



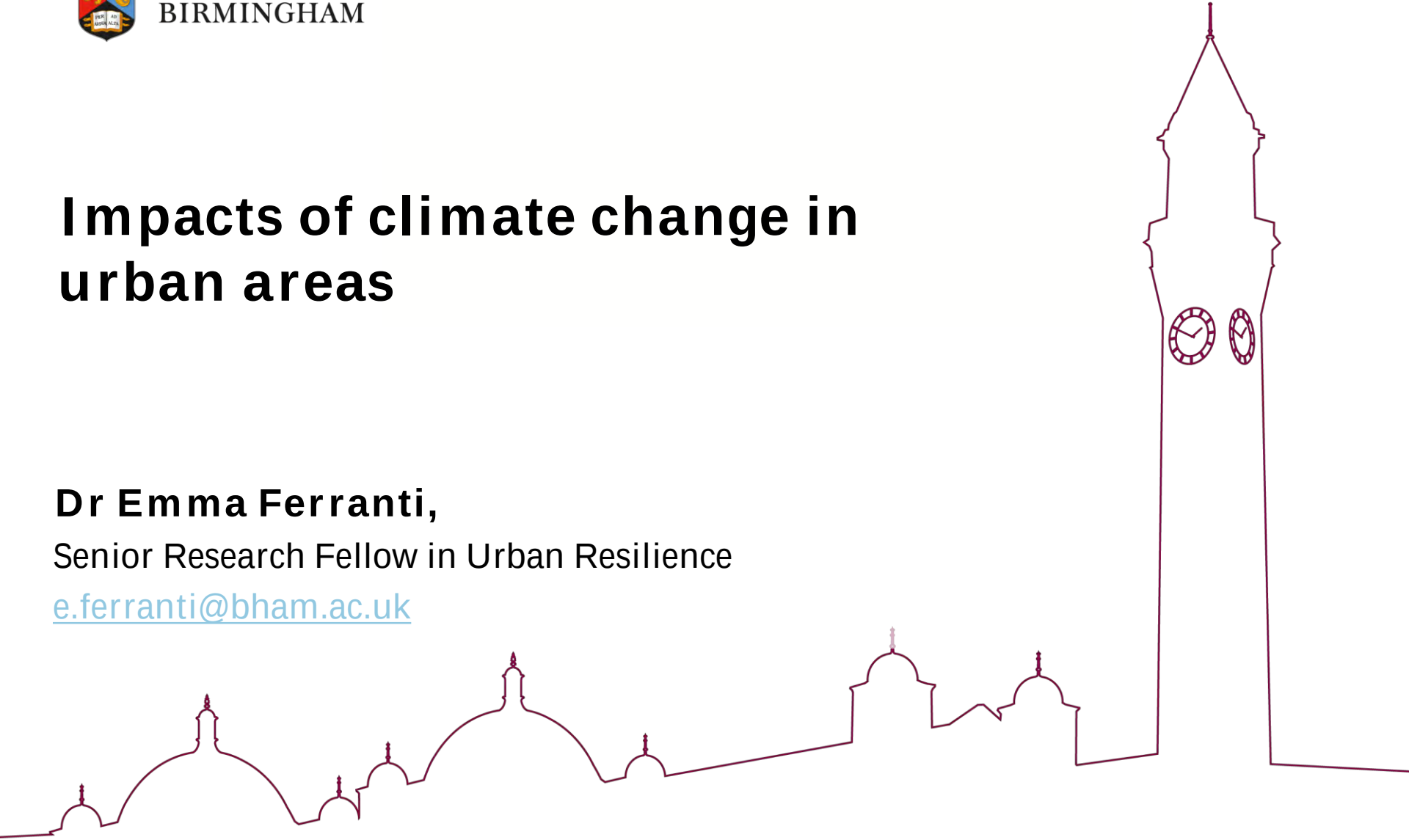
UNIVERSITY OF
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Impacts of climate change in urban areas

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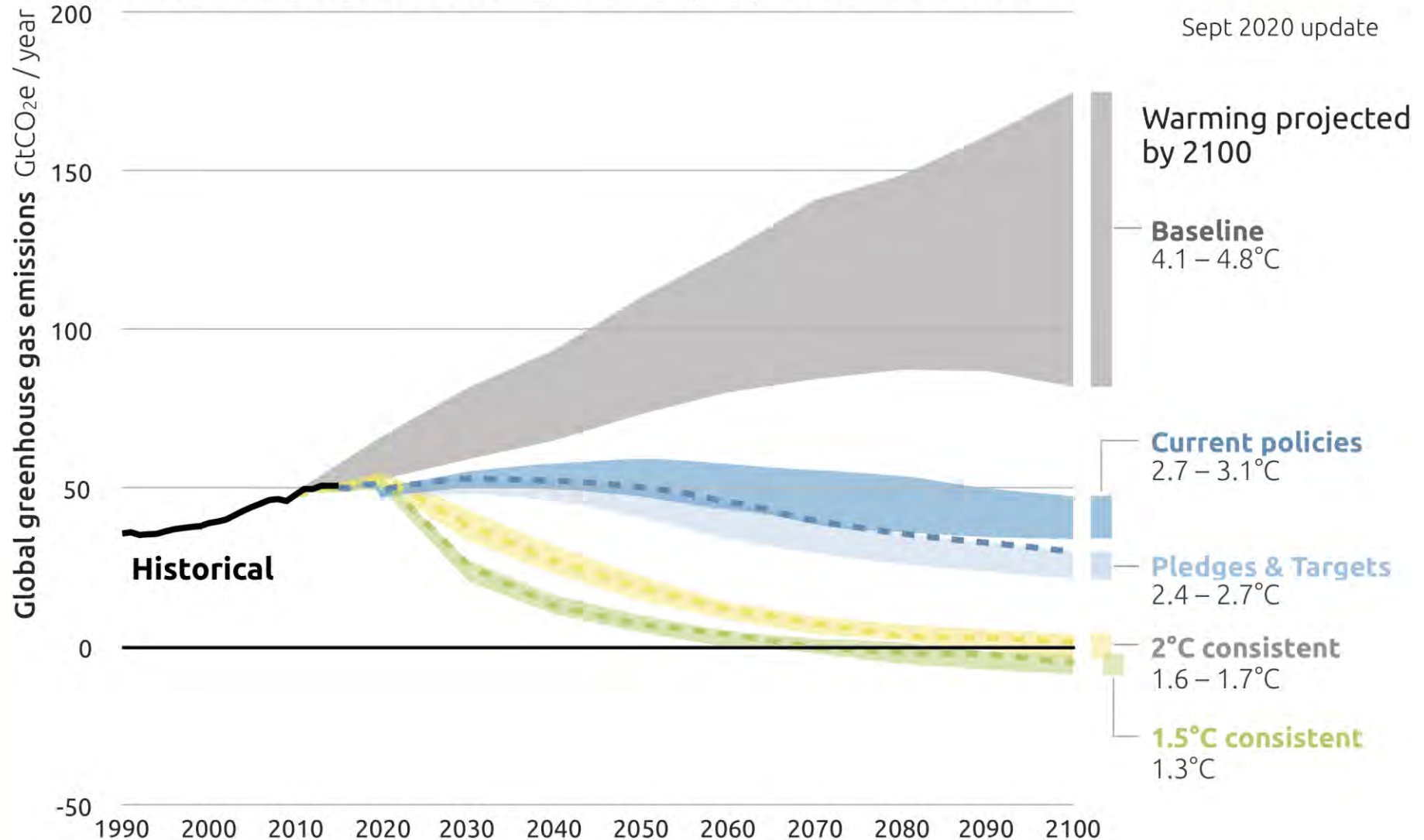
We need to adapt to climate change



Sept 2020 update

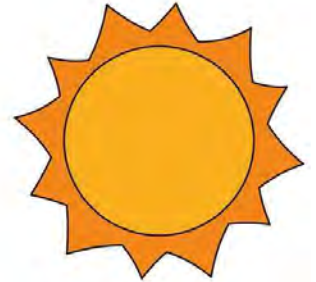
2100 WARMING PROJECTIONS

Emissions and expected warming based on pledges and current policies



Climate change and the UK

- ***“a greater chance of warmer, wetter winters and hotter, drier summers”*** Met Office
 - UK Climate Projections ([UKCP](#))



- **In general, more extreme weather**
 - Higher summer temperatures, more frequent and hotter heatwaves
 - High intensity rainfall events occurring more frequently, and with heavier rainfall (summer)
 - Also sea-level rise, storm surges, wild fires



- **Impacts**
 - Flooding, water shortage, overheating

Climate change – consequences for urban areas

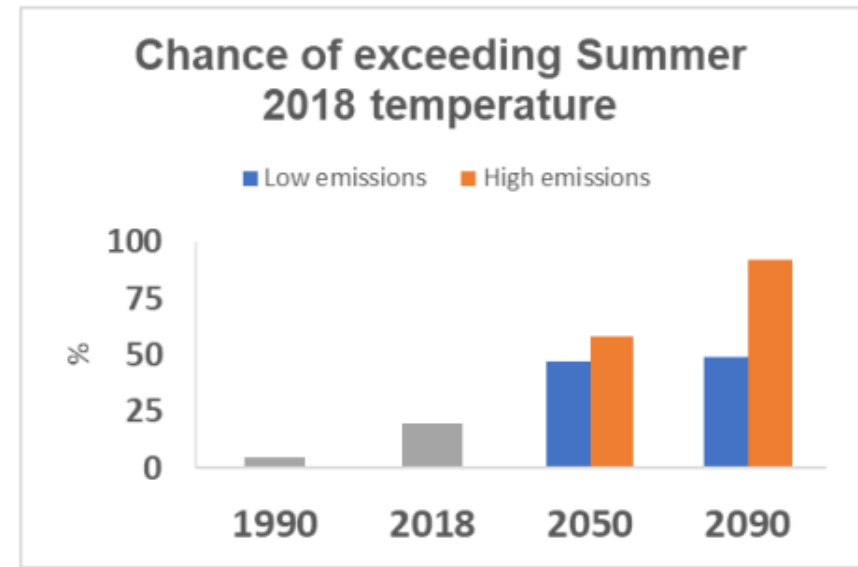
Extreme weather has a disproportionate impact on urban areas because:

1. High concentration of critical infrastructure
2. High concentration of people
3. Dependency on infrastructure networks (esp. power, ICT)
4. Urban Heat Island effect



Impacts: extreme heat

- ❑ Infrastructure impact
e.g. London Underground
- ❑ Overheating risk
 - Schools, care homes?
 - Can you open window?
 - Can you go outside?
 - Can you get water?



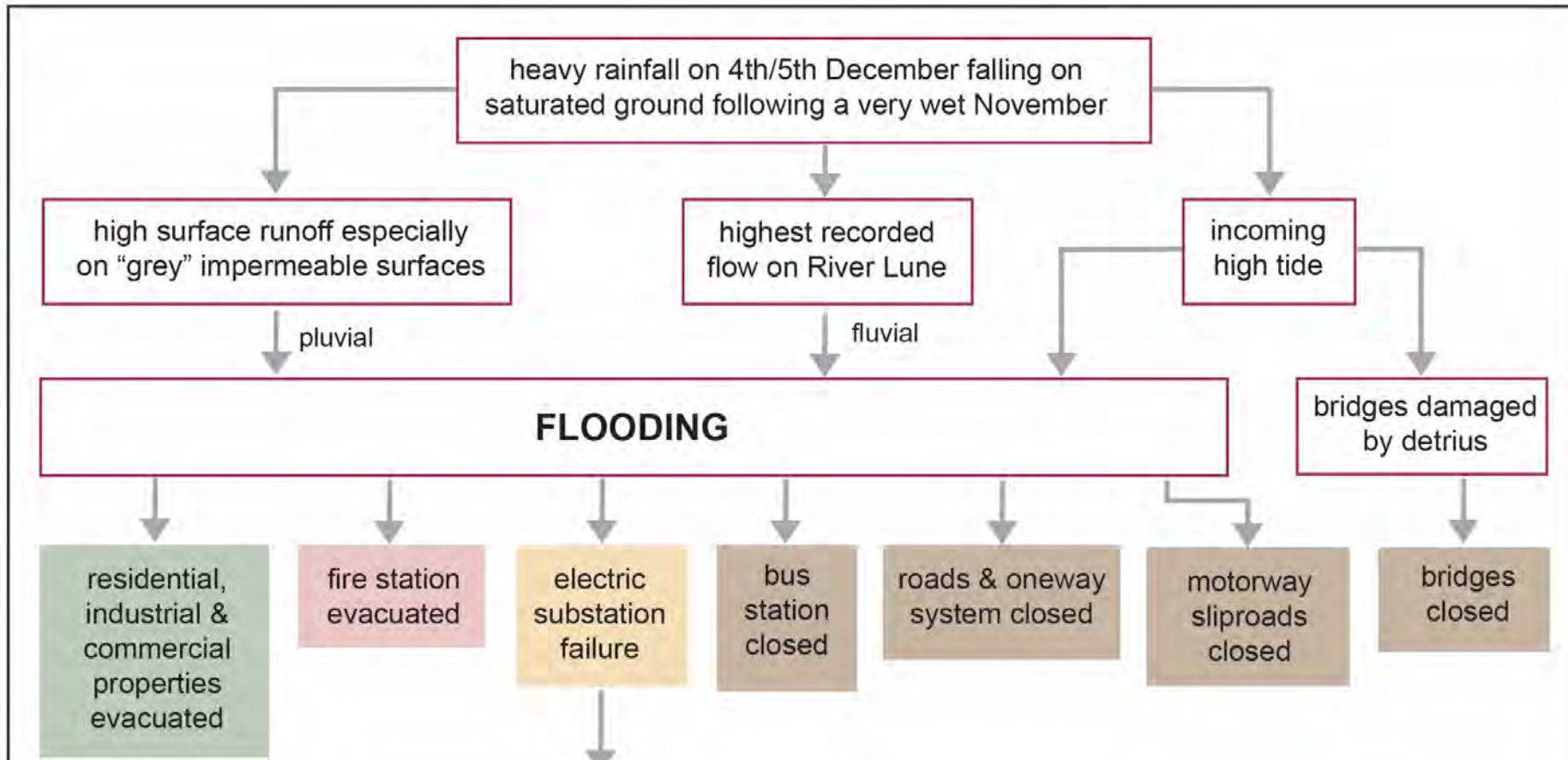
Met Office: [UKCP18](#)
[National Climate Projections](#)

- ❑ Heat can exacerbate poor air quality
- ❑ How to balance air-con demand & net-zero commitments?
- ❑ How can we design urban cooling? (trees take time to grow)

Impacts: cautionary tale of Lancaster



Impacts: cautionary tale of Lancaster



Morecambe Bay



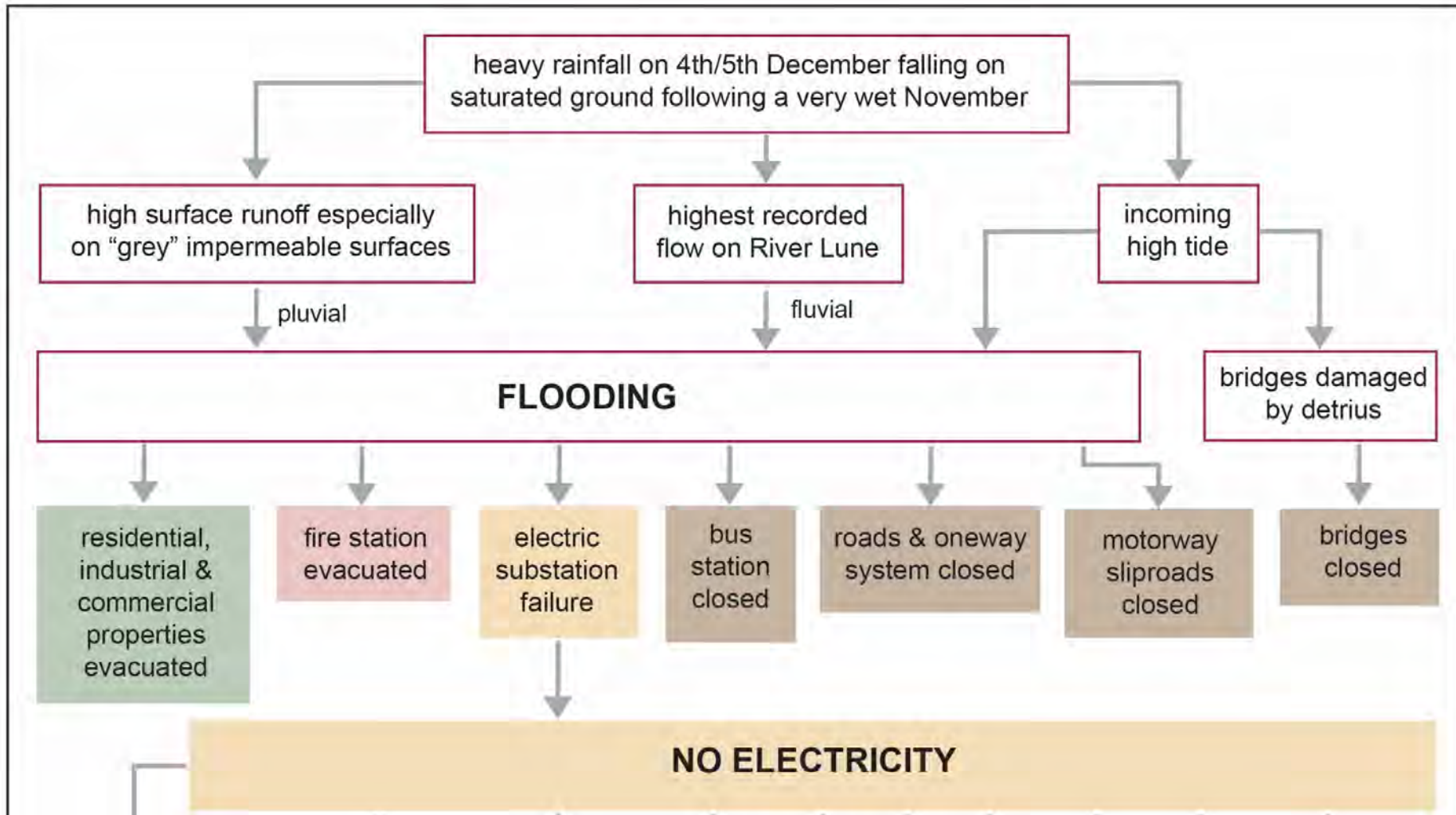
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Impacts: cautionary tale of Lancaster

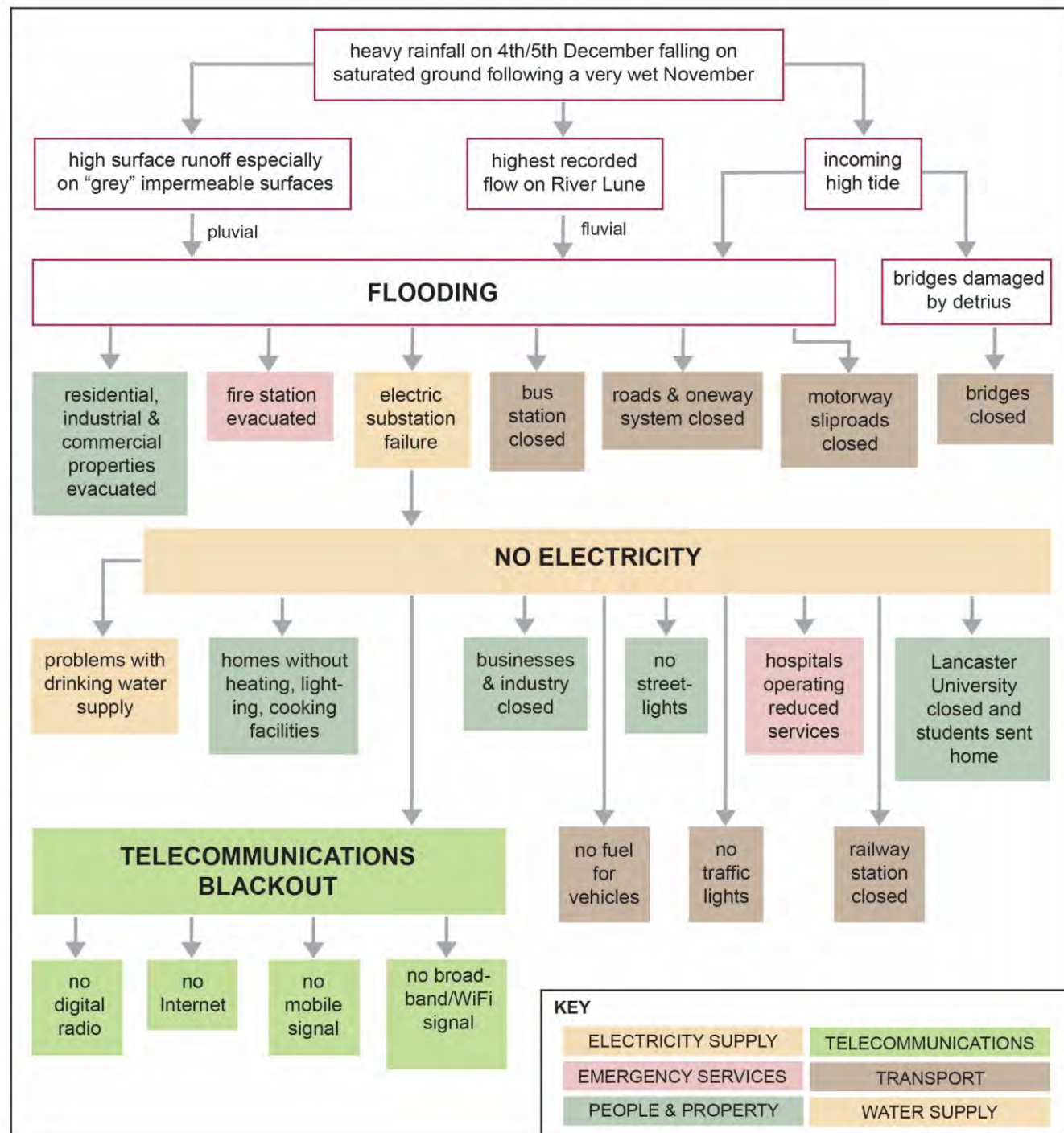


Flooding caused power loss from 5th -8th Dec, 2015

Cities are vulnerable extreme weather

Ferranti, E., Chapman, L. and Whyatt, D., 2017. A Perfect Storm? The collapse of Lancaster's critical infrastructure networks following intense rainfall on 4/5 December 2015. *Weather*, 72(1), pp.3-7.

Kemp R. 2016. *Living without electricity. One city's experience of coping with loss of power.* Royal Academy of Engineering Report. Royal Academy of Engineering: London. ISBN 978-1-909327-26-9



Quotes from students

“We couldn’t get any information on Facebook because we didn’t have any Wi-Fi or even phone signal. So we were completely clueless.”

“It’s so weird to see people using phoneboxes. I wouldn’t know how. The only time I’ve used one was to do prank phone calls,”

**How do you
communicate
with no internet
or phones?**

**No power from Sat
5th – Tue 8th Dec
Food? Heating?**

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**How do you
support elderly,
homeless, other
vulnerable
groups?**

**What if this
happened in
London? Or
Birmingham?**

Discussion points for collaborative adaptation

❑ Legacy infrastructure and risk assessment

- Lancaster: substation next to the river
- 2009 EA report based on historical flooding “*no critical infrastructure at risk of flooding*”

❑ Multi-hazard events

- Lancaster: rain, more rain, heavy rain and tide
- What hazard combinations would impact London?

❑ Interdependencies

- What are the dependencies between systems?

❑ Interacting Risks

- Will net zero ambitions change climate resilience?
- How does energy efficiency link to indoor air quality and overheating risk?