Operation and Maintenance of SUDS in Lyon, France

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The metropolis of Lyon, France

1,333,032 INHABITANTS living in 59 municipalities

3,250 KM SEWER

1,041 combined sewer

449 km stormwater

12 WASTEWATER TREATMENT PLANTS

265 DETENTION or INFILTRATION STORMWATER BASINS

2,500 SOAKAWAYS
Opération and Maintenance of SUDS in Lyon, France

1st December 2017 – Colombian-French Conference on Urban Water Systems

Context

• Sewer system
  – Combined sewer (85%)
  – Partially saturated
  – 21 July 2015 decree: limits the combined sewer overflowing

  • Infiltration basin in Décines, March 2016
  • Swale, Garibaldi Street in Lyon, June 2016

Yet, reluctance to SUDS adoption persists
Thesis within the frame of the “Permeable City” Project: rank and analyze barriers

Problem

• Since 1990, SUDS to:
  – limit flooding and discharges
  – recharge water tables
  – cool the city
  – improve living conditions

  ➔ Yet, reluctance to SUDS adoption persists
  ➔ Thesis within the frame of the “Permeable City”
  Project: rank and analyze barriers

Operation and maintenance
Questions

- How are stormwater assets maintained?
- By who?
- What are the main difficulties?

Field workshops: first findings

Stormwater detention ponds - Portes des Alpes - Saint-Priest, Lyon, France
How are stormwater assets maintained?

- Main results of fields workshops
  - Some SUDS receive very little (hydraulic) maintenance
  - But lots of them are still well functioning
  - Main difficulties regarding SUDS O&M:
    - Demarcation issues: tasks, costs and responsibilities
    - Knowing what, where, how?
    - Unhappy sewer workers?

→ “On-the-job” immersions with maintenance teams
Anthropological approach

- Inductive procedure
- Participant observation
- Learn about what is “not said”

Who is operating and maintaining SUDS?

Key:  maintenance and/or control
- Green spaces department (municipality)
- Roads direction – Trees and Landscape department
- Cleaning department
- Roads department
- Sanitation department

Roadside in Bron (Lyon, France), April 2015
### Who is operating and maintaining SUDS?

- **SUDS O&M complexity**
  - List of tasks for each type of SUDS
  - Nature of tasks: specialty or not
  - Department in charge
  - \( S = \) Sanitation Dptmt, \( G = \) Green Spaces Dptmt

### Cleaning Department

<table>
<thead>
<tr>
<th>Soakaways</th>
<th>Sanitation Department</th>
<th>Green Spaces Service</th>
<th>Roads Direction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soakage trench</td>
<td>C1 Surface and storm drain cleaning (when needed)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>grassy</td>
<td>C1 Cleaning of a screen inside the sewer, March 2016</td>
<td>-</td>
<td>-</td>
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<tr>
<td></td>
<td>C2 Mowing in Confluence, Lyon, France, May 2016</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Swales</td>
<td>C2 Trash collection (depending on dirt and requirement)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>G1 Mowing (1 to 4 times/yr)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>vegetated (herbs, shrubs, trees)</td>
<td>C1 Hydraulics structures maintenance (when needed)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>C2 S1 Hydrostatic structures cleaning or flushing (when needed)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>G2 Pruning (about 3 to 2 times/yr)</td>
<td>-</td>
<td>-</td>
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<tr>
<td></td>
<td>G3 Weeding (when needed)</td>
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<td>-</td>
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<tr>
<td></td>
<td>G4 Watering</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Buried basins</td>
<td>C1</td>
<td>S1</td>
<td>-</td>
</tr>
<tr>
<td>Open-air basins</td>
<td>enclosed</td>
<td>-</td>
<td>S1/S2/C2/3</td>
</tr>
<tr>
<td></td>
<td>open to the public</td>
<td>C1</td>
<td>S1/S2/S3</td>
</tr>
<tr>
<td></td>
<td>Pervious pavement</td>
<td>C1/G3</td>
<td>R2</td>
</tr>
</tbody>
</table>

*1st adv. for centralized systems: simple O&M (MicroMégas)*
Opération and Maintenance of SUDS in Lyon, France

**Cleaning Department**

- Soakaways
  - C1: Surface and storm drains cleaning (when needed)
- Soakage trench
- Grassy swales
  - C1: Trash collection (depending on dirt and requirement)
  - C2: Mowing (1 to 4 times/yr)
- Vegetated swales
  - C1: Trash collection (depending on dirt and requirement)
  - C2: Mowing (1 to 4 times/yr)

**Sanitation Department**

- Soakaways
  - S1: Hydraulic structures maintenance (when needed)
- Grassy swales
  - S1: Hydraulic structures cleaning or flushing (when needed)
- Vegetated swales
  - S2: Hydraulic structures cleaning or flushing (when needed)

**Green Spaces Service**

- Soakage trench
- Grassy swales
  - G1: Mowing (1 to 4 times/yr)
  - G2: Pruning (about 1 to 2 times/yr)
  - G3: Weeding (when needed)
  - G4: Watering

**Paving**

- Buried basins
  - C1: Trash collection (depending on dirt and requirement)
  - S1: Surface and storm drains cleaning (when needed)

**Open-air basins**

- Soakaways
  - S1: Self-monitoring
  - C2: Mowing (1 to 4 times/yr)

**Pervious pavement**

- C1: Trash collection (depending on dirt and requirement)
- C3: Mowing (1 to 4 times/yr)

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"Picking up waste, I am telling you this honestly, I don’t want to do it"

"It was made in 1999-2000. I think it was only once cleaned up"

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"Sometimes it’s easier to say we’ll pull a new sewer line, we won’t have issues with hand over"
What are the main difficulties for SUDS O&M?

- Complex demarcation of tasks
- Lack of systematic rules:
  - who does what?
  - who is responsible for what?
- Needs for
  - a better management of “unusual tasks”
  - an improvement in asset management (what, where, how)
- General context
  - Increase in the number and the complexity of stormwater facilities
  - Stagnating or decreasing functioning budgets

Nevertheless...

- Lots of SUDS are well functioning
- Basic tasks (cleaning, mowing) are done (most of the time)
- An important work has been undertaken to improve O&M considerations in urban design

“Permeable City”
Guidelines for urban designers
Thanks!

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in Lyon, France
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Photographs and Illustrations: N. Cossais