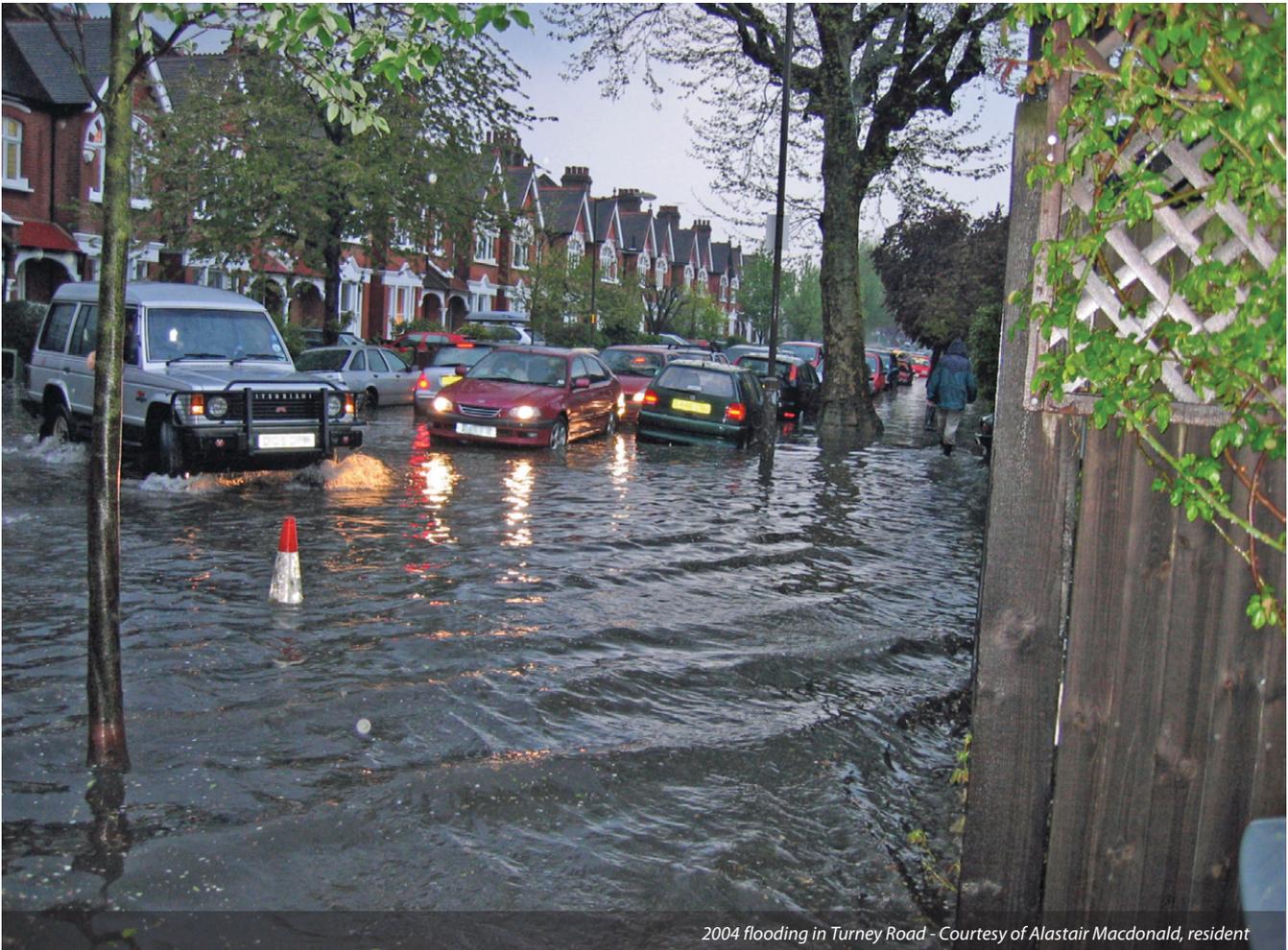


# Herne Hill & Dulwich Flood Alleviation Scheme

## delivering innovation through partnership

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The Herne Hill & Dulwich Flood Alleviation Scheme was delivered through an innovative partnership of public and private sector organisations and is a model-scheme for partnership working and multi-agency project delivery. The scheme provides an estimated £12m economic benefits and protection to over 200 properties at risk of flooding. The scheme reduces flood risk to another 200 properties and also protects over 80 from sewer flooding. The project faced significant and complex challenges which required the effective application of project management skills and strong project leadership to ensure the scheme was delivered within a constrained timescale. Located within a densely populated urban area, extensive engagement with local residents, businesses and community interest groups was integral to the success of the scheme and ensured a legacy of amenity and environmental benefits for the local community as well as signposting a way forward for the future approaches to reducing the risk of surface water flooding in urban areas.



2004 flooding in Turney Road - Courtesy of Alastair Macdonald, resident

### Background

One of London's lost rivers, the River Effra, continues to flow through the areas of Dulwich and Herne Hill in south London. Whilst the river was culverted in the 1880s, the hydrology of the area, shaped by geological processes, is unchanged.

The area has a history of surface water and sewer flooding. The first recorded incident occurred in 1915. In April 2004, 60mm of rainfall fell over two hours flooding over 200 properties. The storm left behind damage estimated in the region of £1m sustained to council infrastructure alone.

### Scheme development

From 2012 a partnership between Southwark Council and Thames Water Utilities Ltd, backed by the Environment Agency, MGJV and Mouchel developed an Initial Design and Project Approval Report (PAR) in support of an application for Flood Defence Grant in Aid (FDGiA) funding to supplement TWUL's sewer flooding project funding. The project business case was approved in July 2013.

After an intensive detailed design period the scheme was submitted for planning approval in December 2013. After a number of delays due to legal issues, construction started in earnest in July 2014.



Detention tank under construction  
Courtesy of Southwark Council & Thames Water



Detention tank under construction  
Courtesy of Southwark Council & Thames Water



Detention tank under construction  
Courtesy of Southwark Council & Thames Water



Geocellular storage units being installed  
Courtesy of Southwark Council & Thames Water

### Scheme overview

The approach to alleviating the flooding embodied the principles of SUDs achieving a sustainable solution focused on capturing and managing surface water across three distinct sites: Dulwich Park, Dulwich Sports Ground and Belair Park. The key elements of the scheme included:

- Building earth bunds and walls to intercept and temporarily contain or redirect up to 51,000m<sup>3</sup> surface water.
- Constructing below-ground storage areas to provide further capacity to store flood water and provide an efficient outflow route from the park for storm water.
- Creation of 3,750m<sup>2</sup> wetland and 6,400m<sup>2</sup> wildflower meadows to attract wildlife, enhancing local habitats and biodiversity.

In total the scheme will protect 200 properties from surface water and 80 properties from sewer flooding.

### Key project challenges

- Programme was the key driver of the project. Strong leadership to align funding programmes and differing conditions for funding was therefore critical to the success of the project.
- Demonstrating that a single solution would solve both surface and sewer flooding in order to secure DEFRA and Thames Water funding. A culture of trust and commitment to the project enabled the project team to work closely together to ensure that all partner objectives were met.
- Designing a sustainable surface water flooding scheme in a dense urban context was complex and required creative thinking and an innovative approach to ensure quality outputs without affecting the delivery programme. The solutions developed through this project can be applied to other projects.
- Delivering a complex construction project within the public domain whilst minimising the impact of the works to both public and local businesses and negotiating significant environmental constraints required detailed planning and coordination with statutory requirements and planned events.
- The informed and influential local community needed to be closely involved with the development of the scheme since their support was a critical component of its success. An involved and intense programme of engagement engendered a culture of trust which enabled the project to meet strict timescales.
- Working within two Grade II Listed landscapes, one previously the subject of an HLF funded project, required a clear and structured approach.

### Planning and modelling phase

Due to the local topography of hills and valleys, the catchment for the Critical Drainage Area was extensive and its interaction with the sewer network complex. It therefore required an innovative approach to model such a complex and large-scale catchment area and validate the findings of earlier studies. Mouchel's design team developed an integrated 2D model linked to TWU's sewer model which modelled the flowpath of surface water during extreme storm events. Customer data provided by Thames verified that the model accurately replicated known storm events.

### An innovative approach to scheme delivery

The project delivery team was a partnership of public and private sector, combining the statutory flood and water management responsibilities of Southwark Council, Thames Water, and the Environment Agency with the technical expertise of consultants (Mouchel) and contractors (MGJV). The nature and diversity of the parties involved often led to competing priorities.

### Programme: Key driver - funding and partnering constraints:

Programme was the key driver for the project due to the funding constraints imposed by the DEFRA AMP-cycle which required beneficial usage of the scheme by the end of the AMP5 (March 2015). The scheme was non-severable and required construction of the whole scheme across the three sites at the same time.

The partnership approach was key to delivery of the project within the contracted timescale:

- The project drew on the strength of the partners with Southwark Council/Mouchel leading on project management and the stakeholder engagement process and TWUL/MGJV providing the early contractor involvement and site supervision drawing on their experience of undertaking projects of this nature.
- The project leader adopted a highly efficient approach to delivery: contractor and consultants were engaged under existing framework contracts truncating the need for tender resulting in time savings whilst quality assurance processes and stringent KPI's maintained high quality output standards.
- ECI benefits: the joint funding arrangement enabled early contractor involvement which ensured the scheme had greater certainty in terms of buildability, quality and cost as well as programme and works phasing to optimise timescales for delivery.

Its future maintenance was a real challenge and truly frustrating at times but through the joint commitment of the stakeholders and the team and a strategically planned and led approach through the negotiation process a complete suite of documents which satisfied each party's mutual objectives were agreed.

The Central South LLFA Partnership provided a facilitating mechanism to establish coordinated working, align programmes and requirements for funding. As a result the project team was empowered to make key decisions to meet the project delivery timescale, circumnavigating the potentially lengthy internal approvals processes of partner organisations.

### Delivery phase

Planning and stakeholder communication and engagement were key to the delivery of a successful scheme. The extensive consultation and planning process created a programme and methodology which contained no surprises and allowed for flexibility. This ability to adjust to changing circumstances whilst ensuring that risks could be mitigated enabled the team to remain in control. As a result, people continued to enjoy the sites whilst work on the scheme continued around them. No injuries occurred and the work received many compliments. The engagement continued during construction.

- The scheme was complex to deliver since there were three separate sites, within which construction activities were progressing in parallel, with movement of materials between the sites to optimise reuse and minimise waste.
- Meticulous planning for phasing of works minimised risks to the public, streamlined activities and identified opportunities to save time. One example was the method of installing geocellular storage units. The tanks were constructed in thirds reducing space required for the management of materials and enabling cut and fill activities to be carried out in parallel which optimised the programme.
- Public use of the parks and sports fields continued during construction. A pre-construction consultation meeting was held with stakeholders to discuss any concerns. One significant outcome was the proposal for site vehicles to be 'walked' around the site by banksman.



Dulwich Park - retaining wall  
Courtesy of Southwark Council & Thames Water



Dulwich sports ground: The bund and wall in the Dulwich Park which holds the water have been made play features  
Courtesy of Southwark Council & Thames Water



Dulwich sports ground  
Courtesy of Southwark Council & Thames Water



Site walkabout with key stakeholders  
Courtesy of Southwark Council & Thames Water

This minor inconvenience minimised the risk of accidents occurring which would have had significant impact on the programme; no accidents were reported.

- The bulk of the operations involved significant earthworks. 12,000m<sup>3</sup> of material was moved. Although constrained by the funding timetable, the works were planned to take advantage of summer weather. Legal issues delayed the start by ten weeks into July however contractors adjusted the delivery plan by varying the deployment of resources and combining activities which enabled them to reduce the impact of the delay. The residual float was sufficient to accommodate the severe delays through the wet October without placing project delivery at risk.

### Summary

The scheme was substantially completed in December 2014. It demonstrated the use of best practice project management principles to deliver a complex, innovative project within a constrained programme:

- Strong leadership partnership approach engendered culture of trust and openness.
- A complex scheme at all levels that required innovation and new ways of working that can be applied to other projects.
- An empowered team committed to achieve excellence.
- Stakeholders and community closely were involved in determining the shape of the final scheme which was delivered to programme without sacrificing safety or quality.

*The editor and publishers thank John Kissi, Flood Risk Manager at Southwark Council, and Matthew Jessop, Principal Landscape Architect at Mouchel, for providing the above article for publication.*

### Emily Montague Chair, Friends of Dulwich Park

*"We have been extremely impressed by the contractors' attention to safety and their consideration of the park users. Dulwich Park has been a tricky site to manage with prams, cyclists, children and dogs very close to working areas. The contractors have, at all times; been exemplary in ensuring safety procedures are adhered to and as much of the Park as possible is open to the public."*

### Councillor Darren Merrill Cabinet member for environment

*"The new flood alleviation scheme brings reassurance to the hundreds of residents and business owners in Dulwich and Herne Hill who were previously at risk of surface and sewer flooding. With limited local government budgets, it's more crucial than ever, to be proactive and invest in infrastructure that has longstanding benefits to our residents. I'm really pleased to have worked with both Thames Water and the Environment Agency on such an innovative and sustainable scheme that works well with the natural environment of our parks."*

### Martin Baggs Thames Water CEO

*"We know that avoiding sewer flooding is a top priority for our customers, but finding solutions often involves a number of agencies, which can make things complicated. We are delighted to have worked so successfully with Southwark Council and the Environment Agency on this innovative and sustainable scheme."*

### Mark Douch, Environment Agency Flood & Coastal Risk Manager

*"Managing surface water flooding is a significant challenge, particularly in urban areas. It's great that we have been able to work with Thames Water and Southwark Council to develop this scheme, which is a fantastic example of how partnership working can deliver a vital flood risk scheme that not only benefits flood risk but also the wider community and environment."*



*Belair Park weir - Courtesy of Southwark Council & Thames Water*