

# Digital and Environment

Wednesday 17 September 2025















in partnership with

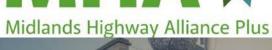








## MANSFIELD SUSTAINABLE FLOOD RESILIENCE







- £76 million in Mansfield on nature-based solutions to protect communities from flooding.
- Created a partnership with Mansfield District Council and Nottinghamshire County Council.
- Provided storage for >31 million litres of surface water.
- Creating a blueprint for how we can manage future flood risk through Sustainable Drainage Solutions.
- Making Mansfield an even greener place to live for our customers and communities.





## Suds (SUSTAINABLE DRAINAGE SYSTEMS)

Nature based template designs to retain surface water, slowing and reducing flow into sewers or allowing infiltration to ground.



1. Freeboard
2. Mulch
3. Growing medium
4. Filter layer
5. Storage layer
6. Liner
7. Outlet

**Detention Basin** 

Verge Raingarden

Street Raingarden

Permeable Paving

8 Flow control facility – 10mm Dia





## **OWNERSHIP & MAINTENANCE**

Intervention type		Ownership	Maintenance	Maintained by SvT?	Note
	Permeable paving	Local Authority or Private	Highway Authority or Private	No	Regulator expectation HA or Private will adopt.
naves	Verge raingardens	SvT - laid as 'Drainage systems' under s114a WIA with KC ruling agreement with HA under S115 WIA framework using S278/S100 Highway Act.	Severn Trent Funded	Yes	Capitalised as a 'drainage system' intercepting others water (i.e., highway surface water).
	Street planters				
	Planted bioswale				
	Grassed / planted detention basin				
	Bio tree pits				
50	Rainwater downpipe planters	Landowner	Landowner	No	On 3rd party building so can't be SvT asset.







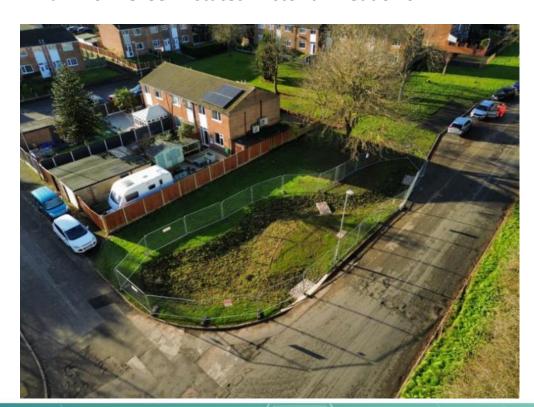








- 143 bioswales constructed, providing over 14.7 million litres of additional network storage.
- Photos left of infiltrating BS during/after construction
- Turfing and planting complete using pre grown Meadow Turf from Green Estates 'Pictorial Meadows'.



## **BIOSWALES**















### PERMEABLE PAVING



We have developed a new permeable paving standard, accepted by local authorities for installation within their asset base & constructed 104 interventions worth nearly 2.9million litre of storage.











Council Tenant car parks with gradient running into more pan flat areas proved to be effective.



## **VERGE AND STREET RAINGARDENS**



We have now built a range of highways interventions include raingardens in both verge and street locations.

- Effective solution for surface water interception, VRG and SRG's proved highly effective at capturing and retaining surface water in storm events.
- 70 rain gardens worth 932m<sup>3</sup> of storage.
- However, it is clear that urban small-scale streetscape interventions, like street rain gardens, have proved both costly to construct and unpopular in some locations.













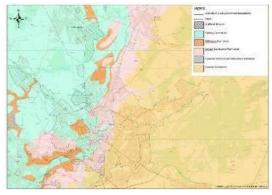




## **CONSTRAINTS/DESIGN CONSIDERATIONS**



#### Hydrogeological Risk



#### Tree Protection & Environmental Screening Assessment



#### Highways Design Standards & Road Safety Audit

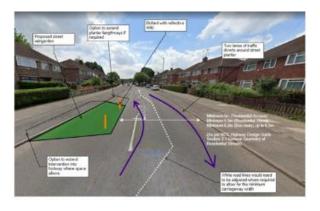


Utility avoidance & protection.

New Roads and Street Works Act 1991



MEASURES NECESSARY WHERE APPARATUS IS AFFECTED BY MAJOR WORKS









## **E2E PROCESS – HIGHWAY INTERVENTIONS**



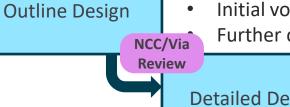
**Desktop Site** Selection

AVZ\_01\_VRG\_010 ITERVENTION TOTAL SURFACE AREA: 32: ONTRIBUTING CATCHMENT AREA: 320.0 URFACE STORAGE DEPTH: 0.225

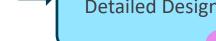
- 'Opportunity area' identification
- Desktop constraints (utility plans, land ownership, highway considerations...)

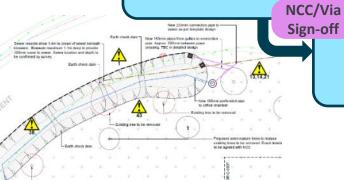


Initial volume calculations Further constraints consideration



**Detailed Design** 





- Site investigation
- Confirming volume **Further constraints**

Construction



Turning the design into reality!

Handover & Closeout

- Assurance packs
- Agreements in place
- Establishment period









# Midlands Highway Alliance Plus

#### Ian Chapman **Martin Carnaffin** Lead Project Manager Contracts Manager Severn Trent Nottinghamshire County Council **David Collins Road Safety Team** Project Lead VIA East Midlands Ben Cook Design Lead VIA East Midlands **Consultant Design Teams** Outline / Detailed Design

### **COLLABORATION**

- The co-location of Via EM into Mansfield District Council's head office encouraged a collaborative working culture
- Severn Trent funded
  - Via EM Design Lead Secondment
  - Highway Design Reviews
  - Road Safety Audits
- Galliford Try funded

- Secondment of 2 Via EM designers to influence design and build knowledge base of highway design
- Approval of 152 interventions being constructed in the adopted highway
- Carried out 3-stage road safety audit for every intervention

## **HIGHWAY DESIGN MANUAL EVOLUTION**

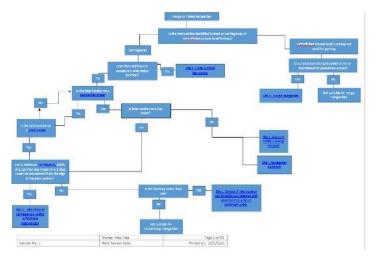


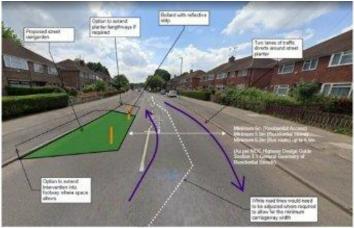
#### **Aim of Design Manual**

- An Educational "Guide" for Consultants for the Design of SuDS in the Highway
- Aimed to Promote a Consistent Approach to Design
- Provided Examples of Best Practice
- Factored in Safety
- Aimed to Set the Standards for all Future Retro-fitting of SuDS

#### **Evolution of Design Manual**

- The Design Manual Developed with Input from ST, Via and Design Consultants
- Each SuDS Feature had to be Developed Individually No "One Size Fits All" - Road Width, Longitudinal Gradient, Varying Ground Conditions, Public Utility Services, Visibility Splays
- Alterations from "Lessons Learned" during Design & Construction











## **ROAD SAFETY AUDITS**

Via EM was commissioned by NCC to undertake design reviews of all interventions on or adjacent to the highway.

#### In total Via undertook:

• **550** Detailed Design Reviews, **300** Stage 2 RSAs, Stage 3 RSA's ongoing Complex due to sheer volume of submissions and information. Challenges:

- Road Safety Audit Challenges
- Evolving design standard details in early stages to reflect technical and safety comments
- Weekly working group with technical and road safety representatives was key.

#### **Post- Construction**

- Stage 3 RSA of completed interventions
- If problems identified Considered by Lead Reviewer with decision to implement recommendations or not
- If further works instructed ST would either confirm implementation or contest

   in which case final decision deferred to NCC and determined through Site
   Meeting to reach agreement







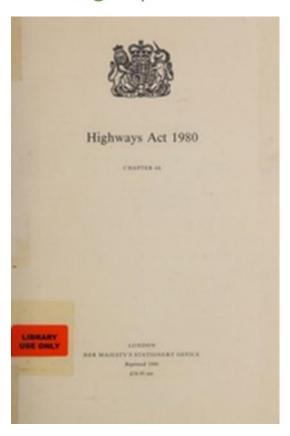


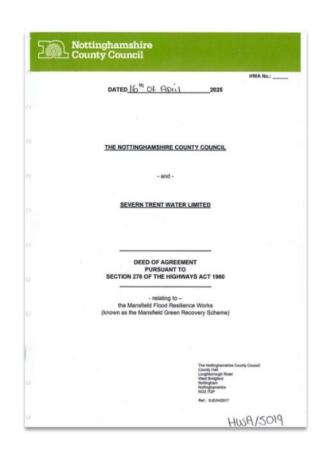


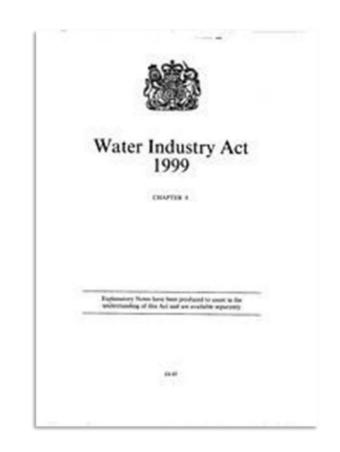




## LEGAL POWERS TO INSTALL APPARATUS BUILDING ORGANISATIONAL RELATIONSHIPS











## EARLY RESIDENT PERCEPTION AND CUSTOMER ENGAGEMENT











#### Consult & inform changing green-scape

- **Quarterly Councillor newsletters**
- Hosted visits to Mansfield for EA, councils, industry bodies etc.
- Challenging message to land for the greater good of the wider catchment

#### **Delivery focused with pressing timescales**

- Disruptive and impactful
- Traffic management
- Access to driveways & parking

#### Influencing & sharing virtual room Website

- Sharing the why, what, when & how
- Customer drop ins
- LinkedIn posts

#### Customer journey & processes developed

- Consult, engage, advise, inform
- Iterative, continuous improvement
- Insights and common themes

## **Outputs & Learnings**

Supportive, just not on my street

contract

- drop curb applications
- 'I don't flood'
- **FAQ** documents
- Complaint management
- Face to face visits
- Customer drop ins
- Councillor engagement

#### **Customer issue themes**

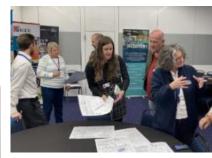
- Access
- Taking away parking
- **Education & comms**



F2F engagement





















letters issued





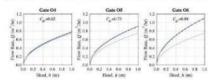


## **RESEARCH & KNOWLEDGE SHARING**



- We are sharing the knowledge and innovation we have developed with the industry to help us all move to using SuDS as a more sustainable way to reduce flood risk and storm overflow activations. Our standards will be published in June 2025 and potentially assist greatly in a National SuDS standard review at a later stage producing a new SuDS Manual.
- Our developing SUDS knowledge and learning has been shared with the leaders in NBS National standards: CIWEM, CIRIA, SUSDRAIN
- In partnership with the University of Sheffield, SvT have co-funded the 'EUGINE: Enhancing Urban Green Infrastructure via kNowledge Exchange' research project.
- Follow-on funding was secured in 2023 to recruit a <u>WIRe CDT</u> PhD student to continue the data collection and analysis beyond March 2025. The Project contributed £50,000 toward the 4-year research programme, with the Engineering and Physical Sciences Research Council contributing £80,000.
- The project is expected to achieve National Flood and Coastal Erosion Risk Management (FCERM) related economic benefits of approximately £34m, including approximately £2.4m of people related benefits.
- 96 households at risk today are better protected, 34 of these are at "Very significant risk". A further 128 households assessed to be risk in 2040 are moved to a lower risk category.
- We are also working in Partnership with Nottingham University to understand Social benefits and perceptions of SuDS in addition to Social value and recreational impact.
- In has also been concluded Mansfield has delivered £14.5m of Health & Wellbeing benefit using CIRIA B£ST tool.
- A key objective of our Green Recovery Mansfield programme was to trial a range of different intervention types in order to understand the costs, benefits, and deliverability of each to inform the broader AMP 8 strategy on sustainable drainage systems across the UK into the future as well as alleviating the risk of surface water flooding to the town.
- The learning has helped inform our AMP8 strategy and SuDS solutions are part of our toolkit for Water Industry National Environmental Programme (WINEP)



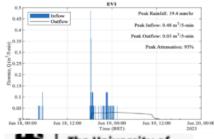
























- SuDS are becoming a key tool in combating climate change, with multiple benefits including mitigation to flood risk, improvements to water quality and prevention of pollution, benefits to amenity and placemaking and biodiversity enhancements
- Significant progression in SuDS design and implementation led by Severn Trent and their design partners such as AECOM
- Learning shared with the industry through presentations, site visits, research and published papers.
- Changes to NPPF (para 182) require SuDS to be incorporated in all developments which could affect drainage.
- Consistency in approach and design across the industry is key and is being worked on.
- Design manuals and standards are being issued for retrofit and new development drainage

## **FUTURE FOR SuDS**











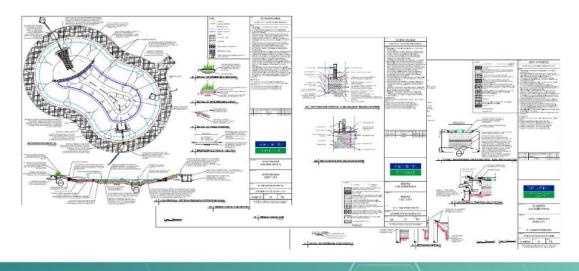


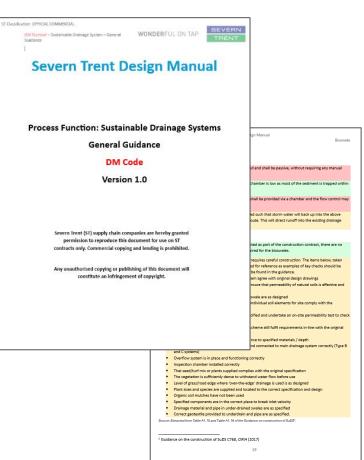




# SEVERN TRENT'S DESIGN MANUALS FOR SuDS

- $\cdot$  Design Manuals for the design of SuDS have been developed by AECOM on behalf of Severn Trent based on their experience of retrofitting SuDS in Mansfield
- · Includes a wide variety of details including some bespoke products developed with suppliers now available on the open market
- · Publishing of design manuals planned shortly to assist others in design of:
- 1) General SuDS
- 2) Permeable Paving
- 3) Raingardens
- 4) Bioswales
- 5) Detention Basins





### NATIONAL STANDARDS FOR SuDS

National standards for sustainable



**Runoff Destination** 

- · Implementation of Schedule 3 of FWMA 2010 is still unclear
- · New National Standards for SuDS (and surface water management) have been drafted by AECOM for Defra and issued in July 2025.

• The National Standards set out the Principals and seven standards relating to surface water and SuDS design:



Management of everyday rainfall

drainage systems (SuDS)



Management of extreme rainfall and flooding



Amenity



Water Quality

Guidance



**Biodiversity** 

AECOM shall be presenting an MHA Bitesize Lunch and Learn on 13<sup>th</sup> November on the National Standards for SuDS if you wish to know more.



Design of drainage for construction, operation, maintenance, decommissioning and structural integrity

