Design and construction specification

Version 1.6

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Contents

Change log

Revision	Amendment	Originated	Reviewed	Authorised	Published date
1	• Original	J. Webster	-	-	Oct 2020
1.2	• Change to Section 10.1 • Change to Table 9.3	N. Webster	-	-	Nov 2021
1.3	• Change to Section 9.8 • Change to 10.1 table and text	J. Snowball	-	-	Sept 2022
1.4	• Change to 9.8.8 (Note Taken Out) • Change to section 21	J. Snowball	-	-	Jan 2023
1.5	• Change to 10.4 Peak Flow • Change to 17.3 Mains Bacteriological Sampling • Added Section 19.5 Water Quality Training Requirements • Added Section 19.6 Host Main connections 63mm — 300mm and PVC • Change to section 9.5.8 and 9.7 • Change to section 10.1;2;3;4;5;7.3;7.4 • Change to section 11.3;4;6;7;8;9;10;12 • Change to section 12.1;3;4;5;6 • Change to section 13.3;7 • Change to section 14.1 • Change to section 15.2;4 • Change to section 17.2;3;4 • Change to sections 19, 21, 22	G. Kerman	N. Webster	G. Kerman	July 2024-2025
1.6	• Change to section 12. Service pipe Design and installation • Change to section 12.2 • Change to section 12.4 Location of boundary boxes • Change to section 22 Meter and service pipe Policy and installation • Change to section 22.1	M. Johnson	J. Snowball	J. Snowball	December 2025

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.

Over time, it is envisaged that work will be undertaken to reduce the scope of variation between each Water Company's version 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 and Guidance Notes
IWater	Institute of Water
LR	Lloyd's Register EMEA
MDPE	(PE80) medium Density Polyethylene
NCO(W)	Water Network Construction Operations
NRSWA	New Roads and Street Works Act
NVQ	National Vocational Qualification
OFWAT	the Water Services Regulatory Authority
PE/AL/PE	Polyethylene Aluminum 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
SLP	Self-Lay Provider
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
WAA	Water Adoption Agreement
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
hL	Head loss due to Friction, metres
L	Length in metres

G	Gravitational acceleration, ms-2
D	Diameter, millimetres
i	Hydraulic Gradient, metres per metre
ϴ	Kinematic viscosity of fluid, m /s
Ks	Effective roughness value, millimetres
Qt	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 referred to expressly 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.

8. Construction (design and 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 and during any subsequent maintenance operations
- Make the Water Company aware of any non-standard method of operation applicable to the Self-Lay Works

- Record non-standard 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

The SLP responsible for the proposed construction shall be made aware of the risks identified by the Designer and the control measure required to reduce the risks to an acceptable level.

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 (Pre-construction information)

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 control valves 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. Please note where an SLP is to carry out the design they shall need the 'Design' accreditation to undertake this. An application form on Anglian Water customer interface InFlow 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 require a tee piece to be installed. This 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.

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 (e.g. 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 Schedule 1 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 on 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 WSG.

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 the 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.

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 WSG). Where further activities are accredited by WIRS, such activities shall be marked as green in the above table once approved 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.

Table 9.3

	Number of properties potentially affected by work			
	50<	50-199	200-499	500+
Design of new water network (subject to SLP achieving design accreditation)				
Construction of new mains and service connection assets in accordance with WIRS scope				
Construction of new mains as part of reinforcement*, mains extension or diversion work				
Chlorination and pressure testing				
Meter installation (physical)				
Taking water quality samples				
Analysing water quality samples				
CRMC connections (subject to SLP holding suitable CRMC accreditation)				
Connection up to 63mm				
PE/Barrier pipe to: Parent main: 12 < CI/SI/DI/AC/PE/barrier pipe/steel Operational pressure: up to 50m				
Connection up to 63mm and 300mm				
PE/Barrier pipe to: Parent main: 12< CI/SI/DI/AC/PE/barrier pipe/steel Operational pressure: up to 50m				
PE/Barrier pipe Parent main: 12 to 18 (300mm-450mm) CI/ SI/DI/AC/PE/barrier pipe/steel Operational pressure: 50m to 75m				
Connection more than 300mm				
Parent main: >18 or high-risk parent material (Such as steel) Operational pressure: >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 mains				
Design of Network Reinforcement (Upsizing of existing infrastructure)				
Pipe sizing criteria and the approval of designs by others				
Assessment of network risk and operating live network				
Commission telemetry links (meters/field equipment)				
Connection and decommissioning of diverted mains				

*** Please note:**

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

9.4.5 References to the Final Connection of the Self-Laid Main to the Existing Main on the Network are;

a) of an under-pressure type connection and/or,

b) 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,

c) 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 and the relevant assets are subsequently adopted by the Water Company (and 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 Water 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 or relevant experience to undertake this activity. This may be demonstrated where the Water Company has previously observed relevant Self-Lay Works having been carried out by the SLP 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 Water Company requirements relative to valve operation in relation to commissioning of Self-Lay Works, a 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 Host main connections between 63mm and 300mm and PVC connections

Anglian Water allow parent main connections that are greater than 63mm up to 300mm. In order to request to undertake these connections the SLP must:

- Hold the required WIRS accreditation for this activity in order to undertake the connection which will be checked at application and pre commencement stage.
- Submit materials list with in date Regulation 31 information to be reviewed by the Anglian Water representative.
- Submit SL1 and SL7 form and ensure that a whereabouts is submitted on a weekly basis with any changes updated. Sufficient notification of planned connection date is required to ensure that all tasks can be completed before the connection is undertaken
- Operatives hold an EUSR registration and can evidence that they have received the required internal training.
- Operatives must have undertaken Anglian Water's internal water quality training.

All companies working on Anglian Waters network must have a train the trainer. A train the trainer is a representative that is trained by Anglian Waters water quality team to enable them to deliver this training to their operatives working on the network. This can be booked via the QR code. It is also available on our website and SL1 form. You can also contact your Anglian Water representative if you require further information.

- The training is provided free of charge and usually has a 4-6 week lead in time to obtain a training session with the water quality team. The modules are:
- **Module 1: POSWSH Introduction** — Introduction to Anglian Water policy and standards
- **Module 2: Working on services** — Specific to service connection
- **Module 3: Metering induction** — Specific to meter installations
- **Module 4: Mains oppening** — Specific to working on potable water mains
- **Module 5: Mains laying** — Specific to main laying activities
- **Module 6: Materials in contact** — Specific to anyone in contact/responsible for material order and design
- Supply a copy of the RAMs to your Anglian Water representative.
- Complete a pre-commencement meeting before the works is undertaken.
- Have a copy of the commissioning plan and be aware of any actions detailed within Anglian Waters impact plan should one be required.
- Ensure that before any connection is undertaken they have been given written approval from Anglian Water of the time and date. To ensure that if there are contingency actions or customers affected the required notifications have been undertaken.
- Have contingency fittings available onsite in the event of a failure.
- Do not commence work without an Anglian Water representative present on site and have been issued with a permit to work.

All works will have an impact assessment and an operational modelling report. If the connection requires an Impact plan this will be completed by your Anglian Water project liaison manager and explained to you at the pre commencement meeting. No connection will be able to take place without an Anglian Water representative present to ensure that the impact plan is followed and any contingencies actions are in place. The SLP must also have an approved commissioning plan and connection form from Anglian Water.

All SLPs wanting to undertake larger connections will be on a Anglian Water approvals list and confirmation at application stage will be given.

The following guidance must be followed:

1. When undertaking the connection ensure all potential/actual contamination incidents (suspected ingress of surface water, soil or sewage into a water main following a mains opening activity)
are effectively managed and communicated to the Anglian Water Project Manager or Network technician. This must include escalation of any damage of assets by a third-party and/or any operation of assets by a third-party, for any such situation it must be assumed that ingress has occurred. Obtain as many photos of the situation as safely possible sharing these with your Anglian Water contact immediately.

2. Disinfect all tools, equipment, fittings, materials and exposed main with 1% sodium hypochlorite solution.

3. Maintain a sump below the main (300 mm below the bottom of the main) and utilise a pump to ensure water does not overwhelm the excavation and water is kept below the water main.

4. In the event of a burst ensure that the water is not discharged directly to a watercourse and all reasonable steps undertaken to protect the environment.

For further information or guidance then please talk to your Anglian Water representative.

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.

Water Company specific considerations in respect of water efficiency to be inserted here e.g. water efficiency incentive scheme details]

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 may be required to meet the requirements of the Site and any Development relative to the Site, following discussion with the Water Company. Any Water Company requirements will be communicated after such discussion has taken place. See further section 10.2
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

Water Companies shall share with the SLP any pipe size methodology where this is requested by the SLP.

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 and 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** 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

10.1 — Permitted pipe diameters, pressure ratings and permissible materials.

Anglian Water currently approve PE100, PE80, PE100 — Barrier Pipe, PE80 — Barrier pipe, Class 25 Ductile Iron and Class 40 Ductile Iron for water main installations.

The below table specifies the Water Company's accepted size and 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
25 OD	PE80 (MDPE)	SDR11	12.5 bar
32 OD	PE80 (MDPE)	SDR11	12.5 bar
50 OD	PE80 (MDPE)	SDR11	12.5 bar
63 OD	PE80 (MDPE)	SDR11	12.5 bar
90 OD	PE100 (HPPE)	SDR11	16 bar
90 OD	PE100 (HPPE)	SDR17	10 bar
125 OD	PE100 (HPPE)	SDR11	16 bar
125 OD	PE100 (HPPE)	SDR17	10 bar
180 OD	PE100 (HPPE)	SDR11	16 bar
180 OD	PE100 (HPPE)	SDR17	10 bar
180 OD	PE100 (HPPE)	SDR21*	8 bar
225 OD	PE100 (HPPE)	SDR11	16 bar
225 OD	PE100 (HPPE)	SDR17	10 bar
225 OD	PE100 (HPPE)	SDR21*	8 bar
280 OD	PE100 (HPPE)	SDR11	16 bar
280 OD	PE100 (HPPE)	SDR17	10 bar
280 OD	PE100 (HPPE)	SDR21*	8 bar
315 OD	PE100 (HPPE)	SDR11	16 bar
315 OD	PE100 (HPPE)	SDR17	10 bar
315 OD	PE100 (HPPE)	SDR21	8 bar
355 OD	PE100 (HPPE)	SDR11	16 bar
355 OD	PE100 (HPPE)	SDR17	10 bar
355 OD	PE100 (HPPE)	SDR21*	8 bar
25 OD	PE80 Barrier (MDPE)	SDR11*	12.5 bar
32 OD	PE80 Barrier (MDPE)	SDR11*	12.5 bar
63 OD	PE80 Barrier (MDPE)	SDR11*	12.5 bar
90 OD	PE100 Barrier (HPPE)	SDR11*	16 bar

125 OD	PE100 Barrier (HPPE)	SDR17*	10 bar
180 OD	PE100 Barrier (HPPE)	SDR11*	16 bar
180 OD	PE100 Barrier (HPPE)	SDR17*	10 bar
225 OD	PE100 Barrier (HPPE)	SDR11*	16 bar
225 OD	PE100 Barrier (HPPE)	SDR17*	10 bar
280 OD	PE100 Barrier (HPPE)	SDR11*	16 bar
280 OD	PE100 Barrier (HPPE)	SDR17*	10 bar
315 OD	PE100 Barrier (HPPE)	SDR11*	16 bar
315 OD	PE100 Barrier (HPPE)	SDR17*	10 bar
355 OD	PE100 Barrier (HPPE)	SDR11*	16 bar
355 OD	PE100 Barrier (HPPE)	SDR17*	10 bar
DN90	Ductile Iron (C25)	*	-
DN125	Ductile Iron (C25)	*	-
DN80	Ductile Iron (C40-C100)	*	-
DN100	Ductile Iron (C40-C100)	*	-
DN150	Ductile Iron (C40-C64)	*	-
DN200	Ductile Iron (C40-C64)	*	-
DN250	Ductile Iron (C40-C50)	*	-
DN300	Ductile Iron (C40-C50)	*	-

*Not suitable for directional drilling

The above table specifies Anglian Waters default option for pipe selection and should be suitable for most applications alongside ensuring the pressure rating has been confirmed by modelling.

Table 10.1

Permitted pipes sizes, materials, SDR and pressure ratings to be used within the Water Company area. Further detail to be taken into consideration:

- When laying ductile iron an appropriate soil resistance test should be undertaken to assess the level of pipe protection required. Any requirements here should be in accordance with the manufacturer's specifications
- MDPE (PE80) 50mm bore pipe (63mm OD) is used within the distribution system — usually for larger services. It can be used as a water main as long as:
  - It is at the end of a distribution system
  - It is not supplying an adopted Fire Hydrant
- In land that is contaminated or is at risk of contamination, PE barrier pipe system should be used in conjunction with barrier service pipes or plastic-coated copper service pipes (ductile iron pipes may be designed/ used under agreement with Anglian Water).

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 to take in account the entire development that the Developer and SLP are aware of, to avoid unnecessary upsizing at a later date, 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.

Anglian Water's methodology for calculating pipe sizes is based on the Darcy-Weisbach equation, linked to our own hydraulic water models.

Where the Water Company undertakes their own hydraulic modelling should there be any factors which result in the need to challenge the pipe sizing these will be discuss during the design phase.

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 its charging arrangements.

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	110mm/125mm	100mm
95-300	160mm/180mm	150mm
300-700	225mm/250mm	200mm

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

Should there be a planning condition for firefighting(such as a fire supply), 63mm pipe may not be appropriate for installation. Consideration should be taken in regard to the length of 63mm installed, Anglian Water would recommend that lengths >100m shall be reviewed individually based on the number of properties to be constructed.

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 its Charging Arrangements.

10.4 — Domestic hydraulic demand calculations

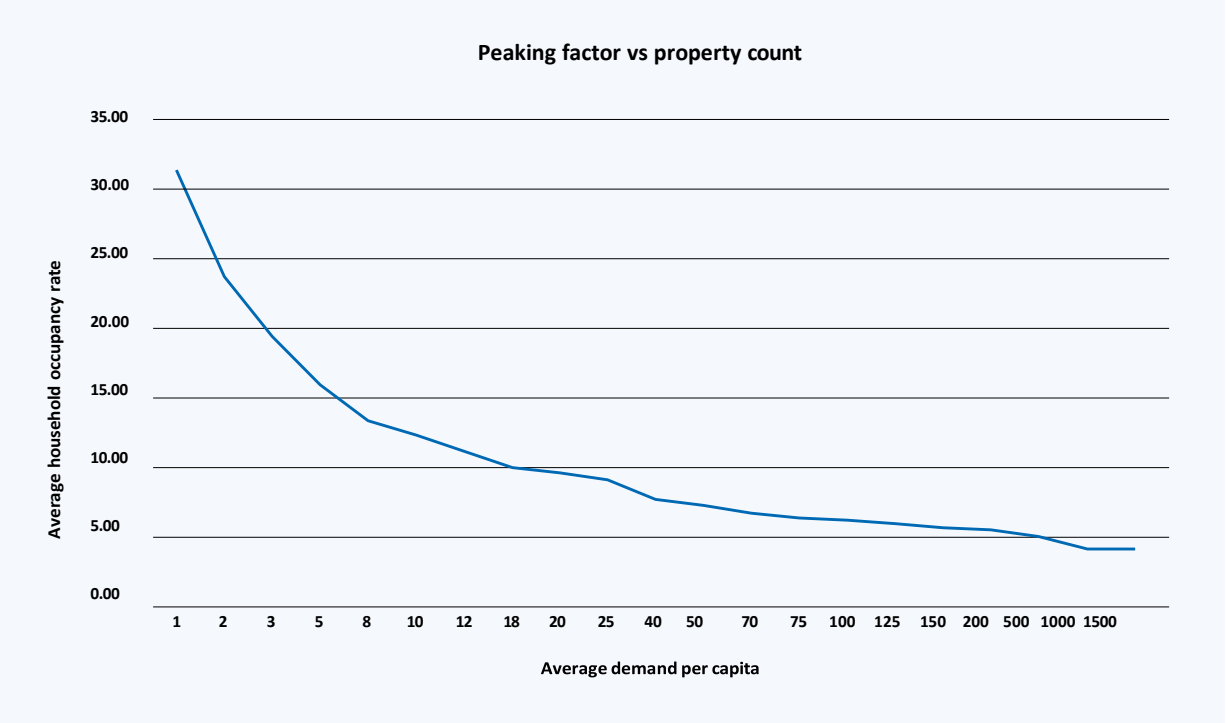
In this section the Water Company shall specify the following constants:

X = Average demand per capita
Y = Average household occupancy rate
Z = Peak flow factor

X = 143 litres — Average demand per capita.
Y = 2.3 persons — Average household occupancy rate.
Z = Peak flow factor. Please refer to the graph below:

This is a combination of the summertime peak, the daily peak and individual user variability. The multiplier needs to be applied to the sites average flow rate in l/s.

The number of properties are along the horizontal axis and the litres is on the vertical axis.



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

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

Average daily demand per household is therefore X x Y = XY.

To account for diversity in the network, Peak Flow Factors for domestic scenarios shall be taken to be Z.

Peak Demand may be calculated then by multiplying the average day demand per household by the peaking factor.

A site of 'n' Domestic units has a daily demand in litres of XY x n = nXY l.

This must be multiplied by the peaking factor Z. Therefore, peak demand in litres per second can be estimated at nXY x Z = Peak demand in l/s.

10.5 — Calculations for multi-occupancy building and industrial and commercial domestic use

Where the developer/SLP provides exact flow rates for non-domestic buildings these shall be used and applied to a typical 10-hour profile to derive diurnal variation. Where no flows are provided by the developer/SLP Anglian Water will apply a standard 2.25 peaking factor.

Alternatively, there is an option derive demand based on the floor area if this is provided. For Industrial and commercial use 15 to 30m l/d/m2 may be used. Generally, as all that is provided is the floor area an average of 22.5 l/d/m2 is used however there may be circumstances where 15 or 30 l/d/m2 is considered more appropriate (i.e. 15l/d/m2 for a warehouse or 30 l/d/m2 for a small non-domestic unit). Typically, this is converted to an average l/s and assigned using the 10-hour profile.

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, the SLP shall check with the Water Company to confirm pressure at the source assume reference level pressure at source of 20 metres head (2 Bar). Any source pressures below this or above 40 metres (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 peak time velocities in all Pipes shall reach 0.3ms^{-1} for at least 1 minute every day. Maximum

velocity in Mains shall not exceed 1ms^{-1}

Maximum velocity in Service Pipe shall not exceed 3 ms^{-1} and the average velocity of flow shall not exceed 1ms^{-1}

10.7.4 Calculating headloss through the network

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

Anglian Water use the Darcy-Weisbach equation to calculate headloss, however other industry approved methodology is acceptable.

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

If contamination is suspected during construction of the Self-Lay Works, the work shall be stopped and be 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.

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 (see section 4 as regards funding of with any such additional works) fully funded by the water company.
- 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. Where the Water Company requests a change to the route due it not meeting their specific requirements, then the costs incurred for doing so will be payable by the Water Company. Any such variation will need agreement with the SLP and Developer before works proceed.

Single, as opposed to dual, main layouts shall be used wherever an economy can be achieved and where possible, ring mains shall be incorporated.

Mains shall be located on the side of the street serving the most properties to minimise the length of communication pipe. Mains shall be designed to ensure turnover every 7 days upon full commissioning. Consideration shall be given to using 63mm MDPE for dead end legs of main that are not more than 100m in length or supply more than 25 properties.

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.

Anglian Water's guidance for shared driveways is set out in the table below:

Number of properties	Distance to the furthest property	Requirement
1-6	≤50m	Private service to multi-port manifold
>6	>50m	Main with individual service connection

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.

Where required by the Land Rights Criteria, the Developer and/or SLP shall, at its or their own cost, grant (if competent to do so) or otherwise apply for, negotiate and procure Land Rights in favour of the Water Company in respect of the Self-Lay Works.

Where the Developer or SLP is unable to obtain any Land Right required under clause 5.3, the Water Company may at its sole discretion, elect to use its statutory powers to obtain that Land Right under the Act. The Developer and/or SLP shall pay the Water Company's reasonable costs (including any professional fees and disbursements) incurred in obtaining the same.

During construction the SLP/Developer shall use reasonable endeavors 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 (no mains shall be design or constructed inside these minimum requirements):

Nominal Pipe Size mm	Min Proximity required (m) from centre line of Water Main
<149mm	2.25m
150mm – 449mm	3.0m
450mm – 749mm	4.5m
>750	6m

See also paragraph 13: Designers shall refer to Streetworks UK publication Volume 4: Guidelines for the Planning, Installation and 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.

No Self-Laid Main shall be constructed unless the design of said main has been approved by the Water Company, and no Self-Laid Main or Service Pipe shall be connected to the Water Company Network until all condition's precedent within the WAA have been met.

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 be 750mm for new Self-Laid Main or 900mm where there is a risk of e.g. from agricultural activities. All DI mains should be installed at 900mm cover. Consideration should be made for service pipes when installing the new Self-Laid Main at 750mm cover to achieve the minimum 750mm cover for service pipes.

11.5 — Water quality considerations

In accordance with the Principles of Water Supply Hygiene and related technical guidance notes listed therein (see Appendix 1-Other documents) the SLP shall ensure that the Developer and the SLP ensure demand is 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. The costs associated with this shall be dealt with under the principles set out in paragraph have been clarified in section 4 of this document.

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

Valves shall be installed to ensure each leg of main can be independently isolated to restrict the number of customers affected by a pipe failure. As a general guide, the maximum interval between valves.

shall not generally exceed 100 properties. Valves shall be provided at each side of a crossing of major infrastructure, such as motorways, railways, rivers/canals or other high-risk locations to enable safe isolation and drain down.

Washouts/Hydrants shall be installed at the end of mains, at high and low points and at changes in mains diameter on the distribution system, unless installation is not feasible. This will enable each section of the pipeline to be emptied or expel air when the main is recharged following a shutdown. Hydrants must be sited for safe operation and must NOT be in a carriageway. Hydrants do not have to be immediately above their water main. Hydrants for firefighting purposes shall be installed as required by the Fire Authority under the provisions of the Water Industry Act.

All hydrants and washouts shall be compliant to BS750 and be a minimum 80mm NB.

Where high discharge volumes are required, or the main is larger than 150mm, or if access to the pipe is required (e.g. for CCTV) then a “through-bore/clearway” type of hydrant should be considered.
These shall have a minimum drilling hole of 76mm and be installed in a chamber of at least 430*280.
If safe — they should be installed directly over the pipe such that direct access into the pipe is achieved (without bends).

Anglian Water encourages a second valve to be installed in a safer location if an installation the first valve(s) cannot be avoided in the highway.

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

Mains isolation 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.

Anglian Water requires internal water quality training for some construction and commissioning activities in relation to valve operations. For an SLP to undertake a mains isolation they shall undertake the mandatory training detailed in the below table. They must also have approval from the Anglian Water representative and an impact assessment provided. Operation of mains isolation valves shall not to be undertaken by an SLP without the required permissions and training, and only Valve operation training provided by Anglian Water is acceptable. Valve operations training provided by other providers or water companies is not acceptable.

Anglian Waters internal training requirements for SLPs

Module / Topic	Applicable to	Delivery route	Validity period	Further information
EUSR card	All (Mandatory)	Online via EUSR website	3 years (Card will hold expiry)	All operatives must have this available when working on any water network
Train the Trainer course	Representative who will be the dedicated internal trainer within their Self-Lay Provider	Classroom via Anglian Water	Must keep email provided at course up to date	Course module updates will be sent by Anglian Water Train the Trainer Team. Training provided free of charge
Courses delivered to SLP Operatives via their Train a Trainer				
Module 1	All operatives (Mandatory)	Train the Trainer	Annual Reassessment (via Train the Trainer)	Delivered by the SLP Appointed Train a Trainer
Module 2	Operatives working on services (Mandatory)			
Module 3	Operatives working on installation of meters (Mandatory)			
Module 4	Operatives working on water mains (Mandatory)			
Module 5	Operatives undertaking main laying (Mandatory)			
Module 6	Any person involved in or contact with materials/ procurement (Mandatory)			
Specific activities				
Valve and Washout operations on Anglian Water live Network	SLP Operatives required to, operate Network Valves Anglian Waters region (Mandatory)	Classroom delivered by Anglian Water	Two yearly reassessment and authorisation	WS080 CALM Networks/ Transient Training WS061 Valve Operations and Appointment (Anglian Water Internal) WS009 1 and 2 Sampling Training (Anglian Water Internal) POSWSH Modules 1- 6
Sampling new water mains	SLP Operatives wishing to sample new water mains	Classroom delivered by Anglian Water	Two yearly reassessment and authorisation	WS009 1 and 2 Sampling Training (Anglian Water Internal) POSWSH Modules 1- 6
Operation of hydrants for mains testing with Aquam supplied stand pipes up to 40mm	SLP Operatives required to operate washouts with approved hired standpipes from Aquam for the purpose of mains testing.	Delivered online by Aquam water, Anglian Water's stand pipe hire provider.	Delivered to operatives when stand pipe is hired	Aquam Calm Network training Calm Networks ⊥ Aquam Water Services calmnetwork@aquamcorp.co.uk

All companies working on Anglian Waters network wishing to undertake valve operations in relation to commissioning must have a train the trainer representative. A train the trainer is a representative that is trained by our water quality team to enable them to deliver some of this training to their mains and service gangs and mains tester. This can be booked via the QR code. It is also available on our website and SL1 form. You can also contact your Anglian Water representative if you require further information.

The training is provided free of charge and usually has a 4-6 week lead in time to obtain a training session with the water quality team. The modules are:

Module 1: POSWSH Introduction — Introduction to Anglian Water policy and standards

Module 2: Working on services — Specific to service connection

Module 3: Metering induction — Specific to meter installations

Module 4: Mains oppening — Specific to working on potable water mains

Module 5: Mains laying — Specific to main laying activities

Module 6: Materials in contact — Specific to anyone in contact/ responsible for material order and design Mains Testers must have POSWSH modules, network transient training, network valve operation or Aquam Calm Network training if only operating on site washouts andin the case of Valve operations be signed off annually by our network team. If they undertake sampling, they must also undertake sample training which is delivered by our water quality team and be annually appointed. During assurance visits this information will be checked. Please refer to the table on page 43.

Valves shall be installed to ensure each leg of main can be independently isolated to restrict the number of customers affected by a pipe failure. As a general guide, the maximum interval between valves shall not generally exceed 100 properties. Consideration should be given to the installation of isolating valves on 2 of the 3 branches of a junction (when there is an alternative supply route to the properties on each branch and where it is cost effective to do so). Valves shall be provided at each side of a crossing of major infrastructure and geographical features, such as motorways, railways, rivers/canals or other high-risk locations to enable safe isolation and drain down.

Valve closing directions within the Water Company area are clockwise closing (Right-handed valves) and all new valves to be installed by an SLP shall be clockwise closing (right-handed valves).

11.8 — Washout and fire hydrants

Washouts/Hydrants shall be installed at the end of mains, at high and low points and at changes in mains diameter on the distribution system, unless installation is not feasible and must be agreed with Anglian Water. This will enable each section of the pipeline to be emptied or expel air when the main is recharged following a shutdown. Where high discharge volumes are required then a Through Bore type of washout should be used. These shall be installed in a standard sized hydrant chamber, refer to the standard product on washouts for further details on this.

All hydrants/washouts shall be compliant to BS750 and be a minimum 80mm NB. Please also note the following:

- Hydrants/washouts shall have a fixed washer plate.
- Hydrants for fire-fighting purposes shall be installed as required by the Fire Authority under the provisions of the Water Industry Act.
- Hydrants/washouts shall always be installed in chambers and be located directly above the main where in non-trafficked areas. To comply with CDM, should the line of the main be in a trafficked area the hydrant should be offset to a safe location for operation.
- Hydrants/washouts shall be such that a 100mm swab can be removed without unbolting the apparatus.
- Hydrants and washouts shall be designed in accordance with standard product PD-246 Washout and Fire Hydrant (Traditional).
- Hydrants shall not be installed on trunk mains.

11.9 — Air valves

Air valves are required at high points and at points of significant changes of vertical direction along the network where in either case there is a risk of air locking. The location is to be agreed at design stage.

Air valves are required on mains for the release of air under normal operation (pressurised) and, if necessary and carefully designed, may be used to prevent mechanical damage to the pipeline during filling and emptying. The risk of contamination entering the pipeline during emptying cannot be overstated and high-quality location, fitting

and chambering will be required for any “DVV” – Depressurisation Vent Valve or “CAV” – Combination Air Valve installed.

Single air valves (“ARV” – Air Release Valve) automatically release air that has accumulated in the main during normal operation. They comprise of a small orifice only and shall be located at all local high points,
e.g. bridge crossing, downstream of pumps and on pressure reducing valves.

Double air valves come in two types. “CAV” – Combination Air Valves — vent air automatically when a main is filled or emptied but will also automatically release air that has accumulated in the main during normal operation. They comprise of a large orifice and a small orifice air valve and shall be located at topographical high points, high points relative to the hydraulic gradient and at significant changes in the pipeline gradient where necessary (see section a). “DVV” – Depressurisation Vent Valves only operate when the pipeline is depressurised and, as such, must not be used within the Distribution Network.

To ensure that air travels to the air valves, pipes should be laid with maximum possible rise and fall (with a minimum permissible gradient of 1 in 500).

For mains of 300mm and greater diameter — the air valve itself may be fitted above a branch tee 50% of the pipe diameter (thus creating a “reservoir” for the air). This is not mandatory and there is not always room (adequate pipe coverage) to install air valves in this way. This would be a discussed in conjunction with an Anglian Water Designer.

Air valve installations, on both potable and raw water mains, shall be designed to prevent the uncontrolled admission of air or water into the pipeline. For this reason, air valves shall not open under transient conditions.

If an air valve must be sited in a WQ medium/high risk location, in order to maintain effective network operation, then approval shall be obtained from Anglian Water, through the Project Liaison Manager and designer. A main deemed to require any type of Air Valve within an area of high risk of contaminants is NOT desirable.

Air valve chambers shall be free draining and must not be located below ground-water level or within flood plains or areas known to be subject to regular flooding. If this is unavoidable then alternative methods should be considered e.g. Washouts. Where possible, they should be in footpaths, grass verges, adjacent to the road, or at field boundaries.

Air Valves installations must comply with CDM in respect of installation and ongoing maintenance. Where safety and/or WQ risk can be reduced, they should be extended away from the line of the water main.
Siting an Air Valve in the carriageway will not usually be acceptable.

Air Valve installations shall be designed to comply with current approved drawings and standards. Drawing available upon request.

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 where a development size of 1500 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 more than one separate zoning Area via two or more Source of Water Connections. Change points in metering (DMA) or pressure control (PMA) must be controlled by and OXO (closed SV with a hydrant on either side). Hydrants must not be sited in trafficked areas – bringing them out to a safer location on 63PE instead (90PE if a Fire Hydrant). 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

Anglian Water does not accept the use of double spade valves.

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 landowner. 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.

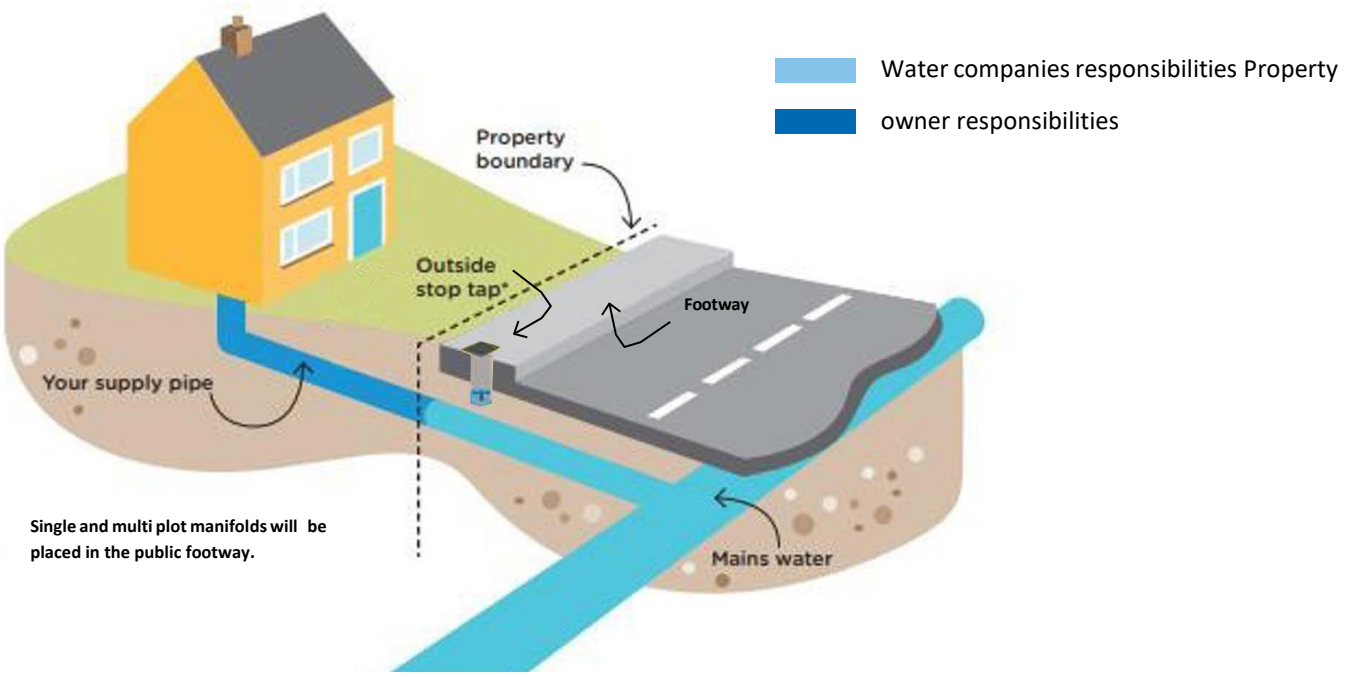
All such servitudes, easements, wayleaves and planning permission required for the Self-Lay Works and land for the siting of equipment shall be obtained prior to commencement of works and in accordance with the Statutory Consents and Land Rights sections of the WAA.

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 here.

The following diagram provides guidance as to the allocation of such responsibilities.
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 be used to reduce road crossings however each property must receive an individual supply pipe and meters. This can only be used for manifold connections, for single boundary connections these will each need their own individual service pipe.

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

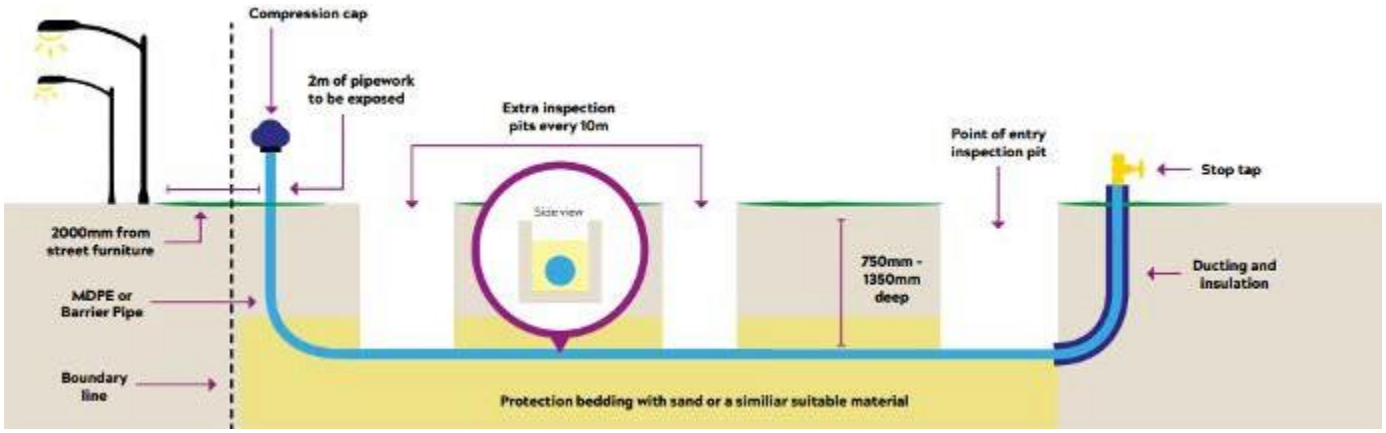
Service Pipes shall be installed in accordance with the Water Regulations and Streetworks UK guidance.

Service pipes shall be laid with an even grade where possible, with cover between a depth of 750mm to 1350mm from the finished ground level in accordance with Water Supply (Water Fittings) Regulations 1999.

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 1.0metre 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.

The following diagram provides guidance as to the standard installation of service pipe:



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 ≤1ms^{-1} and that total headloss is ≤3mH

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

Where service pipes lengths are greater than 40m we recommend service pipes are laid in accordance with the below:

Recommended pipe sizes

Supply pipe length in metres	Up to 40m	40m to 100m	100m to 800m	800m to 2000m
Recommended pipe size in mm	25mm	32mm	50mm	63mm

Services to multi-port manifolds shall be sized in accordance with the below table.

Number of properties	2	4	6
OD of Pipe (mm)	32	63	63

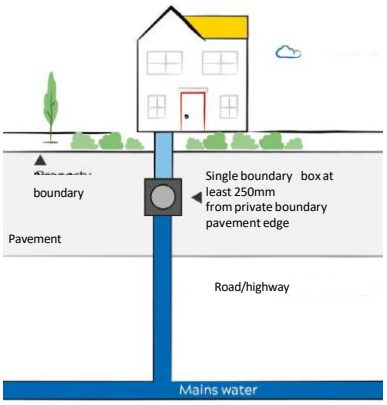
12.4 — Location of boundary boxes

When deciding boundary box locations for your site, please consider the following to avoid failing our inspections. The boundary box:

1. Must be accessible for all occupiers — i.e. not in another property's private land or behind fencing.
2. Must be at least 2m from lamp posts or street furniture, whilst avoiding shubbery, hedges and fences.
3. Must be in a position which allows reading, inspection, maintenance and access to the stop tap. To be laid between 750mm and 1350mm deep, where possible.
4. Must meet the requirements of the Highways Authority, the NRSWA (New Roads & Street Works Act) and NJUG (National Joint Utilities Group guidance).
5. Must be a minimum 250mm — 1000mm from the property boundary, 250mm from a nearby wall and 250mm from any building structure, where possible.

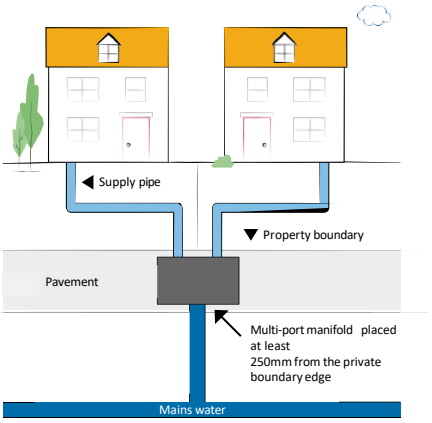
If there is no pavement present, or points 1-5 cannot be met, please contact the Connections team on **0345 60 66 087, option 1,** or email: **developmentservices@anglianwater.co.uk**

Single boundary box in highway



- The boundary box should be placed at least 250mm from the private boundary pavement edge.
- Highway authorities won't allow boundary boxes in driveways or drive entrances where vehicles are likely to drive over them.
- Please consider the homeowner when choosing a suitable location for the box.
- If more than one boundary box is required, a multi-port box should be used.

Multi-port manifold



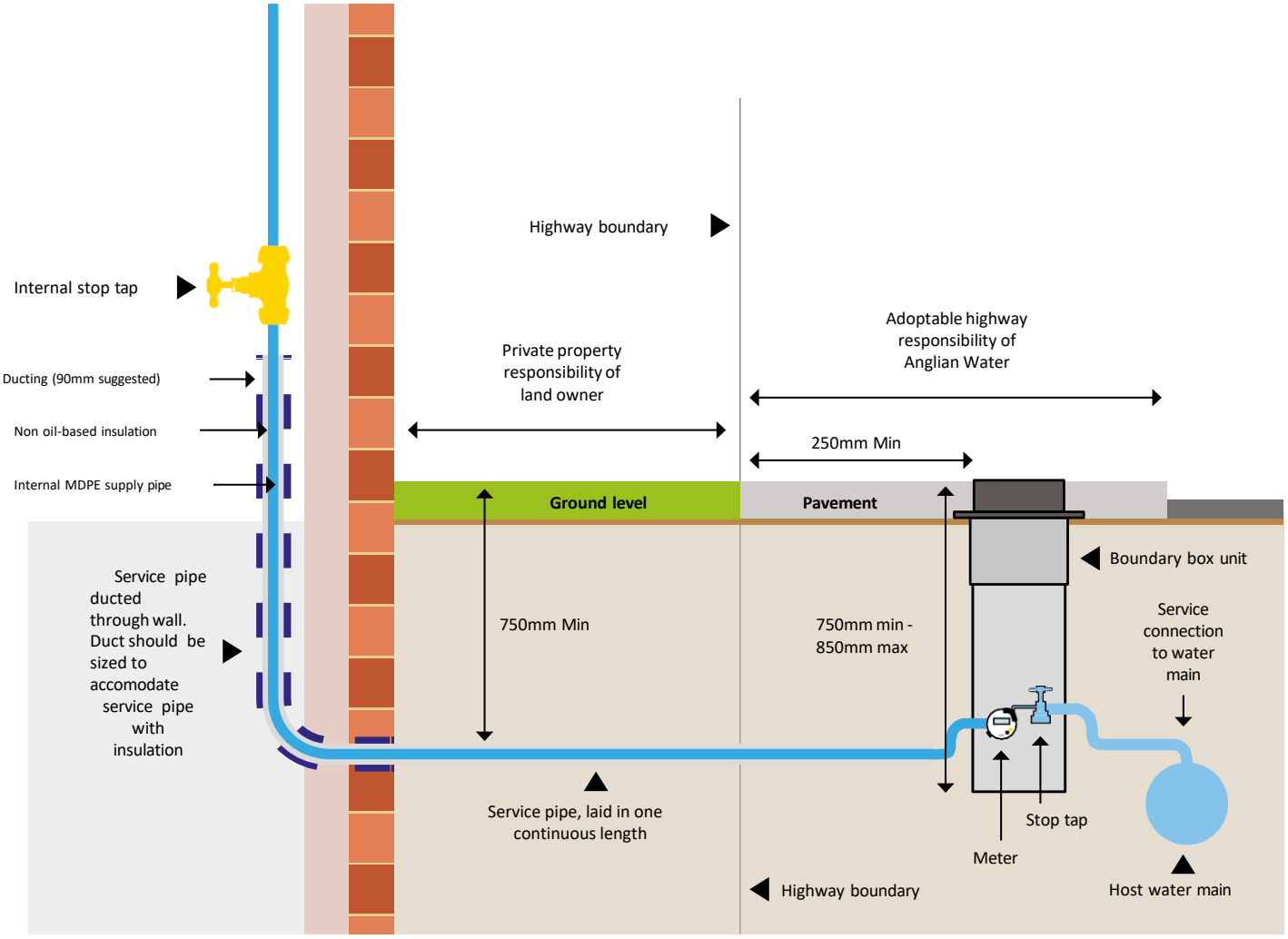
- Multi-port manifolds should always be located in the highway and at least 250mm from the back edge of the pavement.
- Highway authorities won't allow boundary boxes in driveways or drive entrances where vehicles are likely to drive over them.
- Household service pipes shouldn't cross the boundary into or through adjacent plots.

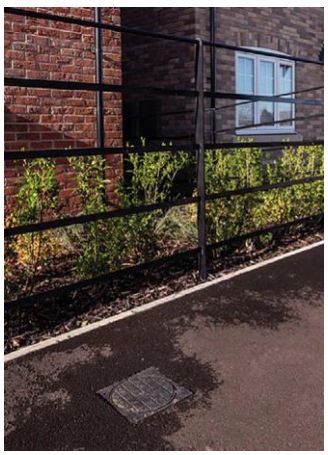
Important information

Fitting boundary boxes in a position that meets our requirements will help prevent any unwanted additional costs. So, before you decide the location, please consider the following:

- **Water mains and services should always be the deepest utility, so please make sure we are the first on site.** All utilities should be installed inline with NJUG guidance as there is a joint responsibility when it comes to maintaining assets.
- **Your designs will need to meet our requirements before commencing work.** For the safety of future meter readings and maintenance, avoid siting boundary boxes in any carriageway/driveways.
- In most cases, Anglian Water is only responsible for the pipework up to the property boundary.

Meter in a chamber at the property boundary





Depth of service:

- Service pipes should be installed in accordance with the Water Regulations and Streetworks UK guidance.
- Service pipes should be laid with an even grade where possible, with cover between a depth of 750mm to 1350mm from the finished ground level in accordance with Water Supply (Water Fittings) Regulations 1999.
- If a boundary box is to be installed on the service pipe, the pipe should be laid with cover between 750mm and 850mm for a minimum of 1.0 metre on each side of the boundary box.

12.5 — Supplies to multi occupancy buildings

Our policy for supplies to multi-occupancy buildings is noted in paragraph 22 ‘Meter and Service Pipe Policy and Installation’.

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 for supplies to multi storey buildings is noted in paragraph 22 'Meter and Service Pipe Policy and Installation'.

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. This is noted in our policy in paragraph 22 'Meter and Service Pipe Policy and Installation'.

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 requires 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.

For new developments and urban areas, we wouldn't expect the need for indicator and marker plates and would expect under CDM that safe and suitable locations for fittings is identified, alongside accurate record keeping of locations to enable GIS data to be updated. Should there be a requirement to install in rural areas liaison with the Water Company will need to be undertaken.

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.

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 1991 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.

Self-Laid Mains shall be located on the side of the road where the housing density is higher to minimise the total length and number of communication pipes. 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.

Ducts for PE pipes shall be coloured blue or black with blue markings. Ducts are not adequate protection against contamination.

14. Metering requirements

14.1 — Standard domestic metering for individual dwellings and multi occupancy buildings

Our Meter and Service Pipe Policy is noted within paragraph 22.

Separate individual meters are required for all new domestic properties and the preference is for these to be located externally in line with the guidance noted in our Meter and Service Pipe Installation requirements in paragraph 22.

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

Hydrants shall be installed in chambers and be located directly above the main where in non-trafficked areas. To comply with CDM, should the line of the main be in a trafficked area the hydrant should be offset to a safe location for operation.

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 polices 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.

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.

Domestic/residential fire sprinkler systems can be fitted to new and existing residential properties. For properties where domestic/residential fire sprinklers systems are installed, Anglian Water cannot guarantee pressures and flows above the minim guaranteed standards for pressure and flow. These are
1 bar(10m/head) pressure and 9 litres per minute flow. This should always be taken into consideration by the designer/installer before proceeding with any installation.

We would strongly advise any designer/installer to contact Anglian Water to check the pressures and flows available PRIOR to installation, so that the need for any boosters and/or storage can be established before installation.

For further guidance on the installation of domestic/residential fire sprinkler systems please see our website.

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 with any 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 the Water Company.

Scaled survey drawings should be provided. The scale shall be to 1:500 (unless otherwise agreed with the Adopting Water Company) 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, tappings, 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. Where working in close proximity to a water course, appropriate measures need to be put in place to ensure flushed water isn't directly discharge here.

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 secures all required permits and agreements for flushing, identifies where water can be flushed to and disposed of and, where if the Water Company is to undertake flushing, is able to indicate whether water is required to be de-chlorinated first.

As a general rule it is 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 are not 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 on the next page.

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 metre (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

Anglian Water requires that all new mains shall be swabbed in accordance with the commissioning plan provided by you Anglian Water. This will be based upon the following requirements.

- The maximum length for swabbing a new distribution main is approximately 1000m.
- The main should be filled prior to swabbing (24 hours is recommended) to allow any debris to be soaked prior to the passing of the first swab.
- Soft swabs shall be utilised with a density of between 20 and 30 kg/m3. For pipe with a nominal bore up to 300mm, the swab shall have a diameter of 1.25 to 1.5 times the nominal bore. For pipe with a nominal bore greater than 300mm, the swab shall have a diameter of the nominal bore 75-100mm.
- All swabs must be soaked in a chlorine solution containing a minimum of 10,000mg/l (1% solution) chlorine prior to use.
- Swabs should be marked, using an appropriate marking technique, to enable the swabs to be clearly identified on discharge.
- Swabs are to be used only once before being disposed of, and all swabs should be recovered. In event of a swab being lost advice must be sort from the Project Engineer
- The velocity of water in the pipe during swabbing is to be the maximum that can be achieved by the best available means, taking account of restrictions on the availability and disposal of water and the effect of draw off on the existing network (with an upper limit of 1.5m/s).
- Ideally the swab velocity should be between 0.8 and 1.5 m/s (the swab velocity will be typically 90 to 95% of the water velocity).
- A minimum of two swabs are required for each section of main with more required as necessary, unless the requirements for permitting tandem swabbing are met.
- Tandem swabbing can only be used on mains with ≤150mm nominal bore, where the new main is a single feed to an end fire hydrant. The main must also be ≤100m in length. In accordance with the Commissioning Plan it may be appropriate to run the two swabs in tandem or each swab as separate passes.
- The swabbing must be repeated as many times as necessary until the water in front of the swab is clear, with no particulate material present (a turbidity tube/meter will aid inspection). The final swab should

not have any ingrained material present or be discoloured. This process shall be carried out in one sequence of operations on any length of main.

- The smell of the swab should also be noted. If any unusual odour is present the swabbing should be repeated until no unusual odour is detectable. This is particularly important for ductile mains. Any unusual odour should be reported to the Project Engineer.
- Following scraping for final connection it is critical that the main is checked and any swarf found is removed from the pipe prior to the final connection being completed. This is because the final flush to washout cannot be relied upon to remove all swarf.
- Results of swabbing should be recorded on InFlow when providing your test data and/or samples.

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

Sampling criteria

Parameter	Criteria
Coliforms and E.coli	Standard analysis required on all new mains (NM) and existing supply (ES) samples
Taste	
Odour	
Clarity	
Turbidity	
Aluminium	Additional analysis required if DI pipes are being tested
pH	
DCM profile	Additional analysis required if DI pipes lined with epoxy are laid
Purge and traps	

Sampling approval criteria

Parameter	Criteria
Coliforms and E.coli	No coliforms or E. coli
Taste	See Table 1 — Criteria for taste assessment
Odour	See Table 2 — Criteria for odour assessment
Clarity	No particles present — if particles are present in the sample the taste assessment will not be carried out by the lab and the samples will fail as per Table 1
Turbidity	See Table 3 — Criteria for turbidity assessment
Aluminium	Aluminium must be below the current PCV (200ug/l)
pH	pH must be similar to the existing supply sample and must be within the PCV range (6.5-9.5)
DCM profile	No unusual compounds. Any compounds typical of ductile mains must have a total concentration of < 20ug/l (see Appendix 2 — Scientific interpretation of new mains results — Organic compounds)
Purge and Traps	

Table 1 — Criteria for taste assessment

Taste descriptor	Key	No taste 1	Very mild 2	Mild 3	Strong 4	Very strong 5
Unspecified	Z	P	N/A	N/A	N/A	N/A
Chlorine	CHLOR	N/A	P	P	I	F
Plastic	PLAS	N/A	P	I	F	F
Disinfectant	DISIN	N/A	I	F	F	F
Flat	FLAT	N/A	I	F	F	F
Sweet	SWEET	N/A	I	F	F	F
Bitter	BITTR	N/A	I	F	F	F
Sharp	SHARP	N/A	I	F	F	F
Sour	SOUR	N/A	I	F	F	F
Metallic	METAL	N/A	I	F	F	F
Musty	MUSTY	N/A	I	F	F	F
Building site	BUSIT	N/A	I	F	F	F
Earthy	EARTH	N/A	I	F	F	F
Vegetation	VEGET	N/A	I	F	F	F
Saline	SALIN	N/A	F	F	F	F
Oily	OILY	N/A	F	F	F	F
Rubber	RUBBR	N/A	F	F	F	F
Pencil wood	PWOOD	N/A	F	F	F	F
Fishy	FISHY	N/A	F	F	F	F

Pass/Fail clearance requirements for taste

Category	Action
N/A Not applicable	No action required
P Category 1 — Pass	Compare with ES if no significant difference no further action required. Where the samples have a 2PLAS taste on site taste and odour must be carried out before customers are connected to ensure the taste has not developed. Flushing and re sampling may be appropriate if the taste is apparent on site
F Category 2 — Investigate	Compare with ES and take appropriate remedial action. Where there is evidence that the ES is the source it may be appropriate to clear the section of new main to enable connection but flush and re-test before connection to customer
F Category 3 — Fail	Compare to ES and carry out appropriate remedial action i.e. flushing or swabbing and re-sample both ES and the new main section

Table 2 — Criteria for odour clearance

Taste descriptor	Key	No taste 1	Very mild 2	Mild 3	Strong 4	Very strong 5
No smell	Z	P	N/A	N/A	N/A	N/A
Chlorine	T	N/A	P	P	I	F
Plastic	PLA	N/A	P	I	F	F
Disinfectant	M	N/A	I	F	F	F
Sweet	L	N/A	I	F	F	F
Fruity	K	N/A	I	F	F	F
Building site	~	N/A	I	F	F	F
Musty	C	N/A	I	F	F	F
Earthy	A	N/A	I	F	F	F
Woody	G	N/A	I	F	F	F
Farmy	B	N/A	I	F	F	F
Vegetation	Y	N/A	I	F	F	F
Silage	X	N/A	I	F	F	F
Soap	I	N/A	I	F	F	F
Milky	J	N/A	F	F	F	F
Yeast	S	N/A	F	F	F	F
Oily	D	N/A	F	F	F	F
Polishing/cleaning fluid	N	N/A	F	F	F	F
Cyanide	O	N/A	F	F	F	F
Gas	P	N/A	F	F	F	F
Organic solvent	Q	N/A	F	F	F	F
Ammonical	R	N/A	F	F	F	F
Bad eggs (H2S)	U	N/A	F	F	F	F
Piggery	W	N/A	F	F	F	F
Putrid	V	N/A	F	F	F	F
Sewage (fresh)	E	N/A	F	F	F	F
Sewage (stale)	F	N/A	F	F	F	F
Abattoir	H	N/A	F	F	F	F

Pass/Fail clearance requirements for taste

Category	Action
N/A Not applicable	No action required
P Category 1 — Pass	Compare with ES if no significant difference no further action required. Where the samples have a 2PLAS taste on site taste and odour must be carried out before customers are connected to ensure the taste has not developed. Flushing and re sampling may be appropriate if the taste is apparent on site
F Category 2 — Investigate	Compare with ES and take appropriate remedial action. Where there is evidence that the ES is the source it may be appropriate to clear the section of new main to enable connection but flush and re-test before connection to customer
F Category 3 — Fail	Compare to ES and carry out appropriate remedial action i.e. flushing or swabbing and re-sample both ES and the new main section

Table 3 — Criteria for turbidity clearance

Result (FTU)	Clearance	Action
≤1 FTU	P	Pass no further action required
>1 - ≤4 FTU	I	Compare to the ES sample and the normal turbidity for that supply. Investigate possible reasons for the failing sample e.g. iron levels in the ES. Remedial action may be necessary, or it may be more appropriate to pass the new main section but confirm it will require cleaning and re sampling prior to service transfers
>4 FTU	F	Compare to ES, carry out appropriate remedial action and re-sample

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.

All activities are to be carried out in accordance with Principles of Water Supply Hygiene and Technical Guidance Notes

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 and 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. Pressure Testing**

PE and PE barrier pipe:

- PE mains shall be pressure tested in maximum possible lengths, with an upper limit of 1000m.
- The test shall be carried out in accordance with one of the two test methods set out in the WRc MDPE Manual:
- WRc Type 1 test method may be used for short lengths of small diameter main of 15m or less where there is no risk of air in the test section. A Project Engineer shall witness the test.
- WRc Type 2 test method shall be used in all other circumstances.
- For PE pipe the test pressures should always be a maximum of 1.5 times the rated pressure of the lowest rated component or 20 bar maximum if any mechanical fittings are present.
- With these provisos, the test pressure should be 1.5 times the pipe rated pressure, when this is up to 10 bar, and 1.5 times the mean working pressure of the system, for pipes rated at 12.5 bar and above.
- Where SDR 11 pipe is installed for pipe wall thickness to utilise no dig techniques, the pipe should be tested to a minimum 12bar
- The pressure test shall be carried out using a pressure logger with printout facilities.
- A record of the pressure record during each pressure test carried out shall be attached to the mains completion certificate together with the results of the test.
- The pressure test printout shall clearly define the section of mains that has been tested.
- Where trunk mains will operate with a measure of certainty over their operational lives, they can be tested at 1.5 times operating pressure. This is inappropriate for distribution mains as the future configuration is unknown.

Pressure Testing for Ductile Iron and Steel pipes:

- Gauges used for testing ductile iron pipelines shall either be of the conventional Bourdon type, not less than 200 mm diameter which are calibrated in metres head water or shall have a digital indicator capable of reading increments of 0.1m head.
- Gauges shall be checked independently, and a dated certificate of its accuracy shall be provided. Gauges shall be recalibrated at intervals and if damage is suspected.
- Methodology

1. Before testing, valves shall be checked, sections of main filled with water and the air released.
2. Hydrants shall be locked off whilst the pressure test is undertaken.
3. During testing and commissioning, no connection shall be permitted to live in-service mains except for filling purposes. Hydrant standpipes and other temporary connections for filling purposes shall be fitted with double check valves for backflow prevention.
4. After having been filled, pipelines shall be left full and under 50% of the test pressure for 24 hours so as to achieve conditions as stable as possible for testing. No test shall take place against closed isolation valves.
5. The pressure in the pipeline shall be raised steadily until the specified test pressure is reached in the lowest part of the section, the pressure shall be maintained at this level by pumping, if necessary, for one hour.
6. The pump shall then be disconnected, and no further water shall be permitted to enter the pipeline for a further period of one hour.
7. At the end of this period, pumping shall restore the original pressure. The loss shall be measured by drawing off water from the pipeline until the pressure, as at the end of the test, is again reached.
8. The measured water loss at the end of the first hour of the test period, shall not exceed the value calculated using the following formula (see BS EN 805 for further details):

$$\Delta Vmax = 1.2 * V * \Delta p * ((1 / Ew) + (D / (e * Er))$$

ΔVmax Allowable water loss in litres

Ew Bulk modulus of water in kilopascals — 2100 kilopascals

1.2 Allowance factor for air during test

D Internal diameter in metres

V Volume of tested pipe section in litres

E Wall thickness of pipe in metres

Δp Allowable pressure loss in kilopascals — 20Kpa/hr/km

Er Modulus of elasticity of the pipe

DI 170000 kilopascals

Steel 190000 kilopascals

9. Test pressures for distribution pipelines shall be 1.5 x working pressure of the main or 9 bar, whichever is the higher value. Pressure tests shall be agreed at design stage and shall be verified by network modelling
10. Where trunk mains will operate with a measure of certainty over their operational lives, they can be tested at 1.5 times operating pressure.
11. The test pressure of the main shall be recorded on the as laid drawing of the scheme to be recorded on GIS. This data shall be made available for reference purposes.
12. Where a new pipeline is to connect to an operational pipeline, the joints of the final connection shall be inspected visually under normal operating pressure and there shall be no visible leakage.

2. Service test: All new Service Pipe connections must undergo a service test.

The procedure is also defined in Water Industry Information and 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

Water Companies to publish key contacts on its website.

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

Where applicable Anglian Water will fit the end point and pair in line with upgraded meter strategy. Metering pairing is available to our self-lay customers. Training and equipment needs to be complete prior to this being undertaken. Please see our website for further information.

19.2 — Timing of the generation of plot reference numbers

Applicable. Plot generation of reference numbers shall be issued in accordance with WSG LOS following SL1 submission. Each phase of delivery requires its own pre-start meeting to ensure plots are raised accordingly. A SL3 form must be submitted when completing plot connections, processed, and permission to connect will be submitted to the self-lay company before connections are completed.
SL4/SL5 or SL4/SL6 form must be submitted within the WSG LOS guidance following connection.

19.3 — Water company design service offerings

Applicable. Anglian Water offer SLP's and/or Developers a full Design Service. Applications for this offering are submitted using InFlow (our online portal), in the same manner as an application for a design approval.

19.4 — Design self-certification scheme

Not applicable. This is currently not a service Anglian Water offer.

20. Design and construction specification appendices

Water Company may insert appendices into this document within the following paragraphs 21 to 24 only in the form of text or object file.

21. Schedule of permissible materials and construction

Anglian Water sets out below it schedule of Permissible Materials and Construction, this should provide any SLP clear guidance on standard requirements for design and construction of self-mains and services. This however isn't exhaustive and where the below doesn't give clarify please liaise with your scheme representative.

Prior to commencement of works/new section of mainslaying the SLP shall provide Anglian Water a list of all materials and products to be used to demonstrate the compliance with Regulation 31 of The Water Supply (Water Quality) Regulations 2016. Main laying cannot commence without this.

Regulation 31 may be referred to by Anglian Water as MiC or Materials in Contact.

Regulation 31 approval relates to a DWI approval where this is a large surface area and WRAS approval where this is a small surface area.

For Regulation 31 help and guidance, please refer to Anglian Water Regulation 31 Compliance Overview.

Mains on non-contaminated sites	Mains up to 90mm to be PE 80 or 90mm-355mm PE100 BS EN 12201-1 and 2
Mains on contaminated sites	Mains up to 180mm shall be in 'Protectaline' barrier pipe Mains above 180mm shall either be 'Protectaline' barrier pipe compliant with BS EN 12201 and WIS 4-32-19 or Ductile Iron compliant with BS EN 545 1995 and WIS 4-41-01, the minimum external corrosion protection shall be zinc coated with epoxy to BS EN 545, and all ductile pipes and fittings shall be internally lined **Please note that butt fusion and electro fusion jointing may be only carried out when the jointer has received the appropriate training and approved by Anglian Water**
Services on non-contaminated sites	Services up to and including 63mm to be MDPE (PE80)
Services on contaminated sites	Either 'Protectaline' barrier pipe (preferred) or plastic-coated underground copper (BS EN 1057/1996)
Electro fusion couplings for mains	To be HPPE (PE100) and can be blue or black in colour, all electro fusion fittings to incorporate fusion indicators **Please note Anglian Water preferred method for installation is butt fusion, is below paragraph for further details**
Electro fusion tapping saddles for MDPE/HPPE mains	To be self-tapping and of under-clamp bottom loading design, all electro fusion fittings to incorporate fusion indicators **Gun metal tapping saddles will not be permitted on MDPE/HPPE mains**
Tapping saddles for ductile iron, cast iron, UPVC, and asbestos mains	All tapping saddles to be made to BS2789 grade 500/7, and capable of withstanding pressures of 16 bar
Valves	Body to be Ductile Iron to BS EN 1563 Internal and external protection to be blue fusion bonded epoxy powder coating in accordance with WIS 4-52-01 Internal to class A and external to Class B **All valves to be right hand (clockwise) close only**

Washouts / hydrants	Compliant with BS750:1984, BS EN 1074-6 and BS EN 14339 All hydrants to have stainless steel outlet The hydrant shall have an automatic frost valve, no water shall escape during operation and the body shall fully drain afterwards **All hydrants to be of a fixed jumper design**
Chamber sections	Chambers shall be of an appropriate size to allow operation of the mains fitting and, where appropriate, maintenance of the mains fitting For Combined Air Valves, chambered District Meters and Control Valves — the minimum standard is a 1300*850 chamber. These may NOT be installed in the carriageway For hydrants and Air Release Valves, the minimum standard is a 430*280 plastic chamber with composite cover. These may NOT be installed in the carriageway Sluice valve chambers shall be poly top and tube construction Large chamber sections shall be composite or concrete and shall comply with BS 5834 Composite Material Contents — Recycled blend of Rigid and Flexible PVC Polymers and may contain a small percentage of Low-density Polythene and Mineral Filler. Colour – Grey/black. Comply with BS 5834 2007 part 4
Chamber covers	Surface box covers shall comply with BS5834 Large covers for carriageway installation shall be tested to BSEN 124:D400 Covers for non-carriageway installation shall be tested to BSEN 124:B125 Recycled plastic covers (large and surface box) shall not be installed in public highways (trafficked roads) Covers shall comply with BS EN 124 D400(carriageway) or BS EN 124 B125 (other locations) The covers shall have slip-resistant properties of a raised pattern cast into the upper surface of the covers and shall be self-draining
Boundary boxes ‘Non-contaminated sites’	Single, double and multi-port manifolds can be used. The boundary box shall be able to incorporate a manifold meter with 1½ inch thread, stop tap and non-return valve. All boundary boxes shall have height adjustment capabilities
Boundary boxes ‘Contaminated sites’	Where boundary boxes are used on contaminated sites, they shall comply with WIS-4-37-01, be watertight and shall have gunmetal connection fittings that are able to accept either Protectaline or plastic-coated copper pipes
Wall mounted boxes	The unit shall be designed to be installed either in or on the outside wall of the property and be positioned such that the meter can easily be read without entering the property. The unit shall incorporate a 1 ½ BSP meter connection, stop tap and non-return valve
Meters	**Only meters issued by Anglian Water to be fitted** Anglian Water currently issue either: Sensus 640MC or Honey V210P

21.1 — Installation practices

Anglian Water requires an appropriate chlorine solution for disinfection of tools, equipment and materials to be used for all mains and service installations during construction, this is made up of **1% (10,000mg/L)** sodium hypochlorite Solution.

21.2 — Pipe jointing

Anglian Water’s approved method of installing PE pipe and PE barrier pipe is by butt fusion. All pipe joints shall be butt fused in accordance with WIS-4-32-08. De-beading of each butt fused joint shall be number, tested and retained for future inspection if required.

PE and barrier pipe: Pipe jointing is approved in the following order (speak to Anglian Water for any clarification):

1. Butt fusion (approved preferred standard when mains laying).
2. Electrofusion shall only be approved when used in conjunction with an approved quality control system.
3. Mechanical.

For PE jointing all EF boxes shall be blue box enabled DI – Push fit

or mechanical

Immediately prior to joining, all straight pipes and the ends of pipe shall be visually checked internally to identify contamination. Any contamination shall be suitably removed or washed away with clean water.
If this is not possible, the pipe shall not be used and shall be quarantined.

Where joints are made in the trench, extreme care shall be taken to ensure that no debris, pipe-bedding material, groundwater, drilling lubricant or any other contaminant enters the pipe.

The ends of PE pipe strings on the surface shall be end capped using watertight end caps and chocked off the ground such that no contamination or groundwater may enter the pipe. Care shall be taken when such pipe strings are moved along the ground.

Pipe ends left in trenches overnight or at any time where there is a risk that the trench may flood, or when the site is unattended, shall be sealed with a watertight end cap.

21.3 — Ground contamination

Pipe laid in contaminated ground shall comply with the Civil Engineering Specification for the Water Industry (CESWI) and Anglian Water's guidance document on Contaminated Land, see link.

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 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.

21.4 — Hygienic storage of fittings and materials

All pipe and fittings shall be stored off the ground. Wherever possible to be stored on hard-standing ground and where not possible grass/vegetation is to be maintained at a height below the off-ground storage.

All pipes shall be delivered and stored with end caps.

All fittings are to be bagged or wrapped. Where large diameter fittings these may also be cap ended. All meters should be

stored in a safe location.

21.5 — 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.

Thrust restraint and anchorage on PE

A. All joints provided shall be type 1 end load resistant.

B. When connecting to non-end-load resistant pipe systems, inline anchor blocks must be provided to resist axial stresses arising from thermal or pressurisation effects on pipelines jointed by the above fully end-load resistant methods. See diagram 1b.

C. These stresses known as the Poisson effect can occur downstream of the transition point between the two systems and result in joints on the non-PE system being pulled apart.

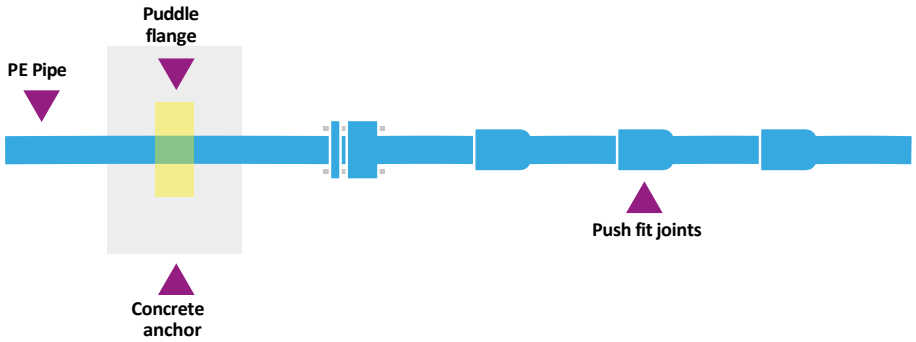
D. The PE pipe itself may be partially or completely surrounded by concrete but should be protected against fretting from any slight movement during normal operational by a heavy-duty polyethylene membrane. With a minimum overall membrane thickness of 3 mm. The membrane should extend outside of the concreted area to avoid possible damage during pouring or compaction and to minimise local stresses.

E. Where a concrete surround to the pipe barrel is to be provided as anchorage, forces may be transmitted to the concrete via an integral stub flange or similar fitting to form a puddle flange. Electrofusion saddles can be effective where relatively low thrust loads are involved.

Anchorage of ductile iron

Consideration shall be given to using the pipe manufacturers design software / technical advice when designing the number, type and location of anchor points on ductile iron mains. This will enable the appropriate number of anchor points to be used and prevent over design.

Connection of PE to non end load resistant system



The SLP shall submit to Anglian their proposal 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 Anglian Water prior to commencement of the works. The SLP shall ensure that their design conforms to all applicable standards and specification.

22. Meter and service pipe policy and installation

All new build properties shall be metered with the pipework and fittings installation complying with Water Supply (Water Quality) Regulations 2016 and Water Supply (Water Fittings) regulations 1999. Our current policy is that meters should be located externally in the public footway to enable reading, inspection, maintenance, and access to the stop tap. We appreciate however that external meters are not always possible or practical, therefore, in these situations Internal meters can be used. Further details of these arrangements can be found below.

Anglian Water offer to SLP's with the relevant accreditation, the option to complete their own services connections less than or equal to 63mm and the ability to fit the meters for these where applicable.
Anglian Water will also consider SLP's with the relevant accreditation to undertake service connections above 63mm.

Anglian Water also offer to both the Developer/SLP an option for Anglian Water to install the pipework from the water main to within 1000mm of the customer boundary in the footway. All Boundary boxes, single and multi-port will be installed in the highway footway.

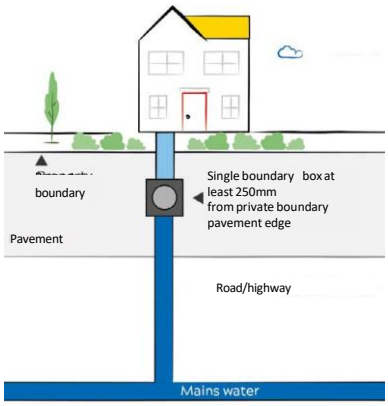
All meters shall be provided by Anglian Water using the relevant forms to order and notify Anglian Water of installation.

22.1 — External meter/s Single and multi-port boundary boxes.

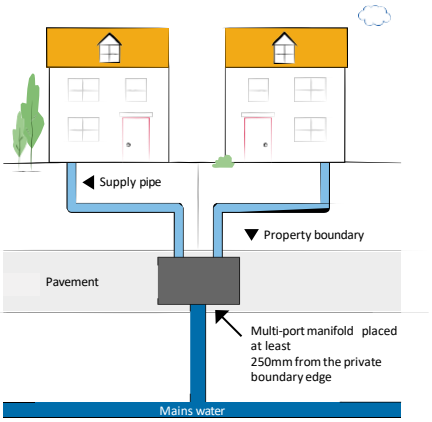
Single and multi-port boundary boxes must be located and installed at least 250mm, and not more than 1000mm from the property boundary. The boundary box shall be accessible for all occupiers and Anglian Water employees - i.e. not in another properties private land. It shall be safe to maintain for Anglian Water employees, avoiding shrubbery, hedges and fences. It must be at least 2m from lamp posts or street furniture. The position of the boundary box shall allow reading, inspection, and maintenance.

A key consideration here is Highway Authorities won't allow boundary boxes in driveways or drive entrances where vehicles are likely to drive over them. When installing multi-port boundary boxes, the household supply pipes should not cross the boundary into or through adjacent plots.

Single boundary box in highway



Multi-port manifold



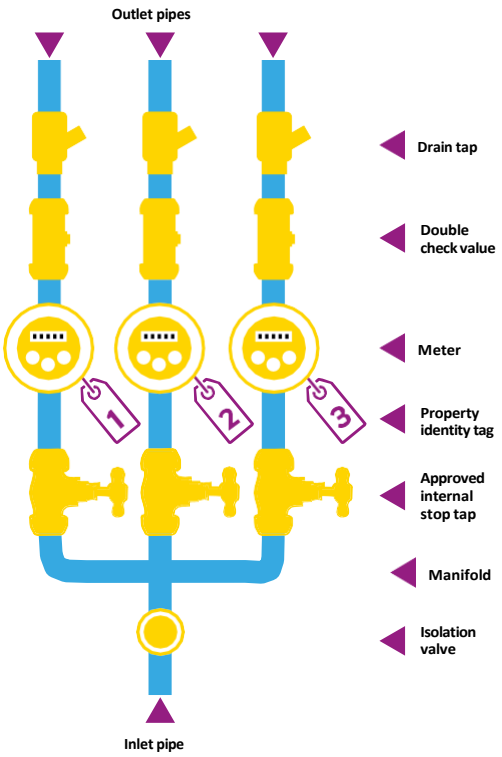
22.2 — Internal meters

Anglian Water will allow internal meters to Multi Occupancy buildings (flats and apartments) where separate external meters are not possible. Where the requirement is for an internal metered solution the customer is to install suitable manifold fitting to house the meters. The manifold shall be of metallic construction, and a maximum of one metre from finished floor level. The installation shall include an isolation valve for each unit downstream of the meter. The installation shall include a non-return valve and drain off point up stream of the meter.

Meter manifolds shall be located in an area of common access, i.e. a meter cupboard, enclosure or plant room. Each manifold port shall be tagged prior to meters being installed, detailing which unit it supplies. Access for meters must be available 24 hours a day, 365 days a year. If the meter cupboard is to be locked, then only the same system in common use for gas and electricity meters will be permitted.

The Developer shall install the pipe from the internal manifold to the property boundary. Anglian Water will install a controlling valve at the property boundary on each connection. In some cases, Anglian Water may also install a non-revenue meter for leak detection purposes.

Example of an internal manifold installation



23. Standard arrangement drawings

Standard Arrangement Drawing can be provided by Anglian Water upon request. If requests are over 12 months old, please ensure you are still following current best practice.

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.

However, such meetings are viewed by Water Companies as a key means of helping to achieve good Health and Safety outcomes, of securing timely, cost-effective delivery and ensuring smooth adoption and handover. For this reason, they will generally be requested by Water Companies.

In more detail, such meetings will allow the following aspects of the project to be addressed:

- Site-specific Health and Safety and site management issues.
- Confirmation of the identity of the Principal Contractor under CDM Regulations.
- Introduce site personnel and establish their individual roles and responsibilities.
- Establish local lines of communication between site and Water Company staff.
- Assess any associated construction activity that may need accommodating in the SLP construction programme.
- Discuss issues relating to the distribution that have the potential to affect the project.

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 on the next page.

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.

'Pre-start information' includes as a minimum:

1. Confirmed arrangements for CDM 2015 Regulations and other HandS 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 and IGNs

Number	Title
WIS 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 4-22-01	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 and 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 wras.co.uk

Appendix 2

British Standards (BS) and BS EN Standards

Number	Title
BS EN 124	Gully tops and manhole tops for vehicular and pedestrian areas
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 EN13959 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 1983 and ISO 7145 1982	Measurement of fluid flow in closed conduits and Determination of flowrate of fluids in closed conduits of circular cross selection — 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). Part 1: General. Part 2: Pipes. Part 3: Fittings
BS PD 855468	Guide to the flushing and disinfection of services supplying water for domestic use within buildings and their curtilages

Appendix 3

Other documents

Number/Date	Title
10/WM/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
Published January 2014	Contaminated Land Assessment Guidance: Protocols Published by Agreement Between Water UK and the Home Builders Federation
Water UK/HBF	Available free of charge here
Volumes 1-6	Streetworks UK (formally National Joint Utilities Group) Guidance Publications
R128	CIRIA Report Guide to the Design of Thrust Blocks for Buried Pressure Pipelines
Principles of Water Supply Hygiene	Principles of Water Supply Hygiene and Technical Guidance Notes
Drinking Water Safety — Guidance to health and	DWI, Available free of charge here
Drinking Water Safety — Guidance to health and water professionals	Specifications for polyethylene pipe and fittings Specifications for PVC pipe and fittings
Report R97	Trenching Practice (2nd edition) CIRIA, 1983
Report 128	Guide to the Design of Thrust Blocks for Buried Pressure Pipelines CIRIA, 1994
HSG 47	Avoiding Danger from Underground Services HSE Books, 2014
Specification for the Reinstatement of Openings in Highways (3rd Edition)	Department of Transport 2010
Water supply to domestic fire sprinkler systems	Water UK June 2015 (and earlier documents)

Anglian Water Services Limited

Lancaster House
Lancaster Way Ermine
Business Park Huntingdon
Cambridgeshire
PE29 6XU

anglianwater.co.uk