Anglian Water
Development Services

Information for developers about contaminated land and ground condition assessment

November 2023

Contents

Introduction to the new approach **3**

Permeation of water pipes **3**

How are sites assessed using UKWIR method? **3**

Stage 1 – Undertake a Preliminary Risk Assessment (PRA) 3

Stage 2 – Site Investigations (SAR/ISI) 4

What should the developer provide? **4**

Information developer provides for the PRA 4

Information developer provides for the Site Investigations (SAR/ISI) 4

Formats 4

Pipe materials selection 4

Pipe selection table 5

Health and safety assessment and the CLEA **6**

Remediation **6**

Remediation plan 6

Dual status sites **7**

Land parcel status assessment for contaminants within a larger development site 7

Part contaminated, part non-contaminated sites 7

Contaminated land information sources **7**

Further guidance **8**

Introduction to the new approach

Prior to 2010 individual water companies set their own standards based on available data. In response to concerns by water companies in 2010 UKWIR have compiled a guide for water companies *Guidance for the selection of water supply pipes to be used in Brownfield sites*. Additional supplementary guidance was provided by Water UK in 2014.

The guide provides:

- A clear concise guidance to developers, designers and water companies
- National standards – national guidance
- Key focus on pipe and fittings integrity in contaminated land

Permeation of water pipes

Plastic supply pipes are permeable to hydrocarbons such as petrol, diesel, heating fuel and white spirits. To ensure that the water supply remains satisfactory we can use a material which is not permeable to hydrocarbons, such as ductile iron, copper, plastic coated copper or aluminium lined polyethylene pipe (ALPE).

From a water company point of view there are a number of key concerns:

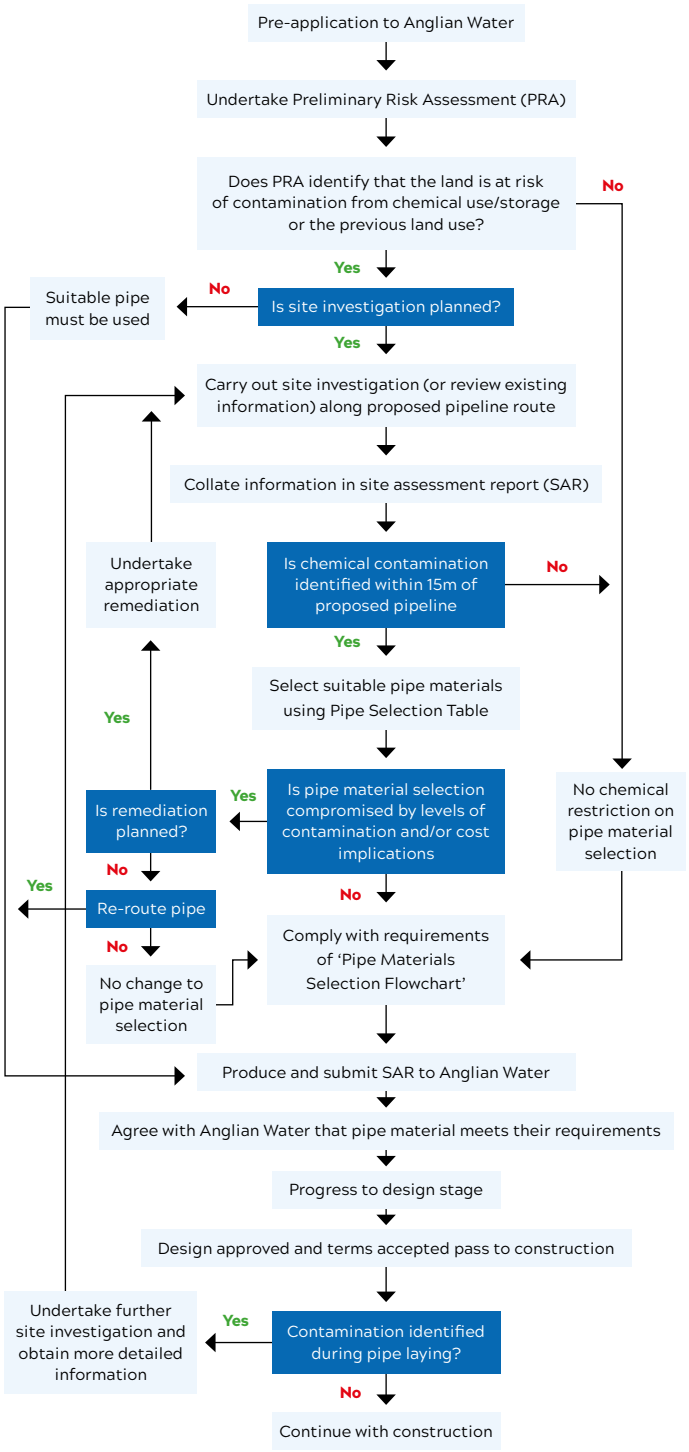
- Permeation of hydrocarbon based substances through pipework (ingestion)
- Pipe failure (environmental stress crackling, swelling of plastic pipes, corrosion of metal pipes)
- Effect of compounds on the health and safety of employees working in the ground (skin irritation)

How are sites assessed using UKWIR method?

Stage 1 – Undertake a Preliminary Risk Assessment (PRA)
For each site the developer will need to provide the following for assessment:

- Desktop study
- Site walk over
- Review findings

- If chemicals have been stored/used on site e.g. oil tank, further work is required (See the flowchart below) or if the previous land use or neighbouring land use identifies that the land could be contaminated.
- If no chemicals have been stored/used on site, or if no contamination risk from previous or neighbouring land use has been identified. (See the flowchart **[1]** below)



[1] Flowchart adapted from UKWIR publication 'Guidance for the selection of water supply pipes to be used in Brownfield sites'

Stage 2 – Site Investigations (SAR/ISI)
If identified as necessary at Stage 1, the developer should undertake an Intrusive Site Investigation (ISI) and produce a Site Assessment Report (SAR). The SAR should contain the items detailed under 'What should the developer provide ?' (below) and with the methodologies in Part 2.1 of the UKWIR *Guidance for the selection of water supply pipes to be used in Brownfield sites*.

What should the developer provide?

When making a submission to Anglian Water the following needs to be included:

Information developer provides for the PRA

- Desk study
  - Desk based
  - Historic and current use
  - Chemicals that may have been stored on site
  - Immediate and neighbouring area considered
  - Land registry, maps. LA Records
- Site plan
  - Site location, scale, site boundary, arrow identifying North, proposed route of pipes
- Site walkover
  - Visual and factory evidence
  - Previous/current site activities eg oil tanks
  - Ground conditions eg fly-tipping
  - Photographs

Information developer provides for the Site Investigation (SAR/ISI)

- Photo-ionisation detection (PID) – measure organic contamination on the site. Above ground and at depth
- 15 metre corridor either side of the pipeline route
- No evidence of organic vapours. At least two samples must be collected for analysis
- If the water pipe route is unknown then the whole site must be assessed
- Minimum depth 500 mm
- Numbers and locations of samples taken should be sufficient in order to assess the site and any potential contamination "hot spots"
- Ground water/perched water within one metre of the base of trench a water sample should be collected (increase to two metres in the summer)
- Analysis
- **Mandatory analytical suite;**
  - Total VOCs, Total BTEX and MTBE, Total SVOCs (excluding PAHs and those substances marked with an *), EC5-EC10 aliphatic and aromatic hydrocarbons, EC10-EC16 aliphatic and aromatic hydrocarbons, EC16-EC40 aliphatic and aromatic hydrocarbons, Phenols*, Cresols and chlorinated phenols*
- **If identified as a risk in the PRA;**
  - Ethers*, Nitrobenzene*, Ketones*, Aldehydes*, Amines
  - Corrosivity also needs to be assessed (conductivity, redox and pH) if PE pipe type is not planned to be used (for example ductile iron).
- All data collated into SAR and submitted to Anglian Water

Formats

Document formats should be as shown in Appendices A, B & C of 1 of the UKWIR *Guidance for the selection of water supply pipes to be used in Brownfield sites*.

Pipe materials selection

Upon receipt of PRA and SAR, Anglian Water will assess the data to confirm material type considering the defined trigger levels in the Pipe Selection Table on page 5.

Pipe Selection Risk Assessment Summary (PSRAS) - from Water UK Contaminated Land Assessment Guidance 2014

1 – Testing must be undertaken on the materials within which the pipes are to be laid, whether that be existing ground materials, remediated materials or imported capping materials. Please use the appropriate testing data to complete Table 1 below.

2 – If more than one pipe selection is being made, for example, for pipes in different areas of a large site, a completed PSRAS is required for each selection.

What materials have been tested to populate Table 1 below? ☐ Existing ground materials ☐ Remediated materials ☐ Imported capping materials

All concentrations in mg/kg

Test group	Testing required	PE threshold	Metal pipes/ barrier pipe	Laboratory detection limit	Testing UKAS accreditied Y/N	Maximum concerntration at proposed pipeline depth [3]	Maximum site concerntration [4]	Locations and depths where concerntrations exceed proposed pipeline threshold
Total VOCs	Where Preliminary Risk Assessment (PRA) has identified land potentially affected by contamination	0.5	Pass					
Total BTEX and MTBE		0.1	Pass					
Total SVOCs (excluding PAHs and those substances marked with an *)		2	Pass					
EC5-EC10 aliphatic and aromatic hydrocarbons		2	Pass					
EC10-EC16 aliphatic and aromatic hydrocarbons		10	Pass					
EC16-EC40 aliphatic and aromatic hydrocarbons		500	Pass					
Phenols* (from SVOC analysis)		2	Pass					
Cresols and chlorinated phenols* (from SVOC analysis)		2	Pass					
Ethers*	Only where identified	0.5	Pass					
Nitrobenzene*		0.5	Pass					
Ketones*		0.5	Pass					
Aldehydes*		0.5	Pass					
Amines		Fail	Pass					
Corrosive	Conductivity, Redix and pH	Pass	**[2]**					

[2] Threshold: For wrapped steel, corrosive if pH<7 and conductivity > 400µS/cm. For wrapped ductile iron corrosive if pH<5, Eh not neutral and conductivity > 400µS/cm. For copper, corrosive if pH<5 or >8 and Eh positive.
[3] Water pipes are normally laid at 0.75-1.35m below finished ground level.
[4] Also state if liquid free product is present in soil or groundwater.

Health and safety assessment and the CLEA

The UKWIR guidance does not cover health and safety considerations.

In order to maintain the safety of our staff, contractors and customers, Anglian Water also assess the site based on EA CLEA (Contaminated Land Exposure Assessment) guidelines.

With each site application please include the following information to comply with Anglian Water health and safety requirements.

The samples are to be taken across the site and focused on the mains services route.

Table of trigger values for health and safety considerations when laying mains or services in contaminated land

	Contaminant	Soil guideline value (mg/kg DW)
Inorganic	Arsenic	32
	Nickel	130
	Mercury	170
	Selenium	35
	Cadmium	10
Organic	Benzene	0.33
	Toluene	610
	Ethylbenzene	350
	Xylene	230
	Phenol	420

Remediation

On site remediation of contaminated soil may have been requested as part of the planning process. Where this has been completed the following will be required in addition to the original soil survey:

- Sampling and analysis of the remediated soil or any imported fill the pipes may be incontact with
- Site plan showing areas and depths or remediation
- Certificates of remediation
- Evidence pipework will be within remediated ground

Water infrastructure is laid with a minimum of 750mm cover to finished surface level. In order for a post remediation assessment to be considered it is suggested that the minimum level of soil cleansed is 1.2 metres in depth. Remediation of only the garden areas will not be sufficient to mitigate against the impacts of contaminants on water mains and services. Anglian Water may ask for evidence pipes are within remediated ground, photographs and/or site plans.

Any imported backfill must be clean, inert and supported by a contamination validation certificate from the supplier with test results.

Remediation plan
Where on site remediation is necessary and has not been completed, there is an opportunity to submit a remediation plan to Anglian Water for consideration.

Benefits include:

- Agreement to move contaminated soil into areas outside those where residential properties are being built, or where water mains and services are being laid
- The classification of the development as noncontaminated and suitable for the installation of plastic water infrastructure

The remediation plan should contain a detailed methodology accompanied by a full Health and Safety risk assessment detailing the impact of work on:

- The land in respect to the Environment Agency guidelines
- Personnel working on site
- Future residents on the site

The excavated areas should be filled with clean material from other areas of the site or clean imported material.

Dual status sites

Land parcel status assessment for contaminants within a larger development site
On large developments it has been traditional to classify the status of the land parcels in accordance with the status of the large site as a whole in respect to contamination. In essence, if the site as a whole, under the initial spine mains scheme, was declared contaminated or noncontaminated, then that status was applicable to all the land parcels contained therein. Anglian Water can undertake to assess not only the site for its spine mains, but also for each land parcel being developed. Therefore it is requested that each land parcel developer carry out soil analysis for their land parcel and submit it with the application.

This means Anglian Water can better assess each parcel of land on its merits and thus the possibility of 'ring-fencing' areas of contamination within a buffer zone and/or declaring land parcels contamination free. In this process of evaluation of land parcels, the elevation of the land parcel and water table in correlation with the test results and any possible contamination hot spots will be taken into account.

Part contaminated, part noncontaminated sites
In assessing the status of a site where there are hotspots of contaminant, Anglian Water will evaluate the extent of the contamination within the site using the trial holes, test results and elevation data, which the Developer has provided as a guideline.

Should the results indicate that the contamination is in an isolated area far from the residential plots and water services, for example in a public open space, then the mains can be laid in unprotected material. However, Anglian Water must be satisfied that the risk is mitigated, for example no risk of leaching due to topography.

This will be done under the provision that, should the site layout change, this decision may be changed if necessary. However, should the contamination be in a contained area which is bordered on the residential development areas, then there is the possibility of that hot spot being ring-fenced within an Anglian Water defined buffer area. The area within the buffer zone will be classified as contaminated with the rest of the site classified as clear.

Contaminated land information sources

Prior site use (site history and description) is of vital importance and all surveys must contain a detailed consideration of the site history. Possible sources to be consulted in the desk top study are detailed below along with the type of information they may provide.

Contaminanted land information sources	
Department of Environment	environmentagency. gov.uk/clea
Ordnance survey maps	Historical site layout, buildings, roads and geographical features
Street, town and county directories	Streets, businesses, trade and land use
Hydro geological information	Surface and groundwater incidence, groundwater depth movement and flow
Soil survey of England and Wales	Local soil type and texture
British Geological Survey	Geology, mines and quarries
Industrial records	Site owners, processes, transport and storage of goods, raw materials, waste and disposal
Site plans and photographs	Current and historic site layout, access, structures and water courses
Local Authority records	Waste disposal sites and landfills, planning registers and applications, land reclamation IPC registration, storage of hazardous substances
Land Condition Register (from Nov 2000)	This is the register of 'contaminated' land held by Local Authorities
Environment Agency records	Groundwater vulnerability, waste disposal, radioactive substances, prescribed processes, enforcement notices, prohibition orders, convictions
Local knowledge (insufficient alone)	Anecdotal information from former employees, local residents etc.
Water Company records	Trade effluent discharges, sludge disposal
Site inspection reports	Groundwater vulnverability, waste disposal, radioactive substances, prescribed processes, enforcement notices, prohibition orders, convictions

Further guidance

Appendices E, F and G of the UKWIR *Guidance for the selection of water supply pipes to be used in Brownfield sites*.

BS 1017 5 (2001) Investigation of Potentially Contaminated Sites a code of practice.

CIRIA (1993) A guide to stage working practices for contaminated sites, W S Atkins, Funders report/cp/9.

Environment Agency – Contaminated Land Exposure Assessment environmentagency.gov.uk/clea

Additional supplementary guidance for PE pipe selection provided by Water UK in 2014. *Water UK Contaminated Land Assessment Guidance 2014.*

Anglian Water Services Limited
Lancaster House
Lancaster Way
Ermine Business Park
Huntingdon
Cambridgeshire
PE29 6XU
anglianwater.co.uk

love every drop
anglianwater