

Using rainwater for tree-based cooling on Garibaldi Street Lyon, France

Reducing weather extremes



TDAG Case Study

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Completion date:

Phase one: March 2014

Phase two: January 2018

Team:

Greater Lyon Authority (Client). Atelier des Paysages/Alain Marguerit (Landscape consultant)

Further information:

Greater Lyon Authority website

www.grandlyon.com/projets/lyon-rue-garibaldi.html

Case study focused on the stormwater management components of the project (see pp121-122 in: *SuDS In London: A Guide*)

<http://content.tfl.gov.uk/sustainable-urban-drainage-november-2016.pdf>

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Garibaldi Street is a major thoroughfare running through Lyon's city centre. Designed as an "urban motorway" in the 1960s, the oversized road no longer serves contemporary needs for development and quality of space. Refurbishment was initiated in the 1990s, and is now entering into a second, more ambitious phase expected to turn the six-lane road into a people-friendly green street that will also serve economic regeneration. The 2.6km project drastically re-allocates space between highway users. Pedestrians, cyclists and buses now have the lion's share. The scheme features extensive tree planting, designed to provide shade and manage surface water runoff from the footways and cycle paths. Structural "skeleton" growing medium is being used underneath footways and cycle paths to maximise the rooting volume: this creates a bridge allowing the roots of trees planted in continuous trenches to access the open soil provided in nearby linear landscape verges collecting rainwater. The first refurbished section of Garibaldi Street opened in March 2014.

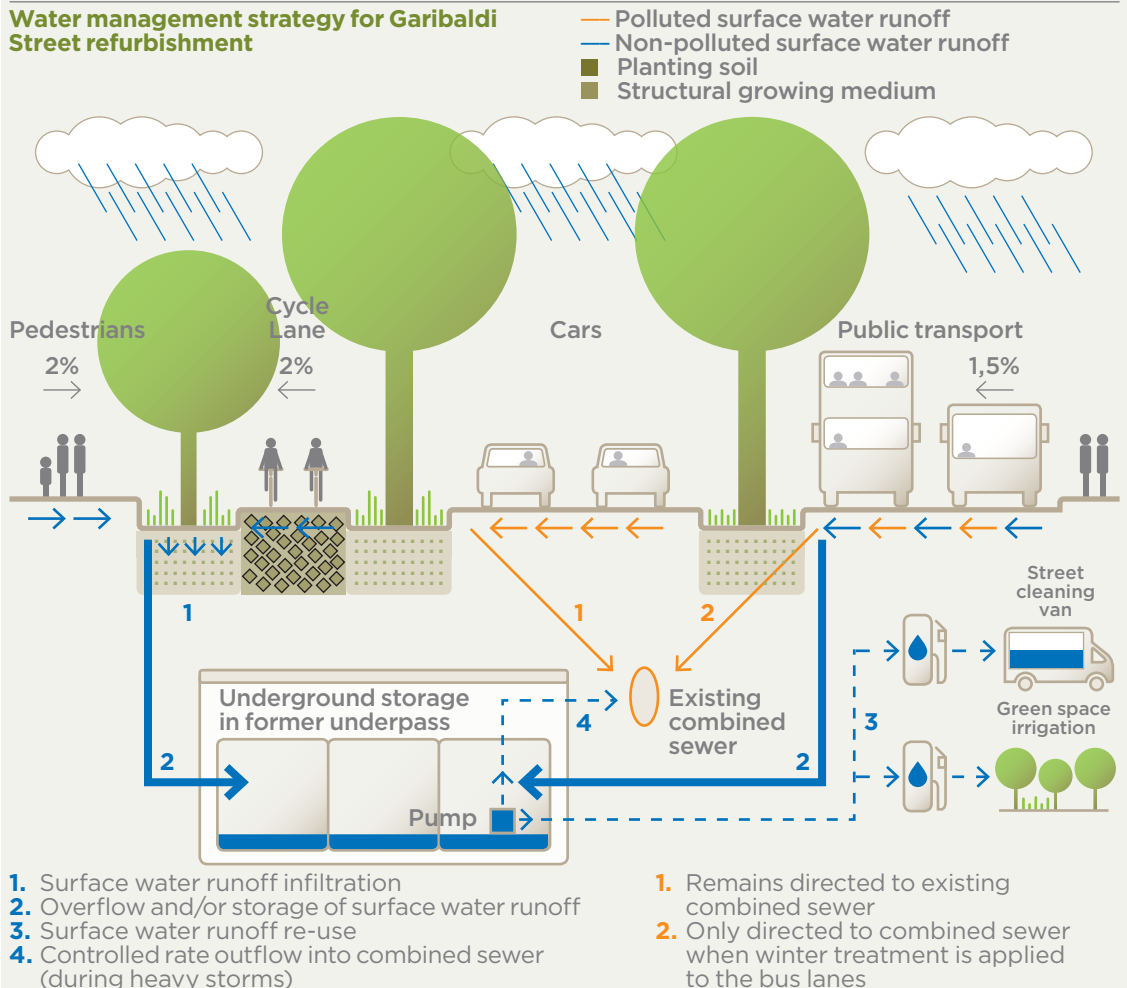
This includes an underpass repurposed as a rainwater harvesting cistern receiving stormwater runoff from the footways, the cycle tracks and the bus lanes when they are not subject to winter treatment (as shown in the diagram below). The rainwater harvested is used for street cleaning and for irrigation of the trees during the summer so as to maximise the cooling they deliver through

evapo-transpiration. Monitoring conducted over two summers demonstrated significant microclimate impacts: ambient summer temperatures were reduced on average by 1.78°C (August 2017) and 2.33°C (August 2018), with at times cooling effect reaching up to 8°C (maximum recorded). The overall resulting impact in terms of user comfort – as measured through the Universal Thermal Climate Index (UTCI), a physiologically-based approach based on human heat balance models – is equivalent to a lowering of the "perceived" temperature by 9°C (-9°C UTCI).

The second section of the project (completed in January 2018), does not replicate the repurposing of an underpass for stormwater retention (deemed too costly) but applies similar design principles to those tested in the first phase for reallocating highway space to sustainable transport modes and introducing appealing vegetated soakaways with a wide range of tree species infiltrating runoff from the footways and the cycle tracks, while enhancing the thermal comfort of pedestrian, cyclist and wildlife alike.

Garibaldi Street is home to the only tall building projects in Lyon, with over 250,000 square meters of new commercial space having either been built or secured planning consent since the onset of the refurbishment project – demonstrating its attractiveness to private investments.

Water management strategy for Garibaldi Street refurbishment



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Garibaldi Street in
September 2015

Image: Frédéric Ségur

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Clockwise from left:
Garibaldi Street before
completion of phase one
of refurbishment

Image: Frédéric Ségur

Garibaldi Street, after
phase one refurbishment

Image: Frédéric Ségur

Gully and swale detail
along newly completed
Garibaldi

Image: Anne Jaluzot

Garibaldi Street's
new water-sensitive
streetscape coming
to life in April 2014

Image: Sophie Barthelet



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About this Case Study

In 2012, TDAG identified 12 good practice principles for urban trees. The project described in this case study illustrates the principles highlighted below:

- 1/ Know your Tree Resource
- 2/ Have a Comprehensive Tree Strategy
- 3/ Embed Trees into Policy and Other Plans
- 4/ Make Tree-friendly Places**
- 5/ Pick the Right Trees**
- 6/ Seek Multiple Benefits**
- 7/ Procure a Healthy Tree
- 8/ Provide Soil, Air and Water**
- 9/ Create Stakeholders
- 10/ Take an Asset Management Approach
- 11/ Be Risk Aware (Rather than Risk Averse)
- 12/ Adjust Management to Needs

For more about the 12 principles, see [*Trees in the Townscape: A Guide for Decision Makers*](#)

Keywords

Reducing weather extremes, Cooling, Economic growth, Active travel, Arterial street, Retrofit, Continuous trench, SuDS, Structural soil, Research and Development.

Author and sources

This case study was written by Anne Jaluzot, based on site visits to Garibaldi Street and interviews with Frédéric Ségur, Landscape and Arboricultural Manager at the Greater Lyon Authority.

Version 1.1

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