motion VOLUME 1 Infrastructure InFocus

An Occasional Review of the water management issues affecting the property development industry

In association with *insight*

FOREWORD

Navigating the complexity of water management constantly brings fresh challenges to property developers. Overcoming drainage and flood risk obstacles can often be the key to unlock land, whether you need to demonstrate water neutrality for industrial premises, design rural housing with no obvious means to drain surface water, or plan mixed-use schemes with limited options for protecting communities downstream.

Wherever you are in property development, you can be sure that the challenges of water management, in particular the risk of flooding, are only likely to intensify as we face increasing threats from climate change. In this *Infrastructure InFocus* Occasional Review, we present different perspectives from four experts in flood risk, water neutrality and drainage, who are seizing these challenges on a daily basis. We cover viewpoints on flood resilience and ageing infrastructure, the importance of reliable data, coastal erosion and adoption of sustainable drainage assets.

These observations may echo your own experiences and we hope you find them thought provoking. If you would value a preliminary consultation about how to mitigate the effects of climate change on your scheme, do give us a call on 01483 531300.

CONTENTS

- P2 Richard Bettridge presents an action plan for tackling the national emergency of sewage spills caused by ageing infrastructure
- P3 Neil Jaques reflects on the problem of acquiring reliable flood data when modelling is not consistent across the country
- P4 Jason Morgans sets out the pros and cons of designing sustainable drainage for private adoption
- P5 Vicki Berg-Holdo reviews two approaches to coastal flood protection strategies and asks if the sequential test should now take centre stage





Richard Bettridge

A collective effort is needed as a national crisis looms

Why urgent investment in infrastructure is the key to unlocking new homes and protecting the local environment.

The most recent headlines reveal yet another dimension to the ongoing dispute about the responsibilities of water companies and the discharge of sewage into local watercourses. The six largest water utilities in the UK prepare for potential legal action, in the latest twists and turns of a most egregious saga. And the stakes are becoming ever higher as water bill payers are now brought into the fray.

But despite the media interest, public disquiet and celebrity involvement, I don't sense that there is any urgency to this debate. To overcome the current challenges, a shift of seismic proportions is likely to be required: in the rapid prioritisation of finance and capital to upgrade or replace ageing infrastructure, the recognition of the critical role of engineering knowhow, and the acknowledgement that a collaborative approach must be a given if public trust and confidence is to be restored, and frictionless infrastructure development is to be achieved to facilitate the building of tomorrow's sustainable private and public property.

Here, I set out my ten-point action plan for success:

- 1. <u>The lack of conveyance capacity in sewer systems</u> means that separation schemes should be considered where practicable, splitting sewage from surface-water drainage infrastructure.
- 2. Surface-water connections into foul sewers are already outlawed, but enforcement is necessary, along with the power to undo connections retrospectively where there is a history of problems. This will act as both a powerful guardrail and effective deterrent.

- 3. Sites where sewer overflows are common need to be identified and reinforced with additional storage capacity near the spillage, for pumping back effluent later for full treatment, once the initial event has passed.
- 4. The lack of treatment capacity, a major hurdle for many new development proposals, could also be overcome by expanding settlement tanks and biological treatment at the works. Primary and secondary treatment should be reviewed and additional infrastructure introduced for tertiary treatment - screens, micro strainers and aeration, for example. This could mean targets for new homes are more likely to be met, year on year.
- 5. A dual approach, increasing treatment capacity AND overflow storage capacity, could either radically reduce or eliminate raw sewage spills.
- 6. The water industry has a responsibility to communicate more effectively with the public and a proper debate needs to take place about the tensions between protecting private property and local watercourses.
- 7. Water companies face damage to reputation mainly because standards as well as stakeholder expectations have been raised. Through public information campaigns, consumers need to understand why and how sewage spills occur. Households should be aware of the need to safeguard the efficacy of the biological treatment ecosystem which depends on a thriving population of bacteria. Domestic cleaning products, medicines and drugs entering the sewerage system all work against this delicately balanced biological process.
- 8. Civil and environmental engineers and public health professionals need to unite and mobilise to help deal with this crisis which, unchecked, is only likely to deepen with the mounting impact of climate change. Water companies need the support of these players. Without them, the risk is that utilities will always be playing catch up, even in the absence of extreme weather events.
- 9. Planning decisions aimed at protecting our rivers and watercourses should be fast-tracked. Problem sites need to be quickly identified and feasibility schemes drawn up to support funding applications.
- 10. To achieve this plan, an injection of government finance would be required. Water company fines, issued with immediate effect, would limit the payment of what seem like excessive dividends to shareholders. These fines could also contribute to the funding of new schemes.

For successful delivery, capital investment and access to land are also urgently required. But to be in with a chance of bringing about change for good, above all this problem needs to be elevated to the status of national emergency.







Neil Jaques

Flood-risk data under the microscope

Why access to real-time intelligence may not be the answer for tight planning application deadlines.

Timescales for flood risk assessments are often critical for the developer. In order to meet expectations, obtaining and analysing flood information has to be completed as quickly as possible. Against these challenges, is access to real-time data justified?

Obtaining reliable flood data and carrying out the necessary analysis can be hampered by the uncertainty caused by varying approaches to modelling in different parts of the country. There is no standard format for provision of flood information across the Environment Agency's regions. A 21-day wait for Product 4 data – which can include detailed flood-risk assessment mapping, flood zones, defence and storage areas, as well as historic flood event outlines – can be a major obstacle for the developer.

Moreover, Product 4 data requests do not always generate information consistent with what is freely available online. If what comes back is not particularly helpful to the flood-risk engineer, further delays to the planning application process could be inevitable. This could be compounded by the costs involved for completion of any additional reports.

A large number of watercourses run across the UK that range vastly in size and scale, and many have not been modelled. Some sites still require the detailed modelling and local assessments which add time and money to a project. Interpretation based on historic flooding is not always accurate or possible.

Intelligent application of data

The article by Jack Heslop, 'How greater use of data can enable better flood risk management' (New Civil Engineer, August 2022) was therefore of particular interest as it makes the case for publishing data online for planners to carry out their own interpretation. A one-stop-shop approach to flood-risk management via a local government digital tool is an attractive proposition. Faster access to data would undoubtedly benefit planners and developers and could be a step in the right direction.

However, planners often need to cover a range of topics. In addition to specialist skills, the critical analysis is the additional value that independent consultants can bring to the table, challenging the data when we believe it is incorrect. Within the realm of hydraulic modelling, there is a difference between data and intelligence. A professional with appropriate skills and training can understand information and harness it for effective decision making. An engineer can also look at data and pinpoint the underlying issues behind the figures.

While dynamic access to flood information sounds compelling, in practice the problem would arise when assessing a whole catchment area. Here, the sheer size of the data set would make it virtually unmanageable.

All of these considerations mean we are still a long way off from clear and easily accessible information for planners. Until such time when we have a uniform approach to the detail, quality and the provision of data, the complexities of flood management need to be tackled at the earliest stage possible. For the sake of a 30-minute consultation with an expert, my initial advice is don't leave flood risk to the last minute.



Infrastructure *InFocus*





Jason Morgans Sewer adoption

The private vs public debate

Are sustainable drainage systems (SuDS) becoming harder to adopt for new residential developments? And what are the challenges of site-wide SuDS strategies?

When I began designing infrastructure for residential development sites, it was almost a given that roads would be designed to adoptable standards, with the intention that they would be adopted by the highway authority under a Section 278 or 38 agreement.

The same would apply for drainage systems. Here, the preference would be for adoption by the sewer authority under a Section 104 agreement. The rationale? It was desirable for the maintenance of this infrastructure to be undertaken by a public body. The alternative was leaving residents with the maintenance liability of a private road, which was considered inappropriate at the time.

More recently, the default position is that many developers plan from the outset for the internal road network and drainage infrastructure to remain private. Some highway authorities' guidance states that residential access roads serving more than ten dwellings will be offered for adoption. The authorities are therefore actively encouraging road adoption. Despite this, there appears to be reluctance in the industry to take up this offer. This also seems to be the case for foul and surface-water drainage.

Adoption benefits

There could be many advantages of adopting residential roads and drainage systems. The maintenance is undertaken by a public body. The standards of maintenance are secured by agreed targets and legislation, with accountability to the general public. Resources and infrastructure are put in place in the local area to deliver maintenance. Responsibility of the funding of maintenance in perpetuity is passed from the developer or residents to the adopting authority.

However, the evolution of road and drainage design and planning policy has impacted on the ability of developers to deliver an offering that meets adoptable standards. Consequently, the benefits are often not being seen in developments built with infrastructure that is offered for adoption. This is particularly true for SuDS. Highway and sewer authorities have generally always taken a conservative approach to acceptance of adoptable infrastructure. In the past, drainage systems were designed to meet adoptable standards. But further back, we did not have to meet the requirements of a site-specific flood risk assessment or drainage strategy, or the one-in-100-year-plus climate change return period, or provide strategies for the treatment of surface-water runoff.

These requirements are a positive and a necessary evolution. To deliver them the design of SuDS infrastructure is needed, such as permeable paving, ponds, basins and swales to drain internal roads. But since these requirements were introduced, highway and drainage authority adoption conditions have not kept pace.

This is illustrated when examining the huge variation in published criteria across different authorities in England. In Sussex, SuDS are adopted as highway drainage, and include ponds, swales, ditches and underground attenuation tanks. Permeable paving and underground cellular-based systems are not preferred. Meanwhile, in Hampshire, the technical guidance states that adoption of permeable paving is only considered if it complies with 26 conditions.

Disconnect

Similarly, highway authorities will not permit water to drain from private areas, roofs and hard standing into the highway drainage system. This can result in the need to develop two separate systems, which is not always easily achieved within the parameters of a SuDS design. During the planning application process, the planning authority and flood authority will generally support, if not actively encourage, the use of permeable paving.

There exists a disconnect between what is stipulated by the local planning authority, the lead local flood authority and the highway authority. Private adoption of infrastructure is therefore one way to get round the significant hurdles imposed at planning stage.

The Code for Adoption provides for the adoption of SuDS that could be approached in the same way as a sewer or lateral drain. Sewer authorities have published guidance that can pave the way to adoption of swales, bio-retention systems, ponds, wetlands and basins. Sewer authorities will not, however, adopt storage crates or permeable paving. This becomes a barrier in SuDS adoption. Here, planning policy and SuDS guidance encourages a site-wide strategy using a variety of methods, some of which will not be adopted by the sewer authority under their current guidance.

Navigating the varied conditions stipulated by the relevant authorities across England requires skill, imagination and creativity in an environment where policy guidance, adoption conditions and design approaches must evolve together.

In future, enactment of Schedule 3 of the Flood and Water Management Act 2010 should help to resolve some of these challenges, with its recommendation for local approval bodies and national standards for design, construction, operation and maintenance of assets. Even then, access to the right skills and capabilities will be key to successful implementation.



Infrastructure ImFocus





Vicki Berg-Holdo Seaside spend

Difficult choices ahead for allocation of coastal protection funds

Two articles caught my attention when browsing a published feature on flood risk. 'Adapt or Drown' by Rob Hakimiam and 'Beside the Seaside' by Claire Smith (New Civil Engineer, August 2022) explored measures designed to protect two very different coastal towns from flooding. The first is Looe in Cornwall and the second is Southsea in Portsmouth, Hampshire. When considering both schemes, it might be helpful to compare proposals designed to address the impact of climate change on coastal areas, with measures to curb flooding of inland areas.

Flooding of inland areas can be due to excessive rainfall and overdevelopment, if robust mitigation measures are not adopted. The problem is only likely to intensify further due to climate change. Much has already been debated about these particular causes of flooding, and planning guidance deals with the issue pragmatically. Each new development must therefore play its part to reduce the risk of flooding to downstream properties.

Not so well managed, perhaps, is the flood risk to **coastal areas**. This can be the result of a combination of:

- sea level rise due to climate change, which will produce higher tides and elevations that will restrict the drainage of land into rivers as they approach estuaries.
- increased rainfall due to climate change, which will add to river flows and create serious flooding when *high flows* meet *high sea levels* at river estuaries.

The NCE articles set out coastal flood protection schemes for two very different towns and serve to highlight the difficulty in justifying the high costs of sea defences.

Seasonable fluctuations

Looe is a small town which, during the tourist season, sees an expansion of the population and increased economic activity. The cost of proposed sea defences to protect the town is around £100m.

The justification for the scheme's funding includes a number of what might be considered subjective arguments; the need to preserve an old town, its customs, livelihoods and skills. It is also important to enable growth and protect the railway station and utilities. The population to be protected is approximately 5,000 inhabitants. 1,600 jobs would be at stake if the town were to be lost to the perils of the sea. On paper, using the common flood defence funding criteria, known as National Flood and Coastal Erosion Risk Management (FCERM), this expenditure is unjustifiable. Whilst an admirable aim to preserve the town, it does call into question the criteria for investing in coastal protection.

Common flood defence funding criteria

The work under way at Southsea in Portsmouth is in stark contrast. Claire Smith has outlined a scheme in which the costs are likely to be of the order of £130m. However, the population to be protected is around 10,000 people and more than 700 businesses.

Pound for pound, the scheme at Looe would not make sense if the FCERM funding criteria were adopted. These criteria were traditionally based on the number of properties to be protected. However, does this approach still remain relevant today? If not, what is the most appropriate alternative?

Southsea has a seasonal tourist population and is a town with significant historical interest. Looe is a picturesque town, but with limited funds for protecting our coastlines against erosion, hard decisions may need to be made.

Do we act out of emotion or necessity when looking at areas whose flood protection raison d'etre no longer has currency? And should we take the opportunity to build new development well away from areas at risk of flooding, now and in the future? These are the questions policy makers and think tanks have been debating.

In Looe, the adaptation policy where old buildings at risk of flooding will not be developed once the use has gone, will need to be implemented. New buildings will be sited away from vulnerable areas. The search for safer sites which do not tend to flood is encouraged, when there is a veto on redevelopment of an existing site. The sequential test within planning guidance - where it can be demonstrated that sites at lower risk of flooding are not available has never really been taken seriously, but it might just have to move to centre stage.



Specialist support for flood management and sustainable drainage design

Motion's infrastructure design team provides pragmatic advice to help a wide range of clients manage the complex interrelation of property development, drainage, <u>water neutrality</u> and flood risk. We can help you achieve the optimum overall result for your development, as well as compliance with statutory requirements for the impact on local watercourses. Your plans will be designed in the most efficient, cost-effective and sustainable way possible.

Key services at a glance:

- Flood Risk Assessments
- Fluvial and coastal flood susceptibility/feasibility assessments
- Sustainable Drainage Systems (SuDS) Assessments
- Foul and surface water drainage strategies
- > Preparing exception tests and supporting sequential tests
- Support for Environmental Statements
- Flood Evacuation Plans
- > Establishing level for level flood compensation measures
- Design of flood protection schemes

- Preparation of Water Neutrality Statements
- Design of swales, retention and detention ponds, and porous car parking
- Hydraulic and drainage modelling and channel/catchment analysis
- Drainage network maintenance and improvements
- Diversion of watercourses and pumping station design
- Procurement and contract management services
- Advice on wastewater disposal

Ask Motion

If you would value a preliminary discussion about the water management issues associated with your development project, give us a call on 01483 531300 or contact one of our experts.



Richard Bettridge CONSULTANT M: 07860 254766 E: rbettridge@motion.co.uk Richard is a highly accomplished figure in the property development sector and has worked in civil engineering for more than 40 years. With experience in flood risk and strategic drainage planning, he has project managed numerous major highways and drainage infrastructure schemes and acted as expert witness in several high-profile flooding, drainage and engineering disputes.

Neil has two decades' experience in civil engineering. He currently leads the flood risk and drainage teams at Motion,

managing projects for residential, commercial and industrial developments. He has earned an enviable reputation

for provision of results-driven advice on water neutrality requirements and also has considerable experience in

Neil Jaques DIRECTOR M: 07557 304223 E: njaques@motion.co.uk



Jason Morgans TECHNICAL DIRECTOR M: 07384 542646 E: jmorgans@motion.co.uk



Phil Allen ASSOCIATE M: 07985 775567 E: pallen@motion.co.uk



Vicki Berg-Holdo SENIOR ENGINEER T: 01483 531300 E: vholdo@motion.co.uk Jason has worked in the field of highways, transportation engineering and drainage for more than 25 years. He has considerable experience delivering highways, infrastructure and drainage projects for a wide range of clients, mainly in the UK private sector for energy, retail, industrial, mixed-use and residential schemes.

highways and drainage design, having worked on S278, S38 and S104 agreements for a range of clients.

Phil has several years' experience supporting property developers with everything from conceptual site layout to detailed design services and site support. His track record in delivering high-quality flood risk assessments and sustainable drainage strategies add value to developments with a range of benefits for landowners, residents and users.

Chris has almost 20 years' experience in engineering, working for an extensive range of public and private organisations. He is able to support clients from the feasibility stage of a project all the way through to detailed design. Chris is skilled in the preparation of sustainable drainage systems (SuDS) designs and flood risk assessments for residential, commercial, industrial and highway scenarios.

Vicki has been working in the water environment industry for more than 14 years, specialising in flood risk and drainage. Using the National Planning Policy Framework, she has gained considerable experience delivering Flood Risk Assessments (FRAs) and Drainage Strategies for a range of clients. With the aid of MicroDrainage she has become skilled in producing hydraulic models of catchment areas.

www.motion.co.uk

Follow us on LinkedIn (Motion Consultants) and X (@MotionInsight)

84 North Street, Guildford, Surrey GU1 4AU T: 01483 531300 Golden Cross House, 8 Duncannon Street, London WC2N 4JF T: 020 8065 5208 Quadrant House, Broad Street Mall, Reading Berkshire RG1 7QE T: 0118 467 4498

If you no longer wish to receive a copy of *Infrastructure InFocus,* please email info@motion.co.uk with the subject line "Unsubscribe Infrastructure InFocus".

motion Infrastructure InFocus