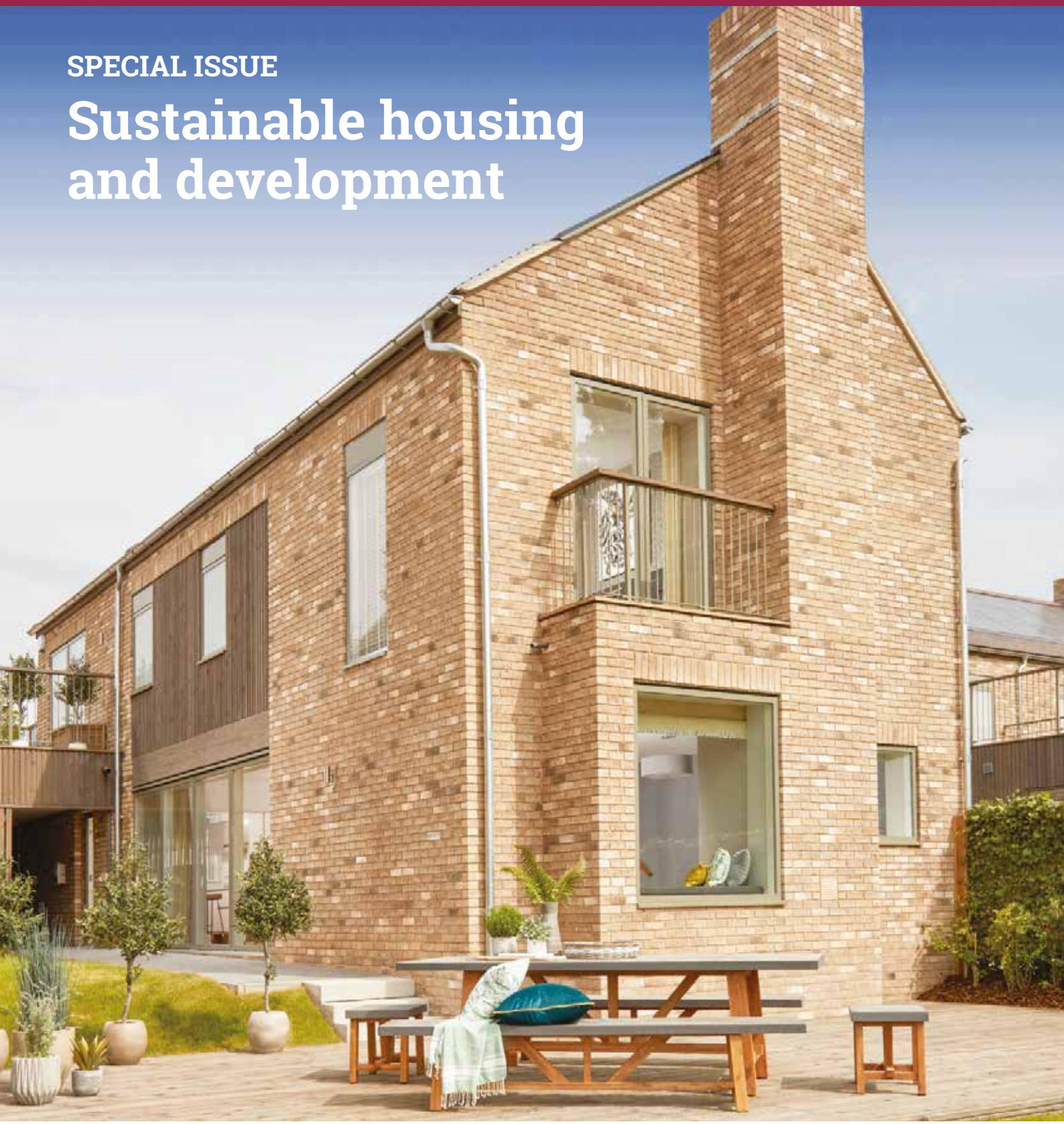
Spring issue • 2018

development+infrastructure

ea brownfield | EIA | flooding | ecology | sustainable building



SPECIAL ISSUE

Sustainable housing and development

Brought to you by:

ea environmentanalyst ltd

brownfieldbriefing

development+infrastructure
ea brownfield | EIA | flood | ecology | sustainable build

Brought to you by:
ea environmentanalyst ltd

Building Sustainable Towns and Cities

Identifying opportunities in planning, housing, development and infrastructure investment

Early-bird offer
Book your place before 3 August to save over £50

20 September 2018, London

Environment Analyst Development & Infrastructure is delighted to announce Building Sustainable Towns and Cities. This packed one day conference will analyse solutions and opportunities linked to the current housing crisis and policy initiatives on regional development, planning reform, urban regeneration and environmental protection.

Key topics to be discussed on the day include…

- Delivering a viable housing strategy - how the Marginal Viability Fund and the Forward Fund will kick-start housing development
- Understanding the current and future housing conditions in UK
- A green future: 25 year environment plan
- Securing land in the right areas - Driving forward the changes put in place by the Governments housing white paper
- The infrastructure requirements to realise the cities of the future
- Brownfield and contaminated land policy developments

To find out more or to book your place visit www.environment-analyst.com/towns-cities-2018

In association with:
brownfieldbriefing
ea development+infrastructure service

Contents

Spring issue • 2018

Cover photo: Schematic of one of HAB Housing's sustainable homes.

From the editor

Sustainable housing can mean different things to different people and hopefully these articles will sharpen the definition.

On the one hand sustainable housing conjures up images of highly efficient timber homes nestled against trees, with solar panels and electric cars; on the other dense urban mid-rise squares around some greenery, which help solve the housing crisis.

One burning question is that with increasing pressure to build homes, how sustainable will they actually be? As Government adviser, **Andy von Bradsky** says (p12) land owners' expectations of land value and pressure on local authorities to deliver their targets could result in them capitulating to pressure to accept housebuilder conditions and can militate against quality and delivery of sufficient affordable housing.

The recently published draft *NPPF* wants more affordable homes which meet the needs of everyone whilst at the same time introducing new quality standards so well designed new homes are built in places people are proud to live in and live next door to – a tall order indeed.

Technological advances can certainly help the numbers. Some off-site home building has been developed to deliver homes up to 50% faster because the focus is on taking construction away from the building site. And as **BRE's Simon Cross** says (p9) Artificial Intelligence will assist with even better solutions and productivity benefits.

Robert Harrold, design manager at **HAB** (p13) says off-site manufacture helps with achieving better air tightness because of constructing in a factory-controlled environment, and fewer joints or connections are made on-site. He adds that once air tightness and insulation have been optimised, the choice of removing gas boilers and going all-electric becomes a more realistic option, and the advent of smart systems in homes will make them more energy efficient still.

And technology can improve the wider environment. Some cities are using sensors to restrict traffic flows, noise and pollution (p24). But there are dangers. **Chris Twinn**, of **Twinn Sustainability Innovation**, says (p23) our homes are being equipped with ever-improving technologies but we're not actually using them efficiently. He says technology is getting better and our understating is getting worse.

There are initiatives such as happiness indexes and well-being often based on digital data. But as **Josh Artus** of the **Centric Lab** says (p24), developments should look more at the emotional needs of inhabitants. "We don't really understand people and use abstract terms such as happiness and well-being which need to be understood, defined and supported and then translated into real estate."

Ian Grant

Managing Editor: Ian Grant
Production: Di Hand. Deputy Editor: Eoin Redahan
Sales: Faye Heslin-Jones, Yuliya Stuart. Marketing Manager: Rebecca Nolan
Events Manager: Matthew Abbott. Managing Director: Julian Rose
Published by Environment Analyst, Talbot House, Shrewsbury SY1 1LG
Tel: 01743 818 008. Editorial: ian@environment-analyst.com
General: enquiries@environment-analyst.com

www.developmentandinfrastructure.com

Brownfield Registers: first impressions

Most UK councils have now published their Brownfield Registers. So, what is the early verdict? We asked **Rebecca Pullinger**, Brownfield Lead at the **Campaign to Protect Rural England.**

What is your first opinion of the Brownfield Registers and the initial take-up by local planning authorities?
In order to guide development to the most sustainable locations, in particular urban brownfields, the Brownfield Registers are a really important tool to help that in a transparent and open way. However, the research that we published last December, *Unlocking Potential: Best Practice for Brownfield Land Registers,* indicates that they're not identifying all of the suitable brownfield sites.

How actively do you think councils will push these sites?
From the sounds of it, it looks like not every local authority is pushing them as much as they could. There was one good practice example at the Isle of Wight, where they were really keen to get people submitting sites and for people to know about the Brownfield Register advertising the register on social media.

For many, they're just making use of evidence they've already gathered. They aren't identifying any new sites or making sure local communities know about the Brownfield Registers. In fact, we've had a number of emails since the deadline where people are saying: "I've just learned we have a Brownfield Register. How do I submit this site to it?" They're clearly missing sites, particularly small sites, that could get a lot of public support – local eyesores for example.

What measures could help to make the Registers more effective?
More encouragement to look at different options for identifying sites – engaging local communities and neighbourhood planning groups for example. More generally, it's really important that brownfield development comes first. If local authorities are empowered to refuse greenfield developments where there is an alternative brownfield site nearby, then that gives them an added incentive to get sites on the Registers and then built out rather than them just being identified and sitting there.

Many of the registers are in a clunky CSV format. Do you think this could be a problem for public visibility?
I think it's about having a balance. For analysing the Register, the CSV format

is good for data analysis. For public accessibility, something like using an online map where you can zoom in by postcode on brownfield sites could be a really important tool for improving accessibility for the general public and developers so they can look at different sites. And that's important for getting homes actually built on them.

Do you think the Government should have a heavier hand in making sure councils push the Registers?
There needs to be a clearer pathway for local authorities to know how the work and effort they put into the Brownfield Registers yield results and to help them with their Local Plan processes, with their five year housing land supply, and delivering the homes that people need.

Should the Government impose penalties for local authorities that haven't completed their Registers?
Not necessarily at the moment. The guidance was only published last summer. They've had less than six months to publish their Registers. Hopefully, in the coming year, they'll have gotten the first one done and the processes should be in place to make it easier when they come to review it on an annual basis.

So, I don't think we would advocate any sanctions at present. There have been noises that the Ministry of Housing will contact those authorities that haven't published their Registers yet, but I imagine it's just to see where they are with the process.

Many councils claim to be overstretched resources-wise. Do you think this is an excuse for not delivering the Registers?
In most dealings, or whatever subject area you talk about with a local authority, resourcing comes up as a key issue. Local authorities were given £15,000 as part of the first package for delivering the Brownfield Registers. If you use that money wisely then I think you can overcome much of the resourcing behind the Registers.

But also, the activities we suggested – such as enhancing local planning processes and engaging neighbourhood planning groups – should actually make the process more efficient. It should make it easier to

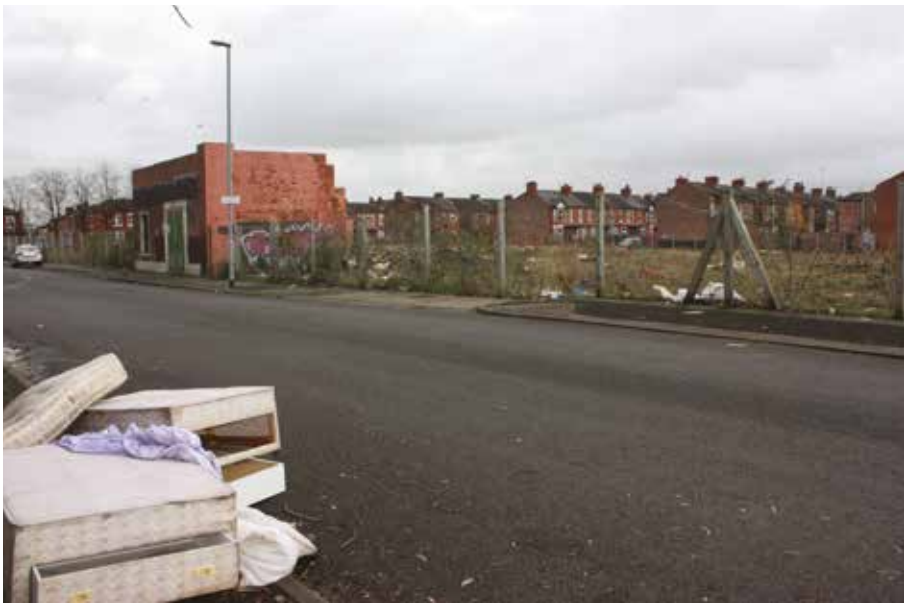
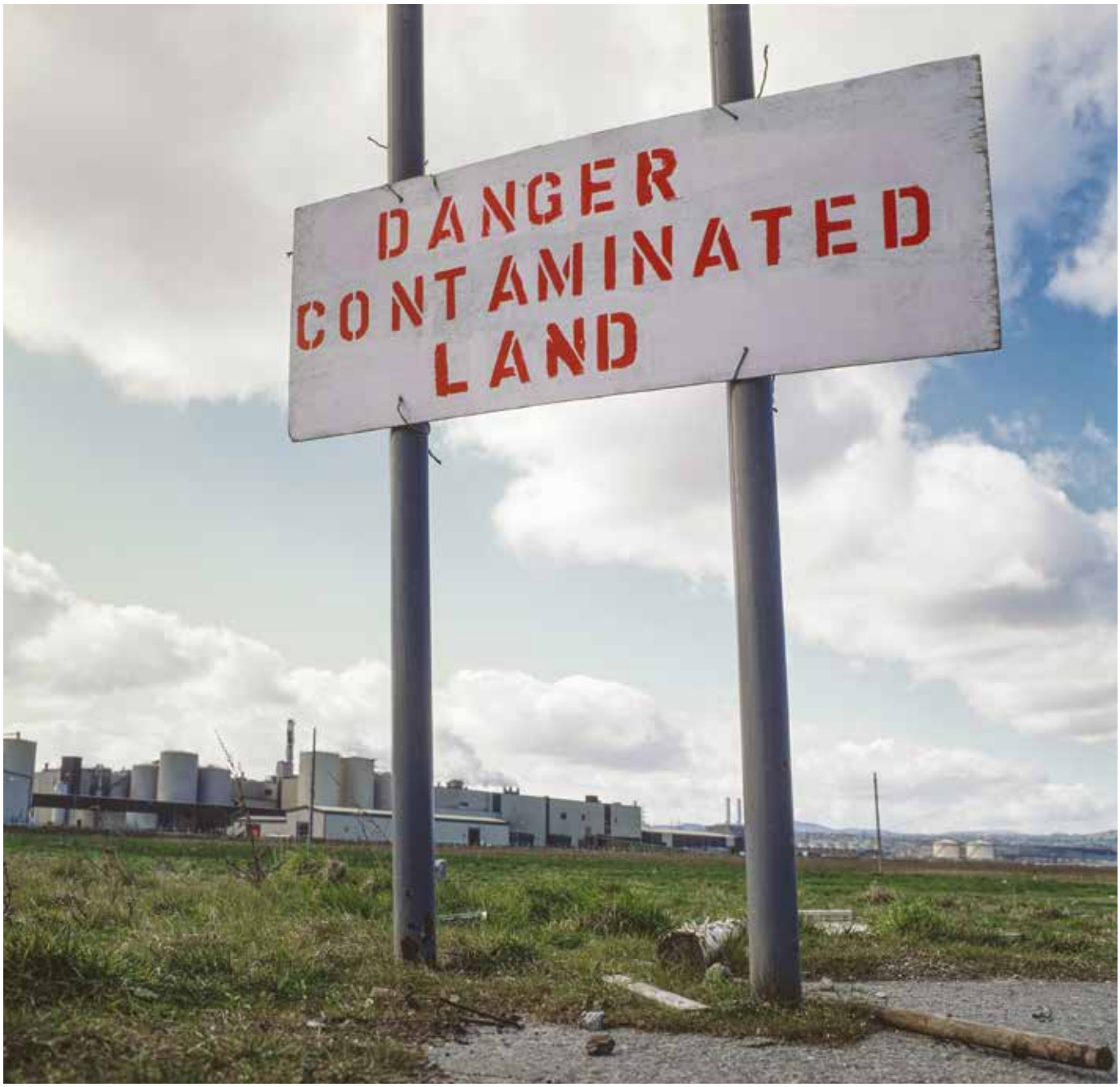


Image: Jackie Copley - Planning Manager, CPRE Lancashire



identify the sites and assess them; but also, when it comes to planning applications and the public consultation, the public would have already been involved so it actually will help the process at all stages.

How important is it for the state to intervene to clean up some these sites?
There are so many different funding streams available for helping with infrastructure. I think it should be targeted towards more complex brownfield sites before greenfield areas. That's another advantage of the Registers. Once those sites have been identified and listed, then hopefully local authorities – and national Government funding for the larger sites for example – could really help unlock them for the future.

In two years, will we be extolling the virtues of the Brownfield Registers, or will it be another case of the Government putting on the good face?
I think it's definitely a good start. The idea of having a national Brownfield Register would really help illustrate the huge potential brownfield has. There's more to be done to make sure they're comprehensive but don't put valued sites or sites in unsustainable locations at risk.

Hopefully, the processes will improve this year. it will be interesting to see how many more councils take up the Permission in Principle (part two of the Register). From my understanding, very few councils are using part two, partly because it's so uncertain as to how it will play out. It's also again about resourcing. Instead of the developer putting in the effort for a planning application, the burden is now on the local authority to assess all those initial stages.

You're the Brownfield Lead at the CPRE. What's next?
We'll be doing an in-depth analysis of the information the Brownfield Registers hold. That's ongoing. More widely, we'd like to do more work on quantifying those gaps we've identified at a local level, but also to work with local communities to develop a toolkit to help them engage with Brownfield Registers as part of the wider local planning processes. We'll also be working towards strengthening the brownfield policies in the *National Planning Policy Framework*.

The trouble with Brownfield Registers

The Brownfield Registers are finally here, but is anyone taking them seriously? That's what worried delegates at *Brownfield Briefing's* Planning Reform and the Brownfield Register event in London. **Eoin Redahan** reports.

"He's not wearing any clothes."

So said the child at the end of the *Emperor's New Clothes*. The emperor in the Hans Christian Andersen folktale paraded naked through town believing he wore clothes fine and delicate. In reality, his tailors merely spun him lies and took his money without stitching a single thread. As he walked proudly in the nip, none of the townsfolk said a word – until the young voice shattered the illusion.

So what does a naked emperor have to do with the Brownfield Registers? Well, there came a moment – after the benefits of the Brownfield Registers had been extolled – when one delegate reprised the role of the child.

"Is this all just window dressing?" he asked. "Really, nothing is happening in substance."

It's all right... in principle

In response, **Rob Griffith** retained his composure. In his role in the Planning - Development Division of **MHCLG**, he is probably used to fielding such questions.

"It's important to mention that these two policies in isolation aren't going to solve the housing crisis," he said. "This isn't going to transform the scene, but it's going to be a very significant change in the way things are going, especially the open data side of things."

On paper, the aims of the Brownfield Registers are noble. They have been put in place to reduce planning risk, prioritise brownfield developments, encourage new entrants into the market, improve planning efficiency, and increase housing supply.

Nevertheless, at speech's end, questions whipped in at him like wind-driven rain. One delegate was worried that Planning Permission in Principle could be misleading. For example, what if a council gave PiP for 100-200 dwellings on a site, only for the developer's site investigation to deem the site unsuitable? Given the cost incurred, would this not place the developer in a worse position?

"To get onto the Register, [a site] must meet certain criteria," Griffith replied. "There will be cases where you don't have enough information to make that decision... but in the majority of cases, you do have a strong idea of whether a site can be approved in principle."

On a similar thread, another delegate wondered whether local planning authorities could potentially be liable for wasting developers' time, while another struggled to see the benefits of PiP compared to the outline application process.

Again, Griffith defended the Registers, but with the Registers only in their infancy, there was little he could do but defend the ideal.

"The key thing for us is getting permissions on land in the right places," he added. "Suitable land with permission."

Embracing the spirit

In essence, everyone is staring into the unknown. For many of them, the PiP issue is little more than a mark on the horizon. We won't know the answers people start testing the principle of the principle, noted **Martin Hutchings**, improvement manager at the **Planning Advisory Service**.

"Can PiP offer certainty? Will it encourage more small builders? We don't know. That's what it's there for."

The worry is that some councils will have completed the Registers to the letter of the edict only to neglect the spirit of the initiative. Hutchings hopes that councils identify new sites for the Registers rather than merely filling them with sites from their Local Plans. He also hoped they make the Registers attractive, with pictures of the sites, maps, and polygons preferred to bare text.

Councils certainly aren't shy when it comes to voicing capacity concerns, but compiling these Registers brings several challenges including the cost of publicity and consultations, monitoring, and the allocation of resources.

Some will doubt the value of the scheme and may act accordingly, yet Hutchings sees its merit – not as a panacea, but as one of many solutions.

"This is another tool at the armoury," he said, "another means of getting sites available and built."

That sound: jaws hitting the floor

So, what should we expect? **Graham Jones**, principal and director of **Jones and Jones Associates**, dampened some already sodden expectations.

"It has tended to creep up on people," he said. "I don't think we should expect too much by way of new sites yet – and I do say yet."

On a brighter note, he believes the Registers could provide a guaranteed pool of development sites and a tool in establishing five-year land supply.

As ever, however, the audience was sceptical. What, for example, becomes of the brownfield sites that aren't included on the Registers, or those that do not receive planning permission in principle?

"There's no appeal against that," Jones noted. "There's no way a developer can question that decision, apart from maybe the Local Plan process."

> "It's important to mention that these two policies in isolation aren't going to solve the housing crisis...This isn't going to transform the scene, but it's going to be a very significant change in the way things are going."
> **Rob Griffiths**

Is there anything in place to stop the Registers becoming little more than a box-ticking exercise, and how much pressure are local authorities under to deliver? One audience member asked what what would have happened to a local authority that did not have its Brownfield Register in place by the end of last year.

"The sanction in the regulations is purely and simply that the Secretary of State can ask them when they're going to produce it," Jones said, to the sound of several jaws hitting the floor.

"At the moment, there are no penalties."

BREEAM and future issues

Martin Townsend has overseen the evolution of the BREEAM standards over the last decade. Here we talk to him about their development and some of the issues facing the industry.

"Back in the 1980s when we didn't have the range of rating tools as we do now (BREEAM was the first) there was much talk of "low energy" buildings but there was no credible way of independently measuring the claims," says Martin Townsend, Sustainability at BRE Global.

"By the end of that decade leading professionals came together to change that. Together we saw an opportunity to raise the visibility of low energy, environmentally sensitive design, recognising the market advantage for high quality office buildings through the development of a label for buildings, similar to the successful "miles-per-gallon-label" that had already become a market differentiator for cars.

"This meeting of minds inspired the development and launch in 1990 of the first version of BREEAM to assess the environmental performance of office buildings – a genuine global first. Environmental debate may have moved on from the oil crisis of the 1970s to today's focus on low-carbon construction and climate change, but BREEAM has remained at the heart of sustainable construction and innovation".

He says BREEAM has improved performance through an independent and research-based approach. "For more than 25 years, BREEAM's schemes have evolved and grown to reflect advances in science, technology, policy and business. BREEAM has remained the world's leading environmental assessment method, across the world."

In terms of other standards, Townsend says currently there is more co-operation than competition and it is one of the major trends he has seen over the last few years. "At the **US Green Building Council** we compare notes with **Green Star** and **LEED**. We are working with the **International WELL Building Institute** on Well Standard v2 on things like circadian rhythms, VOCs and air quality."

"To make change happen it is important that like-minded organisations come together sharing their knowledge and working together to make sure they give a strong message to market. That's what's happening with IWBI and **BRE**, two organisations working together; sharing knowledge and reinforcing their strengths makes a much stronger message and drives change much quicker."

Townsend sees increasing collaboration from completely different industries who share a similar problem. But in this context, he says that it is vital that governance models are developed and maintained to ensure stakeholders can have confidence in what is being achieved in a way that is not anti-competitive.

We asked Townsend what are the other major issues he sees moving forward. He says transparency is a big issue. "We have to ask ourselves how we, as an industry, can become more transparent."

Another big issue is big data. "In terms of data integration, there is more that we can do. There are opportunities for efficiencies. There is a lot more live data and an onset of live data streaming. How can we integrate paper records efficiently? How can we protect data securely? We have to look at BMS and BEM and use the advantages they bring to better effect."

He says emerging technologies are many and varied, and are completely changing the face of the industry. These include virtual reality and 3D printing along with car batteries moving into theconstruction realm which necessitate new ways of working.

In terms of offsite construction, he says there needs to be more good examples which show the advantages to gain more market traction – things like less waste and disruption and in the increasingly carbon savvy world – less carbon.

"How do we inspire people to do the best and get away from a tick box mentality? How do we make modern buildings more flexible and adaptable and suitable for the future?

"There is now an ever-increasing emphasis on the adaptability of spaces, buildings, communities, and neighbourhoods. These must now be designed to meet the rapidly developing needs of an ageing population, along with a changing climate, to satisfy current and future demands on the spaces in which we work and live.

"How do we integrate more modern and durable materials into existing buildings to make them more durable?

"How we can balance our rising population and evolving city-scapes with the imperative conservation of our resources? There is a developing dialogue around how we can rethink the relationship

between suppliers and end-users, and how that can translate into a greater understanding of the benefits of eco-friendly products and systems." Townsend thinks we will see a rise of the circular economy, with a drastic reduction of waste.

Townsend also sees a shift in emphasis from quantity to quality. "This is particularly relevant to housing developments, where consumers are far better informed than ever before, and can conduct research on products and builds at the touch of a button.

"One example of this enforced transparency is consumer interest in long-term operating costs. Savvy buyers are now comfortable asking questions about factors such as the efficiency of a home's heating system, green finance, or overall adaptability, and have the knowledge to back it up. A consumer-led agenda of quality, through demand, rather than the supply side, is gradually becoming a reality."

He says this was one of the ideas behind the Home Quality Mark. "Once we knew the Code for Sustainable Homes was going we didn't look to developers to create a standard, but to consumers and issues such as the need for houses to be energy efficient, adaptable and healthy." He says the HQM has picked up in the last couple of years.

"We still have to look at the performance gap. In New South Wales there is a system called NABERS where if a design isn't built to the correct performance, after two years the builders have to come back as part of the contractual terms and make good."

Off-site. Of mind.

Quality control. Speed. Energy efficiency. The prospect of off-site home manufacturing is tantalising, but how close is to the mainstream? **Simon Cross**, director of **SiteSmart** at **BRE**, offers his perspective.

How much quicker could off-site manufacturing be compared to standard construction methods?
Some off-site home building has been developed to deliver homes up to 50% faster because the focus is on taking construction processes away from the building site. There are two main strands: volumetric systems where a whole complete pod is delivered to site from a factory, or panellised systems where the walls of a home come from the factory and are assembled on site.

The advantage of a factory-based process is controlled conditions. This is significant in terms of the vagaries and unpredictability of the UK's weather which can delay progress on site with traditional building methods. With controlled conditions you can speed up the build process because less time and labour are spent on the building site. Also, off-site construction allows for quality control and consistency checks on what's being produced in the factory, so the snagging process is minimised.

Regarding energy efficiency, how much extra would it cost to make each pre-fabricated home passive or at least highly energy efficient?
Going super energy efficient, towards zero carbon for instance, incurs extra capital cost on a prefabricated or traditional new home, but these costs are recouped in lower energy bills.

How will standardisation make the construction industry more efficient?
Standardisation in the construction industry is happening and is ongoing. Repeatability of similar product families enables volume growth of standard products for manufacturing. This in turn creates profit and the business case for capital investment to mechanise construction of buildings in a factory.

How far is the UK behind other countries in off-site construction and how close are UK housebuilders to changing their methods?
Japan has a mature off-site sector – building approximately 200,000 homes per year – and parts of mainland Europe are also moving forward well. In the UK, at least one top 10 developer is committed to

construction with off-site business models by 2025. Overall, the UK development models need significant change to benefit the sector. Our best opportunity is within the growing Build to Rent sector, where constructing faster will benefit the client.

BRE has been part of a Business Innovation and Skills-funded project called the Advanced Manufacturing Supply Chain Initiative, which aims to accelerate the delivery of homes, buildings, and infrastructure across the UK at a time of huge demand in the sector.

Our role in the project (led by **Laing O'Rourke**) has been to develop a modular standard for homes which will ensure that the spaces created are great for people. There is a minimum compliance level set by the standard with higher performance thresholds included.

Could you tell me more about this modular standard?
The standard looks at occupant wellbeing factors such as maximising daylight, enhanced energy efficiency that goes beyond the requirements of the building regulations, and the sustainability of materials. To comply with the standard, systems are subjected to rigorous acoustics testing as this has been an issue with modern methods of construction in the past – for example, hearing next door's dog barking.

3D racking tests ensure the structure doesn't move and you don't get that lightweight temporary feel synonymous with 1970s prefab housing. For the 3D fire testing, three modules (one on top of other) are tested with a focus on the performance of compartmentation between floors when a fire breaks out. The standard also addresses security aspects

Prototype homes at the BRE Innovation Park in Watford, Hertfordshire, which showcases advanced methods of construction.

of modern methods and reparability in the event of a flood or a leak.

Which UK sites have been built, and are being built, that showcase the potential of cutting edge construction methods?
The Y:Cube project in Mitcham, Place Ladywell apartments for **Lewisham Council**, and Clarges Estate, London, built by Laing O'Rourke.

What tools are available right now to make construction companies more efficient?
Digital tools are accelerating the understanding of performance gains. BRE's SiteSmart tools – *SmartWaste* and *YellowJacket* – enable organisations to identify and take action throughout the supply chain on projects. These tools focus on productivity measurements across the design to construction process, including building processes and environment.

To what extent do you think artificial intelligence could drive growth in the industry?
We are on an unplanned roadmap to this at the moment, with the first phase being gaining better information about construction problems and solutions. Digital products are assisting organisations to use real data to make better decisions. In the future, AI will assist with even better solutions and productivity benefits.

How big of an issue are the skills shortage?
We do have skills shortages in the UK, but all skills need to be matched to demand. This is a circular argument. It is more about the change in skills than the shortage in skills.

What needs to happen from a regulatory perspective to create meaningful change?
A focus on accelerating organisations' change of business models through Government financial investment in the sector related to its spend in the construction sector.

Is there any benefit to off-site construction for brownfield projects?
Newbuild projects are currently better aligned for off-site business models, whether on brownfield or greenfield. Where land is remediated, off-site may offer a better structural foundation solution.

What emerging modern methods of construction excite you most?
I get excited when I see organisations strategically changing their structures, business practices, and supply chains to benefit from existing modern methods of construction. Taking these actions will enable organisations to benefit from the iterative new forms of off-site construction.

How much of a difference do you think off-site manufacturing will make in reducing the housing crisis within the next 10 years?
It is likely that off-site will initially make a higher impact on the Build to Rent and affordable housing sectors. Building and selling homes for consumers to buy will, in part, be dependent on the rate of sales and demonstrating higher quality for off-site homes. If manufacturers can build volume and scale, together with high quality, we will see a sustained off-site industry develop.

No great loss?

Won't somebody please think about the great crested newts? **Eoin Redahan** spoke to **Fabien Quétier**, of **BIOTOPE**, about achieving No Net Loss of biodiversity in development projects and the questions it poses.

Several years ago, I spent a month in Haiti doing some volunteering work. The hilly country had been completely deforested and there was little vegetation to stop the tropical rains pooling where people made their homes.

So, someone had the bright idea to create a series of flood trenches down the hillside and to populate them with a thirsty bamboo-like plant species. Problem was, to create these trenches, we dug out all the vegetation in our path: hedges, roots, trees, and grasses. Did we do more harm than good? I would say probably.

Before speaking to Fabien Quétier about No Net Loss of Biodiversity, I couldn't help recalling that dog-eared memory and wondering how effectively biodiversity offsets are carried out in practice. Do they leave the environment in a worse state? With housing pressures mounting, is there any political will to safeguard wildlife?

Thankfully, the overall picture in Europe appears encouraging, with positive discussions having taken place across Europe on the topic.

Even the UK, in its own messy way, seems to be going about things the right way despite the struggles of the voluntary biodiversity offsetting scheme. According to Quétier, local governments use planning regulations to adopt these ideas and positive moves have been made regarding Positive Net Gain for large national infrastructure projects.

Nevertheless, there is no joined up EU strategy to address No Net Loss of Biodiversity. Quétier explains that the powers-that-be tried to implement it as part of the EU diversity strategy in 2011. Nevertheless, it foundered.

"There was some backlash and some conflict between trying to introduce European level policy proposals around No Net Loss and at the same time going through an assessment and a refit of the Habitats and Birds Directive, but a lot of people didn't want to conflate those. Of course, business interests were often against it because it was an extra environmental requirement, but a lot of NGOs also didn't want to get caught in a horse trade between taking pieces out of the Habitats Directive in exchange for a broader No Net Loss objective. So that went nowhere and now the ideas are being recycled into a bigger pot around integrating ecosystems and their services into decision-making, with a focus on green infrastructure and nature-based solutions."

On a general level, Quétier says a lot has been done and is being done, but that NNL is often overlooked because many countries don't have effective policies to deal with it. Even in countries where regulations are in place, many projects don't achieve No Net Loss of Biodiversity due to the limited capacity to enforce such requirements.

Out with the old, in with the newt?

If you delve deeper into the issue, you see how positive outcomes can easily get lost in semantics. For example, if you build over a newt pond and breed the creatures in an aquarium and plants on a balcony, could you argue there is No Net Loss of biodiversity?

"You could restore hedgerows, convert farmland, or put in ponds where great crested newts can breed - to make sure the animals can move between the pond and the woods so that they have their whole lifecycle on land and water, but if you wanted [newts without their habitat], you could probably achieve the same goal by rearing newts in a farm, aquarium, or much smaller area. You would just be stacking newts up over several floors - a newt-rearing facility somewhere in some dark suburb. So you would be achieving more newts in that project than without it, but you would not be respecting the spirit of the regulation."

You can't blame developers for not caring about the next generation of great crested newts when they have fulfilled their statutory requirements. They aren't ecologists after all and it is not their fault if regulations are a bit baggy.

Quétier argues that to demonstrate No Net Loss or Positive Net Gain of biodiversity, you need clear reference scenarios. "In most EU countries, the assessment of your impact is against the baseline of the state of the environment when you apply for the permit, and so the assessment of your Net Gain achievement is going to be judged against that same baseline.

"This is fine and legally robust, but it doesn't address cases where there is a strongly declining trend for the species? You can claim No Net Loss against this fixed baseline for when you applied for the permit, but the outcome is that you're still going to keep losing the newts at the same rate. You're not stopping the loss of newts.

"For the general public, if you say No Net Loss, people are going to understand you're going to stop losing newts everywhere, not 'we're going to stop losing newts faster than we already were,' which is much less appealing phrasing."

What this tells us is that meeting NNL regulations will not create a biodiverse idyll. Indeed, even achieving Net Positive Gain for a specific species can be misleading. That is why it is important that the public knows what's going on, especially as, by their very nature, biodiversity and development aren't natural bedfellows.

Despite the general lack of legislation and enforcement, Quétier believes progress is being made but that the effect of these regulations may be minimal in the bigger picture. A relocated bat roost here or a wildflower meadow there are important, but they are little more than specks on the landscape.

To achieve significant environmental gains, Quétier says we should focus on other areas. "Why do people obsess over living in individual houses when you could live in flats and have a much smaller spatial footprint," he says. "The big question, in terms of the impact of development on biodiversity, has more to do with macroeconomics and planning - urban design and those sorts of choices - than whether there is No Net Loss or Net Gain for a few selected species."

To negate biodiversity loss, Quétier advocates increasing housing density in urbanised areas. By concentrating development on areas that are already biodiversity poor, less damage would be done to the environment.

"Instead of building homes on natural habitats, you should build apartment blocks on brownfield land," he says. "In that way, you have a much more effective No Net Loss outcome. Bring nature into the cities, rather than spreading cities over nature."

Gove's 25 Year Environment Plan – what does it mean for housing?

Helen Bowdren, partner at **Dentons,** looks at what the Government's 25 Year Environment Plan means for housing.

The Government published its 25 Year Plan for the Environment in January 2018, to great fanfare. It sets out the Government's plans for the environment for the next generation, and is particularly relevant with Brexit in sight, and the potential policy upheaval that may bring. The 25 year plan is big on ambition although light on legal obligations. But what does it mean for the housing sector?

Natural capital

The theme of "natural capital" runs through the plan – and this could have a major effect on Government decision making in this area. So what is natural capital? It is the sum of our ecosystems, species, freshwater, land, soils, minerals, air and seas. It includes all elements of nature that either directly or indirectly bring value to people and the country, for example providing us with food, clean air and water, wildlife, energy, recreation and protection from hazards. Natural capital can be thought of as similar to other forms of capital such as financial, social, human and intellectual capital, although it is notoriously hard to quantify.

"Net environmental gain" from development

The plan proposes a concept of "Net environmental gain", whereby new developments would need to show a positive impact on the local or national environment (including wildlife, green space provision and air and water quality). A key question would be whether a development gives a boost to "natural capital".

The current policy is that the planning system should provide biodiversity net gains where possible. The Government will explore strengthening this requirement for local planning authorities (LPAs) to ensure environmental net gains across their areas, and will consult on making this mandatory (including any exemptions that may be necessary). This will enable LPAs to develop locally-led strategies to enhance the natural environment, creating greater certainty and consistency.

This, of course, is in the context of the Government's ambitions for a major increase in housebuilding (300k extra homes a year by the middle of the next decade) and infrastructure investment.

First steps

The Government's immediate ambition is to work in partnership with other Government bodies, local planning authorities and developers to mainstream the use of existing biodiversity net gain approaches within the planning system, update the tools that underpin them and reduce process costs on developers.

The plan suggests a carrot-and-stick approach – on the one hand, natural capital benefits should be achieved in tandem with reduced costs to developers through environmental process streamlining. On the other, the plan also implies new tariffs being used to steer development towards the least environmentally damaging areas and to secure investment in natural capital.

Similarly, the Plan proposes a new land management system featuring incentives, to encourage land managers to restore and improve natural capital.

Better quality monitoring

The plan acknowledges the difficulties in evaluating the quality and quantity of natural capital. It proposes enhanced monitoring of the environment, with emphasis on soil health and the functioning of ecological systems, and using satellite data to record more accurately and more frequently how land is used.

Pioneers and innovation

DEFRA has created four "pioneer projects to inform the development and implementation of the plan, each located in a different part of the country. One of these is the Greater Manchester Urban Pioneer, focused on creating green infrastructure in the Greater Manchester area. Manchester is holding a Green Summit in March 2018, to discuss an ambitious goal of becoming a carbon-neutral city. Developers will note with interest the focus on low-carbon energy, smart networks and embedded generation at the building or community scale.

The 25 year plan sits alongside the Government's Clean Growth Strategy, which sets out how the UK is leading the world in cutting carbon emissions to combat climate change and driving economic growth.

Building materials

Aside from a brief mention to mineral-based building materials, the plan does not explore house building materials in detail, though it does aim for higher environmental standards and greater resilience in new builds. The plan does set out the Government's plan to increase the amount of home grown timber used in England in construction and also focuses on resource efficiency such as management of residual waste, more efficient water use, and reduced energy usage and carbon footprint of the UK's housing stock.

Energy Efficiency

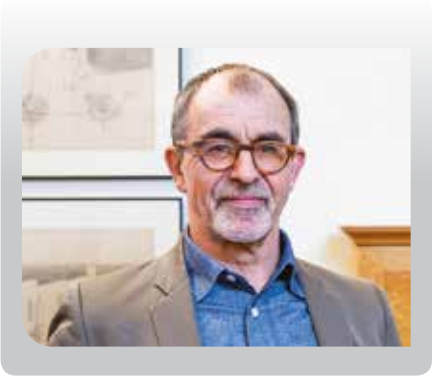
Surprisingly, the plan also does not explore energy efficiency in housing in any depth. However, this is an area where the existing Minimum Energy Efficiency Standards regime, whereby it is unlawful to let out low energy efficiency properties (those rated F or G on an EPC) is already incentivising significant change.

In Summary

So, how much impact is it likely to have on the housing sector? Embedding an "environmental net gain" principle principle for development could be very significant for housing and other infrastructure. As always, the devil is in the detail and so we await with interest the further consultations and updates from the Pioneer projects on how this is working in practice.

Housing densities and sustainability: where to draw the line

Housing densities are a key issue with regard to sustainable housing. **Ian Grant** talks to **Andy von Bradsky**, Adviser to the **Ministry of Housing, Communities and Local Government**, chair of the **Housing Forum** and Founder of **von Bradsky Enterprises.**



How have housing densities changed since 2000? Is the move from Superdensity to Hyperdensity in some places unsustainable?
This is best referred to **GLA** Planning team and *London Plan* team. The densities have been increasing and GLA's Sustainable Residential quality density matrix is no longer a guide that is referred to by developers or planners and omitted from the London Plan. Density will be assessed on a site by site basis.

Is London a case apart, or do you see the trends reflected in other urban centres in the UK?
Cities such as Manchester and Birmingham are following the London lead. The *Manchester Residential Design Guide* promotes high density and tall buildings in centres and close to transport hubs.

In terms of reports over the last three years, for example *Shared Estates, Superdensity, Delivering Homes Better* are you seeing some of the recommendations being put into practice?
Recently published planning reforms of the *NPPF* and supporting guidance out for consultation affirm that effective use of land requires an increase in density and Local Plans should state minimum densities by introducing a density matrix!

What aspects of the recently released *National Planning Policy Framework* do you see leading to more sustainable housing?
Planning reforms include encouraging statements about quality of design of homes and public spaces that are popular and support higher density. Use of traditional typologies such as terraces, mews and mansion blocks should lead to increased density without resorting to tall buildings in many towns and cities. The common method of assessing housing need should lead to a healthy mix of housing provision in local areas.

Can you provide examples of best practice sustainable housing and why?
I would refer to well designed projects that are higher density but include a balance of affordable and family housing with mixed tenures that create mixed balanced communities. They have high quality materials and public realm and a popular appearance that communities enjoy. The Upton Hospital development by **Peabody** is a good example.

Do you think the relaxation of the density matrix in the draft London Plan will help or hinder sustainable housing in London?
This depends on the intelligent application of the principles by clients and local planning authorities. LPAs need enhanced skills to assess this well and enforce quality. The Government's Planning Delivery Fund will help improve skills and increase resources for LPAs in London and elsewhere.

Do you think the Hackitt Review will lead to more medium rise, due to cost and space issues?
We do not yet know what the outcome of the Hackitt Review will lead to. The initial report covered a wide spectrum of issues and recognised that the problems are systemic in the industry.

Will it also lead to more sustainable housing in terms of material specification and tightened building controls and more offsite construction?
These are different issues to the Hackitt Review – but yes it is likely that clients will opt for durable materials such as brick and tile or external cladding. Regulation requires simplification and rationalisation. More off site manufacture will arise as a consequence of skill shortages as much as a need to improve quality and performance, but will likely be applied to specific tenures and clients – such as Build to Rent and housing associations, that take a longer term view of costs and value.

What factors militate against sustainable housing?
Land owners' expectations of land value and pressure on local authorities to deliver to their targets thereby capitulating to pressure to accept housebuilder conditions, This can militate against quality and delivery of sufficient affordable housing.

Isn't it hard to get a mix of tenures – student, mature, and family homes once the buildings / blocks have been built?
The new standard method for calculating housing need, Objectively Assessed Need, should address this, with greater consideration given to the needs of young and older people in particular

Is management and maintenance the forgotten part of sustainability with regards to housing?
Place and building management is a crucial consideration from the outset of a project particularly for higher densities of development. It should be embedded in the concept design and explicitly expressed at planning stage in the planning and access statement. The impact a management regime has on service charges should be assessed at an early stage. The built form may be influenced by management considerations, as taller buildings will generally have a higher management cost and high density mid-rise will have lower service charges.

What do you see as the best way to maintain standards, whilst at the same time building enough homes to hit the targets?
More development by intelligent clients that take a long-term investment view of development and take account of whole life costs, management and are committed to delivering socially and environmentally sustainable outcomes.

HAB for the HAB nots

How does a home make people feel happier? Is it light or a generous floor to ceiling height? **Eoin Redahan** asked **Robert Harrold**, design manager at **HAB Housing**.

The lead pigments **Leonardo da Vinci** painstakingly added to his glazes to create the shadowy brilliance of the *Mona Lisa*. The subtle movements made by three rugby players to create a sliver of space for their teammate to score. The five years of head-splitting revision it took for **Leonard Cohen** to write his four-and-a-half minute masterpiece *Hallelujah*. A lot of unseen work makes the arduous look effortless, but not knowing about all of this behind-the-scenes work doesn't make the painting less enjoyable to look at, your team's victory less satisfying, or a song less moving.

And so it is with HAB, the housing company that seeks to create sustainable homes that blend into their surroundings and make people feel happier. So much craft goes into the design of every nook; yet, for the most part, the householders don't see, or probably care about, the creative sleight of hand that makes their house feel like home.

"Let there be light: and there was light"

On the first day of everything, the world's most famous designer-maker created light. At least that's how the story in the Christian *Bible* goes. Anyway, whoever or whatever turned on the light was onto something because the shine of day is essential to our wellbeing.

At HAB Housing – which stands for Happiness Architecture Beauty – the creation of natural light and the feeling of space are founding stones in their designs. Like plants that lean towards the sun, people are magnetised by the light. With that in mind, HAB designs its spaces to make the most of the natural light. The kitchen sink is always by a window overlooking the street. Window seats soak up the sun's rays and benches flank the front of their homes for neighbourly natterings.

Similarly, space – or at least the illusion of space – staves off that dank, wintery feel. Each door must be proportionate to the size of the room and every cranny must be usable. Then there are the generous floor to ceiling heights that you never thought you would grow up to covet. As Robert Harrold, design manager at HAB Housing, notes, there is a reason why everyone loves those grand old Victorian houses: we are drawn to those yawning floor to ceiling heights, which stand in such a tall contrast to many modern homes.

Connecting with nature

Another pivotal part of HAB's housing schemes is the connection with nature. Wildlife habitats, ponds, and flower beds are incorporated throughout the developments. The benefits of these are manifold – be it for food, for the protection of the environment, or misty-eyed staring into nowhere.

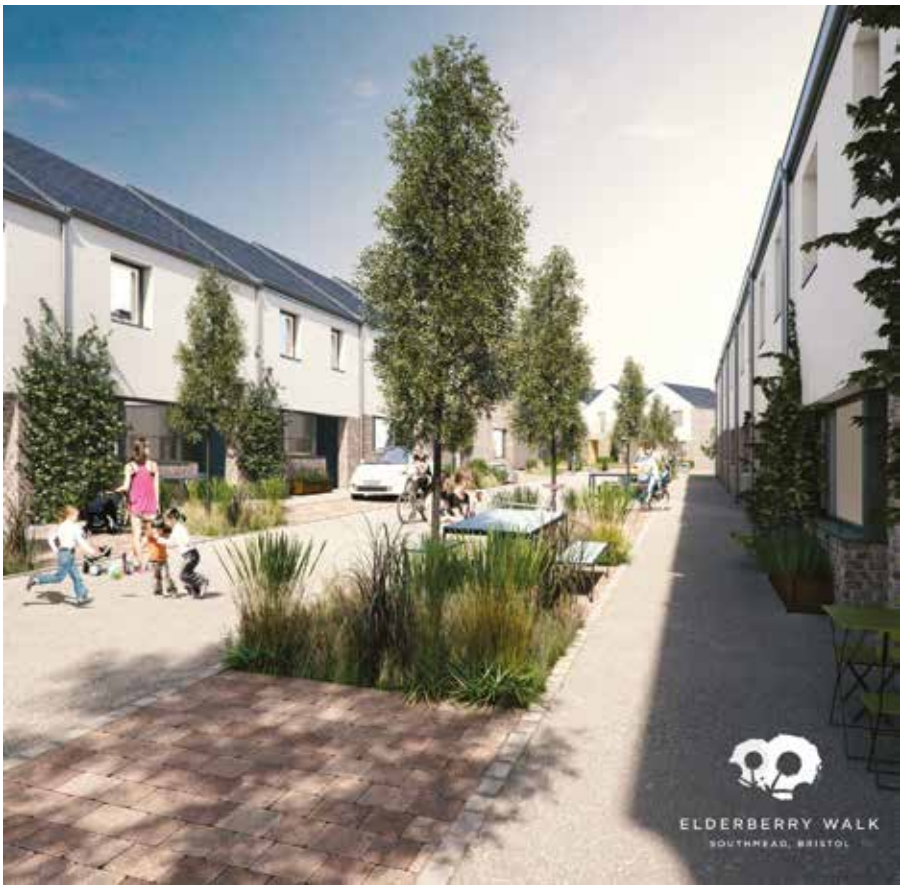
In terms of promoting wildlife, the wildlife corridors on HAB's sites are interconnected, ensuring a continuous corridor where these green spaces link and creatures can go about their way without fear of stomping feet and prying eyes. Another reason for creating wildlife and vegetation-rich sites is nature's soothing effect.

One simple example is the fruit trees that grace the Lovedon Fields development in Winchester, Hampshire. "We've put an orchard on the site and that's fantastic in terms of connections with the seasons," explains Harrold. "They blossom in the spring, then there is the growing season, harvest in the autumn, and the leaves fall off for winter."

It is no accident that most of its developments also sit on the edge of town, within easy reach of the rolling field and leafy way. "All of our sites, in certain respects, have been brownfields," notes Harrold. "And that partly goes to our selection of sites… There are fundamental human needs and one of those is a direct connection to nature.

"And so, at the very early stages of our projects, in the strategic planning, we look at sites that are located well from that perspective. That often means sites on the edges of settlements. Traditionally, they've been ignored as good sites. They give you the connectivity to the community; but also, you can design a development that really benefits from the connectivity to nature."

This keen eye for a brownfield site has



Elderberry Walk, Bristol

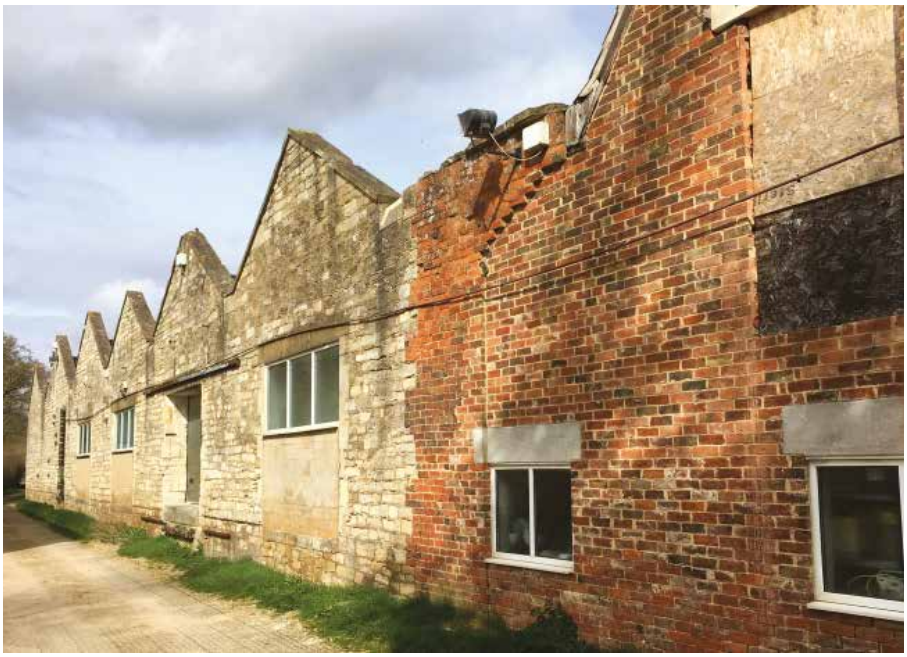
wandered farther south to the Mercury Marina in Hamble-le-Rice, Southampton. HAB will work with the legacy landowner to create a new environment that endures and complements the construction of a new Marina on the site. The obsolete marina buildings will be demolished and a new housing scheme will sprout in its place. HAB also intends to formalise the areas of significant ecological interest around the site and to advance them from an environmental perspective so the people can enjoy them too.

Making a material difference

It might not be a magnificent high ceiling or the sun pouring into the living room mid-morning, but public buy-in is key in ensuring that HAB's homes meld into local life. Before embarking on the redevelopment of the old Tannery site in Holt, Wiltshire, HAB sat down with the parish council to see which sort of amenities the local village needed. As it happens, the area was well served in terms of sports pitches, but it lacked a park and other recreational spaces; so, it has created a new park with a running track on the side and a space for allotments.

"All of that is permeable for the residents and for anyone the village – not just people who moved into the development," says Harrold. "[Also], what we're doing there is something we do with all our schemes – linking it to existing footpaths and cycleways so that the site is permeable and you can easily get out into nature."

Then there is the way the development looks. A gawky modernist scheme on the site of an old Victorian tavern tannery would probably have raised local hackles. However, the tannery company, which still sells chamois from the historic buildings, will remain on-site and the Victorian buildings will be refurbished to provide new office space. The later, low-value buildings will be demolished; and, after the contamination has been stripped from the industrial site and the land has been remediated, 44 new homes will be built.



HAB will redevelop the Old Tannery in Holt, Wiltshire.

The plan is to create these homes with a nod to the site's past. The aesthetic of the existing tannery buildings, which are composed of red brick, Bath stone, slate roofs, and a significant amount of metal work – will be respected. "That material palette will be carried through into the homes as well as the vernacular with the pitched roofs," Harrold notes. "For example, we have several terraces and the gable ends of those will reflect the gable ends of the tannery building."

An aerial view of the Elderberry Walk scheme in Bristol.

The net positive dream

In general, the materials HAB's chooses reflect that of England's South-West. Brick, timber, and pitched roofs are chosen because of their proven longevity and marriage with the local vernacular. Timber is used often because of its warmth, price, ease of use for off-site manufacturing, and sustainability.

The last of these elements is something of a calling card for HAB. It prides itself on creating nice places to live that don't leave sooty carbon footprints. So, timber is used partly for sustainability reasons and solar panels are playing a more pronounced role in its developments. One of its current projects, on the site of the Dunmail Primary School in Bristol, will include a microgrid and photovoltaics on each of the homes. These homes will be built to exacting air tightness and insulation standards to reduce heating bills.

Such an approach is sustainable, but is it actually affordable? Perhaps it was an artful way of re-framing the question, but Harrold says the cost of building high quality, energy efficient homes is falling all the time.

"The encouraging thing is that it's moving quite fast in terms of the products available and the suppliers and how used the planners and contractors are to working with and installing these

schemes," he says. "There's more choice. Solar panel efficiency is increasing year-on-year while the prices are going down… The pace of developments, the products that are available, is just exploding."

To illustrate this point, Harrold uses the example of hemp, which HAB originally used for the shuttering on one of its projects. The product used, hempcrete, was initially buoyed by a grant. The technology has since moved on and they now readily use hemp blocks on their schemes.

"There are a lot of products now that have come past the point of being early adopters and needing grant funding in becoming readily available competitive products on the market," he adds. "Sustainable products don't really need to wear it on their sleeves any more."

The long-term goal for HAB is for each of its developments to be net energy positive. To that end, the rising waters of sustainability are seeping into the work of designers, landscape architects, and local authorities. Even if the UK as a whole hasn't embraced them as yet, advanced manufacturing techniques will make homes more energy efficient from conception to construction.

"More and more manufacturers – particularly timber frame manufacturers – offer a large degree of off-site manufacture," Harrold says. "That helps with achieving better air tightness because you're constructing in a factory-controlled environment, so you have to make fewer joints or connections on-site.

Once air tightness and insulation have been optimised, the option of removing gas boilers and going all-electric becomes a more realistic option, and the advent of smart systems in homes will make them more energy efficient still. In that regard, however, HAB is cautious.

"When we put it [a smart system] into homes, we like it to be invisible or something that doesn't have to be managed with a large computer console that you have to deal with," he says. "Everything should be intuitive. Where we've put smart systems into our homes, they have tended to be ones that are invisible and provide a benefit without being an encumbrance on the people living there."

HAB's Applewood development in Stroud, Gloucestershire.

Weaving invisible seams

Some people say that classic books are masterpieces because you cannot see the seams. You do not notice where the writer flows in the back story, subplots, and the devices that keep the reader reading hungrily even when sleep is calling. Similarly, HAB wants to create homes where people enjoy the environment instead of spending half the day regulating the temperature on a giant wall-mounted tablet or worrying about the sub-site structure.

This approach was most evident when Harrold spoke about the drainage system in Loveden Fields. The scheme was Highly Commended at the *Landscape Institute Awards* for the quality of its water management, ecology, vegetation, and infrastructure, and one of the main reasons for this is that there is no connection into a drainage network – it is all handled on-site.

The rainwater trickles from these homes and car parking spaces. It feeds into the continuous swale underneath, lending life to the flora above and preventing flooding.

"What we're really proud of is that there is a lot of landscape and infrastructure design, sophisticated modelling, and design and integration of systems below the surface but the people living there don't see any of that or know any of that," Harrold notes.

From their windows, the residents see flowers, ponds, and the small bridges that arch by their homes. It makes them feel better and they don't stop to think why. And that's the entire point.

A multi-vector approach to domestic heating

A holistic approach to energy is key in delivering sustainable, affordable domestic heating. **Oliver Lancaster,** Future of Energy project manager for **Wales & West Utilities**, discusses the multi-vector approach taken in the **Future Project**.

At Wales & West Utilities we keep the gas flowing to a population of 7.5m people, heating 2.5m homes, powering businesses and keeping the lights on by transporting gas for electricity generation. The gas network is a virtual energy battery, providing 58GWh of energy storage daily in Wales and the south west of England – equivalent to nearly 6m Tesla Powerwalls.

Whole systems thinking

Recently the energy system has become greener and demands a more integrated approach from gas and electricity networks. Across Wales and the south west of England, we have 31 gas fired power stations and around 2,000 combined heat and power plants of varying sizes connected to our network. While the latter are often used in commercial/industrial settings, the former are essential in supporting low carbon electricity generation, their flexibility making up for the intermittency of renewable generation.

In transport, the increased electricity demand from electric vehicles is currently being met by gas and legacy coal generation. However, with increasing renewable generation and smart charging the energy will be sourced from wind and solar in the future, with gas as a back-up. We're also beginning to see lower cost and lower carbon gas-powered heavy goods and public transport vehicles in our area, which is having a positive impact on urban air quality.

Our "customer first" approach led us to develop the 2050 Energy Pathfinder to identify value-for-money future energy solutions for the communities we serve. Pathfinder enables any energy scenario to be modelled for any geographic area. Results show costs, carbon impact and any shortfall or surplus in heat and power supply. All-electric simulations have been run for Swansea, Wales and Cornwall. These simulations clearly demonstrated the need for a mix of energy solutions; particularly for seasonal storage and to support intermittent sources of generation, such as tidal lagoons, wind and solar. Pathfinder will soon be available online via our website.

Master Therm - HP 8kw

What about heat?

To continue delivering for our customers while meeting challenging environmental targets, it's clear that the decarbonisation of heat is essential. However, instead of this being at the forefront of the debate, decarbonisation of electricity has taken prime position – and commanded greater public interest.

In recent years, the assumption has been that the decarbonisation of heat would mean the end of the gas network and result in the electrification of heat. This would be an infrastructure challenge unprecedented in British history, many times larger than HS2 or Hinckley Point C. Even with the most optimistic assumptions on increased energy efficiency, it would need vast investment to deliver a reinforced electricity network and significant amounts of new generating capacity, causing huge disruption in our communities. To the customer, the cost of contributing towards not only the infrastructure required, but also the installation of new internal fixtures and fittings would simply be astronomical.

It's clear that a holistic approach to energy is required to decarbonise heat and deliver a future energy system that is affordable, cost effective, secure and reliable – and sustainable for both existing housing stock and future homes.

The Freedom Project

Freedom is a £5.2m industry first cross-sector collaboration project seeking to understand the potential role of multi-vector solutions to determine their potential to support the low cost decarbonisation of domestic heating. We're collaborating with Western Power Distribution and PassivSystems on this project with other project partners: Delta-ee, Imperial College and City University.

Based in the "Living Heat Lab" in Bridgend, south Wales, Freedom investigates the consumer, network and energy system implications of fully-optimised hybrid heating system deployment, where domestic heating systems have the flexibility to operate using a standard gas boiler or an air source heat pump.

We want to demonstrate the ability of the hybrid system to switch between gas and electric load to provide fuel arbitrage and highly flexible demand response and frequency response services. The consumer, network, carbon and energy system benefits of aggregated controls are also being explored.

Key learnings so far

Smart controlled hybrid heating systems with a boiler running on natural gas offer lower cost and lower carbon domestic heat when compared to electrified heat through ASHPs alone. The system avoids inefficient and costly use of peaking generation, with associated line losses, to power an ASHP. Burning gas in the home at 93% efficiency is more carbon efficient than incurring 6% electricity network transmission losses after burning fossil fuel at coal (34% efficient, 937 gCO2e/kWh) or gas peaking OCGT (28% efficient, 651 gCO2e/kWh) power stations. Even future low carbon homes with improved energy efficiency and on-site renewable generation are still likely to need to import energy for heat and

hot water in the winter and would benefit from hybrid flexibility.

When there is insufficient renewable electricity generation, power is expensive; it is very cold and/or when there are capacity constraints in the electricity network, the heat load can shift across to the gas network, and visa-versa, to provide uncompromised heat, flexibly using the vast energy storage within the gas network (210TWh seasonally).

The addition of renewable gases to the network, such as hydrogen blends, biomethane or BioSNG, significantly improves the carbon reduction when the boiler operates and could achieve full decarbonisation of domestic heating. The Wales & West Utilities network currently has 17 distributed biomethane sites connected with a 1.5TWh capacity.

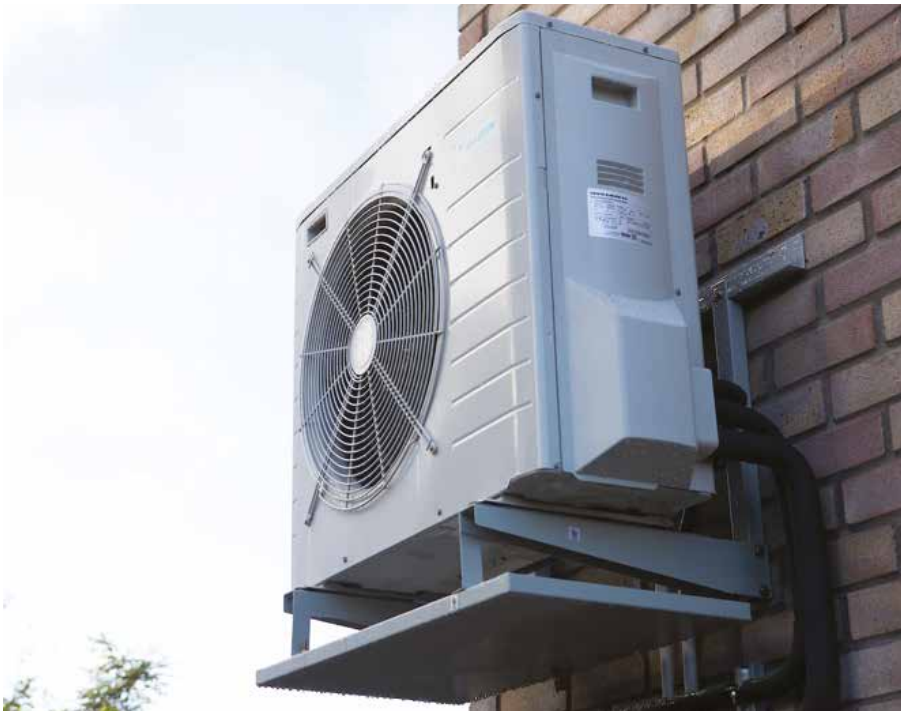
The smart control panel enables the opportunity to switch between the two fuel sources and heating appliances 17,520 times per year – supporting the decarbonisation of heat in an affordable way, with limited cost to the customer and limited behaviour change needed.

Freedom could help deliver a future energy system that is affordable, secure and low carbon, while avoiding the need for costly and disruptive electricity network reinforcement, as well as in-home deep insulation retrofits and replacement of hot water central heating.

Customer installations and engagement

The project team delivered 75 installations during 2017, with a focus on ensuring the portfolio of residential properties was representative of UK housing stock that will be around in 2050. The properties included: flats, bungalows, terraced, semi-detached and detached properties; one to five bedrooms homes; an age range from pre-1900 to new build; an almost equal split between privately owned and social tenanted homes; and three off-gas-grid properties with Calor gas heating.

The supply of a hybrid heating system without triallists having to invest their own money in the equipment was very appealing. Some of our recent research has shown that initial capital cost is the key factor that influences a decision to change to an alternative heating solution, with 80% of consumers not being able or willing to pay.



Dalkin HP - 5kw air source heat pump

Master Therm

Freedom brings with it the potential of heat being sold as a service. Initial findings, which show that this may be achievable to deliver by the mid-2020s, indicate that the potential combined value of fuel arbitrage, domestic demand side response and frequency response services could avoid initial capital outlay. This model requires a demand aggregator to act on behalf of heat consumers and share the value from the benefit of flexibility of using two vectors and the storage in the gas network, with third party investors owning and maintaining heating assets.

The value between purchase of fuels and sale of heat could be grown further by reducing heat demand in the home, with the aggregator and investor incentivised to install insulation measures which pay back at no further cost to the consumer. The leakiest homes and those properties with higher occupancy and, therefore, higher heat demand would attract the quickest financial return from lowering demand in a heat service world.

Not only is the evolving customer proposition attractive in offering lowest cost heat with minimal disruption, flexibility to smartly and remotely switch vectors on a variety of signals could enable a pathway to full domestic heat decarbonisation, through the balancing of renewable gas and renewable electricity – which neither could achieve on their own by 2050.

And it's not just "on-grid" homes that could benefit from Freedom. The solution is suitable for installation and immediate benefit in areas off the gas grid and where the electricity networks are also most constrained, with hybridisation of oil and LPG boilers and replacement of direct electric and solid fuel heating providing financial savings and heat comfort now, as well as being future-ready for smart control and heat as a service. With a higher proportion of fuel poor homes located off the gas grid, there's a desperate need for this to be implemented now.

Next Steps

We will continue running aggregated controls in all 75 homes using signals to switch between both appliances and explore the potential for smart hybrid heating in hydrogen cities. We will also develop potential follow-on projects, including using different hybrid appliances and technologies in non-domestic properties and smart hybrid heat networks.

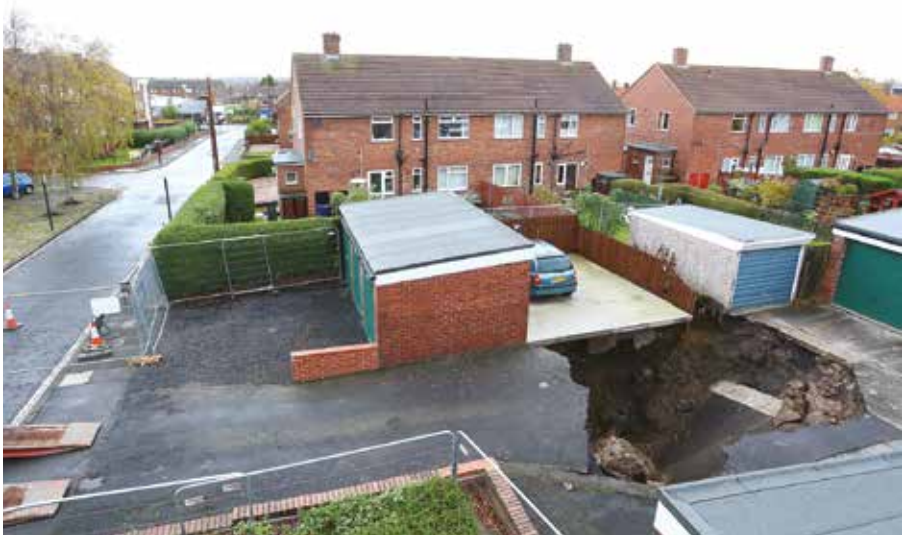
Interim report with the early trial results: https://goo.gl/oh1Rk7

Towards better coal mining risk assessment

If you are wondering what the **Coal Authority** has to do with sustainable housing, seven million properties lie within Britain's coalfield and 130,000 properties lie within 20m of at least one mine entry.

That is not surprising given that 11% of the UK is occupied by the UK coalfield and there are 172,000 recorded mine entries. Coal mining has left a legacy of mine shafts and shallow mine workings and this has implications for public safety, ground stability, and liability for future coal mining subsidence damage.

Some of the land is important regeneration territory and the land conditions have to be suitable for property. The Coal Authority has to respond to 7,500 planning applications each year. But the CA needs to be pro-active in protecting existing properties. Five hundred subsidence claims are assessed each year, and 600 surface hazards reported. These are generally divided evenly between hazards relating to mine entries and hazards relating to shallow workings, which can include mine gas or mine water issues.



- 11% of the UK is occupied by the UK coalfield
- 172,000 recorded mine entries
- Seven million properties lie within Britain's coalfield
- 130,000 properties lie within 20m of at least one mine entry
- 600 surface hazards report each year
- 500 subsidence claims assessed each year
- 7,500 planning application responses

Building a proper "mental geology"

Under planning guidance, environmental consultants and geotechnical engineers must develop coal mine risk assessments that fully appraise the site in the context of its use and suitability, based on a detailed study of subsurface conditions. However, many continue to use basic screening data, leaving unanswered questions requiring more time-consuming research.

The challenge for consultants at present is that they must frequently refer to multiple sources to build their own "3D mental geology" of a site. Assuming the development site is in a high risk area, they typically consult 1:50K geology maps, past site investigations the freeholder may possess and a standard screening report, usually the CON29M Coal Mining Search.

The CON29M search was developed by **British Coal** and further refined by the Coal Authority to deliver a standard set of questions and answers, approved by **The Law Society** that would respond to solicitors' specific concerns about a residential or commercial property purchase. This does not serve the engineer or consultant well enough to develop a robust and fully informed risk assessment on behalf of their client, as it is essential to understand more about the seams, outcrops and past investigations and / or remedial action to characterise the site better.

The following case study illustrates how, with newly enhanced Coal Authority data now available, risk assessments can be more data rich and less time consuming.

Interpreting better data

The Coal Authority has now launched a fully enhanced desktop data report, the *Consultants Coal Mining Report*, which names specific seam workings, their direction to a property, as well as their depth, dipping angle and the last year they were worked.

It also picks out additional shallow workings on maps and the presence of roadways, which provides much more immediate subsurface characterisation.

Used in conjunction with retained geology maps, consultants gain a better appreciation of the seam in relation to bedrock and deposits above. This informs any future borehole drilling and piling estimates, by identifying any risks that could affect future excavation and development. It also shows mine water treatment schemes and management areas that could require further investigation by consultants considering development proposals on any adjacent land. Consultants better understand how water is being managed locally and the client is given reassurance that these risks are being been considered. Mine water treatment schemes can also provide opportunities for the adjacent development, and the Coal Authority is keen to discuss these.

Understanding previous remedial

activity for other site risks such as mine gas and subsidence is critical from a health and safety perspective. Showing areas of past activity, especially outside the immediate site boundaries, helps consultants appreciate proximal risks and how they may interact with the complex subsurface geology on-site.

Using larger maps with more features also enables clients to get a faster identification of potential issues, provides greater clarity to make more informed decisions and an enhanced visual appeal.

Meeting market requirements

The new data report is the result of an extensive six month research and development programme carried out by the Coal Authority to understand how environmental consultants and geotechnical engineers build their own risk assessments. It revealed there were significant opportunities to provide additional data, better mapping and stronger guidance to make the assessment process smoother.

One of these additional features includes automatically providing relevant abandoned mine catalogue reference numbers on-site to make further enquiries easier. Additional tailored guidance can help signpost consultants to planning and environmental professionals within the Coal Authority who can help them with specific permitting or planning submission support.

Mine gas

Mine gas – and how it is treated – is one of the particularly dangerous hazards dealt with by the Coal Authority, says the CA's **Rachel Norton**.

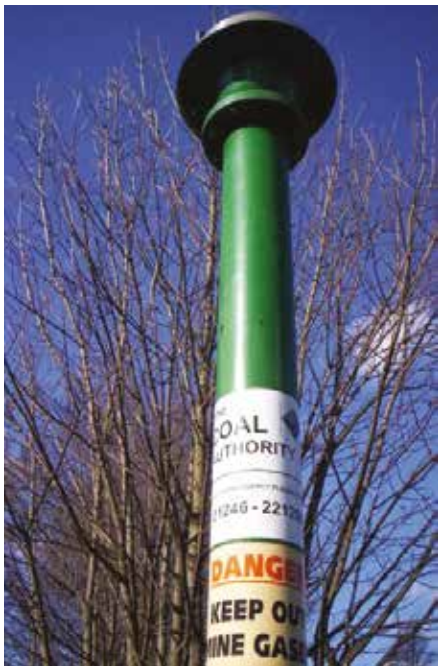
Generally colourless and odourless, gas escaping from abandoned coal mines is usually only detected if you are looking for it. But this hidden problem can present a significant risk.

Mine gas – of various types – rises from old coal workings through old mine shafts and fractures. It can also escape when it is disturbed – such as when rising mine water in old collieries pushes it towards the surface or when coal seams and workings are investigated.

Gases include carbon dioxide, methane, carbon monoxide and hydrogen sulphide. The principal risks come from explosion due to the escape of methane and asphyxiation by low oxygen/high carbon dioxide mixtures, known commonly as "blackdamp". These risks are greatly increased where gases leak into buildings, drains and other confined spaces through mine workings, mine entries that are open at the surface or surface crown holes that collapse.

Managing this silent, but deadly problem is just one of the Coal Authority's public safety responsibilities. Fortunately, dangerous incidents are not common thanks to the proactive and reactive work it has carried out since its inception in 1994.

Over 700 gas monitoring points have been installed across coalfield areas within coal workings, shafts, coal seams and in private properties. Installed for a variety



of reasons, some are fitted as a precaution after colliery closures, while others are part of proactive control schemes. Places that have experienced problems with mine gas also have monitors installed as part of their remediation schemes.

Monitors are used to check for any changes in gas composition in the vents that are installed in workings suspected of containing gas at pressure. Two protective pumping schemes have also been installed in North East England to prevent the entry of gas into residential properties, while elsewhere, where it is suitable, mine gas is allowed to vent naturally into the atmosphere.

Residential remediation

During 2017 the Coal Authority was called to investigate and monitor a property in the East Midlands after another agency identified low oxygen in one of the rooms. The homeowners had also experienced persistent breathlessness, sore throats and were frequently unable to light their gas appliances.

The authority's desktop investigation revealed that an old mining roadway lay at a shallow depth directly underneath the property and that a further six coal seams with recorded workings were within influencing distance.

As well as probable unrecorded workings beneath the property and a backfilled opencast site behind the rear boundary fence, the Coal Authority had treated a shallow collapse in the garden previously.

Experts visited the property and although no abnormal gas was detected, both monitors and carbon dioxide alarms were installed. This alarm was activated the following day and the residents were evacuated; the monitoring of surrounding properties began and vulnerable stakeholders in neighbouring properties were identified.

Monitors within the evacuated property revealed carbon dioxide levels of up to 11% and persistently above 5% for extended periods, while oxygen levels fell as low as 7.5%.

Further investigations involving boreholes and monitoring standpipes identified broken ground within a recorded roadway at a depth of 3.5 metres. Gas levels within the boreholes mirrored the levels within the property.

The Coal Authority was faced with several options to resolve the problem. It could ventilate the workings beneath, increase the ventilation within the property, carry out retrospective sealing of the property or purchase and ultimately demolish the property.

The Coal Authority not only bought the property after discussions with the homeowners but it also installed two temporary vents in the rear garden.

Monitoring has shown there has been a significant reduction so far in the carbon dioxide entering the affected and neighbouring properties. This monitoring will continue and the two temporary vents will be replaced by a permanent vent stack. Alternative remediation options, such as active ventilation, are also being considered for the site but ultimately, the property is likely to be demolished.

Ground gas emissions occur for a variety of reasons, including as a result of historical coal mining activity. They, and any concerns, can be reported to the Coal Authority on a dedicated incident hazard line that operates 24 hours a day, seven days a week on 01623 646 333.

For more information on the Consultants Coal Mining Report, visit: https://www2.groundstability.com/enhanced-consultants-report

Project Iceberg: a sustainable opportunity

Could the collation and digitalisation of subsurface data promote more sustainable planning and development? **Charlotte Edwards** reports.

Led by **Ordnance Survey, British Geological Survey** and **Future Cities Catapult**, Project Iceberg aims to address the lack of information about the ground beneath our cities and the uncoordinated way in which this space is managed. Although the project itself has not developed a database, researchers interviewed a range of stakeholders – across the planning, utilities, mapping and research sectors – and analysed previous research to determine the demand, practicability and potential implications of doing so.

The project's long-term aim is to help increase the viability of land for development and de-risk investment through the use of better subsurface information. However, it also presents tangible benefits in terms of the sustainability of site selection, planning and construction.

With the UK scrambling to meet demanding house building targets, the need for sustainable site selection has become vital, with most of the low hanging fruit snapped up long ago. Furthermore, how we understand and manage underground space influences how sustainable and resilient our cities will be. In the face of ever-more extreme weather conditions, considering the capacity of ground to support a development has become increasingly important. As such, any trustworthy sources of information which can aid planners and developers in solving these conundrums, would surely be most welcome?

Although there does exist a great deal of subsurface data, standards about the capturing of it vary greatly. In addition, the information is often dispersed between many different parties and can differ in its accuracy.

Rollo Home, content strategy lead at Ordnance Survey, comments: "The absence of standards governing the collection of underground data means decision makers working on cross-sector domain projects face a challenge to untangle the web of data that is available."

As part of Project Iceberg a wide range of stakeholders were interviewed and surveyed about their own assets, the data currently available and the demand for a framework integrating a range subsurface data. The results revealed a significant lack of accuracy within current data, with around 50% of stakeholders quoting the positional accuracy of buried assets using a metre scale.

This lack of coordination and accuracy comes at a cost to development, causing delays and third party damage, impacting site selection, the final design of the project and its total cost. In 2005 third party damage to utility assets was estimated to cost about £150m a year, while indirect costs were estimated to be 10 times higher. Two thirds of those surveyed as part of the project said their organisation incurs indirect costs as a result of incomplete information about the subsurface.

How would it work?

Project Iceberg identified the need for a public data-exchange framework that can be integrated with other existing surface-city data. Initially, existing data would be fed into the framework, complemented by additional data capture in the future. The information would include elements such as utility infrastructure, buried structures, soil features, water table and surface nature (such as existing streets and buildings). The data would be assured using a grading system to provide a measure of its reliability. Finally, the framework in which the data is stored would need to be designed for easy access by multiple parties, while also being secure enough to protect the intellectual property.

Combining such a range of information would bring about a number of benefits for both planners and housing developers. The resiliency, sustainability and suitability of a site could be more accurately established and communicated. The spatial planning of a project could be optimised, considering the location of existing utility infrastructure and roads. This would minimise the construction of new infrastructure, reducing noise and sound pollution as well as the cost and time of development. It would allow the location, scope and cost of land remediation to be identified prior to development. A development's impact on green infrastructure could be better assessed at the planning stage, as could the placement of supplementary green infrastructure.

This database would also synergise with other technological advances such as virtual reality and 3D modelling. Sustainable drainage schemes could be modelled to help manage surface water runoff and reduce pressure on existing water pipe networks.

Once construction commences, a virtual recreation of the site would help developers work with less risk of causing third party damage and long-term delays due to unforeseen subsurface issues.

Urban geoscience team leader at British Geological Survey **Stephanie Bricker** confirms: "We need to consider the interaction between the natural and built subsurface environment, and utilise data-driven processes and new technologies to apply novel approaches to urban planning – whether that's to support brownfield development, new infrastructure or urban resilience."

In combination, these factors could significantly contribute to the sustainable site selection, planning, design and construction of a development. It would enable planners and developers to make more informed decisions about a project at an earlier stage, as any interactions between the development and existing subsurface features, infrastructure and surface features could be accurately preempted.

All that remains is for someone to take the bull by the horns and put this research into practice. Project Iceberg suggests the **National Infrastructure Commission, Infrastructure Projects Authority** and **Digital Built Britain** as prime candidates.

Building Sustainable Towns and Cities

Matthew Abbott looks ahead to some of the issues to be covered at the *Development and Infrastructure* Summit.

Can the Government ensure the use of land is maximised, strengthen protections for the Green Belt and place a greater emphasis on converting planning permissions into homes?

These are the key issues at the heart of the planning reforms, launched by the Prime Minister to deliver the homes the nation needs.

Environment Analyst's Development & Infrastructure service will draw upon the recent draft revised *National Planning Policy Framework*, announced March 2018*, examining the policy proposals previously consulted on in the Housing White Paper and the Planning for the right homes in the right places consultation whilst looking at how the challenges we face can be overcome:

"This Government is rewriting the rules on planning. With the major overhaul being published today, we're giving councils and developers the backing they need to get more homes built more quickly." Prime Minister **Theresa May**

March 5th, 2018 saw planning policy documents published, in draft, for consultation*: a revised *NPPF, a Housing Delivery Test, Viability Assessment Guidance and a Reforms to Developer Contributions* document with more national guidance to follow. These documents will aim to speed up the much criticised slow pace of change, which many have perceived since the Housing White Paper was introduced back in February 2017.

This major overhaul, the first in over six years, provides a comprehensive approach for those at the heart of house building; planners, developers and councils to build the homes required by the nation, more quickly and in the places people want to live. The main areas for focus from the Ministry of Housing, Communities and Local Government are:

- **Placing a greater responsibility**

Local authorities and developers will be held to account on houses built not planned, whilst developers will also be held to account for delivering the commitments, including affordable housing and the infrastructure needed to support communities

- **Maximising the use of land**

More freedom will be given to local authorities to make the most of existing brownfield land to build homes that maximise density

- **Maintaining strong protections for the environment**

Ensuring developments result in a net gain to the environment where possible and increases the protection given to ancient woodland so they are not lost for future generations

- **Ensuring the right homes are built**

Delivering more affordable homes that meet the housing needs of everyone wherever they are in their life, including sites dedicated for first time buyers, build to rent homes with family friendly tenancies, guaranteed affordable homes for key workers and adapted homes for older people

- **Higher quality and design**

Introducing new quality standards, so well designed new homes are built in places people are proud to live in and live next door to

- **More transparent planning process**

Local authorities will be encouraged to work together and continue to close the gap between planning permissions granted and homes built. The morning session will take stock of the recent policy changes, highlight the importance of **Defra's** 25 year environmental plan that new development should result in net environmental gain whilst providing an understanding of the current and future housing conditions in UK.

> "This Government is rewriting the rules on planning. With the major overhaul being published today, we're giving councils and developers the backing they need to get more homes built more quickly."
> **PM Theresa May**

Rebecca McDonald will be highlighting the City Space Race: Balancing the needs for home and offices in cities. McDonald, an Analyst at the **Centre for Cities** authored the *City Space Report* which looked in to city centre land availability and the constant battle between residential and commercial development. The report highlighted the difficult policy choices being faced in the prioritisation of these sites and that housing developments must not squeeze the commercial hearts out of cities.

Launched in 2013, **One Public Estate** (OPE), the national programme delivered in partnership by the **LGA** and **Cabinet Office Government Property Unit** supports joint working across central and local government to release land and property and boost economic growth, regeneration and integrated public services. OPE is now working with more than 250 councils, transforming local communities and public services. **Michael O'Doherty**, Regional Programme Manager will be on hand to explain the core objectives of the programme, highlight the success that have seen OPE generate 44,000 jobs, release land for 25,000 homes and raise £165m in capital receipts.

The afternoon sessions will detail the urgent need to understand the critical role of infrastructure in this agenda, exploring the *National Delivery Plan 2016-2021*, progress to-date and the potential gains to be made through the Housing Infrastructure Fund and the importance of good design.

The *NPPF* consultation holds stark warnings for both local councils and developers. There are plans to penalise the latter who do not build homes quickly enough, along with the possible introduction of sanctions for councils via the housing delivery test. This states that they will be held to account for the number of new homes delivered in their areas, not just the number planned.

Key to overcoming these warnings will be the co-operation and joined up thinking of those responsible for developing land from site to occupation; from the organisations that undertake the remediation of brownfield land to planners, developers, those charged with infrastructure and the manufacturers and designers of sustainable housing.

*The consultation period on all of the draft proposals and reforms ran to 10 May 2018.

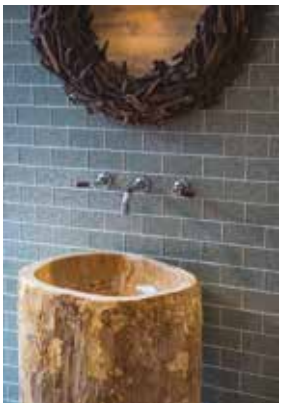
***Building Sustainable Towns and CIties: Environmental opportunities in planning, housing, development and infrastructure investment*: https://events.environment-analyst.com/65589/building-sustainable-towns-and-cities**

The building burden

We're driving headlong into the fourth industrial revolution, yet the experts don't trust those with the hands on the wheel. **Eoin Redahan** sifted through the expert panel sentiments at **Ecobuild 2018**.

It was a peculiar place for a forum. The constant buzz of conversation from outside the partitioned conference area hovered at ear level, yet the talks remained gripping, if grim.

Unfortunately, the tone struck by many housebuilders, ecologists, and professors in London's ExCel Arena was downbeat. They may have been surrounded by stand after stand showcasing the best in sustainable building, but most seemed worried about lukewarm Government policy and outmoded practices that blight the UK's construction industry.



Left: the ZedPod by Zed Homes; Top right: petrified wood basin by Indigenous; Bottom right: the FLIR ONE thermal imaging camera attachment detects energy loss.

The problem with policy

In the past couple of years, we've all listened through grandstanding ministerial statements, outlining a low-carbon future with affordable homes for all. For **James Lidgate,** CEO of **Legal & General Homes,** there are several Swiss cheese-sized holes in these professions.

"There was no reference to design, to the quality of homes we build," he said of the proposed housing policies. "Equally, there were lots of sticks to beat housebuilders with but not enough carrots."

For **David Birkbeck**, CEO of **Design for Homes**, deeper legal issues dog the best laid plans of policymakers and housebuilders. He mentioned the significance of a landmark appeal case taken by housebuilder **Redrow Homes** back in 2014. The developer built a 525-home scheme in Huyton, Liverpool, along with new estate roads. However, **Knowsley Metropolitan Borough Council** felt it shouldn't have to pay to maintain the new streetlights for the decades to come.

On its own, this case seems far too banal to make a material difference to our lives, but the following excerpt from the case gives us pause for thought.

"A section 38 agreement… can in law contain provision for the party other than the highway authority to pay a sum referable to the expenses of a highways maintenance after the date on which it becomes maintainable at public expense."

The ramifications of this are bleak when you consider the other elements of a scheme that may now come from a developer's pocket? Who will trim those trees for the next 30 years? Who will tease weeds from the flower beds and clip the verges? And how likely will developers be to add in wildlife corridors, parks, trees, and street furniture if they will have to pay for them for decades? How happy would residents be to foot large bills from management companies to pay for this maintenance work?

"I really worry about this," Birkbeck said. "I don't know where it's going but I think there's going to be trouble."

Clearly, the law could be a barrier to sustainable development but it could also be used to mobilise greener schemes. From several quarters, delegates called for better cross-party cooperation – to create planning policies that endure from Government to Government.

Hugh Barton called for state intervention to empower local authorities and diversify the housing market. "The current system almost obliges local authorities who are strapped for cash to work for particular developers - developers who can do all the hard work so the local authority can tick the boxes," said the Emeritus Professor of planning, health, and sustainability in the **WHO** Collaborating Centre at the **University of the West of England**.

He would like the Government to enable local authorities to take control of sites themselves and to divide them into smaller plots so that small builders and social providers could create a more mixed housing ecosystem.

What is built is broken

Alastair Parvin, the charismatic co-founder of **WikiHouse Foundation**, underlined the sheer scale of the challenge confronting the construction industry. "We need to build a city the size of New York every five years," he said, "and we need to do it without fossil fuels."

He doesn't believe the construction industry is equipped to meet this challenge. The sector described was sluggish and profligate, where obsolete building techniques are wielded in their blunt way, extraordinary amounts of waste material tips into landfill, and 10 companies build half the homes.

But what if that were to change? "What would happen if we developed low-cost building technologies?" he said, gradually going full ideologue. He has seen digital technology driving costs down and transforming our economy and he sees this same disruption coming to the physical world.

He sees WikiHouse as one of these agents of change. Essentially, it is an open source project to reinvent the way people build homes, which is developed by architects, designers, engineers, inventors,

manufacturers, and builders. Using open source software, anyone can literally download the blueprint for a home and "print" all of the components on CNC-milled plywood panels – at about £45,000 per house.

He likens these homes to giant Ikea kits. Each one can be assembled by ordinary Joes without any construction experience within 7mm precision. "For the first time, we can set up small factories," he said. That's what WikiHouse is – digital **Lego**."

Home truths

Indeed, it was exciting to hear of homes built by our own hands. It was even comforting to blame faraway forces for the ailing construction industry; but **Chris Twinn**, of **Twinn Sustainability Innovation**, brought it all back home.

Our homes are being equipped with ever-improving technologies but we're not actually using them efficiently. He offered up the humble boiler as a case in point. Years ago, we put 12kW boilers in our homes. Now, many of us have 32kW devices even though they're scarcely necessary.

"We haven't engaged with the end user," he said. "The amount of hot water we use is no greater than we used to but the perception is that we need more."

His contention is that the technologies we use in our homes aren't intuitive. People don't actually understand how the heating systems work in their own homes. In this respect, the human interaction systems in other industries are far more intuitive than construction. Take the car. The technological advances made in recent years have been extraordinary, yet many of the operational systems in the car, such the steering wheel and the manual plastic air vents (you know, the one in the corner you push up and down), remain easy to use.

Even more worryingly, we are putting new, high-tech gadgetry into our homes, but we are not getting enough accurate feedback from these devices to see how our homes are performing. "Technology gives us solutions and doesn't give us feedback," he added. "The loops are too small."

We have all seen an elderly person tapping at a phone as if trying to defuse a bomb and younger people's eyes glazing over when the red error numbers appear on their boilers (E133 for me). The technology is getting better and better but our understanding of it is arguably getting worse.

"All the technology we need and all the knowledge we need to solve all the problems already exists," Parvin said. "There was a 29-year gap between the invention of the motorcar and putting white lines on the road… What we need to do is stop thinking of technology as a commercial product."

Misadventures in placemaking

One of the things that made the talks depressing was the sheer volume of misplaced good intentions. **Joey Talbot** was part of a **Foundation for Integrated Transport** team that examined how the sustainable developments described in Government policies function in reality.

Having visited 20 settlements around the country, they found that parking and road access accounted for 30-40% of the land area. These new settlements had excellent road access but poor access to public transport. Furthermore, there were few places to walk or cycle to and, apart from supermarkets, there was very little actual place-making involved.

"Housing targets are set without really taking geography into account," he said. "They are based largely on past demographic trends. We really don't have consideration of public transport routes."

Unsurprisingly, the UK lags behind some of its continental cousins. Talbot cited the Netherlands as a model for sustainable placemaking with its new towns built around cycling, walking, public transport infrastructure, and thriving towns.

"In this country, we are failing to create healthy urban environments," Hugh Barton noted. "What we are creating is wrong and it's going on and on and there's no sign of real change. We need to put people before land."

Look, it's not all bad

Proceedings weren't all gloomy. Kate Burrows, project manager of Advancing Net Zero at the **World Green Building Council**, gave examples of cities and countries where real change is happening at a fair clip. Vancouver has put a zero-emissions building plan in train whereby there will be no operational greenhouse gas emissions in new buildings by 2030, and it plans to go 100% renewable by 2050. To do this, it has put in place a cocktail of amendments to bylaws, policies, and guidelines.

Similarly, the Australian Government is actively trying to tackle the energy efficiency of its building stock through the NABERS system – a national rating system that measures the energy efficiency, water usage, waste management, indoor environment quality, and environmental quality, and it too has made an ambitious renewable energy pledge.

Closer to home we also have the EU's Level(s) programme, which provides a common EU approach to assessing the environmental performance in the built environment, and the BREEAM sustainability assessment method for masterplanning projects, infrastructure, and buildings.

And there was the airport hangar-sized conference hall chock-full with the latest technologies, equipment, methods, and materials to make our future leaner and greener.

So, the will is there. We just need to change our bad habits. Some feel we need to fundamentally change the way we build our homes. Others believe we need more Government intervention to build the right sites and to create stronger, binding policies that will set us along the right path; but, as one delegate warned, "If we keep mucking about in Westminster, we'll never get there."

They said…

"The Treasury wants us to put a pound value on natural capital but it's almost impossible to do it. Unless we move beyond it, there will always be an issue. You can't value wellbeing" - Professor Kathy Willis, director of science at the Royal Botanic Gardens, Kew

"Our Governments have to understand that we are spending more and more of our prosperity in buying resources from abroad. If you have lived in China like I have and you've seen the new superpower - we don't know what's going to hit us" - Chris Twinn, of Twinn Sustainability Innovation

"In the last two days, data have come out that bricklayers earn more than architects" - Delegate

"The intergenerational fairness index dropped by 28% between 2010 and 2016. That inequality is driven by the housing market" - James Lidgate, CEO of Legal & General Homes

"Between now and 2050, the amount of global building stock will double" - Kate Burrows, project manager of Advancing Net Zero at the World Green Building Council

Welcome to the brave new world of bricks and data

Proptech was a dominant theme at **Mipim** this year along with smart cities, silver planning and where to put all those extra homes. **Ian Grant** reports.

Tech is causing a revolution in real estate, and in sectors which were previously thought to be immune. There was talk of blockchain in transactions and leases, cryptocurrencies in trades, artificial intelligence and machine learning in designing buildings and services, and changed city environments due to sensor based mass transit systems, driverless cars and rapidly increasing drone delivery services to flat roof ports (packages soon and people later).

Smart cities

What is a smart city? Does anybody know? If you are not a smart city, are you a dumb or stupid city? These were some of the questions around the discussions.

Joe Dignan of **Global Real Estate Experts** summed it up well: "Smart cities as a market is moving from vision to reality as the ubiquitous connectivity of devices encapsulated in the Internet of Things (IOT) allows data to be turned into information, giving insight that leads to impact.

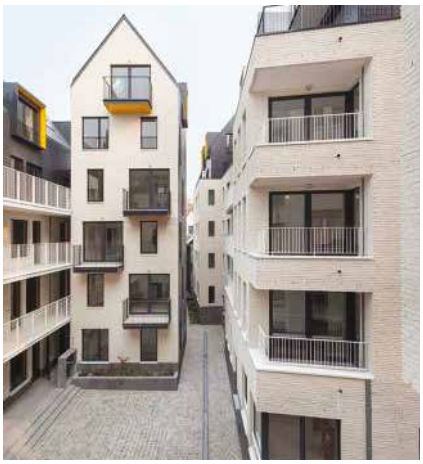
"Architectural, engineering and construction companies have always known that BIM and asset management allow them to improve services, maintenance and energy usage resulting in reduced costs. What is new is that residential and retail have moved into the 'smart' mix.

"Housing developers are now being challenged by planners to 'future proof' developments and to take more of a role in maintaining the stock. This in turn means housing developers have an interest in transport, urban mobility, air quality, parking, smart lighting and waste where before they may have built at lowest cost and moved on."

A live poll in one seminar found 55% of investors had changed investment strategy due to the potential impact of technology over the next 10-15 years, while 40% planned to do so in future.

In a Mayors and Political Leaders think-tank, **Josh Artus** director of the **Centric Lab** said neuro-science principles can be used to create places for people to flourish in rather than just exist. He said cities should be more like websites and smartphones – more intuitive. All part of the theme that developments need to take more heed of the emotional needs of inhabitants. But he highlighted the problem of hiding behind words and definitions, saying that we don't understand people and use abstract terms such as happiness and wellbeing which need to be understood, defined and supported and then translated into real estate.

Filippo Rean, head of Real Estate at **Reed MIDEM** picked up on a theme that a lot more emphasis was focused around the customer or end-user. Technology was enabling better service to clients. Data from sensors were opening up possibilities to improve the environment for citizens for example controlling traffic flows, air pollution and noise. In Asia city management is becoming increasingly connected from shopping to security. But with GDPR coming in Europe there are uncertainties on how data can be used and who owns it. He said on the one hand there is clarity, in that everyone knows the limits, but on the other restrictions.



Credit: © serge brison; marie-noëlle dailly

Mipim 2018 Awards 2018 Winner: best residential development – Ilot Sacré

Jack Sibley from **TH Real Estate** pointed to the impact of driverless cars on real estate. Will it be seen at a city level or an asset level, he asked? Will it lead to increasing sprawl or higher densities? Will citizens be comfortable with longer commuting times and live on the outskirts of cities creating less density and more carbon emissions?

Concluding the MIPIM wrap up session he said that the idea that property is different to other industries, which have been vastly affected by tech, and much like it was 20 years ago is disappearing and will certainly do so in the next year or so.

In a seminar on The City as Service, **Nicole Stock Stanley** ceo of **dan pearlman Group** explained that artists and musicians created their own infrastructure in Berlin, in the process making it a very liveable city, with clubs and attractions. However, such was the success, the cost of living quadrupled.

She said with increasing interconnectedness and opportunities for increasing efficiencies, cities can spend a lot of money on services but still not increase the happiness index of the residents. The panel agreed there were opportunities for aggregation services for citizens and that there were blockages in the ideation process – gathering ideas from citizens and putting them into practice. It was agreed that tech developments are putting extra stress on local governments.

In a seminar on The Urbanised Future, **Lisette van Doorn**, ceo of **ULI Europe**, stressed that we have to avoid the mistakes of the past including suburban spread and retail parks and made the point that good density with affordable housing increased returns in the long run making investments less volatile. She said a mix of population and income groups, mixed use, good connections and green space made for attractive and liveable cities. She stressed that density is not high rise, and when consulting the public beware of 3D models, as the assumption is that it is the finished building, and advised early consultation with good examples of similar buildings.

Lisa Taylor of **Future of London** was not alone in stressing that high density doesn't necessarily mean tower blocks and the higher the tower often the greater the costs, so it doesn't always mean affordable housing. She said the move towards local authorities thinking more about health has meant silos breaking down. This includes parks and more green space, more encouragement of walking and cycling which means integration with planning and transport departments.

Jo Davis of **GVA** said transport hubs offered a lot of solutions to the housing problem, with the Elizabeth Line estimated to generate over 90,000 new dwellings, along with office and retail space. She said that in some cases energy services could be put in basements leaving roofs for plants and amenity space, and that more greenery was needed for pavements. As examples of tech influences, she cited the city of London, where wind and noise assessments are extensive prior to agreeing planning permission and in Adelaide sensors are being used to control air pollution and traffic flows.

Credit: © ingenhoven architects / h.G. Esch

Mipim Awards 2018 Winner: best innovative green building – Marina One, Singapore

Silver planning

A major and increasing trend was the impact of seniors on real estate and planning. By 2030 all major urban centres in the OECD will see a sharp increase in the number of elderly and cities will have to adapt short term and long term strategies.

There are different responses in different cities. In England, only 2% of households aged over 65 have moved in the past seven years. There are opportunities for retrofitting existing homes to extend independent living or building mid-sized homes in existing communities, adapted to seniors' needs.

There is a fine balance to be struck between higher densities and the right space standards to meet elderly needs.

At Mipim there was one particular inspiring development offering a potential solution, Le Jardin des Paraboles in Wallonia, Belgium, is a former satellite station being planned as a senior village offering community care and preventative safety services in a rural environment. Residents will get around by chauffeured golf carts or by walking and cycling. There will also be a school, for inter-generational contact and a wellness centre.

At a Counselors of Real Estate meeting, chair **Joe Nahas** stressed that an ageing society affects planning design and investment in real estate. Baby boomers, now seniors, prefer city centre locations, and there is a trend towards renting. The younger seniors have access to entertainment, while the elder seniors can access healthcare. He sees a demand for mixed product types which people can move through as their needs change.

In Japan, which has the largest population of over-65s in the world, developers, the hospitality trade and medical industry are working together to create buildings promoting wellbeing and encouraging exercise.

Increasing the housing stock

In a housing seminar, **James Murray,** London's deputy mayor for housing and residential development stressed building homes in London's outer boroughs and on small sites would go some way to alleviating the shortage. But **Jo Negrini,** chief executive at **Croydon Council** said people get attached to small spaces, like greenery and garages and they will be harder to get through than larger residential schemes.

The **Crown Estate's** chief investment officer **Paul Clark,** Speaking at EG's London Realigned session, said infrastructure, air quality, and congestion, along with affordability of housing, were the four main things which "London has to get right over the medium term" in order to remain one of the top global cities.

In a seminar on planning for 10m people, on the London Stand, **Paula Carney** from **WYG Planning** said the houses expected from the Opportunity Areas hadn't all materialised with issues over land ownership and conflict between the public and private sectors. She said more leadership was needed along with changes in regulation and more funding to hit the targets. **Victoria Hills**, ce of **Old Oak and Park Royal Development Corporation,** and moving to **RTPI**, stressed that building density around stations would solve some problems, and suggested some tax penalties on those responsible for not building on spare land around stations.

Sir Richard Leese, leader of **Manchester City Council** said at a Northern housing seminar that there isn't a sufficient range of housing stock across the north of England – a range of tenures or a range of price points. "We need everything from very affordable housing for low income families right the way through to executive housing, as if we want companies and inward investment then we have to have places for the people who run those companies to live. We need more housing to be developed in a way that creates places.

"I'm going to be critical of the property industry now, as too much of volume house builders are about building estates and moving on.

"It doesn't create any sense of place or there is no sense of ownership. It requires a sort of collaboration between councils, developers and a whole range of other people to do that place making, which I think Manchester is pretty good at."

At a joint London and Manchester seminar he said the agenda has moved from real estate to place, people and sustainability. He said there had been no coherent policy response to the housing crisis and that there needed to be more Government funds to clean-up and prepare sites for the houses our cities need.

Out and about

nHouse showed some interesting modular designs on the London Stand including a three bed nHouse3 with 100m² of floor space, large windows, solar panels and high insulation standards. Marketing director Nick Fulford told D&I that there was strong interest from housing associations.

Towers came with their obligatory greenery, illustrated by Green Satellite a 1 million square metre development in Bucharest with 20,000m² of green space – offset by 25,000m² of car parking in multi-storey buildings. Tower trends were also illustrated by 101 George Street, Croydon, 44 and 38 storey offsite constructed towers with roof gardens, sun lounge, galleries, gyms, business incubator hub and café.

The Greater Manchester Combined Authority launched a £15m low-carbon fund to help developers and infrastructure providers install renewable energy systems. The funds are from the European Regional Development Fund and will be managed by GVA who will work with the Greater Manchester European Local Energy Assistance Fund.

At the Inventing Greater Paris Metropolis competition 45 projects were unveiled to accelerate urban regeneration in the suburbs. They include sports facilities, offices, retail, logistics and residential and some features include wood construction and recycled building materials and not forgetting the impact of tech - drone delivery.

Service Provider Directory

Below is a selection of service providers including land remediation consultants and contractors as well as flood risk & control services. For our full directory, please visit our website **www.developmentandinfrastructure.com/directory**

Land Remediation Consultants and Contractors

AECOM

A Fortune 500 firm, AECOM is the world's largest remediation company with over more than 5,000 remediation staff world-wide and a gross annual revenue from remediation projects alone of over $1 billion. We design, build, finance and operate infrastructure assets for governments, businesses and organizations in more than 150 countries.
Richard Bewley
Technical Director
EHS & Remediation Services,
UK & Ireland
Tel: 0161 2376011
Email: Richard.bewley@aecom.com
Web: www.aecom.com

Arcadis UK Ltd

Arcadis FieldTech Solutions has a dedicated team of environmental experts who specialise in meeting your environmental contracting needs including Geotechnical and Environmental Ground investigation; specialist in-situ probing (MIP and LIF);tailored design and build remediation contracting services; decommissioning and demolition services (including explosive demolition) and creating value from redundant assets.
Mark Webb
Senior Technical Director
34 York Way, London, N1 9AB
Tel: 01638 674767
Email: mark.webb@arcadis.com
Web: http://arcadis.com

Campbell Reith

Campbell Reith is an independent firm of consulting engineers providing structural, civil, environmental, geotechnical, highways and transportation services. With a reputation for producing imaginative and cost effective design solutions, we are recognised by our clients as a firm of innovative and pragmatic thinkers
James Clay
Partner
Tel: 01737 784500
Email: jamesclay@campbellreith.com
Web: www.campbellreith.com

Celtic EnGlobe

Celtic-EnGlobe is one of the leading remediation and brownfield enabling works contractors in the UK, with a proven track record of delivery after more than 20 years in the industry. Celtic-EnGlobe is part of EnGlobe Corp, a world leader in providing integrated environmental services which operates in the UK, France, Middle East, USA and Canada. By partnering with us, you are able to rely on our extensive experience and delivery capability.
Kathy Newall
Business Development Manager
Unit 8, Commerce Park Brunel Rad,
Theale, Reading, RG7 4AB
Tel: 07985 836227 | Tel: 01189 167340
Email: kathy.newall@celtic-ltd.com
Web: http://celtic-ltd.com

DEME

DEME Environmental Contractors UK Ltd
DEC is one of Europe's leading environmental remediation contractors with more than 25 years' worldwide experience in the treatment of contaminated soil, sediment and groundwater using both in-situ and ex-situ technologies (on and off site). Projects undertaken range from small petrol station clean-ups to large-scale, complex, multidisciplinary remediation schemes.
Jim McNeilly
General Manager UK
Tel: 07713 121839
Email: mcneilly.james@deme-group.com
Web: http://deme-group.com/dec

Ecologia

Ecologia is a multi-disciplinary, specialist contaminated land contractor that provides advice and undertakes remediation projects across the UK and Europe. We also have an established and excellent reputation for the construction and operation of in-situ remediation plant for soil and groundwater.
Giacomo Maini
Managing Director
Tel: +44 (0) 1795 471611
Email: g.maini@ecologia-environmental.com
Web: www.ecologia-environmental.com

ERS

Established in 1994 and wholly employee-owned, ERS is a team of >30 engineers and scientists dedicated to providing the most appropriate and cost-effective remediation of contaminated soils and groundwater. Trusted by property developers, house builders, contractors and consultants; projects range in value from under £5k to >£1m. ERS is Constructionline, CHAS, SMAS, PCA and Achilles registered. Services include: Remediation-oriented ground investigation; treatment of soil and groundwater for contaminants including hydrocarbons, chlorinated solvents, heavy metals and invasive plant species; In-situ and ex-situ remediation by physical, biological, chemical and thermal means; Waste classification and disposal via landfill or soil treatment centres
Andrew Mackenzie
Managing Director
Tel: 0141 772 2789
Email: andew@ersremediation.com
Web: www.ersremediation.com

GB Card & Partners

GB Card & Partners is a specialist environmental and civil engineering consultancy with an international reputation for the assessment and remediation of brownfield land. We have been at the forefront in setting industry standards and government policy in both the UK and overseas, particularly in the compilation of guidance and policy documents for land quality, gas/vapour protection and development on former landfill and gassing sites. The expertise and skill that we bring to a project has enabled our Clients to successfully develop award winning schemes.
Dr. Geoff Card
Managing Director
Dixcart House, Addlestone Road,
Bourne Business Park,
Addlestone, KT15 2LE, Surrey,
United Kingdom
Tel: 0203 795 9990
Email: gbcard@gbcardandpartners.com
Web: www.gbcardandpartners.com

If you would like to appear in this magazine directory or our online directory please email sales@environment-analyst.com

GeoStream UK Ltd

GeoStream UK is the only single source provider of tried and tested remediation technologies in the UK, offering the full range of physical, chemical and biological treatment techniques for soils and groundwater and exclusive providers of Trap & Treat® (BOS 100® & BOS 200®) and the full range of injectable substrates supplied by Carus Remediation Technologies for the UK and Ireland.

Chris Evans
Technical Director
Tel: 01902 906205
Email: chris.evans@mcauliffegroup.co.uk
Web: www.remediation.com

John F Hunt

JFHR undertake innovative and sustainable soil and groundwater remediation projects across the UK. We work in a collaborative manner to deliver projects on time and on budget. As part of the wider JFH group, we are able to integrate other disciplines including demolition, civils and infrastructure, and asbestos consultancy.

Ben Williams
Managing Director
Tel: 01227 811826
Email: ben.williams@johnfhunt.co.uk
Web: www.johnfhunt.co.uk/

McAuliffe Civil Engineering Ltd

McAuliffe delivers solutions in brownfield site transformation at land acquisition and build-out stages. The business offers a full turnkey service, with core capabilities including soil and groundwater remediation, haulage and materials management, ground improvement and foundation solutions, and demolition services.

Lucy Martinez
Communications Manager
McAuliffe House, Northcott Road, Wolverhampton, WV14 0TP
Tel: 01902 354400
Email: lucy@mcauliffegroup.co.uk
Web: www.mcauliffegroup.co.uk

Peter Brett Associates LLP

PBA is an independent practice of engineers, planners, scientists and economists delivering major development and infrastructure projects. We provide trusted advice to create value from the land and buildings owned or operated by our clients. We have a regional spread of offices with a depth of technical skills throughout the UK, including specialists in contaminated land and its remediation.

Catherine Copping
Associate
Tel: 0118 950 0761
Email: ccopping@peterbrett.com
Web: http://peterbrett.com

Ramboll

Ramboll is a leading engineering, design and consultancy company employing 13,000 experts. Our presence is global with especially strong representation in the Nordics, UK, North America, Continental Europe, Middle East and Asia Pacific. We constantly strive to achieve inspiring and exacting solutions that make a genuine difference to our clients, end-users and society at large. Our globally recognised environment and health practice has earned a reputation for technical and scientific excellence, innovation and client service. Advances in science and technology and evolving regulatory, legal and social pressures create increasingly complex challenges for our clients. We evolve to keep pace with these changes – by adding new services, contributing to scientific advances or expanding geographically.

Greg Stoner, Marketing Communications Project Manager - Europe & Africa
Tel: 01225 748420
Email: gstoner@ramboll.com
Web: www.ramboll.com

Rodgers Leask

Rodgers Leask delivers major civil engineering and building projects and takes pride in providing high quality, innovative solutions. Our highly qualified team of civil, structural and geo-environmental engineers achieve excellent service levels by drawing on years of experience in addressing the most complex technical issues. We have a hard-earned reputation for providing cost effective, practical, buildable solutions, whilst developing close working relationships with clients and fellow professionals.

Sean Leach
Director - Business Development
St James House,
St Mary's Wharf, Mansfield Road, Derby, DE1 3TQ
Tel: 01332 28500
Email: sean.leach@rodgersleask.co.uk
Web: http://rodgersleask.com

Sanctus Ltd

Sanctus is a specialist remediation contractor offering solutions for all issues associated with brownfield land development, including a wide range of in-situ and ex-situ soil and groundwater remediation techniques. Sanctus holds a bespoke environmental permit for the onsite treatment of hazardous waste and is also a licensed asbestos contractor.

Peter Cooke
Managing Director
Tel: 01453 828222
Email: pcooke@sanctusltd.co.uk
Web: www.sanctusltd.com

Shawcity Ltd

Shawcity is an independent business focused on bringing the latest technology from the world's leading manufacturers to the UK and Ireland. We enable customers working in Environmental, Occupational Hygiene and Health & Safety applications to achieve the highest levels of monitoring performance. We have the UK's largest hire fleet of GasClams, the world's first in-situ borehole gas monitor which gives high frequency unmanned data readings for up to three months at a time. Manufacturer-trained and approved, our technical team also offer in-house servicing, calibration, repairs and training as well as unlimited technical support.

Elliot Rosher,
Product Specialist Manager
Tel: 01793 780622
Email: elliot.rosher@shawcity.co.uk
Web: www.shawcity.co.uk

Soil and Water Solutions Ltd

S&WS Ltd is a licensed specialist environmental and enabling works contractor providing sustainable in-situ and ex-situ remediation, bulk excavation and disposal/recycling using our own plant, on time and budget. Our in-house expertise enables delivery of bespoke brownfield solutions for treatment of contaminants including hydrocarbons, asbestos and Japanese Knotweed, nationwide

Paul Garrett
Remediation Manager
Tel: 020 3667 8666
Email: paul.garrett@soilandwatersolutions.com
Web: http://soilandwatersolutions.com

Soilfix Limited

Soilfix is an award-winning remediation solutions provider to the development, industrial, commercial and public sectors. Our mission is "to understand and manage risk in the ground".
Soilfix has developed an outstanding track record for delivering innovative remedial solutions for contaminated and brownfield sites.
Steve Jackson
Director
Tel: 0117 982 0025
Email: steve@soilfix.co.uk
Web: www.soilfix.co.uk

Waterman Infrastructure and Environment

Delivers multidisciplinary engineering solutions to the property, construction and redevelopment sectors. Services include site investigations, risk assessment, cost effective remediation and contract management, reporting to facilitate planning conditions discharge, and waste classification advice on excavated materials during development and contract negotiations.
Our experience brings strategic advice to minimise risk and costs.
Carl Slater
Technical Director
Pickfords Wharf, Clink Street,
London, SE1 9DG
Tel: 020 7928 7888
Email:
carl.slater@watermangroup.com
Web: www.watermangroup.com

Flood Risk & Control Services

Rivelin Bridge Ltd

Rivelin Bridge Ltd is a civil and environmental consultancy working throughout the UK and internationally. We provide engineering and advisory services related to flood resilience, water related development and adaption.
Our services include: project development and planning, business case development, stakeholder engagement and scheme promotion, programme and project management, tendering, training and advice. We help you create value by connecting water, people and places.
Steven Trewhella
Director
Tel: 075579 14100
Email: steven.trewhella@
rivelinbridge.com
Web: www.rivelinbridge.com

UK Flood Barriers

Since being established in 2007, UK Flood Barriers has grown to become the UK's leading specialist flood contractor. It provides effective flood defence protection to members of the public, businesses, councils, main scheme contractors and the Environment Agency. UKFB hasw built an enviable project portfolio delivering world class flood defence solutions which are as effective at an individual property level as they are in large scale community infrastructure projects.
Matt Keight
Managing Director
Tel: 01905 773 282
Email: matt.keight@ukfloodbarriers.co.uk
Web: www.ukfloodbarriers.co.uk

Brownfield Briefing **Awards 2018**

bb AWARDS 2018

27 September, London

Nominations now open!

The fourteenth annual Brownfield Briefing Awards return to London on 27 September 2018. The Awards have become the flagship event for the brownfield community, and is one of the highest industry accolades that a company can receive. The awards recognise technical and conceptual excellence in projects that have been underway over the past 12 months.

We are pleased to announce that the nominations for the 2018 BB Awards are now open. For more information on this year's categories and to submit your entry visit **www.brownfieldbriefing.com/bb-awards-2018**

Tables at the 2017 Awards sold out fast, so to guarantee your table at the 2018 Awards and to ensure you receive a prime position get in contact today.

+44 (0)203 637 2191

sales@environment-analyst.com

brownfieldbriefing
ea development+infrastructure service

Brought to you by:
ea environmentanalyst ltd

Events 2018

Executive Briefing Webinar Series

Development on and Near Closed Landfills

23 May 2018

Brownfield Redevelopment: Midlands 2018

5 July 2018, Derby

Executive Briefing Webinar Series

Courting Wisdom - Lessons from Recent Judgments, Appeals and Debates

13 June 2018

Building Sustainable Towns and Cities

20 September 2018, London

EA Business Summit 2018: Pre-Summit Industry Leaders' Dinner

19 June 2018, London

Brownfield Risk & Remediation 2018

27 September 2018, London

Environment Analyst Business Summit 2018

20 June 2018, London

Brownfield Briefing Awards 2018

27 September 2018, London

Site Investigation 2018

28 June 2018, London

Brownfield Land Wales 2018

4 October 2018, Cardiff

Further events to be announced shortly

For more information email sales@environment-analyst.com or call +44 (0)20 3637 2191

development+infrastructure

ea brownfield | EIA | flood | ecology | sustainable build

Brought to you by:

ea environmentanalyst ltd

Get unrestricted access to all Development & Infrastructure news articles plus much more...

Sign up to one of our premium membership packages including small team, large team or corporate wide and get access to:

- All news articles from the Development & Infrastructure services including Brownfield Briefing, EIA + Planning Briefing, Flood Briefing, Ecology Briefing and Sustainable Building Briefing
- A weekly email news alert with access to premium news stories
- Insight features
- An online and printed copy of the Development & Infrastructure Magazine
- Access to conference presentations and webinars
- Event discounts

For more information and to sign up to the service visit www.developmentandinfrastructure.com call +44 (0)203 637 2191 or email sales@environment-analyst.com