

## Ruskin Square, Croydon



### SuDS used

- *Source Control – Green roofs*
- *Source Control - Pervious surfaces*
- *Retention & Detention – Geocellular storage systems*
- *Infiltration – Rain Gardens*

### Benefits

- *Water quantity – controlled release of water through interception storage*
- *Water quality – infiltration of surface water run-off through rain gardens*
- *Biodiversity – habitat enhancements and seasonal change through green roofs and rain gardens, planting large species tree planting and retention of an existing mature tree*
- *Amenity – creation of biodiverse public square and space to relax under a tree canopy*

### 1. Location

Ruskin Square, Croydon CR0 1XJ

## 2. Description

Ruskin Square Plot B03 is the latest phase to be completed in the mixed-use re-development site adjacent to East Croydon Station. The area is undergoing a programme of regeneration as part of the East Croydon Masterplan to create a new urban quarter with improved transport links, residential, retail and office space and an investment public realm, built ahead of development.

‘Ruskin Square’ lies at the heart of the new quarter; a public space for events and a place for office tenants and other local workers to relax. At the centre of the square is an oval timber stage, surrounded by a grove of Pin Oak trees and a verdant understorey of grasses, ferns and specimen shrubs. The encompassing effect is reminiscent of the oval timber panelled drawing room in the Working Men’s College where John Ruskin, the development’s namesake, taught drawing classes.

## 3. Main SuDS components used

The Ruskin Square and office development utilises multiple SuDS components to attenuate and control water flow.

**Green Roof** – Office Building B03 has a total extensive green roof area of 3800m<sup>2</sup> providing biodiversity enhancement, water infiltration and 135m<sup>3</sup> of attenuation during 1 in 100-year storm events.

**Pervious Surfaces** – Ruskin Square is paved in permeable grit jointed granite paving that provide 60m<sup>3</sup> of surface water attenuation. The below-ground build-up uses a ‘tanked’ system with discharges run-off into the geocellular storage crates.

**Geocellular Storage System** – beneath Ruskin Square, geocellular storage crates provide 380m<sup>3</sup> of water attenuation. The crates collect water run-off from the office building roof and the surrounding permeable paving system and stores before controlling release into the drainage network.

**Rain Gardens** – Surplus surface water run-off from the surrounding permeable paving is channelled into sunken planted rain gardens. The rain gardens contain a grove of semi-mature pin oak trees which benefit from an extended rooting zone beneath the paving created by soil cell crates.

## 4. How it works

As demonstrated in the diagram overleaf, roof and paving run-off is attenuated at source via green roofs and permeable paving before being directed into the below-ground geocellular storage crates. Surplus surface water that cannot be attenuated by the permeable paving is channelled into several rain gardens which infiltrate through the soft landscape before releasing water into the geocellular storage crates. The water held in the storage crates has a controlled release into the drainage network, protecting the function of the sewer during storm events.

## 5. Specific project details

The landscape has been designed to be resilient to climate change by optimising sustainable drainage and to cool the urban environment with the significant biomass of the trees and understorey planting. The apertures of sunken planting attenuate rainfall and surface water run-off, connecting to an extensive below ground ‘rooting zone’ of soil cell crates. These crates extend beneath the paving to provide each tree in the square with around 25m<sup>3</sup> of soil volume, creating an optimum growing environment in this hard, urban setting to allow the trees to thrive and mature over the long term. The understorey of grasses, ferns and specimen shrubs, with a ‘secret’ forest of transplants, keeps soil cool and enhances biodiversity and seasonal dynamics. The granite paving is a flexible, permeable grit jointing construction that attenuate and slow surface water run-off. This

surface water, along with roof run-off, is captured in a large attenuation tank located below the 'rooting zone'.

A single, mature horse chestnut, a remnant of the 1970's landscape, was carefully retained, with its low, wide canopy creating a welcoming feature of the space. Initially planted into a concrete ring to restrict its growth, the tree has been nursed back to health by releasing it from construction and improving the surrounding soil conditions. A survivor of previous cycles of development, the tree is symbolic of the resilience and longevity of urban forestry.

This is set within a wider strategy of bringing nature to the city, incrementally, alongside adjacent initiatives, in particular a bioretention pavement park that replaced asphalt paving alongside the award winning multi-storey car park.

## 6. Maintenance & operation

Green roof – The office building has an extensive green roof system requiring an annual inspection of vegetation for undesirable weed growth.

Permeable surfaces – Requires regular inspection of the grit jointing for weeds and debris to ensure water can permeate through the paving joints. If cleaning is required, this must be carried out by hand as jet-washing cannot be used so as not to dislodge grit from joints.

Geocellular storage system – The system requires a twice-annual inspection of catchpits to check for silting and clearance of any debris build-up using a jetting system.

Rain gardens – The planting requires minimal maintenance with pruning and dividing of plants only required when necessary and a top-up of mulch once per year. Planting areas require regular litter picking.

## 7. Monitoring and evaluation

Ruskin Square and Office Building B03 is part of a multi-phase redevelopment with several of the plots still to be delivered. Several members of the design team are involved in the forthcoming phases of development, so will be able to learn from feedback from the client and site management team and monitor the success of the design.

## 8. Benefits and achievements

Close collaboration between the design team disciplines was key to ensure several important strategies could be combined within the one space; water attenuation, large soil volumes for tree planting and public amenity space. Inspiring the Client to champion SuDS and to undertake a deeper excavations, at greater cost, enabled different systems to be stacked on top of each other and allowing each layer to optimise output. In the one plan area, Ruskin Square is able to provide 380m<sup>3</sup> of water attenuation in storage crates, 25m<sup>3</sup> soil volume per tree and a square that can also accommodate events, markets and provide space to sit, gather and relax.

## 9. Lessons learnt

Integration of rain gardens within publicly accessible space can be challenging in relation to ongoing maintenance operations. The very nature of rain gardens means they may receive the surface water run-off from surrounding paved areas, which may at time contain contaminants. In recent cold weather, paved areas had to be heavily gritted to ensure they are safe, however this caused salt-water to wash into the planting beds and 'burning' some of the foliage. The lesson learned is that

robust and preferably salt-tolerant planting should be used, particularly at the edge of beds in contact with paving.

## 10. Interaction with local authority

The design team presented several times to the officers at Croydon Council, to ensure they were satisfied with the proposals for SuDS and the scheme as a whole. The team worked with the client to develop a proposal within budget and which met the requirements of the Local Authority.

## 11. Project details

**Construction completed:** 24<sup>th</sup> July 2017

**Cost:** cost not known

**Extent:** Building Footprint 13,000m<sup>2</sup>, Public Realm 5400m<sup>2</sup>

## 12. Project team

Funders	<ul style="list-style-type: none"> <li>• Stanhope Plc</li> <li>• Schroders</li> </ul>
Clients	<ul style="list-style-type: none"> <li>• Croydon Gateway Limited Partnership</li> </ul>
Designers	<ul style="list-style-type: none"> <li>• Architect – Shed KM</li> <li>• Public Realm Architect – muf Architecture/art</li> <li>• Landscape Architect – J &amp; L Gibbons</li> <li>• Structural &amp; Civil Engineers - Arup</li> </ul>
Contractors	<ul style="list-style-type: none"> <li>• Main contractor – Lendlease</li> <li>• Landscape contractor – Nycon</li> <li>• Soft Landscape contractor - Ruskins</li> </ul>

## 13. Project images and illustrations



Fig 1: Ruskin Square, Oct 2014 – Before development. © J & L Gibbons

Planting and Water Management:  
Drainage network diagram

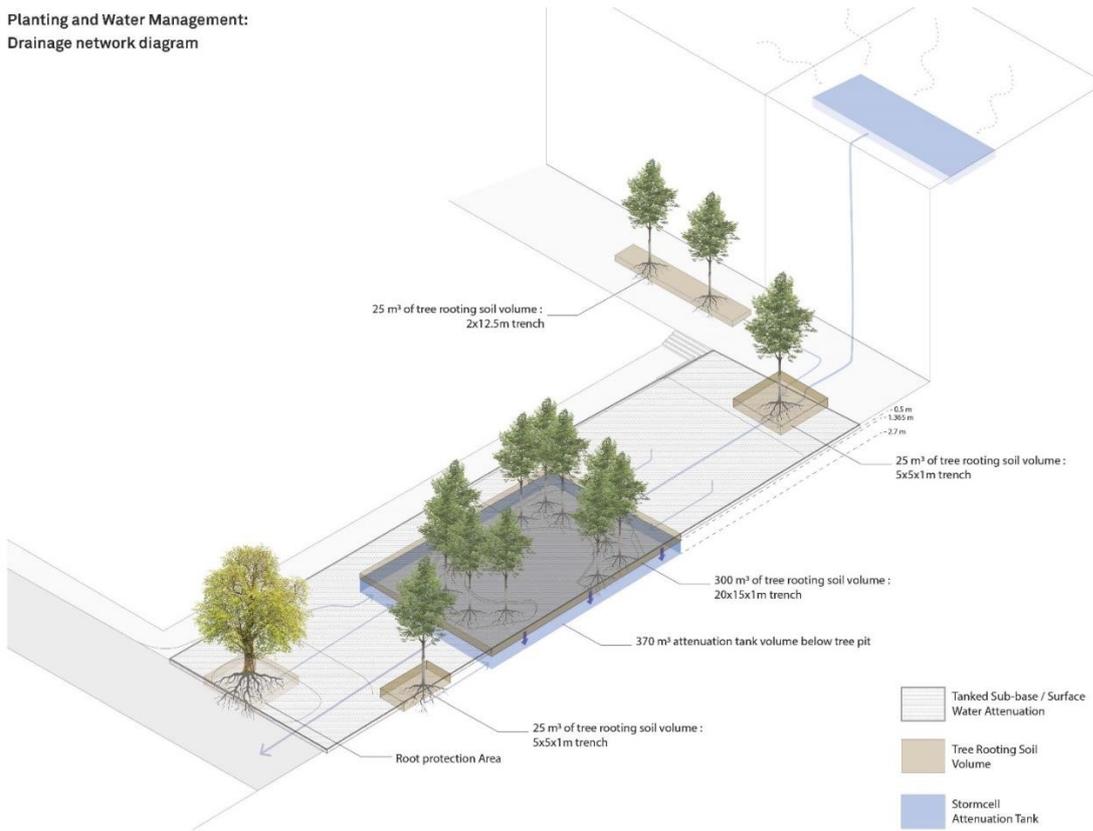


Fig 2: Ruskin Square SuDS diagram. © muf Architecture/art



Fig 3: Geocellular storage crates installation, March 2016 © Lendlease



Fig 3: Soil cell installation, June 2016. © J & L Gibbons



Fig 4 Grit-jointed permeable paving installation, September 2016. © Lendlease



Fig 4 Ruskin Square, July 2017. © J & L Gibbons / Sarah Blee



Fig 5: Ruskin Square, July 2017. © J & L Gibbons / Sarah Blee

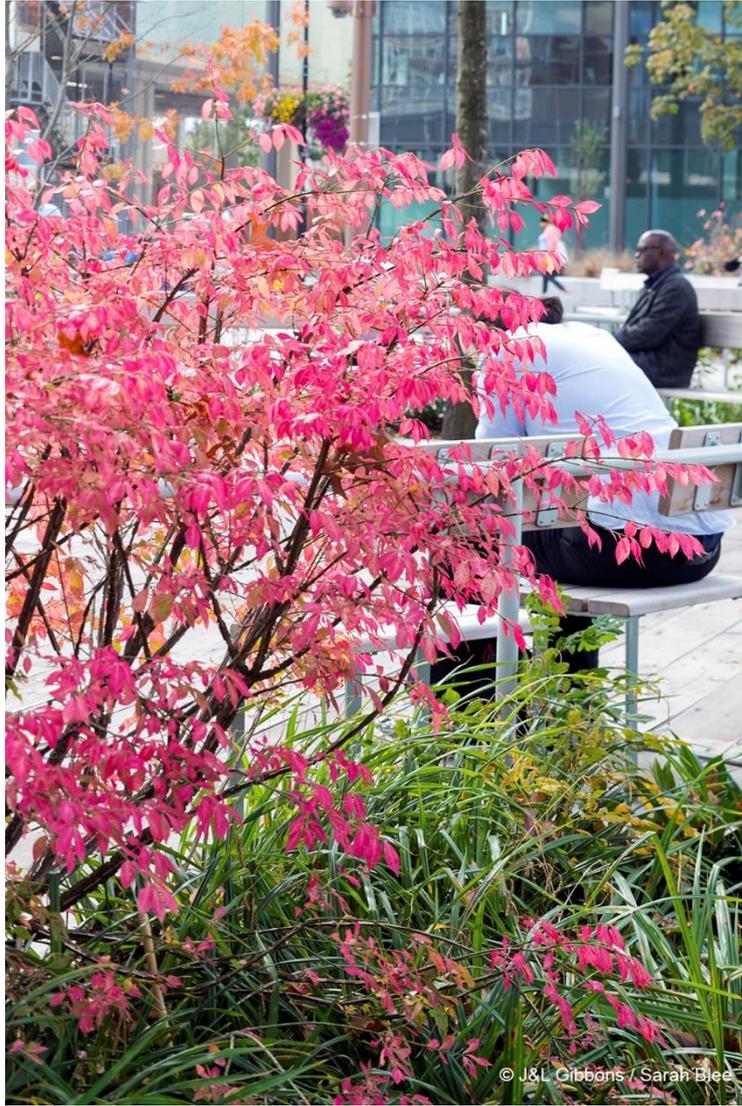


Fig 6: Ruskin Square, September 2017. © J & L Gibbons / Sarah Blee