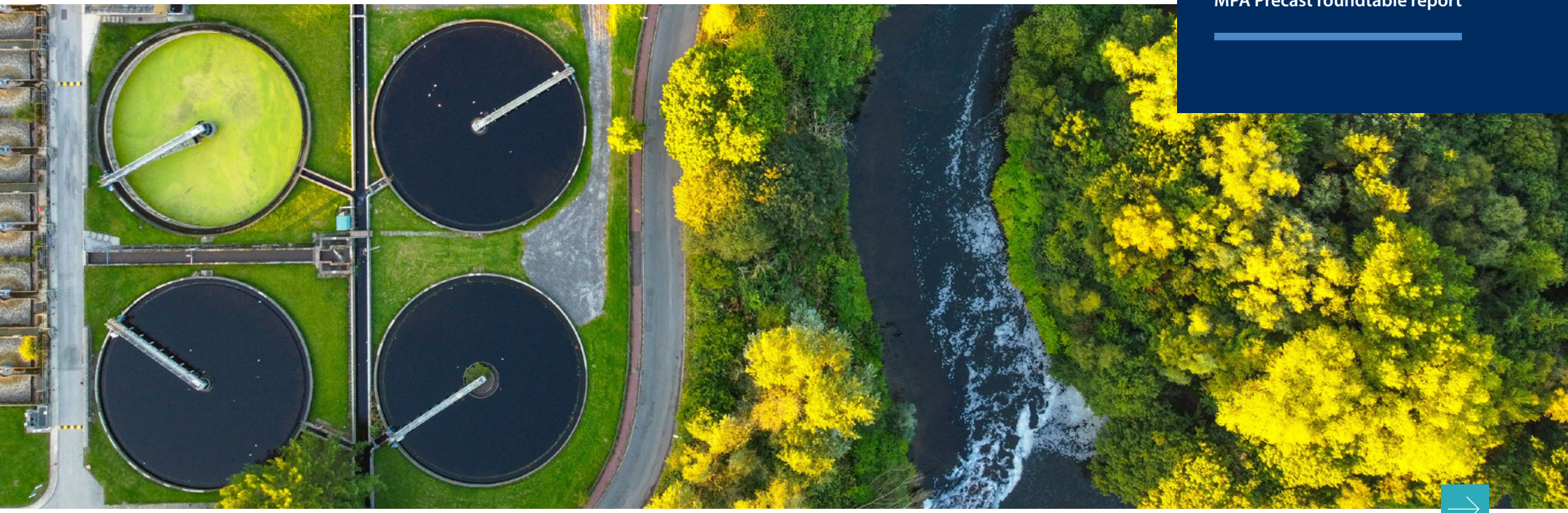
Revitalising the UK's drainage infrastructure

MPA Precast roundtable report



The UK's drainage infrastructure faces unprecedented challenges from climate change, urbanisation, pollution and ageing systems. This report captures insights from leading industry experts and researchers who participated in the recent MPA Precast roundtable discussion. They examine both the challenges and potential solutions for creating more sustainable, resilient and efficient drainage systems.

Contents

Context

"UK drainage infrastructure faces a perfect storm"

Surface water drainage, flooding and wastewater management are emotive topics in the UK. Utility networks face widespread and complex challenges, compounded by aging infrastructure and a perceived lack of investment. As a result, finding solutions is difficult, and their implementation is under intense public scrutiny.

But is this public ire fair, and what can stakeholders in the water industry do about it?

The UK's drainage infrastructure faces mounting pressures which affect both existing infrastructure and the development of future systems, which will need to meet these growing demands and environmental requirements. MPA Precast recently brought together drainage experts from across the industry, academia, engineering and specialised organisations to analyse the challenges UK infrastructure faces. The discussion that took place revealed the need to look beyond the headlines to understand the real cause of today's drainage problems.

Clear themes emerged included climate change, urbanisation and ageing systems. As explained by our panel of industry experts, these obstacles are not merely technical but also institutional, financial, political and cultural.

Climate change is creating increasingly unpredictable weather patterns, with more frequent and intense rainfall events alternating with prolonged dry periods.

This cycle puts tremendous strain on ageing drainage systems designed for more consistent weather patterns. Simultaneously, rapid urbanisation is reducing natural drainage capacity as permeable surfaces are replaced with impermeable ones, significantly increasing runoff volumes and velocities.

It's a problem that's exacerbated by prolonged periods without rain, which cause the ground to harden. When it returns the result is flash flooding, creating huge drainage capacity issues.

The legacy of Victorian-era systems poses another layer of complexity. While impressive in their longevity, these systems have reached the end of their design life. Originally built for different population densities and climate conditions, they now struggle to meet modern demands.

The combination of these factors has created a perfect storm for UK drainage infrastructure.

Addressing these challenges will require breaking down silos between organisations, balancing short-term maintenance with long-term solutions, and engaging the public in what has traditionally been an invisible infrastructure problem.

The following report summarises key insights from our roundtable discussion on drainage infrastructure including suggested solutions to address the challenges identified.

Meet the experts who participated in our roundtable discussion:

- **Jo Bradley**, Director of Operations, Storm Water Shepherds
- **Professor Fay Couceiro**, Professor of Environmental Pollution at the School of Civil Engineering and Surveying at the University of Portsmouth
- **Professor Nicole Metje**, Director, UK CRIC (National Buried Infrastructure Facility)
- **Pete Tamblin**, Head of Design and Engineering, Marshall Civils & Drainage
- **Dr. John Gumbel**, Owner and Director, JG Pipeline Consultancy Limited
- **Steve Callow**, Manager, Masonry & Concrete Products, Mineral Products Association (MPA)

Moderated by Henry Rubinstein
Head of Construction PR, The Think Tank

Ageing infrastructure and maintenance challenges

> "We know more about stars than we know about what's below our feet"

The UK's drainage infrastructure faces significant challenges related to its age, condition and the accuracy of information about it. Many of our systems date back to the Victorian era, creating a legacy that continues to impact current operations and future planning.

While remarkable engineering achievements for their time, these systems are now showing their age. Much of this drainage infrastructure was installed over 150 years ago and has exceeded its design life, yet maintenance is often neglected until failures occur. Our panel observed that "We've got problems now that we are trying to overcome because of our Victorian assets...we are just perpetuating that problem, and we're just pushing it forwards into the future."

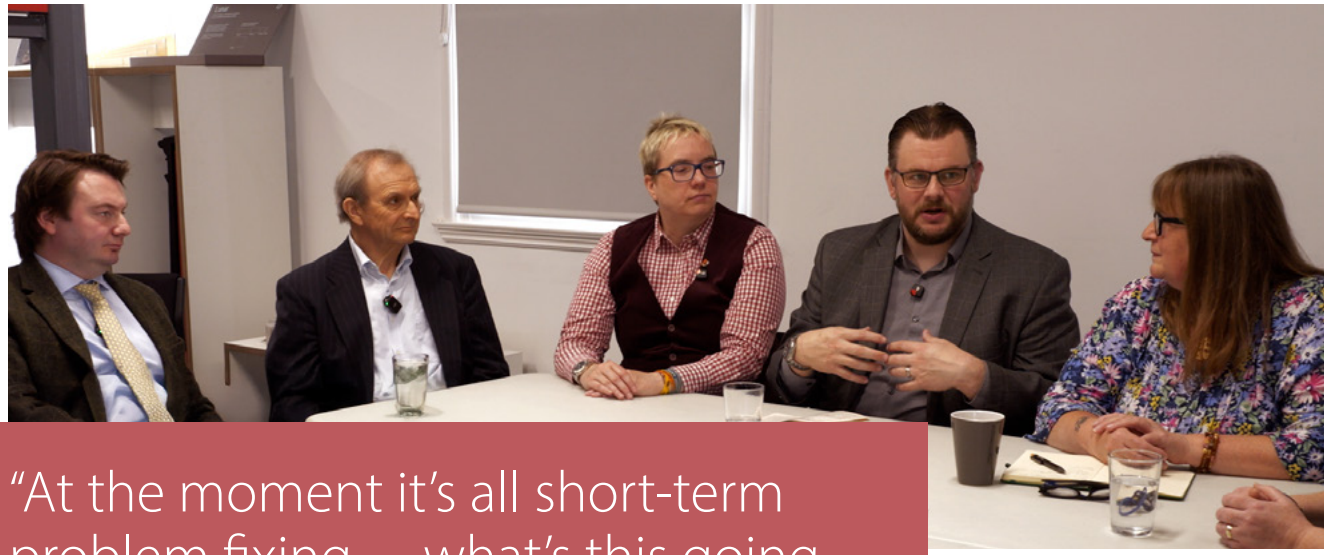
Our panel agreed that *a more proactive approach to maintenance is essential*, but acknowledged the practical challenges involved with renewing these systems – not least of which is our limited underground mapping information.

One panellist estimated that less than 50% of the industry's statutory record data is accurate, making maintenance, repairs and planning for new infrastructure extremely difficult. This can be further exacerbated by assets being found up to 20 metres from their recorded position, according to industry feedback.

Asset records continued to be highlighted. One member of our panel shared their experience of discovering large, unknown precast concrete tanks during CCTV surveys, illustrating how even major infrastructure components can be "lost" due to poor record-keeping.

The conclusion? Dr Nicole Metje put it best:
"We know more about the stars than we know about what's below our feet."

Issues with misaligned policy and fragmented governance



"At the moment it's all short-term problem fixing… what's this going to look like in 100 years' time?"

The roundtable discussion revealed significant concerns about how drainage infrastructure is governed and how investment decisions are made, creating barriers to effective long-term solutions.

A major challenge identified is the short-term nature of investment planning in the water sector. The Asset Management Plan (AMP) cycles, typically five years in duration, encourage a focus on immediate problems rather than strategic, long-term solutions. The result is that quick returns on investment are prioritised, important decisions are put off and long-term legacy assets stay unbuilt.

Our panel expressed frustration with this approach. Pete Tamblin raised the important point, "It's all short-term problem fixing rather than planning for the long-term. No one's asking 'what's the system's going to look like in 10, 20, 30, 100 years' time?" *The consensus was that longer planning horizons are essential for sustainable infrastructure development.*

Another issue identified was the complex network of organisations with overlapping responsibilities that manage the UK's drainage. Water companies, local authorities, highways agencies, and private landowners all play roles in managing different aspects of drainage systems, often with limited coordination.

A telling example of this fragmentation was described concerning a site where three major contributors to drainage struggled to work together.

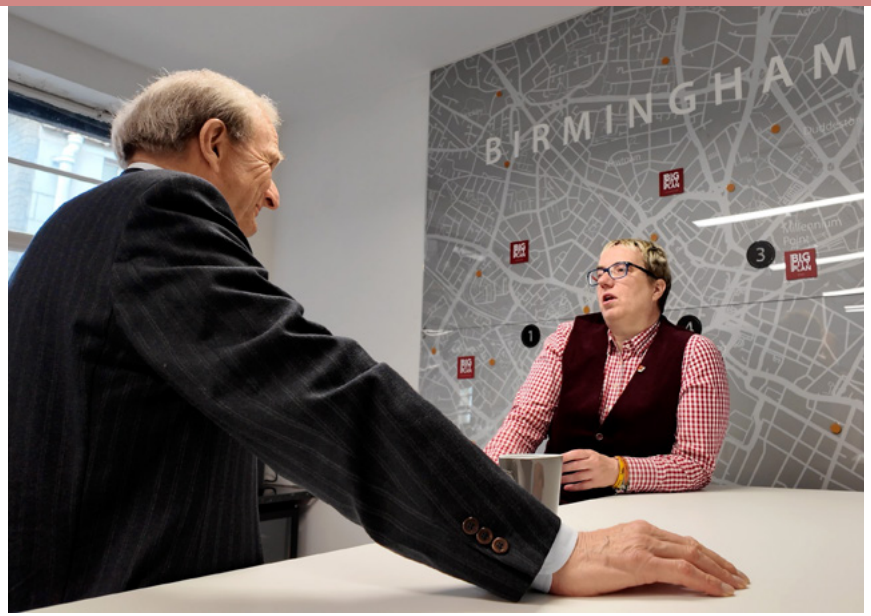
"None of them were interlinked. There was a developer who was working with the water authority, but who wasn't talking to the local council or the Highways Agency… so you had three isolated little pockets, all of which doing the right thing, but no interconnectivity between the three major bodies that control discharge."

This lack of coordination leads to inefficient systems, with residents potentially impacted by the knock-on effect of urban flooding.

The roundtable participants strongly advocated for more integrated approaches to drainage infrastructure planning and management, with better coordination between different agencies, longer-term planning horizons and more holistic consideration of both water quantity and quality issues.

Addressing pollution sources

"It's too easy to say that the problems we face today are the result of lack of investment..."



Water pollution is a complex issue with multiple sources, yet public and media attention often focuses disproportionately on sewage discharges from water companies. Our roundtable participants challenged that perception, emphasising the need for a more balanced understanding of pollution sources and more proportionate approaches to addressing them.

The panel highlighted that, rather than solely the sewage industry, a significant proportion of pollution entering drainage systems stems from urban and agricultural drainage. There's also growing concern about emerging contaminants including microplastics, PFAs (per- and polyfluoroalkyl substances) and pharmaceuticals.

Jo Bradley pointed to a lack of investment in non-sewage pollution control. As she put it:

"I think it's too easy to say that the problems we face today are a result of a lack of investment. I'm not sure that's strictly true. It's that the investment has been made in the wrong way… we need a more proportionate application of investment across all sources of pollution, rather than just sewage fare."

The discussion zeroed in on the need for better quality controls for highways, including the use of separators instead of simple catchpits to remove pollutants before they enter watercourses. As one participant noted, modern vortex separators that are now used on motorways are very effective compared to "legacy design silt chambers," representing an important step forward in highway drainage pollution control. If anything, these solutions are needed in higher quantity to tackle the issues around water carried pollutants.

Our panel agreed that reducing contamination levels at source is vital for achieving environmental outcomes, and often a far more realistic target to hit.

As Professor Fay Couceiro observed:

"If you're at the sewage works and you have a containment that you have to reduce to one part per billion, and it comes in at ten parts per billion, it's really hard because you're trying to remove a small amount. Whereas if you're at the source where the contamination is occurring and it's at very high concentrations, you can do it much more simply and cost-effectively…If you can remove a containment at source, it is so much easier than at end-of-pipe."

“We need to shift focus towards Sustainable Drainage systems”

Sustainable Drainage Systems (SuDS) emerged as a crucial part of the solution to the challenges posed by climate change to the UK’s drainage infrastructure. As explained by our panel, they serve dual purposes: managing water volumes to reduce flood risk, and improving water quality by filtering out pollutants.

The panel highlighted above ground SuDs as being especially important for getting public buy-in for sustainable solutions. By getting people excited by above-ground features, and demonstrating that flooding isn’t a worry, visibility can help build public support for investment in drainage infrastructure and create a greater sense of connection to water management issues.

Also discussed were innovations to meet new and challenging SuDS requirements, *including precast concrete solutions that can be integrated with surface features to create comprehensive water management systems*. These innovations allow for more flexible and effective responses to the diverse challenges faced in different contexts, deliver on the important aspects of water quantity, water quality, amenity and biodiversity.

Despite their benefits, SuDS implementation faces significant institutional barriers. Unclear responsibilities for maintenance, uncertainty about asset ownership and competing priorities within local authorities all create obstacles to wider adoption.

The roundtable participants highlighted that, currently, local authorities often prioritise other matters such as affordable housing. The situation demonstrates the need for policy frameworks that better integrate drainage considerations into broader planning and development processes, ensuring SuDS becomes a standard element rather than an optional extra.

Considering materials and lifecycle

> "We can now put systems back in that are going to last for a long time – that's the art of precast"

When selecting materials for drainage infrastructure, durability, performance and environmental impact all matter. The roundtable experts highlighted how precast concrete solutions offer particular advantages when considering the whole life of a system.

Precast concrete drainage systems can last an impressive 120 years when properly designed and installed. This exceptional longevity cuts lifecycle costs and reduces environmental impacts by avoiding the need for frequent replacements. Such durability is especially valuable for underground infrastructure, where access for maintenance or replacement is both challenging and disruptive.

The carbon question is more nuanced than it might first appear. While all construction materials have embodied carbon impacts, the roundtable emphasised looking at whole life carbon rather than just 'headline' figures. As precast concrete systems last so long, their carbon impact over the full lifecycle can actually be significantly lower than alternatives that need replacing more often.

"Smarter underground systems, better design" was picked out as the key to further reducing carbon footprints. This includes more efficient designs and reducing the up-front embodied carbon of products.

This efficiency drive has lead the sector to iterate products down to fit-for-purpose items that are easily sourced, efficient in their design and have class-leading product performance. The panel highlighted many examples where precast drainage manufacturers produce a diverse range of products, from the smallest seating rings to large box-culverts.

Flow control technology has seen significant innovations in recent years. Vortex flow control chambers and interceptors have "reduced the need for more rudimentary 'big-tank' systems," as Steve Callow explained, making drainage systems more efficient. These smart solutions allow for more precise water flow management, reducing both the size and cost of upstream storage tanks while improving overall performance – a clear shift from simple volume-based approaches to more sophisticated solutions.

Rather than complete replacement, retrofitting existing infrastructure often makes more sense. **Dr. John Gumbel noted:**

"There's now many techniques for rebuilding the infrastructure from the inside, lining techniques and completing pipe replacement online – without actually having to dig it up."

These approaches cause less local disruption, cost less and have smaller environmental impacts than full replacement. The experts agreed that a balanced approach to existing infrastructure was warranted, combining targeted replacement with strategic retrofitting.

The value of drainage infrastructure isn't just about initial performance but about maintaining that performance over time with minimal intervention. This requires careful consideration of durability, resilience to changing conditions, and ease of maintenance – areas where precast concrete systems offer distinct advantages with their standardised components, robust performance under varying conditions and minimal maintenance requirements.

MPA Precast represents the UK precast concrete manufacturers and members of the supply chain. We develop and disseminate best practice guidance to promote precast concrete in construction.

Web www.mpaprecast.org

LinkedIn @mpaprecast

MPA Precast is a product group of the Mineral Products Association, the trade association for the aggregates, asphalt, cement, concrete, dimension stone, lime, mortar and industrial sand industries.
www.mineralproducts.org