



*How SuDS and trees can make
great partners*

TDAG
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illmanYOUNG

SuDS background

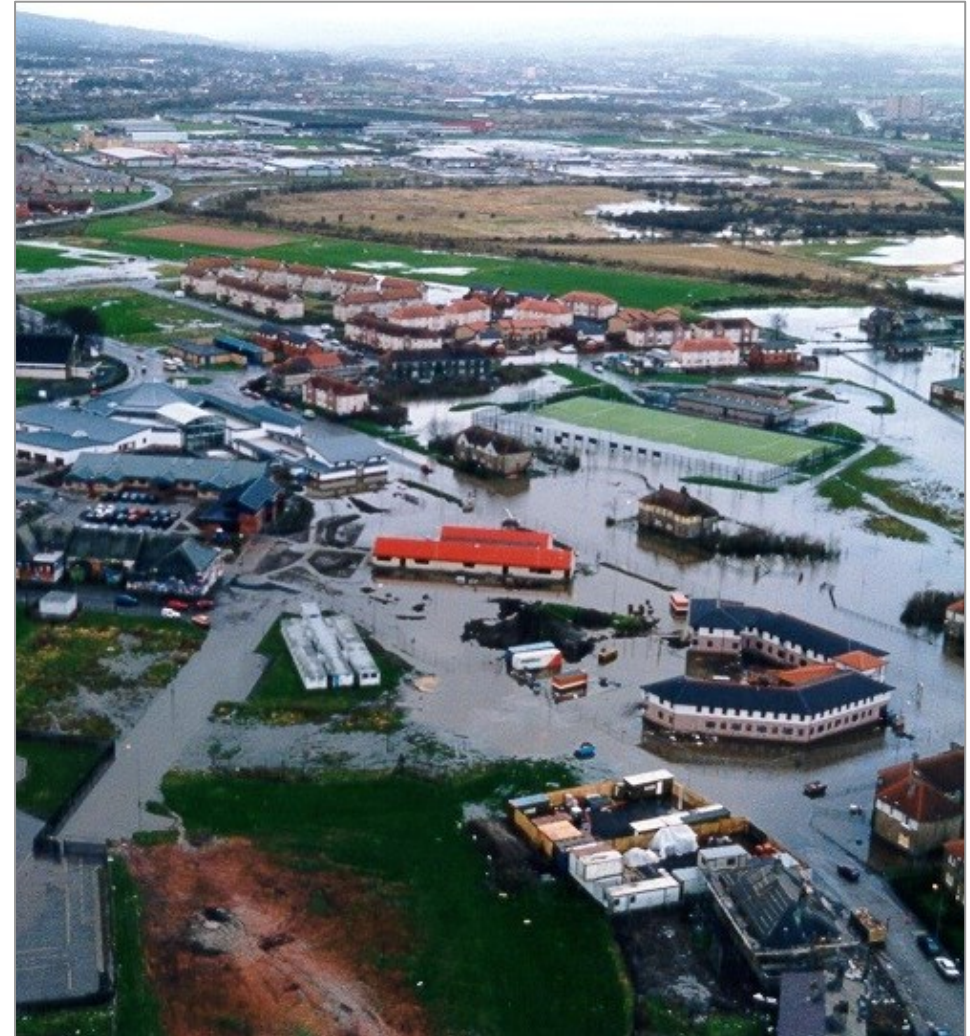


- Completed 2 year research project into the design of SuDS that are functional, attractive and ecologically sound
- Investigation of existing schemes within the UK and abroad
- Development of Good Practice Guidelines and SuDS Training
- Work with CIRIA and co-author of the SuDS Manual
- Lead author for SuDS Construction Guidance published 2018
- SuDS designer, trainer, advocate and lobbyist

The problem of flooding

WE ALL UNDERSTAND THE PROBLEMS

- Climate change - more extreme and prolonged rainfall events
- Towns and cities historically located on rivers
- Groundwater
- Coastal flooding
- Effect of land management and overland flows from agricultural land
- Urban creep and upstream development
- Combined sewers have limited capacity
- 1 in 5 homes and businesses at risk
- Huge financial and social cost of flood damage and reinstatement



Understanding the opportunities for environmental change

THE DIRECTION OF GOVERNMENT

- 25 Year Environment Plan
- Natural Capital Accounting
- Environmental Net Gain
- National Infrastructure Assessment
- Biodiversity Net Gain
- Climate change Adaptation Plan
- Defra review of SuDS policy

National Model Design Codes?

**Government appears
committed to change...**



Current opportunities for change



- The extra homes we need
- Urban regeneration
- Levelling up

- Number of homes at risk of flooding hasn't changed
- Retrofitting at both a catchment and local scale

- Communities are more informed and active

- And then there's WaSCs

Consider how trees and SuDS work together

Plant trees in:

- Swales
- Bioretention planters
- Tree pits
- Wetlands
- Pond (sides)



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... and in association with permeable paving!



SuDS and trees as part of GI retrofitting...

- Incremental but immediate effect
- Multiple interventions inherently build greater resilience
- Flexible application and value for money
- Develop a mindset that considers SuDS first
- Consider its application everywhere
- Integrate with other planned works
- Aligns with other objectives around public health, GI, biodiversity, water quality and place-making
- **NEED TO DO..... *all the time* *everywhere!***

Portland – 56,000 downspouts

Philadelphia – 25 year ongoing plan



How's retrofitting different?


- Different approach to new build SuDS
- Different site constraints – services in particular
- Design criteria decided on site by site basis
- Brownfield site redevelopment
- Engineering (and bioengineering) likely to be a key aspect
- Requires individual approach – frequently linear
- **Be opportunistic**
- *But – can be expensive*
 - so align with other outcomes and people



Work in partnership

- Seek partnership funding with all stakeholders
- Consider – local authorities, water companies, EA, LEPs, BIDs, local commercial organisations, third sector organisations, radio and TV
- Its not just cash!
- You need community champions
- Community engagement is time consuming, expensive..... **but essential**
- **Seek genuine partnerships... and be honest**

Working in Partnership



Can your green spaces work better for you and the environment?
A chance to have your say

What is the problem?



There aren't many places for wildlife to live

Surface water flooding due to increase in tarmac and concrete drives

The fish and wildlife in Wymans brook and Pittville Lake suffer from silt and pollution

Things that could be done to help



Plant wildflowers, trees and gently recontour or landscape some areas

Install rain gardens which hold water back when it rains, and help reduce flood risk

Filter water through the ground, in shallow depressions (eg swales) to clean it up

Come along to the drop in session to find out more

What you can do and where

ANY BUILDING

- Rainwater harvesting for internal use
- Water butts or tanks for external re-use
- Consider green/brown/blue roofs when flat roofs need repair or renewal
- Depave drives or disconnect downpipes to raingardens



FLATS AND APARTMENTS

- Disconnect downpipes and
- Redesign the communal space
- Green roofs to garages, cycle sheds or bin stores
- Disconnect downpipes to raingardens ponds or other garden features

What you can do and where

CAR PARKS

- Repave sections with permeable paving and potentially connect to rain gardens or tree pits
- Reconfigure to introduce stormwater planters & potentially trees
- Collect rain water for recycling on site



SCHOOL GROUNDS

- Redesign for creative play/use
- Often extensive hard surfaces
- ‘Spare’ green space invariably available
- Soft SuDS especially align with the curriculum

What you can do and where

TRANSPORT AND HIGHWAYS

- Road widening/narrowing schemes
- Traffic management schemes
- Integrate with shared surface schemes
- Tram routes or light rail
- Parking schemes
- New cycle routes or pedestrianisation
- Use street tree planters



URBAN DESIGN AND CITY PARKS

- Town centre regeneration
- Commercial/retail redevelopment
- Use parks or 'left over' urban space
- Verges and roundabouts
- Temporary 'Meanwhile' projects

What you can do - use trees wherever you can!



- Uptake of water
- Interception of water
- Water quality improvements
- Air quality improvements
- Urban heat island effect
- Increase in biodiversity and opportunities for wildlife
- Species migration and GI networks
- Visual quality in the environment
- Health and wellbeing – physical and mental

...and in urban environments trees have greater all-round acceptability

An example - existing



An example – as it could have been - quite simple....



An example – or even better



SuDS design – the myth of ‘difficult sites’

- Quality
- Quantity
- Amenity
- Biodiversity



*Ideally, a SuDS endeavours to deliver a balance of these
... 'a difficult site' DOES NOT mean that we can't deliver anything*

Construction – we have the guidance

- [Guidance on the construction of SuDS \(C768\)](#)
- created to support and provide greater confidence to those constructing SuDS by helping them to understand and avoid common pitfalls experienced through the delivery process.
- complements [CIRIA's SuDS Manual \(C753\)](#)

C768 is collaboratively funded and free to download from the CIRIA website

www.susdrain.org

Guidance on the construction of SuDS



Problems in building SuDS generally

MAIN PROBLEMS

- level changes
- cut or fill
- conflicts with services

COMMON PROBLEMS

- inadequacies in the design drawings
- recording of existing site information
- additional hard surfaces
- changes of materials
- changes on site or poor construction
- inexperienced contractor



Options for tree pit construction with SuDS

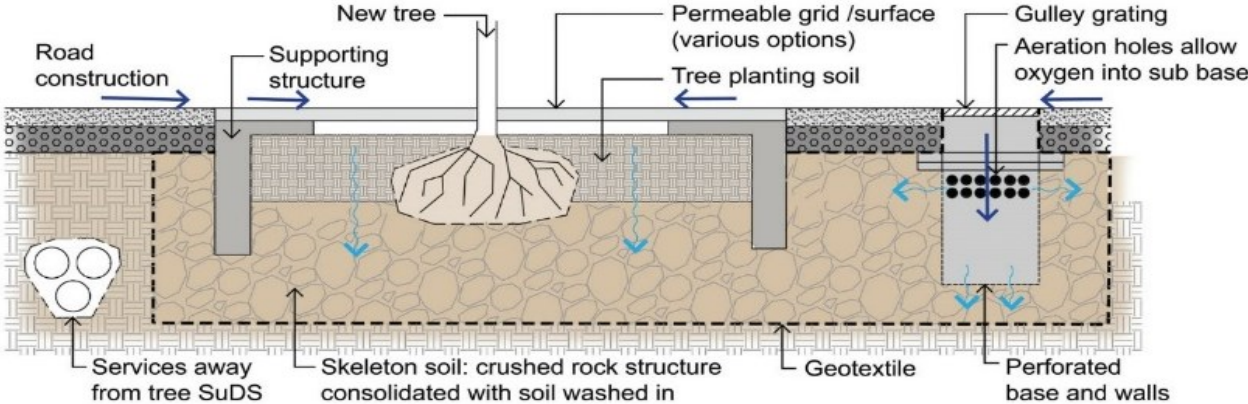


Figure 32.2 Tree pit with structural skeleton soils

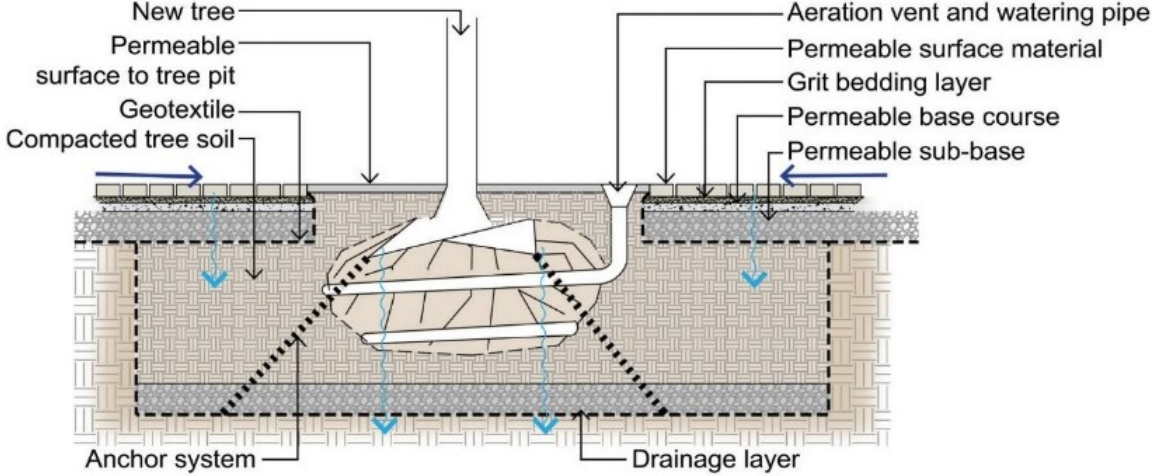


Figure 32.1 Tree pit with sand-based structural soils

Options for tree pit construction with SuDS

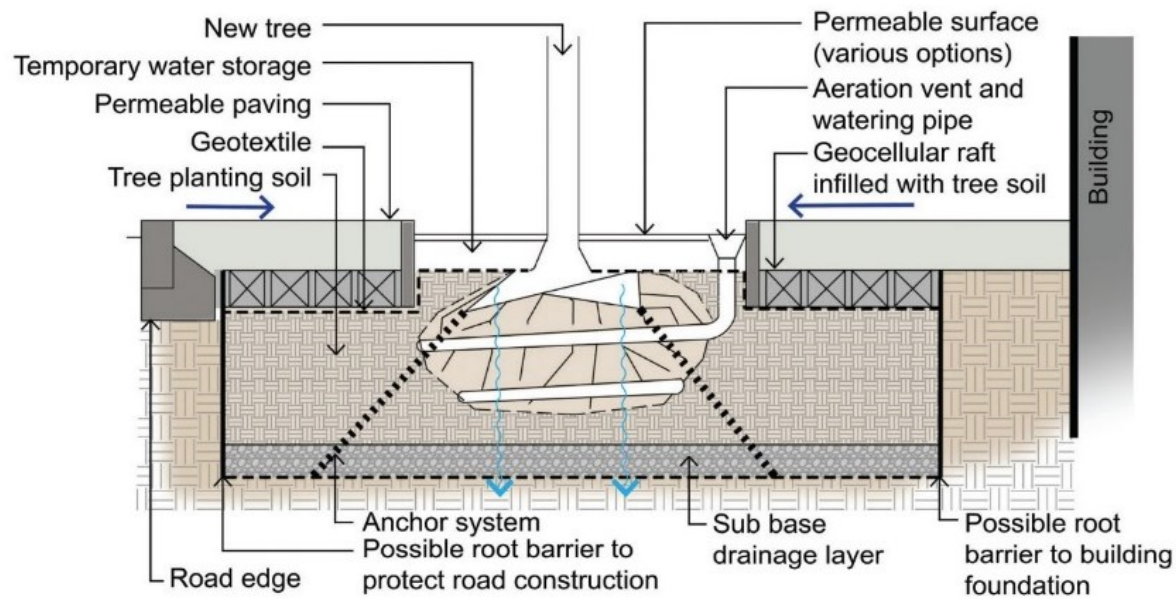


Figure 32.4 Tree pit with raft system using geocellular sub-base replacement

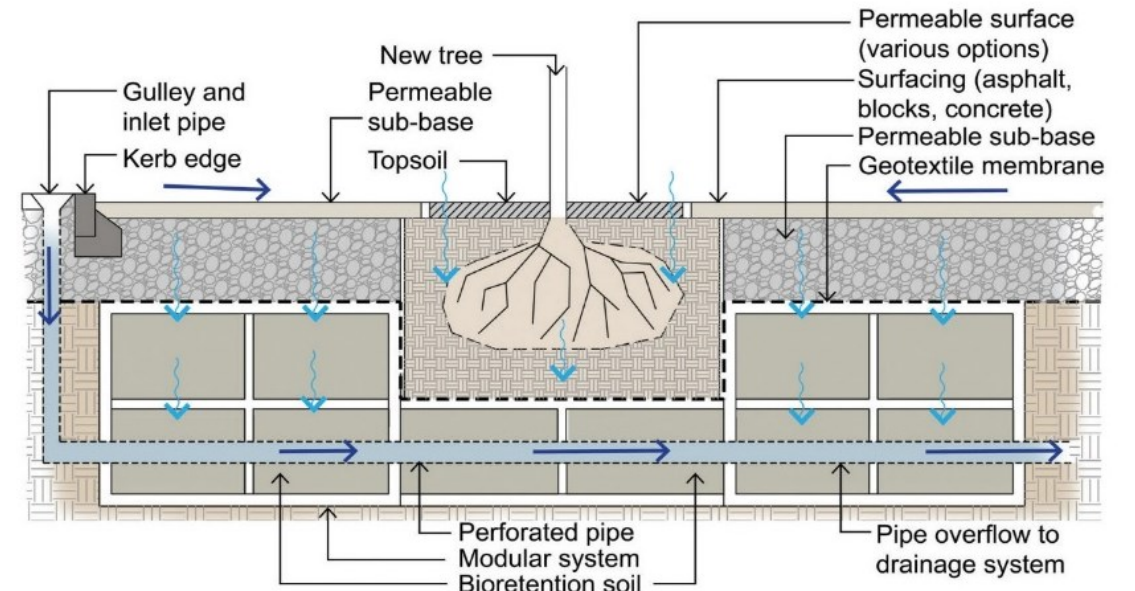
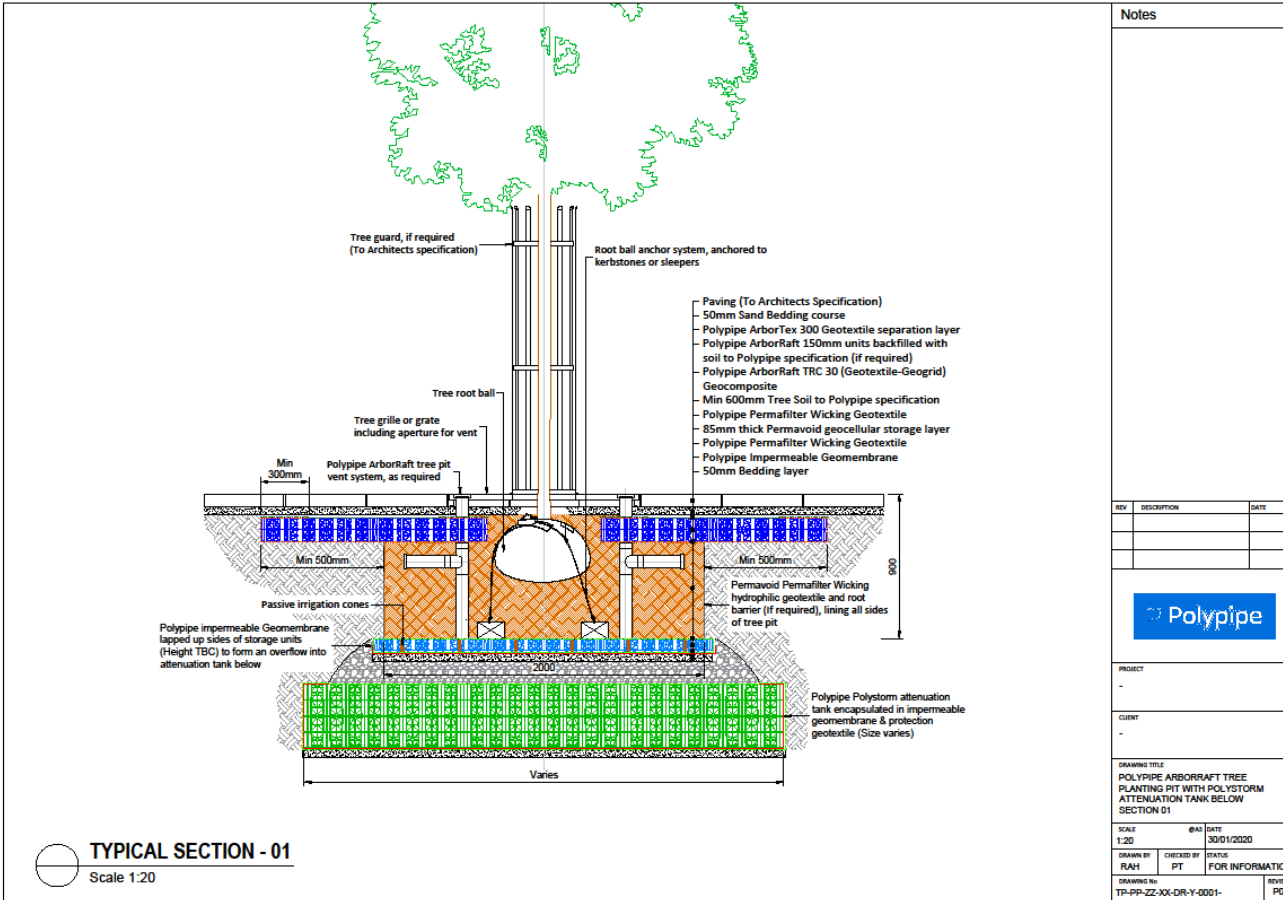


Figure 32.3 Tree pit with modular structures filled with soil

SuDS tree pits with raft systems



SuDS tree pits with modular crates



Lets design and build places to live and enjoy

DESIGNING PLACES OF VALUE TO PEOPLE

We have learned to value our open spaces

- Connect with nature
- Connect with friends or family
- Space to run, walk, play or just be
- Places to think
- Places of beauty
- Space to breathe

.... and include trees

To make our streets and public spaces liveable, attractive, resilient places to be



Any questions?

