Shoreham Harbour Regeneration: Future Proofing against Climate Change & Sea Level Rise

Interpreting the vision!

The vision for the regeneration states: *By 2031 Shoreham Harbour will be transformed into a vibrant, thriving waterfront destination comprising a series of sustainable, mixed-use developments….* It goes on to identify the benefits it will provide that include *….enhanced public realm and the delivery of critical infrastructure that will help respond positively to climate change.*

In the space available here, we want to share with you some innovative ideas on surface water drainage to inform the design of the new developments that we consider will both respond positively to climate change and offer the potential to enhance the public realm.

First here is some context from which these ideas have emerged.

What happens when it rains?

The geography of the urban coastal strip of West Sussex, within which Shoreham Harbour Regeneration is located, presents significant issues for surface water management. During winter months, particularly when ground water levels are high, storm water run-off from the South Downs drains rapidly onto the coastal flood plain and typically enters culverts that drain via tidally constrained gravity outfalls through sea walls.

Potential flood storage inside the defended coastline is very limited and pressure for housing development is increasingly targeting some of the few remaining sites that offer such capacity. The expansion of urban areas over recent decades, in combination with the increased intensity of rainfall events associated with climate change, has resulted in storm water flows entering the surface water drainage system at rates that exceed its capacity to drain. Furthermore, as one looks ahead throughout the lifetime of new developments sea level rise is predicted be 1.15m between now and 2115, further restricting the period during which existing or planned tidal flaps can operate on surface water outfalls.

Figure 1 illustrates the problem of constrained surface water discharge in and around Shoreham Harbour.

An Opportunity!

Some elements of the Shoreham Harbour Regeneration offer a unique opportunity to influence the resilience for waterfront developments that, with appropriate design and timely intervention, can minimise the impact upon surface water drainage in defended coastal environments.

The default drainage approach is to route storm run-off from the rooftops of buildings via vertical downpipes into new or existing drains below ground level that will discharge through gravity outfalls in the sea defences to the sea. West Sussex Lead Local Flood Authority is building a case for an alternative more sustainable approach that will discharge rooftop run-off from the buildings over the sea-wall that we are referring to as ‘over the wall’ drainage.

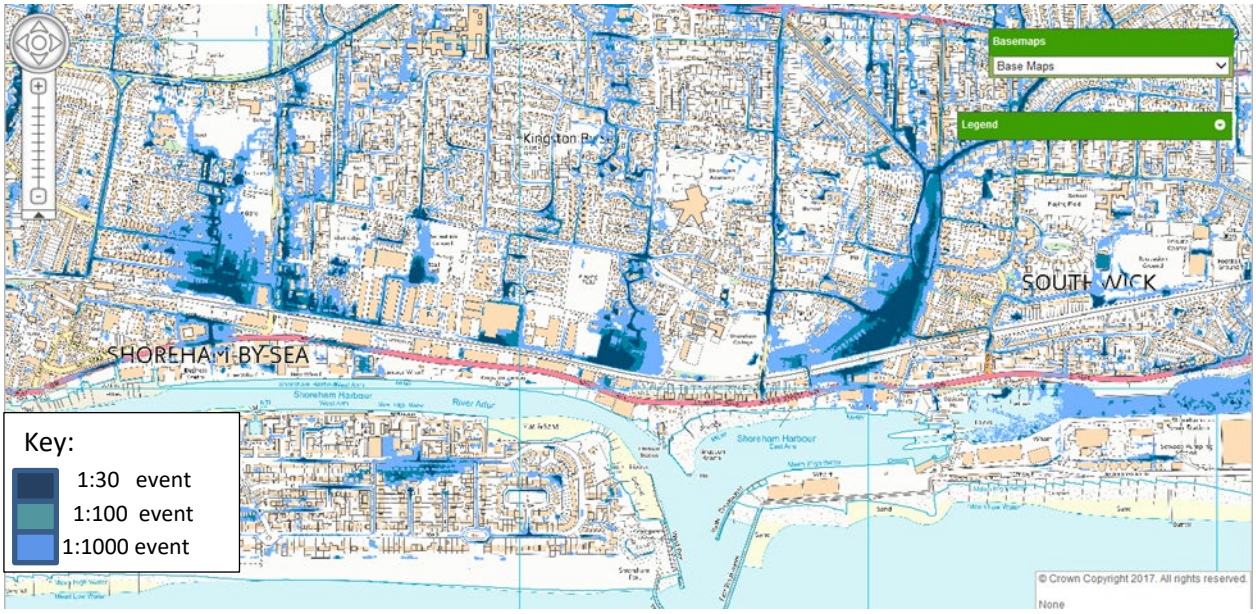


Figure 1 Plan of Shoreham Harbour showing surface water flood risk.

Why might developers want to consider over the wall drainage?

- Drainage could be made simpler and cheaper by directing the water over the seawall rather than through it. This is an approach that only applies to a defended waterfront development such as Shoreham Harbour Regeneration.
- No flow restriction should be necessary for roof-originated discharge; (a significant element of the drainage for Shoreham Harbour regeneration will originate from the roof areas);
- No development-lifetime issues that are present with the more traditional approach gravity discharge via tidal flaps; i.e. no reducing window for discharge attendant with sea-level rise;
- Potentially reduced drainage infrastructure and complexity associated with routing drainage down to seawall outfalls; furthermore, a reduced / eliminated need to attenuate for any backwater associated with tidal restrictions on discharge;
- The opportunity to celebrate rainwater and incorporate it as a feature of a vibrant public realm; and
- The potential prestige in demonstrating an innovative approach to drainage for waterfront developments that could form the basis for best practice.

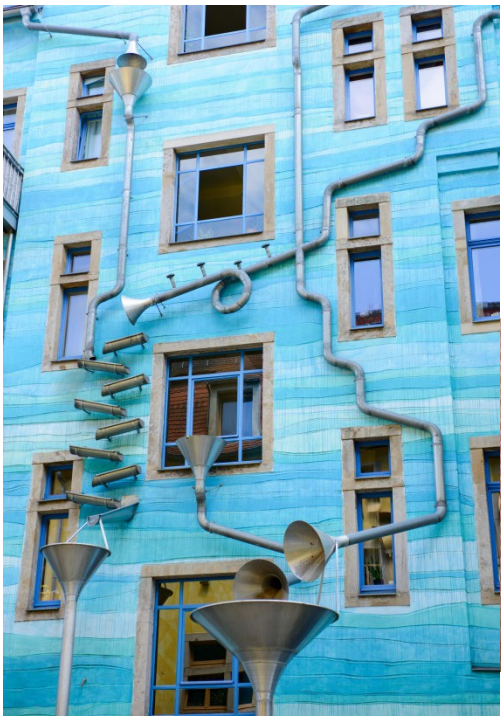
What might 'over the wall' drainage look like?

The answer depends upon a range of considerations including the proximity of the development to the sea-wall. If the buildings are designed with an overhang over the seawall, as some approved designs have been, then the scope exists to effectively hide the drainage behind existing facades and piers.

If buildings are set back some way from the waterfront then this does not necessarily preclude over the wall drainage, but it would necessitate some form of aqueduct to convey water by gravity at a height above the top of the sea-wall. As referred to above, rainwater is a feature to celebrate within the public realm and can be used to enhance the waterfront.

Osmaniye irrigation Ozgurmulazimoglu licensed use under Creative Commons Attribution-Share Alike 3.0 Unported

The critical consideration is that water can be conveyed and discharged without increasing surface water flood risk and, providing it serves this primary function, the means of conveyance can stray into the imaginative – even the whacky realm!



Drainpipes Dresden; Atlasobscura

Above; Bridget Jones Square Rain Garden; **right**; Rain slides at Fort Royal School, Worcester; both Schemes designed by Bob Bray Associates

Helping us to help you

Because the ‘over the wall’ approach to rooftop drainage, while technically achievable is somewhat novel, West Sussex Lead Local Flood Authority has applied for funding from the Southern Regional Flood and Coastal Committee to:

- Investigate the opportunities, constraints and overall feasibility of ‘over the wall’ drainage for waterfront developments;
- Work with developers to apply this innovative approach to the design of drainage;
- Assess the relative costs and benefits of traditional vs ‘over the wall’ drainage; and
- Initiate a wider debate on the possible merits of a changed approach to drainage of waterfront developments.

There is therefore the scope to potentially draw upon wider expertise to evaluate the relative merits of ‘over the wall’ drainage when compared with a traditional design.

Where to find out more?

If you are a developer at pre-application stage for planning development within Shoreham Harbour Regeneration Scheme, I would love to hear from you! Ray Drabble, Drainage Engineer, West Sussex Lead Local Flood Authority: Ray.Drabble@westsussex.gov.uk Tel: +44 (0)330 2224077 | Mobile: +44 (0)7590183138