Veolia Water Central Limited
New Supplies

Operational standards and preferences for Self Lay Organisations

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Contents

1 Introduction

It is the Water Company's responsibility, under license and as required by law, to ensure that the water we supply is safe, secure and reliable. This information (to be read in conjunction with the Companies Addendum to the code of practice for England and Wales for the Self-Laying of Water Mains and Services in the Veolia Water Central [VWC] supply area) is provided to achieve compliance with Veolia Water Central policies and procedures.

2 Design parameters – Water mains and services

2.1 Design standards

Where the SLO chooses to design the on-site water mains network to support a new development, the SLO is responsible for the design of both the mains distribution and service pipe work. The design will principally address the following issues and is subject to VWC consent prior to installation on site.

a) Assessment of demand from the development including domestic and non-domestic use, consideration of fire fighting needs, the use of direct mains feed systems (no storage), allowance for future growth and likely insurance requirements on the connected properties.

b) Assessment of ground type and the likely affect of contamination on both pipe and fitting materials and the water supply conveyed by the network.

c) Technical liaison with VWC to determine the appropriate point of connection to the existing network.

d) Determination of pipe size and construction appropriate to deal with the assessed demand and to deliver water at the minimum required levels of service for each consumer whilst maintaining adequate flow velocities.

e) Determination of pipe configuration, layout, fittings, etc. so as to facilitate efficient operation and maintenance of the installation and to facilitate sampling and testing of the water after mains disinfection and prior to putting the main into service.

f) Provision of a method statement detailing how the new mains will be constructed, tested, cleaned and subsequently connected to the system and put into service. This will include means to keep water flowing in the mains to avoid stagnation.

g) The fire authorities' requirements for hydrants.

There are a number of standard works available around which designs may be based.

- A guide to Water Service Pipes – Water UK/WRc
- Principles of Water Supply Hygiene and Technical Guidance Notes 1998 Water UK
- Guidance on Safeguarding the Quality of Public Water Supplies – HMSO
- Water Supply (Water Fittings) Regulations 1999
- Guidelines on the Design of Water Distribution Systems for small and medium sized developments – WRc/Water UK
- The service pipe manual – Water UK/FWR

- Manual for PVC pressure pipe systems
- Manual for polyethylene Pipe Systems for Water Applications – WRc
- Pipe Materials selection Manual Water Supply – 2nd edition – WRc
- NJUG Publication No 7 – Recommended positioning of Utilities Apparatus for new works on developments and in existing streets
- NJUG Publication No 10 – Guidelines for the planning, Installation and Maintenance of Utility Services Proximity to trees
- BS 5837 – Guide to Trees in relation to construction
- Trees on development sites – Arboricultural Association
- Civil Engineering Specification for the Water Industry (6th Edition) – Water UK
- Guidelines for the sizing of Water Service Pipes and small mains FR D164 – FWR
- WRAS Information Guidance Note No 9-04-03 The Selection of Materials for Water Supply Pipes to be laid in Contaminated Land.
- UKWIR Pipe Material Selection and Specification for use in Contaminated Land and CLIPS database.

SLO's are required to take and demonstrate measures to protect and not prejudice the wholesomeness of any water in supply. Reference to five documents is recommended as follows:

- Safeguards in the operation and Management of Waterworks in England and Wales
- Principles of Water Supply Hygiene and Technical Guidance notes 1998
- Water Supply (Water Fittings) Regulations 1999
- Water Fittings and Materials Directory – WRc
- The Water Supply (Water Quality) Regulations 2000 Regulation 31

2.1.1 Water Pressure

The reference standard is to supply water to the Highway boundary (generally the point where the communication pipe joins the supply pipe) at a pressure of 1 bar (10 metres head) with a flow of 9 litres per minute at all times (except during periods of peak demand). Whilst the normal working pressure in the area may be greater than the reference standard, it is possible that in future the pressure may fluctuate or reduce to this level.

The pipework system must be designed to ensure that VWC's standard of service with regard to water supply pressure is maintained. At present the standard is 1 bar measured at the outlet to the stop tap at the street boundary.

- The SLO will need to take account of any intention to install direct water heating combi-boilers etc in this respect.
- The SLO will need to take account that most developers no longer install storage in individual properties

2.1.2 Sluice valves

Sluice valves shall be installed on all branch connections. Maximum spacing of isolation valves on distribution mains shall be 1,000 metres or to shut off a maximum of 30 properties. The number, size and position of valves at the point of connection to the existing main will be determined by VWC and carried out by it on a fixed charge.

2.1.3 Washouts

Washout hydrants should be installed on the ends of every branch and at any low point that may be required to drain the main during maintenance operations. Hydrants should be installed on purpose made tees or duckfoot bends and rising pieces installed to ensure that the outlet to the hydrant is not more than 300mm from the surface on completion.

2.1.4 Air Valves

Air valves will not normally be attached to the main. Where used they must be designed and sited so as to be above the highest anticipated level to which groundwater may rise in the chamber

2.1.5 Water Mains

The following criteria must be observed in the design and specification of water mains:

- VWC will determine the point of connection to the existing distribution network
- The main will be positioned relative to the edge of the road in accordance with NJUG7.
- The minimum size of distribution main is 80mm nominal bore (NB)
- Maximum design velocity – 1.5 m/s
- Minimum design velocity – 0.2 m/s
- Optimum design velocity of flow in mains – 1.0 m/s
- Maximum hydraulic gradient for distribution mains is 1:500
- Mains should be laid at a depth to the crown of the pipe of between 800mm and 900mm from finished ground level

2.1.6 Service pipe

The following criteria must be observed in the design and specification of service pipes:

- The SLO shall make under-pressure service connections only to ‘live’ mains laid by the SLO
- The minimum size of service pipe shall be 20mm NB (25mm OD), maximum size to be agreed. Other sizes include 32mm, 50mm and 63mm
- The maximum service pressure is 45m. This may be increased if particular topographical features make this necessary
- Service pipes should be laid at a depth to the crown of the pipe of between 750mm and 850mm below finished ground levels
- Service pipes are ducted under roads
- Consideration shall be given to the sizing of the connection, the communication pipe, the meter and the meter carrier
- Fire supplies must be fitted with a non-return valve

2.1.7 Manifolds

Multiple service manifolds may in certain circumstances be used to provide a multiple connection to a group of premises. This involves making a single connection to the water main, laying a new communication pipe to the inlet of the fitting called a manifold. The manifold can have up to six outlets and is situated in a concrete or plastic chamber.

The SLO will lay the supply pipes from the premise (i.e. block of flats), in a single trench to meet with the outlets of the manifold. It is essential that each supply pipe in the common trench is permanently identified at its end (close to where it meets the manifold) with the correct premise

number so that we know which manifold outlet is connected to which premise. This is vital because we install a meter on each manifold outlet, which is used, for billing the customer.

The size of the inlet pipe must be determined by calculation to ensure it meets the customer's demands.

2.1.8 Metering Policies

VWCL have comprehensive policies which relate to metering configurations, which are designed to support operational needs after the installation is commissioned. All of the policies are available on request. However, in general terms the following principles should be adopted for the design of meter installations.

Configuration	Company
Bulk Supplies/ Blocks of Flats	
Block of Flats - 12 dwellings or less	• Bulk supply will not be permitted • External meters to be installed to VWCL policy for single domestic supplies
Block of Flats > 12 dwellings	• Bulk supply will be required • Internal meters to be fitted in accordance with VWCL policy **AM306 Design of Bulk Supply Metering Installations**
Single Domestic Supplies	
Standard Single Connection	• Installation of a combined boundary box and meter in the highway at the property boundary
Multiple Connections for Single Properties	• Installation of two, four, six-way manifold configuration installed in the highway at the property boundary • Meters are to be installed on each individual service outlet
Wall boxes for single connections	• Approved wall boxes are permitted • Meter to be fitted within wall box
Non-domestic/ Large Supplies	
All connections	• Information available on request from VWCL dependant on required loading demand • Please consult VWCL before undertaking design of meter chamber

2.1.9 Meters

All meters have a minimum, continuous and maximum flow range. It is therefore important to size the meter correctly in order to capture the premise demand over a wide flow range.

At present four types of meters are used by VWC:

- Manifold (positive displacement) installed in boundary boxes, 1.0 QN and 2.5 QN
- In-Line (Positive displacement) size 25mm to 40mm
- Flanged (Helical Turbine) size 50mm to 150mm
- Flanged electromagnetic size 80mm and above

2.2 Application Form

The Developer/SLO must complete our application form. Comprehensive information enables us to understand your needs better and to provide you with a cost-effective proposal. The details provided on the application form, together with the requested enclosures will provide all the necessary information we need to design, or assess your design of a water mains scheme. Copies of the application form can be downloaded from the New Supplies section of Veolia Water Central web site.

2.3 Specification

The SLO will be required to identify in detail their proposed specification for the permanent works, which it is proposed that VWC will adopt for future operation and maintenance. This will cover such items as demand and hydraulic calculations, pipe materials, layout of mains, depth of mains, location of fittings, etc., ancillary equipment and so on.

The specification must extend to cover associated works such as thrust restraint, pipe supports, beds and surrounds, backfill, surface restoration, access arrangements, etc. The specification will take into account the impact of the works on the environment and conversely assessment must be made of the environment's effects on pipe installation. This requirement may be illustrated by particular reference to trees, the effect of the works on existing trees must be considered and the appropriate mitigation measures taken.

Conversely, proposed tree and other planting by the developer must be selected so that apparatus is not prejudiced or put at any risk by future. Where impact on existing trees, etc, is anticipated the SLO will be responsible for all liaison with the appropriate authority and for securing all necessary consents. The SLO's proposed specification is subject to the consent of VWC.

2.4 Fire Authority

Where the SLO undertakes design, the SLO must consult with the appropriate Fire Authority to determine their needs for fire fighting and insurance purposes to serve the development and will advise VWC of their requirements. The costs of any hydrants will be met by the Fire Authority.

SLOs must demonstrate to VWC that this process has been completed to the satisfaction of the Fire Authority. Under certain circumstances Planning Authorities may stipulate that the developer must pay for all fire hydrants.

2.5 Pipe materials and fittings

The SLO must provide all the materials necessary to support the works they have chosen to undertake, subject to our specification and consent to use. The exceptions to this are meters, which we will provide, subject to four weeks advance notice. VWC will provide all the materials for works that are non-contestable.

Pipe work and fittings must be selected in order to satisfy three principle requirements:

- That they can sustain the operating pressure to which they will be subjected with sufficient capacity for any potential surge events.
- That they are able to maintain their integrity and perform their functions over an appropriate "design life" which must be not less than 70 years.
- That they do not adversely affect the quality of the water over the design life in compliance with the requirements of BS 6920 and the drinking water inspectorate regulations.

2.5.1 Sluice valves

Isolation valves shall be of the gate type with resilient seat; clockwise closing and double flanged, with dollies for key operation.

Valves shall be blue in colour to BS 5163 type B coating WIS 4-52.01.B+

2.5.2 Washouts/hydrants

Hydrant pattern – BS 750 type 2 PN16 flanged inlet, screw down type body, clockwise closing.

Fire hydrant marker posts and plates may be required by the Fire Authority and must be installed to Fire Authority specification

2.5.3 Air Valves

Air valves shall have separate isolating valves below

2.5.4 Flanges

Pipe work flanges are to be to NP16. Flanged joint sets – bolting hot dipped galvanised and Rilsan coated

2.5.5 Nuts, Bolts, Washers and Screws

Stainless steel, or mild steel coated with epoxy resin, Rilsan nylon or zinc plating

2.5.6 Water Main

Preferred material is HPPE – blue (engineering conditions may dictate the need for an alternative material)

Ductile Iron (DI) internal cement mortar, external colour blue PE wrapped or coated to BS EN 545

Pressure rating – HPPE 10 bar, MOPVC 12.5 bar, DI – 16 bar

Flanged adapters/couplings – Viking Johnson type, epoxy coated or Rilsan coated.

Marker tape, blue in colour and water noted and should be capable of being traced with electronic pipe/cable detecting and tracing equipment.

2.5.7 Service pipe

Service pipe material should be Medium Density Polyethylene Pipe to BS 6572, blue in colour. As an alternative, approved barrier pipe systems should be used in contaminated ground (generally blue in colour with a black line). Pressure rating 12 bar (120 m head)

2.5.8 Chambers

Chambers must be designed to prevent the accumulation of groundwater:

- Sluice valve cover – Ductile Iron, class A 380mm * 230mm (badged W)
- Fire hydrant cover – Ductile Iron class A 380mm *230mm (badged FH) As single piece cover compliant with Fire Authority specification
- Air valve cover – Ductile Iron class A 380mm * 230mm (badged AV)
- Washout cover – Ductile Iron class A 380mm *230mm (badged WO)
- Chamber sections shall be of pre-cast concrete or plastic

2.5.9 Entry onto site

Where a main or pipe work is laid in private land other than land owned by the developer, the SLO must not take entry until expiry of section 159 notice served by VWC (3 months to expire).

The full cost of land agents fees, compensation etc will contribute to the total cost of the works.

Upon completion of work in any part of the site the SLO shall restore the surface to the satisfaction of the landowner

3 Construction

The works shall be completed in accordance with the drawings approved by VWC and specification and manufacturer's instructions

3.1 Consent procedure

The SLO shall submit a detailed schedule of pipes and fittings to be supplied and installed, including sufficient information to enable VWC to consent to their use, including:

- Name/type
- Manufacturer
- Specification/rating
- Relevant compliant standard
- Country of manufacture

This should be forwarded in writing to VWC. We will review your list and provide consent within 10 working days.

3.2 Before work commences

The SLO is required to have met the provisions of the Self-Lay Agreement before construction work commences (refer to VWC Policy and Company Specific Addendum).

3.3 Trenches

The following standards are required for all trenches:

- The minimum trench width shall be the external pipe diameter plus 150mm either side.
- All trenches and connection holes should be kept clear of water.
- No new or existing pipes should be used for carrying water away from the excavations
- The SLO shall excavate the pipe trenches in accordance with lines and levels agreed with VWC
- The trench bottom shall be hand trimmed so that pipes, when laid shall have a bearing upon the solid and undisturbed ground throughout their length except at necessary joint holes.

3.4 Marker tape

Marker tape shall be laid in the trench backfill in continuous / jointed lengths at 450mm beneath the finished surface, above mains 80mm dia and above..

3.5 Pipe work

All pipes and fittings shall be supplied, stored, handled, installed and commissioned in accordance with manufacturer's recommendations.

MDPE pipes and fittings shall be butt welded wherever possible, electrofusion will only be permitted to install fittings that cannot reasonably be joined by butt fusion

Except when mainlaying and jointing is in progress, all open ends of pipes must be sealed with a purpose made water tight stopper. The ends of pipelines shall be securely capped off at the end of each working day and individual pipes shall be anchored to prevent flotation

The SLO to install thrust blocks as required

3.6 Bed and surround

Pipes and fittings should be bedded on and surrounded with a minimum of 150mm granulated material either sand or graded 3mm to 6mm single size. The material should be compacted by hand in particular at the sides of the pipe

It is not acceptable to lay the pipes on the trench bottom

The SLO shall fill the trench around the mains and to a depth of 150mm over the mains.

3.7 Operation of valves

Valves and hydrants on live water mains MUST only be operated by VWC

3.8 Reinstatement

All highway reinstatements are to be undertaken in accordance with HAUC ‘Specification for the Reinstatement of Openings and Highways’.

3.9 Pre-commencement and Progress meetings

VWC will provide a Delivery Project Manager for means of day to day communication

The SLO shall not commence construction until VWC has given consent

The SLO shall attend regular meetings with VWC for the purpose of monitoring progress and performance

4 Commissioning

The SLO shall ensure that their workforce is conversant with and at all times applies the recommendations laid out in ‘principles of Water Supply Hygiene and Technical Guidance Notes’ whenever working with, on or adjacent to VWC’s apparatus

4.1 Testing

The SLO will be required to undertake all pipeline swabbing, hydraulic testing, chlorination, dechlorination, flushing and preparation for sampling.

Before a new main is brought into service it must be pressure tested, swabbed, flushed, disinfected and satisfactory samples obtained. SLOs’ work instructions and method statements covering pressure testing, swabbing, flushing and disinfection are to be submitted for checking prior to any works being carried out. The SLO will be required to comply with the company standard **NW033 VWCL Network Disinfection – Procedure**.

The test procedure must be recorded by an approved system of pressure logging and should be provided to VWC in advance of the technician visiting site to take the sample

4.2 Pressure test

All temporary work, pipe work, fittings, plant, labour and materials shall be provided by the SLO

Prior to pressure testing, each length of main shall be swabbed with foam swabs

MDPE Mains shall be tested in accordance with manufacturers instructions, the whole test shall be recorded by a pressure logging system

Ductile Iron or rigid plastic mains will be subject to a one-hour static test at a pressure of 1.5 times the working pressure or 10 bar, whichever is the greater. The whole test shall be recorded by a pressure logging system

VWC will interpret the results and confirm to the SLO in writing the acceptance or otherwise, of the test

4.3 Disinfection

The mains shall be disinfected in accordance with NW033. The SLO must provide a disinfection method statement in writing for VWC consent

Pre-disinfection: Following a satisfactory pressure test the main should be swabbed and flushed (3 times the volume of the main) using potable water.

Disinfection: Disinfect with free chlorine levels of greater than 50mg/l with a contact time of greater than 30 minutes. The chlorine used must comply with DWI Regulation 31.

Post-disinfection: The chlorinated water in the main should be discharged (dechlorinated) and the main flushed with potable water until chlorine residual at the inlet and outlet are the same. The water in the main should then be allowed to stand for a minimum of a further 24 hours before water samples are taken from it.

4.4 Sampling and Testing

A VWCL representative will undertake water quality sampling in accordance with the company standard **NW080 VWCL Water Quality Sampling Following Network Activities – Procedure**. They will then arrange for the samples to be tested by a VWCL laboratory. The analysis will include free/total chlorine, taste, odour on site and microbiological, turbidity, pH and conductivity. VWCL will make a charge for this service.

The SLO is to provide the VWCL representative with records for mains chlorination and pressure tests, and confirm whether the records are satisfactory. If the records or results do not meet the required standards, the VWCL representative will recommend the actions required to remedy the situation. The SLO will be required to meet any additional costs for the extra work to be undertaken.

4.5 Mains connections

Final connection to the network must not be made until a satisfactory pressure test and water sample results have been obtained (and as-laid records provided).

VWCL will notify the SLO of the outcome of the testing results – **No connections are to be made to the existing network until VWCL have advised that satisfactory results have been received**.

Once satisfactory results are confirmed the connection to the network must take place at the earliest opportunity and no later that 14 days from the sample pass date. If the developer has been expressly granted permission to undertake the piece through of the main as part of the Self-Lay Agreement then they must notify VWCL a minimum of 3 working days in advance.

If the SLO fails to make connection within this time or fails to notify VWCL of their intent to connect in sufficient time to meet the 14 day connection timescale then the main must be re-chlorinated using the procedure described in Section 4.3, above. The cost for this will be met by the SLO.

4.6 Service connections

Service connections shall be made by electrofusion saddle or mechanical (gunmetal) ferrule strap to the top of the main.

All meters are to be provided by VWCL upon request, and will be issued from the company stores. The SLO is permitted to fit meters supplied to them be VWCL or request that a VWCL representative fit them (a charge will be made for this service).

4.7 Disposal of Water from cleansing, Testing or Disinfection

When discharging flushed water the SLO shall meet the exact requirements of the Environment Agency or Sewerage Agency as appropriate.

The SLO shall avoid discharging chlorinated, or high pH water into surface water drains or watercourses or onto arable land or pastureland. Care should be taken when using existing drainage to ensure that the requirements of the receiving watercourse are considered.

If discharge is via a foul water sewer, precautions shall be taken to avoid any risk of back-siphonage.

5 Data Capture requirements for newly laid mains, services and associated apparatus.

As-laid drawings should be provided at a large scale, our own teams use the developers design plan as a base, typically these are at 1:500 scale. Completed mains as-laid drawings should be forwarded to our Network Project Manager within 5 working days of commissioning each phase or section. A completed mains record form, (shown below) should accompany the drawing.

Positional accuracy – All apparatus should be measured and recorded to a minimum accuracy of +/- 100mm to the centre of the apparatus. Measurements from two fixed points are preferred.

Density of measurement – The position of the mains and services should be recorded where there is a change in size, material, depth or direction and at a minimum of 25 metre intervals. Every junction should also be measured and recorded together with every fitting e.g. valve, hydrant, air valve, etc. Depth measurements should be recorded at 50 metre intervals or where a significant change in depth of the main occurs. The plan should clearly indicate where different main laying methods were used, and where any ducts for the services have been laid.

Measurement fixed points – Measurements should be taken from geographical features that will ultimately appear on Ordnance Survey digital maps at 1:1250 and 1:2500 scale. These will include in order of preference, Building corners, Boundary wall corners, kerbs, fence line corners, etc. Please display a north point on the plan.

Nature of recording – The drawings should indicate the plan location of pipelines and ancillary apparatus in relation to background geography. Pipe diameters and fitting sizes should be clearly marked on the drawing.

Discrepancies to existing records – All discrepancies with the current GIS information that we may have provided to you must be noted on the plan (eg size of main incorrect, position of main in road incorrect, etc.)

6 DWI Regulation 31 Contract Clauses

6.1 Purpose of Contract Clauses

To ensure that all materials procured for use by the Company that come into contact with drinking water are suitable for purpose and will not pose a risk to the water supplied.

The Drinking Water Inspectorate (DWI) produce and maintain a document which includes a list of products and processes Approved under regulation 31 for use in connection with the supply of water for drinking, washing, cooking and food production purposes. The list is published once a year, and is circulated by Scientific Services to departments within the Company. It can also be obtained from the DWI web site www.dwi.gov.uk/cpp/pagea.htm.

It is an offence to use non approved products, therefore it is imperative that the document is consulted prior to purchasing products that may come into contact with water that is to be supplied to our customers.

7 Ground Conditions Assessment

The SLO must provide evidence to the undertaker that an investigation has been completed and measures established to ensure ground conditions would not affect the quality of the water in any pipe.

Prior to the design stage SLO's must provide a comprehensive Ground Condition Assessment (site investigation report) to enable VWC to establish the types of materials to be used, details will be provided in the developers pack.

If the site is deemed contaminated a remediation strategy and proof of remediation is required.

The information supplied will be assessed and the type of materials to be used, and any additional protection requirements, will be established.

If SLO's fail to provide the relevant information, the company will consider the use of protective measures to safeguard the water supply when:

- a chemical is present at a concentration above the threshold trigger levels
- or conditions in the local environment cause a justifiable concern.

More inspection may be needed on larger sites. This includes sites that are phased or on brownfield or contaminated land sites where special materials or different working practices apply. VWC reserves the right to reflect any additional costs incurred.