

Design and Construction Specification For Southern Water Services Limited

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Version 1.1



from
**Southern
Water** 

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1 Scope

This document has been prepared to assist practitioners with the planning, design, construction and commissioning of a Self-Laid Main and Service Pipes to supply domestic and industrial/commercial properties.

It has been prepared to meet the requirements of the Code and is a template document. The contents of this template are mandatory but there remain a number of areas where there will be variations between individual Water Companies.

This template indicates where there is scope for variation and each Water Company will complete those parts of the document and publish a Water Company specific version on its website. That version will govern the requirements in that Water Company's area.

This document should be read in conjunction with the Water Sector Guidance which can be found on Water UK's website at <https://www.water.org.uk/technical-guidance/developers-services/water-asset-adoption/>

Over time, it is envisaged that work will be undertaken to reduce the scope of variation between each Water Company's versions of this document. This will be done through change requests presented to the Water Adoption Code panel (details of which can be found on the Water UK website).

2 Responsibilities

An SLP and/or Developer wishing to design and/or construct a Self-Laid Main shall comply with the DCS.

It is the responsibility of the Water Company to ensure that the relevant sections of the DCS conform to its design standards, completing the sections highlighted in yellow with their own parameters and inserting text where instructed by the square brackets. Completing these sections will create the Water Company's Design and Construction Specification document which shall be published on the company's website and which form a contractually binding part of the Water Adoption Agreement.

Within this document the words "include" and "including" are to be construed without limitation.

3 Terminology

In this document the following terms have the stated meanings:

Shall:	Indicates a mandatory requirement
Should:	Indicates a strong preference or best practice
May:	Indicates an option which is not mandatory

References to the SLP shall include a reference to its permitted contractor where relevant.

4 Charging

Water Company charges for work relating to the adoption of water assets are based on the Water Company's published charging arrangements.

Funding of any work over and above that which is required to supply a Site (including Network Reinforcement) shall be in accordance with Ofwat's Charging Rules and therefore any work of this type shall be identified during the design stage and funded appropriately by the Water Company.

5 Abbreviations

AC	Asbestos Cement
AOD	Above Ordnance Datum
ACS	Annual Contestability Summary
CDM	Construction, Design and Management Regulations
CESWI	Civil engineering Specification for the Water Industry
CI	Cast Iron
COSHH	Control of Substances Hazardous to Health
DEFRA	Department for Environment, Food and Rural Affairs
DCS	Design and Construction Specification
DI	Ductile Iron
DMA	District Metered Area
DWI	Drinking Water Inspectorate
EA	Environment Agency
EUSR	Energy and Utility Skills Register
FRS	Fire and Rescue Service
HAUC	Highway Authorities and Utilities Committee
HPPE	(PE100) High Performance Polyethylene
HSE	Health and Safety Executive
HSWA	Health and Safety at Work Act
ICE	Institution of Civil Engineers
IGN	Information & Guidance Notes
IWater	Institute of Water
LR	Lloyd's Register EMEA
MDPE	(PE80) medium Density Polyethylene
NCO(W)	Water Network Construction Operations
NRSA	New Roads and Street Works Act
NVQ	National Vocational Qualification
OFWAT	the Water Services Regulatory Authority
PE/AL/PE	Polyethylene Aluminium Composite Barrier Pipe
PE	Polyethylene
PE80	Medium Density Polyethylene
PE100	High Density Polyethylene
PPE	Personal Protective Equipment
PPM	Parts Per Million
PVC	Poly Vinyl Chloride
SDR	Standard Dimension Ration - Outside diameter / Wall Thickness
COMPETENCY	Safety and Technical Competency
TA	Technical Advisor
SDR	Standard Dimension Ratio
WIA	Water Industry Act
WIRS	Water Industry Regulation Scheme
WIS	Water Industry Specifications
WRAS	Water Regulation Advisory Service

6 Nomenclature

v	-	Volume, Litres
A	-	Area, metres squared
V	-	Velocity, metres per second
Q	-	Flow, litres per second
t	-	Time, in seconds
P	-	Pressure, in Bar
H	-	Static Head, in metres
h_L	-	Head loss due to Friction, metres
L	-	Length in metres
G	-	Gravitational acceleration, ms ⁻²
D	-	Diameter, metres
i	-	Hydraulic Gradient, metres per metre
θ	-	Kinematic viscosity of fluid, m ² /s
K_s	-	Effective roughness value, millimetres
Q_t	-	Design Flow, l/s
LU	-	Loading Units
E	-	Equivalent length, metres
Ω	-	Soil Resistivity, Ohm -cm

7 Reference Documents

See Appendix 1 for a comprehensive list of reference documents.

The documents in this list are relevant to design and construction standards but may not necessarily be referenced in this DCS.

If there is a conflict between any of those standards and the DCS, the DCS shall take precedence unless otherwise agreed by the parties.

A list of accredited SLPs can be found here:

<https://www.lr.org/en/utilities/water-industry-registration-scheme-wirs-wirsae/search/>

8 Construction (Design & Management) Regulations 2015 (CDM)

8.1 General

The relevant sections of the CDM Regulations (2015) apply to all design works carried out by or on behalf of the Water Company – both the Water Company's representative (Approving Design Engineer) and the SLP's representative (SLP Designer) are Designers under CDM Regulations when the design of Self-Lay Works is being generated and accepted for adoption. When carrying out work specific to a Site, neither the SLP Designer nor the Approving Design Engineer would be expected to be the Principal Designer. The Client (Developer) has a responsibility to formally appoint a competent Principal Designer and Principal Contractor for the Site. The Principal Designer shall provide oversight of all design activity in accordance with the Regulations.

To comply with CDM Regulations (2015) it is expected that, prior to release for construction, the SLP Designer shall:

- Ensure that the design avoids or addresses at source foreseeable risks to health and safety.
- Give priority in the design to measures which will protect all people associated / or affected by the project.
- Ensure that the design includes adequate information about any aspect of the project, structure, and all materials which may affect the health and safety of persons during construction.
- Record residual risks including chemical or oil pipeline crossing, working at height which cannot be designed out, in the project file, and a copy passed to the Principal Designer and Water Company.
- Co-operate with all parties concerned with planning and design for the project.
- Complies with this Design and Construction Specification the SLP responsible for the proposed construction shall be made aware of the risks identified by the Designer and the control measures required to reduce the risks to an acceptable level. The CDM regulations apply relative to any required notification to the HSE..
- SLP is to make the Water Company aware of any non-standard method of operation applicable to the Self-Lay Works

In this case the HSE will be notified by the Client who will complete an F10 form. Typically, this may only apply to off-site works which meet the criteria.

A design which is prepared or modified outside Great Britain, for use in work to which CDM 2015 applies, must comply with “Regulation 9 – Duties of Designers” and the person who commissions the work is responsible for ensuring Regulation 9 is complied with.

8.1.1 Pre-Construction Phase Plan

A Pre-construction Phase Plan shall be created at the design stage. This plan shall include the following: –

- Description of works.
- Proposed time scales of works within the project.
- Details of risk and required control measures.
- Information required by Principal Contractor to demonstrate competence of resources.
- Information for preparing the health and safety plan for the construction phase

The pre-construction phase plan shall be passed to the Principal Contractor for inclusion and development of their Construction Phase Plan before work commences on Site.

8.2 Collaborative Design

On occasion Water Companies may produce indicative design drawings relative to the proposed Site layout for costing, routing or tendering purposes.

Where this is the case the design drawing should be clearly marked as “Not for Construction” and/or an accompanying document produced which states precisely what has been considered when producing that layout drawing. The Water Company shall detail any services supplied and the rates chargeable in its published Charging Arrangements.

8.3 Non-Contestable Work – Installation of District Meter or Pressure Reduction Equipment

Sites may require a Source of Water Connection from a high-pressure Water Main and, in such a case, the Water Company may require a pressure reducing valve or district meter installation as part of the Non-contestable Work and Services (typically with branch connection). In this instance, the Water Company shall assume Designer responsibility under CDM Regulations for this element of the work solely where it is off Site (outside of the site boundary) and out of scope of the contestable activity to be undertaken by the SLP. If this installation is required to be installed within the Site boundary due to the proximity of the Source of Water Connection, then design responsibility will be determined between the parties by written agreement.

9 Design Process

9.1 Minimum Information Required from Developers

Appendix E (Minimum Information) of the WSG contains a complete statement of information requirements at all stages of the adoption process. At the design stage, the SLP may be Accredited to carry out the design activity or may request the Water Company carry out this activity if the Water Company offers this service as a Local Practice under section 4.6 of the WSG. An application form available from the Water Company website shall be completed which is used to identify the minimum inflow of information to begin the design process relevant to the route of delivery of the Design.

9.2 Point of Connection (PoC) Requests

At the determined PoC the connection is typically made by an under-pressure connection (UPC) to ensure disruption to existing customers is minimised. However operational considerations may dictate that the Water Company determines that an UPC is not suitable and that the connection will comprise a tee piece be installed which involves isolating the Network and cutting a section of the existing Network out to insert same, and additional valves may also be installed in conjunction, on the existing Network. Such a connection will be considered as Non-contestable work.

Where additional valves on the existing Network, typically installed at the same time as a connection involving cutting in to the existing Network are not specifically required in the design for the new Self-Laid Main (i.e. to supply a development Site) but which the Water Company requires to be installed for operational reasons; then these valves shall be considered as Network Reinforcement work.

A non-UPC connection to an Existing Main which requires additional valves to be installed on the line of the Network, to either side of said connection, will be considered Network Reinforcement for the purposes of the Annual Contestability Summary (ACS).

The Water Company may identify a supply need in respect of future development that means that it requires Network Reinforcement to be incorporated within the SLP's design (i.e. via the planning system, local authority development plans or developer engagement). In these circumstances, the Water Company shall initiate discussions with the SLP when a Point of Connection (PoC) is issued, or at the earliest opportunity if a Point of Connection (PoC) has already been issued.

Similarly, where the Water Company identifies a need for the improvement or upgrade of the Network as part of the Self-Lay Works, the Water Company shall initiate suitable discussions with the SLP when a Point of

Connection (PoC) is issued, or at the earliest opportunity if a Point of Connection (PoC) has already been issued. These requirements may be incorporated by agreement into the final SLP Accepted Design.

If an alternative PoC is required and is evident particularly during the early stages of design by the Water Company to a PoC (that may have been provided also by an SLP/Developer) for technical and/or supply reasons the Water Company shall provide the SLP designer with an explanation and identify related options and requirements.

If Network Reinforcement work is deemed necessary by the Water Company relative to supplying the Site this shall be identified by the Water Company to the SLP and/or Developer during the initial design stage; and considered by the SLP designer in designing the layout of the Self-Lay Works. See also paragraph 10.3.

The requirement for detailed design drawings and related information relative to design and/or construction activities shall be agreed between the parties to the WAA and included in Schedule1 of the WAA.

9.3 Annual Contestability Summary

9.3.1 This section contains information about how the Water Company assesses contestability of particular work categories.

9.3.2 Set out below at Table 9.3 is the summary that all Water Companies will publish at the date of implementation of this DCS and at least annually thereafter. This will be known as an “Annual Contestability Summary (“ACS”) and it will be a Water Company specific variant of the standard template appearing at table 3.2 of the Sector Guidance.

9.3.3 No Water Company’s ACS will allow fewer activities to be Contestable Work and Services than are set out on that template, as amended from time to time.

9.3.4 Each Water Company’s ACS will be accompanied by indicative information about the steps that an SLP would be required to take to carry out the higher risk tasks shaded amber on table 9.3.

9.3.5 It is expected that over time, the template ACS will be modified in the light of experience and of changing accreditation requirements, to increase the scope of Contestable activities available for SLPs to undertake.

9.3.6 The activities appearing in green on table 9.3 shall always be Contestable (i.e. marked green).

9.3.7 The works and services designated Contestable by a Water Company under its ACS shall not, in any event, be fewer than those permitted to be carried out by SLPs in that Water Company’s area before the date on which the Guidance comes into effect.

9.3.8 In advance of publication, the ACS will be discussed with relevant Customers in a Water Company’s area. Each Water Company shall publish its ACS on its website no later than four (4) weeks before it takes effect, to allow sufficient time for SLPs to amend their processes, if required.

9.3.9 A Water Company will explain within its ACS where it has used its discretion to include an activity within the red category and ensure this is published on its website.

9.3.10 Where providing an adequate Site supply requires Network Reinforcement, elements of this work should be considered as Contestable subject to the scope of works required and impact on existing end-user customers. This concerns additional works to extend from the nearest Point of Connection of suitable size to a more distant Point of Connection specified by the Water Company. Charges shall by agreement between the SLP and the Water Company and with reference to Water Company Charging Arrangements

Table 9.3

	Work categories by number of properties potentially affected by work or strategic nature of Existing Main			
	>49	50-199	200-499	500+ / Strategic main
Selection of a proposed POC to serve a Site/Development from records of Existing Mains				
Construction of new mains and service connections				
Construction of new mains as part of reinforcement of Network extension or associated Site diversion work				
Design of new water network				
Chlorination and pressure testing of Self-lay Works				
Meter installation in conjunction with new service connections				
Undertaking Water Quality samples				
Analysing Water Quality samples (subject to paragraph 17.3)				
Construction of routine mains connections (CRMC) connections				
Main and/or service connection: up to 63mm PE/Barrier pipe to: Parent Network: <12" nominal bore* DI/CI/SI/PE/AC/ Barrier pipe/ steel Permanent Connections (Piece through).				
Connection: 63mm to 300mm PE / Barrier Pipe to: Parent Network: <12" nominal bore * CI/SI/DI/AC/PE/Barrier pipe/steel Operational pressure: up to 50m				
Connections: 63mm to 300mm PE / Barrier pipe to: Parent Network: 12" nominal bore * to 18" nominal bore * / 300mm to 450mm nominal bore * DI/ CI/ SI/ AC/ PE/ Barrier pipe/Steel Operational pressure: 50m to 75m				

Connections: over 300mm to: Parent Network: 18" nominal bore * & above, or high risk parent Network: material (such as steel) Operational pressure: above 75m				
Valve operation in relation to commissioning new Self-Lay Works				
Self-certification of SLP for Site water distribution systems designs				
Any size connection to GRP / PVC Network				
Design of Network Reinforcement (upsizing of existing assets) and/or design of Network diversion(s).				
Pipe sizing criteria, and the approval of design by others				
Assessment of network risk, & operating live network				
Commission telemetry links (meters / field equipment)				
Connection, commissioning and/or decommissioning of diverted Network				

* Notes:

- 1 All references to PE are to all Polyethylene pipe materials
- 2 PE pipe sizes are identified by outside (OD) diameter and other pipe materials and sizes refer to internal (nominal bore) diameters.
- 3 Strategic main defined by reference to potential impact of work on key customer such as a hospital

9.4 Activities shaded green in the ACS

- 9.4.1 All activities shaded green in the above table are capable of being performed by SLPs.
- 9.4.2 These green-shaded activities will apply where the SLP has the relevant WIRS or other accreditation (see section 7 of the Sector Guidance). Where further activities are accredited by WIRS, such activities shall be marked as green in the above table by agreement with the Codes Panel.
- 9.4.3 The Water Company will set out the procedures it has in place relating to connections to the Existing Main and the forms supporting this. These will be published on the Water Company's website.
- 9.4.4 Changes will be brought about by the procedures set out in the Water Sector Guidance Section 11 – Governance.
- 9.4.5 References to the Final Connection of the Self-Laid Main to the Existing Main on the Network are; of an under-pressure type connection and/or, a connection to a previously installed temporary valve-controlled washout installed in conjunction with the connection to the Existing Mains Network at the POC to supply the Site or Development, and/or a connection to a previously installed valve-controlled washout, which has been installed on a Self-Laid Main for a future connection off such main.

Where references to the Final Connection of the Self-Laid Main to the Existing Main on the Network require a section to be isolated by a shut (to enable it to be cut-out to install a connection point), and/or if a new branch tee is required to be cut into a Self-Laid Main subsequently adopted by the Water Company (which therefore forms part of the Network), then such connections are excluded from activities shaded green.

9.5 Activities shaded amber in the ACS

- 9.5.1 The activities shaded amber shall be capable of being performed by an SLP in the area of an individual Water Company where the SLP complies with the requirements of the Water Company as set out below. Such publication shall include information about control measures required to allow the work to be performed. The following paragraphs set out how publication of such information is to be approached.
- 9.5.2 The Water Company may require additional evidence of competence to carry out activity and/or require the SLP to follow an operational process equivalent to one that the Water Company's direct labour or term contractor would be required to follow.
- 9.5.3 The company's requirements will relate to the specific site and will take account of the type of connection involved; the location of the connection; the strategic importance of the main Network to be connected to; the potential impact on end user customers; risk to water quality and regulatory impact/consideration; and the resources the SLP proposes to use.
- 9.5.4 The company will set out the information it needs from the SLP regarding its Accreditation and how its general and specific operations, resources, and procedures will protect the company from any risk of interruption of supply to its end-user customers and/or to water quality. These requirements will be equivalent to those that the Water Company's direct labour or term contractor would be required to follow.
- 9.5.5 The SLP will need to demonstrate its competence to undertake this activity. Such may be by Self-lay works being supervised by the Water Company or by the SLP providing details of similar work that it has carried out to a satisfactory standard for other Water Companies.
- 9.5.6 Valve operation in relation to commissioning of Self-Lay Works: Water Company requirements relative to this contestable activity shall apply as set out in in paragraph 11.7
- 9.5.7 The Water Company will set out below the procedures it has in place to allow connections to the existing Main and the forms supporting this. These will be published on the Water Company's website.
- 9.5.8 Prior to any connection to any water main, the SLP shall submit a relevant risk management plan and method statement, and all operatives to be employed on the work shall have attended a Southern Water Safe Control of Operations (SCO) awareness course (and any other Southern Water provided course relative to the work proposed) and the SLP shall comply with the SCO procedures and our authorisation process.

9.6 Activities shaded red in the ACS

- 9.6.1 The Water Companies have concluded that connections shaded red in table 9.3 are of such a high risk that they are unlikely to be contestable in most conceivable circumstances
- 9.6.2 However, if an SLP wishes to carry out this work, it shall contact the Water Company directly to determine whether conditions can be agreed that enable the SLP to carry out the requested activity

9.7 Design Submissions to Water Company

Design submissions shall be submitted to the Water Company along with all supporting information as set out in Appendix E – Minimum Information of the WSG.

Any activity classed as Non-Contestable shall be confirmed in writing by the Water Company following discussion between the Water Company and SLP upon the issue of a Design Acceptance.

Southern Water operates in a water stressed region and is keen to work with developers and incentivises them to build new homes that are water efficient. Our aim is to reduce the average amount of water used by our customers to 100 litres per person per day by 2039. Currently our existing customers use about 130 litres per person per day on average. When new homes are built with water efficient fixtures and fittings that will achieve average water use of 100 litres per person per day, the water Infrastructure Charge will be waived. We will measure this against the current optional Building Regulations standards, to take a consistent approach. At application stage, evidence of the property construction to the optional Building Regulations standard shall be provided to secure the discount.

9.8 Design Proposal

When preparing a water network design proposal the SLP Designer shall:

- 1 Select appropriate materials for the Self-Laid Main and Service Pipes.
- 2 Determine the legal land ownership boundary of the Site.
- 3 Produce a drawing to an appropriate scale to show the layout and route of the Self-Laid Mains and Service Pipes and proposed meter arrangements (relative to Service Pipe entry points) in accordance with this Design and Construction Specification.
- 4 Provide all related material requirements and details as required by this Design and Construction specification.
- 5 Calculate demands and size all Service Pipes in line with this Design and Construction Specification (see also paragraph 10.2).
- 6 Size the Self-Laid Mains across the Site as required specific to the Site and with regard to any Development relative to the Site, by discussion with the Water Company who may offer clarification to suit.
- 7 Identify the agreed Point of Connection and determine by agreement with the Water Company all work that is Contestable and Non-contestable.
- 8 Design the appropriate number of Self-Laid Main fittings required to control the Network and the Self-Lay Works.
- 9 Identify any sections of Self-Laid Mains that require easements or wayleaves.
- 10 Identify any Special Engineering Difficulties as appropriate.

9.9 Drawing Standards

The Water Company may supply the SLP with templates to assist in the standardisation of design drawings. If this is not available, then the SLP should provide their own design template.

Design and as-laid (as constructed) drawings shall be submitted to the Water Company electronically in both CAD and PDF format, by agreement with the Water Company, for incorporation into the Water Company's corporate geographical information system (GIS).

Design drawings shall show all asset locations, size and specification in a clear and unambiguous format. Should enlargements, blow ups or schematics be required in order to ensure a clear and unambiguous layout then these shall be incorporated within the design submission.

Design drawings shall include and clearly show, as a minimum:

1. Proposed off-site Self-Laid Mains to Point of Connection to the Network
2. AOD at POC and highest point of the site including Site topography can be provided separately
3. Proposed Self-Laid Mains, including position of sluice valves, washouts, hydrants, air valves and any other fittings required
4. Any requirements for the protection and/or diversion of the existing Network.
5. Material and size of each Self-Laid Main
6. Depth of each Self-Laid Main when installation depth is not in accordance with Streetworks UK guidance (subject to agreement by Water Company).
7. The Self-Lay Works and Water Company Works (Contestable / Non-contestable activities)
8. Position of existing buildings or features relative to the design proposal for reference (minimum of 3 points on the drawing to enable triangulation)
9. Individually numbered plots
10. Location of Service Pipes, showing size if above 25mm
11. Service Pipe entry points
12. Location of boundary boxes, manifold boxes and any meter chambers as applicable
13. Type of service connection for each plot, i.e., wall box, boundary box, manifold, internal
14. Hydrants adoptable by the Fire and Rescue Service
15. Location of any ducts
16. Any Special Engineering Difficulties
17. Areas of contamination where protective pipework is required
18. Future demand, or Development, or phase adjacent to Site as identified by the Water Company or Developer and its Point of Connection relative to the proposed Self-Laid Main
19. North point
20. Site boundary
21. Roads / highways / service strips (adopted or proposed for adoption)
22. Change in ground level
23. Service strips, wayleaves and easements required for the construction, operation and maintenance of the Self-Laid Main
24. Significant environmental and health and safety hazards
25. Design risk assessment demonstrating hazard and risk management
26. Contestable / Non-contestable works annotated
27. A drawing legend / title block

9.10 Drawing Legend

The drawing legend shall contain:

1. SLP contact details
2. Developer contact details
3. Company carrying out the design (if different to above)
4. SLP Designer name
5. CAD operator name
6. Site name
7. Site address
8. Ordnance Survey coordinates
9. Industry recognised scale of the drawing
10. Drawing / revision reference number
11. Water Company reference number
12. Approval status i.e.
 - a. Proposed design (not for construction)
 - b. Water Company approved design (not for construction)
 - c. Approved for Construction)

9.11 Design & Construction Variations

Changes to the design/construction of the Self-Lay Works (including those due to site conditions, changes to the Site made by the Developer, etc.) which require the re-issue of either the SLP Accepted Design or the Water Company Design shall be considered a Significant Variation. The Parties shall comply with the process in clause 19 of the WAA (Variations).

9.11.1 Minor Variations

Minor variations shall be agreed in writing between the Parties.

Minor variations shall be classed as changes to the proposed Self-Laid Mains and/or Service Pipe design with no significant impact on the maximum scope of work measured by the number of plots on the Site i.e. if there is no change in the number of plots or the financial transaction, the change is classed as minor.

10 Pipe Sizing Methodology

This section covers permitted pipe sizes and methodology of pipe size determination.

10.1 Permitted Pipe Diameters, Pressure Ratings and Permissible Materials.

PE100 Pipe
PE80 Pipe
PE/AL/PE PE80 Type A Barrier Pipe
PE/AL/PE PE100 Type A Barrier Pipe
Class 40 Cement Lined Ductile Iron*

*A Resistivity Survey shall be undertaken by a competent person to determine the external protective coatings required for Ductile Iron underground pipelines in accordance with the manufacturer's specifications. All installation of Ductile Iron pipework shall comply with the manufacturer's technical instructions. Flanged pipework shall not be laid below ground; however flanged valve connections are permitted.

High performance polyethylene pipe is Southern Water's preferred pipe material of choice (PE100) with medium density polyethylene (PE80) to suit on diameters of 63mm and less. PEB (barrier) pipe shall be used where contaminated land is identified in proximity to new water mains. Ductile Iron will be considered depending on Site specific criteria but the use of such shall require to be approved by Southern Water during the design stage.

The below table specifies the Water Company's accepted size and minimum pressure ratings for water pipes. Requests to use sizes and materials other than those listed below must be approved by the Water Company.

Size	Material*	SDR	Pressure Rating
32mm OD	PE80	SDR11	12.5 bar
63mm OD	PE80	SDR11	12.5 bar
32mm OD	PE80 – barrier pipe	SDR11	12.5 bar
63mm OD	PE80 – barrier pipe	SDR11	12.5 bar
90mm OD	PE100	SDR17	10 bar
125mm OD	PE100	SDR17	10 bar
180mm OD	PE100	SDR17	10 bar
225mm OD	PE100	SDR17	10 bar
315mm OD	PE100	SDR17	10 bar
90mm OD	PE100 – barrier pipe	SDR17	10 bar
125mm OD	PE100 – barrier pipe	SDR17	10 bar
180mm OD	PE100 – barrier pipe	SDR17	10 bar
225mm OD	PE100 – barrier pipe	SDR17	10 bar
315mm OD	PE100 – barrier pipe	SDR17	10 bar
80mm ID	Ductile Iron (class C40 – 300mm)	N/A	C40
100mm ID	Ductile Iron (class C40 – 300mm)	N/A	C40
150mm ID	Ductile Iron (class C40 – 300mm)	N/A	C40
200mm ID	Ductile Iron (class C40 – 300mm)	N/A	C40
250mm ID	Ductile Iron (class C40 – 300mm)	N/A	C40
300mm ID	Ductile Iron (class C40 – 300mm)	N/A	C40

Table 10.1 Permitted pipe sizes, materials, SDR and pressure ratings

*PE80 pipes shall be light blue in colour. PE100 pipes shall be dark blue in colour.

10.2 Principles of Sizing of Water Mains

The Self-Laid Main shall be sized to meet peak hydraulic demands and shall be not oversized such that they fail to satisfy all requirements or conditions to maintain water quality.

The Self-Laid Main shall be sized such that all known future sites within any larger area of Development relative to the Site are taken into consideration to avoid unnecessary upsizing at a later date, such that the pipes shall be sized to supply the entire Development notwithstanding any phasing, taking into account:

- The results of any Network modelling by the Water Company relative to an area of Development by reference to information in the public domain and/or by reference to related development enquiries it has received
- Information from the Water Company relevant to the design of mains and services for a Site and/or a Development.

(Water Companies' Charging Arrangements shall be referred to in relation to the provision of more than a single feed into a Site and/or a Development and/or relating to upsizing of proposed Self-Lay Works).

If the Water Company identifies a need for the betterment of Network or associated activity required on the existing network and has agreed with the SLP that they will undertake this work, or part thereof, then this proposal shall be shown as part of the detailed design of the Network and Service Pipe to supply the development.

The sizing of pipes for indicative design purposes (e.g. for cost estimates or tendering) may be done using a simple table method for number of properties. However no reliance shall be placed on this indicative assessment for the purposes of any final design as pipes shall be designed in accordance with the principles and criteria stated below.

Southern Water uses network modelling to size pipes based on Colebrook White and taking into account local losses such as bends, reducers, junctions, etc.

Pipe friction coefficients (Ks) used in the design of clean water mains shall take into account pipe material and deterioration with age. Values of Ks shall be taken from the 'Charts for the Hydraulic Design of Channels and Pipes' (or the tabulated form) published by Hydraulics Research Station." Head losses associated with pipeline, junctions, bends exits, etc. shall be estimated using coefficients (K) in the velocity head term $KV^2/2G$. The coefficients used shall be published values either as above or in the form of "effective lengths of straight pipe". K values from suppliers may alternately be used, but the SLP shall chose coefficients that are reflective of pipe ageing.

Note: By reference to paragraph 9.8 (6), the requirement for hydraulic modelling is typically required when related specific parameters applicable are exceeded.

10.3 Indicative Pipe Diameter Selection

As an indicative initial assessment of the water network pipe size requirements for a Site, Table 10.3 may be used to determine the size of pipe to supply a given number of residential dwellings. It may also be used as a method of determination of Source of Water requirements on the existing Network.

When a Water Company requires to deviate from these guidelines in determining a suitable PoC (e.g. inadequate capacity in the Network or site-specific constraints including the condition of existing assets) then such additional work would be categorised as Network Reinforcement and funded by the Water Company in accordance with Ofwat guidelines.

Number of individual Residential Dwellings	Typical Pipe Outside Diameter (PE Pipes)	Nominal Bore (Other Pipe Materials)
0-20	63mm	50mm
20-40	90mm	80mm
40-95	90mm	80mm
95-300	125mm	100mm
300-700	180mm	150mm

Above Table 10.3: Derived from section A.12 of BS 805:2000

For all developments the Designer shall consider and incorporate spine mains as necessary to allow for additional development or phases of development which are to be connected ideally to at least two points on the Network. The Water Company shall make available information during this discussion and an assessment and advice shall be provided to the Designer of any Network Reinforcement to be considered in a Site design.

Note: Notwithstanding that more than one connection point into a Site may be designed (i.e. for mitigation of future supply risk) only one of these shall be designated as the Point of Connection of supply to the Site as required by the Sector Guidance and the criteria for such set by Ofwat). Any such additional work over and above that which is required to provide the Site with a water supply shall be categorised as Network Reinforcement and funded by the Water Company in accordance with Ofwat guidelines.

10.4 Domestic Hydraulic Demand Calculations

In this section the Water Company shall specify the following constants:

X = Average demand per capita

Y = Average household occupancy rate

Z = Peak flow factor

We do not typically use alternative constants to that detailed under and/or use other related considerations for design.

Demand per capita per day shall be taken as 125 Litres unless evidence to the contrary is provided for the specific development.

Calculation for household occupancy shall be taken as 2.4 persons per household on average unless evidence to the contrary is provided for the Site.

Average daily demand (ADD) per household is therefore $125 \times 2.4 = 300$ Litres/Property/Day.

To account for diversity in the network Peak Flow Factors for domestic scenarios shall be taken to be Z. The value of Z shall be based on the following;

- To account for diurnal variation over 24 hours a Multiplying Factor for a domestic scenario shall be taken to be 2.27.
- It should be noted that optimum design should consider average day peak week (ADPW) or critical period (CP) demand factors in order to account for the maximum demand in a critical period.
- For the purposes of preliminary design, the ADPW/CP factor shall be taken as 1.3, so multiplying 2.27×1.3 gives an overall peak flow factor "Z" of 3.0.

- The ADPW or critical period factor can vary from one zone to another; as a result the exact value should be obtained from SW prior to outline design of infrastructure/non-infrastructure assets.
- Total number of properties/flats in multi-storey residential/domestic buildings should be calculated accurately. Once the total number of properties is established, the methodology described in this section applies.

Peak Demand may be calculated then by multiplying the average daily demand (ADD) per household by the peaking factor.

A site of 'n' Domestic units has average daily demand in litres of $300 \times n$ l/day.

This must be multiplied by the peaking factor Z. Therefore peak demand in litres per second can be estimated at $n \times 300 \times Z = \text{Peak demand in l/s}$

10.5 Calculations for Multi-Occupancy Building and Industrial and Commercial Domestic Use

The below alternative methodology shall be used for calculating flows for buildings that are not domestic, however if the SLP has exact flow rates for the non-domestic buildings, the exact flow rates may be used instead.

	Property / Use Classification	Value	Totals (calc.)	Unit / Calculation
1	INDUSTRIAL	-	-	-
	Area Based Demand	-	-	-
	Area Coverage (data provided)	-	-	Area (m2)
	Class B1/B2 - Businesses & General industrial use	40	-	m ² /person (area based demand). Use this to calculate the number of persons.
	Class B1 high tech	25	-	m ² /person (area based demand). Use this to calculate the number of persons.
	Total no. of people	-	-	No.
	Class B1/B2 - PCC	100	-	l/person/day (apply this PCC after calculating the number of persons)
	Industrial peak factor	2.25	-	Factor
	Industrial average demand (total)	-	-	l/s (l/person/day x No. people) / 86400
	Industrial peak demand	-	-	l/s (Avg. demand x peak factor)
	<u>Direct Demand</u> If direct demand is provided please apply a 10hr profile to derive diurnal variation. Direct demand can be given as average flow per day (l/s, m3/hr) or peak flow (l/s, m3/hr).			
2	SCHOOLS (if no data is provided by the developer)	-	-	-

	Property / Use Classification	Value	Totals (calc.)	Unit / Calculation
	Primary School (x1)	0.23	-	l/s (average demand) <u>Assumptions</u> - Average primary school size = 260 pupils. - 25 l/day per pupil and staff for small schools; rising to 75 l/day per pupil and staff in large schools. This is calculated based on 75 l/day per pupil and staff.
	Secondary School (x1)	0.79	-	l/s (average demand) <u>Assumptions</u> - Average secondary school size = 910 pupils. - 25 l/day per pupil and staff for small schools; rising to 75 l/day per pupil and staff in large schools. This is calculated based on 75 l/day per pupil and staff.
	*University (more detail required to estimate number of students, type of accommodation etc.)	-	-	l/s (average) In the absence of data use the estimated demand for secondary school.
	School peak factor	2.23	-	Factor
	School average demand (total)	-	-	l/s (calculate total if applicable)
	School peak demand	-	-	l/s (Avg. demand x peak factor)
3	HOTELS, PUBS & CLUBS	-	-	
	Residential Training/Conference Guest (inclusive all meals)	350	-	l/person/day
	Holiday camp chalet resident	227	-	l/person/day
	Students (Accommodation only)	100	-	l/person/day
	Total no. of people (data provided)	-	-	No.
	Hotels/Pubs/Clubs Peak factor	2.75	-	Factor
	Hotels/Pubs/Clubs average demand	-	-	l/s (l/person/day x No. people) / 86400
	Hotels/Pubs/Clubs peak demand	-	-	l/s (Avg. demand x peak factor)
4	LEISURE RECREATIONAL SITES			
	Direct Demand	-	-	
	Amusements	0.03	-	l/s (Avg. demand)

	Property / Use Classification	Value	Totals (calc.)	Unit / Calculation
	Arena / Stadium	0.87	-	l/s (Avg. demand)
	Cinema/Conference Centre/Theatre/Bingo	0.07	-	l/s (Avg. demand)
	Campsite Caravanning	0.17	-	l/s (Avg. demand)
	Peak factor (Recreation)	1.4	-	Factor
	Average demand	-	-	l/s
	Peak demand	-	-	l/s (Avg. demand x peak factor)
5	HOSPITALS & RESIDENTIAL CARE HOMES			
	Residential old people / nursing	350	-	l/person/day
	Small hospitals	450	-	l/person/day
	Total no. of people (data provided)	-	-	No.
	Peak factor	2.75		Factor
	Average demand	-	-	l/s (l/person/day x No. people) / 86400
	Peak demand	-	-	l/s (Avg. demand x peak factor)
6	COMMERCIAL OFFICE, RETAIL PARK, WAREHOUSE			
	Area Based Demand	-	-	
	Area Coverage (data provided)	-	-	Area (m ²)
	Class A1 offices or retailing	25	-	m ² /person (area based demand)
	Warehouse	120	-	m ² /person (area based demand)
	Class A1 - PCC	50	-	l/person/day
	Total no. of people	-	-	No.
	Peak Factor	2.25		
	Average Demand	-	-	l/s (l/person/day x No. people) / 86400
	Peak Demand	-	-	l/s (Avg. demand x peak factor)

Table 10.5 Methodology for flow calculation for non-domestic buildings.

10.6 Process Water

It is expected that the client should provide peak demands given their individual knowledge of the Development. The connection and Self-Laid Mains that are to be installed should then be selected based on their peak demand.

10.7 Pressure and Flow

10.7.1 Source Pressure

The SLP may, for the purposes of designing the network, assume reference level pressure at source of 20 meters head (2 Bar). Any source pressures below this or above 40 meters (4 Bar) shall be highlighted by the Water Company.

During the design stage, if any constraints e.g., effect on headloss due to an increased AOD relative to a Site and/or Development, are identified by the SLP or the Water Company a workable solution is to be agreed between the Parties.

10.7.2 Pressure and Flow

Reference levels of service shall be used to ensure that networks can supply all properties with a minimum pressure and flow at the customer's communication pipe.

Minimum pressure in communication pipe at boundary of property to be serviced based on Ofwat's Guaranteed Standards Scheme (GSS) is 7 metres head with a flow of 9 litres per minute.

In normal operational circumstances Minimum Pressure at a hydrant or nodal point on the system shall be 15 mH or 1.5 Bar

Maximum Design Pressure (MDP) which is equal to Design Pressure plus allowance for surge, shall not exceed Pressure Nominal (PN) which is the pressure rating of the lowest rated component in the system.

SLP Designers shall clearly state where a component has been used below the Water Company's standard pressure rating to allow standard System Test Pressures (STP) to be adjusted on site.

10.7.3 Velocity

Minimum velocities in all mains shall reach 0.4ms^{-1}

Maximum velocity in mains shall not exceed 1.0ms^{-1}

Maximum velocity in Service Pipe shall not exceed 1.0ms^{-1}

Furthermore, the velocity of flow should be between 0.4m/s and 0.6m/s under average daily operating conditions, and between 0.6m/s and 1.0m/s under peak daily operating conditions, excluding emergency conditions.

10.7.4 Calculating Headloss through the Network

For newly designed and constructed Water Mains headloss per km shall not exceed 3mH.

An industry accepted methodology should be used to calculate headloss, such as Colebrook White.

10.7.5 Topography

Above Ordnance Datum (AOD) shall be the preferred scale when highlighting level changes on the design drawing.

The effect of increased altitudes on a Site shall be taken into consideration by the SLP Designer when low source pressures have been identified by the Water Company.

The finished floor level of the highest connection shall for the purposes of the design serve as the additional loss of head when ensuring the reference level of service.

10.8 Selection of Materials for Contaminated Ground

Materials for use in contaminated ground shall be selected in accordance with the Water UK Contaminated Land Assessment Guidance. See link in Appendix 1.

10.8.1 Ground contamination during construction

When contamination is suspected during construction of the Self-lay Works the work shall be stopped and shall be isolated from the potential source of contamination and the incident reported to the Water Company and Developer. An investigation and action plan, which may include a change of pipe material (and/or replacement of the apparatus already installed) shall be agreed with the Water Company before work recommences.

The SLP shall ensure that all employees are trained and able to undertake the appropriate actions when working in potentially contaminated land in accordance with health and safety legislation.

Consideration should be given to the effect of permeable surfaces on future contamination risk and documented in section 5 of the Contaminated Land Risk Assessment.

See the Schedule of Permissible Materials and construction in paragraph 21 for any additional considerations applying.

11 Water Main Design and Construction Principles

General principles in designing Self-Laid Mains shall be that they;

- Minimise whole lifecycle costs and impact on the environment
- Deliver minimum standards of service to customers
- Ensure security of supply so far as reasonably practicable
- Ensure continuing water quality
- Allow for safe and flexible operation of control points and surface assets

11.1 Design Accreditation

The SLP shall demonstrate that it has suitable design Accreditation based on WIRS.

11.2 Construction (pre-start)

Prior to the construction of any Self-Lay Work the SLP shall ensure that any Water Company required approvals have been obtained and that a pre-start meeting between the Parties has occurred when one has been requested by reference to paragraph 24.

11.3 Routing and Positioning Principles

Where the Self-Laid Main is to be laid within an adopted highway, a street, or a dedicated service strip, it should be laid in accordance with the latest Streetworks UK good practice guidance (Volumes 1 to 6) unless the Water Company has indicated its preferred routing and positioning of the Self-Laid Main and Service Pipe. In this case, the Water Company's requirements shall be incorporated into the design by the SLP Designer. Any requirement for preferred routing and positioning will typically be associated with technical requirements that includes future access to assets for maintenance and/or repair, and be in accordance with Water Company Charging Arrangements.

See additional information and relevant criteria in paragraph 22.

Design Acceptance will consider any installation route relative to private land, land that is defined as a street and/or which is designated as highway and any requirement for an adoptable service strip or footpath.

Designs for the installation of Self-Laid Main and/or Service Pipe(s) in shared driveways (i.e. where multiple plots are to be supplied) shall be in accordance with the Water Company's criteria.

See additional information and relevant criteria in paragraph 22.

If it is not possible to follow the Streetworks UK guidance, then the SLP Designer should consult with the Water Company to agree the preferred location.

During construction the SLP/Developer shall use reasonable endeavours to ensure that other utility companies' apparatus installed after the Self-Laid Main and Service Pipe shall not restrict or compromise that Self-Laid Main and future access to it.

Self-Laid Mains are to be laid on the side of the road where the housing density is higher to minimise the number of service pipe crossings.

Although not a preferred configuration, the requirement for new Self-Laid dual Main(s) (typically where road construction prohibits utility apparatus at normal depths e.g. shallow drains, permeable paving systems) may be necessary, and in these instances such a technical consideration is to be agreed between the parties.

Security of supply may be increased by linking in the Self-Laid Main when there is a significant number of properties being serviced through a single pipe, provision for flushing in these cases must be made by designing washouts located within 3-way valve arrangements or between in line valves.

To reduce the likelihood of water quality issues from the lack of turnover in the Self-Laid Main to an end hydrant (dead leg) it shall not extend more than 2m past the last service connection.

Self-Laid Mains shall maintain minimum proximity to buildings and structures as specified by the Water Company in the table below:

Nominal Pipe Size mm	Min Proximity required (m) from centre line of Water Main
< 250 mm	3m + 0.5*D (to be agreed at design stage)
250 – 299 mm	3m + 0.5*D (to be agreed at design stage)
300 – 449 mm	3m + 0.5*D (to be agreed at design stage)
> 450 mm	3m + 0.5*D (to be agreed at design stage)

Table: 11.1 Minimum strip width required for varying pipe diameters.

See also paragraph 13: Designers shall refer to Streetworks UK publication Volume 4: Guidelines for the Planning, Installation & Maintenance of Utility Apparatus in Proximity to Trees when selecting route in proximity to existing trees and if necessary, shall highlight any Tree Protection Orders on the design drawing.

11.4 Depth of Self-Laid Main

Self-Laid Main(s) shall be installed at the appropriate cover depths in accordance with the minimum and maximum depth range specified in the Streetworks UK guidance relative to the surface in which the Self-Laid Main(s) are to be installed.

The Water Company preferred installation depth (cover to crown of pipe) is to be a minimum depth of 900mm unless approved by Southern Water during the design phase for new Self-Laid Mains.

11.5 Water Quality Considerations

In accordance with the Principles of Water Supply Hygiene and related technical guidance notes listed therein the SLP shall ensure that the Developer and the SLP ensure demand sufficient to allow adequate turnover of water following commissioning of any new Self-Laid Main in order to protect water quality.

Where possible, Development spine roads shall be serviced with two-way fed ring mains to maintain water quality across the Site. The Water Company and SLP Designer shall consult on such proposals and the SLP Designer shall incorporate the Water Company requirements relative to this design consideration into the Site design

Where despite the above, infrastructure is laid in advance of turnover, the Self-Laid Main shall either have artificial load by way of cross connection into the live system or shall have a flushing programme denoted on the design, to be carried out by the SLP.

The Developer or SLP shall be responsible for ensuring that all required permits and agreements are in place for identifying where water can be flushed to and for disposal of said water and whether water is required to be de-chlorinated prior to disposal.

Only standpipes that have been approved by the Water Company shall be used (details of such may be published on the Water Company website).

Operation of valves: The Water Company's specified standards in paragraph 11.7 below for operation of valves and hydrants shall be complied with (including satisfactory completion of any related training in line with guidance material offered by the Company).

11.6 Mains Fittings

See also the Schedule of Permissible Materials and construction in paragraph 21.

Line valves shall be installed to restrict the number of consumers isolated by a pipe failure. As a general guide, it should be possible to limit the loss of supply to no more than circa 50 properties. Isolation valves placed in the pipeline shall be positioned at intervals so that drain down time between valves on pipe diameters of 300mm or greater shall not be greater than 3 hours. A method statement shall be provided for the drain down procedure for all pipe diameters of 300mm or greater. For pipe diameters less than 300mm the drain down time shall not be more than 1 hour.

Isolation valves shall be provided at each side of crossings, such as motorways, rivers, railways or other hazardous locations to enable isolation and draining down. The valves shall be installed in chambers and incorporated where possible with a washout and shall be marked by a 'post and plate'. These valves should be the same diameter as the main line pipe.

Where practical, valves should be located at tee installations in preference to inline valves.

The top of the valve spindle is to be positioned between 200mm – 300mm of the cover level of the chamber cover.

Where a dead end on a main is unavoidable it shall have a washout facility. A washout or hydrant sited as close as possible beyond the last service connection may serve this purpose. Washouts shall be installed at either side of closed boundary valve (typically as per washout-valve-washout arrangement) to enable flushing of both mains in the event that the boundary valve requires opening.

The frequency of customer connections on distribution mains usually makes it unnecessary to install air valves but typically air valves will be required in the following situations:

- On long distribution mains feeding rural areas,
- On local high points such as bridge crossings,
- At high points on the main which are above the level of the local service connections.
- In new systems most new connections are fitted with check valves at the boundary with the meter boundary box. There may however be a requirement to provide venting points when emptying or drawing down water mains for repairs.

Valves, washouts, hydrants, etc. should, as far as is practicable be located in the footpath or verge for both access and safety reasons and to mitigate the effect of traffic, surface water and silting in chambers.

Where there is no option but to design site fittings in trafficked areas, under no circumstances shall they be placed in parking bays or behind any locked access gates.

11.7 Controlling Valves and Valve Operation

Isolation of mains associated with any planned interruption requiring a shut to an Existing Main valve may be carried out by the Water Company and/or by an SLP subject to the SLP persons involved in the Site works having been authorised by the Water Company to undertake this activity. The Water Company will take into account specific Site constraints or considerations that may impact on the end user customer and/or water quality.

Approval and authorisation by the Water Company may include compliance with specific Water Company approval and authorisation procedures (and training) and completion of Water Company provided training that includes; CALM network training, valve operations, and discoloration risk assessment.

See also the Schedule of Permissible Materials and construction in paragraph 21.

Consideration shall be given to the use of bypasses where it is necessary to provide a ready facility for disinfection of a newly installed or modified water-main.

Valve closing directions within our Water Company area are left-hand closing (anti-clockwise) and all new valves to be installed by an SLP shall be left-hand closing (anti-clockwise closing).

The Water Company to insert its policy on valve operations by third parties (See under).

The SLP shall not be permitted to operate existing valves on our existing system unless the following conditions have been satisfied;

- Operatives have received and passed our Safe Control of Operations (SCO) training.
- SCO authorisation procedures have been complied with.
- Site specific constraints or considerations have been assessed by us relative to valve operation by any party.

Note: Depending on Site specific or our operational requirements applying (being relative to the Site or to a wider area) we may not authorise valve operations notwithstanding that the above bullets have been complied with. In such circumstances we will endeavour to promptly consider and action any request for a valve operation by us that may be possible.

Care shall be exercised to locate valves in positions where they can be operated safely, allowing adequate space to rotate the tee-bar. Wherever possible, valves shall not be located in busy highways or junctions.

The location of line valves shall be submitted to Southern Water for agreement during the design process to ensure that the locations are operationally acceptable.

11.8 Washout and Fire Hydrants

- a. See under for Southern Water's hydrant preference and also the Schedule of Permissible Materials and construction in paragraph 21.
- b. All new fire hydrants shall be of the through-bore type. Fire hydrants are to be installed on mains with an internal diameter of 80mm or greater. Washouts installed on mains of internal diameter less than 80mm are not used as fire hydrants.
- c. Hydrants shall be centralised in the chamber and aligned vertically so that the operation of the spindle and installation of a standpipe by the fire authority is not compromised. All hydrants shall comply with British Standards and be of the 2.5 inch stainless steel London round thread and shall be right-hand (clockwise) closing.

- d. The chamber shall have a minimum clear opening of 230mm x 380mm and the sections shall be of pre-cast concrete or of an equivalent recycled composite material subject to Southern Water approval.
- e. A means of isolation of the washout/hydrant from the main shall be provided. This is to ensure that the washout/hydrant can be exchanged without isolating the main.
- f. All hydrants shall be rated at 16bar continuous operating pressure. The design flow capacity shall not be less than 2,000 litres/minute at a constant pressure of 1.7bar at the outlet.
- g. All nuts and bolts incorporated into a hydrant assembly shall be of a corrosion resistant material or else coated according to WIS 4-52-03.
- h. Hydrants are owned by the local fire authority once commissioned but maintained by Southern Water under an agreement with the fire authority. The SLP shall be responsible for determining the locations for washouts and fire hydrants, and shall submit them to Southern Water for approval during the design stage.
- i. Covers and frames: shall comply with British Standards. There shall be two prising inserts and lifting keyholes in a permanent non-rock design cover and frame with a single lid only (i.e. not split).
- j. Where a main comes to a terminal point a terminal fire hydrant may be installed on mains 80/90mm and above, but any main smaller than 80/90mm shall have a washout specified for flushing purposes as fire hydrants are not typically requested by the fire authority on such sized mains.

11.9 Air Valves

Air valves should be installed at high points along the network where there is a risk of air locking. The location is to be agreed at design stage.

Air valves shall be installed in free draining chambers and to prevent potential contamination air valves shall not be located in areas where there is risk of water inundation.

Air valves shall be installed with isolation valves to allow removal during maintenance without affecting network operations.

11.10 District Metered Areas and Boundary Valves

District meter locations shall be agreed with the Water Company. If no information is available, then as a rule new DMAs in the design shall not exceed 750 domestic properties in size and a development size of 750 properties then a DMA meter is likely to be required. See also paragraph 8.3.

Shut valves will need to be installed if a Site is fed by two separate DMAs via two Source of Water Connections. In this instance their requirement and location shall be agreed at the design stage with the Water Company.

11.11 Sustainable Drainage Systems (SuDS) Considerations

SLP Designers shall ensure relative to the final installation of the Self-Laid Main and Service Pipe that any Sustainable Drainage system (SuDS) shall not be installed above, underneath, or adjacent to the final position of Self-Laid Mains and Service Pipe. The location of any proposed SuDS and permeable surfaces proposed for a Site are to be clearly marked on the proposed design drawing (see also paragraph 10.8).

11.12 Double Spade Valves

Southern Water does not accept the use of double spade valves and hence any proposed use of same shall only be permitted when we have provided prior approval.

11.13 Rights of Access

The Self-Laid Main shall, wherever possible, be routed in publicly adopted highways and maintained highways or streets as defined in NRSWA Section 48 (1) and amended under the Traffic Management Act (TMA) 2004. These shall not normally require rights of access. Examples of situations where Self-Laid Mains are to be laid in a street are:

- An adopted street on land which is owned by a Local Authority.
- A street on land which is owned by the Developer and which may or may not be adopted in the future but serves more than one property.
- A street on land which is in joint third-party ownership.

The section 38 Drawing shall be used to highlight any Self-Laid Main installed in third party land, which is not a street and that may require land rights to be obtained and a legal notice to be issued. In these instances, the Water Company shall establish and confirm with the Developer/SLP the right of access and shall normally require an easement to be provided by the land owner. Examples of situations where Self-Laid Mains are not to be laid in a street are:

- Industrial and commercial Site where land is wholly owned by a singular 3rd Party.
- Site access is through a third party's land that does not form part of the development.

In cases requiring the Self-Laid Main to be laid in land not defined as a street all such permissions and rights of access shall be identified before the design is approved.

In the process of designing it may be necessary to obtain other consents for works; these consents include;

- Local Highways by way of Section 50 Agreements
- Other Adopting Utilities where we are laying within an existing easement
- Environmental Agencies and Waterways Authorities
- Rail and Transport Network Operators
- Historical Societies and National Heritage Agencies

All such servitudes, easements, wayleaves and planning permission required for the-Self-Lay Works and land for the siting of equipment shall be obtained prior to commencement of works and in accordance with the Statutory Consents and Land Rights sections of the WAA.

In accordance with the WAA, the Water Company shall obtain any required easements to protect its Network, or any future extension of such, and any related and/or incurred costs including third party costs shall be recovered by the Water Company in accordance with its published Charging Arrangements.

12 Service Pipe Design and Installation

Both parts of the Service Pipe shall be appropriately designed, and responsibility for design acceptance typically rests with the party responsible for its maintenance (for detail of who is responsible for maintenance please see the relevant Ofwat guidance at Southern Water's policy), requirements and installation requirements on the design and installation of permissible materials (service pipes, meters, chambers, ducting etc.) required routing, and location; relative also to contaminated ground are detailed in the Schedule of Permissible Materials and construction in paragraph 21 and the Meter and Service Pipe Installation requirements in paragraph 22.

The supply pipe shall be the property owner's responsibility and shall conform to the Water Regulations and requirements of the Water Company.

12.1 Routing, Positioning and Location

The Water Company shall specify its policy and installation requirements on the design and installation of Permissible Materials (service pipes, meters, chambers, ducting, etc.) required routing, and location relative also to contaminated ground

Service Pipes shall only be laid through land which either form part of a street or to which the property being served has permanent rights of access.

Service pipe routes in so far as is reasonably practicable shall follow a straight route perpendicular to the Self-Laid Main and the property to which it services.

Service Pipes shall generally be designed to connect to the nearest Self-Laid Main to the property.

Separate Service Pipes shall be provided to each house or building on the premises, or to those different parts of a building on the premises which are separately occupied by way of multiple supply pipes.

Joint communication pipes may / may not be used to reduce road crossings however each property must receive an individual supply pipe and meters (if applicable).

Service Pipes shall be designed such that the requirements of Streetworks UK are maintained with respect to separation from other plant and utilities.

12.2 Depth of Services

Service Pipes shall be installed in accordance with the Water Regulations and Streetworks UK guidance.

If a boundary box is to be installed on the Service Pipe, the pipe shall be laid with cover between 750mm and 850mm for a minimum of 1.0m on each side of the boundary box.

Service Pipes being designed outside this range shall have special protective measures vetted and agreed by the Approving Design Engineer.

12.3 Sizing of Services

While service connections can only be designed to meet minimum standards at the point of delivery every effort shall be made to ensure that all parts of the service pipe are sized in accordance with industry standards.

Service Pipes shall be sized to ensure velocity is $\leq 1.0 \text{ms}^{-1}$ and that total headloss is $\leq 2 \text{ mH}$.

Services to standard domestic properties shall be minimum 25mm internal diameter and capable of supplying required flow and pressure based on required demand.

Southern Water's required standard is to use high-performance polyethylene ("PE") material for all services subject to suitable ground conditions and the Water Regulations applying

Typically service pipes will have an OD range of 32mm – 63mm inclusive and our required standard is for PE80, which is light blue in colour.

It is important not to over-size service pipes as this may affect water quality.

When service pipes are proposed in areas of low water pressure but are longer than 30m from the point of connection with the supply main, or are support sprinklers (domestic), or to be used to assist fire-fighting (non-domestic), consideration should be given to the proposed service diameter.

When installing water services to flatted property the following table represents a guide, but is not to be substituted for a full hydraulic assessment.

Number of Individual Dwellings	1-2	3 – 4	5 – 8
typical od – PE (mm)	32	63	63

Approved standard for service pipe connections:

- Tapping saddles shall be of gun-metal.
- A minimum distance of 300mm shall be maintained between service tapping's and there shall be no obstruction to future access to the tapping/connection with the main.
- All tapping saddles shall be to BS2789 grade 500/7 and capable of withstanding pressures of up to 16bar.
- Meter carriers and other integral fittings in a boundary box (domestic meter chamber) shall be WRAS approved i.e. gunmetal or brass.
- All service pipe fittings shall be WRAS approved and in all ground conditions be protected against contamination, i.e. brass, copper, and/or gunmetal.
- PE Electro-fusion top tees for service connections less than or equal to 63mm outside dia. (or internal dia. Equivalent) shall not be accepted without prior written approval from Southern Water.
- Such approval shall typically only be considered relative to a service connection required to be made to a non-standard diameter main or to a PE 315mm main when it is not a trunk main; as typically service connections to trunk mains shall not be accepted.

12.4 Location of Boundary Boxes

Further policy and requirements on external boundary boxes and their location is detailed in the Schedule of Permissible Materials and construction in paragraph 21.

In non-contaminated ground:-

Single, double, and/or multiple port manifolds boundary boxes can be used in conjunction with screw in meters. The boundary box (sealed type) must be able to incorporate a manifold meter with 1.5 inch (40mm) thread, stop tap and non-return valve.

All boundary boxes must have height and slope adjustment capabilities and be WRAS approved.

- When sited where vehicular traffic will pass over the box the specification is for a trafficable surface box (typically grade B compliant with relevant aspects of BS 5834).
- The use of a 2 port or 6 port manifold box when the number of service pipes converging at an accepted location number is in excess of two services is a preferred standard.
- For single services: the current specification for a standard boundary box is a below ground boundary box with sealed telescopic plastic raised manifold'.
- For twin-port manifolds, our current specified standard is for a raised twin 25mm In/Out meter box plus the MB601297 water surface box adjuster.
- For 6-port multi manifolds our current specified standard is a below ground boundary box with rigid plastic base.

Additionally, for when in contaminated ground:-

- Boundary boxes (sealed type) used on contaminated sites shall comply with WIS-4-37-01.
- They shall be watertight and have gunmetal connection fittings that are able to accept either barrier pipe or plastic coated copper pipes.
- All internal parts (i.e. meter carrier, ferrule) shall be made of brass.
- Both 2 and 6 port manifolds shall be made up from brass and copper and, when applicable, be sited in a suitably-sized chamber comprised of pre-cast concrete sections (or approved composite alternative).
- Our current specified standard is for a sealed telescopic gunmetal base manifold.

12.5 Supplies to Multi Occupancy Buildings

Our policy on supplies to multi-occupancy buildings and details is provided in the Schedule of Permissible Materials and construction in paragraph 22.

12.6 Services to Multi Storey Buildings

Water Industry Act 1991 - Section 66 states that where the top-most storey in a building is greater than 10.5m below the draw off point the statutory undertaker may require the Developer to fit storage equal to twenty-four hours usage and adequate pumping to reach the highest point.

Our policy and requirements relative to this paragraph 12 in the Meter and Service Pipe Installation requirements in paragraph 22.

12.7 Additional Requirements for Supplies to Buildings Other Than Domestic Dwellings

When the Developer's flow rates are in question the SLP Designer shall check that demand was calculated in accordance with BS EN 806.

The design shall include for back flow prevention; at least single check non return valves.

Demand for process water shall be treated separately when designing the service.

The SLP Designer shall investigate any seasonal demand patterns when designing the service.

Our policy and requirements relative to this paragraph 12 in the Meter and Service Pipe Installation requirements in paragraph 22.

13 Civil Engineering Considerations

13.1 General

The general specification for civil engineering components and materials shall be that of the document "Civil Engineering Specification for The Water Industry ("CESWI") 7th Edition which is available from the WRc plc.

The Water Company shall confirm its requirements by reference to CESWI and any additional specific requirements and/or include such in the Schedule of Permissible Materials and Construction in paragraph 21, which as a minimum shall include information and requirements relating to;

- Thrust Restraint and Anchorage
- Puddle Flanges
- Self-Anchoring Joints
- Site Conditions and Ground Bearing Capacities
- Thrust Blocks
- Jointing of pipes
- Ground Anchorage

13.2 Marker Tape and Tracer Tape

Marker Tape to be compliant with CESWI and Water Fittings Regulations.

13.3 Indicator Posts and Marker Plates

Indicator Posts and Marker Plates to be compliant with CESWI.

13.4 Chambers and Covers

Water Company to detail Permissible Materials in paragraph 21. Chambers shall be designed and installed to be of an appropriate size to allow operation of the Self-Laid Mains and service fittings.

Covers shall be designed to be capable of withstanding all potential loads placed upon them and shall comply with BS EN 124.

See our general arrangement drawings detailing standard assemblies, chamber size, covers included in paragraph 23.

13.5 Bedding and Backfill

Materials used for bedding shall conform to WIS 4-08-02 "Specification for bedding and side fill materials for buried pipelines" and material for backfill material shall be in accordance with the NRSWA 1919 the Specification for the Reinstatement of Opening in Highways (3rd Edition).

13.6 Reinstatement of Highway

Materials and work shall be in accordance with the NRSWA 1991 the Specification for the Reinstatement of Opening in Highways (3rd Edition).

The SLP is responsible for the classification and disposal of waste from excavations in highway accordance with Applicable Law.

13.7 Ducts

SLP Designers shall consult with the Water Company at Design Acceptance stage if ducts are required to be installed by a SLP/Developer.

Where ducts are designed to be laid under major roads or obstructions, they shall be shown to extend beyond the road to ease installation and future inspection.

Service pipe ducting where extending into building to form part of the service entry must facilitate the installation of insulation to Water Fitting Regulations.

Mains shall be located on the side of the highway serving the most properties to minimise the total length and to minimise the number of communication pipes, such that where a crossing beneath a public road is required (long side communication pipe) a suitable service pipe duct shall be required.

Communication pipes beneath roads shall be laid in ducts wherever possible. These allow for future maintenance and repair to be undertaken on communication pipes while minimising disruption to a public highway. A maximum of two services shall be installed in any one duct. The location of ducts shall be recorded on design and As-laid drawings.

14 Metering Requirements

14.1 Standard Domestic Metering for Individual Dwellings and Multi Occupancy buildings

Our domestic metering policy is inserted under and the Meter and Service Pipe Installation requirements in paragraph 22

Separate individual meters are a requirement for all domestic and commercial properties and our default position covering the installation of meters is that they be sited externally at the boundary of the highway with the property that they are to supply.

In accordance with the Water Sector Guidance see also paragraph 19 for our specified Local Practice relating to meter requirements.

The specification for meter type and sizes we currently accept is detailed in paragraph 21. See published standard charges for the option of procuring meters direct from Southern Water.

The current specified type of meter and current supplier is as follows.

Supplier:

Arad Metering Services, 21 Marys Lane, Burghill, Hereford, HR4 7QL

Meter Type:

Automated Meter Reading (AMR) type screw in concentric 15mm or 20mm meter (Supplier ref: F389-10) and as listed under;

- 15mm 3G inline meter (equivalent pipe diameter 0.5 inch)
- 20mm 3G inline meter (equivalent pipe diameter 0.75 inch)
- 25mm (TAGUS) inline meter (equivalent pipe diameter 1 inch)
- 40mm inline meter (equivalent pipe diameter 1.5 - 2 inch)
- 15mm 3G Gladiator concentric (screw-in type)

Note: The SLP should refer to our current published charges arrangement for the latest specified meter type and supplier as the above is subject to periodic review.

Internal Meters (supplementary information);

When approved for installation by us (typically this would be identified by the SLP at the design stage) internal meters shall be 15mm or 20mm diameter unless otherwise accepted. All meters shall be installed in accordance with the manufacturer's instructions depending on flow through the pipe etc. The preferred internal meter is a Concentric "Gladiator" meter (screw in type, with internal manifold). The installation of this is subject to the meter maintaining an adequate flow of water to the customer's premises as otherwise a 15mm inline meter is to be installed.

15 Water for Firefighting

15.1 Fire and Rescue Service (FRS) Consultation

Pursuit to Section 43 (1) of the Fire and Rescue Services Act 2004 a plan showing adoptable washouts shall be sent to the FRS for consultation purposes, along with this plan shall be a location plan and a covering letter.

Water Companies to provide FRS contact upon request from an SLP.

The FRS have the statutory period, 42 calendar days, to respond with their requirements in respect of adopting hydrants for firefighting.

Hydrants to be adopted shall be then marked on the drawing.

15.2 Location and Flow from Hydrants

Ordinarily, water companies do not design distribution networks for firefighting purposes. It should be expected that flow from fire hydrants would be in line with minimum standards on the water distribution network.

See also Water UK Guidance: <https://www.water.org.uk/guidance/national-guidance-document-on-the-provision-of-water-for-firefighting-3rd-edition-jan-2007/>

(See in particular those details referenced in Appendix 5 regards flow from fire hydrants)

15.3 Dedicated Fire Mains

Dedicated fire mains shall be designed and constructed in accordance with Water Supply (Water Fittings) Regulations 2016 and fitted with backflow prevention, spiral wrapping and appropriate marker tape.

15.4 Fire Sprinkler Systems

In the absence of any information from the Water Company, SLP Designers shall refer developers to the policies within the building regulations when requests for sprinklers are being made, these documents, "Document B (Fire Safety) –Volume 1: Dwellings and Volume 2: Buildings other than Dwelling houses", can be obtained on the UK Government Planning Portal at <http://www.planningportal.gov.uk/buildingregulations/>

It is recommended that the SLP Designer consults with the Developer who is responsible for seeking advice from a specialist provider of sprinkler systems (where one is required) relative to the Site and/or Development.

16 As Laid (As Constructed) drawings

The Water Company's asset data is typically recorded on a geographic information (digital mapping) or CAD systems. Therefore, it is important that accurate and compliant location information is supplied to the Water Company in a format agreed with the Water Company and which shall be specified by each Water Company in the Schedule of Permissible Materials and construction.

The approved design drawing shall be updated and amended in accordance with all changes to as constructed installation whenever there is a deviation from the approved design (note: all changes to an approved design shall only be made with the acceptance of the Water Company as per Level of Service measure S2/1b).

The “as-laid / as-constructed” installation shall be in accordance with the approved design and changes to same approved by the Water Company as any deviation not agreed by the Water Company from the approved design shall be a Defect and the Water Company may require such to be corrected prior to adoption of the installation.

The position of all installed apparatus shall be recorded to ensure locational accuracy (the position of apparatus shall be recorded relative to a minimum of two fixed (geographical or otherwise) features adjacent to the installed apparatus and the measurements shall intersect the centre of the new asset and if available is to be referenced by British National grid reference).

Positional accuracy is to be measured and recorded, wherever practicable, to a minimum GPS accuracy of +/- 100mm to the centre of the apparatus.

Surveys for Self-Lay Works shall be carried out using triangulation, i.e., two measurements taken from fixed Ordnance Survey features. They should intersect at the centre of the asset in the following order of priority;

- corners of buildings, and
- corners of boundary walls

Surveys done using offsets, i.e., using a single measurement (usually along the length of the Self-Laid Main) in accordance with the following order of priority:

- building lines, and
- kerb lines

Temporary and natural features should only be used when no other permanent features are available, with the agreement of Southern Water.

Scaled survey drawings should be provided. The scale shall be to 1:500 (unless otherwise agreed with the Adopting Water Authority) to ensure clarity of applicable measurement and features.

Material, pipe size, external and internal corrosion protection of pipe, and the depth of cover to Self-Laid Main (where depth differs from standard) shall be identified.

All valves, hydrants, washouts, meters, ducts, swab access points, tapping's, tees, Service Pipe(s) and boundary boxes shall be clearly identified, together with the relevant fitting on the plan and/or in an accompanying legend. The legend should be consistent with the Water Company' Schedule of Permissible Materials and construction.

Where a number of assets are installed adjacent to each other, suitable asset information (increased scale extracts) are to be incorporated and clearly referenced as a subset of information from the Self-Laid Main “as-laid / as-constructed” drawing.

The full dimensional references for all pipes and fittings shall be indicated (e.g. material, diameter, SDR) at any change in details, and measurements shall be in millimetres.

Clear differentiation should be made between live and decommissioned Water Mains and associated fittings. Decommissioned Network assets may be shown on a separate drawing, if required.

As-laid / as –constructed drawings shall be submitted with any request to commission any completed work. Such shall be clearly labelled with the Developer's name, scheme number, scheme name, scheme type, stage, number, and date of submission.

17 Self-Laid Main and Services Commissioning

To enable the commissioning of new assets to take place the Water Company shall provide its flushing, super chlorination and sampling requirements including minimum training requirements for samplers e.g. as per the Water Regulations under ISO/IEC 17025 may be deemed appropriate.

A compliant pressure test should be carried out which demonstrates the Self-Laid Main to be free of air and leaks. Certificates shall be provided by the SLP to the Water Company confirming a compliant pressure test.

Before flushing into a public combined or surface water sewer the developer shall contact and obtain approval from the local wastewater company, Environment Agency, Highway Authority or other, as appropriate.

In addition, the Water Company may include further guidance in its Schedule of Permissible Materials and construction in paragraph 21.1 setting out its requirements for the provision of Testing and commissioning.

17.1 Mains Flushing

In accordance with the Principles of Water Supply Hygiene and associated technical guidance notes (see in particular TGN02 and TGN03) it is a requirement that there is always a sufficient turnover of water on all potential dead-legs of main or sectional lengths and a regular flushing of these mains shall be undertaken to satisfy water quality requirements.

Accordingly, a suitable flushing regime is to be agreed in respect of the construction programme of the Self-Laid Main. The responsibility for work and related costs is set out in the WAA.

Note: Operation of existing valves shall only be in accordance with the Water Company's published guidelines in this DCS.

The Water Company may seek to recover the cost of flushing work where a delay to the proposed Delivery Date occurs as a consequence of a failed pressure test and/or mains sample. This will likely delay the mains connection date and subsequent installation date of new service connections and hence an appropriate flushing regime to protect water quality will be required to be agreed with the Water Company who reserves the right to revert to a flushing regime operated and managed by the Water Company with costs recovered.

Prior to any end washout on any phase/section of main the SLP may install a temporary or permanent sluice valve and if the washout is to be used for flushing or building water with a standpipe then it shall be an approved metered standpipe in accordance with the Water Company requirements.

The SLP is responsible for ensuring that the Developer is responsible for ensuring that all required permits and agreements are in place and for identifying where water can be flushed to and for disposal of flushed water and if the Water Company is to undertake flushing whether water is required to be de-chlorinated first.

As a general rule it's unnecessary to consider cleansing velocities, except the need to discharge a volume (twice the pipe's volume will ensure complete turnover) from a washout at the end of the main.

The Water Company has a responsibility to ensure that its customers aren't affected by discoloured water which may be caused by flushing out mains so when discharging water it is important to keep velocities in the pipe under control to avoid discolouration upstream.

Suggested guideline is to limit flow velocity to no greater than 0.2 m/sec with the need to turn over mains water at least once per week, and examples are detailed in the table below.

Example guidelines

Pipe size (mm)	Internal diameter (mm for PE)	Imperial equivalent	Area m2 and volume in m3 per meter	Volume in litres per meter (rounded off)
63	50	2 inches	0.00196	2
90	80	3 inches	0.00502	5
125	110	4 inches	0.00950	9.5
180	158	6 inches	0.01960	19.6
225	198	8 inches	0.03079	31
250	220	8 to 9 inches	0.03801	38
315	278	11 inches	0.06069	61
355	312	12 inches	0.07645	76.5

17.2 Mains swabbing

In accordance with the Principles of Water Supply Hygiene and associated technical guidance notes (see in particular TGN02) consideration may be made for mains swabbing required as part of commissioning the main; which should also consider providing for facilities for inserting and extracting the swab(s), the provision for disposal of the large flows of water required and discharging any flushed chlorinated water safely without causing pollution. Note: de-chlorination of water prior to discharge is recommended.

17.3 Mains Bacteriological Sampling

All sampling and data relating shall be undertaken by an approved UKAS accredited analytical laboratory that will confirm and provide all results and required reports relative to:

- Incoming main sample(s).
- New mains sample(s) - result(s) for each length of new main to be commissioned and connected to existing water supply distribution network.

All taking of samples shall be carried out by accredited persons. Sample point location(s) where samples were taken from must be detailed and cross-referenced with the results and shown on the construction drawing and provided to the Water Company.

Prior to accepting a request for any Final Connection to the Network, the Water Company must be reasonably satisfied that the samples have been taken where indicated and have passed water quality requirements such that the Self-Laid Main can be adopted.

As such, the Water Company may (at its own cost) undertake a check sample on the Main post Final Connection, prior to permitting any further connections (mains or services).

In accordance with the Principles of Water Supply Hygiene (TGN02) if the Self-Laid Main is not brought into service within 14 calendar days of a satisfactory sample having been taken, the Main should be flushed with mains water and re-sampled. If contamination is suspected, the Main should be re-chlorinated and sampling carried out as in paragraphs numbered 10 & 12 of the TGN02.

The SLP is advised to contact the Water Company to confirm arrangements for taking samples, sample testing, testing parameters and reporting, and laboratories they intend to use and/or to confirm any requirement for the Water Company to provide (at reasonable cost) any such support services.

17.4 Pressure testing of Self-Laid Main

17.4.1 Pressure testing of pressure pipes and fittings for use by public water suppliers

Must be carried out as set out in the Water Industry 'Information and Guidance note' (IGN 4-01-03 October 2015: issue 2), available to view online at water.org.uk/publications/wis-ign/general with reference to the following guidance notes: 'Pressure Testing and Disinfection (supplemental) of PE Water Pipelines, Services and Installations'. Pressure data, analysis report/pass certificate and pressurisation/decay graphs are to be provided by the SLP to the Water Company within a handover commissioning suite of information.

All results must be provided in both graphical (test output graph) and tabular formats.

17.4.2 Pressure Testing and Disinfection (supplemental) of PE Water Pipelines, Services and Installations

All testing shall be carried out in accordance with IGN 4-01-03, reference should also be made to the Civil Engineering Specification for the Water Industry (CESWI) (with Additional Clauses) and any specific Water Company requirements specified additionally in paragraph 21 Schedule of Permissible Materials and construction.

The following also applies:

1. On-site testing operations will be clearly identified using appropriate warning notice boards.

See also paragraph 21 "Schedule of Permissible Materials and Construction".

2. Service test: All new Service Pipe connections must undergo a service test. The procedure is also defined in Water Industry Information & Guidance Note (IGN 4-01-03) 'Pressure Testing of Pressure Pipes and Fittings for use by Public Water Suppliers'.
 - The system test pressure shall be 18 bar.

- The service shall not have been tapped prior to this test being conducted.

18 Water Company Key Contacts

Please see the links to our published key contacts:

<https://www.southernwater.co.uk/developing-building/escalation>

<https://www.southernwater.co.uk/developing>

19 Local Practices

By reference to the Water Sector Guidance, the Water Company may insert here a permitted local practice using the terminology in the WSG.

19.1 Meter Pairing and Commissioning

Applicable: Guidance to be confirmed.

19.2 Timing of the Generation of Plot Reference Numbers

Applicable: Guidance to be confirmed.

19.3 Water Company Design Service Offerings

Not Applicable: We do not currently offer this service.

19.4 Design Self-Certification Scheme

Not Applicable: We do not currently offer this service

20 Design and Construction Specification Appendices

Page 58 - British Standards (BS) & BS EN Standards

Page 59 - Other documents

21 Schedule of Permissible Materials and Construction

21.1 General

Southern Water's preference is for materials that are best suited to be integrated in to the existing Network so that a consistent operational, maintenance programme and a resilient Network is maintained and developed.

With the exception of meters, where, with regards to its metering operations work the exact same specification of meter type and supplier specified in paragraph 14 shall be used, the SLP may use any Regulation 31 approved products provided that it can demonstrate to our satisfaction that such materials are to an equivalent specification to those currently installed by Southern Water.

Whereas the SLP shall prove to Southern Water prior to commencement of the Self-lay Works that all materials and products are referenced relative to Regulation 31, if proposed materials are to be of an alternative to those we typically and currently install but are to an equivalent specification the change shall require to be agreed by us.

Trenchless design methodologies shall be agreed with Southern Water.

21.2 Civil Engineering Consideration additional information

a) Thrust Restraint and Anchorage

Thrust block design shall be carried out in strict accordance with CIRIA R128 - Guide to the Design of Thrust Blocks for Buried Pressure Pipelines.

Where the use of thrust blocks is considered unfeasible, tied joints, anchored joints [described further in section 21.2 b)], restrained length, or welded pipes shall be considered. Where restrained length solutions are chosen, marker tape shall be laid along the restrained length to inform second comers working on the pipeline of the need to maintain the restrained length during and subsequent to the works.

Gradient thrust blocks to prevent sliding shall be designed for sloping pipelines, particularly those steeper than 1 in 6.

No part of a thrust block shall extend outside the line of the permanent easement.

Vertical joints requiring holding down straps shall be avoided where possible, particularly where they will be buried.

When a polyethylene pipeline is subjected to internal pressure and/or a temperature change, longitudinal stress will be produced. The resultant axial load has the capacity to dislocate unrestrained pipe joints therefore the use of anchor blocks shall be considered in the pipeline design. Where such restraint is required the encased axial length of the pipeline shall not exceed 1m. In addition such restraint shall not encase valves or other appurtenances.

The SLP shall submit to Southern Water their 'For Construction' drawings, as well as all detailed design supporting documents, relating to thrust blocks, anchored restraints, and pipe supports associated with the

design and construction of the works. This information shall be issued to Southern Water prior to commencement of the works and with sufficient time for it to be assessed. The SLP shall ensure that their design conforms to all applicable standards and specification. Southern Water acceptance of the SLP design does not constitute adoption of design liability which remains with the SLP.

b) Self-Anchoring Joints

Where anchored length restraint methods are proposed, the SLP shall confirm with the manufacturer the maximum pressure of the self-anchoring pipework system. The SLP shall be responsible for determining the anchored length required either side of the bend or fitting being restrained.

Buried flanged pipe joints (not including end-restrained flange adaptors with allowable joint deflection) shall not be used as anchored length thrust restraint systems.

The SLP shall ensure that any and all self-anchoring joints (e.g. flange adaptors, couplings, anchored gaskets etc) are rated at the applicable system test pressure. In addition, the SLP shall ensure that the self-anchoring joint is appropriate for use on the applicable pipe material.

c) DI Pipe Jointing

Where thrust blocks are unfeasible (space constraints, presence of existing services, poor ground conditions etc) DI pipelines may be end-restrained by means of push-fit anchored gaskets or mechanically anchored flexible systems, e.g. flange adaptors, couplings etc.

Rigid flange joints shall not be used on buried pipelines except for connections to and from fittings and appurtenances, and providing the length of rigidly jointed pipework (inc. the fittings) does not exceed 1 no. standard offer pipe length.

d) Jointing of PE pipe with butt-fused Joints (approved method)

Southern Water's approved method of PE pipe jointing is by butt fusion. All PE pipe joints shall be butt-fused in accordance with Water Industry Specification 4-32-08. The preferred method of connection to tees, valves, non-return valves and other appurtenances is flanged connections either using end-restrained flange adaptors or stub flange/backing ring arrangements.

Pipe joints shall be externally de-beaded and twist tests conducted to check for weld ductility. Tested weld beads shall be bagged, labelled and retained by the SLP. Weld logs and bead test data shall be provided to Southern Water on request. There is no routine requirement for internal de-beading.

Note: Electro-fusion joints and/or mechanical joints shall not be used on PE pipes and fittings except in exceptional site specific circumstances (i.e. to circumvent an obstruction or a constraint prevents butt-fusion) or when a specialised anchor joint is required. Exceptions shall be by agreement with Southern Water prior to installation work commencing. See section e).

Example: if two PE pipe coils to be joined the resistance may preclude butt fusion of the two coils such that electrofusion may be the most appropriate jointing method.

However, best construction and our required preference is to ensure during construction in such an event is that jointing corresponds with the installation of a valve, a tee, or another fittings; where flanged pipework will be inevitably be present, so precluding the use of an electro-fusion joint at the point of connection between the two coils. The use of coiled pipe does not therefore provide an automatic or routine entitlement for the use of electro-fusion joints as such shall be assessed on a case by case basis in line with the above paragraph; as in most instances proper planning can prevent electro-fusion jointing.

Note: Electrofusion jointing is not permitted in any instance on PE coiled pipes above 180mm outside diameter or exceeding 225mm outside diameter on straight lengths (sticks).

e) Electro fused joints (when approved)

For Polyethylene pipes up to and including 225mm outside diameter for straight lengths (sticks) and up to and including 180mm outside diameter for coils, Southern Water will accept jointing using electrofusion couplers where butt fusion is not practicable due to site constraints only. Electrofusion jointing is not permitted above these diameters.

All jointing using Electrofusion couplers shall comply with the provisions of WIS 4-32-08 for workmanship and materials unless any provisions are superseded by BS EN 13067:2012 in which case the latter shall apply. All welders shall submit certification of passing examinations following accredited training to the provisions of BS EN 13067:2012 prior to commencement of welding and at any time as requested by Southern Water and such evidence shall be approved by Southern Water prior to undertaking welding using Electrofusion materials.

Data from calibrated proprietary equipment to record each weld's location and all relevant attributes related to the quality of each weld shall be recorded and provided on request by means of a printed report for each electro-fusion joint and its location pin-pointed on an as-laid drawing of the completed installation.

Electro-fusion couplers shall be blue coloured when the use of these couplers is approved.

21.3 Ground contamination – additional information

a) Pipe Protection (joints)

Pipe laid in contaminated ground shall comply with the Civil Engineering Specification for the Water Industry (CESWI) and Southern Water's following supplementary requirements;

- Where pipework passes through contaminated land it shall be suitably protected. Refer to 'Guidance for the Selection of Water Supply Pipes to be used in Brownfield Sites' and the Pipe Selection Manual by UKWIR (UK Water Industry Research) for advice on the selection of materials for pipelaying in contaminated ground.
- The SLP shall assess the need for clay stanks to prevent potential migration of contaminants, and during the design phase shall submit a typical detail drawing to Southern Water for acceptance.
- The SLP shall consult Pipe manufacturers as necessary to provide specialist, site specific, advice with regard to the suitability of their products for use in specific ground conditions. If fitting or joints that are supplied by a Manufacturer other than the one supplying the pipe, the SLP shall provide a risk assessment to SW to demonstrate how the minimum equivalent level of pipe protection shall be provided.

- Joints and fittings shall be kept to a minimum and protected in accordance with the manufacturers recommendations. As a minimum they shall be wrapped externally with aluminium tape which in turn should be protected with Denso tape or similar.

21.4 Civil Engineering Specification for the Water Industry (CESWI)

All works shall be in line with CESWI and Southern Water's CESWI supplementary clauses relative to this DCS are published on our website.

When we have approved the use of ductile iron pipe it shall be lined and externally protected in accordance with the requirements in the above documents and the following supplementary requirements to CESWI;

5.14 Protection of Ferrous Pipes, Joints and Fittings

Additional Clauses:

7. Damage to PE wrapping during pipe handling or installation shall be repaired by using polythene film to provide a good overlap and securing such overlays with waterproof wrapping tape.
8. Where ductile iron pipes are built into concrete of any type other than benching and haunching, the sleeving shall be terminated at the interface. The pipe at the interface shall be wrapped with waterproof adhesive tape over a 150mm length of which 50mm shall extend within the concrete to be cast.
9. Flanged joints, adaptors, collars and all other such connections featuring metallic fixings underground shall be protected using petroleum based tape with a minimum overlap of 55% to ensure at least two layers. Moulding compound shall be used on the connection surface as necessary to provide a smoothed profile such that the tape provides a water resistant seal to the fixings.

The requirements in the above section 21.3 shall also apply to pipework laid in contaminated ground.

21.5 Valves

21.5.1 Main(s) Isolation valves

Isolating valves shall comply with the Water Industry Mechanical and Electrical Specification 8.09, Issue 1, January 2014 and the following supplementary specification for wedge gate valves. This specification defines the amendments to WIMES 8.09 by utilising the WIMES clause numbers. Where a new clause is added, this is identified using the next sequential clause number and an '[N]' suffix.

6.0 General

5. [N] The equipment service life shall be a minimum of 20 years for above ground valves and 50 years for below ground valves.

6.4 Materials Selection

3. Valves used in conjunction with water intended for drinking, shall comply with the following:
 - Where a valve is utilised in conjunction with fully treated potable water (e.g. building services, chemical make-up water, domestic areas, hose points, etc.), it shall be WRAS approved in accordance with the 'Materials in Contact with Potable Water' section of MED 4001 Part A.
 - Aluminium Bronze CW307G is permitted

- 11.b) Fasteners exposed to corrosive gases and chloride levels over 200 ppm, but less than or equal to 1000 ppm, shall be A4.
12. Brass shall not be used where H₂S gas is present.

6.8 Marking

2. Reference labels shall be supplied and comply with MED 4001.

8.0 OPERATING REQUIREMENTS

8.2 Manual Operation

8.2.1 General

4. Where ever possible valves shall be installed so that they can be operated from waist height. Where this cannot be achieved, then the valve shall be capable of being operated comfortably or one of the following shall be supplied:

- Permanent access
- T-key
- Gearbox
- Chainwheel
- Extension system

8.4.1 General

5. The extension system materials shall be a minimum of carbon steel coated in accordance with clause WIMES 8.09 clause 6.6.1.

8.4.3 Couplings

2.c) Universal couplings shall be provided with protective gaiters and stainless steel clips.

APPENDIX A 1.0 WEDGE GATE VALVES

APPENDIX A 1.1 Cast Iron Wedge Gate Valves (DN > 50)

APPENDIX A 1.1.1 Performance and Design Requirements

- 6.b) Endurance for manual valves shall be 2500 cycles.
- 6.e) Valves < 600mm shall be resilient seated; valve >= 600mm shall be metal seated.
- 6.f) Stem seals shall be o-ring.

21.5.2 Pressure Reduction Valves, Pressure Sustaining Valves and Flow Control Valves

The need for and locations of Pressure Reducing Valves (PRVs), pressure sustaining valves (PSVs) and flow control valves shall be discussed and agreed with SWS.

PRVs, PSVs and flow control valves shall comply with the Water Industry Mechanical and Electrical Specification 8.09, Issue 1, January 2014 and the following supplementary specification;

C 1.0 LINE PRESSURE DRIVEN CONTROL VALVES (FOR PRESSURE, FLOW, LEVEL AND PUMP CONTROL)

- 5) The following additional features shall be incorporated into the valve:
- m) Minimum pressure ratio of 4:1
 - n) Opening and closing speed control
 - o) Plugged bosses for connecting gauges

21.6 Concentric tapers

Where concentric tapers are fitted, consideration should be given to the release of air, especially at meters etc.

21.10 Boundary boxes:

See paragraph 23.2 for drawing showing alternative acceptable location positions relative to Site constraints on acceptable locations.

21.11 As-laid drawings (clarification of requirements)

Further to paragraph 16; as-laid drawings shall be provided for all commissioned mains relative to the Site with Service Pipe and meter locations being detailed there-in.

The as-built drawings shall be issued to us in an electronic format that is compatible with our current systems and records as follows and we may also require a hard copy of all documents.

The following also applies:

- Drawings shall be produced on Auto CAD 2004 (or later) compatible DWG files (including all supporting layers and backgrounds).
- PDF copies of all CAD Drawings shall be provided.
- GIS data: the location of all new adoptable assets shall be accurately captured on site by GPS with a suitable survey.
- The drawings shall comply with current drawing semiology and be appropriately scaled, accurately show the location of the apparatus, detail all fittings, the material types used and pipe diameters.
- The drawings shall clearly show the location of all installed mains, services and meter chamber positions, diameter of pipe, locations of Sustainable Underground Drainage Systems (“SUDS”) and material (including any distinction between protected or otherwise due to contaminated ground) of pipe.
- Drawings shall be accurate to within 0.1m.
- Electro-fusion and/or mechanical joints (when the usage has been approved by us) shall be accurately described and shown on the drawing.

21.12 Main Commissioning: Disinfection of Pre-coiled Pipe

Where we have agreed to off-site pre-disinfection of coils then the following additional procedures shall be applied:-

- Factory sealed coiled pipe shall be installed within six months of the disinfection/sterilisation date. If more than six months has passed, the pipe shall be re-chlorinated.
- Factory sealed coiled pipework shall be charged with mains water then left to stand for 24 hours prior to sampling following which the SLP shall take representative water samples from the coiled pipe.
- Once satisfactory sample results have been provided pipework ends are to be marked with the sample tag number and use by date.
- Where a factory sealed coiled pipe has been cut or there's any doubt about the disinfection status of the pipe (or it's suspected that contamination has occurred) the coil shall be re-chlorinated.
- Bacteriological sample results and actions shall be recorded against the coil's unique tag number.

21.13 Permeable Paving

It has currently been determined that the risk from hydrocarbons to PE water main pipes is low and therefore notwithstanding compliance with contaminated land assessment guidance, use of standard PE pipes in permeable paving access roads within residential developments is acceptable.

22 Meter and Service Pipe Policy and Installation

22.1 Meter and service pipe policy and Installation

All new build properties shall be metered and this paragraph sets out the criteria relating to the design and installation of water service pipes and related meter locations for domestic properties in order to achieve a standard which is compliant with Southern Water's preferred options to achieve a resilient network installed to a consistent specification.

Our current policy is that all meters shall be located externally to ensure ease of access for reading and maintenance, and for reducing unnecessary disturbance to customers in the future and accordingly such our preferred scenarios in order of precedence are detailed under sub-sections a) to c).

Our current requirement is that meters are generally to be installed at the back edge of the highway boundary in a footpath or service strip but alternative locations may be permitted to suit development layout constraints. See also the preferred scenarios relative to installation of meters that are in our required order of precedence.

Consideration is to be taken in the design of any new main to ensure that the boundary box (meter chamber) is suitable for passage of vehicular traffic when such is sited where vehicular traffic over the chamber could occur post installation.

See paragraph 23 for drawing showing alternative positions for the location of meters/boundary boxes when the design of a Site layout does not adequately provide suitable proposed adoptable footpaths and/or service strips.

The SLP and/or Developer is responsible for the installation of all necessary pipework and the boundary box (and meter) unless otherwise agreed with us; and the installation of the meter after, which, and thereafter we assume responsibility for the chamber and meter.

a) Scenario One: External meter in chamber

See paragraph 23.1 Diagram 1 which shows how the boundary box (meter chamber) is to be located at the back edge of the footway and/or adoptable service strip.

See paragraph 23.2 Diagram 4 and 4a which details pipework entry into a building and the relative position of external pipework in trench, and

See paragraph 23.3 Diagram 4b which details the Installation of service pipe, meter chamber, and required installation depth(s).

In the event that the meter chamber is to be located in a service strip with a soft surface (i.e. verge) the cover is to be set within a suitable concrete surround set flush with the final permanent surface in which the chamber is to be located in. Note: in the event that the SLP does not set the cover to a final finished level as construction work is still on-going by a Developer, the SLP may have to retrospectively insert the concrete surround protection when the final surfaces are constructed (but this is to be discussed and agreed between all parties relevant to the Agreement between Southern Water, the SLP and the Developer).

Single meters shall be installed in an approved boundary box with an integral meter carrier and stop-tap; and multiple numbers of meters in an approved multi manifold chamber of typically two to six meter ports. Meter chambers, covers and frames shall be suitable for the final surface, ground conditions, and location in which they are to be installed.

We do not currently accept boxed wall mounted with external meters but if the SLP/developer wishes such to be considered we will consult with them.

b) Scenario Two: - Internal meter installed inside a property

In the event that we accept that scenario one is not possible or practicable due to Site constraints or considerations (including design) then single or multiple services into a property may be accepted and be internally metered in accordance with this scenario two.

If an SLP/developer therefore wishes to install internal meters this is to be identified at the design stage when applying for a service connection and we will assess and confirm our decision.

Internal meters, related pipework, and fittings shall be of a material that is suitable and appropriate to the location in which they are to be installed and be accessible for future reading, exchange, or maintenance. For instance, internal meters are typically installed in meter cupboards or plant rooms and as such they can easily be disturbed or exposed to extreme temperatures, so Material selection is to suit the location.

It is our preferred requirement that multiple meter manifolds are constructed of gunmetal and be suitably protected. Any alternative to this shall require our approval.

Our policy is that internal meters are fitted with radio reading devices so they can be read from outside of the property to ensure that customers aren't inconvenienced by meter reading personnel requesting future access.

See paragraph 23.3 Diagram 2 which shows an illustration of a typical single meter installation of in-line meter (not on manifold).

Diagram 3 (paragraph 23.4) shows a meter carrier for a single and/or multiple internal meter installation (which can also be used on a multiple manifold).

Only one meter shall be installed per individual property and in no circumstances shall more than one meter be installed to supply the same property unless the property is a block of flats with multiple individual units (which may have a single person or appointed organisation responsible for water supplies to said flats). In this instance a suitably sized meter may be installed once accepted and agreed by us.

Student accommodations may not be typically individually metered but could be supplied by a suitably sized single meter to supply the accommodation block. In the event said meter has a nominal diameter of 40mm or

above it shall require to be sited on a bypass arrangement for ease of future maintenance or meter exchange.

Internal manifolds and meter carriers guidance

When manifolds are accepted and a pre-fabricated manifold isn't available (or suitable) the SLP/Developer is responsible for any required fabrication of the internal meter manifold.

A six-way internal manifold (typically 540mm wide x 340mm high) requires 90mm space on either side to accommodate the meter and space to fit it. It shall be fixed securely to a wall, and if located in a cupboard it will typically protrude 250mm from the wall.

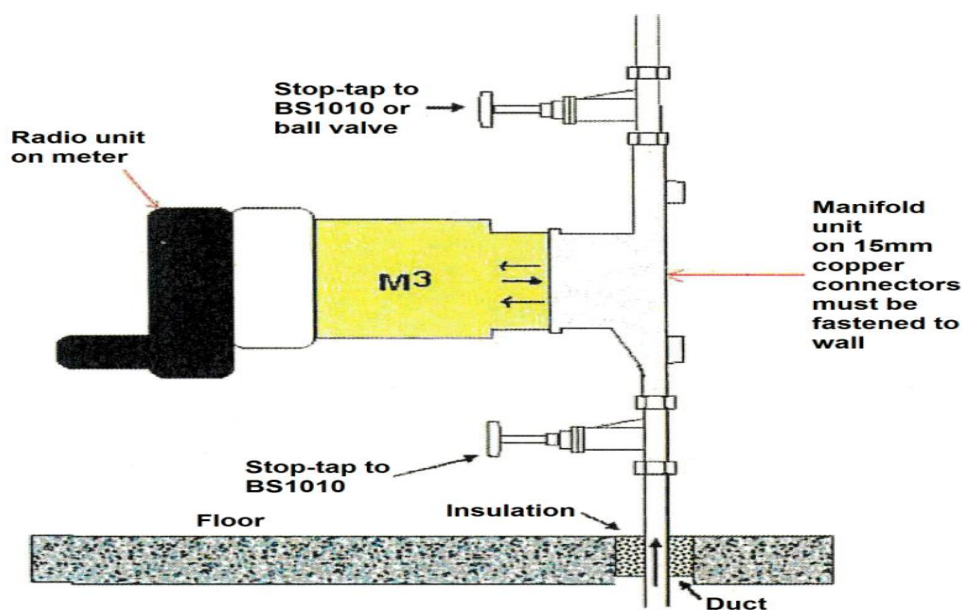
A single internal manifold (meter carrier) is typically 65mm wide x 110mm long and requires 160mm between the centres to enable the meters to be screwed in, and likewise must be fixed securely to a wall. Material selection shall be designed to suit the proposed location, and unless otherwise agreed by us meter carriers shall be constructed of gunmetal and be suitably protected.

Fitting the manifolds guidance

If the pipework is incorrectly installed when a meter installer turns up it may not be possible to fit the meter(s) resulting in a delay whilst awaiting correction.

When the manifolds are installed they shall satisfy the following;

- A single stop-tap shall be installed on the inle
- t to a six or four-way manifold (of the same diameter as the inlet pipe) to enable the manifold to be completely isolated and exchanged.
- Safe and comfortable access to the manifold shall be provided to install or exchange meters.
- A non-return (check) valve and drain cock shall be installed immediately upstream of each meter.
- Each pipe shall be tagged to indicate the apartment/unit it supplies (i.e. a block of flats or properties with multiple units).
- A stop tap is to be fitted in each apartment or unit and left closed following installation.
- Single manifolds require 160mm between the centres to enable the meters to be screwed in and shall comply with the drawing under.



c) Additional information on service / meter installation(s)

- Meter chambers shall be of a self-contained type, with integral meter carriers and isolation valves.
- The boundary box shall be installed so that all joints are water tight.
- Excavation around the water main shall expose the point of connection to the pipe and also relative to any road crossing ducts (for service crossing of roads) for the service connection to be made.
- The supply pipe shall consist of a single length of pipe (no joints) installed from the property footings (and from the internal stop-tap) to the boundary box (meter chamber) outlet where the connection with the boundary box is to be made; leaving a sufficient length to make the connection as necessary.
- The communication pipe shall consist of a single length of pipe (no joints) installed from the inlet of the boundary box (and integral pipework) to the point of connection with the supply main; leaving a sufficient length to make the connection as necessary.
- Pipework shall be capped with a mechanical fitting until the trench and pipework have been inspected by Southern Water, and passed as satisfactory to connect to the supply main.
- Southern Water shall not be liable for blockages in the pipework once the connection is made so installers shall ensure that all pipework is free of debris prior to fitting a cap end and has been flushed and tested in accordance with the Water Regulations.
- All pipework shall be clearly marked up to identify the plot it will be supplying.
- External meter (single boundary box/chamber and/or multiple meters in manifold chamber) are to be installed within 300mm of the back edge of the kerb within a service strip or public adopted footpath.
- When boundary boxes and/or manifold chamber(s) are to be laid fronting a communal driveway separate supply pipes shall be installed in a communal excavation in the driveway and brought out to the highway/road location for the point of connection to the main unless otherwise agreed with us at the design stage.
- Preferably, where possible, chambers shall be sited clear of vehicular traffic or else a suitable boundary box able to withstand vehicular traffic shall be installed.
- All excavations shall be backfilled with suitable and appropriate materials but the joints at the meter chamber shall be left exposed until all connections are satisfactorily completed.

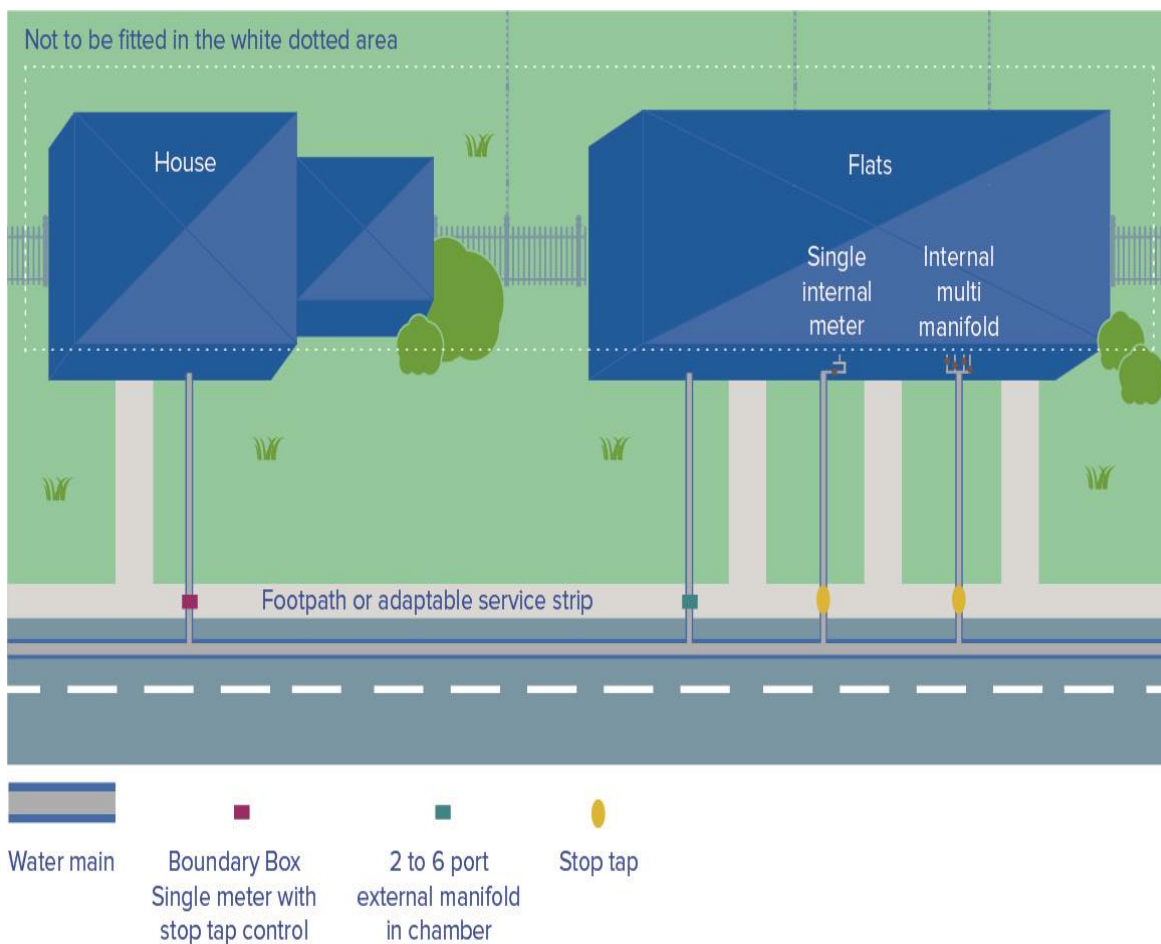
d) Guidance notes for meter manifolds (see diagram 23.4)

- In accordance with our preferred requirement the meter carrier shall be gunmetal or a similar approved material (plastic is not recommended in this installation) complete with integral stop-taps and non-return valve and both the inlet and outlet shall have $\frac{3}{4}$ inch BSP threaded ends.
- The meter carrier shall be fixed securely to a wooden backboard.
- Meters are to be installed that provide a safe and comfortable access for maintenance or meter replacement. Meters are preferably to be located at eye level for ease of viewing.
- A stop-tap shall be installed on both the inlet and outlet pipework to a meter. Note: The stop tap with an external single meter is typically located in the boundary box as an integral part of the chamber.
- All individual flats shall have individual meters (no shared supply shall be accepted) and the location of individual meters to a flat shall be obvious and identified.
- Access for meter reading and/or maintenance shall be provided for 24 hours a day, 365 days a year. Meter readers may not have any special keys to open doors to premises, gated communities or lockable plant room. Any doors to a room that contains meters shall have a coded key pad (codes to be notified to us) and meter cupboards shall not be lockable.
- Following installation the meter is owned by us, as is any boundary box and we are responsible for maintaining and/or replacing these. Charges apply if damage is caused by a third party.

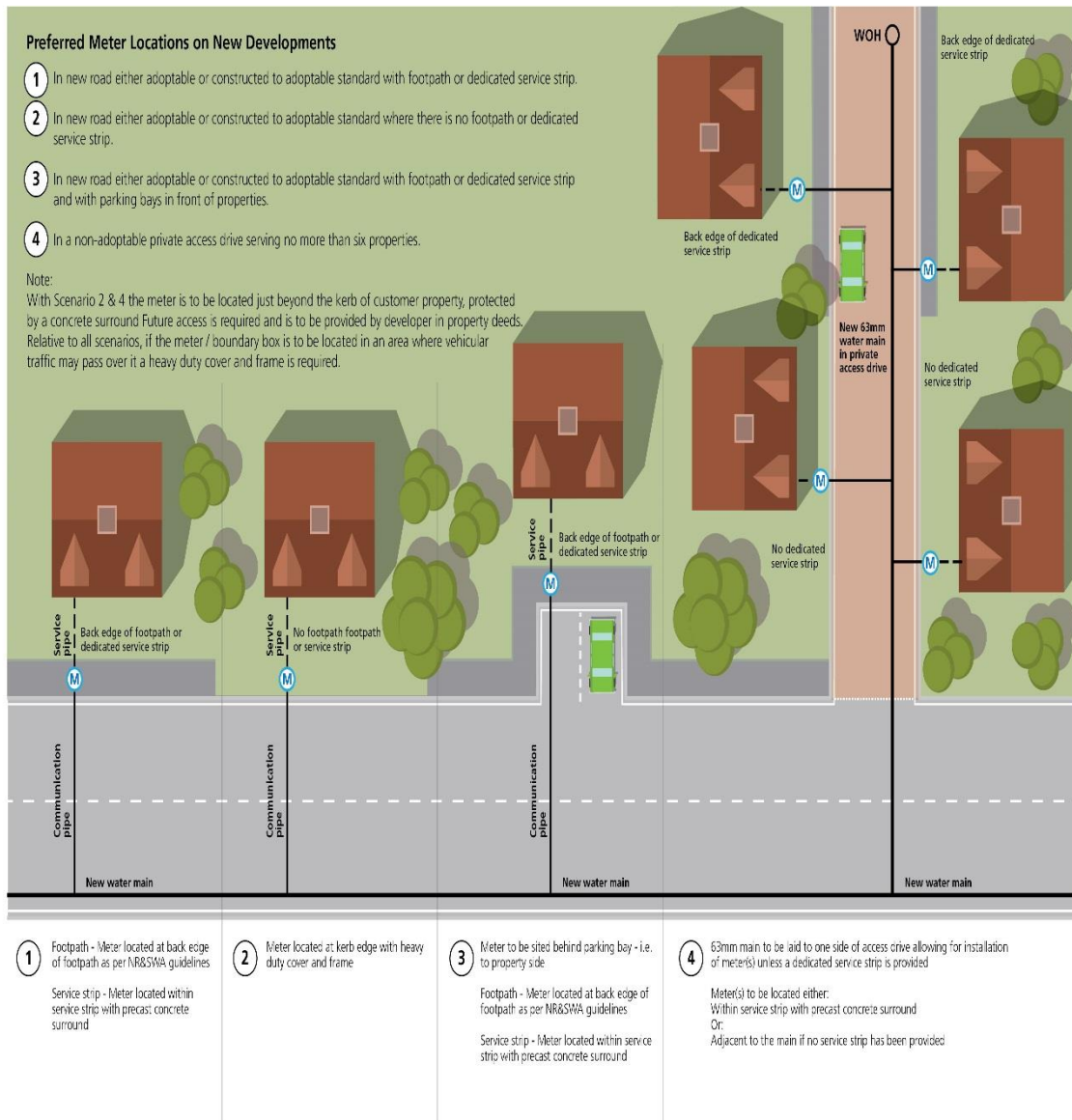
- The meter carrier and associated pipework is not our responsibility but that of individual property owners and/or managing agents (i.e. of flats) who are responsible for all future leaks, repairs and/or maintenance. This includes all pipework installed within the curtilage of a property (i.e. the supply pipe) to the property boundary with the highway.
- Water and electrical apparatus shall not be installed in close proximity or within the same cupboard) and the current Electrical and wiring Regulations shall apply.

23 Standard Arrangement Drawings

23.1 Diagram 1: Typical location of boundary boxes in a service strip or footpath.

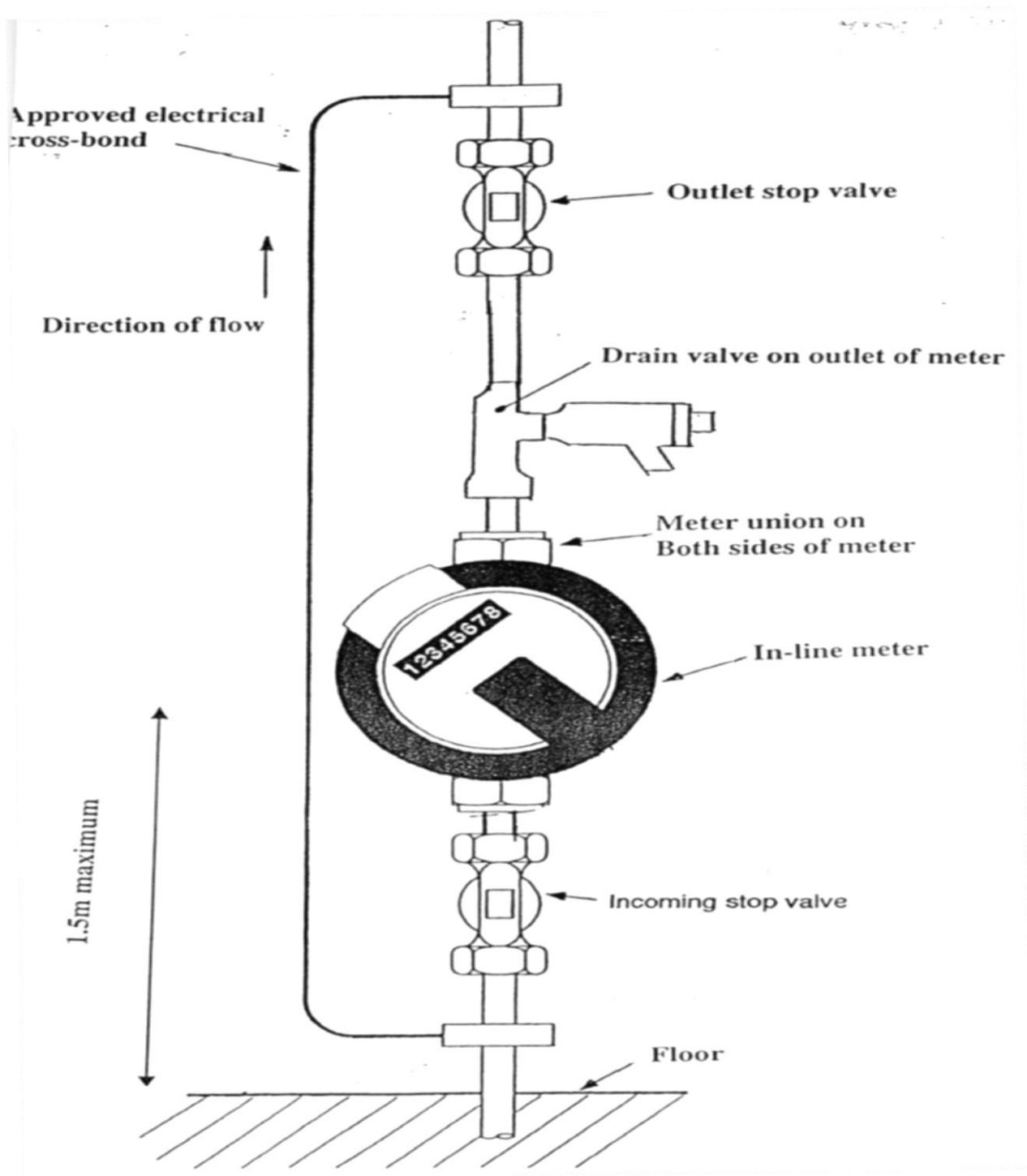


23.2 Diagram 1a: Alternative acceptable locations of boundary boxes relative to a service strip or footpath / highway.



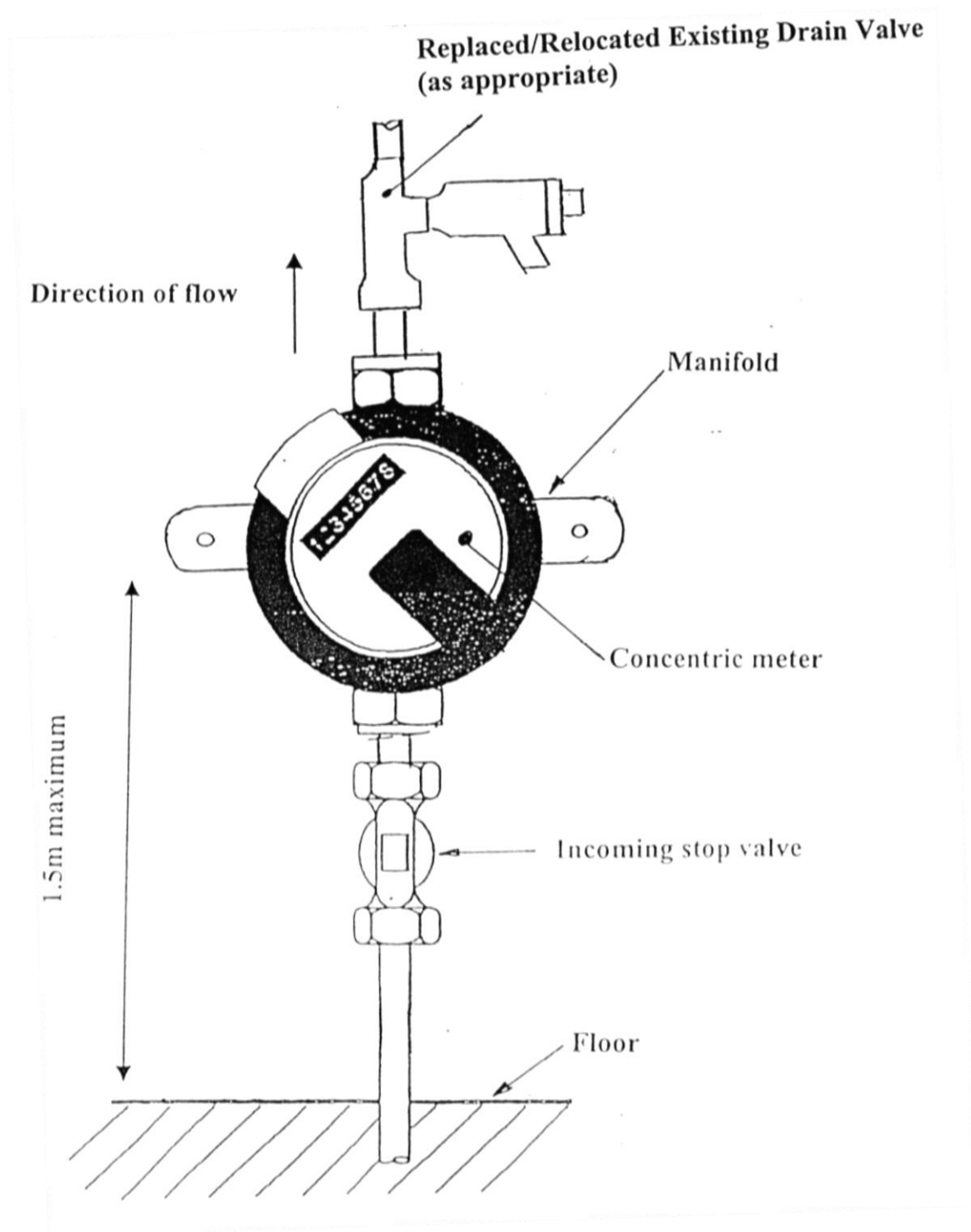
23.3 Diagram 2: Typical single meter installation with In-line meter (not on manifold)

In the below diagram a double check valve shall be inserted after the meter but before the drain-cock. An external installation does not require a drain-cock or stop tap on the outlet.



23.4 Diagram 3 (3a): Typical meter carrier installation for a single and / or multiple internal meter installation

In the below diagram a double check valve shall be inserted after the meter but before the drain-cock. An external installation does not require a drain-cock or stop tap on the outlet.

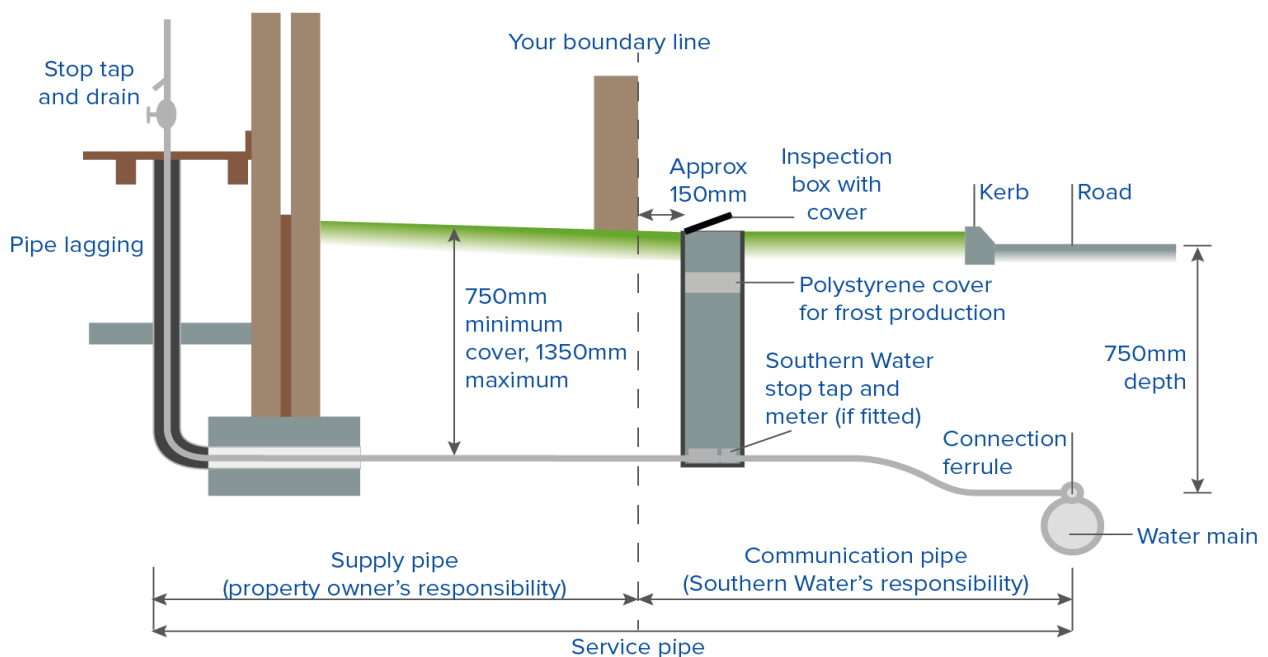


23.5 Diagram 3 (3b): Typical internal meter manifold multi meter installation



Diagram 4 (4a): Typical installation of service pipe, meter chamber box, and depths

For additional information, please refer to the WRAS Guidance on 'Water System and design installation' and in particular Section 4, Schedule 2, paragraphs 8, 9,10,11,12 and 13, together with Schedule 2, Section 3, paragraphs 3, 4, 5, 6 and 7.



The maximum installation depth (cover to crown of pipe) for service pipes shall be 1350mm.

Diagram 4 (4b): Typical details of pipework entry into a building and relative position of external pipework in trench

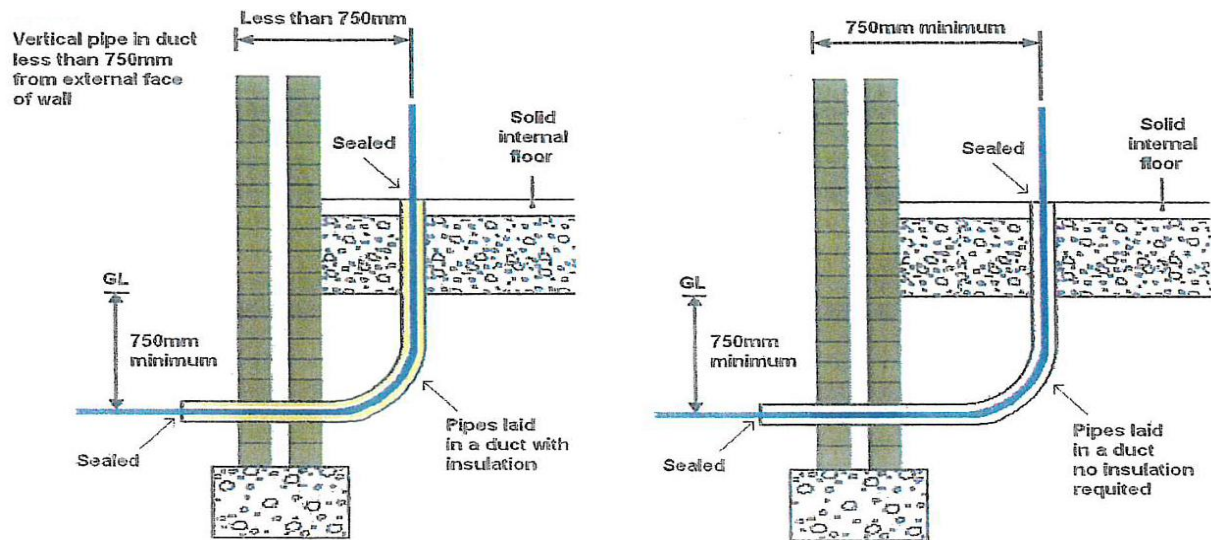


Diagram 4b-1; Pipes entering buildings below ground*

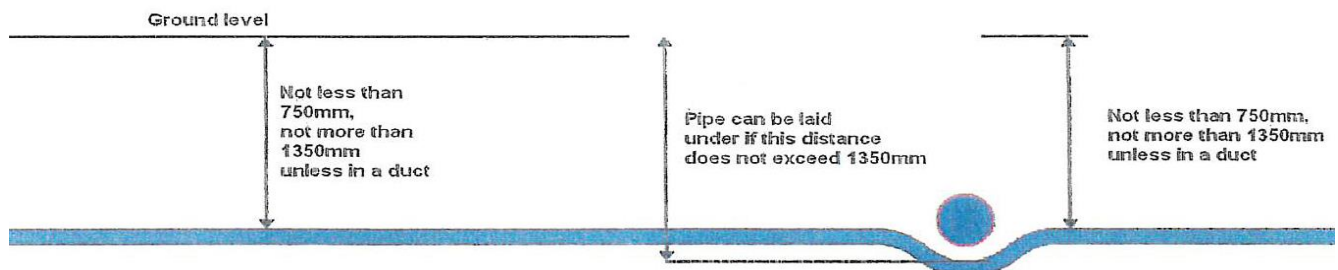


Diagram 4b-2; Pipes laid under an underground obstruction*

**Adapted from; Figures 3.3. and 3.4 of DEFRA document "Water Supply (Water Fittings) Regulations 1999 Guidance Document relating to Schedule 1: Fluid Categories and Schedule 2: Requirements For Water Fittings"*

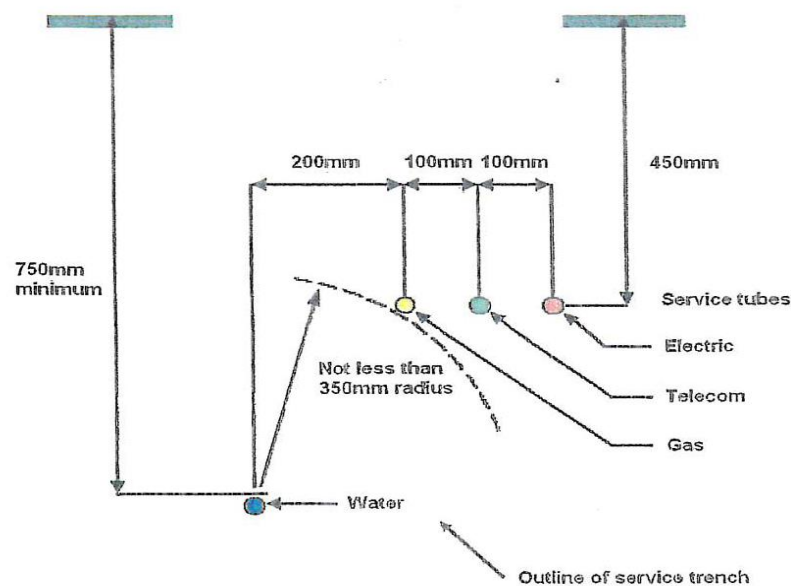


Diagram 4b-3; External pipework in trench

24. Construction Pre-Start Meeting Agenda

A pre-start meeting shall only be required if one party to the WAA submits a written request to the remaining Parties notifying them that it requires a pre-start meeting. The Parties shall agree the date of the pre-start meeting and the Developer and shall record the minutes of the meeting and circulate such within 5 calendar days. The pre-start meeting shall include the 'pre-start information' listed below.

Where no pre-start meeting is required by a party, the SLP and/or Developer shall, if requested by the Water Company, prior to the commencement of the Self-Lay Works, provide the following pre-start information in any event.

21.6.1.1.1.1 'Pre-start information' includes as a minimum:

1. Confirmed arrangements for CDM 2015 Regulations and other H&S requirements.
2. Future contact arrangements and authorised parties for giving instructions, agreeing "right day" for SLAs, making variations, and exchanging information regarding progress with all parties' works.
3. Confirmation of line and level of Self-lay Works.
4. Confirmation of national (Street-Works) and local (Water Company) design requirements.
5. Overview of process for dealing with variations/ and changes to the Site layout and associated approved design drawing (revisions and impact on design, co-ordination and charges etc.).
6. Confirm and detail the Source of Water for testing and mains connection Delivery Date.
7. Confirm latest design approved drawing, and any revision, and drawing for construction
8. Process for submitting as-laid drawings.
9. Identify any potential site hazards or constraints (such as existing Network considerations, including protection, diversion or renewal)
10. Confirm that access is approved relative to any land rights, statute, and third-party consents.
11. Contact details.
12. An indication of when any new service connections are required by and if any new property is to be fed from the Network.
13. Confirmation that the Agreement has been signed by all Parties.

14. Completion and issue by the SLP and/or Developer and/or the Water Company of all risk and method statements relative to design and/or construction activities.
15. Arrangements for co-ordination of activities.
16. Arrangements for supply of proof of WIRS Accreditation, personnel qualifications and/or certification documents (i.e. Hygiene Code of Practice).
17. Arrangements for water sampling and requirements for certification and accreditation of results, pressure testing, and disposal of water.
18. Arrangements for Water Company approved standpipe supply if required.
19. Confirmation of all required Regulatory requirements, arrangements, permits and consents relative to the construction, flushing (and any future arrangements to maintain water quality), and commissioning of the Self-lay Works.
20. Confirmation of any requirement for a Water Company post commissioning check sample by the Water Company in accordance with the Code Procedures.
21. Arrangements and contact details for future management of Defects and/or damage following adoption.
22. Confirmation of how the SLP proposes to demonstrate to the Water Company that the materials and products intending to be used (and on completion of work all actual materials used in case of divergence from the intended list) in the installation of Self-lay Works complies with Regulation 31 of The Water Supply (Water Quality) Regulations 2016 before commencement of any work. This confirmation may consist of the SLP providing the Regulation 31 appropriate identifier relative to the materials proposed.

Appendix 1

WIS & IGNS

Number	Title	
S 4-08-02	Specification for bedding and sidefill materials	
IGN 4-37-02	Design against surge and fatigue conditions for thermoplastic pipes	
IGN 4-01-03	Guide to Pressure Testing of Pressure Pipes and Fittings for use by Public Water Suppliers	
R128	CIRIA Report "Guide to the Design of Thrust Blocks for Buried Pressure Pipelines".	
IGN	4-01-03	Water Industry Information and Guidance note - Guide to Pressure Testing of Pressure Pipes and Fittings for use by Public Water Suppliers
IGN	4-08-01	Bedding and sidefill materials for buried pipelines
WIS	4-08-02	Specification for bedding and sidefill materials
WIS	4-21-02	Mechanical couplings and repair clamps for iron pipes for the conveyance of cold potable water (underground use) for the size range 40 to 1600mm
WIS	4-22-02	Specification for ferrules (tapping tees) and ferrule straps for underground use
WIS	4-23-04	Specification for underground stop valves, including spherical valves, for potable water services for nominal sizes up to and including 63 and nominal pressures of 10 bar minimum and made principally of metal or thermoplastics
WIS	4-52-03 & 4-52-03A	Specification for Anti-Corrosion Coatings on Threaded Fasteners. See also amendment 4-52-03A

WIS	4-32-08	Specification for the fusion jointing of polyethylene pressure pipeline systems using PE80 and PE100 materials..
WIS	4-32-11	Specification for thermoplastic end load resistant mechanical fittings for polyethylene pipes of nominal size < 63mm. Note with outside diameters to BS 5556 (metric)
WIS	4-37-01	Specification for boundary boxes for the metering and control of domestic and small industrial water services.
WIS	4-32-16	Specification for butt fusion jointing machines.
WIS	4-37-01	Specification for boundary boxes for the metering and control of domestic and small industrial water services (see also British Standards).
IGN	4-37-02	Design against surge and fatigue conditions for thermoplastic pipes.
IGN	4-50-03	Operating guidelines for the use of site-applied, factory applied, and reinforced factory applied polyethylene sleeving on ductile iron pipeline systems
IGN	4-51-01	External zinc coating of ductile iron pipe.
WIS	4-52-01	Specification for polymeric anti-corrosion (barrier) coatings.
IGN	4-52-02	The use of polymeric anti-corrosion (barrier) coatings.
IGN	9-04-05	Report of the expert group on the risks of contamination of the public water supply by backflow at: http://wras.co.uk

British Standards (BS) & BS EN Standards

Number		Title
BS EN 124		Gully tops and manhole tops for vehicular and pedestrian areas
BS		
BS5834-2		"Meter chamber" - Boundary box - (and when for use in areas subject to occasional vehicular access relevant aspects of this BS apply) with anti-slip lid design to BS 7976 Part 2 Internal fitted NRV in accordance with WIS 5-11-01(BS EN 13959 and shut off device rising-spindle with WIS 4.23.04.
BS EN 805		Water Supply – Requirements for systems and components outside buildings
BS 8588		Polyethylene pressure pipe with an aluminium barrier layer and associated fittings for potable water supply in contaminated land. Size 20 mm to 630 mm
BS 8561		Specification for mechanical fittings for use in the repair, connection and renovation of pressurized water supply pipelines. Requirements and test methods
BS EN	545	Ductile iron pipes, fittings, accessories and their joints for water pipelines. Requirements and test methods.
BS	750	Specification for underground fire hydrants and surface box frames and covers.
BS EN	805	Water supply. Requirements for systems and components outside buildings.
BS EN	806	Specifications for installations inside buildings conveying water for human consumption. Operation and maintenance.

BS	1042-2.2 & ISO 1745	Measurement of fluid flow in closed conduits and Determination of flowrate of fluids in closed conduits of circular cross section – Method of velocity measurement at one point of cross-section.
BS EN	1295	Structural design of buried pipelines under various conditions of loading. General requirements.
BS	3251	Indicator plates for fire hydrants and emergency water supplies.
		Part 1: Hose Reels and Foam Inlets.
BS	9295	Guide to the structural design of buried pipelines.
BS EN	12201	Plastics piping systems for water supply, and for drainage and sewerage under pressure. Polyethylene (PE). General.
		Part 2: Pipes.
		Part 3: Fittings.
BS EN	13067	Plastics welding personnel. Qualification testing of welders. Thermoplastics welded assemblies.
BS	PD 855468	Guide to the flushing and disinfection of services supplying water for domestic use within buildings and their curtilages.

Other documents

Number / Date	Title
10/WMI/03/21	Guidance for the Selection of Water Supply Pipes to be used in Brownfield Sites
CESWI	Civil Engineering Specification for the Water Industry 7th Edition (or later version thereof) ("CESWI") together with any Water Company amendments (to be published on Water Company website with DCS).
2009/03	Guidance Note On Notification of Methods of Reinstatement using EToN available at: http://hauc-uk.org.uk/
Published January 2014	Contaminated Land Assessment Guidance: Protocols Published by Agreement Between Water UK and the Home Builders Federation https://www.water.org.uk/guidance/contaminated-land-assessment-guidance/
Water UK/HBF National Joint Committee 2014 (available free of charge at: http://www.water.org.uk/publications/water-industry-guidance)	Water UK/HBF National Joint Committee 2014 (available free of charge at: http://www.water.org.uk/publications/water-industry-guidance)
Volumes 1 - 6	Streetworks UK (formally National Joint Utilities Group) Guidance Publications available at: http://streetworks.org.uk/resources/publications/
R128	CIRIA Report "Guide to the Design of Thrust Blocks for Buried Pressure Pipelines".

	Principles of Water Supply Hygiene & Technical Guidance Notes (available from Water UK online at water.org.uk/publications/reports/principles-water-supply-hygiene)	
Drinking Water Safety - Guidance to health and water professionals		DWI, Available free of charge at: http://dwi.defra.gov.uk/stakeholders/information-letters/2009/09_2009Annex.pdf
Drinking Water Safety - Guidance to health and water professionals	Specifications for polyethylene pipe and fittings:- https://bpfpipesgroup.com/support-downloads/guidance-notes/ instead of the individual document. Specifications for PVC pipe and fittings:- https://bpfpipesgroup.com/support-downloads/guidance-notes/ instead of the individual document.	
Report R97	Trenching Practice (2nd edition)	CIRIA, 1983 Available at: http://www.ciria.org/ItemDetail?iProductCode=R97&Category=BOOK&WebsiteKey=3f18c87a-d62b-4eca-8ef4-9b09309c1c91
Report 128	Guide to the Design of Thrust Blocks for Buried Pressure Pipelines	CIRIA, 1994 Available at: http://www.ciria.org/ItemDetail?iProductCode=R128&Category=PHOTOCOPY
HSG 47	Avoiding Danger from Underground Services	HSE Books, 2014 Available free of charge at: http://www.hse.gov.uk/pubs/priced/hsg47.pdf
	Specification for the Reinstatement of Openings in Highways (3rd Edition)	Department of Transport 2010 Available at: https://www.gov.uk/government/publications/specification-for-the-reinstatement-of-openings-in-highways

	Water supply to domestic fire sprinkler systems	Water UK June 2015 (and earlier documents Available free of charge at: http://www.water.org.uk/publications/policy-positions-and-briefings/water-supply-domestic-fire-sprinkler-systems
DEFRA	Water Supply (Water Fittings) Regulations 1999 Guidance Document relating to Schedule 1: Fluid Categories and Schedule 2: Requirements For Water Fittings"	
Hydraulics Research	Charts for the Hydraulic Design of Channels and Pipes	
UKWIR	Guidance for the Selection of Water Supply Pipes to be used in Brownfield Sites'	
	Pipe Selection Manual	
WIMES	Water Industry Mechanical and Electrical Specification (Published by the Pump Centre	
	8.03	Mechanical Installation
	8.09	Valves