection Results”, the WSD inspectorate shall indicate on the checklist as appropriate and both the WSD inspectorate and the LP shall sign next to the amendment.
7. During the interim inspection, if defect exists, its location with photo details should be recorded on the checklist. The LP and the WSD inspectorate should sign on the checklists and WWO 1008 will be issued.

Annex to Appendix 13: Standard Template for Hydraulic Test Report

Description of Works :

Diameter of Pipes (mm) :

Location :

Test Date and Time :

Length of Pipeline (m) :

Maximum static pressure¹ (m) :

Testing Pressure Head² (m) :

Details of discernible leakage of water from the pipeline during the test (if any):

Results of Pressure Test:

Pass

Fail

(Signature of LP)

(Name in full)

Date:

Note: Copy of testing record sheet should be attached together with this report

¹ Maximum static pressure = top water level (TWL) of supplied service reservoir - elevation head of the pipes being tested.

² Testing pressure head shall be 1.5 times the maximum static pressure if the maximum static pressure does not exceed 1.5 MPa (150m head); or 1.3 times the maximum static pressure if the maximum static pressure exceeds 1.5 MPa (150m head)

Appendix 14: Certificate of Interim Inspection of Inside Service/Fire Service [For Underground Pipes]

Address: _____

To the Water Authority

I refer to the letter under reference _____ dated _____ submitted by (name of licensed plumber in full) _____ enclosing the Form WWO 46 Part IV.

I confirm that *I/my representative¹ who has the qualification as given in the footnote below (name in full) _____ has witnessed the inspection by the licensed plumber of the underground pipes mentioned in the above Form WWO 46 Part IV and the hydraulic test on the concerned underground pipes carried out at the captioned address on (date) _____. I certify that the underground pipes mentioned in the above Form WWO 46 Part IV comply in all respects with the provisions of the Waterworks Ordinance (Cap. 102), the Waterworks Regulations (Cap. 102A), the requirements of the Water Authority and the applicable requirements set out in the Technical Requirements for Plumbing Works in Buildings, the Water Supplies Department Circular Letters to Licensed Plumbers and Authorized Persons and the Guide to Application for Water Supply issued by the Water Authority. I have reviewed and am satisfied with the attached completed inspection checklist(s) and hydraulic test report prepared by the licensed plumber.

I certify that the concerned underground pipes were satisfactorily tested to 1.5 times the maximum static pressure² if the maximum static pressure does not exceed 1.5 MPa (150m head); or 1.3 times the maximum static pressure if the maximum static pressure exceeds 1.5 MPa (150m head).

Signature of *registered professional engineer³ /
member of the Hong Kong Institution of Engineers⁴

Name in full

*RPE No. / MHKIE No.

*Email / Correspondence Address

Date: _____

* Delete where inappropriate

¹ The representative should have a Diploma or Higher Certificate in Electrical Engineering, Mechanical Engineering, Electrical Installation and Building Services, or Building Services (BS) Engineering from a Hong Kong polytechnic university/polytechnic, the Hong Kong Institute of Vocational Education or technical institute/technical college, or equivalent; and possess 3 years' relevant post-qualification experience in BS installation.

² Maximum static pressure = TWL of supplied service reservoir - elevation head of the pipes being tested.

³ Registered professional engineer as defined in the Engineers Registration Ordinance (Cap 409). Registered Professional Engineers (Mechanical) with 2 years of relevant working experience in BS installation or Registered Professional Engineers (Building Services) are qualified for certification.

⁴ Corporate member of the Hong Kong Institution of Engineers in the Mechanical discipline with 2 years of relevant working experience in BS installation or in the Building Services discipline are qualified for certification.

Appendix 15: Procedures for Voluntary Submission of Final Inspection Checklists

Part A

1. When submitting WWO46 Part IV to apply for final inspection, the LP shall indicate in the covering letter that he opts for joining the “**Voluntary Scheme**” on voluntary submission of inspection checklists. The name, email, RPE No./MHKIE no., curriculum vitae, certificate, certificate of Employment or the like of the certifying person – [RPE(MCL)/REP(BSS)] or MHKIE in (MCL)/(BSS) and his representative (if applicable) to demonstrate their attainment of sufficient qualification and relevant working experience should also be submitted.
2. Upon receipt of WWO46 Part IV, WSD shall issue “**Notification of the Selected Locations for Voluntary Submission of Final Inspection Checklists**” (Notification) by email advising the certifying person the selected zones for inspection and submission of the checklist within 7 working days of receipt of WWO46 Part IV. A sample of the Notification is attached at **Annex to Appendix 15** for reference. WSD shall also make appointment with LP for the date of final inspection when issuing the Notification. WSD’s target is to arrange final inspection for at least 70% of the cases within 14 working days (or on a date mutually agreed when making appointment with the LP if final inspection cannot be arranged by the LP within 14 working days) from the time making the appointment. The LP shall submit the following documents within 7 working days upon the issuance of the Notification:
 - (i) a completed checklist for final inspection (Colour photos attached to the inspection checklists shall be submitted in both hard copy and soft copy (in PDF format and supplied in a CD ROM)); and
 - (ii) a certificate of final inspection certified by qualified certifying persons as set out in **Appendix 16**.

Part B

3. If the completed checklists were found to be not in order, WSD may require the LP to amend the completed checklist and provide supplementary document. If the LP does not submit the completed checklist within 7 working days of the issue of the Notification or the checklist is not amended or supplemented to the satisfaction of the WSD before the final inspection date, the inspection checklist will be rejected. Beside, in case the submission is of inferior quality in respect of completeness, correctness and clarity of the information provided such as out of focus photos, illegible handwriting and unclear description, WSD may reject the inspection checklists. If the inspection checklist is rejected, WSD will notify the LP the reasons of rejection and the LP is not allowed to re-submit the inspection checklists and the application will be handled as if it has not been submitted for voluntary submission. WSD will make an appointment with the LP for final inspection within 7 working days from the day on which the inspection checklist is rejected.
4. For new buildings, since some of the target items to be inspected (e.g. meter cabinet) are typically the same within the selected zones (e.g. high zone 15/F to 21/F), the LP shall prepare one set of typical inspection checklists (FI-A to FI-H as appropriate) with record photos for each individual zone selected by WSD.

5. During the final inspection, WSD would verify the “Inspection Results” of the submitted inspection checklists and record photos. WSD inspectorate may select extra sample(s)/location(s) for final inspection (e.g. another meter cabinet upstairs / downstairs) if necessary.
6. In case there is any disagreement on the “Inspection Results”, the WSD inspectorate shall indicate on the checklist as appropriate and both the WSD inspectorate and the LP shall sign next to the amendment.
7. If defect exists, its location with photo details should be recorded on the checklist. The LP and the WSD inspectorate should sign on the checklists and WWO 1008 will be issued.

- End -

Annex to Appendix 15:**Notification of the Selected Locations for Voluntary Submission of Final Inspection Checklist**

ASN : _____

(I) Check List FI-A (Tank and Pump Room)

	Roof Tank	Intermediate Tank	Sump Tank and Pump Room	Break Pressure Tank	Break Tank	Other (As specify)
Fresh Water (FW)			✓			
Flushing Water (FLW)						
Fire Service (FS)						

(II) Check List FI-B (Meter/Check Meter/Meter Position and Adjoining Pipes and Fittings/Master Meter Room)

	Master Meter	Check Meter	Meter Position and Adjoining Pipes and Fittings	Master Meter Room
Fresh Water (FW)			✓	
Flushing Water (FLW)				
Fire Service (FS)				

(III) Check List FI-C (Meter Cabinet/Room)

	Zone		Floor	Meter Cabinet	Meter Room
Typical	Upper	✓	15/F to 21/F	✓	
	Middle				
	Lower				
Non-typical					

(IV) Check List FI-E (Connection)

	Connection
Fresh Water (FW)	✓
Flushing Water (FLW)	
Fire Service (FS)	

(V) Check List FI-F (Communal Part)

	Zone		Floor	Riser Pipe & Valve	Down-feed Pipe & Valve
	Upper	Middle			
Fresh Water (FW)	Upper	✓	15/F to R/F	✓	✓
	Middle				
	Lower				
Flushing Water (FLW)	Upper				
	Middle				
	Lower				
Fire Service (FS)	Upper				
	Middle				
	Lower				

(VI) Check List FI-G (Communal Part)

		Swimming Pool (with balancing tank)	Swimming Pool (with feed tank)	Irrigation	Cleansing	Others (e.g. Hydrant, Hose Reel, Sprinkler, Fountain etc.)
Fresh Water (FW)	✓					Hot Water System
Flushing Water (FLW)						
Fire Service (FS)						

(VII) Check List FI-H (Individual Household Flat/Unit)

	Zone		Floor	Flat /unit No.
	Upper	Middle		
Typical	Upper	✓	15/F to 21/F	A
	Middle			
	Lower			
Non-typical				

(VIII) Check List FI-I (Building of Storey <4, Village House and Construction Supply)

	Connection	Meter / Cabinet Box	Communal Part	Individual Household Flat/Unit	Water Tank	Other (As specify)
Fresh Water (FW)						
Flushing Water (FLW)						
Fire Service (FS)						

Appendix 16: Certificate of Final Inspection of Inside Service/Fire Service

Address: _____

To the Water Authority

I refer to the letter under reference _____ dated _____ submitted by (name of licensed plumber in full) _____ enclosing the Form WWO 46 Part IV.

I confirm that *I/my representative¹ who has the qualification as given in the footnote below (name in full) _____ has witnessed the inspection by the licensed plumber of the completed plumbing works mentioned in the above Form WWO 46 Part IV carried out at the captioned address on (date) _____. I certify that the completed plumbing works mentioned in the above Form WWO 46 Part IV comply in all respects with the provisions of the Waterworks Ordinance (Cap. 102), the Waterworks Regulations (Cap. 102A), the requirements of the Water Authority and the applicable requirements set out in the Technical Requirements for Plumbing Works in Buildings, the Water Supplies Department Circular Letters to Licensed Plumbers and Authorized Persons and the Guide to Application for Water Supply issued by the Water Authority. I have reviewed and am satisfied with the attached completed inspection checklist(s).

Signature of *registered professional engineer² /
member of the Hong Kong Institution of Engineers³

Name in full

*RPE No. / MHKIE No.

*Email / Correspondence Address

Date: _____

* Delete where inappropriate

¹ The representative should have a Diploma or Higher Certificate in Electrical Engineering, Mechanical Engineering, Electrical Installation and Building Services, or Building Services (BS) Engineering from a Hong Kong polytechnic university/polytechnic, the Hong Kong Institute of Vocational Education or technical institute/technical college, or equivalent; and possess 3 years' relevant post-qualification experience in BS installation.

² Registered professional engineer as defined in the Engineers Registration Ordinance (Cap 409). Registered Professional Engineers (Mechanical) with 2 years of relevant working experience in BS installation or Registered Professional Engineers (Building Services) are qualified for certification.

³ Corporate member of the Hong Kong Institution of Engineers in the Mechanical discipline with 2 years of relevant working experience in BS installation or in the BS discipline are qualified for certification.

Appendix 17: Flushing Protocol

The building contractors/Licensed Plumbers (LP) are required to carry out three flushing cycles according to the following systematic flushing protocol [each cycle consists of steps (i) to (iv) below] for the completed inside services to cleanse the newly installed plumbing system-

- (i) Thoroughly flush the inside services at drinking water tap(s);
- (ii) Allow the water to stand for at least 3 hours;
- (iii) Thoroughly flush the inside services at drinking water taps(s) after (ii); and
- (iv) Allow the water in the inside services to stand overnight for at least 12 hours.

The inside service shall be thoroughly flushed again at drinking water tap(s) upon completion of all systematic flushing cycles.

The followings should be observed when carrying out systematic flushing:

- (i) All drinking water taps of newly installed inside service should be thoroughly flushed throughout the systematic flushing cycles.
- (ii) All strainers, if installed at the drinking water taps, must be removed before carrying out systematic flushing.

Appendix 18: Record of Systematic Flushing for New Village Houses

(Only one record is required for each village house)

ASN: _____

Location of new plumbing works: _____

Systematic Flushing has been carried out at the above-mentioned plumbing works as follows:

Cycle	Date	Steps	Start Time	End Time
1		Thoroughly flush at drinking water tap(s)		
		Water stagnation for at least 3 hours		
		Thoroughly flush at drinking water tap(s) again		
		Overnight water stagnation		
2		Thoroughly flush at drinking water tap(s)		
		Water stagnation for at least 3 hours		
		Thoroughly flush at drinking water tap(s) again		
		Overnight water stagnation		
3		Thoroughly flush at drinking water tap(s)		
		Water stagnation for at least 3 hours		
		Thoroughly flush at drinking water tap(s) again		
		Overnight water stagnation		
-		Final thorough flushing at drinking water tap(s) after three cycles of systematic flushing		

Record of additional systematic flushing before re-testing (if applicable):

Cycle	Date	Steps	Start Time	End Time
-		Thoroughly flush at drinking water tap(s)		
		Water stagnation for at least 3 hours		
		Thoroughly flush at drinking water tap(s) again		
		Overnight water stagnation		
-		Final thorough flushing at drinking water tap(s) after additional cycle of systematic flushing		

Signature of Licensed Plumber_____
Name in full_____
Plumber's License No.

Date: _____

Appendix 18A: Record of Systematic Flushing for New Building

(One record is required for each floor)

ASN: _____

Location of new plumbing works: _____

Systematic Flushing has been carried out at the above-mentioned plumbing works as follows:

Floor	Cycle	Date	Steps	Start Time	End Time
	1		Thoroughly flush at all drinking water tap(s)		
			Water stagnation for at least 3 hours		
			Thoroughly flush at all drinking water tap(s) again		
			Overnight water stagnation for at least 12 hours		
	2		Thoroughly flush at all drinking water tap(s)		
			Water stagnation for at least 3 hours		
			Thoroughly flush at all drinking water tap(s) again		
			Overnight water stagnation for at least 12 hours		
	3		Thoroughly flush at all drinking water tap(s)		
			Water stagnation for at least 3 hours		
			Thoroughly flush at all drinking water tap(s) again		
			Overnight water stagnation for at least 12 hours		
-			Final thorough flushing at all drinking water tap(s) after three cycles of systematic flushing		

LP should note that all strainers, if installed at drinking water taps, must be removed before carrying out systematic flushing.

Record of additional systematic flushing before re-testing (if applicable):

Floor	Cycle	Date	Steps	Start Time	End Time
	-		Thoroughly flush at drinking water tap(s)		
			Water stagnation for at least 3 hours		
			Thoroughly flush at drinking water tap(s) again		
			Overnight water stagnation for at least 12 hours		
	-			Final thorough flushing at drinking water tap(s) after additional cycle of systematic flushing	

The records of water meter readings at the above-mentioned floor are detailed as follows: (only record readings before and after completion of all systematic flushing cycles)

Meter No.							
Reading before start of systematic flushing							
Reading after end of systematic flushing							
Meter No.							
Reading before start of systematic flushing							
Reading after end of systematic flushing							
Meter No.							
Reading before start of systematic flushing							
Reading after end of systematic flushing							

Signature of Licensed Plumber (LP) _____

Name in full _____

LP's License No. _____

Date _____

Appendix 19: Water Sampling Requirements

(A) Water Sampling Locations

Type	Fresh water inside service (excluding fresh water flushing supply and fire service supply)	
	new plumbing works	plumbing works in occupied buildings
Building of storeys ≥ 4		
Indirect Supply System	<ul style="list-style-type: none"> ● 1 sample at one of the roof tanks ● 1 sample at one of the sump tanks ● 1 sample at drinking water tap for each downpipe 	<ul style="list-style-type: none"> ● 1 sample at one of the *roof tanks ● 1 sample at one of the *sump tanks ● 1 sample at **drinking water tap/sampling tap for ***each downpipe/supply system
Direct Supply System	<ul style="list-style-type: none"> ● 1 sample at the drinking water tap in the supply system ● 1 sample at the drinking water tap at another location within the supply system 	<ul style="list-style-type: none"> ● 1 sample at **drinking water tap/sampling tap in the supply system ● 1 sample at drinking water tap/sampling tap at another location within the supply system
Underground pipe	<ul style="list-style-type: none"> ● 1 sample at each connection point 	<ul style="list-style-type: none"> ● 1 sample at each connection point
Village House and Building of storeys < 4		
Direct Supply System	<ul style="list-style-type: none"> ● 1 sample at drinking water tap of the supply system 	<ul style="list-style-type: none"> ● 1 sample at **drinking water tap/sampling tap of the supply system
Underground pipe	<ul style="list-style-type: none"> ● 1 sample at each connection point 	<ul style="list-style-type: none"> ● 1 sample at each connection point****
Temporary Houses/Squatters		
	<ul style="list-style-type: none"> ● If the Licensed Plumber carries out the flushing for the whole pipe in one go, 1 sample at drinking water tap of the supply system shall be collected. 	
Separate Meter		
	<ul style="list-style-type: none"> ● 1 sample at drinking water tap in the supply system 	<ul style="list-style-type: none"> ● 1 sample at drinking water tap in the supply system
Sampling Protocol		
	Paragraph 2, Part (B) of Appendix 19 (6 hour stagnation sampling)	Paragraph 2, Part (B) of Appendix 19 (30 mins stagnation sampling)

Type	Fresh water flushing and fire services supply (non-potable fresh water supply)	
	new plumbing works	plumbing works in occupied buildings
All building and application types		
	● 1 sample at each connection point	● 1 sample at each connection point****
Sampling Protocol		
	Paragraph 2A, Part (B) of Appendix 19	Paragraph 2A, Part (B) of Appendix 19

* If the extent of plumbing works involve roof tanks/sump tanks

** If the extent of plumbing works do not involve inside service for individual units, samples taken at sampling taps installed on the plumbing works are accepted

*** If the extent of plumbing works do not involve downpipe, samples will be taken at random locations of the supply system

**** Applicable if the extent of plumbing works involve connection to WSD's mains.

Licensed Plumbers (LPs) shall arrange accredited laboratories to carry out water sampling and analysis at all sampling locations (including at connection point) and for any pipe size. List of laboratories accredited for testing lead, cadmium, chromium, nickel, antimony and copper in water with all reporting limits meeting the Hong Kong Drinking Water Standards can be found at:

https://www.itc.gov.hk/en/quality/hkas/doc/CAB_accruited_for_all_6_trace_metals.pdf

LPs may also request Water Science Division of the WSD to carry out water sampling and analysis at connection point of all pipe size. The contact person for making such request are as follows:

Areas	Contact Person	Telephone No.
Hong Kong and Outlying Islands	Waterworks Chemist/Treatment (1)	2294 2738
Kowloon and New Territories East	Waterworks Chemist/Treatment (2)	2691 7689
New Territories West	Waterworks Chemist/Treatment (3)	2450 6121

(B) Sampling Protocol for Commissioning Test of Fresh Water Plumbing System**1. General**

- 1.1 This sampling protocol is applicable for collection of water samples at water sampling tap and connection point for commissioning of newly installed or replaced inside services for fresh water supply in occupied or unoccupied buildings.
- 1.2 Site supervisors/testing laboratories shall take necessary measures and maintain relevant records to ensure that the water samples are:
- a) taken by a competent person with proper training supported by relevant training records on the sampling procedures and handling of the water samples.
 - b) representativeness of the water quality of the new plumbing system at the time of sampling
 - c) free from contamination during the course of sampling, sample storage and transportation.
- 1.3 Sample Bottles
- 1.3.1 Sample for Metal Tests: Sample bottles shall be made of PE, PP, FEP, PE-HD or PTFE¹, with a capacity of 1-litre each. Sample bottles and caps shall be: (i) thoroughly cleaned with a phosphate-free detergent solution; (ii) thoroughly rinsed with deionised water; (iii) soaked in dilute nitric acid (~10% volume dilution of concentrated HNO₃) or dilute hydrochloric acid (~25% volume dilution of concentrated HCl) for 24 hours; (iv) rinsed with deionised water several times, and (v) dried and kept tightly capped in storage.
- 1.3.2 Sample for Chemical and Physical Tests: Sample bottles shall be made of plastics or glass except soda glass with a capacity of 500mL. The bottles shall be prepared in accordance with the ISO 5667-3.
- 1.3.3 Sample for Bacteriological Tests: Sample bottles shall be glass or plastics with a capacity of 250mL and the recommendations for sample bottles given in ISO 19458 shall be followed. The bottles shall be prepared in accordance with the ISO 19458. Sufficient amount of sodium thiosulfate (7.1 mg of sodium thiosulfate (pentahydrate) can neutralise 1 mg of residual chlorine) shall be added into the sample bottle to remove the residual disinfectant present in the water sample.

¹ FEP: perfluoro(ethylene-propylene) plastic; PE: polyethylene; PP polypropylene; PE-HD: high density polyethylene; PTFE: polytetrafluoroethylene

- 1.4 Water samples shall not be taken at the following drinking water tap or sampling tap:
- a) Leaking tap;
 - b) Drinking water tap installed with an inline water filter or a point-of-use filter with no bypass switch;
 - c) Insufficient space below the tap to accommodate the sampling bottle;
 - d) Environment with high risk of contamination such as close to works site or dusty environment or dirty water tap.

1.5 All information and observation regarding the sampling location shall be recorded, in particular, when a tap at a sampling location is considered not representative and rejected due to conditions mentioned in Clause 1.4 above.

1.6 Never rinse sample bottle prior to sample collection.

2. Collection of Water Sample from Fresh Water Plumbing System (excluding fresh water flushing and fire service supply)

2.1 Collection of Water Samples for Heterotrophic Plate Count (HPC) Test at Water tap/Connection Point.

2.1.1 For fresh water inside service in unoccupied buildings, before flushing, remove and cleanse the strainer. Flush the temporary sampling pipe/tap (for connection point) or water tap for at least 2 minutes. Close the sampling pipe/tap or water tap and reinstall the strainer after flushing. Disinfect the sampling pipe/tap or water tap in accordance with ISO 19458. Open the sampling pipe/tap or water tap and flush briefly² with a view to collecting a representative sample from the plumbing system for commissioning test. Place a sterile sample bottle under the sampling pipe/tap or water tap and take 250-mL sample for testing of HPC. For fresh water inside service in occupied buildings, after collecting the water sample for testing of HPC as above, the strainer is removed and cleansed again, followed by 3 minutes flushing at the sampling pipe/tap or water tap. Then the strainer is reinstalled to the water tap before commencing the 30 minutes stagnation period as stated in clause 2.2.1.

2.2 Collection of Water Samples for metal, chemical, physical and E. coli tests after water stagnation.

² Flush briefly only to overcome influence of disinfection of the tap or to remove non-representative volume of sample trapped inside temporary sampling pipe and tap which is not part of the new plumbing system.

2.2.1 Always collect the water sample for metal testing first after the stagnation period (For fresh water inside service in unoccupied buildings, the stagnation period is minimum 6 hours. For fresh water inside service in occupied buildings, the stagnation period is minimum 30 minutes) followed by collection of water samples for analysis of chemical, physical parameters and E. coli. The start time of stagnation and the collection time of stagnation samples shall be recorded.

2.2.2 Sample Collection at Water Tap

2.2.2.1 At the end of the required stagnation period, place a 1-L sample bottle for metal testing under the tap. Collect 1-litre of water with the tap opened as much as possible without spillage. Never rinse the sample bottle before sample collection.

2.2.2.2 Immediately after collection of 1-L of water sample, place a 500mL sample bottle for chemical and physical testing under the tap and collect 500mL of water. Close the tap after sample collection.

2.2.2.3 Disinfect the tap in accordance with ISO 19458. Open the tap and flush briefly² with a view to collecting a representative sample from the new plumbing system for commissioning test. Place a sterile sample bottle under the tap and take 250-mL sample for testing of E. coli.

2.2.3 Sample Collection at Connection Point

2.2.3.1 For sample collected from temporary sampling pipe/tap, at the end of the required stagnation period, open the sampling pipe/tap and flush briefly² with a view to collecting a representative sample from the plumbing system for commissioning test. Place a 1-L sample bottle for metal testing under the sampling pipe/tap immediately after the brief flushing. Collect 1-L of water without spillage. Never rinse the sample bottle before collection.

2.2.3.2 Follow clauses 2.2.2.2 and 2.2.2.3 to collect water samples for chemical, physical and E. coli testing.

2A. Collection of Water Sample from fresh water flushing and fire service supply

2A.1 Collection of Water Samples for Physical, Chemical and Bacteriological Tests at Connection Point

- 2A.1.1 Flush the temporary sampling pipe/tap for connection point for at least 2 minutes. Place a 500 mL sampling bottle for physical and chemical tests under the sampling pipe/tap and collect 500 mL of water. Close the sampling pipe/tap after sample collection.
- 2A.1.2 Disinfect the sampling pipe/tap in accordance with ISO 19458. Open the sampling pipe/tap and flush briefly³ with a view to collecting a representative sample from the new plumbing system for commissioning test. Place a sterile sample bottle under the sampling pipe/tap and take 250 mL sample for bacteriological tests (i.e. *E. coli* and HPC).

3. Sample Labelling and Transfer

- 3.1 All sample bottles shall be properly labelled immediately after sample collection to avoid inadvertent mislabelling and sample mix-up. Pack each water sample bottle in a plastic bag and store them in a cold box for transportation. Deliver the samples to an accredited laboratory for analysis as soon as possible after completion of the sampling. Care shall be taken to avoid sample contamination during sample collection, handling, storage and transportation.

4. Retesting Arrangement

- 4.1 The retesting arrangement in Table 1 shall be followed when any result(s) of parameter(s) fail(s) to comply with the acceptance criteria in Table 2.

Table 1: Retesting Arrangement

Parameters	Scenarios		
	fail	pass	pass
Metal parameters	fail	pass	pass
Physical and Chemical parameters	pass or fail	fail	pass
Bacteriological parameters (<i>E. coli</i> and Heterotrophic Plate Count (HPC))	pass or fail	pass	fail
Parameters to be retested	all parameters	all parameters other than metal	

Table 2: Acceptance Criteria

³ Flush briefly only to overcome influence of disinfection of the tap or to remove non-representative volume of sample trapped inside temporary sampling pipe and tap which is not part of the new plumbing system.

Parameter	Acceptance Criteria
<i>Chemical and Physical</i>	
Turbidity	≤ 3.0 NTU
Colour	≤ 5 Hazen Unit
pH at 25°C	≥ 6.5 and ≤ 9.2
Free Residual Chlorine	> 0 mg/L and ≤ 1.5 mg/L
Conductivity at 25°C	≤ 300 μ S/cm
<i>Metals</i>	
Lead	≤ 10 μ g/L
Chromium	≤ 50 μ g/L
Nickel	≤ 70 μ g/L
Cadmium	≤ 3 μ g/L
Copper	≤ 2000 μ g/L
Antimony	≤ 20 μ g/L
<i>Bacteriological</i>	
HPC	≤ 20 cfu/mL
<i>E. coli</i>	0 cfu/100mL

5 References:

- 5.1 ISO 5667-3:2012 “Water Quality -Sampling Part 3: Preservation and handling of water samples”
- 5.2 ISO 19458:2006 “Water Quality – Sampling for microbiological analysis”

Appendix 20: Submission for Temporary Resumption of Water Supply for Purposes other than Drinking and Cooking for Online Re-plumbing Works

To the Water Authority,

ASN: _____

Address of works: _____

I hereby submit to you the following section of works that had been completed:

(A) Works Completed :-

Location of works	Description of completed works

(B) Site photo(s) showing the completed works described in (A) and the relevant pipes and fittings to be attached on separate sheet(s):-

(Note: If soldering is adopted for connecting copper pipes, please also attach relevant photo(s) to show a satisfactory result of non-destructive test of lead content for the copper pipe joint.)

(C) I undertake and declare that the information given in this submission and photos attached is true, correct and complete.

Signature of Licensed Plumber/
Representative of Licensed Plumber

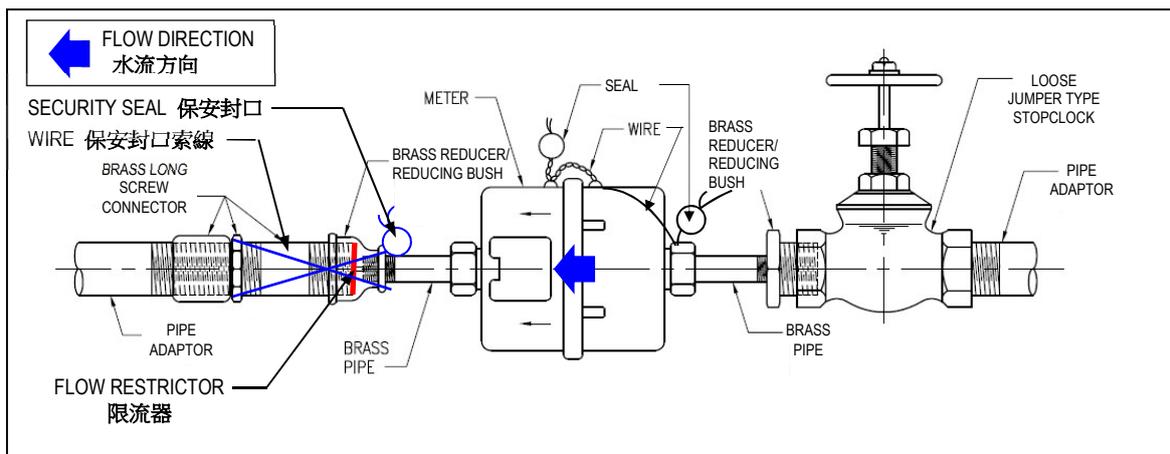
Name in full

Plumber's Licence No.

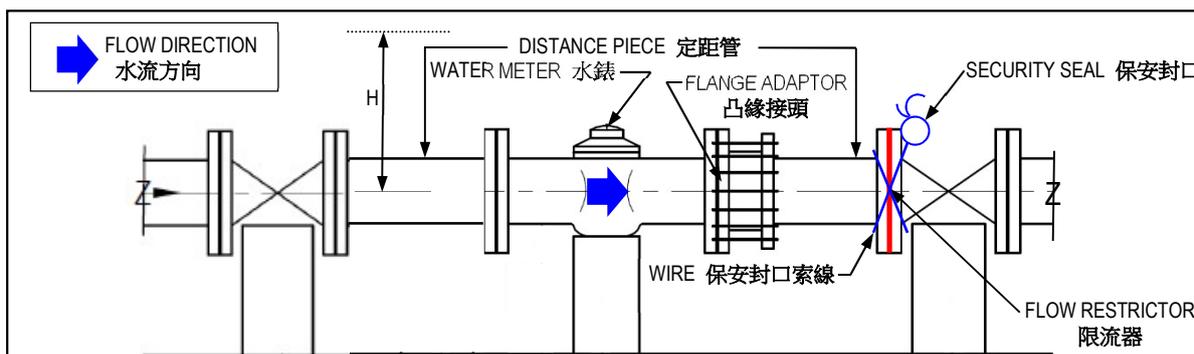
Date: _____

Appendix 21: Not Used

Appendix 22: Typical Configuration of Flow Restrictor and Security Seal



ARRANGEMENT FOR WATER METER WITH DIAMETER OF 15mm to 40mm 直徑 15 毫米 至 40 毫米水錶的安排



D = NOMINAL DIAMETER OF THE METER 水錶標稱直徑
H = VERTICAL WORKING CLEARANCE 垂直工作間隙

NOTES 備註:

1. CLEAR VERTICAL WORKING CLEARANCE (H) SHOULD NOT LESS THAN 6 TIMES THE NOMINAL DIAMETER OF THE METER (D) MEASURED FROM THE PIPE CENTERLINE 從喉管中線以上的垂直工作間隙(H) 應不少於水錶標稱直徑(D) 的 6 倍
2. THE LENGTH OF UPSTREAM AND DOWNSTREAM DISTANCE PIECES SHALL REFER TO "TECHNICAL REQUIREMENTS FOR PLUMBING WORKS IN BUILDINGS". 上游及下游定距管應符合"樓宇水管工程技術要求"所訂明的所需長度
3. THE UPSTREAM DISTANCE PIECE MAY BE REPLACED BY INSTALLATION OF STRAINER IF CONSIDER NECESSARY BY THE WSD. 若水務署認為有需要安裝濾水網，該濾水網有可能取代上游定距管

ARRANGEMENT FOR WATER METER WITH DIAMETER OF 50mm OR ABOVE 直徑 50 毫米或以上水錶的安排

Appendix 23: Operational Range and Specifications of Different Type and Size of Meters

A. For small size water meter (DN15mm) 小型水錶尺寸(15 毫米)

Nominal Size 標稱尺寸	mm 毫米	15
Type 類型	-	Rotary Piston 旋轉活塞溶積式
Permanent Flowrate, Q 常用流量	m ³ /hr 立方米/小時	2.5

B. For medium size water meter (from DN25 to DN100mm) 中型水錶尺寸(25 - 100 毫米)

(i) From DN25 to DN40mm 由 25 至 40 毫米

Nominal Size 標稱尺寸	mm 毫米	25		40
		Existing Specifications 現時規格	Revised Specifications for the New Supply Tender to be Issued in 2017 2017 年調整新標書規格	
Type 類型	-	Rotary Piston 旋轉活塞溶積式		
Permanent Flowrate, Q 常用流量	m ³ /hr 立方米/小時	3.5	6.3	10

(ii) From DN50 to DN100mm 由 50 至 100 毫米

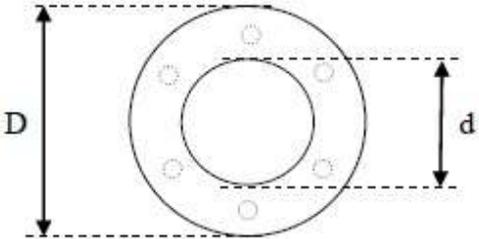
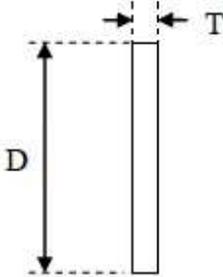
Nominal Size 標稱尺寸	mm 毫米	50		80		100	
Type 類型	-	Turbine 螺翼式/ Woltmann (Higher Q ₄)	Single Jet 旋翼單 流式	Turbine 螺 翼式 / Woltmann (Higher Q ₄)	Single Jet 旋翼單 流式	Turbine 螺翼式 / Woltmann (Higher Q ₄)	Single Jet 旋翼單 流式
Permanent Flowrate, Q 常用流量	m ³ /hr 立方米/小時	50	15	120	30	180	50

C. For large size water meter (from DN150 to DN300mm) 大型水錶尺寸 (由 150 至 300 毫米)

Nominal Size 標稱尺寸	mm 毫米	150	200	250	300
Type 類型	-	Turbine 螺翼式/ Woltmann (Higher 較高 Q ₄)			
Permanent Flowrate, Q 常用流量	m ³ /hr 立方米/小時	450	700	1,000	1,400

Appendix 24: Data Sheet of Flow Restrictor (Stainless Steel Orifice Plate)

The following data to be provided by Applicant/LP to suit the inside services arrangements.
 以下資料由申請人或持牌水喉匠填寫以配合屋內供水設備安排

 <p>Plan View 正面</p> <p>○ Bolt Hole (for meter size of 50mm or above) 螺栓孔 (水錶尺寸為50毫米或以上適用)</p>	 <p>Side View 側面</p>								
<table border="1"> <tr> <td>Outer Diameter 外圈直徑 (D)</td> <td>(mm/毫米)</td> </tr> <tr> <td>Orifice Diameter 內孔直徑 (d)[#]</td> <td>(mm/毫米)</td> </tr> <tr> <td>Thickness 厚度 (T)</td> <td>(mm/毫米)</td> </tr> <tr> <td>Stainless Steel Grade 不銹鋼型號 *</td> <td>304 / 316</td> </tr> </table>	Outer Diameter 外圈直徑 (D)	(mm/毫米)	Orifice Diameter 內孔直徑 (d) [#]	(mm/毫米)	Thickness 厚度 (T)	(mm/毫米)	Stainless Steel Grade 不銹鋼型號 *	304 / 316	
Outer Diameter 外圈直徑 (D)	(mm/毫米)								
Orifice Diameter 內孔直徑 (d) [#]	(mm/毫米)								
Thickness 厚度 (T)	(mm/毫米)								
Stainless Steel Grade 不銹鋼型號 *	304 / 316								
<p>* Please delete the inappropriate type 請刪去不適用者</p> <p>[#] The dimension (d) should be equal to the required orifice diameter specified in the approval letter. (d) 的尺寸須與批准信內要求的內孔直徑相同</p>									

Please provide the following data if the size of water meter is 50mm or above.
 如水錶尺寸為50毫米或以上請提供以下資料

<u>Stainless Steel Orifice Plate 帶孔不銹鋼片[^]</u>	
Number of Bolt Hole 螺栓孔數量	(number/個)
Bolt Hole Diameter 螺栓孔直徑	(mm/毫米)
Pitch Circle Diameter of Bolt 螺栓節距圓直徑 (PCD)	(mm/毫米)
<p>[^] The stainless steel orifice plate to be inserted between flanges at the joint should have suitable gasket and bolt holes for installation. 夾於接頭凸緣間的帶孔不銹鋼片須備有合適的軟墊及螺栓孔以作安裝</p>	
<u>Gasket 軟墊</u>	
Material 物料	
Thickness 厚度	(mm/毫米)

Appendix 25: Guidelines on Cleansing and Disinfection of Fresh Water Inside Service

(A) Newly Installed Fresh Water Inside Service

The newly installed fresh water inside service shall be cleaned and disinfected to the satisfaction of the Water Authority in accordance with the following procedures.

(I) Newly Installed Underground Fresh Water Mains

- (1) Remove all extraneous materials inside the water mains. Fill the fresh water mains slowly with water and carry out the required water pressure testing. If the result of the test is satisfactory, clean the fresh water mains internally and flush them with potable water. For fresh water mains of sizes less than 600 mm in diameter, swab to remove the dirt and materials inadvertently left in the water mains and flush them with potable water.
- (2) Fill the water mains completely with a homogeneous solution of chloride of lime for disinfection. The concentration of the solution has to meet the requirement that when the water mains are filled up with water, the free residual chlorine in the water will be at least 30 ppm. Keep the water mains under disinfection for at least 24 hours. After disinfection, flush the water mains thoroughly with potable water to remove disinfectant remaining in the mains.
- (3) Arrange with Water Science Division of WSD or accredited laboratories to conduct water sampling tests following the requirements in **Appendix 19**.
- (4) To avoid possible re-contamination, the fresh water mains concerned shall be put into operation within 7 days from the date of water sampling with satisfactory results. In this respect, LPs are advised to allow sufficient time to carry out water sampling and analysis and to avoid arranging disinfection and water sampling immediately before long public holidays.

(II) Newly Installed Fresh Water Inside Service other than Those covered in (A)(I) above

- (1) Flush the inside service concerned thoroughly with potable water.
- (2) After flushing, follow one of the three procedures stated below to disinfect the inside service concerned.

Methods Using Chlorine as a disinfectant

- (i) Fill the inside service concerned with a homogeneous solution of chloride of lime for disinfection. The concentration of the solution has to meet the requirement that when the inside service is filled up with water, the free residual chlorine in the water will be at least 30 ppm. After keeping the inside service under disinfection for at least 24 hours, the inside service shall be immediately drained and thoroughly flushed with potable water.

or

- (ii) Fill the inside service concerned with chlorinated water at an initial concentration of 50 ppm for a contact period of one hour. If the free residual chlorine measured at the end of the contact period is less than 30 ppm, the disinfection process shall be repeated. After successful disinfection, the inside service shall be immediately drained and thoroughly flushed with potable water.

or

Methods Using Disinfectants other than Chlorine

- (iii) Fill the inside service concerned with the disinfectant solution other than chlorine at the initial concentration and for the contact time specified by the manufacturer of the disinfectant. The disinfectant solution shall not contain any substances in quantities capable of causing deleterious or injurious health effects to consumers using the inside service disinfected in accordance with the manufacturer's instructions/ recommendations. If the residual of the disinfectant at the

end of the contact time is less than the manufacturer's recommendation, the disinfection procedure shall be repeated. After successful disinfection, the inside service shall be immediately drained and thoroughly flushed with potable water. Flushing shall continue in accordance with the disinfectant manufacturer's instructions/recommendations or until there is no evidence of the disinfectant chemical being present, or it is at a level that is no higher than that present in the potable water supplied.

- (3) Arrange with Water Science Division of WSD or accredited laboratories to conduct water sampling tests following the requirements in **Appendix 19**.
- (4) To avoid possible re-contamination, the fresh water mains concerned shall be put into operation within 7 days from the date of water sampling with satisfactory results. In this respect, LPs are advised to allow sufficient time to carry out water sampling and analysis and to avoid arranging disinfection and water sampling immediately before long public holidays.

(B) Repair or Maintenance of Fresh Water Inside Service

(I) Repair or Maintenance of Underground Fresh Water Mains

- (1) Keep the excavation surfaces of trench clear from the pipe body and remove all extraneous materials in the fresh water mains. If the trench is flooded, pump water out of the trench.
- (2) Clean the internal surface of the exposed pipe ends and the replacement pipe with a solution of chloride of lime. The concentration of free residual chlorine in the solution shall be at least 30 ppm.
- (3) Fill the section of the water mains that has been shut down for repair or maintenance with a homogeneous solution of chloride of lime for disinfection. The concentration of the solution has to meet the requirement that when the water mains are completely filled with water, the free residual chlorine in the water will be at least 30 ppm. Fill the water mains with water and isolate them

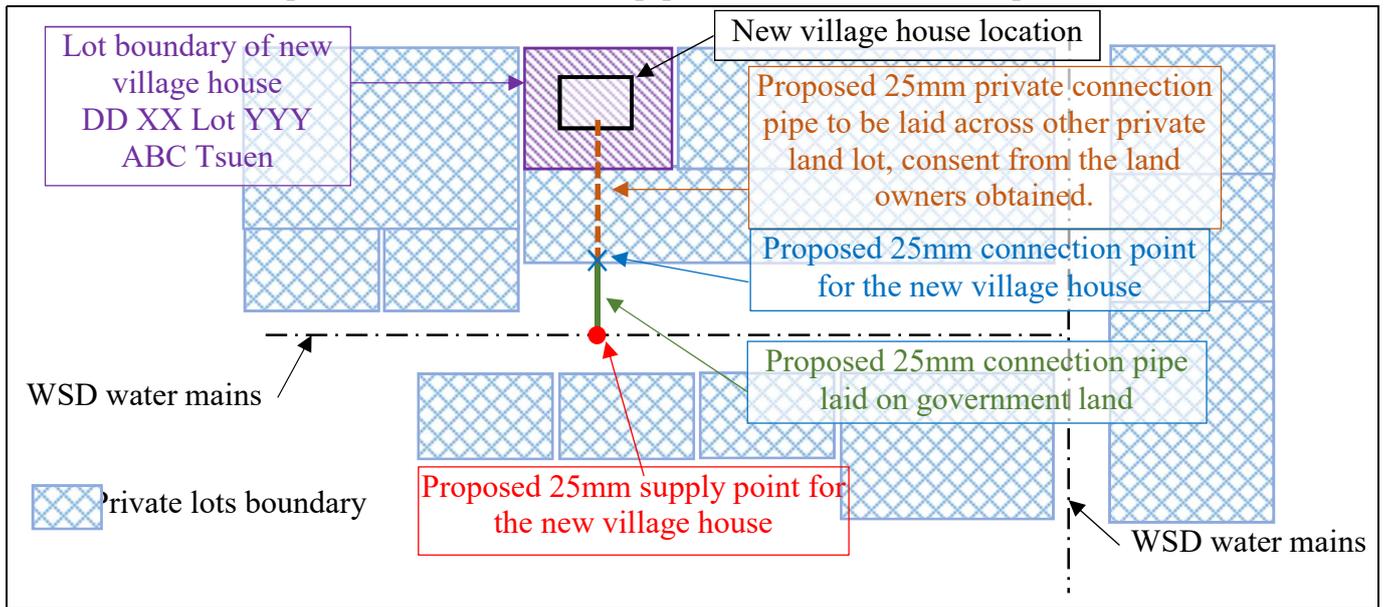
when filling is completed. Keep the water mains under disinfection for at least 30 minutes. After disinfection, flush the water mains thoroughly with potable water through a fire hydrant, washout or, if no such facilities are available, through a submain temporarily put out of service.

(II) Repair or Maintenance of Fresh Water Inside Service other than Those covered in (B)(I) above

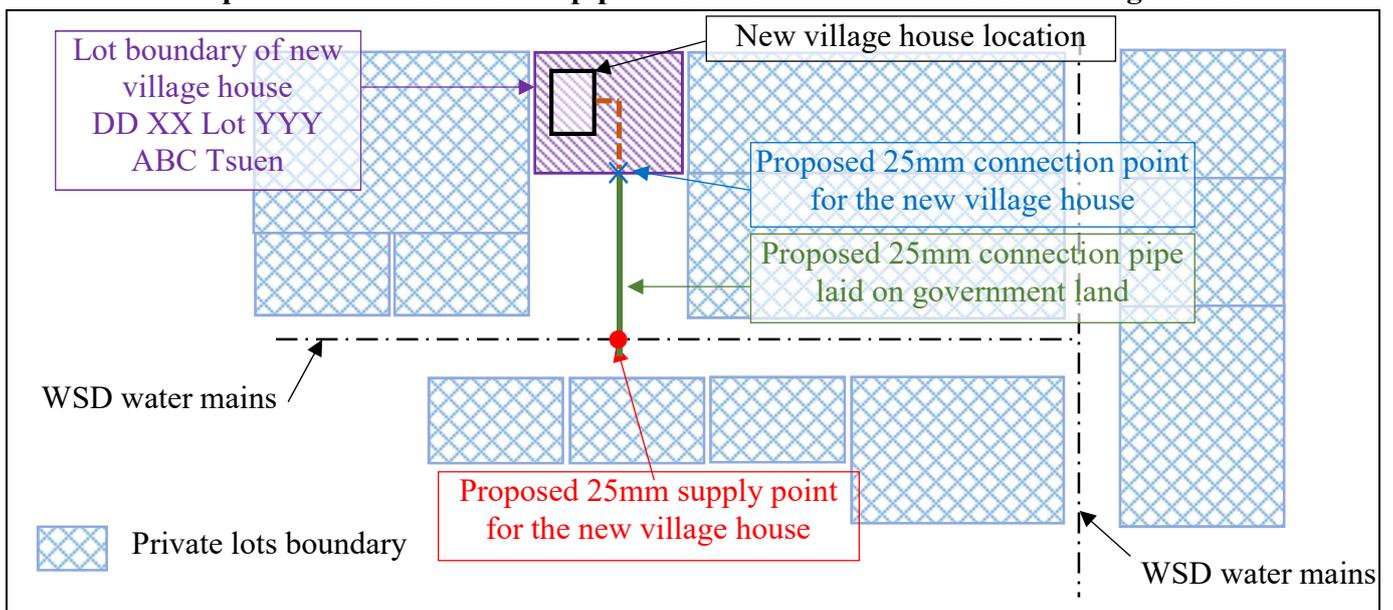
After completion of repair or maintenance works, fill the concerned inside service that has been shut down for repair or maintenance with a homogeneous solution of chloride of lime for disinfection. The concentration of the solution has to meet the requirement that when the inside service is completely filled with water, the free residual chlorine in the water will be at least 30 ppm. Isolate the inside service when filling is completed and keep the inside service under disinfection for at least 30 minutes. After disinfection, flush the inside service thoroughly with potable water.

Appendix 27: Example of Connection Layout Plan

Example 1: Private connection pipe to be laid across other private land



Example 2: Private connection pipe to be laid within the land lot of village house



Appendix 28: WSD Mains Record Plan Acquisition Form

To: WSD Access to Information Officer

Application No. _____ (official use)

(Please return the completed form by email: wsdinfo@wsd.gov.hk or by fax: 2824 0578. Please read the notes at the bottom of the form before completing the form.)

Basic Information of the Applicant:

Name:		Telephone No. :	
Plumber's Licence No.: (If applicable)		Email:	

The extent information of mains record plan for acquisition:

	[Example]	Application 1	Application 2	Application 3
Demarcating District No.:	DD 115			
Lot No.:	399SE RP			
District/Street:	Yuen Long			

Or

Grid Reference: (Easting Range)	821700			
	821900			
Grid Reference: (Northing Range)	834100			
	834300			

Mains record plan to be provided by²

- Photocopy in A3/A4 size Electronic copy on CD-ROM

Acquisition means of demand notes and mains record plan:

- Collect in-person at WSD Headquarters
- By mail (mailing address: _____)

Applicant's signature:		Date:	
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Notes:

- The mains record plan for the use of application of water supply will be provided in scale 1:1000. Private land lot boundary information shown on the mains record plan is for reference only.
- WSD will levy for the charge of photocopying of the mains record plan as requested, mail despatch cost of the mains record plan and the demand notes (if applicable). Photocopying charge for black and white hard copy mains record plan for size at A3 is HK\$1.5 per copy while size at A4 is HK\$1.3 per copy. Handling charge of electronic copy is at HK\$54 per drawing and HK\$1.1 per 700MB CD-ROM. WSD will advise you in advance of any charge. The above charge is subject to revision from time to time.
- WSD may not be able to process your application if you do not provide sufficient information.
- Each application form can acquire at most 3 extents of mains record (3 applications). One set of fresh water and salt water mains record (in black and white) within the extent or closest to the lot no. will be provided in each acquisition application.
- The information provided will be used for matters related to process your application to acquire the mains record plan. For correction of or access to personal data contained in this application, please contact the Access to Information Officer of the WSD.

Appendix 29: List of Pre-approved Standard Plumbing Designs

Standard Vertical Plumbing Line Diagram

Drawing No.
SPD01
SPD02
SPD03
SPD04
SPD05
SPD06
SPD07
SPD08
SPD09
SPD10
SPD11

Standard Meter Box Arrangement

Drawing No.
SMB01
SMB02
SMB03
SMB04
SMB05

Appendix 30: Official Websites of LP Associations/Institutions

LPs may refer to the websites of the following LP associations/institutions for a copy of the standard drawings:

LP associations/institutions	Official Websites
Plumbing Technology Student Association	https://sites.google.com/site/hkptsa/home
Hong Kong Licensed Plumbing Professionals Association	http://www.hklppa.com.hk/
The Hong Kong Institution of Plumbing and Drainage	http://www.hkipd.com.hk/
Hong Kong Water Works Professionals Association	http://hkwwpa.mysinablog.com/index.php

Appendix 31: Plumbing Proposal Form for e-Submission for Application of Water Supply of New Village Type Houses

To Water Authority,

(Please complete and submit the form together with the Form WWO 542 via email address: awsvillagehouse@wsd.gov.hk if electronic submission is adopted or by hand/mail to Document Management Centre)

I would like to apply for water supply for the new village type houses. The plumbing proposal details are given below:

Address of the Premises for water supply (Please fill in **English**)

Floor	Lot Number	Demarcation District Number
Name of Village		District

1. Site Layout Plan : Attach a Lot Index Plan¹ issued by the Lands Department and mark the Lot Number, Demarcation District Number, Lot boundary and the proposed meter box location on the plan.
2. Connection Layout Plan: Attach a plan that contain all WSD mains available in the vicinity of the new village type house, the boundary of the new village type house and the concerned land lot boundary and the proposed locations of supply point, connection point, and alignment of connection pipe on government lands between the proposed supply point and proposed connection point².
3. Vertical Plumbing Line Diagram – Pre-approved design drawing no.: SPD ____.

Pipe Jointing Method: Soldering Compression Other (Please specify) :

Material of connection pipe: Polyethylene Copper

4. Meter box arrangement – Pre-approved design drawing no.: SMB ____.

5. Form WWO 1149

6. Particulars of Licensed Plumber
Name of Licensed Plumber:

Licensed Plumber Identity No.:

Contact No. of Licensed Plumber:

Please tick in the appropriate box in item 3.

¹ Other plans containing similar information in Lot Index Plan are also acceptable.

² Please also provide the proposed alignment and size of the private connecting pipe between the proposed connection point and the new village type house if the proposed connection point is not located at the lot boundary of the new village type house and state whether the consent of the relevant private land owner(s) has been obtained if the connection pipe has to be laid across other private land lots

November 2020

Appendix 32: Sample of e-submission Email for New Village Type Houses

From: lp123456@lp.com
To: awsvillagehouse@wsd.gov.hk
Date: 01/11/2019 14:24
Subject: AWS Submission for New Village Type Houses at G/F - 2/F, Lot45 DD123 XXX Chuen, Yuen Long

To the Water Authority,

I would like to submit an application for water supply for new village type houses.

Please find attached the following supporting documents according to the attached Document List for the AWS for your processing.

1. Document List



1.Document List.pdf

2. Form WWO 542



2.WWO 542.pdf

3. Copy of Business Registration



3.BR Copy.pdf

4. Drawings



4.Drawings.pdf

Regards,

Chan Tai Man

November 2020

Appendix 33: Sample of e-submission Email for New Village Type Houses

From: lp123456@lp.com
To: awsvillagehouse@wsd.gov.hk
Date: 12/11/2019 10:30
Subject: Re-Submission of WWO 1149 – G/F - 2/F, Lot45 DD123 XXX Chuen, Yuen Long

To the Water Authority,

I would like to re-submit the Form WWO 1149 for the above village type houses.

Please find the document attached for your processing.
The ASN No. is 9876543210

Regards,
CHAN Tai Man

Attachments:



WWO 1149.pdf

Appendix 34: Sample of e-submission Email for Selected Business Trades and Other Simple Cases of Separate Metering

From: lp123456@lp.com
To: awssimpleapp@wsd.gov.hk
Date: 01/09/2020 14:24
Subject: Simple AWS Submission for G/F, XX Shopping Arcade, Mong Kok

To the Water Authority,

I would like to submit an application for water supply for new catering business.

Type of AWS: Food Business

Classification Code of Water Account: 641100

Please find attached the following supporting documents according to the attached Document List for the AWS for your processing.

1. Document List



1.Document List.pdf

2. Form WWO 542



2.WWO 542.pdf

3. Copy of Business Registration



3.BR Copy.pdf

4. Drawings



4.Drawings.pdf

Regards,

Chan Tai Man

Appendix 35: Meter Installation Table

Page _____ of _____

Meter Installation Table

ASN :
 WWO46 Serial No. :
 Communal Premise ID :
 Address :

Total no. of record :

Flat	Floor	Size	Type	Meter no.	Dials	Initial reading	Meter Fixing Date	Location Details Of Meter	Seal Serial no.	Seal Installation Date
							/ /			/ /
							/ /			/ /
							/ /			/ /
							/ /			/ /

Notes:

1. This table should be completed by LP or AP in typed form.
2. A written explanation should be attached if any initial reading recorded in this table is different from that shown in the "List of Water Meter Received for Installation".
3. This table should be submitted when reporting completion via WWO 46 Part IV.
4. Use separate sheet for meter installation at different position.
5. The order of meters to be recorded on this sheet shall be as follows:
 - a) vertical stack of water meters,
 - b) for each vertical stack, the bottom meter should be recorded first and the top last, and
 - c) the left stack should be recorded first and the right stack last.

