

Howard Street, Salford, Manchester



SuDS used

- *Tree pits, soil, slot kerbs, perforated pipe,*

Benefits

- *Reduced localised flooding, slowing down storm-water at source, contamination removal, storm-water retention, detention, Large healthy trees*

1. Location

Howard Street, Manchester, UK M5 4SA

2. Description

City of Trees Manchester, in partnership with the University of Manchester and a tree pit manufacturer wanted to assess how trees and soil under paving could be used as a form of ultra-urban "green infrastructure" to improve water quality and reduce the amount of runoff directed into the sewer. The selected site for the project site is a pavement in a residential area in Salford near

Manchester. This was a challenging environment on a site where trees had previously failed and had to be removed.

City of Trees Manchester installed three plane trees along a residential street in a 3 layer tree pit system filled with a soil provided by British Sugar.

3. Main SuDS components used

Tree pits, soil, trees, slot kerbs

4. How it works

City of Trees Manchester installed three trees along a residential street in a 3 layer tree pit system filled with a soil provided by British Sugar. Runoff is collected and enters the tree pit using slot kerbs, which convey it from the catchment area into a perforated distribution pipe along the upper layer of tree pits under the paving, it is then distributed evenly throughout the whole system. An underdrain sits at the bottom of the system to convey excess water away. Monitoring chambers at either end were installed to make collecting water samples easy, and data collection began as soon as the last of the monitoring equipment was installed.

5. Specific project details

Trees had previously failed along this street and had been removed. Replacement trees were being considered to be planted in the tree pits to support the paving and provide lightly compacted Soil. Localised flooding issues could be addressed because this soil is relatively un-compacted and water can take up the macro and micro pore space within the soil. Infiltration through the soil column removes contaminants and slows the water down at source. Taking water off line during the rain event adding capacity to the current over capacitated drainage system. Integrating trees and water into suds systems will only improve over time as the trees become larger, with evapotranspiration the increased demand for water.

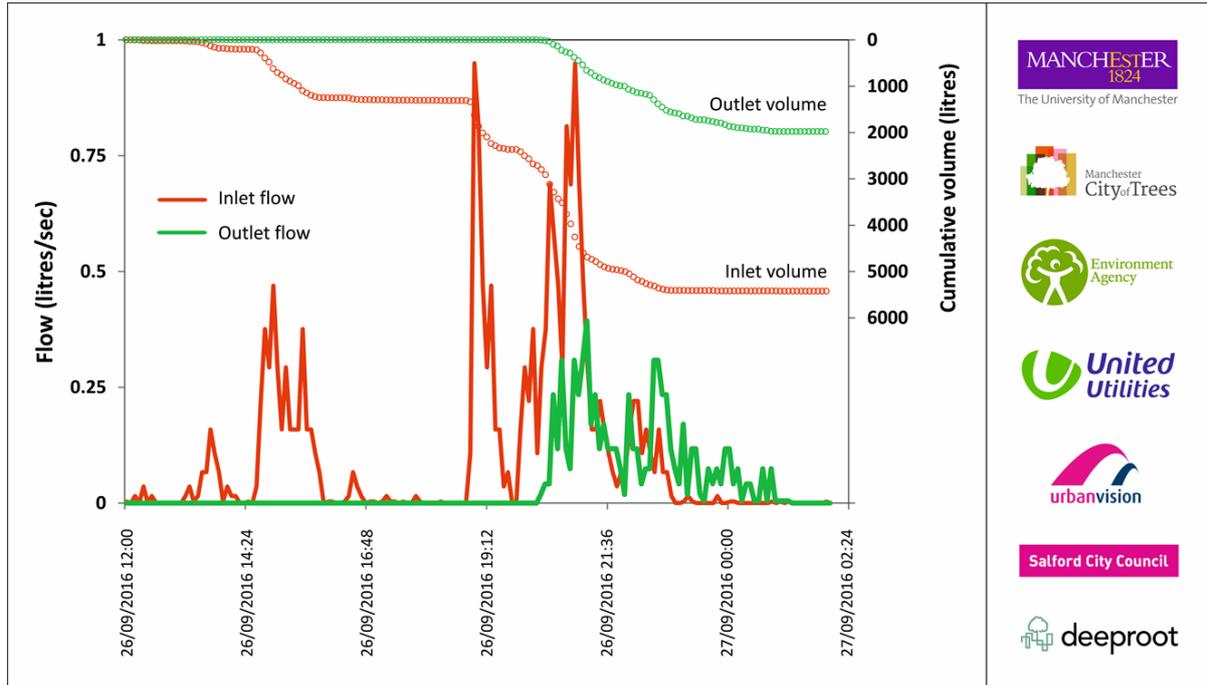
6. Maintenance & operation

With clean out points for the drainage pipe there is the ability to flush through should it become blocked along with the collection point on the slot kerb but other than that there is little required in ways of maintenance. The trees will receive water and the soil will be hydrated everytime it rains.

7. Monitoring and evaluation

Dr James Rothwell from the University Manchester is responsible for supervising the data collection analyse over the coming years. Dr James Rothwell said *“These results demonstrate that retrofit tree planting schemes in towns and cities can be used as a nature-based solution to tackle urban flooding”*

Results from a summer storm in 2016



8. Benefits and achievements

Providing a natural alternative to the expensive physical, biological and chemical processes that are employed by water utility companies at their sewage treatment plants

2016

Reduction in peak flow rates

Average flow rate reduction has been about 70% during this summer

The largest summer storm was recorded on June 25th 2016 which saw a 98% reduction (3.6 litres on the inlet – negligible flow on the outlet)

Runoff Volume Reduction

Average volume reduction during summer storms has been around 60%

Delay in storm-flow peaks

Average delay in water leaving the tree pits during storm events has been about an hour and a half

9. Lessons learnt

As of this writing, results are still being gathered by James Rothwell (Manchester University) but Pete Stringer (city of trees) is full of enthusiasm for the preliminary, results and surprised and impressed with the clarity of the water exiting the system from the first rainfall event. "The aim of the Howard Street project is to demonstrate and quantify how, in an urban context, Green Infrastructure such as street trees can provide a natural solution to managing surface water runoff and addressing diffuse pollution," he said. "City of Trees Manchester had long been aware of the projects that had been delivered in North America using DeepRoot Silva Cells for helping managing water quality and quantity and so was keen to demonstrate this system in a UK setting. It is hoped that the findings from this project can be used to encourage a wider uptake of this natural alternative to engineered drainage systems in particular for new infrastructure projects."

10. Interaction with local authority

Local authorities, Utility companies and SUDS designers are excited to learn the findings from this project, one of the first of its kind in the United Kingdom that prompted a visit to the site by Sir James Bevan from the Environment Agency. Tony Hothersall, Director of City of Trees Manchester, recently used the Howard Street project in a presentation about future proofing Manchester, using the details from this site to demonstrate some forward thinking and innovative tree planting design. City of Trees Manchester, the Environment Agency, Salford City Council, United Utilities and Urban Vision plan to share their findings in videos, conferences, and more.

The Salford City Council Development Plan Document (Publication Core Strategy, February 2012) includes a section on "Green infrastructure spatial strategy" that states that a network of green infrastructure will be established throughout the city to, among other things, mitigate the risks and impacts of flooding and air, water, and noise pollution, as well as provide attractive walking routes. We believe Howard Street is one of the first and essential steps toward that goal.

United utilities are monitoring the situation with an interest in both slowing water down at source, reducing localised flooding and also the contamination removal, ultimately they are managing the water quality further down the line.

11. Project details

Construction completed: June 2015

Cost: SuDS: £18,962.10

Extent: 300m²

12. Project team

Funders	<ul style="list-style-type: none"> • City of Trees Manchester • Salford City Council
Clients	<ul style="list-style-type: none"> • City of Trees Manchester • Landscape Engineering
Designers	<ul style="list-style-type: none"> • Urban Vision/ DeepRoot
Contractors	<ul style="list-style-type: none"> • Landscape Engineering
Manufacturer	<ul style="list-style-type: none"> • DeepRoot
Other	<ul style="list-style-type: none"> • Environment Agency

13. Site photographs, images



Figs 1-3



Figs 4-6



Figs 7-8



Fig 9