



Abstract Book

Contaminated Land and Groundwater: Resources, Past and Future

Thursday 26th July 2018
University Place, Manchester

Convenors:

The early-career sub-committee of the Contaminated Land Specialist Group

- Katherine Ashdown (Jacobs)
- Amy Juden (Arup)
- Molly Brown (IGE Consulting)
- Clay Durrant (Environment Agency)
- Kristian Fox (Atkins)
- Sarah Hey (Hydrock)
- Abigail Brooks (Vertase FLI)



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Sponsors Acknowledgement

We gratefully acknowledge the support of the sponsors for making this meeting possible.



Conference Programme

9:00 AM	Registration and coffee	
9:30 AM	Welcome	Molly Brown (IGE Consulting Ltd)
9:40 AM	<i>Industrial landfill remediation: Badnells Pit and Sandford Farm landfill case studies</i>	Dave Jacob (RSK)
10:05 AM	<i>Soil organic matter management</i>	John Williams (ADAS)
10:30 AM	Questions	Molly Brown (IGE Consulting Ltd)
10:40 AM	Poster competition	Amy Juden (Arup)
11:00 AM	Coffee	
11:20 AM	<i>Mines gas - hazards and opportunities</i>	Simon Talbot (GGS)
11:45 AM	<i>Understanding former gasworks sites</i>	Russell Thomas (WSP)
12:10 PM	Questions	Kristian Fox (Atkins)
12:20 PM	Lunch and posters OR workshop session 1	
1:30 PM	Lunch and posters OR workshop session 2	
	Workshop A: Room 4.211	Darren Beriro (BGS)
	<i>BGS geoscience tools for brownfield practitioners</i>	
	Workshop B: Room 4.212	Ian Bishop (One Touch Data)
	<i>Waste classification – down & dirty</i>	Peter Dumble (PD Hydrogeology) and Kayleigh Smith (Insitu)
	Workshop C: Room 4.213	Katherine Ashdown (Jacobs)
	<i>Sampling Groundwater at Contaminated Sites</i>	
2:30 PM	Welcome back	Deborah Thomas (Envireau Water)
2:35 PM	<i>The importance of appropriate water monitoring in sand and gravel quarries</i>	Laura Ward (The Environment Agency) and Jenny Lightfoot (Arup)
3:00 PM	<i>Hydrogeological risk assessments for onshore oil and gas exploration projects</i>	Katherine Ashdown (Jacobs)
3:25 PM	Questions	
3:35 PM	Coffee	
3:55 PM	<i>The potential of utilising heat energy from groundwater in abandoned coal mines: results of a ground investigation at Caerau, Upper Llynfi Valley, South Wales</i>	Peter Brabham (Cardiff University)
4:20 PM	<i>Historical landfill impact on groundwater - case study</i>	Leon Warrington (Hydrock)
4:45 PM	Questions	Clay Durrant (The Environment Agency)
4:55 PM	Results of poster competition. Interactive feedback session and closing remarks.	Sarah Hey (Hydrock)
5:30 PM	End of conference	

Speaker Abstracts

(listed in programme order)

Industrial Landfill Remediation. Badnells Pit and Sandford Farm Landfill Case Studies



Dave Jacob
(RSK)

The UK like many countries is in a housing crisis, with demand far outstripping the available supply. Are we now at a turning point where our former waste sites can now be remediated to provide the next generation of development sites? Presented by David Jacob, RSK's Industrial Landfill Remediation presentation explores this question and looks to see if these under-valued historic landfills are now beginning to become an important source of the UK's potential land for development. Presenting two very different case studies of successful landfill remediation in the UK, RSK demonstrates the case that these once difficult to remediate sites can now be completed

successfully. Each case study goes through the remediation process from the site investigation to the final residential developments and brings in examples of how these schemes have been viewed by the public. Ending with some useful lessons learned, RSK are a strong believer that these former waste sites have a firm future in our development portfolios.

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Soil Organic Matter Management



John Williams
(ADAS)

The majority of soil functions are controlled by biological processes which are underpinned by the decomposition of soil organic matter. Soil aggregate stability, water holding capacity and nutrient availability are important soil properties that are influenced by soil organic matter content. There is increasing interest in the role that organic matter plays in the sustainability and resilience of soils for food production. It is well understood that arable farm practices implemented over decades have led to a reduction in soil organic matter content. This presentation will describe some of the methods for maintaining soil organic matter in agricultural systems and focus on the benefits of using organic materials to enhance soil nutrient supply and broader soil quality indicators.

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Mines Gas - Hazards and Opportunities

Simon Talbot
(GGS)



The UK has an estimated 23,000 former landfills which may be associated by landfill gas. However, this number is dwarfed by the number of former mine entries linked to former mine workings. Eleven percent of the UK's total land area is underlain by coal fields and The Coal Authority have records of 172,000 mine entries with a similar number of unrecorded entries. With 7 million properties located within coalfields, the mines gas hazard has often been overlooked resulting in a number of serious incidents.

This presentation will provide a review of the UK's mining legacy with a particular reference to the South Lancashire Coalfield. The specific hazards and risks associated with mines gas will be discussed. Using case studies, best practice monitoring and risk assessment techniques will be presented together with risk management techniques and principles of protecting new development.

However, coal mine methane can also be a resource and examples of mines gas collection and power generation are also presented.

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Understanding Former Gasworks Sites



Russell Thomas
(WSP)

Commercial gas manufacture was introduced in 1806, it was one of the great technological innovations of the Industrial Revolution, driving British manufacturing output. Gas was manufactured from coal or oil up until the advent of North Sea gas in the 1960's. For the first seventy years it was used almost exclusively for lighting. As competition emerged from electricity, the gas industry found new markets in heat and power, aided by developments such as the Bunsen burner.

Gas was manufactured at sites we refer to as gasworks and they present an interesting challenge for the contaminated land professional, not least because gasworks contained a significant number of subsurface structures. The process had many common features and assumptions can be made as to what maybe encountered. However, as you may expect over a period of 150 years, the technology evolved and at least 20 different processes were used. Gas manufacturing produced a range of wastes and useful by-products, which became important chemical feedstocks. Some of these by-products were processed on the larger gasworks which operated chemical works

Whereas many industries were restricted to certain localities, gasworks can be encountered almost anywhere, from as diverse a location as remote light houses to airship stations in addition to your town gasworks.

This presentation aims to inform the junior contaminated land practitioner about the issues of investigating former gasworks, how the processes operated and what they may expect to find, above and below the ground.

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Importance of Appropriate Water Monitoring in Sand and Gravel Quarries



Deborah Thomas

(Envireau Water)

Due to their geological and geographical locations, sand and gravel quarries often have a complex relationship with their hydrogeological surroundings. In terms of site wide water monitoring, typically 10 suitably located and adequately monitored boreholes provide better hydrogeological and hydrological information than 30 poorly located and badly monitored locations. Therefore, within quarries, adequate monitoring strategies are required to ensure productivity is maintained, whilst providing appropriate protection to the surrounding environment.

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Hydrogeological risk assessments for onshore oil and gas exploration projects



Laura Ward and Jenny Lightfoot
(The Environment Agency) and (Arup)

The presentation will consider the Environment Agency regulatory approach to onshore oil and gas exploration and will use as an example the technical assessments undertaken for the shale gas exploration scheme proposed by Cuadrilla Resources at Preston New Road in Lancashire. The

assessment of risks to groundwater undertaken as part of the Preston New Road Environmental Impact Assessment associated with surface activities, well drilling and integrity, and hydraulic fracturing and fracture propagation will be discussed.

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The potential of utilising heat energy from groundwater in abandoned coal mines: Results of a ground investigation at Caerau, Upper Llynfi Valley, South Wales.



Peter Brabham
(Cardiff University)

Underground coal mining in South Wales began in the late C18th and lasted until the last deep mine closed 2008. The region has somewhere between 1000-2000 abandoned coal mines from over two centuries of coal exploitation. Output statistics show that at least 3 billion tons of coal have been mined out of the region. The larger and deeper shaft mines when in operation continually pumped out water to stop flooding of the many miles underground access tunnels. When mines were closed and abandoned, the pumps were shut off, so the mines gradually flooded. The research questions are therefore, what is the temperature of the water trapped in the mines today and can it be utilised as a green geothermal energy source?

An operational heat from minewater energy system already exists at Heerlen in the Netherlands. As part of the ongoing FLEXIS ground energy research, Bridgend C.C. commissioned a multi-disciplinary team from Cardiff University and BGS to investigate the geothermal potential beneath the abandoned mine at Caerau in the Upper Llynfi Valley. After an extensive desk study of the mine workings a 250m deep borehole was located and drilled in the heart of the village in October 2017. The exploration borehole struck flooded workings with water at a temperature of 21 degrees C. This talk illustrates how the borehole location was determined and the hydrogeological results of the study.

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Historical landfill impact on groundwater - case study



Leon Warrington
(Hydrock)

In the 1980's, two landfill sites at Helpston, near Peterborough, were used for the disposal of an agricultural pesticide called Mecoprop. This pesticide has since leaked into a principal aquifer, causing widespread pollution which is adversely impacting upon public water supplies. The two former landfill sites (Ailsworth Road and Ben Johnsons Pit) have been designated as 'Special Sites' under Part IIA contaminated land regulations and are creating two distinct pollution pathways. The first pathway extends several kilometres north east of the site, polluting public water supply boreholes, while the second plume will potentially pollute a private water supply to the south-east if no remedial action is taken. This lecture will present an overview of the project, including geology, hydrogeology and contaminant distributions which have been assessed to build up a good conceptual understanding of the system. Particular attention will be given to the role of faulting with respect to groundwater movement, and the effects thereof on the conceptual model.

NOTES

Workshop Abstracts

Workshop A: BGS geoscience tools for brownfield practitioners (*Room 4.211*)



Darren Berrio

(BGS)

This interactive session will provide attendees with an understanding of how BGS geoscience is used to develop conceptual site models for risk-based management of brownfield land. Darren will present on a range of topics including accessing BGS digital geology data and geological software for drawing cross-sections. Group discussions will focus on what BGS might do differently to enhance the benefits of its science within the brownfield redevelopment process and how we could adapt to respond better to day-to-day practitioner need. BGS will use the results of the workshop to help plan future geoscience activities.

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Workshop B: Waste classification – down & dirty (*Room 4.212*)



Ian Bishop
(*One Touch Data*)

The workshop will start with a live presentation of HazWasteOnline including the importation of some contaminated soil data using the new .hwol lab file format. This will help demonstrate the efficiency and the auditability of using this format before moving on to assessing the data and classifying the soil. We will discuss;

- how to determine more reasonable case metal species for our metals rather than sticking with worst case species,
- understanding and applying the correct moisture correction(s), followed by
- shining some light on the need to understand what a particular hydrocarbon test, from a given lab, is actually telling us and whether a particular TPH test is fit for purpose.

This will be brought together by a case study of a non-hazardous but hazardous.... filter cake. Whilst not a contaminated soil, the case study will demonstrate how having a better understanding of the processes that created the waste, the chemistry of substances in it and the nature of the hydrocarbons, is far more likely to give you a better (i.e. less expensive) waste classification.

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Workshop C: Sampling Groundwater at Contaminated Sites (*Room 4.213*)



Peter Dumble and Kayleigh Smith

(PD Hydrogeology) and (Insitu)

In this workshop we will aim to design a groundwater sampling strategy for a monitoring borehole at a contaminated site.

In doing this, we will draw on delegate's experience and explore the pros and cons of using different purge and sample methods (e.g. 3 well volume, low flow, passive/no purge) and discuss the science and guidance behind the choices to be made.

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Poster Competition

The four finalists shortlisted for the poster competition are:

Clare Lucas (<i>Arup</i>)	Use of 3D digital models for characterisation of a former landfill site and contamination assessment of a key groundwater resource.
Oliver Gernon (<i>ameyconsulting</i>)	The Dove Way: Landfill Redevelopment and Soil Reclamation Scheme.
Richard Lewis (<i>Dounreay Site Restoration Ltd</i>)	Groundwater Monitoring of Low Level Waste Disposal Facilities at Dounreay, Scotland.
Sean Collier (<i>AECOM</i>)	Remedial Works at Frongoch Lead and Zinc Mine.

The winner will be selected on the day (26th July 2018).

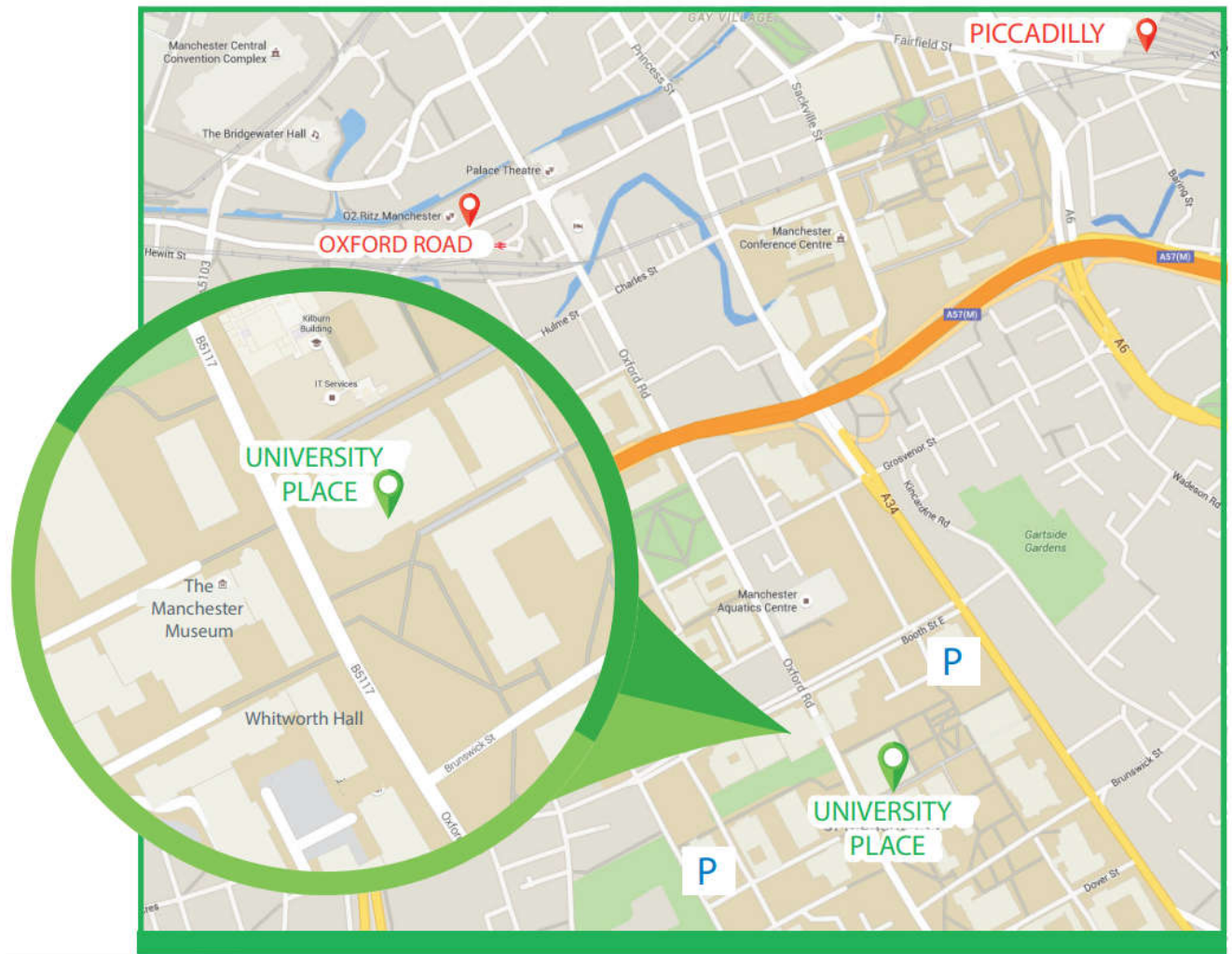
Interactive Session

For participation during the interactive session please use the URL: <http://etc.ch/n3wS>

Alternatively scan the below QR code.



Map and Access



By Rail

PICCADILLY STATION:

Head for the escalators to the left of the concourse, following the signs for Taxis/Fairfield Street. Piccadilly Station is linked to Oxford Road campus by the Oxford Road Link (147 bus) shuttle bus which runs every 10 minutes, Mon – Fri, from Stop D, Fairfield Street: www.route147.co.uk

OXFORD ROAD STATION:

At the bottom of the station approach, turn right on to Oxford St (leading on to Oxford Road). Continue along Oxford Road, approximately 15 mins walk, and University Place is on the left hand side. You will find the main entrance to University Place opposite The Manchester Museum.

VICTORIA STATION:

Take the MetroLink Tram to Piccadilly Rail Station. Exit to the street at platform level following signs for 'taxis' and continue directions as for PICCADILLY STATION.

Bus

There are many direct services from Piccadilly Bus Station and from south Manchester. From other parts of the city a change of buses is usually required, normally at Piccadilly. From Piccadilly Bus Station to south campus, buses include the 15, 16, 16A, 42, 42A, 43, 44, 111, 142, 143, 157 and 250. The 147 service runs from Piccadilly Rail Station: www.route147.co.uk.

For bus timetables, information and a journey planner go to www.tfgm.com/buses

Cycling

The University provides large numbers of hoop stands for cyclists in key locations across both campuses. For detailed information on cycling and routes, as well as a journey planner go to: www.tfgm.com/cycling

Walking

Pedestrians are catered for with designated campus routes and much of Manchester is relatively easy to get around on foot. To plan your walking route, go to: www.walkit.com/cities/manchester

By Car

Please use Google Maps (www.google.co.uk/maps)

Parking

You can park at the Aquatics (NCP) Multi-storey, Booth Street East. Please use postcode M13 9SS. Up to 2 hours £2.40, 2 to 4 hours £4.10, 4 to 9 hours £5.80, 9 to 24 hours - £8.60 (Please note this car park closes at 12 pm).

Additional parking is also available at the multi-storey carpark on Booth Street West. Please use postcode M15 6PB. Drivers should collect a ticket on entry and pay at one of the machines prior to collecting their vehicle at the end of the day.