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# City Centre Retrofit

The challenges & solutions

Ian Titherington

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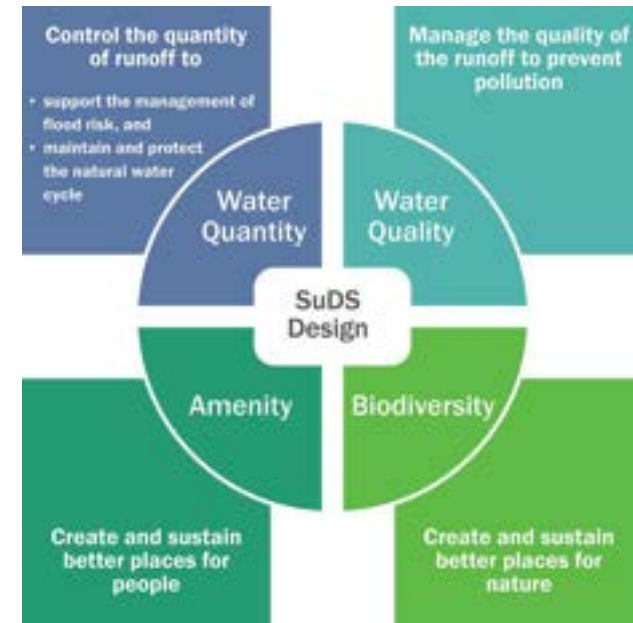
# Why is Cardiff exploring B.G.I. to manage surface water?

- Statutory SuDS legislation
- Lessons from Greener Grangetown & other projects
- One Planet Cardiff policy agenda
- Active travel funding
- A supportive Highways Department
- Maximising multi-benefits



# NATIONAL SuDS STANDARDS FOR WALES

1. Surface water runoff hydraulic destination
2. Surface water runoff hydraulic control
3. Water Quality
4. Amenity
5. Biodiversity
6. Design of drainage for construction, operation and maintenance



# What are the drivers?

- The drivers for potential SuDS retrofit will not always be drainage related, but the opportunity must be taken when it arises.
- A city centre street will be renewed once every generation, so putting off maximising multi-benefits is short-sighted.
- City centres are becoming as much living as working spaces; quality BGI works for both.
- The statutory SuDS legislation is a key factor, but not having it is NOT a valid excuse not to maximise city BGI .
- Retrofit SuDS is no longer *'something nice to have'* in Cardiff; it's accepted as good design practice – whether the legislation is triggered or not.



# Opportunities Cardiff wants to deliver

- Maximise street-scene BGI
- Meaningful consultations with residents and businesses
- Manageable maintenance solutions
- Robust designs
- Maximise catchment interception & treatment
- Build capacity for future BGI flow interception
- Add to existing BGI; don't replace it





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# Case Studies

6 recent & current city centre projects:-

Cowbridge Road East

completed Spring 2022

Park Place

completed Summer 2022

Wood Street

tbc Autumn 2022

Tudor Street

tbc autumn 2022

Cathays Terrace

tbc winter 2022/2023

Churchill Way

tbc autumn 2023



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# Cowbridge Road East

**8 no. rain gardens in a busy city shopping street**

Challenges - parking, visibility, silt loading & kerb design

Solutions - enlarged internal silt traps, additional bollards



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- Flush kerbs
- Bollards
- Pumpkins



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# Park Place

## A re-constructed adopted highway requiring full treatment & attenuation

Challenges- A large, flat highway run-off to convey with self cleansing velocity, to a suitable location for surface treatment & attenuation – avoiding mature trees, services and students!

Solutions- Heavy duty kerb channels, shallow highway crossings protected by raised pedestrian points, pinpoint trial holes to negotiate through services, a large rain garden contouring around tree root zones & flexible box systems to avoid trees.





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- A retrofit-retrofit
- Hidden attenuation
- Keeping the canopy



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# Wood Street (Central Square)

**The installation of cycleways, taking the opportunity to intercept 10,000sqm of run-off from the combined sewer network, through the installation of 6 elliptical rain gardens and 13no. tree cell systems**

## Challenges-

Every conceivable service, including buried tramrails (not aided by a dubious GPR survey). Heavy traffic during construction & frequent construction interruptions from city centre events. Also, soil problems.

## Solutions-

Rain garden depths and shapes adapted to work around services, and soil specifications radically changed to cope with both silt ingress and inconsistent soil permeability delivery.







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## Greening a grey street



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# Tudor Street

**A street scene renewal, incorporating 20 rain gardens.**

Challenges- Matching catchments with available spoil areas/volumes.  
Plant theft, soil specifications, kerb designs.

Solutions- Replanting!, soil replacement, services ducted through  
rain gardens, vertical rain garden walls in narrower areas.



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Stadium  
Suds

&

Bus stop  
BGI



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# Cathays Terrace

**Street Suds associated with the delivery of a new cycleway linking the city centre with the University hospital.**

**Challenges-** A principal design team lacking in retrofit SuDS experience. An over-reliance on GPR and service records. A lack of thought about catchment ratios.

**Solutions-** A lot of on-site redesign (subsurface). Removal from the design of several proposed street trees & soil replacement.





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BGI come in all  
shapes & sizes



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# Churchill Way

**Daylighting a dock feeder, to create a new green/blue zone for the city centre.**

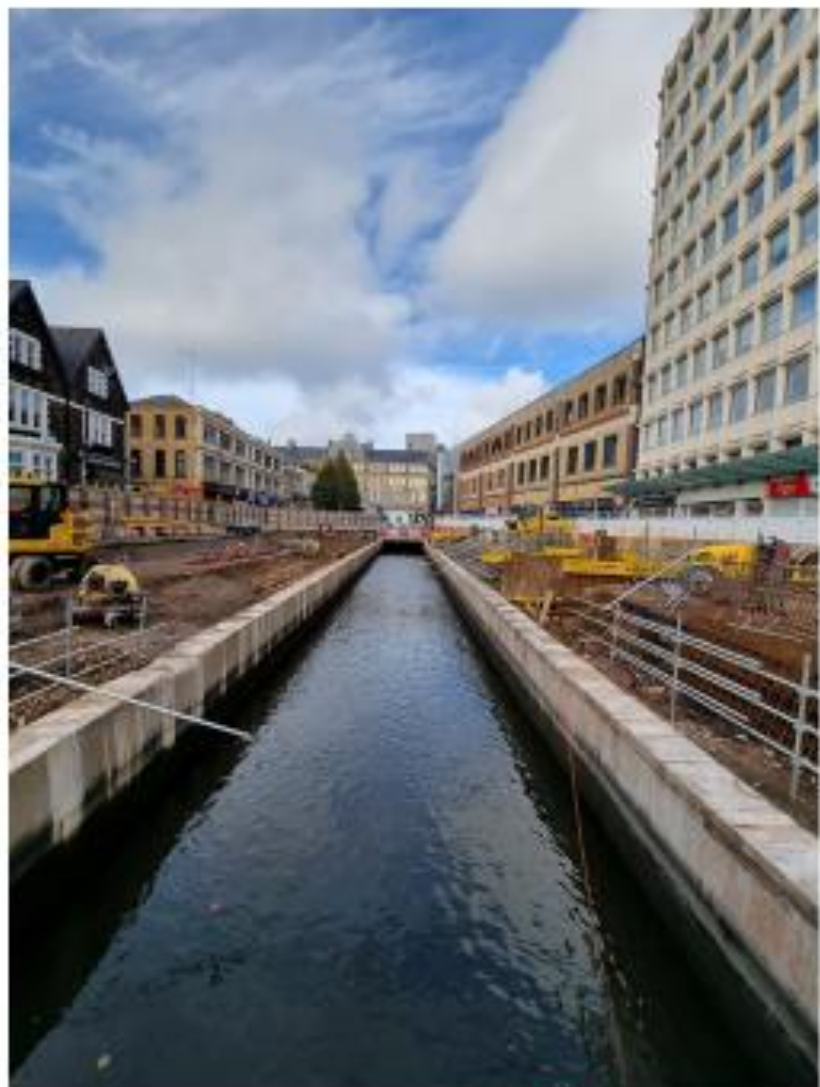
Challenges- GPR survey anomalies.

Solutions- A lot of trial holes



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## A B.G.I. & uplighting combination



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As climate change influences our weather patterns, using blue/green infrastructure (BGI) in our towns/cities will become the norm.

A street intervention/re-design will happen every generation, so every effort must be made to maximise the use of BGI when it occurs. Well designed BGI should enhance the living and working community improving the environment, the economy, health, biodiversity & numerous other factors.

However, trying to fit in too much at significant extra cost may undermine the whole project. Try to get the balance right between cost & delivery, design for easy maintenance & involve the community in the design process. By doing so, they will take ownership of the completed works & support the overall aims.



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