Moorlands Junior School SuDS, Sale

SuDS used

- *Raingardens*
- *Infiltration trench*
- *Permeable Paving*

Benefits

- *Education and amenity*
- *Biodiversity and habitat creation*
- *Lower water bills*
- *Demonstrator site for potential scale up across Greater Manchester*

1. Location

Moorlands Junior School, Temple Rd, Sale M33 2LP; 53°25'30.9"N 2°18'07.5"W

2. Description

Business in the Community – The Prince's Responsible Business Network - is a business-led membership organisation who exist to build healthy communities with successful businesses at their heart.

Their Water Resilient Cities initiative sought to prove a concept; that non-domestic customers, working with schools initially, could be incentivised to implement sustainable drainage systems (SuDS) through re-investing subsequent savings from surface water charges.

Moorlands Junior School SuDS is a pilot project. SuDS divert rain from playgrounds, roofs and car parks away from the public sewer and achieve a 20% reduction in chargeable surface area.

The work at the school was managed and carried out by a collaborative partnership including United Utilities, Arup, Costain, Marshalls, Atkins, CLASP and Stantec who also provided data, technical expertise and materials for free.

Additional funding came via Natural Course, an EU LIFE integrated project to build capacity to protect and improve the water environment.

3. Main SuDS components used

- 5 raingardens (130 m^2) temporarily store rainwater and infiltrate into the sandy loam soils on the site. A fluted channel and cascade of river washed cobbles carry the surface water from roof and paved areas. Shrubs, ferns and grasses finish the raingardens. Raingardens are designed in accordance with the CIRIA SuDS manual.
- Permeable Paving (190 m^2 of block paving over 200 mm sub base) treats surface water from a car park and roof area.
- Infiltration trench (10 m x 1 m x 1 m) collects surface water from an adjacent paved area and rainwater pipe.

4. How it works

United Utilities charge for surface water on non-domestic customers based on a measure of impermeble area of the premises. Once the chargeable area is calculated, a site area charging band is assigned. This presents the opportunity to reduce the bill if surface water is diverted from the public sewer by draining directly into a nearby watercourse, constructing a soakaway or managing surface water in a more sustainable way in SuDS measures.

BITC and their stakeholders are developing tools and support to guide companies to take practical action on the sustainable management of water resources.

BITC are engaging directly with a sustainable drainage programme in schools and other public buildings across Manchester to free up money for public services and help Manchester meet Mayor Andy Burnham's aim to be one of Europe's leading green cities.

The school benefits from reduced charges on their utility bill and gains an attractive feature that can be enjoyed by the children and wider community and used as an educational tool to learn about water, flora and fauna.

The project is a demonstration site for retrofitting SuDS in non-domestic properties in Greater Manchester. Alongside development of this demonstration site, the project team has developed an economic model to show the costs, direct financial savings and wider benefits of retrofitting SuDS across all schools in Greater Manchester. Being able to quantify wider benefits of rolling out SuDS at scale including health & wellbeing, education, air quality, carbon sequestration, reduced flood risk

and property value alongside the direct cost savings on waste water charges means that potential financing opportunities for a city-wide programme have been identified.

5. Specific project details

The school currently has 3,905 m^2 of chargeable surface area and the works remove 905 m^2 to move it into the lower charge band.

At an early stage, the potential for infiltration was assessed from British Geological Survey maps. On site testing confirmed soils, infiltration rates and design parameters. Measures accommodate a 1 in 10 year storm with exceedance onto the surrounding green space.

Four main raingardens directly outside the four classroom areas take surface water from classroom roofs and outside welcome areas. Rainwater gulleys are abandoned and rainwater pipes are intercepted using flute drains to transfer water across the surface to the new raingardens. The existing loamy sands provide suitably free draining soils without amending. Planting within the raingardens adopt the colours of each of the school houses. Mulch helps the garden retain some moisture for when it dries out and suppress weeds. Stepping stones provide the opportunity for school children to interact.

Permeable paving replaces a section of the existing tarmac car park and treats surface water from the car park, adjoining playground and school hall roof. The paving is designed for car and emergency vehicle loading. An infiltration trench intercepting runoff from paved area and a rainwater pipe makes up the difference in surface area.

The school Eco Council of elected school children were involved with development of the proposals from the start of the project. The raingardens open up the space outside the classrooms and a new permeable footpath weaves under the mature trees and leads parents and visitors through the school grounds. Landscape bunds reuse the spoil from the raingardens and add character.

6. Maintenance & operation

Raingardens are on the surface and most can be managed using landscape maintenance techniques. Permeable paving requires little maintenance over the 20 year life. A maintenance schedule derived from the CIRIA SuDS Manual provides maintenance advice. The contractor provided training for the caretaker as part of the works.

A planting event introduced the school children and teachers to the raingarden and plant maintenance and helped infuse a sense of ownership. Involving the Eco Council in the development of the raingardens from the outset ensures long term sustainability of measures.

7. Monitoring and evaluation

The school Eco Council have adopted the SuDS and set up a project to teach their peers about the water cycle and monitor the raingardens as they mature.

The children from the Eco-council have presented the project to a delegation of business leaders from the Greater Manchester area and an innovative financing delegation from Greater Manchester Combined Authority.

8. Benefits and achievements

Moving from a band 6 (3,000 – 6,999 m^2) charge of £5,108 to a band 5 (1,500 – 2,999 m^2) charge of £2,297 saves the school £2,811 annually on their water bill.

The payback period is 12-15 years. It is hoped this can be improved upon as more schools and other community buildings are implemented in the programme.

United Utilities' Head of Sustainability Chris Matthews said:

"Traditionally, managing the flow of surface water has been seen as the responsibility of water companies and local authorities, but investing bill payers' money in ever more pipes and treatment works is not always the best way. We need to work more broadly as a community to find a solution, and involving the children of Moorlands in planting up their new rain garden means, as future water bill payers, they are more in tune with the environment and are seeing the positives for themselves."

9. Lessons learnt

The key success factors at this school were:

- Potential/headroom within the charging bands
- Opportunity to infiltrate
- Easily accessible rainwater pipes and paved areas
- Space to build raingardens
- Willingness to engage

Stepping stones through the raingardens are popular with school children and the new permeable footpath is a welcome addition for parents at school pickup. Permeable paving demonstrates that SuDS are possible when there is no green space available.

Across the pilot area, Greater Manchester, there are currently over 1,000 schools paying together over £4.3m in surface water charges to United Utilities per year. If they could all move down one charging band, this could save over £2m which could be reinvested to cover the costs of SuDS measures in the short-term and educational benefits in the medium term

10. Interaction with local authority

Involvement of the school headteacher and children through the Eco Council from an early stage was key to successful adoption of the new features. Trafford Council were also involved in project meetings. Wider discussions on how this could be scaled up across all Trafford Schools are underway.

11. Project details

Construction completed: Construction completion was 27 April 2018.

Cost: Construction of the works cost £18,000 with additional materials costs of £3800. Hard landscaping materials were donated by Marshalls. Design and management time was given freely by the project partners.

Extent: The SuDS now manage 900 m^2 of roof and paved area.

12. Project team

Funders	• Business in the Community are funded by • DEFRA, United Utilities
Clients	• Moorlands Junior School • Business in the Community
Designers	• Arup

	• Marshalls • Stantec
Contractors	• Groundwork Landscapes
Other	• Wildfowl & Wetland Trust • British Geological Survey • Costain • Atkins • CLASP • CIRIA • Environment Agency • Greater Manchester Combined Authority

13. Site images and illustrations

Fig 1: Moorlands Junior School SuDS New Site Layout

Fig 2: Stepping stones provide the opportunity for school children to interact with the raingardens

Fig 3: Fluted drain and river washed cobble cascade transfer surface water to the raingardens

Fig 4: School children show a delegation of Greater Manchester business leaders around at the planting event

Fig 5: Permeable paving replaces an existing tarmac car park and offers a SuDS solution where space is at a premium