

Supplementary guidance for the selection of water pipes in land potentially affected by contamination



Introduction

In January 2011, UK Water Industry Research (UKWIR) published "Guidance for the Selection of Water Supply Pipes to be used in Brownfield Sites" (Ref 10/WM/03/21; the 'UKWIR Guidance'). Its aim is to ensure that the correct materials are selected for water pipes and components to be used below ground in brownfield sites to protect the quality of drinking water whilst taking into account the service life of the water distribution system. It supersedes the Water Regulations Advisory Scheme (WRAS) Information and Guidance Note 9-04-03 "Laying Pipes in Contaminated Land" which has been withdrawn.

The UKWIR Guidance is for use by developers, self-lay organisations, water companies and consultants when planning, designing and constructing water mains and/or services in brownfield sites. It defines brownfield sites as "land or premises that have previously been used or developed. They may also be vacant or derelict. However, they are not necessarily contaminated." The UKWIR Guidance states that it does not apply to greenfield sites; however, we consider this supplementary guidance and the relevant sections of the UKWIR guidance as being equally suitable for application to those greenfield sites considered to be potentially affected by contamination. Where greenfield sites are not affected by contamination a preliminary risk assessment (see below) will suffice.

The UKWIR Guidance also states that there should be no departure from its provisions "*except where formally approved by the Water Company, such departure being technically justifiable or representing advances in knowledge or product development*".

We have adopted the UKWIR Guidance in principle and produced this company specific supplementary guidance (the 'UUW Guidance') which includes the Risk Assessment for Water Pipes (the 'RA').

This guidance does not cover operative safety, health exposure modelling or accidental pipe damage.

Risk Assessment for Water Pipes in Land Potentially Affected by Contamination

Any application for new water supplies to a development (construction of new properties, or renovation or conversion of existing buildings) in land potentially affected by contamination shall include a completed RA.

As a minimum a desk study (preliminary risk assessment) shall be provided with the RA in accordance with the framework in Environment Agency publication "Model Procedures for the Management of Land Contamination" (ref: CLR11) that sets out whether the land through which the pipes are to be laid may be affected by contamination. The application of the source, pathway, receptor concept will be an integral part of any pipeline risk assessment. For each potential source (the contamination) and each potential receptor (the water pipe), consideration shall be given to whether a potential pathway between source and receptor exists, or may exist in the future, linking the two. There are normally only three pathways by which contamination may come into contact with water pipes. These are direct contact with the soil or backfill, an excessive vapour phase or a contaminated groundwater regime. If none of these conditions exist on site (adopting the source, pathway, receptor concept) then it is likely that extended and/or targeted soil testing will not be required and a simple risk assessment will suffice. For those sites where land may be affected by contamination appropriate testing shall 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. The testing requirements are as described in the following section.

The signatories of the Water Supply Application Form and the RA must ensure that all assessments of land condition have been carried out in accordance with applicable current standards and guidelines by or under the direction of a suitably qualified competent person.

We require the competent person to be a) a chartered member of an appropriate professional body (such as the Institution of Civil Engineers, the Geological Society of London or the Royal Institution of Chartered Surveyors) with relevant experience of investigating contaminated sites or b) a Specialist in Land Condition (SiLC) with appropriate geo-environmental experience.

Testing Requirements

The soil, rock and if appropriate groundwater tests that are required on all sites where the potential for organic contamination has been identified in the desk study and where water pipes are proposed to be laid must be accredited by United Kingdom Accreditation Service (UKAS) as a minimum and where commercially available the Environment Agency's Monitoring Certification Service (MCERTS). These accredited tests should be undertaken for:

Banded hydrocarbons EC5-EC10, EC10-EC16, EC16-EC40 (Total aliphatic and aromatic hydrocarbons for each banding may be summed). Aliphatic/aromatic fractionation and subsequent banding may be required should a more detailed site specific risk assessment be undertaken. The bandings have been amended to take into account readily available laboratory tests. The equivalent carbon number (EC) is used to assess petroleum hydrocarbon mixtures rather than the actual number of carbon atoms in the molecule in line with guidance issued by the Environment Agency (2005).

Volatile organic compounds (VOCs) (method by head space or purge & trap GCMS) with tentative identification of compounds greater than 20µg/kg. The method used should be capable of detecting a wide range of compounds listed in US EPA Method 8260C or similar. The method should include analysis of naphthalene.

BTEX (Benzene, toluene, ethyl benzene and xylenes) plus MTBE (Methyl-tertiary butyl ether) (by head space GCMS)

Semi-Volatile Organic Compounds (SVOCs) (method by GCMS) with tentative identification of compounds greater than 20µg/kg. The method used should be capable of detecting the compounds listed in US EPA Method 8270D or similar. The total concentration of SVOCs excludes polycyclic aromatic hydrocarbons, ethers, nitrobenzene, ketones, aldehydes, phenols, cresols and chlorinated phenols. Phenols, cresols and chlorinated phenols which are detected by the SVOC analysis are given their own assessment criteria.

We do not consider Table G1 and Table 3.1 of the UKWIR Guidance to be a definitive guide for assessing total concentrations. Table 1 in the RA below replaces Table 3.1 of the UKWIR Guidance.

Where previous site uses include the use, storage, treatment, disposal or manufacture of any of the following, appropriate testing for these substances will be required:

Ethers, nitrobenzene, ketones, aldehydes and amines. Note that the presence of amines on any site at the proposed pipe depth +/- 1.0m precludes the use of polyethylene. The methods of analysis and method of calculation of total concentrations of these compounds will need to be agreed with UUW.

To comply with the testing requirements, the suites of tests that are required on all brownfield sites where wrapped steel, wrapped ductile iron or copper pipes are to be laid as minimum must include:

pH, Conductivity and redox potential

Sufficiency of Testing

Water pipes are normally laid at between 0.75 and 1.35m from finished ground level to crown of pipe. Samples taken and tested must represent both a) the soil in which the water pipes are to be laid and b) the soil down to at least 500mm below the underside of the proposed pipe. Where the proposed depth of the pipes is unknown at the time of application, soil samples representative of the ground condition between surface level and 1.5m below finished ground level shall be taken as a minimum. Where appropriate (see UKWIR Guidance) groundwater sampling and groundwater monitoring will also be

necessary. Photo-ionisation detection (PID) monitoring along the proposed route of the pipeline may be employed, though this does not provide a definitive guide to the suitability of water pipe materials.

Where required a sufficient number of test results should be obtained from the material in which the pipes are to be laid. CLAIRE/CIEH 2008 "Guidance on comparing soil contamination data with a critical concentration" may be used, where appropriate, to justify the number of soil samples tested; however, this statistical model should not be used on heterogeneous materials or used to average test results from different types of materials.

Further guidance on representative sampling is contained within BS10175:2011 Code of Practice for the Investigation of Potentially Contaminated Sites, the Department of the Environment's Contaminated Land Research Report "Sampling strategies for contaminated land" prepared by The Centre for Research into the Built Environment, Nottingham Trent University (Ref: CLR 4; 1994) and the Environment Agency's "Secondary Model Procedure for the Development of Appropriate Soil Sampling Strategies for Land Contamination" (ref: R&D Technical Report P5-066/TR; 2000).

Where remediation has been carried out on the site, the test results obtained from validation samples will be used in the assessment. Where a horizontal capping system has been or will be employed using materials spread across a site, sufficient samples will need to be taken to characterise the capping material used and the results presented to UUW. However, the sufficiency of sampling on the horizontal capping system, in which the pipeline will be placed, may be assessed on the basis of the source, quantity and type of materials used.

Detection Limits

Only positive concentrations, ie those above the limit of detection should be used in summation of VOC and SVOC (or other test groups of compounds ie phenols, cresols and chlorinated phenols). Laboratory methods shall provide a minimum limit of detection of 10µg/kg for each individual VOC or SVOC (or other test groups of compounds) quantitatively detected in accordance with the methods described above. For tentatively identified compounds (TICs), only those compounds with a concentration of 20µg/kg or greater shall be used in the summation of VOC and SVOC (or other test groups of compounds).

Protective Measures

Where polyethylene, ductile iron, steel or copper pipes are to be laid on a brownfield site or other land potentially affected by contamination (whether or not it has been remediated) and where the concentrations exceed the generic guideline values set out in Table 1 of the RA, the developer shall provide either:

- a) a robust risk assessment to show how any contaminants will not significantly impact on proposed water supplies or buried assets over the lifetime of the assets; or
- b) more suitable pipe materials; or
- c) an engineering solution to protect the pipe work backed up by an adequate assessment of the risk.

Liquid free phase product (e.g. oil or free solvent layers) shall not remain in the ground or groundwater in the vicinity of water pipes, whether barrier pipe or any other pipe materials are used.

When designing pipe routes on land potentially affected by contamination, new preferential contamination pathways along the route of new water pipes shall not be created. Particular measures may be required to prevent the possible migration of contamination through pipe bedding and into controlled waters.

References

BS10175:2011 "Investigation of Potentially Contaminated Sites Code of Practice"

CLAIRE/CIEH "Guidance on comparing soil contamination data with a critical concentration" 2008

Department of the Environment Contaminated Land Research Report "Sampling strategies for contaminated land" prepared by The Centre for Research into the Built Environment, Nottingham Trent University (Ref: CLR 4) 1994

Environment Agency "Secondary Model Procedure for the Development of Appropriate Soil Sampling Strategies for Land Contamination" (ref: R&D Technical Report P5-066/TR) 2000

Environment Agency "Model Procedures for the Management of Land Contamination" (ref: CLR11), 2004

Environment Agency P5-080/TR3 "The UK Approach for Evaluating Human Health Risks from Petroleum Hydrocarbons in Soils", 2005

UK Water Industry Research (UKWIR) "Guidance for the Selection of Water Supply Pipes to be used in Brownfield Sites" (Ref 10/WM/03/21)" January 2011

Water Regulations Advisory Scheme (WRAS) Information and Guidance Note 9-04-03 "Laying Pipes in Contaminated Land" 2002



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Risk Assessment for Water Pipes (RA)



The risk assessment for water pipes will help you choose appropriate materials for your development. We are happy to deal with a risk assessment for water pipes in advance of any formal application for a new water supply.

If you need any help completing the form please call us on [REDACTED]

When completing this form electronically, the larger text boxes will expand in height if required.

Section 1: Development Details

Development Name (if it has one)	Manchester College Campus
Development Address	Great Ducie Street, Strangeways, Manchester, M3 1FF
OS Grid Reference (mid point)	383824, 399191
Developers Name	Willmott Dixon Construction Ltd
UW reference number (for UU use only)	

Please provide details below of the current and historical use of the site and adjacent sites.

If your supporting information has details of the current and historical site use, please reference below the relevant sections of your report.

The majority of the site housed a brewery and printworks from earliest historical mapping c. 1848 onwards. Mapping shows a number of tanks, boilers and abstraction wells on site. Surrounding areas comprise typical industrial landuses (print works, cotton works, hat works, iron works, etc) throughout the history of the site. The site has been cleared and has been in use as a car park from c. 2010.

Section 2: Preliminary Risk Assessment

Has your desk study and site walkover identified any land potentially affected by contamination?	☒ Yes ☐ No
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If the site is potentially affected by contamination but you have not completed any intrusive site investigation please provide details below of the rationale behind the intended pipe selection.

If your supporting information has details of the rationale behind the intended pipe selection, please reference below the relevant sections of your report.

N/A

Section 3: Intrusive Site Investigation	
Have you completed any intrusive site investigation?	☒ Yes ☐ No
Date(s) when the site investigation(s) undertaken	3 rd to 21 st June 2019
At what level has groundwater been encountered?	4.32-9.32 metres below ground level or ☐ Not encountered
<p>Table 1 (Pipeline Selection Risk Assessment Summary (PSRAS)) below classifies testing required where the preliminary risk assessment has identified land potentially affected by contamination. Please provide details below of any test groups which have not been tested and the rationale for not testing.</p> <p><i>If your supporting information has details of the rationale behind not testing any particular test groups, please reference below the relevant sections of your report.</i></p>	
ethers, nitrobenzene, ketones, aldehydes, amines not tested as no source identified as part of conceptual model and no evidence identified.	
<p>If the intrusive site investigation has identified concentrations above the PE threshold (see PSRAS) and your intended pipe selection is PE please provide details below of the rationale behind the intended pipe selection.</p> <p><i>If your supporting information has details of the rationale behind the intended pipe selection, please reference below the relevant sections of your report.</i></p>	
N/A	

Section 4: Site Remediation	
<p>Please provide details below of any site remediation (which may include a change in site levels) already completed.</p> <p><i>If your supporting information has details of the site remediation already completed, please reference below the relevant sections of your report.</i></p>	
N/A	
Has the PSRAS (Table 1) been completed using appropriate data after remediation?	☐ Yes ☒ No ☐ N/A
<p>Please provide details below of any proposed site remediation and an analysis of whether this will affect your intended pipe selection.</p> <p><i>If your supporting information has details of any proposed site remediation and whether this will affect your intended pipe selection, please reference below the relevant sections of your report.</i></p>	
<p>Site remediation will incorporate grubbing out of in-ground structures to approximately 4mbgl. Areas of visual/olfactory contamination shall be removed from site. Suitability for re-use testing shall be undertaken on all material to be re-used on site. Based on testing, suitable made ground will be placed and engineered beneath a 600mm construction platform comprising suitable site-won crush.</p> <p>Pipeline to be laid into sterile trench corridor on a bed of clean imported stone. Trench detail TBC. Approximate pipeline route shown on attached. Pipeline to be laid within typical pipeline depth range (0.95-1.35mbgl).</p>	

Section 5: Final Use of Site

Please provide details below of any chemicals (including fuel) to be stored on site and any other future contamination risks which may affect your intended pipe selection.

If your supporting information has details of potential contamination risks which may affect your intended pipe selection, please reference below the relevant sections of your report.

Development incorporates erection of a five storey educational building with associated access, landscaping, public realm and other associated works following removal of a car park. No bulk storage of chemicals or fuels anticipated. Enabling works includes overturn of made ground to ~4mbgl and re-engineering to new levels of geotechnically and chemically suitable material. Precautionary barrier pipe recommended. Pipeline to be laid into sterile service trench - approximate pipeline route attached.

What water pipe materials are intended to be used on site?

☐ PE ☒ PE Barrier Pipe Type A ☐ PE Barrier Pipe Type B
Other (please specify):

Section 6: Additional Information

Please use the section below to provide any additional details to support your intended pipe selection.

If your supporting information has additional information to support your intended pipe selection, please reference below the relevant sections of your report.

Assessment in Table 1 excludes pipeline depth, as data refers to pre-remediation ground conditions and depths. Enabling works includes overturn of made ground to ~4mbgl and re-engineering to new levels of geotechnically and chemically suitable material. Precautionary barrier pipe recommended. Pipeline to be laid into sterile service trench - approximate pipeline route attached.

Section 7: Risk Assessor

Name and relevant qualifications of person directing the risk assessment for water pipes

Chris Hughes BSc, MSc, CEnv

Name and address of risk assessor's company

LK Group, Unit 29 Eton Business Park, Eton Hill Road, Radcliffe, M26 2ZS

Date risk assessment performed

06.02.2020

Section 8: Declaration

I confirm I have completed this form and provided supporting information in accordance with 'UKWIR Guidance for the Selection of Water Supply Pipes to be used in Brownfield Sites' and UuW's Supplementary Guidance. I also confirm that if any further site investigation is needed and carried out, I will be required to submit an additional Risk Assessment for Water Pipes with the relevant supporting information. I understand that failure to supply any of the required information may delay my application being processed.

Name

Chris Hughes

Company

LK Group

Phone Number

[REDACTED]

Date

06.02.2020

Please e-mail the completed form and supporting information to water.connections@uuplc.co.uk. Alternatively you can fax a paper version to 01925 678926 or post to us at United Utilities Water, Metering and Connections, Ullswater House, Lingley Mere, Warrington, WA5 3LP.



About us

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Table 1 - Pipe Selection Risk Assessment Summary (PSRAS)

- 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 accredited Y/N	Maximum concentration at proposed pipeline depth See Note [2]	Maximum site concentration See Note [3]	Locations and depths where concentrations exceed proposed pipeline threshold
Total VOCs	Where Preliminary Risk Assessment (PRA) has identified land potentially affected by contamination	0.5	Pass	0.1	Y	N/A	3.6	BH105/1m,TP103/0.2m,TP106/0.5m
Total BTEX & MTBE		0.1	Pass	0.001	Y	N/A	<LOD	N/A
Total SVOCs (excluding PAHs and those substances marked with an *)		2	Pass	0.1	Y	N/A	17	TP103/0.2m
EC5-EC10 aliphatic and aromatic hydrocarbons		2	Pass	0.001	Y	N/A	<LOD	N/A
EC10-EC16 aliphatic and aromatic hydrocarbons		10	Pass	1	Y	N/A	154	BH102/0.5m,BH102/1.5m,BH105/1m,BH106/1m, BH106/3.5m, BH110/0.5m, BH111/1m, BH111/1.5m,TP103/0.2m,TP104/0.6m, TP106/0.5m,TP107/0.3m,TP203/0.9m
EC16-EC40 aliphatic and aromatic hydrocarbons		500	Pass	10	Y	N/A	7,560	BH102/0.5m, BH105/1.0m, BH106/1m, TP103/0.2m,TP107/0.3m, TP109/1.2m, TP201/0.5m,TP206/0.7m
Phenols* (from SVOC analysis)		2	Pass	0.1	Y	N/A	<LOD	N/A
Cresols and chlorinated phenols* (from SVOC analysis)		2	Pass	0.1	Y	N/A	<LOD	N/A
Ethers*	Only where identified	0.5	Pass	-	-	-	-	-
Nitrobenzene*		0.5	Pass	-	-	-	-	-
Ketones*		0.5	Pass	-	-	-	-	-
Aldehydes*		0.5	Pass	-	-	-	-	-
Amines		Fail	Pass	-	-	-	-	-
Corrosive	Conductivity, Redox and pH	Pass	See Note [1]	-	-	-	-	-

Note [1] Threshold: For wrapped steel, corrosive if $\text{pH} < 7$ and conductivity $> 400 \mu\text{S}/\text{cm}$. For wrapped ductile iron corrosive if $\text{pH} < 5$, Eh not neutral and conductivity $> 400 \mu\text{S}/\text{cm}$. For copper, corrosive if $\text{pH} < 5$ or > 8 and Eh positive.

Note [2] Water pipes are normally laid at 0.75-1.35m below finished ground level.

Note [3] Also state if liquid free product is present in soil or groundwater.



1 ExternalMEP
1:200

Visible services shall be coordinated such that they are aligned and ordered in a repeatable equally spaced fashion with coordinated repeatable offsets. Rooms of a similar type shall have the same repeatable installation details

BUILDING DESIGN PARTNERSHIP SHALL HAVE NO RESPONSIBILITY FOR ANY USE MADE OF THIS DOCUMENT OTHER THAN THAT FOR WHICH IT WAS PREPARED AND ISSUED.
ALL DIMENSIONS SHOULD BE CHECKED ON SITE.
DO NOT SCALE FROM THIS DRAWING.
ANY DRAWING ERRORS OR DIVERGENCES SHOULD BE BROUGHT TO THE ATTENTION OF BUILDING DESIGN PARTNERSHIP AT THE ADDRESS SHOWN BELOW.
DRAWINGS SHALL BE READ IN CONJUNCTION WITH THE FOLLOWING BEFORE WORK COMMENCES:
• THE CDM DESIGN ISSUES REGISTER
• THE BOP RISK SERIES OF DRAWINGS
• THE PROJECT CDM RISK REGISTER

NOTES

1. THE INFORMATION SHOWN ON THIS DRAWING IS BASED UPON THE MODEL AND DRAWINGS ISSUE BY THE PROJECT ARCHITECT ON THE DATES AS INDICATED BELOW.
2. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH ALL RELEVANT ENGINEERS AND ARCHITECTS' DRAWINGS, REPORTS AND SPECIFICATIONS.
3. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE STATED.
4. THIS IS NOT A COORDINATED WORKING OR INSTALLATION DRAWING.
5. DRAWINGS / ACCESS POINTS SHALL BE PROVIDED AT THE END OF ALL HORIZONTAL BRANCHES AND AT ALL CHANGES OF DIRECTION OR ELEVATION.
6. HV CONNECTION DETAIL AND CABLE INSTALLATION DETAIL TO BE AGREED WITH THE DNO.
7. THIS EXTERNAL SERVICES DRAWING OUTLINES DESIGN INTENT ONLY. ALL FINAL LOCATIONS AND SIZES ARE TO BE CONFIRMED ON SITE AND SUBJECT TO AGREEMENT BY UTILITY OPERATORS.
8. SEE ALSO BOP ELECTRICAL LV SCHEMATIC AND ELECTRICAL DISTRIBUTION DRAWINGS FOR ADDITIONAL INFORMATION AND INTERNAL SERVICES.
9. ALL IN-GROUND SERVICES TO BE INSTALLED AS PER NUG GUIDELINES.
10. ALLOWANCE MUST BE MADE FOR POWER AND DATA CONNECTIONS RAN WITHIN INDIVIDUAL DUCTS TO EXTERNAL CCTV LOCATIONS NOT CURRENTLY SHOWN ON THE EXTERNAL SERVICES DRAWING.
11. CONTRACTOR TO ALLOW FOR COMMS DUCTS TO INCOMING SERVICE METER LOCATIONS ON THE SITE BOUNDARY.
12. EXTERNAL SERVICES DRAWING TO BE READ IN CONJUNCTION WITH LUMINAIRE SCHEDULE.

LEGEND

- DUAL ELECTRIC VEHICLE CHARGE POINT
- DATA DUCT (150mm DIA Unless stated otherwise)
- INCOMING HIGH VOLTAGE CABLE ROUTE / TRENCH (Details to be confirmed with DNO, Indicative route shown)
- LV / LIGHTING DUCT (150mm DIA Unless stated otherwise)
- INDICATIVE INCOMING GAS ROUTE (Installed to Gas Boards specifications)
- INDICATIVE INCOMING WATER ROUTE (Installed to Water Boards specifications)
- CABLE DRAW PIT (600x600 APPROX)

PO4	20/12/2019	Stage 4a Issue	MG	S
PO3	20/10/2019	Stage 3 Rev design Issue	JC	MG
PO2	19/10/2019	Stage 3 Rev design Issue	DM	OK
PO1	21/06/2019	Stage 3 Issue	MG	AR
REVISION	DATE	DESCRIPTION	BY	CHK

This design (submitted upon this drawing) has been coordinated with the following discipline models:

20191129	CC-BBA-09-ZZ-M0-A-0001_P16
20191202	CC-BBA-09-ZZ-M0-A-0002
20191202	CC-SNP-PHY-ZZ-M0-A-0001_P13
20191202	CC-A2M-PHY-ZZ-M0-C-0001_P14

KEYPLAN

CLIENT



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For Information

P3000166
City Centre Project
MEP External Services Drawing

ISSUE DATE	PROJECT STAGE	DISCIPLINE	SCALE @ A0
20/12/2019	4a	MEP	As indicated
DRAWING NUMBER	REVISION		
CC-BDP-ZZ-ZZ-DR-MEP-9401	P04		

