

Climate Resilience of Highway Network

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Project motivation

Resilience emerges as a promising pathway to climate change adaptation by tackling the challenges -- the high uncertainty of changing climate and the threat of cascading impacts in complex infrastructures. In highway sector, resilience studies are under high priority to understand how prepared the current highway network is in face of future extreme weathers and its dependency on related infrastructures.

Project aim

The project aims to develop a system approach to assess highway resilience in face of extreme weathers, with integrating geospatial analysis, risk assessment, network analysis, and modelling of potential cascading failure.

- Extreme rainfall is first selected for analysis, which is demonstrated with a case study of Greater London and surrounding areas.

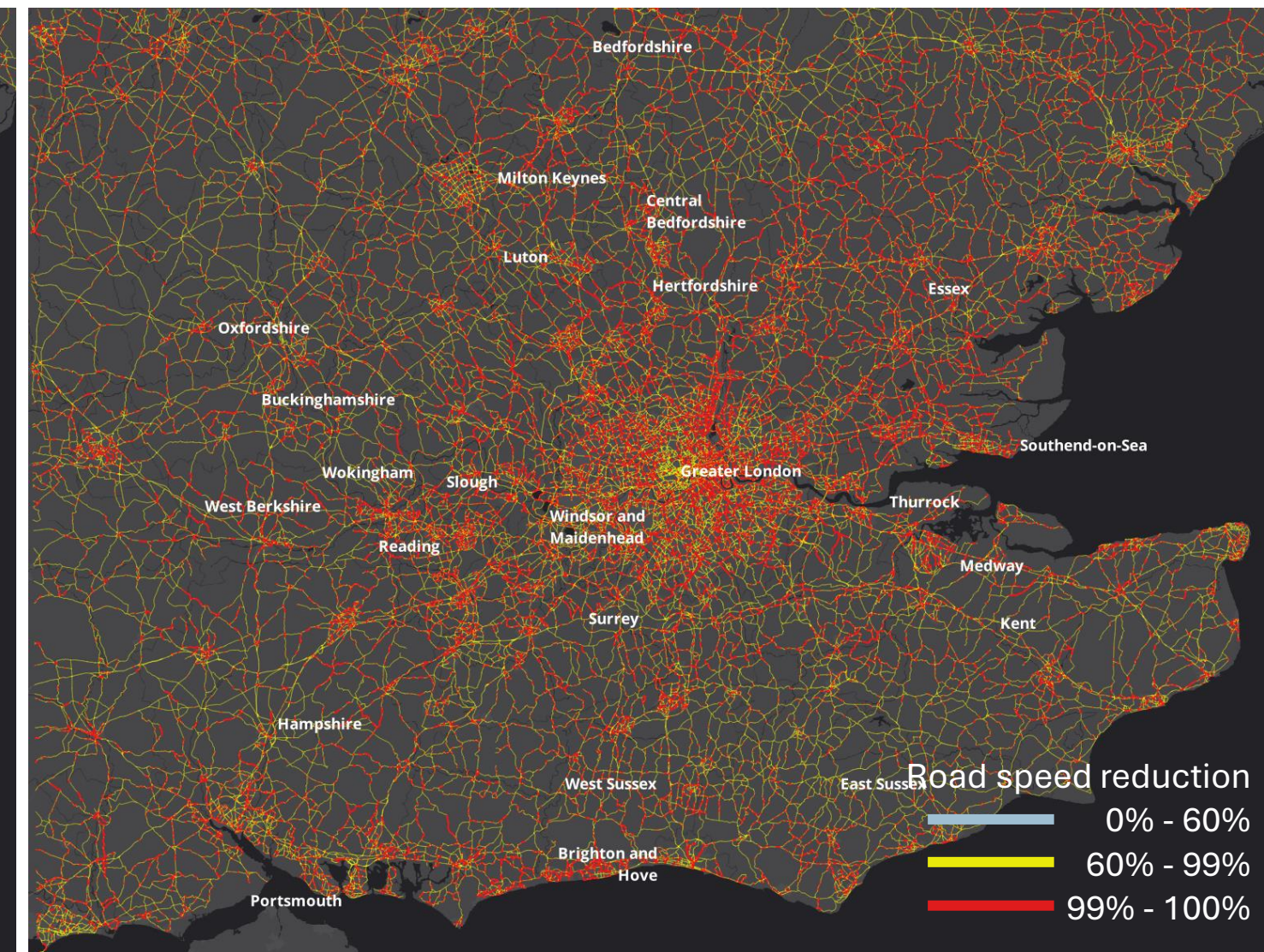
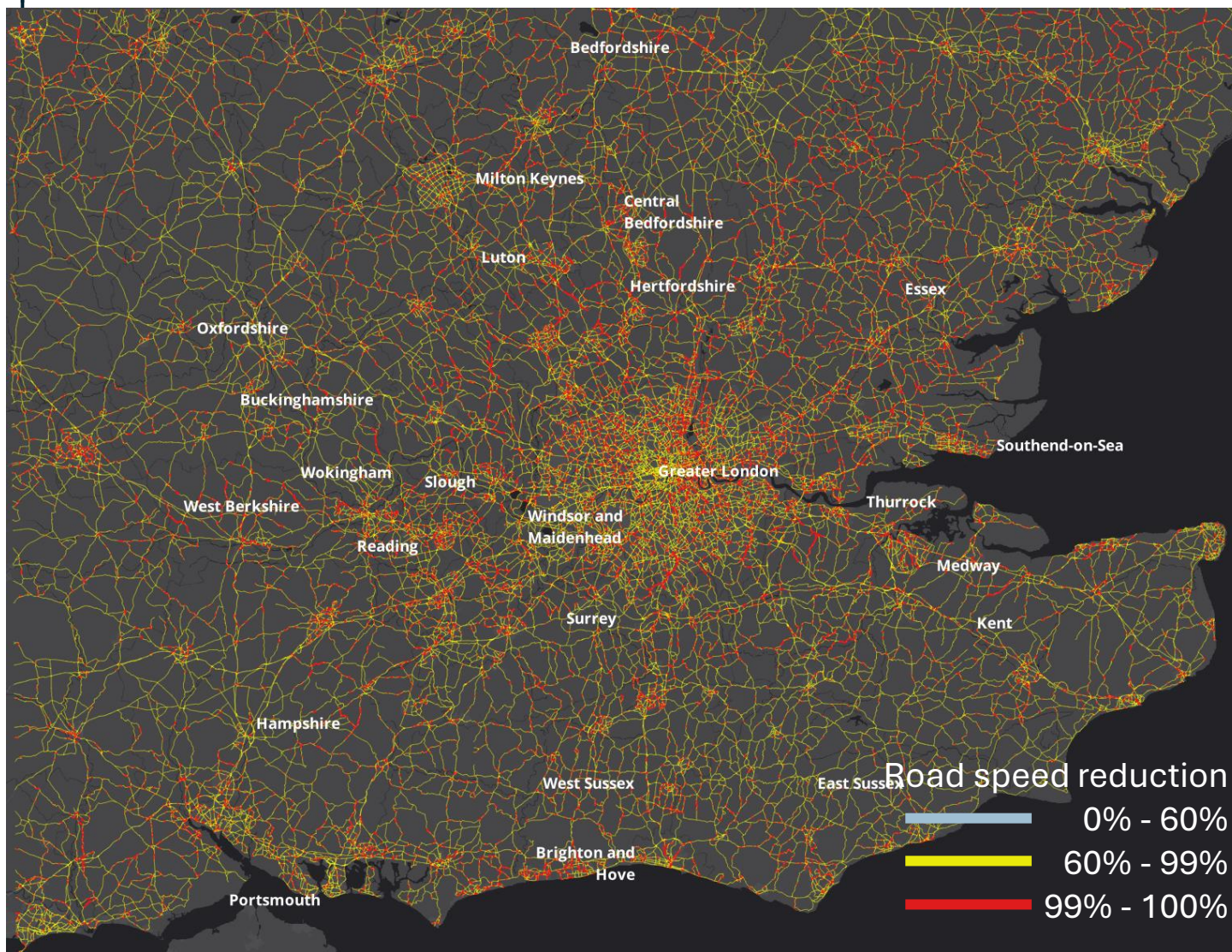
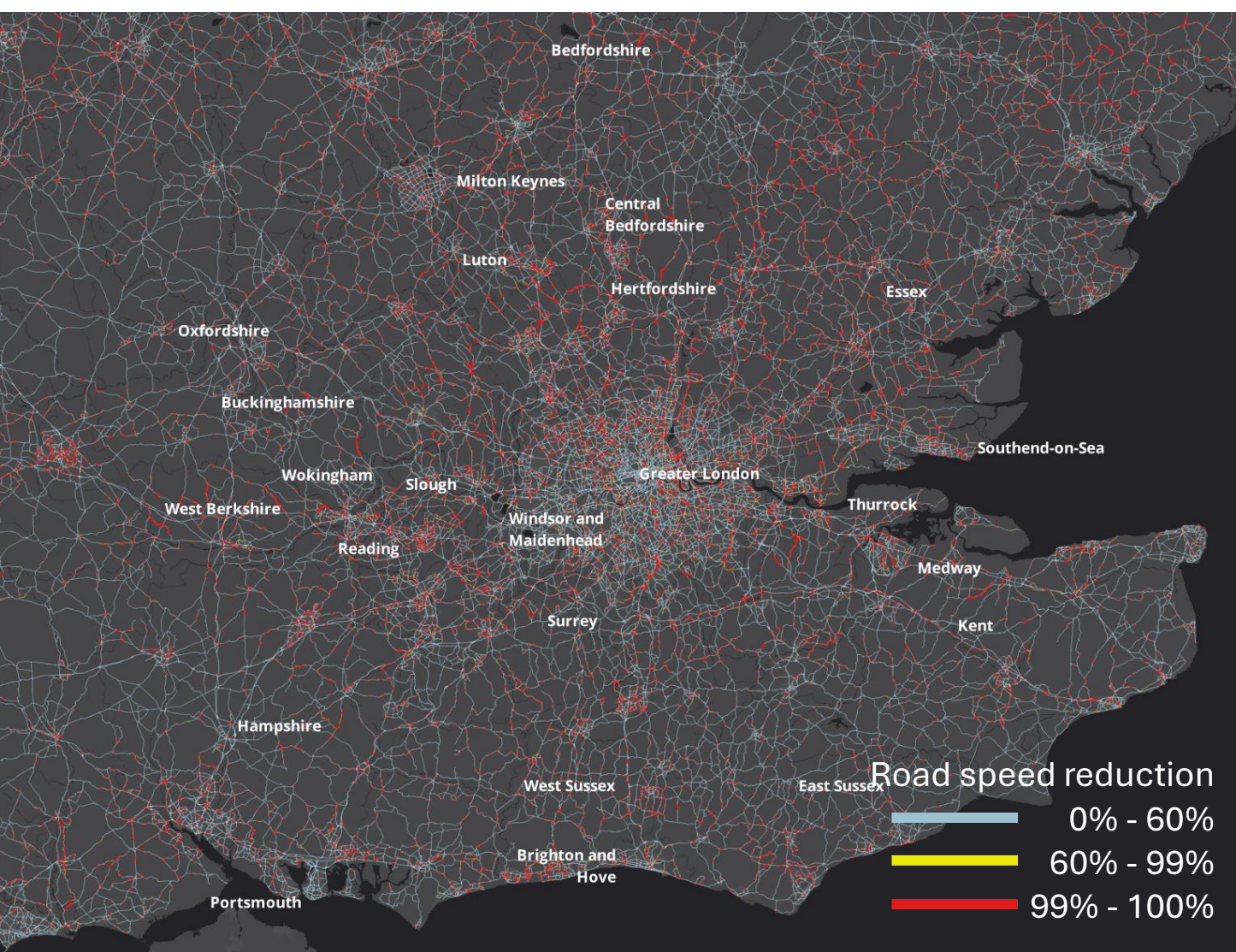
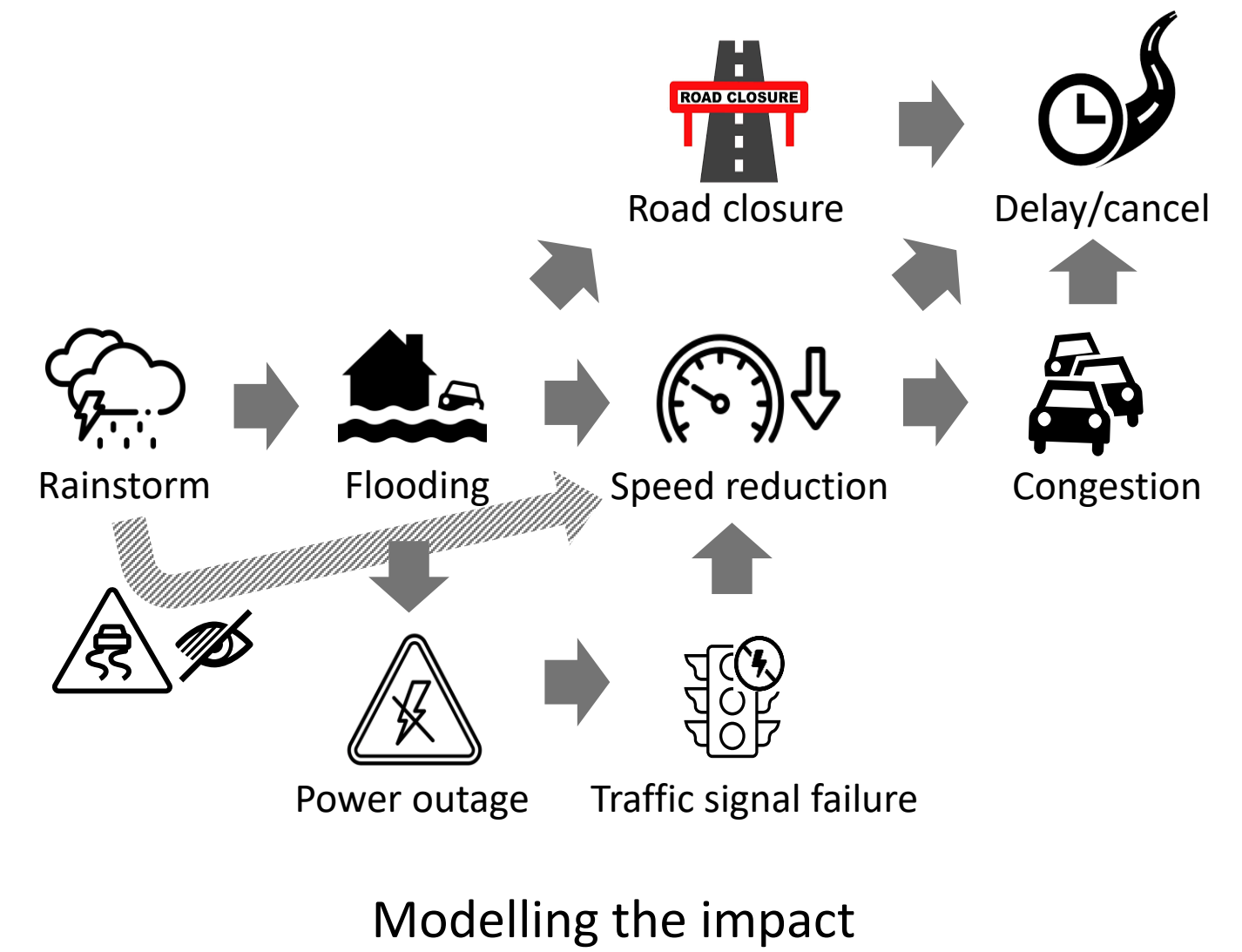
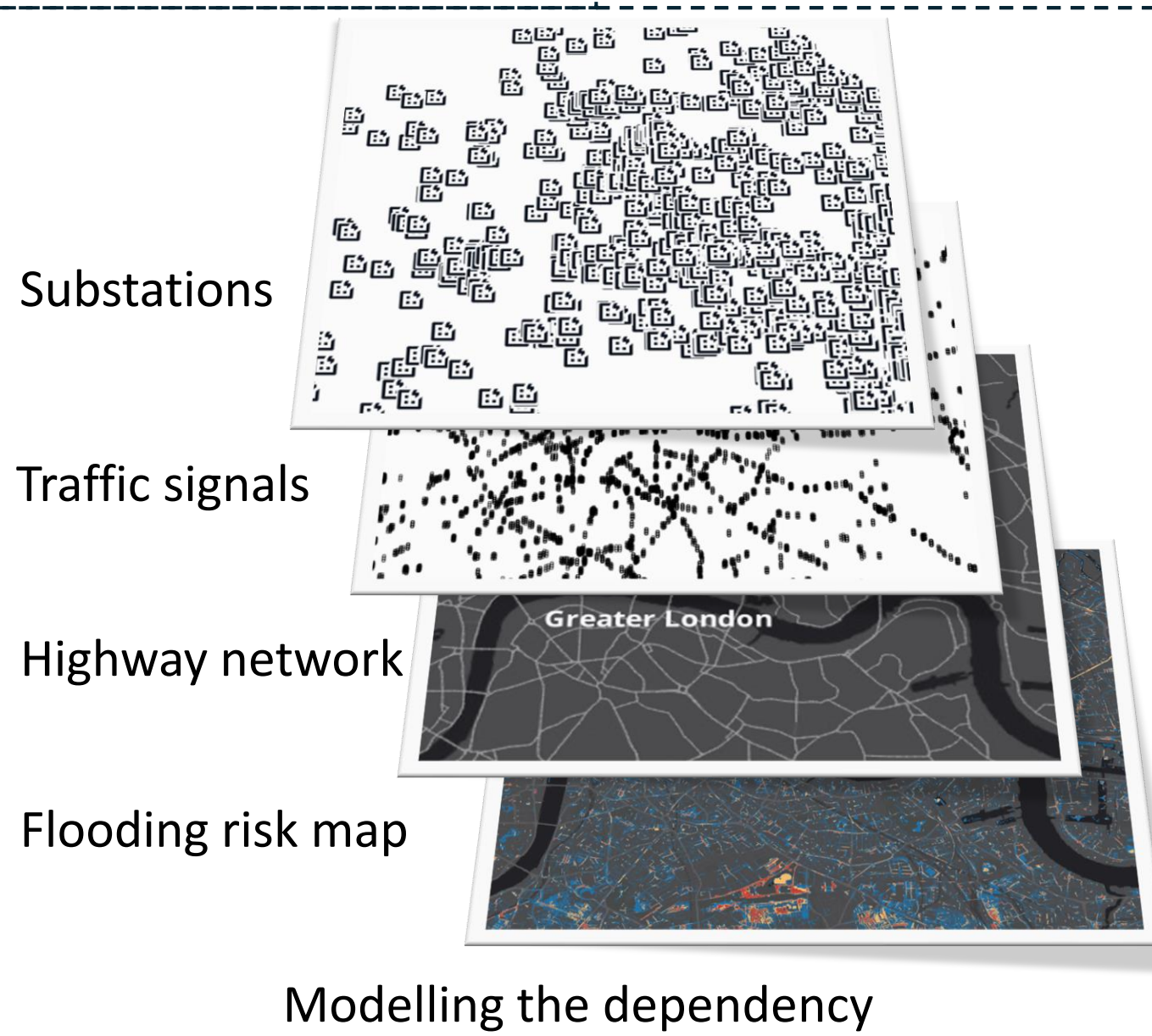
Methodology

Three effects of extreme rainfall are modelled:

- Waterlogging/flooding [1]
- Visibility and slipperiness
- Traffic signal power failure (due to flooding at substations)

Impact analysis

Road speed reduction; medium luck.



Next step: a nationwide case study

Expanding the research area to England and Wales while adjusting the focus from traffic analysis to network analysis and climate projections:

- Which part of highway network is critical but vulnerable?
- Do local communities have robust mobility and accessibility to critical services?
- How is the risk of reaching the worst-case scenario in future climate change?

Acknowledgements

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References

- [1] Pregnotato, Maria, et al. "The impact of flooding on road transport: A depth-disruption function." Transportation research part D: transport and environment 55 (2017): 67-81.