

# Sustainable Drainage Systems (SuDS): Developing 'landscape-scale' approaches in the South West

The new SWEEP-designed SuDS Strategic Screening Tool was used by South West organisations on a range of drainage projects delivering business efficiencies. Training in its use and other flood risk tools boosted capacity and commercial strategic advantage. The new innovative Opportunity Mapping Tool further identifies where SuDS measures can be applied at scale, across Devon.



## sweep Impact Summary

SuDS retention pond

Strategic Screening Tool supported projects valued at **£355k** and a further **£370k** bids



**6** staff trained in use of SWEEP SuDS and flood-risk tools with **28** jobs safeguarded



**£20k** cost saving to customers per use of Strategic Screening Tool



### Ways of Working



### Why it mattered?

Sudden flash flooding can be devastating, risking lives, homes and vital infrastructure. Damages in the UK are estimated between £250m and £500m annually. The environment suffers through uncontrolled sewer discharges into rivers, lakes and bathing waters. Public health and tourism can also be affected. South West England has been particularly badly hit by surface water flooding, with major flash flood events at Boscastle, Coverack and Clovelly in recent years.

### SuDS

New 'green' sustainable drainage systems (SuDS) provide a natural approach to combat increased surface water flooding risks, driven by climate change and urbanisation, and to tackle deteriorating 'traditional'

infrastructure, such as sewers, tanks and overflows. These systems manage surface water before it reaches sewers and can improve water quality and biodiversity by mimicking natural draining through the use of green roofs, permeable surfaces, ditches, swales (shallow drainage channels), ponds and wetlands. SuDS have proved successful at sitescale - but widespread implementation across whole water catchments remains fragmented and opportunistic.

### What we did

Between 2018 and 2020, Dr James Webber & Prof Guangtao Fu of the University of Exeter's Centre for Water Systems promoted an integrated, collaborative and strategic view of surface water management in South West England through these activities:

1. **Developed the new SuDS Strategic Screening Tool**, which maps surface water (overland exceedance) flow paths and catchments for South West England, promoting an early-stage, 'whole catchment' approach to surface water management, in contrast to conventional ad-hoc, site-specific approaches. The Tool was used in 8 flood risk assessment and SuDS-landscape

management analyses in Devon, Cornwall, Yorkshire and the USA.

2. **Delivered training** in the use of the **SuDS Strategic Screening Tool**, the University of Exeter's **CADDIES -2D lood model** and the **CORFU lood damage assessment tool** to key project partners, including environmental charity Westcountry Rivers Trust and international engineering consultancy Pell Frishmann. Knowledge was also shared with 250 water industry professionals and other organisations such as South West Water and marine and consultancies Jacobs and Fjordr.
3. **Developed the new SuDS Opportunity Mapping Tool** which indicates high-level opportunities for SuDS application in Devon by incorporating a range of environmental (land uses, slopes, water environment, hazards), human (socio-demographics, buildings) and engineering (SuDS suitability) factors.



*Good forecasting is the most cost effective way to safeguard communities at the coast and, ultimately, save lives."*

Nick Ely, Environment Agency Coastal Modelling & Forecasting Manager



SuDS swale

## Impacts & benefits delivered



### Organisational Function

#### Strategic commercial advantage and cost savings:

The SuDS Strategic Screening tool supported £355K of sustainable drainage and flooding project work carried out by Pell Frischmann and Westcountry Rivers Trust and an additional £370K of bids. Projects included Dartington Estate, Clinton Devon Estates, Burrator Reservoir, Kingsbridge and the Rivers Culm & Otter in Devon, and Cornwall's St. Austell Bay StARR flood alleviation and regeneration scheme. The tool was used as a high level screening tool by Pell Frischmann for initial SuDS catchment assessment, one of their strategic growth areas. It delivered operational efficiencies, enhanced capacity and its use enables us to "reduce the bid value and therefore improve our competitive edge." Jonathan Hubbard, Pell Frischmann.

### Organisational Function

#### Strengthening capacity and increasing resilience:

Training in the use of the SuDS Strategic Screening tool and other surface water management and flood risk tools (e.g., CORFU and CADDIES) was delivered to six staff across Pell Frischmann and Westcountry River Trust. The skills of three early career technical specialist jobs were enhanced and their jobs safe-guarded in the Westcountry Rivers Trust team, as a result of this training. The enhanced organisational capacity which, in turn, helped to support their whole Natural Flood management of approx. 25 people going forward.



*There's nothing out there at the moment defining which SuDS solutions are viable in an area. The SWEEP Strategic Screening Tool and Opportunity Mapping will help to fill that gap in the South West."*

Jonathan Hubbard, Pell Frischman



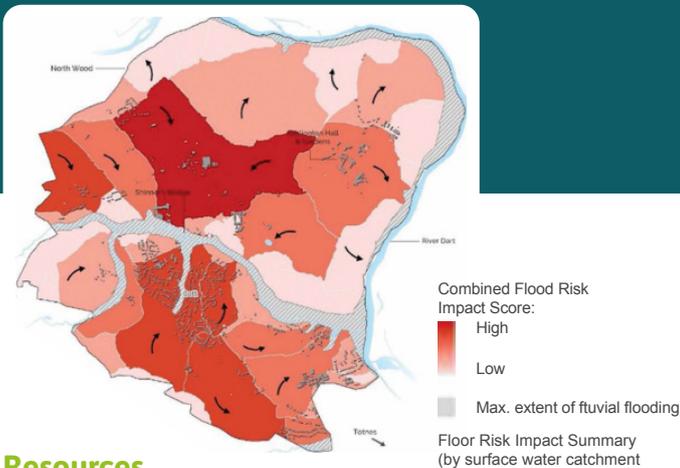
*The Strategic Screening Tool helped us to rapidly identify a previously unknown, hidden culvert in the town of Kingsbridge. It was significant to the final design concept for the flood mitigation works which will cost around £8-10m to construct."*

Jonathan Hubbard, Pell Frischman



*The SWEEP SuDS project provided a huge opportunity for us to access tools such as CADDIES and the Strategic Screening Tool, and for our staff to be trained in their use. This delivered significant cost savings in terms of access to tools, training, salary costs and time savings. We are now able to offer a broader, integrated package of natural flood management and SuDS services to our clients which has definitely boosted our reputation and opened up doors for us and is helping to transform WRT and make it more resilient going forwards. A real game-changer for WRT!"*

Nick Paling, Westcountry Rivers Trust



## Resources

The SWEEP SuDS Tools are available directly from Dr. James Webber and further guidance and Case Studies can be found here:

- [How the SuDS Strategic Screening Tool works](#), with a Case Study application at Dartington Estate, Devon,

- produced collaboratively with Westcountry Rivers Trust.
- [How the SuDS Opportunity Mapping Tool helps spatial planners in Devon to understand](#); (a) where SuDS are needed, and, (b) where they can be placed, considering SuDS solutions.
- [The Cost effectiveness of a SuDS Strategic Screening Tool](#), viewed through a Case Study in Exeter, Devon.
- [Addressing urban surface water flooding](#), through the use of SuDS, at city catchment scale with a Case Study in Melbourne, Australia.
- [Targeting property flood resilience](#) and investigating methods, with a Case Study in Bristol.

The SWEEP team continues this pioneering work through the University of Exeter's Smarter Stormwater Research Group and continued collaboration with the SuDS expert community.

## Underpinning NERC Science

- NE/K008765/1 Susceptibility of catchments to intense rainfall and flooding (Project SINATRA)
- NE/N01670X/1 Coupled Human And Natural Systems Environment (CHANSE) for water management under uncertainty in the Indo-Gangetic Plain
- NE/K00896X/1 TENDERLY: Towards end to end flood forecasting and a tool for real-time catchment susceptibility

## About SWEEP

The South West Partnership for Environmental & Economical Prosperity (SWEEP) is a partnership between the University of Exeter, the University of Plymouth, and Plymouth Marine Laboratory. Funded by the Natural Environment Research Council and stakeholders together to solve key challenges faced by those working with our natural resources. [www.sweep.ac.uk](http://www.sweep.ac.uk)

