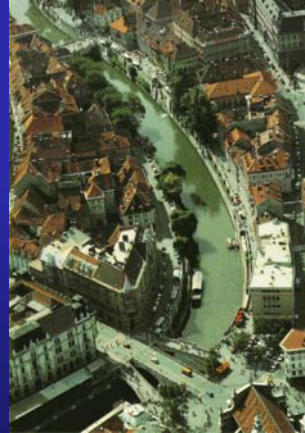


## Real-time pollution management



*Dr Zoran Vojinovic*

## Urban Flooding Risk Everywhere...



Prague (Czech Republic)



Dhaka City (Bangladesh)

**Sewer overflow in many places...**



**Lisbon Harbour, Portugal - Summer 1999**



## Sewage "connections", Lao P.D.R



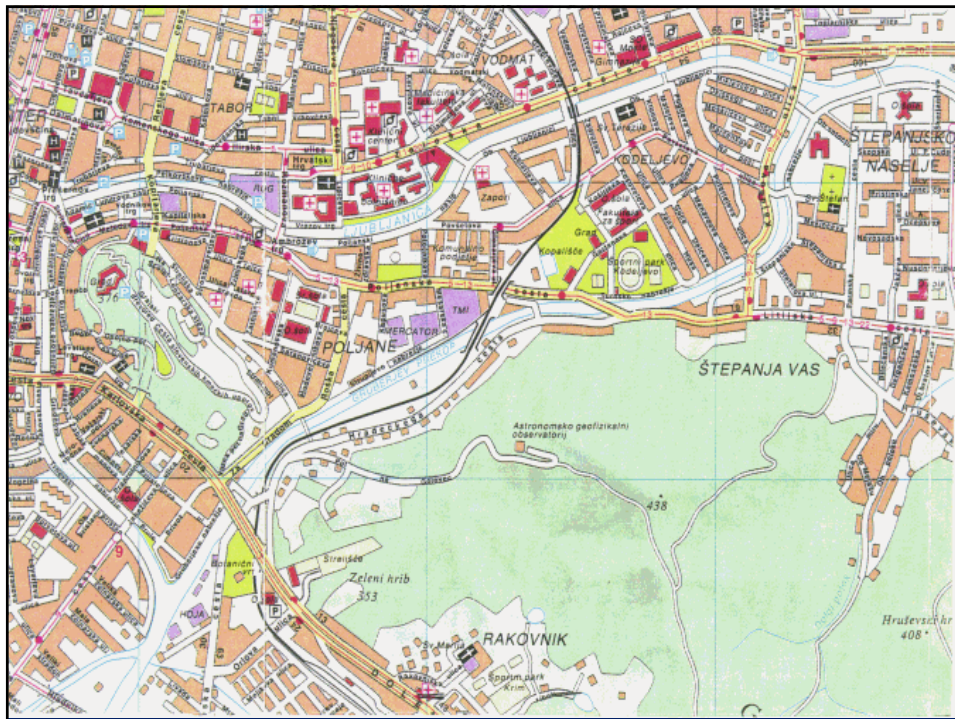
## Ljubljana Master Plan Project

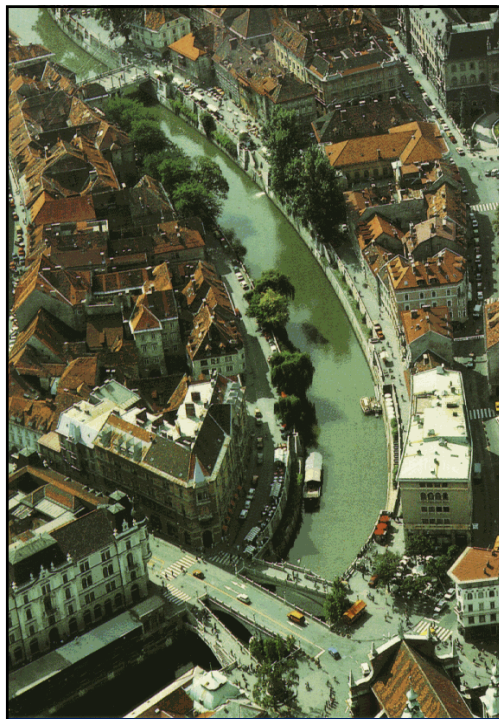
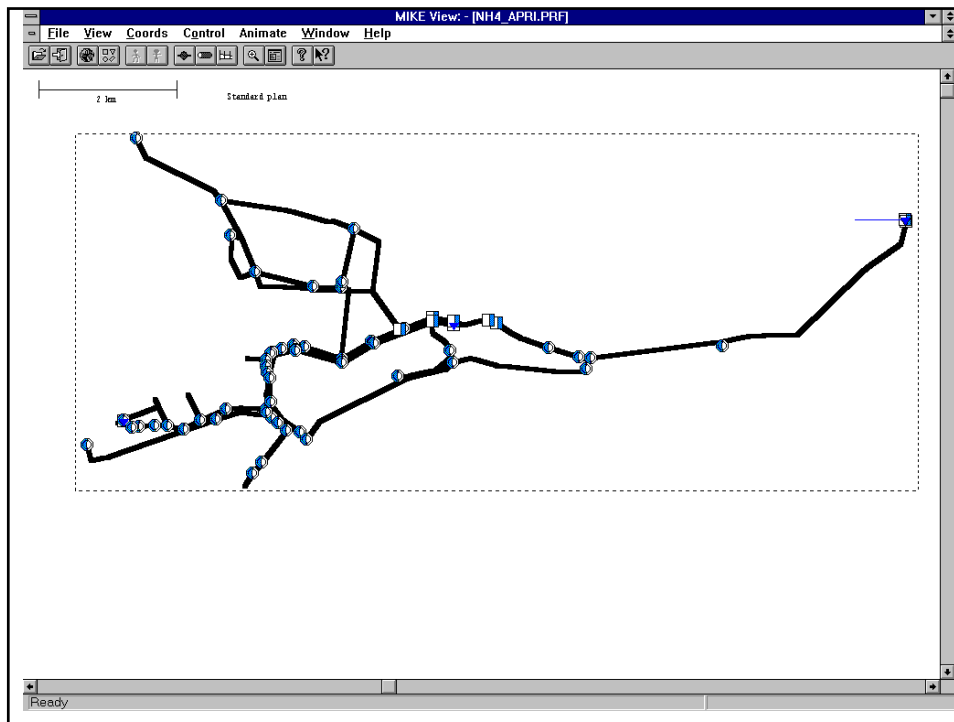
- Problem definition
- Methodologies
- Modeling tools
- Recommendations



## Ljubljana, Slovenia

- 275,000 inhabitants
- 4,640 ha
- 80% combined
- 700 km pipes
- 29 pumping stations
- 66 CSO structures



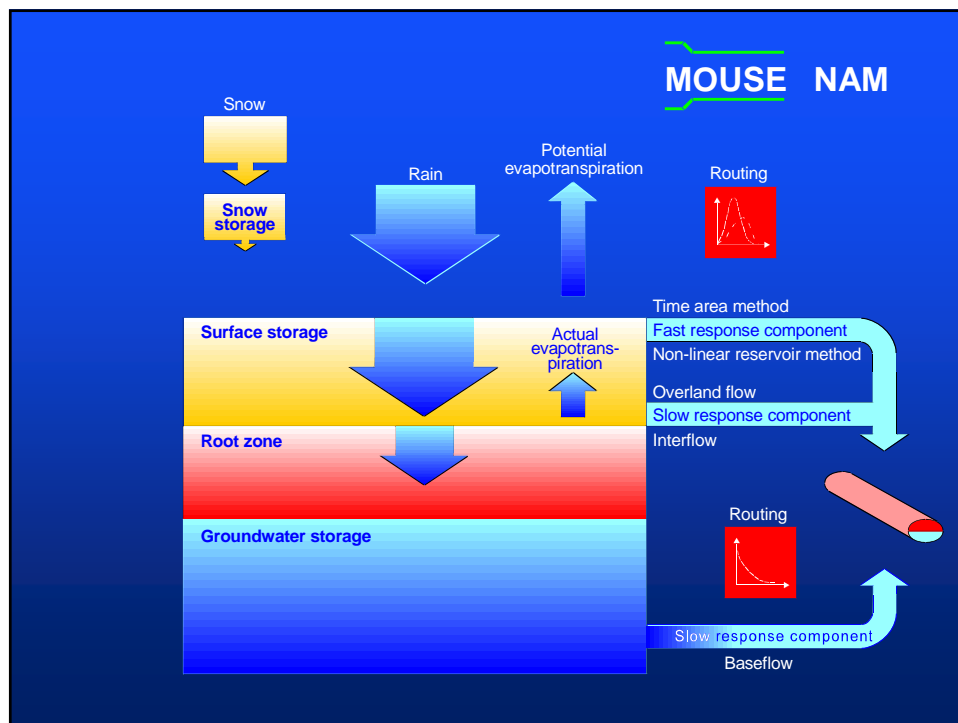


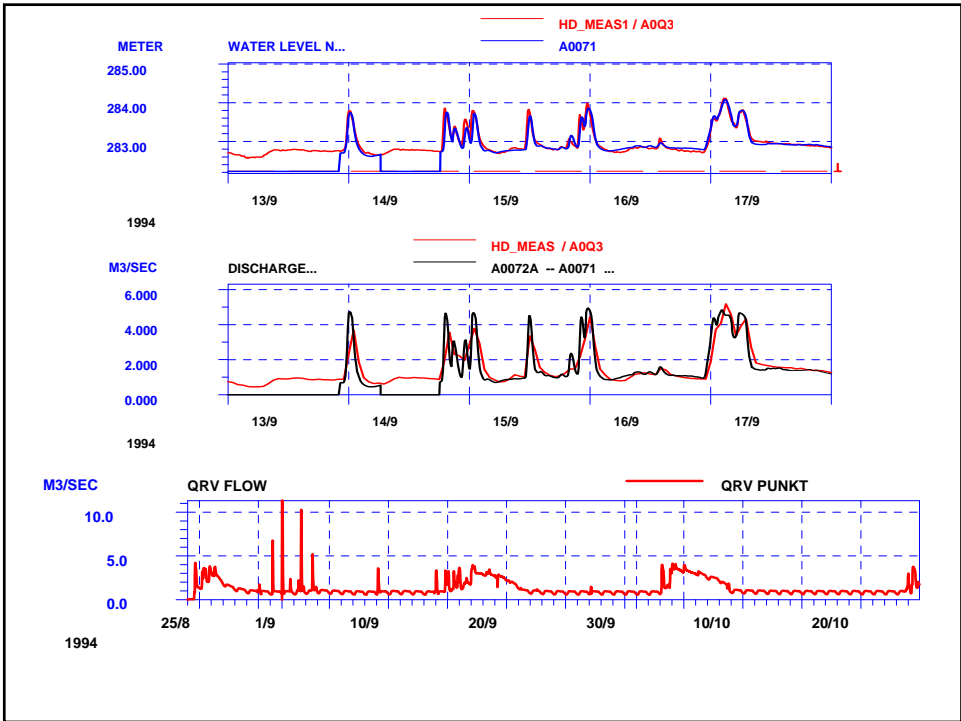
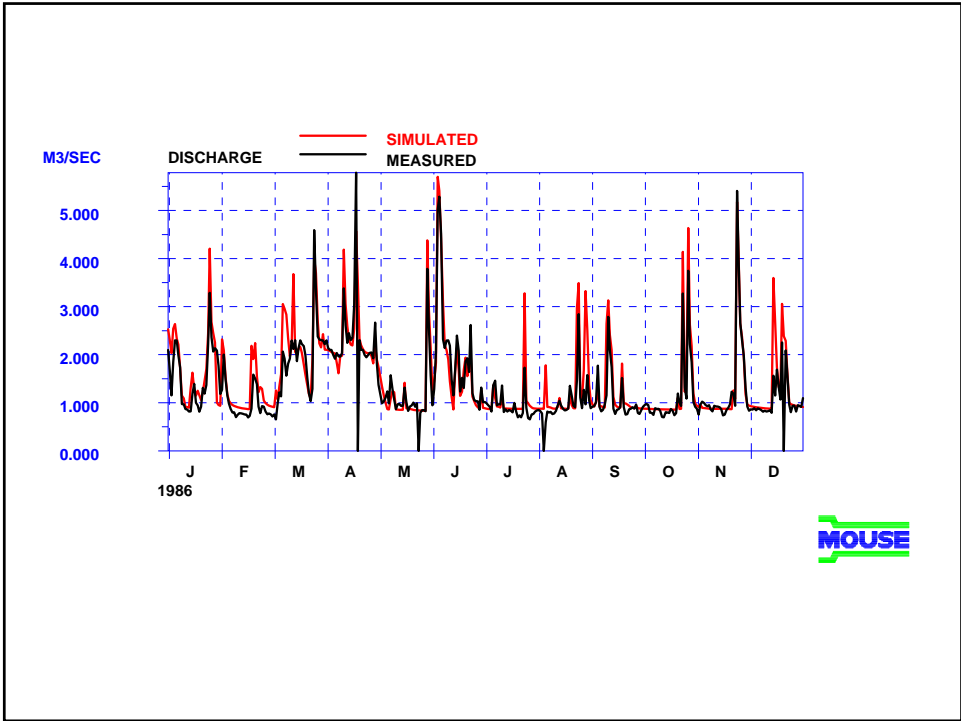
## Focus points

- CSO to the river
- Groundwater infiltration
- River back flows
- Sewer sediments
- Impact on receiving water
- WWTP loads

# Main Project Tasks

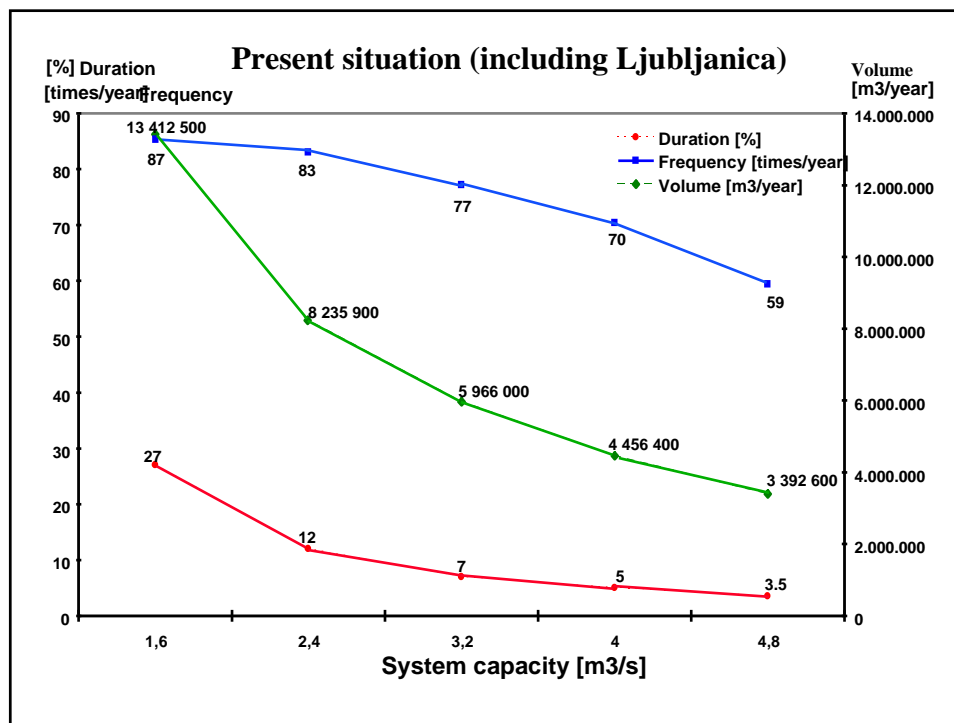
- Document present functionality
- Review alternative rehabilitation schemes
- Recommend upgrades





## Existing System

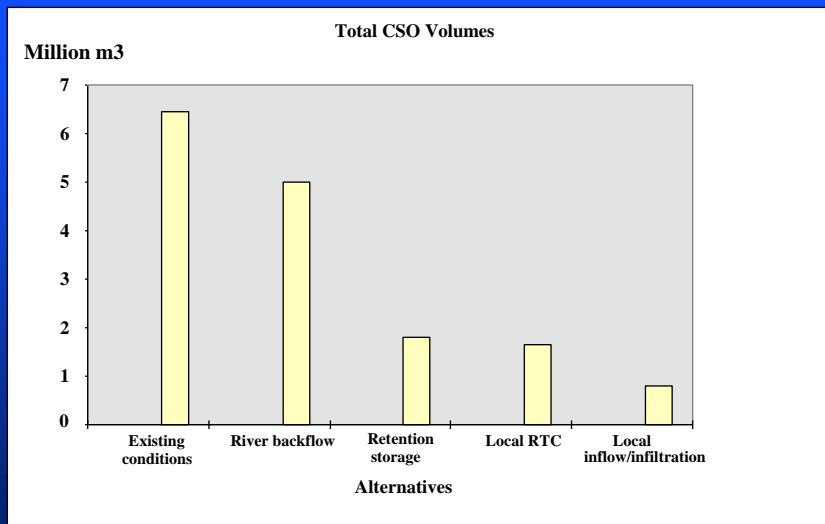
- Annual CSO Volume approx. 6.5 mio m<sup>3</sup>
- 70% spilled from two structures
- 5% spilled at the STW
- 20-25% of spills originate from river inflow



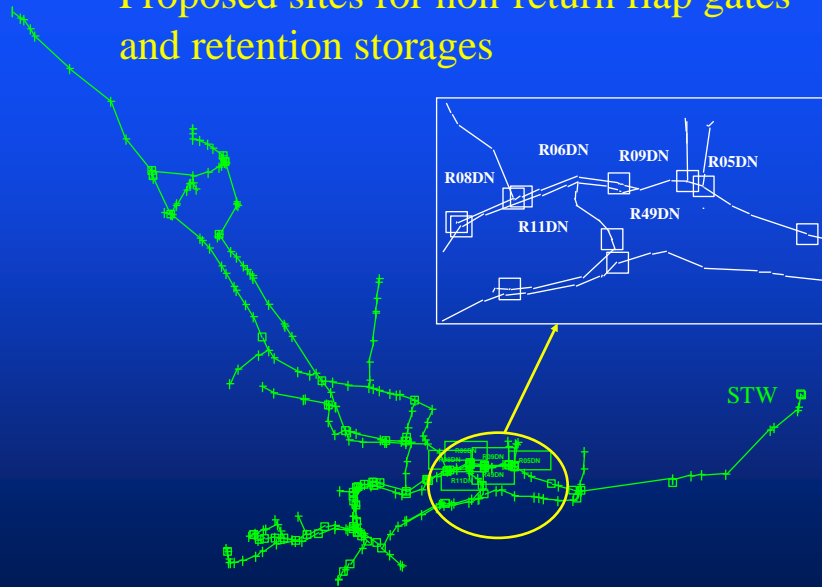


## Upgrade schemes

- First priority
  - Reduction of river inflow
- Short term solutions
  - Retention volumes, bottlenecks, pumps, local control
- Long term solutions
  - Local retention/infiltration, integrated RTC



## Proposed sites for non-return flap gates and retention storages



## Other activities

- Include impacts on receiving waters
- Detailed assessment of “best solutions”
- Transfer planning tools to client

