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Essex SuDS and Green Infrastructure in Schools Programme

project **summary**

Increasing rainfall intensity and more frequent storm events are placing growing pressure on existing drainage systems. School sites, which are typically characterised by large impermeable areas, limited green space and ageing drainage infrastructure, are particularly vulnerable to exceedance and surface water flooding.

Across six schools in Essex, these pressures were already being experienced, with frequent flooding, surcharge of existing drainage systems and disruption to normal school operations. Working in partnership with Essex County Council, The Environmental Protection Group (EPG), alongside Carrick Construction, delivered a coordinated design & build service of retrofit sustainable drainage systems (SuDS).

The schemes were designed to attenuate surface water runoff, reduce peak discharge rates and improve overall site drainage resilience.

The programme delivered over 50 SuDS interventions across the six sites within a four-month period, with a total project value of approximately £300,000. Each site was assessed individually through detailed feasibility studies, including drainage investigations, topographical surveys and hydraulic modelling, ensuring tailored, site-specific solutions.

The schemes prioritised nature-based, above-ground SuDS features to manage surface water at source, reduce flood risk and enhance school environments. The result is a scalable, repeatable delivery model for multi-site SuDS retrofit programmes within live environments.

the **challenges**

Each school presented a unique combination of technical and operational constraints:

- Surface water flooding: Impermeable surfaces, ageing drainage infrastructure and complex flow pathways contributed to regular flooding issues
- Live school environments: All works were undertaken within operational settings, requiring strict safeguarding, careful programming and minimal disruption
- Constrained sites: Limited space, existing infrastructure and buried services restricted design and construction options
- Variable ground conditions: Infiltration potential varied across sites, requiring flexible drainage strategies
- Programme and budget: A fixed budget and accelerated delivery programme required efficient design, coordination and construction
- Stakeholder engagement: Solutions needed to be clearly communicated to non-technical stakeholders, including school staff and pupils

These challenges required a fully integrated approach, ensuring that design intent, buildability and delivery were aligned from the outset.
designs for waterproofing.

the **solution**

EPG adopted a collaborative, multidisciplinary approach, integrating engineering design, landscape strategy and construction delivery to ensure efficient and practical implementation.

Detailed site assessments informed the development of bespoke SuDS strategies for each school, following the SuDS hierarchy and prioritising interception, storage, treatment and reuse of surface water.

A strong emphasis was placed on nature-based, visible SuDS features, enabling water to be managed at source while delivering wider benefits. Interventions included:

- Rain gardens and SuDS planters for attenuation, filtration and reuse
- Bioswales and filter drains to convey and treat runoff
- Permeable surfaces to reduce runoff rates
- Rainwater harvesting features, including rain chains and butts
- Landscape planting to support biodiversity and natural flood management

These systems were designed as above-ground, accessible features, creating a clear connection between drainage function and the school environment. Where ground conditions limited infiltration, controlled discharge to existing networks was incorporated to maintain performance.

Close coordination between EPG, Carrick Construction and Groundwork East ensured designs were buildable and efficiently delivered. Construction was carefully phased around school operations, with off-site fabrication and compact plant used to minimise disruption and maintain programme.

the **results**

The programme successfully delivered a coordinated SuDS retrofit across six schools within a constrained timeframe and budget, demonstrating the effectiveness of an integrated design and build approach.

Key outcomes include:

- Reduced surface water flood risk across all sites through effective on-site water management
- Delivery of over 50 SuDS interventions, forming integrated drainage systems tailored to each school
- Improved water quality through natural filtration and treatment processes
- Increased biodiversity and green infrastructure, transforming hardstanding areas into functional landscapes
- Enhanced outdoor environments, providing usable, engaging spaces for pupils and staff
- Educational value, with SuDS features integrated into learning and pupil engagement activities

The project also demonstrates a scalable and repeatable delivery model, capable of supporting multi-site programmes at pace, with strong alignment between design, construction and stakeholder requirements.

By combining technical rigour with practical delivery, EPG has delivered a resilient, multi-functional SuDS scheme that extends beyond flood risk management to provide long-term environmental and social value.

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