The Multi-Hydro flood model and SMARTeST technologies

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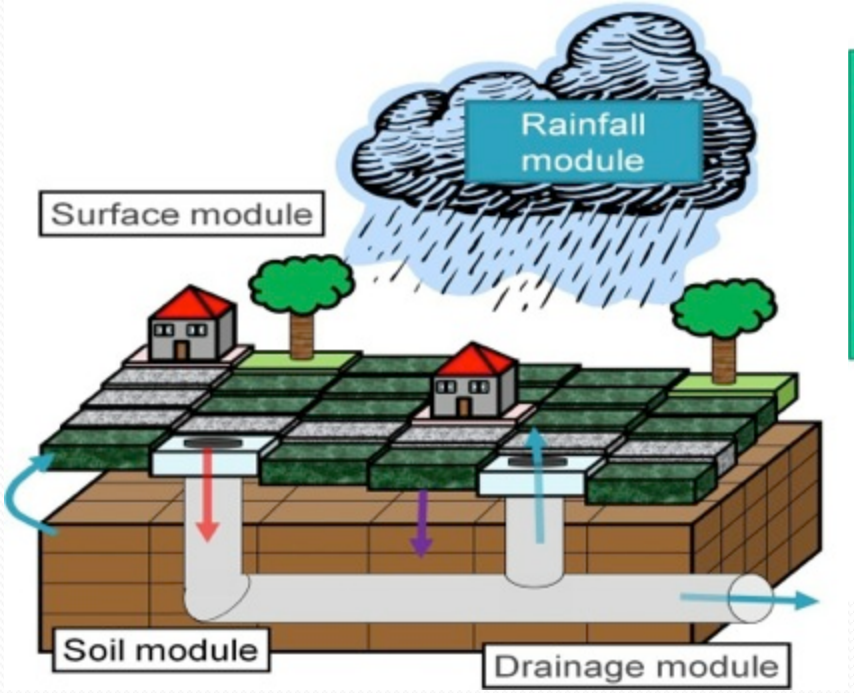
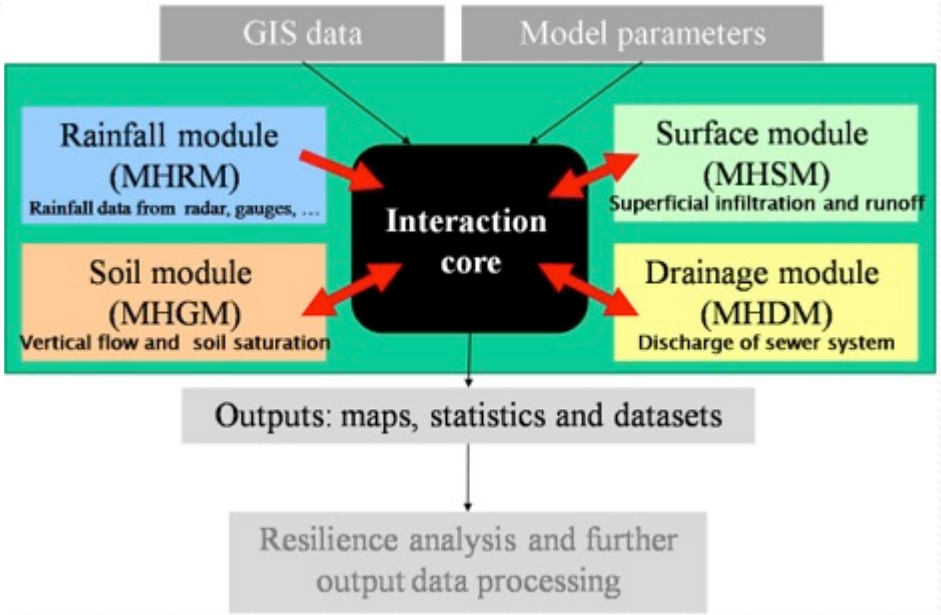
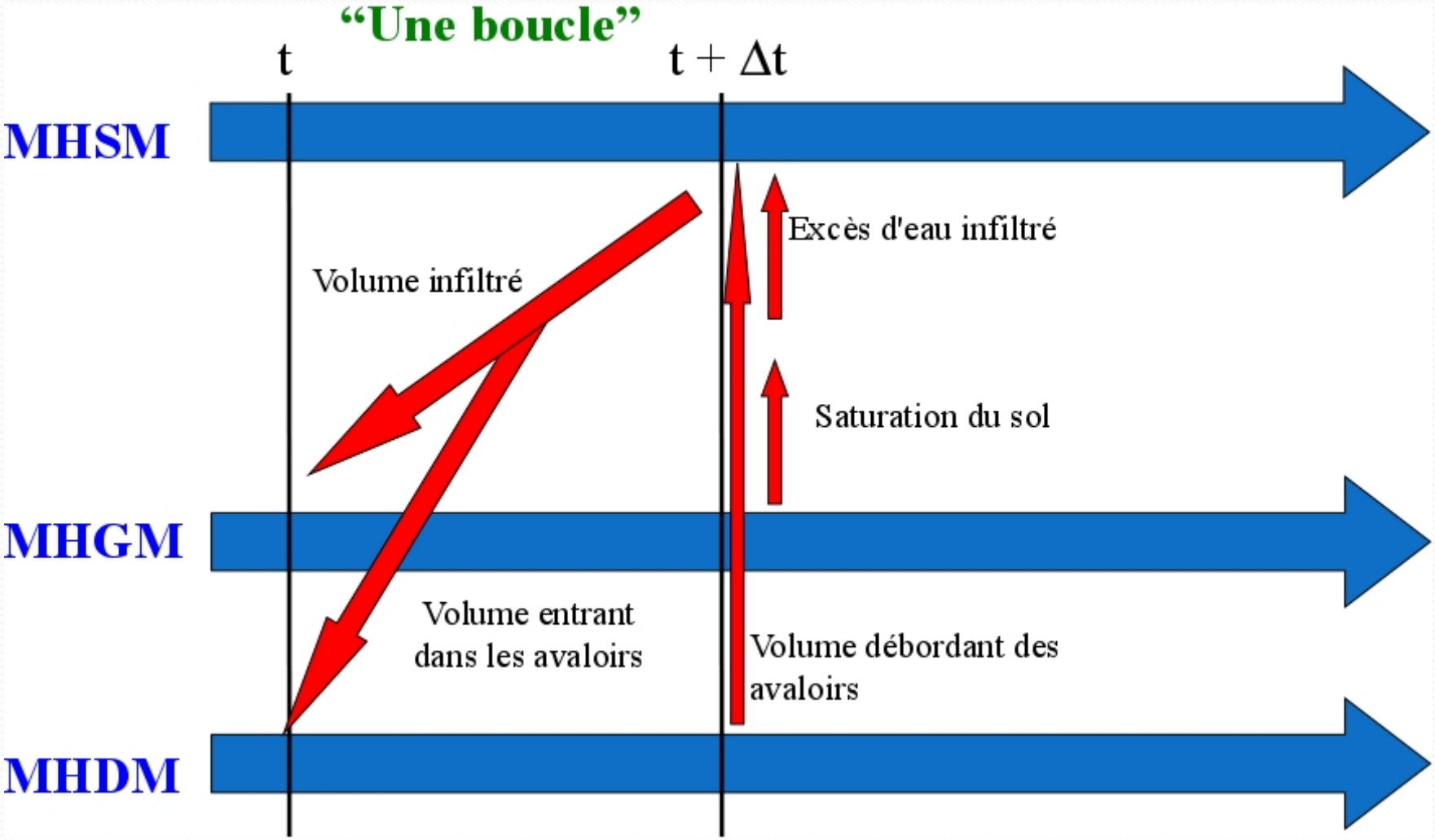
Multi-Hydro - Description





- Totallement distribué
- Structure modulaire ➔ <u>interopérabilité</u>
- A base physique ➔ Assimilation facile de données SIG
  ➔ Génération à différentes échelles des données manquante
- <u>Transportable</u> ➔ Basé sur les SIG
  ➔ Absence de calage → Outil SIG dédié = MH-AssimTool
- <u>Scalable</u>

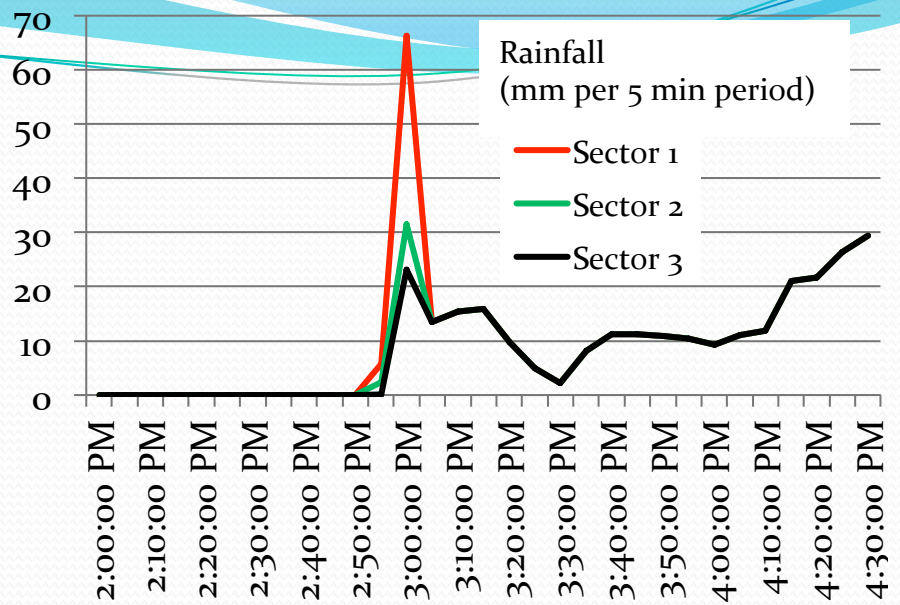
Couplage des modules

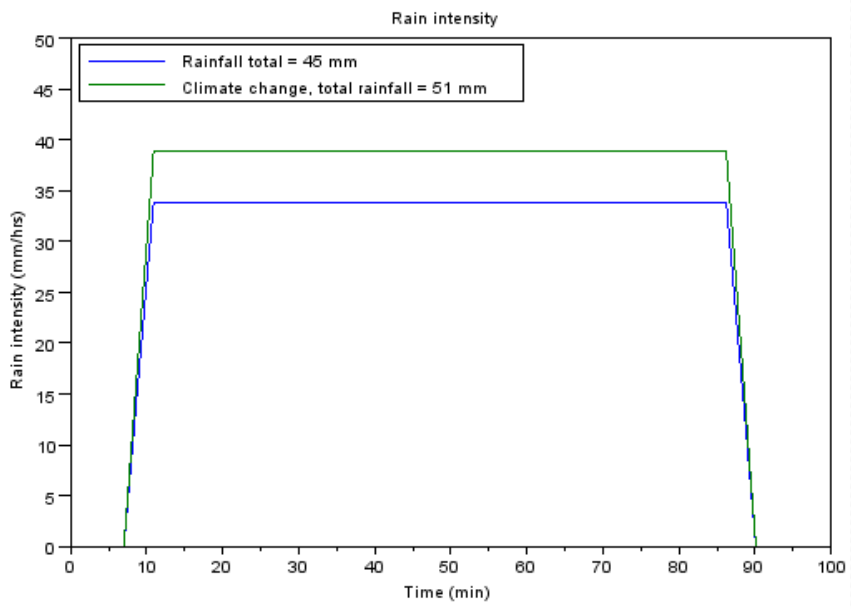


Heywood case study - Location

Scenario 1

- Flood event in Heywood, Greater Manchester, 2004-08-03
- Model parameters:
  - 40mm rainfall over 80 minutes, homogenous across area
  - 1m spatial resolution
  - No flood resilience interventions
  - Land cover classes: vegetation, building, road, water
  - Homogenous clay soil across area
  - No discharge through sewers





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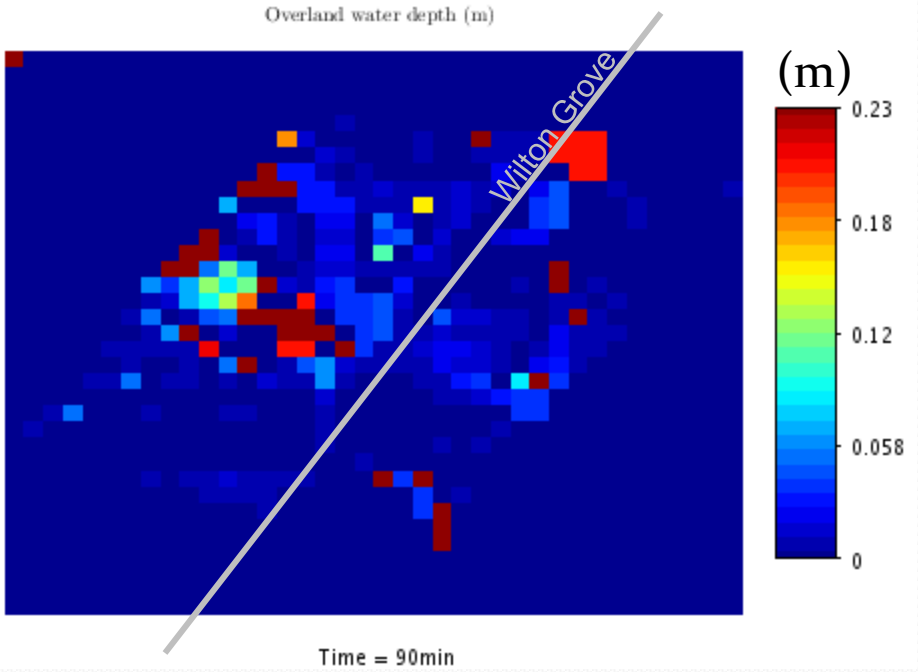
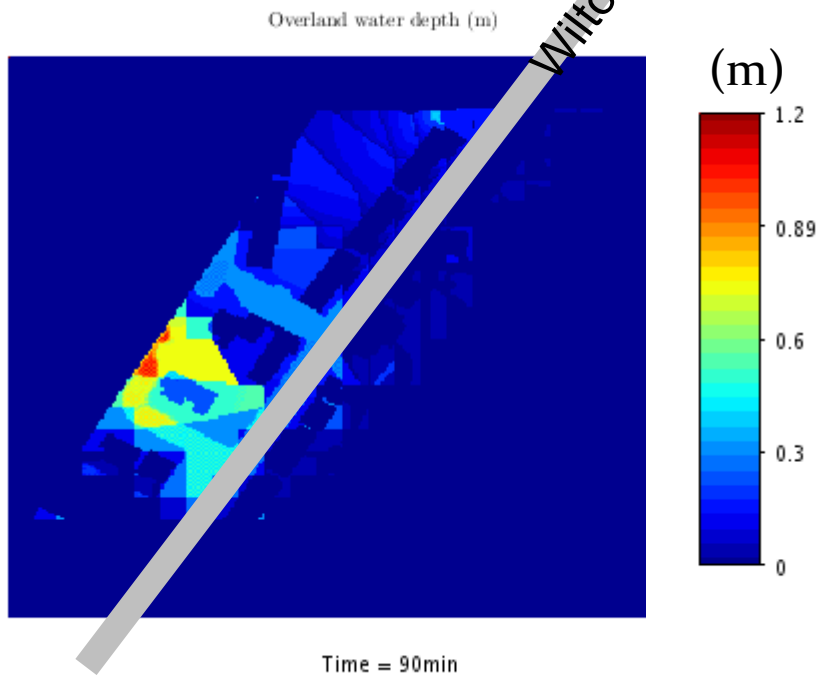
Scenario 1 – modelling result

Water depth at the end of the rain event

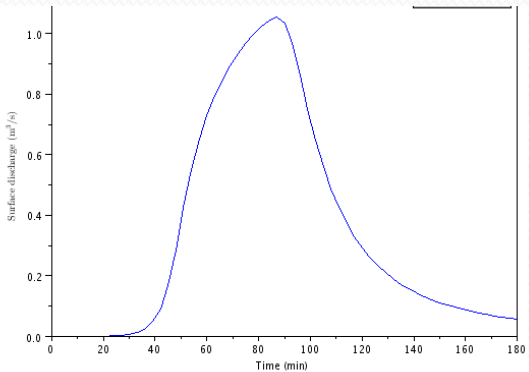




Catchment level

Spatial resolution : 15 m
Depth max.: 23 cm

Peak flow at
outlet: 1.05 m^3/s

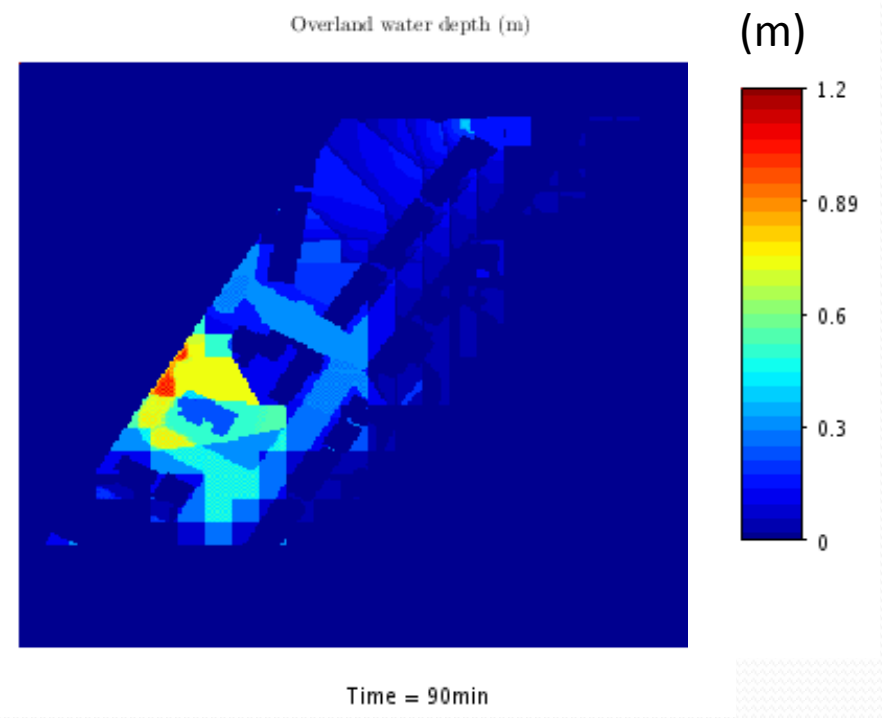


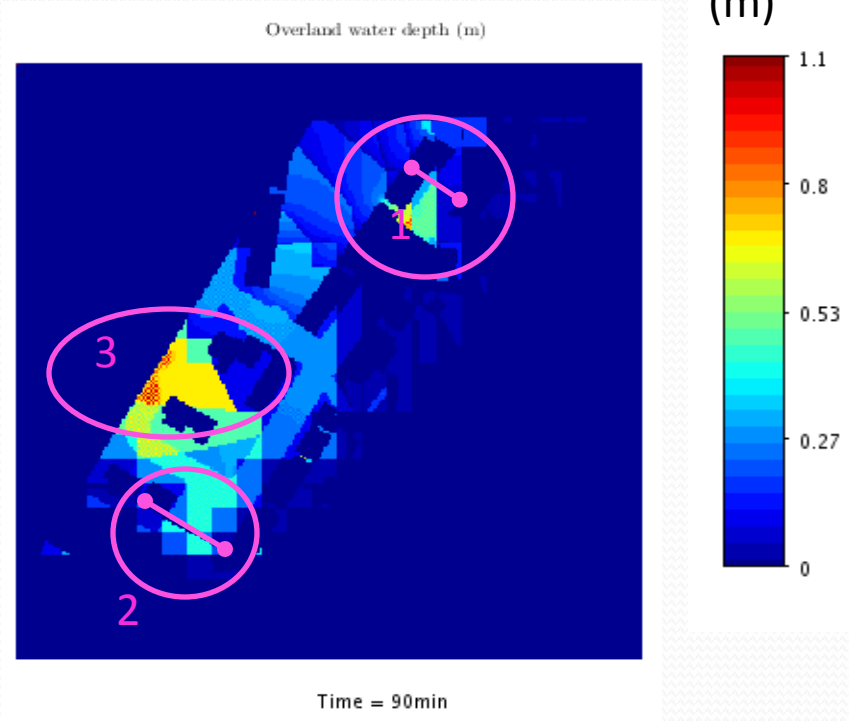
Street level (Wilton Grove)

Spatial resolution: 1 m
Depth max.: 1.2 m

Scenario 2: Barriers on

As scenario 1, but with flood gates installed at north and south side of Wilton Grove



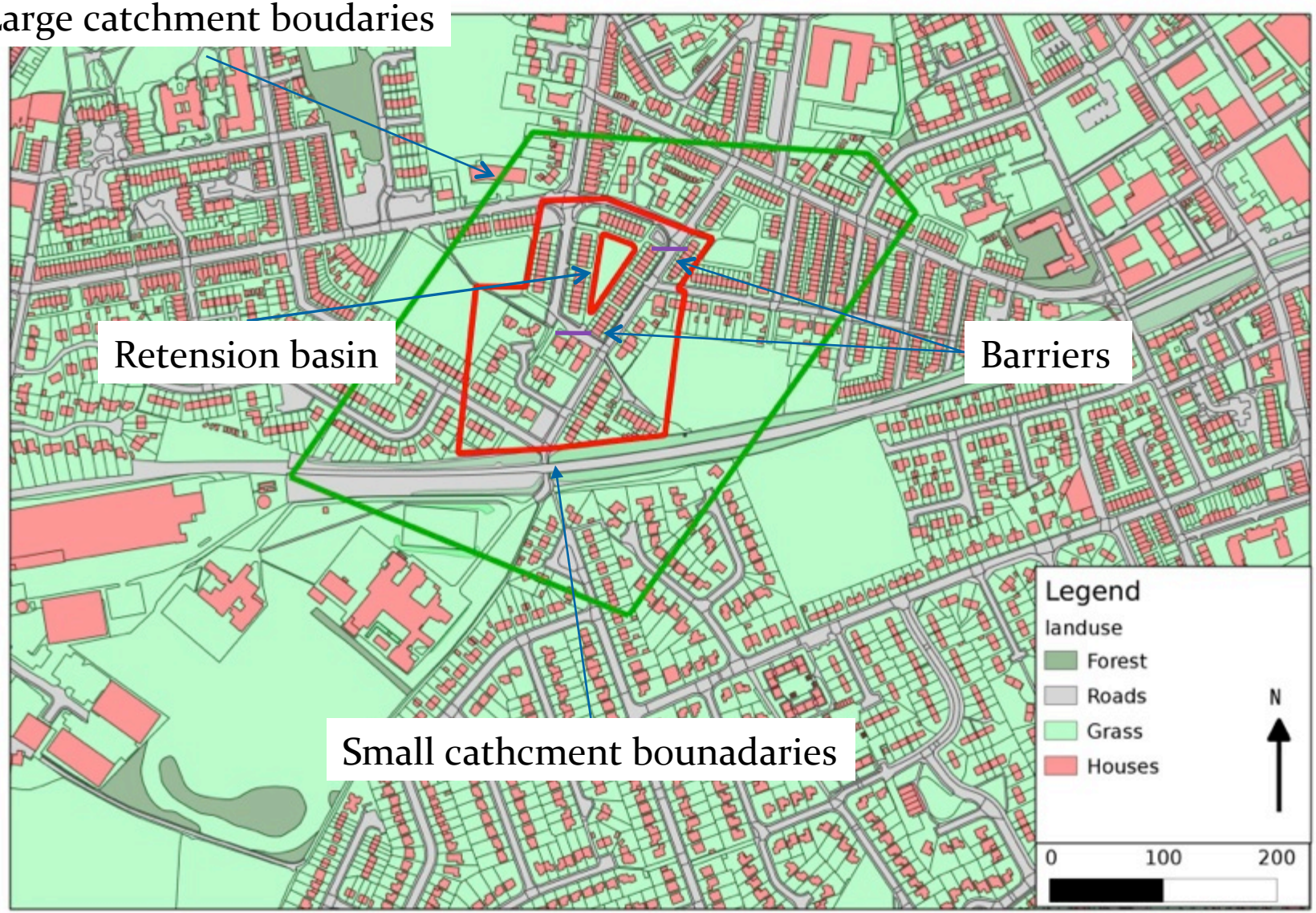


Effects of barriers:

- Area 1: increase of water depth upstream and no water downstream of the barrier
- Area 2: no effect of the barrier, due to flow direction from northeast to southwest
- Area 3: small decrease of water depth

Heywood case study - Location

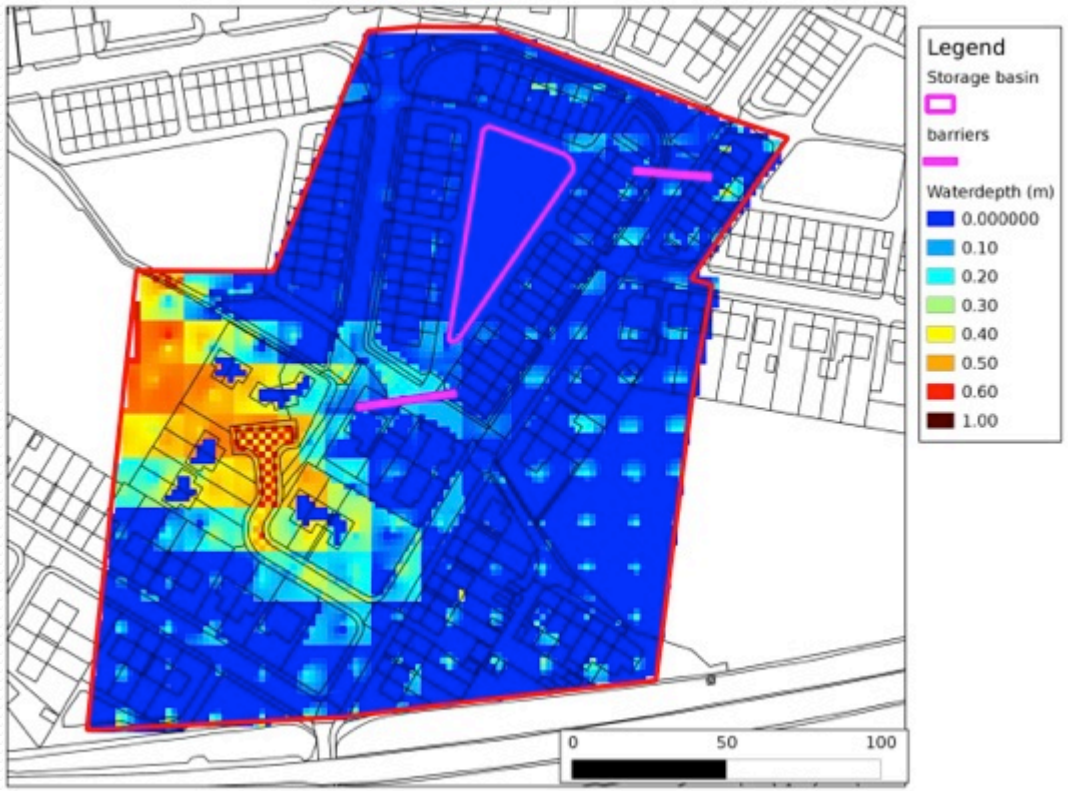
Large catchment boudaries



Large catchment to evaluate the lateral inflow for the small one

Barriers + Basin 50cm

Rainfall = 58.5 mm



Roughly the same result as basin of 1.5m :

- only 15 cm in Egerton Street (25 with 1.5m basin)
- only between 15 to 45 cm in green areas (30 to 60 with basin)

Results need to be analysed regarding to

- ➔ Difference of cost for deep of 1.5m or 0.5 m + barrier ?
- ➔ Comparison with damage costs ?
- ➔ Return period ?
- ➔ Acceptability of inhabitants (basin size) ?

Conclusions

- Ability to simulate various types of SMART measures, with parameters (height, materials, time required to erect barriers, time of alert, ...)
- Works with full or partial input data
- Potential to produce results superior to other models due to coupling of different physical processes