



Towards the best management of SuDS treatment trains

by

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Coventry

Overview

- SuDS presentation & Actual design
- Objectives
- Methodology
- Results
- Conclusion
- Further research
- Questions / feedback

SuDS presentation

Objectives

Methodology

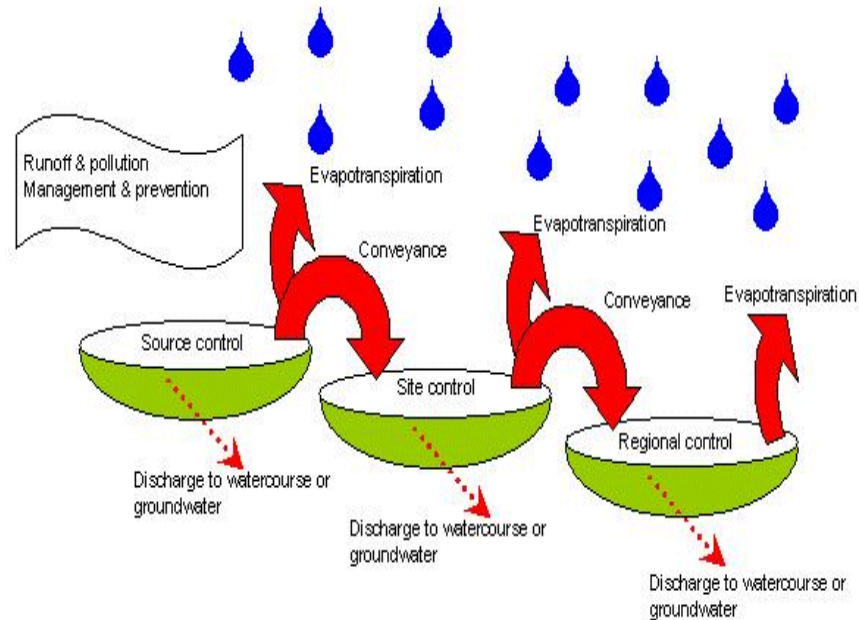
Results

Conclusion

Further research

Questions

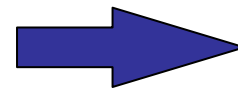
The “treatment train”



Treatment train

- Mimic natural drainage
- Better treatment
- Risk management
- Avoid shock loads

- Adoption
- Costs
- Land take
- Non integrated approach



Over 70% of SuDS schemes in Scotland are using only a single SuDS device (Wild, 2002)

SuDS presentation

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Encourage move away from
“end-of-pipe” techniques



Optimise management trains
for different developments

SuDS presentation

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- Selection
- Holistic assessment
- Case study

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Catchment and
site characteristics

Land use

SuDS
characteristics



Selection of potential source and site SuDS



Holistic assessment of SuDS in series

SuDS presentation

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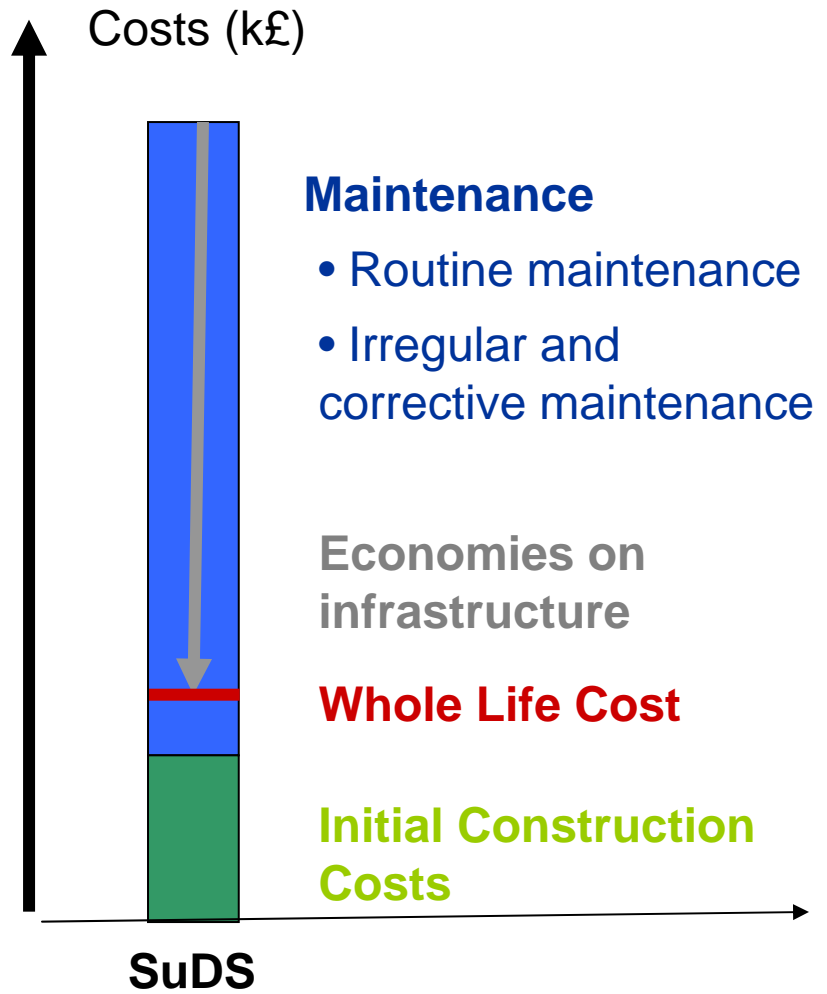
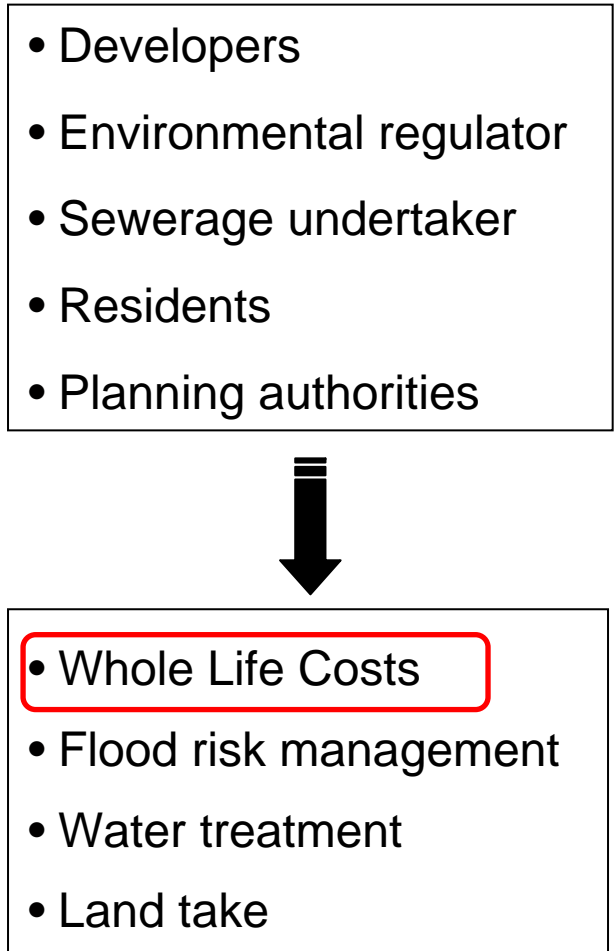
- Selection
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Towards the Best Management of SuDS Management Trains *by Nicolas BASTIEN*



SuDS presentation

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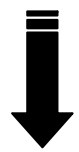
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Questions

- Developers
- Environmental regulator
- Sewerage undertaker
- Residents
- Planning authorities



- Whole Life Costs
- **Flood risk management**
- Water treatment
- Land take

Environmental regulator Local authorities



Impact on watercourse water quality and channel hydrology Risk of downstream flooding



- No attenuation
- Limited attenuation (30 years)
- Robust attenuation (100 or 200 years)

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- Whole Life Costs
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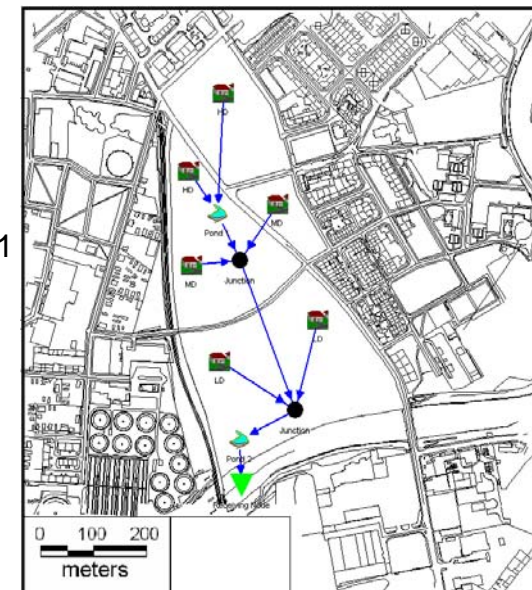
Parameters influencing SuDS water quality performance:

- Influent water quality
- SuDS ability to remove pollutants
- Residence time
- Area of facility

Model for urban stormwater improvement conceptualisation: MUSIC

Input:

- M1-60 event
- TSS 160 mg.l⁻¹
- TN 2.63 mg.l⁻¹
- TP 0.35 mg.l⁻¹



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Design based on guidelines available in the UK:

- CIRIA , 2007. The SuDS Manual
- Scottish Water, 2007. Sewers for Scotland, 2^d edition

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Clyde Gateway SWMP:

- 339 Ha redevelopment
- 16 Ha allocated to regional SuDS controls

Dalmarnock Road area:

- 20 Ha development
- 5000 m² for regional control

SuDS presentation

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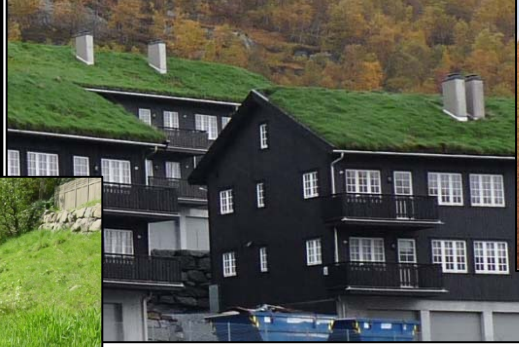
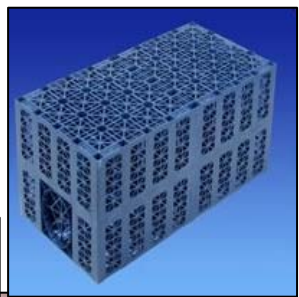
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- Catchment and site characteristics
- SuDS characteristics
- Land use
- Potential amenity – biodiversity / density



➡ 23 treatment trains

SuDS presentation

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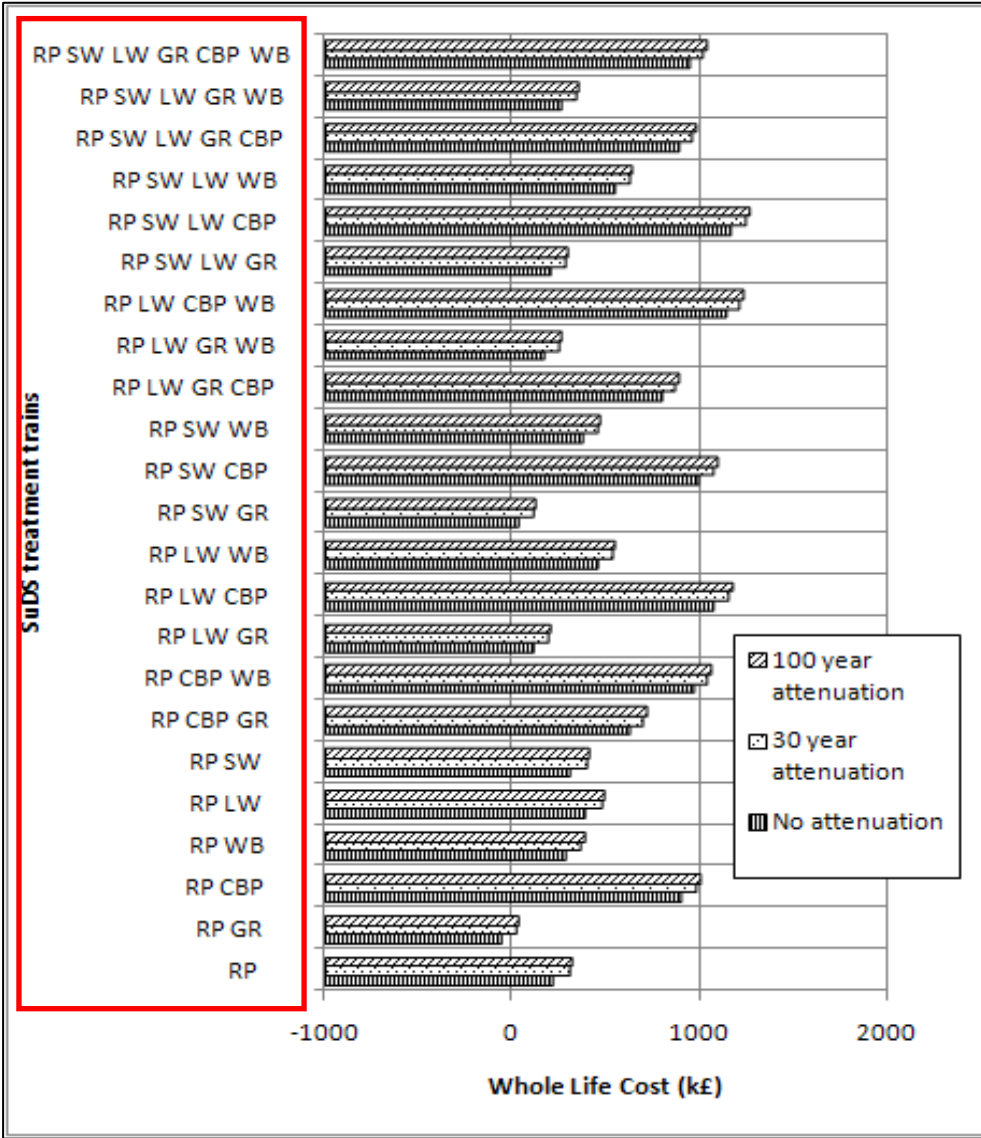
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Whole Life Cost



- RP Regional Pond
- GR Green Roof
- CBP Concrete Block Pavement
- WB Water Butt
- SW Swales
- LW Linear Wetland

A few interesting solutions:

- Green roofs
- Swales
- Linear wetland

SuDS presentation

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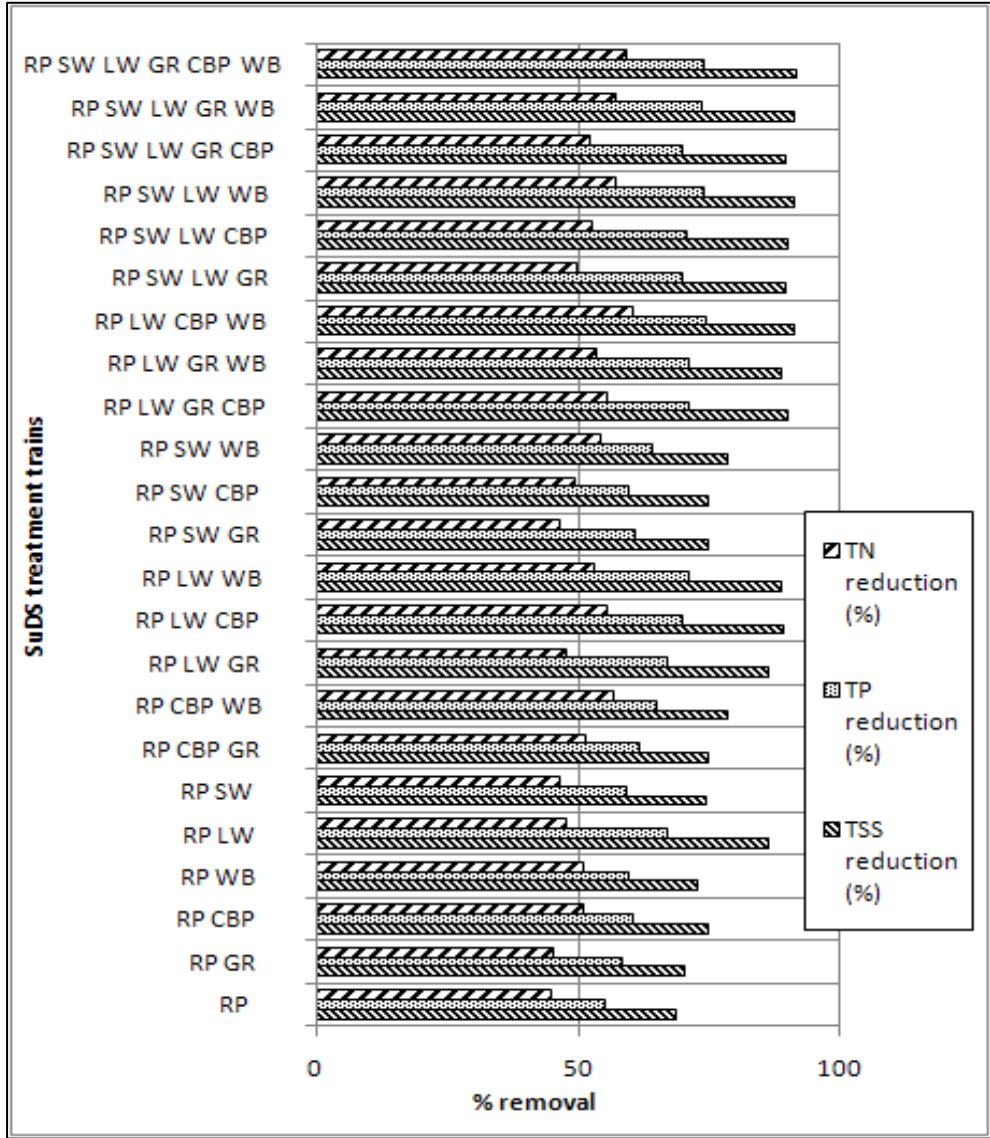
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Water quality

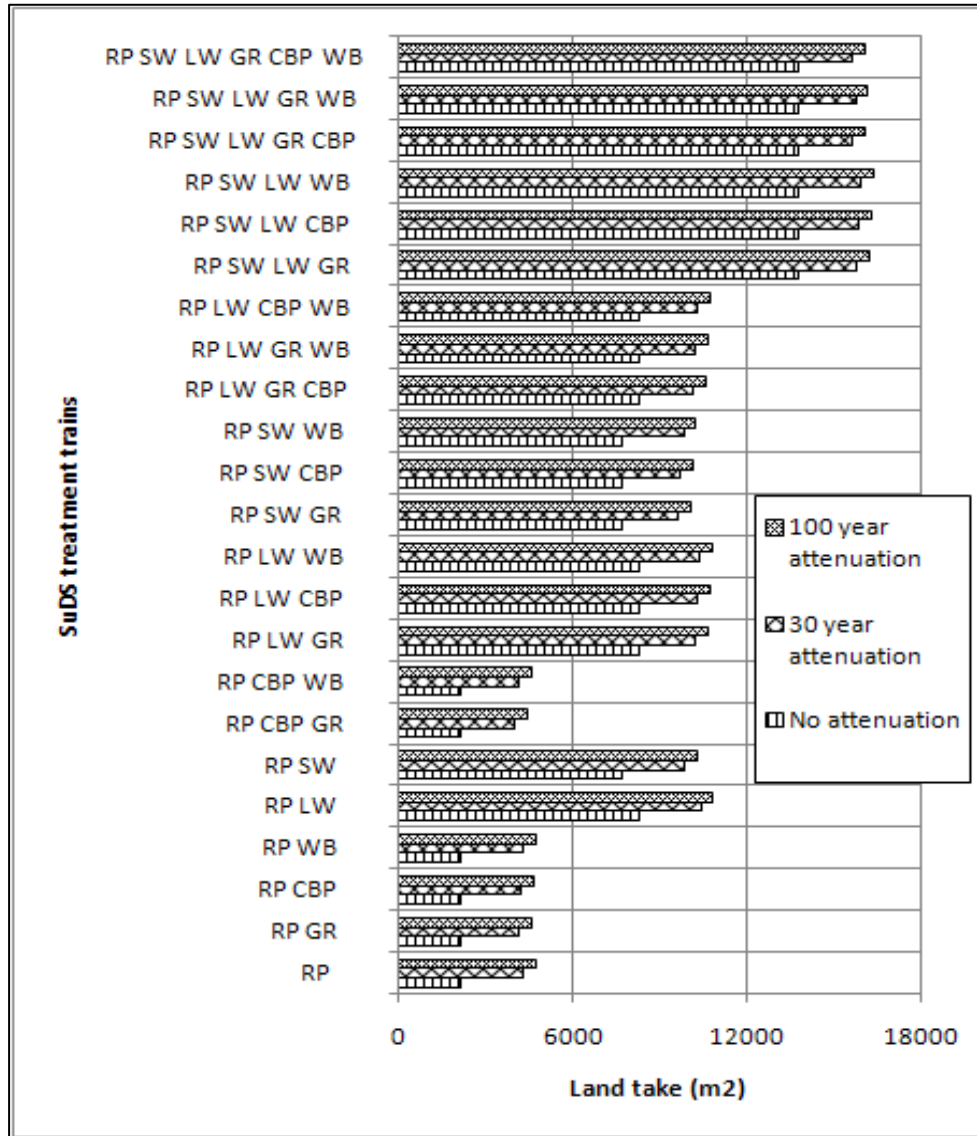


Significant water quality improvements

E.g. TSS improvement up to 25%.

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Land take



A few interesting solutions:

- Concrete Block Pavement
- Green Roofs

Opportunity to reduce land take based on:

- Reduction of attenuation volume
- Reduction of permanent pool

Land take reduction: permanent pool reduction

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SuDS Treatment Trains	Achievable reduction of regional SuDS land take (%)	Achievable reduction of SuDS treatment train's land take (%)
RP	0	0
RP GR	0	0
RP CBP	20	20
RP WB	13	13
RP LW	100	27
RP SW	20	6
RP CBP GR	20	20
RP CBP WB	33	33
RP LW GR	100	27
RP LW CBP	100	27
RP LW WB	100	27
RP SW GR	20	6
RP SW CBP	20	6
RP SW WB	26	7
RP LW GR CBP	100	27
RP LW GR WB	100	27
RP LW CBP WB	100	27
RP SW LW GR	100	16
RP SW LW CBP	100	16
RP SW LW WB	100	16
RP SW LW GR CBP	100	16
RP SW LW GR WB	100	16
RP SW LW GR CBP WB	100	16

Regional control can be significantly reduced

Difficult to offset SuDS treatment train footprint

* Based on TSS removal

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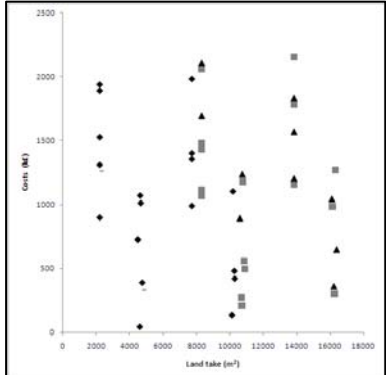
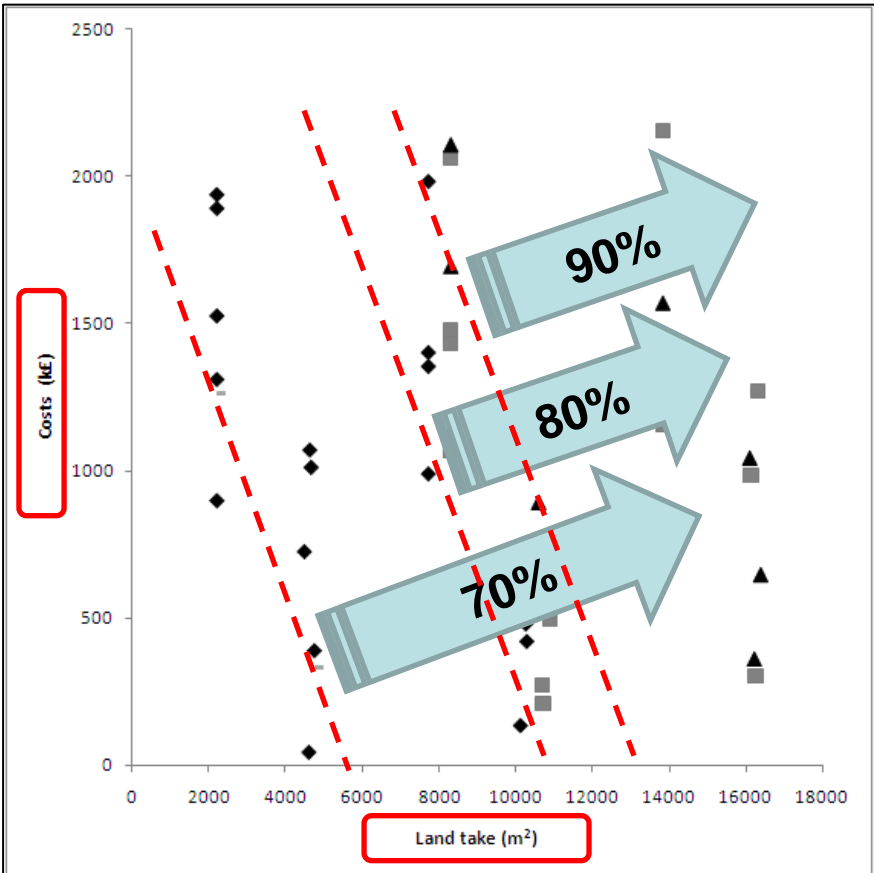
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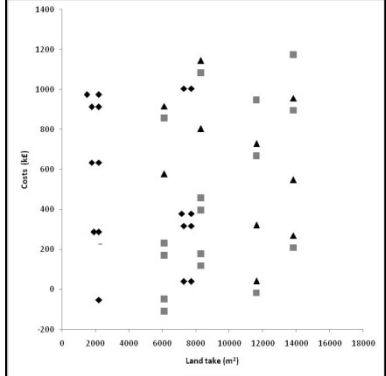
Questions

Establish relationship between:

- Whole life costs
- Land take
- Water quality
- Flood risk management



Limited retention



Robust retention

SuDS presentation

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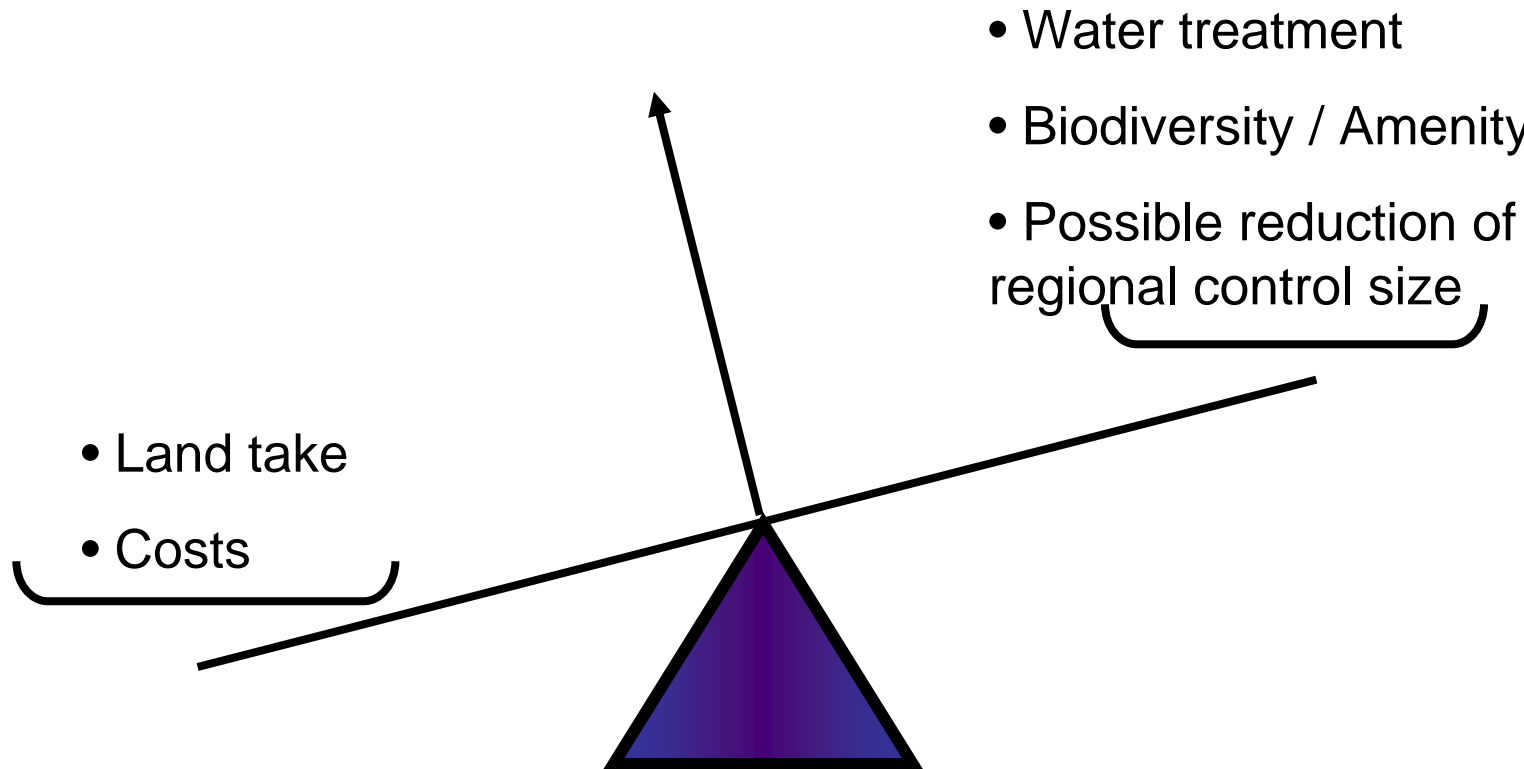
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• Alternative solutions are existing



SuDS presentation

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- Whole Life Costs
- Flood risk management
- Water treatment
- Land take
- Understand public perception of SuDS

Thank you!

Acknowledgements:

