

# ADDED VALUES IN SUSTAINABLE URBAN DRAINAGE SYSTEMS: WET BASINS IN GREATER COPENHAGEN

Thesis Talk  
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#KUThesis #ThesisTalk



- Background
- Problem & Approach
- Findings
- Discussion
- Improvements
- Conclusions



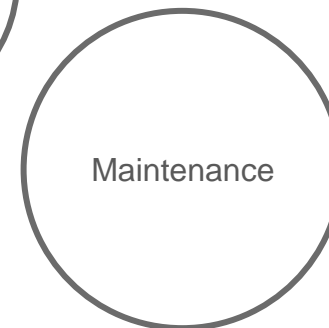
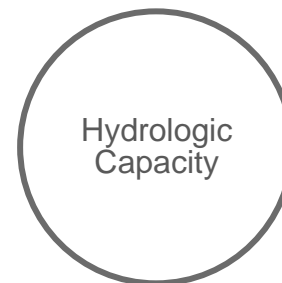
Background

# Sustainable Urban Drainage Systems | SUDS



Blue-green  
Infrastructure |  
Ecosystem-based  
CCA | WSUD |  
LID | BMP

# SUDS Added Values & Shortcomings



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The overarching principle of SuDS design is that surface water runoff should be managed for maximum benefit.



## Problem & Approach

## Problem

- Little knowledge of SUDS design considerations for added values

## Study's Objective

- Explore to which extent SUDS design considers potential added values





# Approach



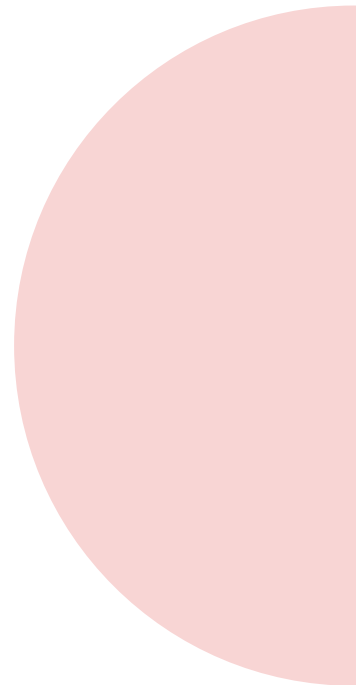
Cases studies



Interviews and site visits

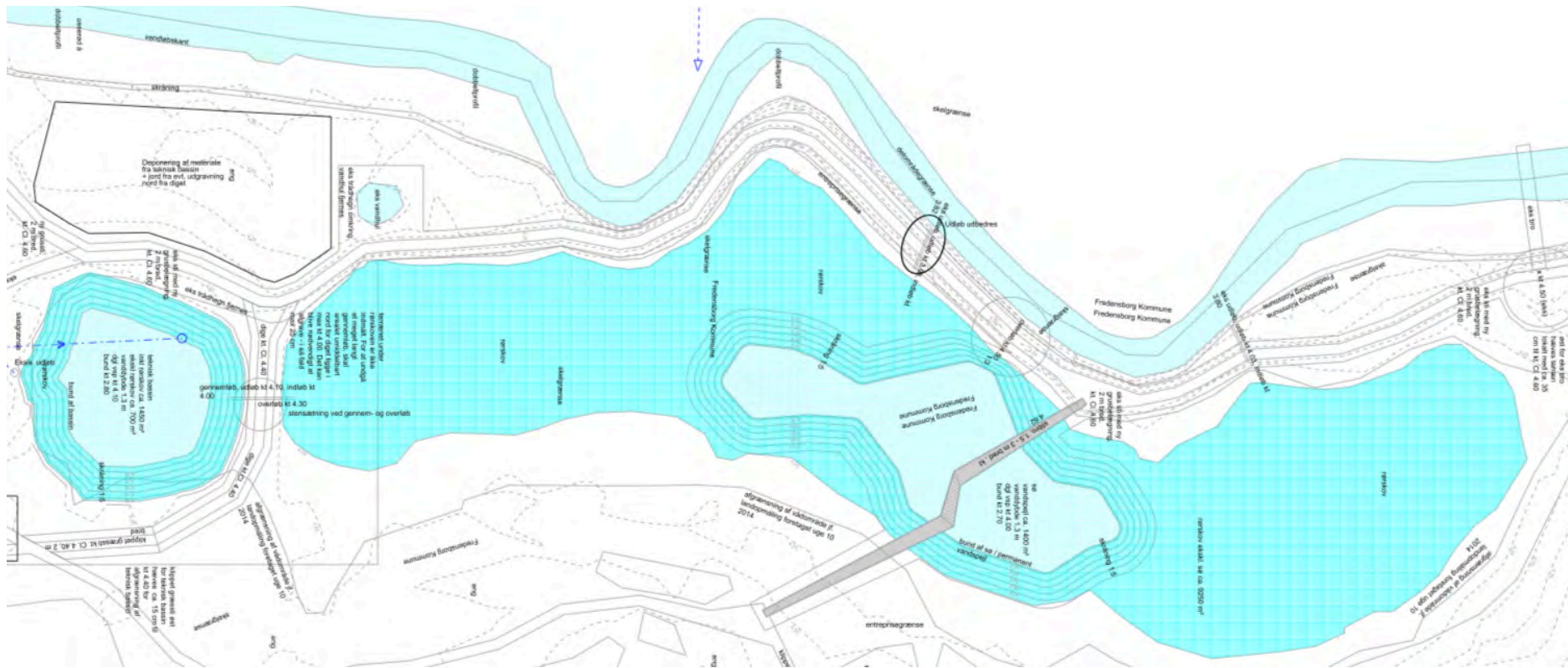


ESS analytical framework





# Kokkedal Ådalen



Age (yrs)	Area (m <sup>2</sup> )	Permanent pool depth (m)	Storage depth (m)
3	1400	1.3	0.5



# Kokkedal Ådalen – Site Visits



# Holmegårdsparken



<b>Age (yrs)</b>
2
<b>Area (m<sup>2</sup>)</b>
360
<b>Permanente pool depth (m)</b>
1.5
<b>Storage depth (m)</b>
0.1

# ? Holmegårdsparken – Interviews

DSI Holmegårdsparken

Opland

Orbicon



# Holmegårdsparken – Site Visits



# Analytical Framework

Added Values

Supporting | Biodiversity

Regulating | Water Quality

Regulating | GHG

Regulating | Air Quality

Regulating | Microclimate

Provisioning | Food

Provisioning | Raw Materials

Cultural | Recreation

Cultural | Education

Cultural | Aesthetics

favour native habitats and species  
 align with local biodiversity objectives  
 establish habitat connectivity  
 close to non-intensively managed landscapes  
 paths do not disturb wildlife  
 smaller ponds in the proximity  
 trees and shrubs against excessive waterfowl  
 depths vary and includes depths over 1 meter  
 several plant species  
 open and slightly shaded areas  
 depth above 1.5 m have recirculation of water  
 deeper bottom closer to the outlet  
 breeding corners and small islands for waterfowl  
 path of overflow waters kept to a minimum  
 two-phase approach taken

Ecosystem Services by  
 Moore and Hunt, 2012

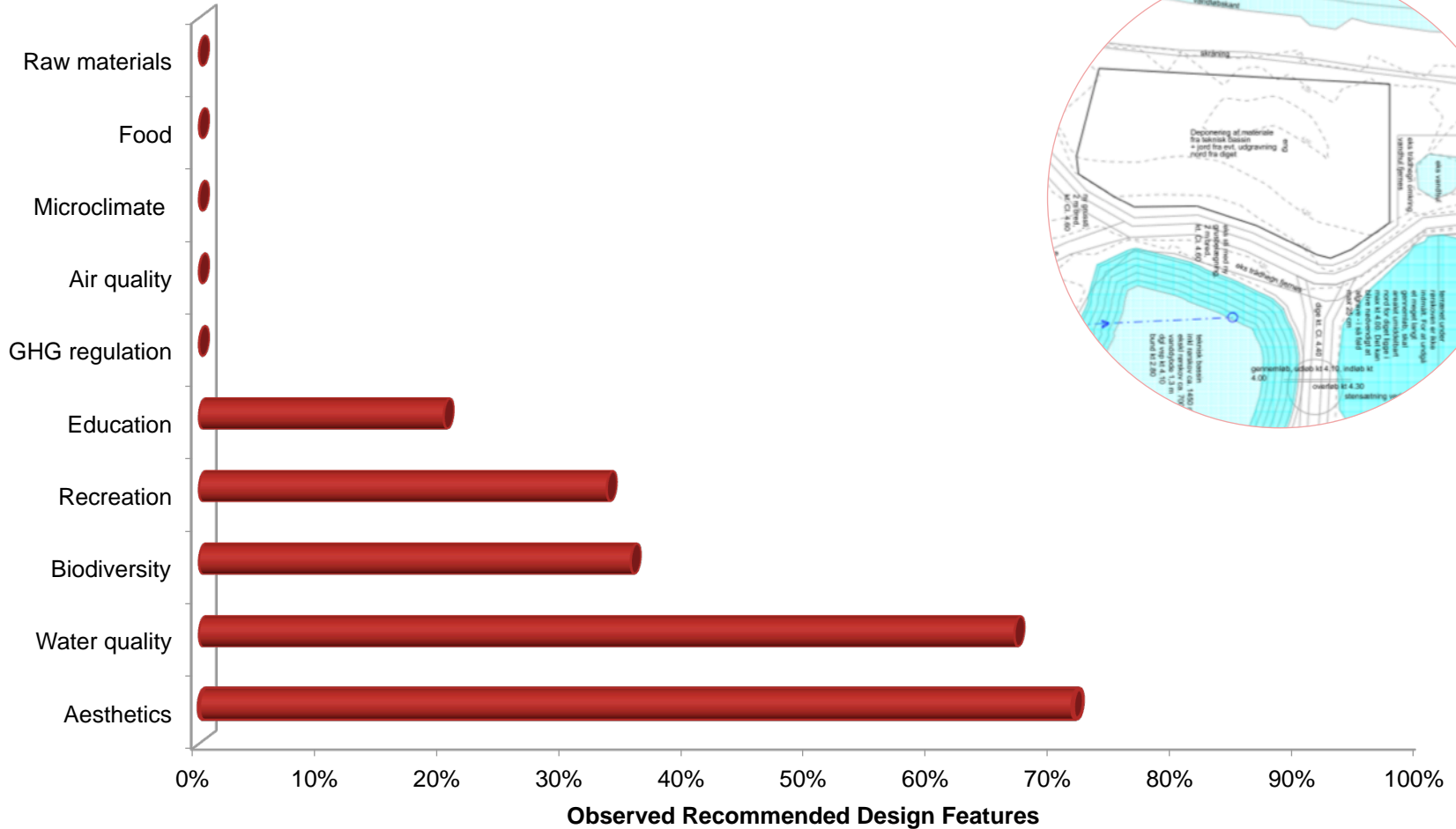
Design Features by  
 CIRIA and literature



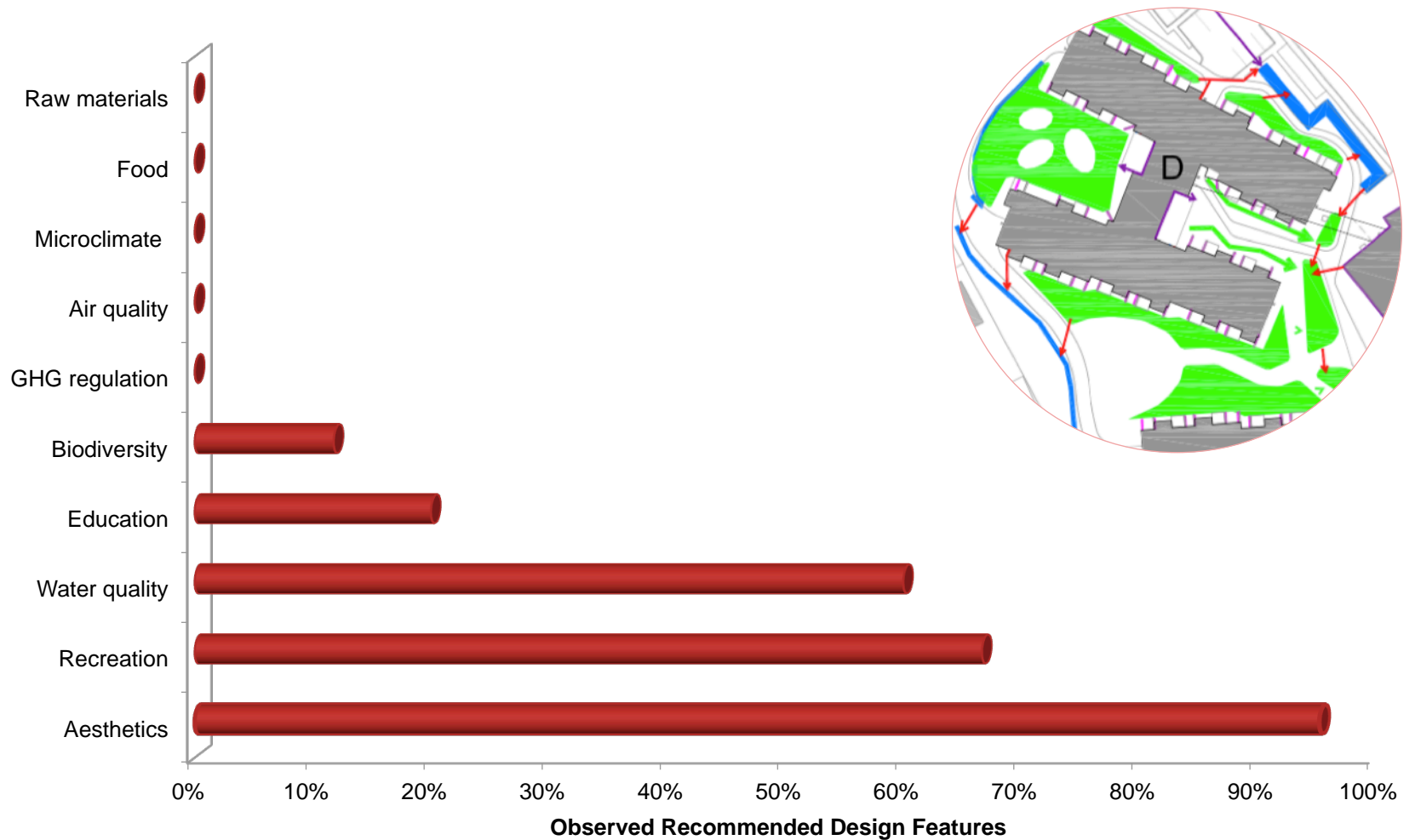


# Findings

# Design Considerations for Added Values



# Design Considerations for Added Values



# Design Considerations for Added Values



Limited consideration in the design.  
Most features related to suitable water quality.



Assumed to be sufficient based on  
common practices and no tests done.



Lacked consideration in design, but  
addressed through tours.



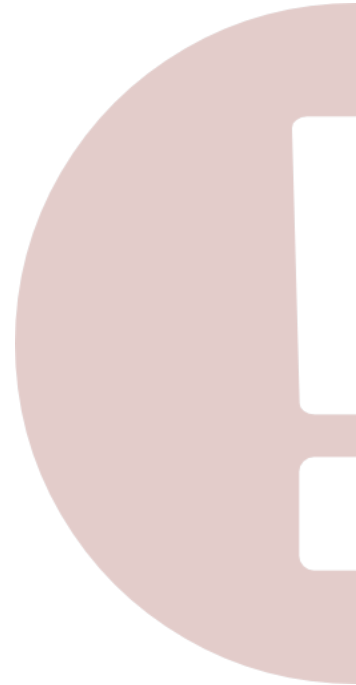
Key to preserve several pursued  
added values and a common issue.



## Discussion

# Discussion

- Education supporting SUDS practice
- Natural succession not allways favours biodiversity
- Added values are not the holy grail of design
- CIRIA's guidelines biased and context-specific





## Improvements

# Design Improvements Examples

- Biodiversity
  - Basin bottom with varying depths and deeper close to outlets
- Water Quality
  - Identifying pollutant profile, set goals and test discharge
- Education
  - Interpretation boards for citizens and professionals
- Maintenance
  - Operation and maintenance manuals and workshop transition



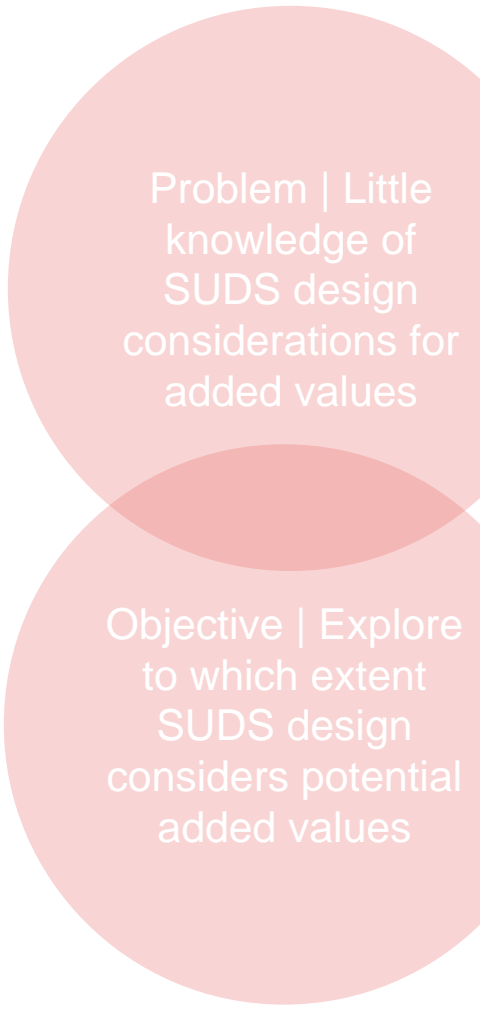




## Conclusions

# Conclusions

- Design considers multiple added values
- Several added values are not fully tapped
- Assumptions seem to be frequent
- Maintenance lacks attention
- Need to integrate broader expertise



Problem | Little knowledge of SUDS design considerations for added values

Objective | Explore to which extent SUDS design considers potential added values

# Marco Carreira Silva

Climate Adaptation | Technology Innovation | Project Management

## Competencies

- Climate adaptation innovation development
- Design and assessment of SUDS
- International project management
  
- Academic background
  - MSc. climate change (UCPH)
  - MSc. techno-anthropology (AAU CPH)
  - Eng. information technology (ISCTE-IUL)



**Ambition**  
Development and  
export of innovative  
climate adaptation  
solutions worldwide.

Thank you.