

ARUP

# The role of transport in achieving the UN SDGs

Dr Juliet Mian Associate Director, Infrastructure Advisory, Arup and Technical Director, the Resilience Shift

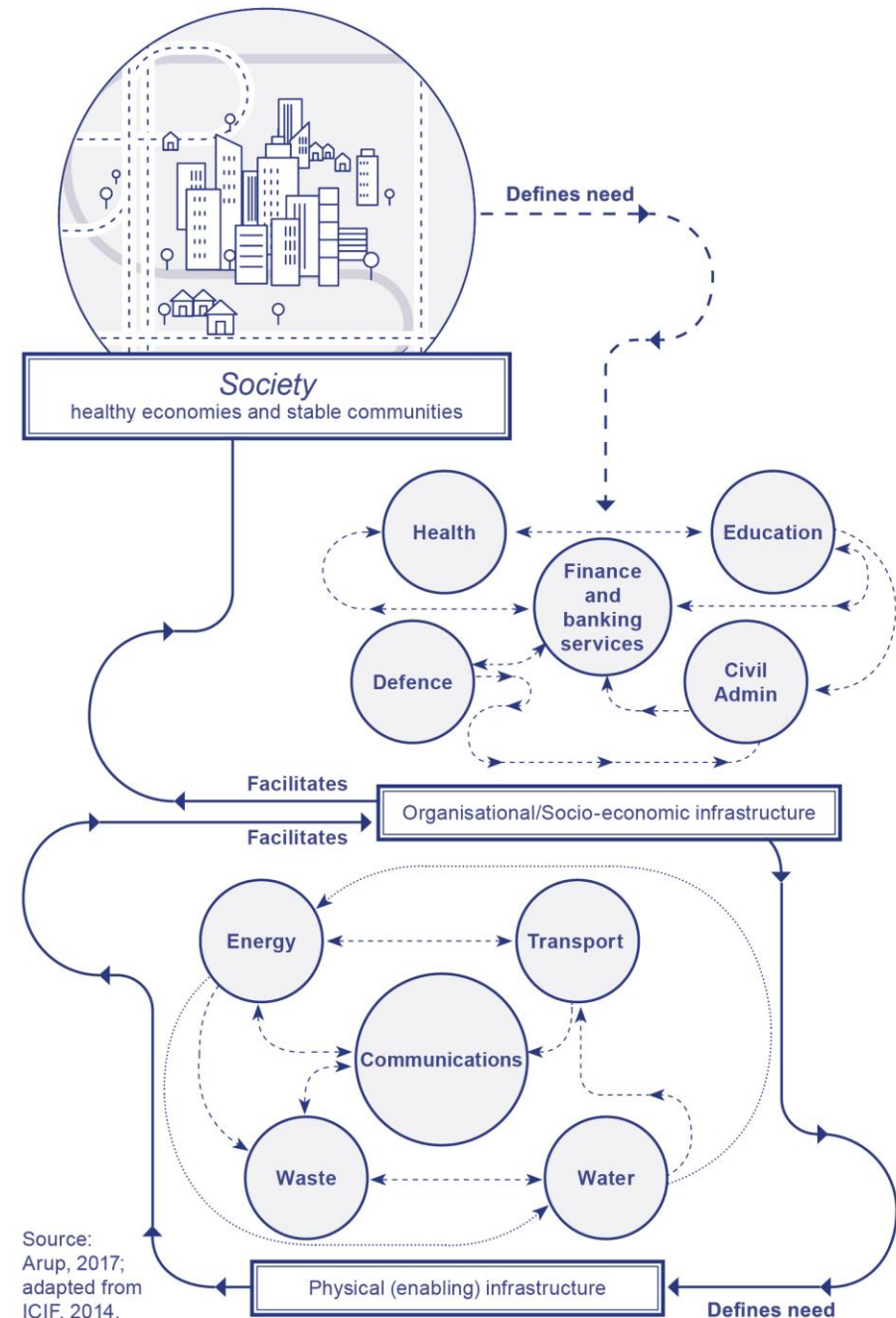
Rebecca Powell, Senior Planner, Consulting, Arup

14<sup>th</sup> November 2019

# ARUP

“A reliable transport system is essential to a functioning and prosperous society”

DfT Transport Resilience Review (2014)



Source:  
Arup, 2017;  
adapted from  
ICIF, 2014.

Change  
History







Globalisation



Urbanisation



Population

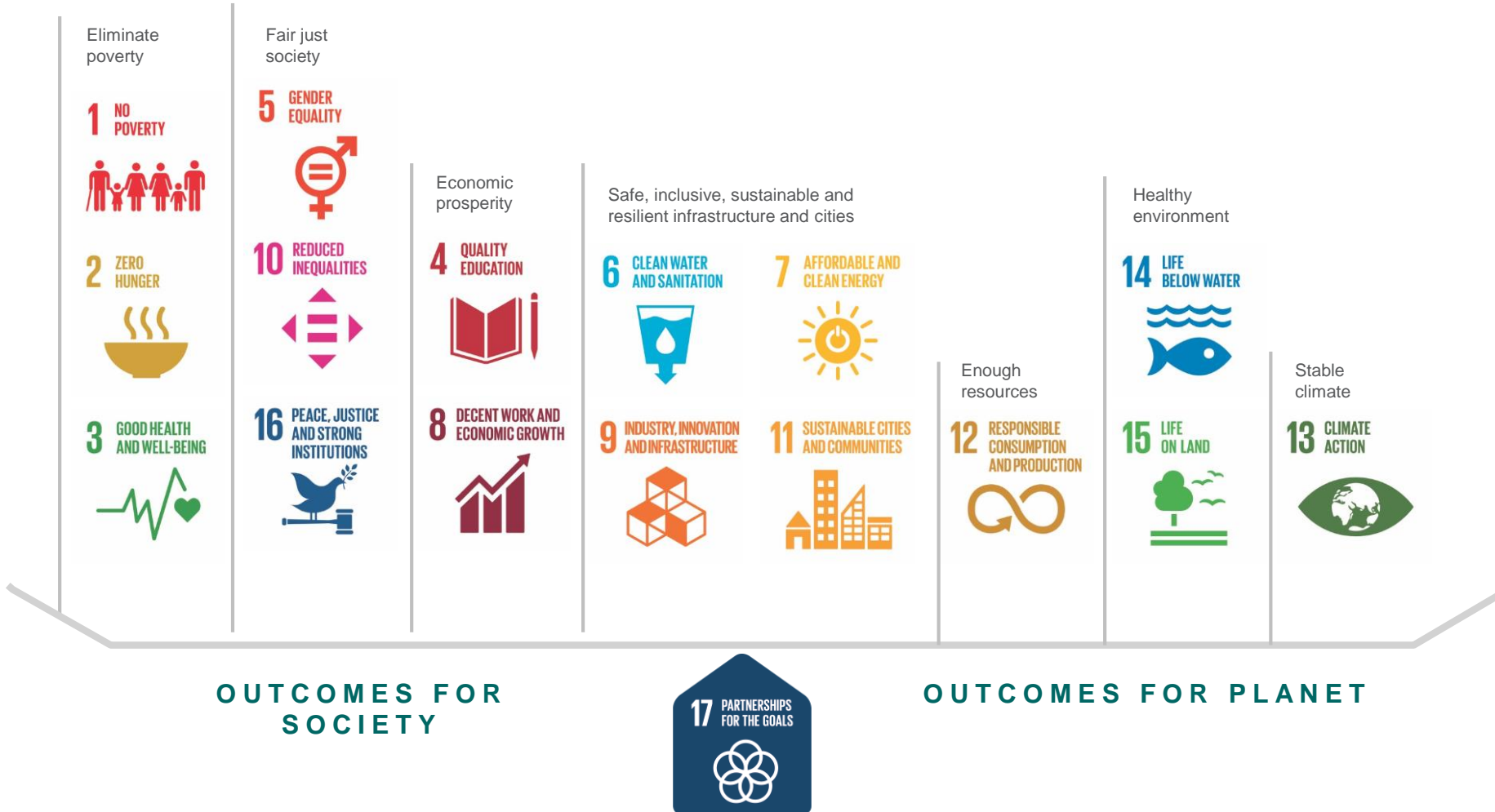


Climate and planetary boundaries



# SUSTAINABLE DEVELOPMENT GOALS

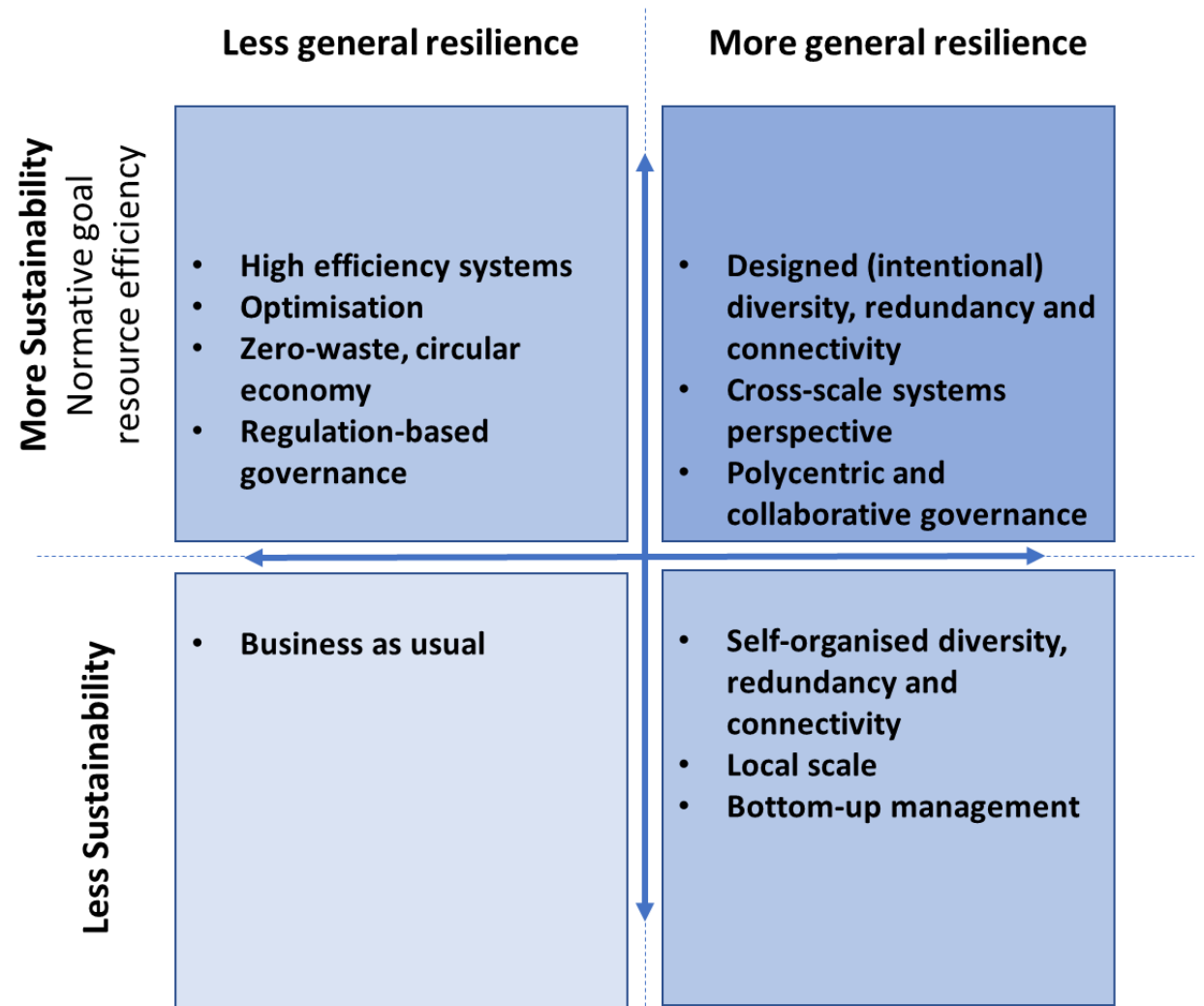




# Sustainable development



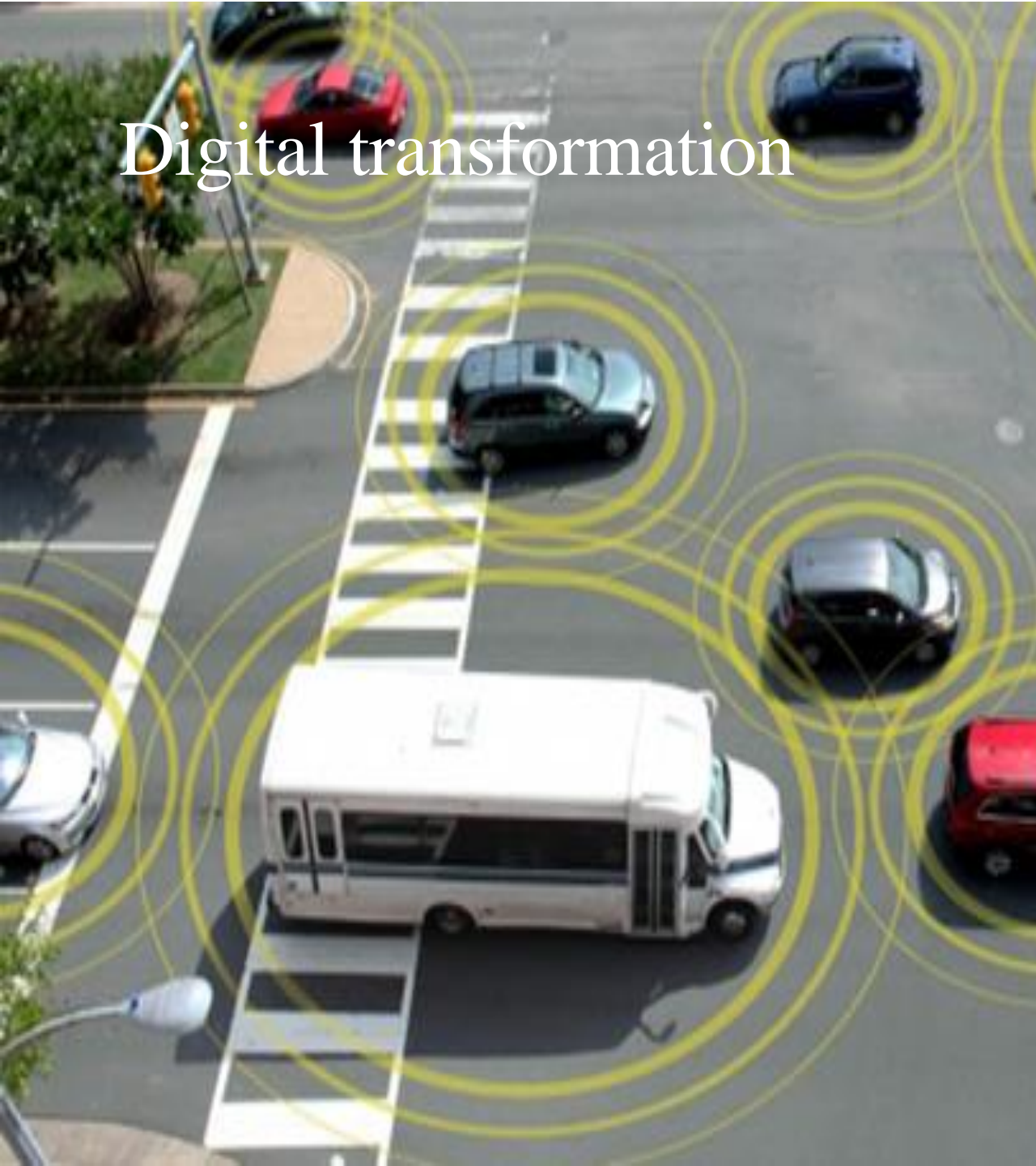
## Balancing sustainability and resilience



Adapted from: Elmqvist et al. 2019



Digital transformation





# Urban transformation





# Changing climate





# Adaptive planning





# Resilient systems



 THE RESILIENCE SHIFT

# Resilient infrastructure for a safer world

[resilienceshift.org](https://resilienceshift.org)  
[info@resilienceshift.org](mailto:info@resilienceshift.org)

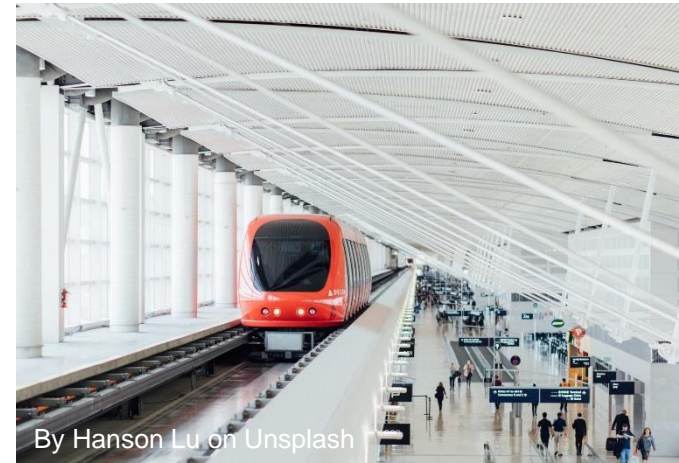
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 Lloyd's Register  
Foundation



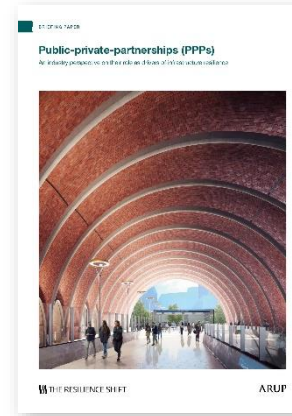
# The work we do

Supported by Lloyd's Register Foundation and Arup, the Resilience Shift provides **knowledge** and **tools** for those responsible for planning, financing, designing, delivering, operating and maintaining critical infrastructure systems.



# Influencing policy

Understanding how different mixes of legislation and policy instruments can incentivise and enhance the resilience of critical infrastructure, and shape resilience-led policy-making.



## PUBLIC PRIVATE PARTNERSHIPS (PPPS)



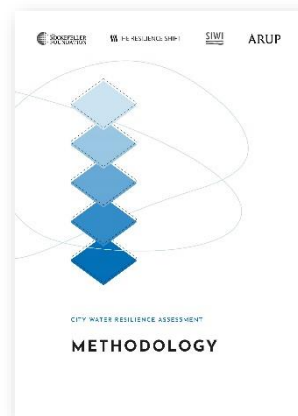
## LEGISLATION



## PUBLIC POLICY

# Shaping practice

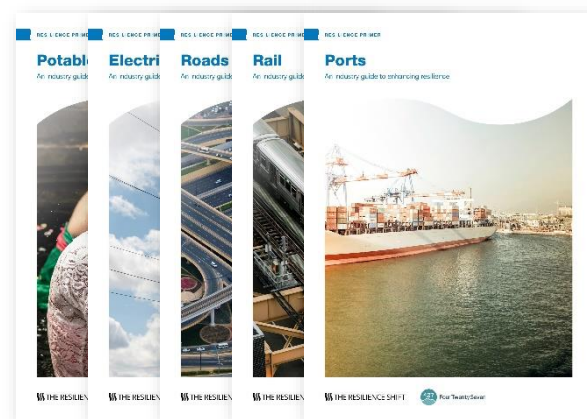
Building a global community equipped with the knowledge and tools needed to drive practice towards better, more resilient critical infrastructure and a safer world.



## CITY WATER RESILIENCE APPROACH



## RESILIENCE TOOLS



## RESILIENCE PRIMERS



# Sharing learning

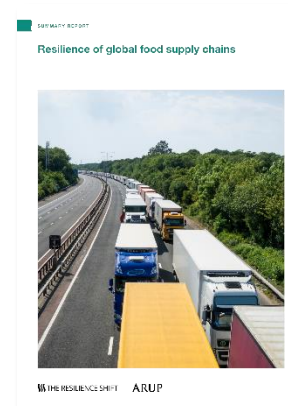
Advancing best practice across the infrastructure value chain requires collaborative working and fostering knowledge transfer.



## BLACK SKY SCENARIOS



## CHRISTCHURCH'S RECONSTRUCTION



## GLOBAL FOOD SUPPLY CHAINS



# Learning from Day Zero

THE RESILIENCE SHIFT

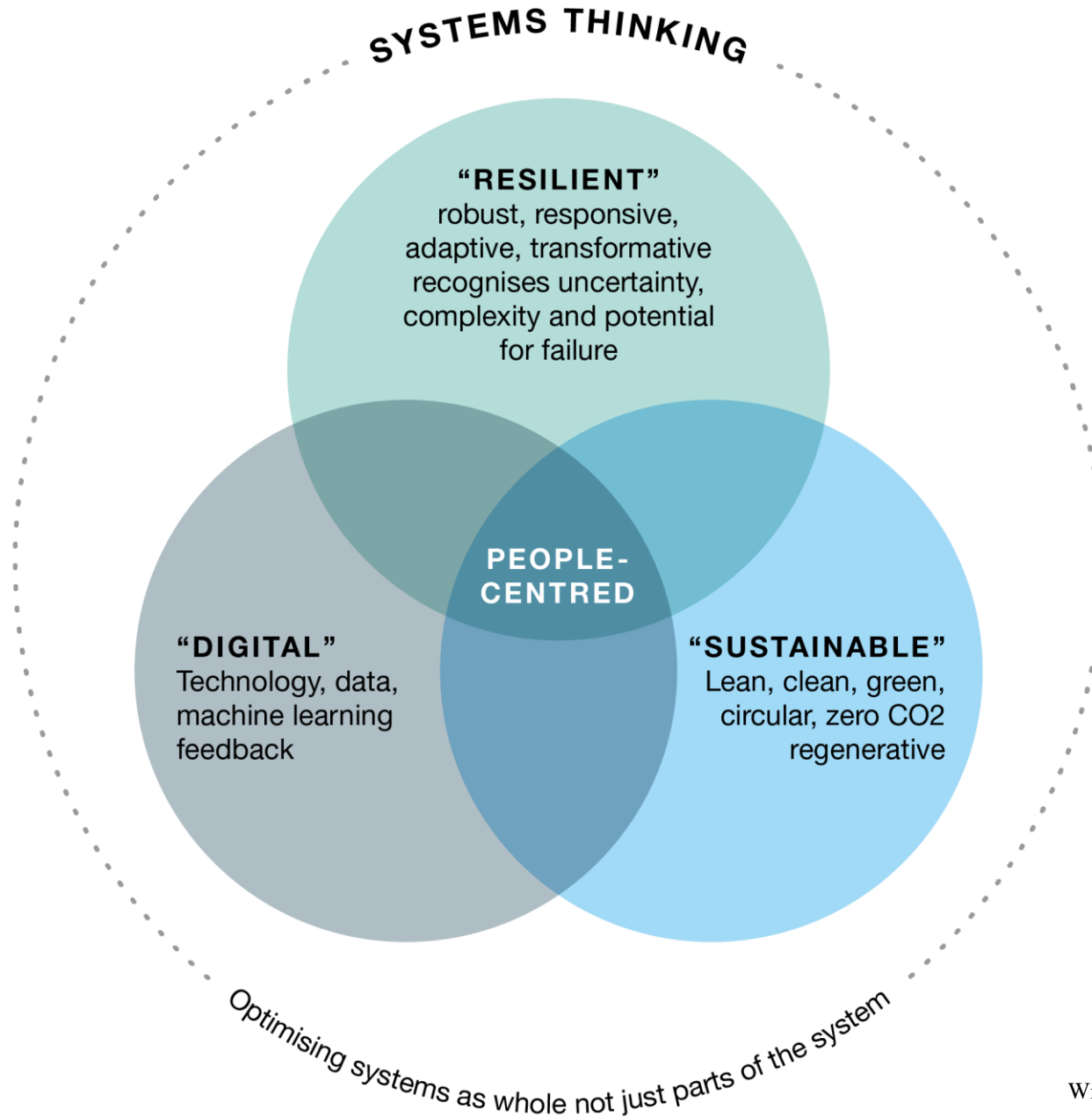
THE CAPE TOWN  
DROUGHT RESPONSE  
LEARNING INITIATIVE





# ARUP

## Outcome-led design for a sustainable future



With thanks to Jo da Silva

## Resilience of the Strategic Road Network to geotechnical events

A resilient road network is one that can **anticipate**, **absorb**, **resist**, **respond** to and **recover** from unexpected geotechnical events.



Supporting Economic Growth



Safe and Serviceable Network



More Free Flowing Network



Improved Environment

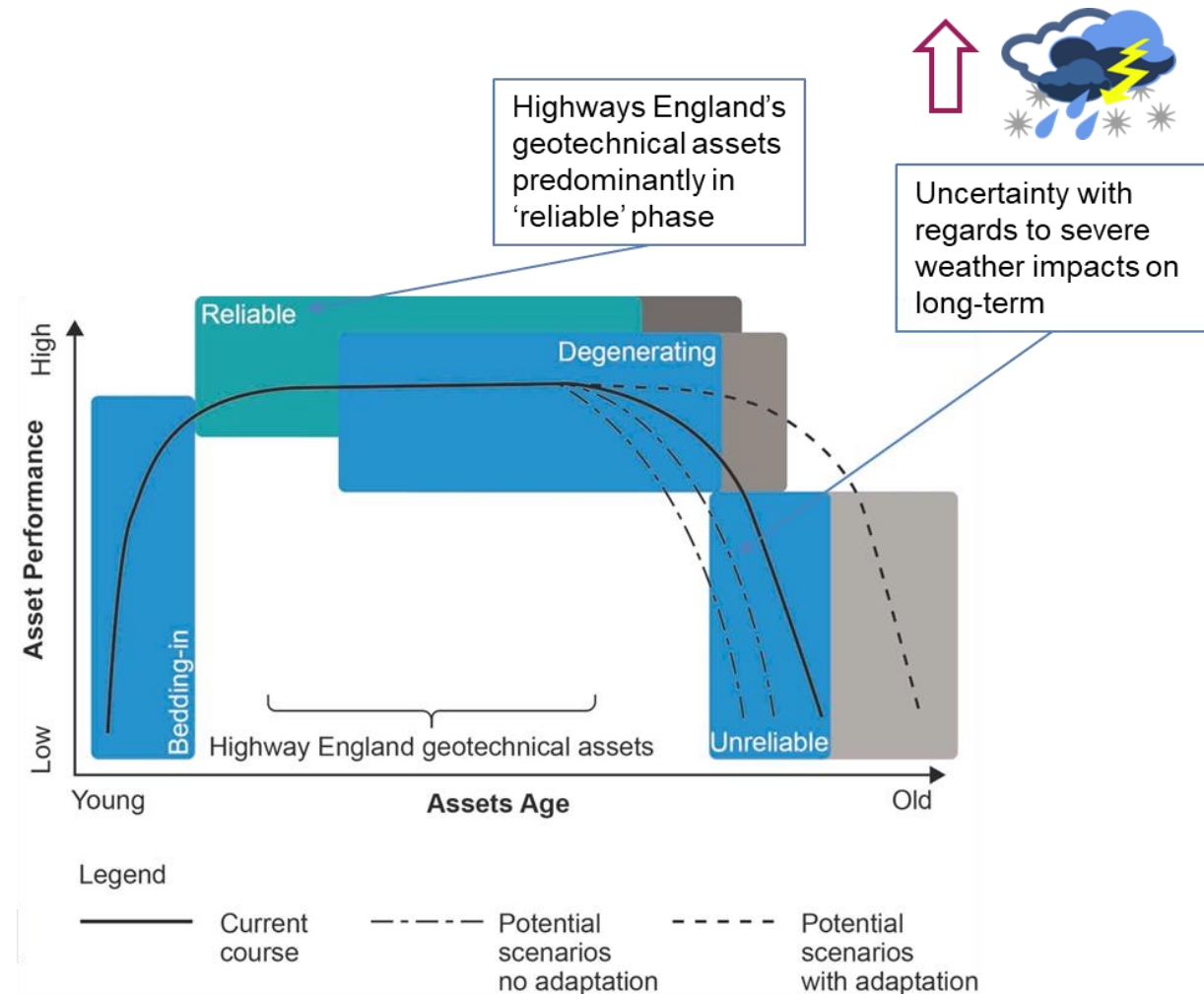


More Accessible and Integrated Network

Strategic Outcomes, 2015-2020 Delivery Plan



## Geotechnical asset performance



Adapted from Thurlby (2013 and Glendinning et al (2015)

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Innovative and sustainable approaches to geotechnical asset management

Willow poles



Electro kinetics



Source: TRL/Coffey



# ARUP

## Green Ribbs A30 Environmental Designated Funds

Carbon sequestration through land use upgrade  
and biodiversity increase

Catchment-level intervention – increased  
resilience for the wider area

BEFORE



Fig 1.1 Illustrative view of typical Central Cornish landscape. Issues include: lack of recreational access, sparse vegetation, disrupted wildlife corridors, heritage assets in poor condition, erosion and bare waterway margins.

AFTER





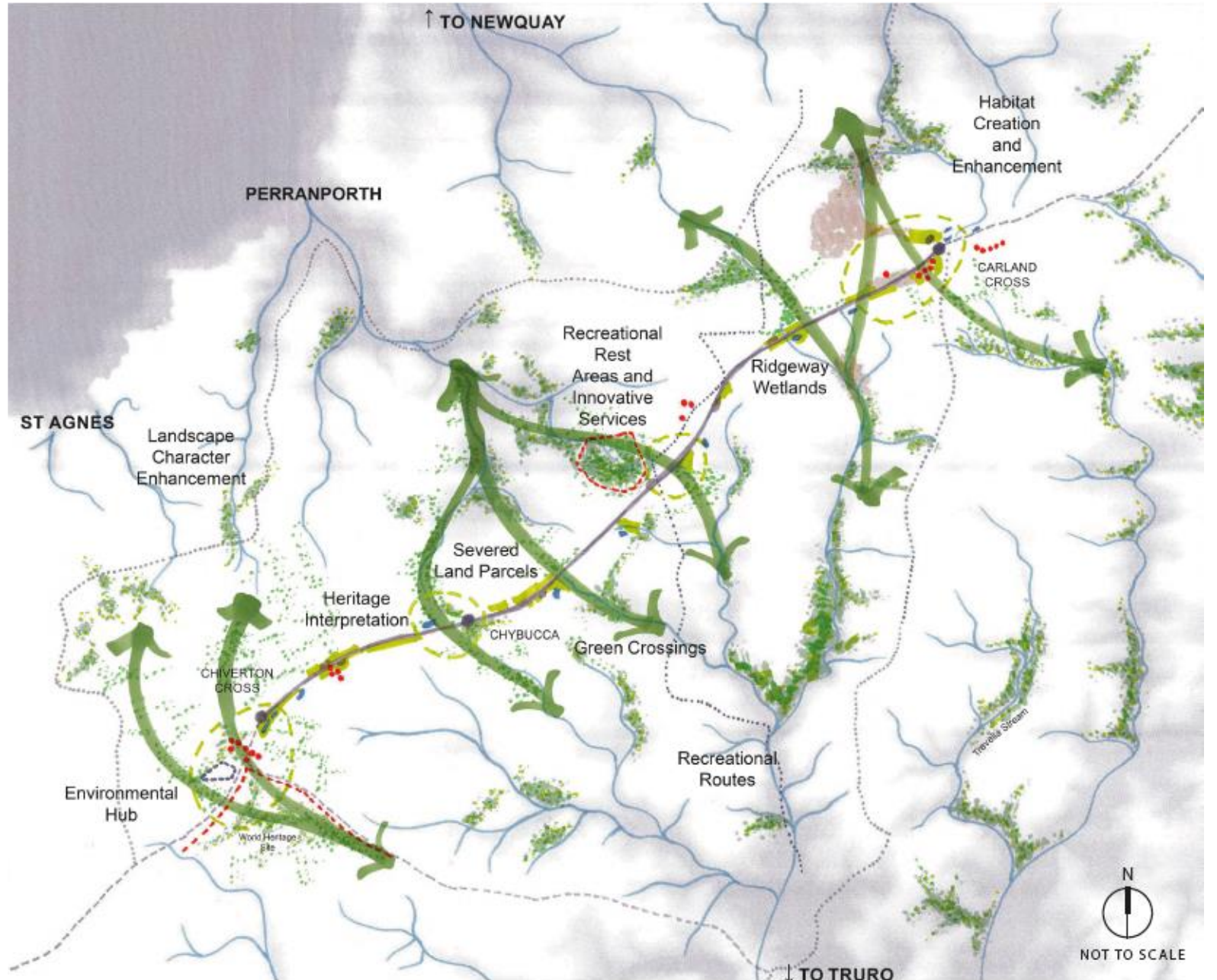
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## Green Ribbs A30 Environmental Designated Funds

Improving valued features in the  
Cornish landscape

£2m connected habitat network across  
30km<sup>2</sup> of countryside

Wide scale approach to framework for  
the whole area.





# ARUP

## A417 Missing Link

- The A417 is located in Gloucestershire in the Cotswolds Area of Outstanding Natural Beauty (AONB) and is one of the south-west's most important road corridors.
- **The “Missing Link” is a 5.5 kilometer stretch of remaining single carriageway between the Brockworth bypass and Cowley roundabout.**



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## A417 Missing Link Landscape-led approach

This approach sensitively integrates the proposed scheme to **'meet the character of the landscape'** and reduce negative impacts on the surrounding environment.

Its vision to improve opportunities for landscape, historic and natural environment enhancements.





## Scheme objectives



1.

### **Transport and safety:**

to reduce delays, create a free-flowing road network and improve safety along this stretch of the A417.

2.

### **Environment and heritage:**

to reduce the impact on the landscape, natural and historic environment of the Cotswolds and, where possible, enhance the environment.

3.

### **Community and access:**

to reduce traffic and pollution, improve access for local people to the road network, and support residents' and visitors' enjoyment of the countryside.

4.

### **Economic growth:**

to help boost growth and prosperity by making journeys more reliable and improving connectivity.

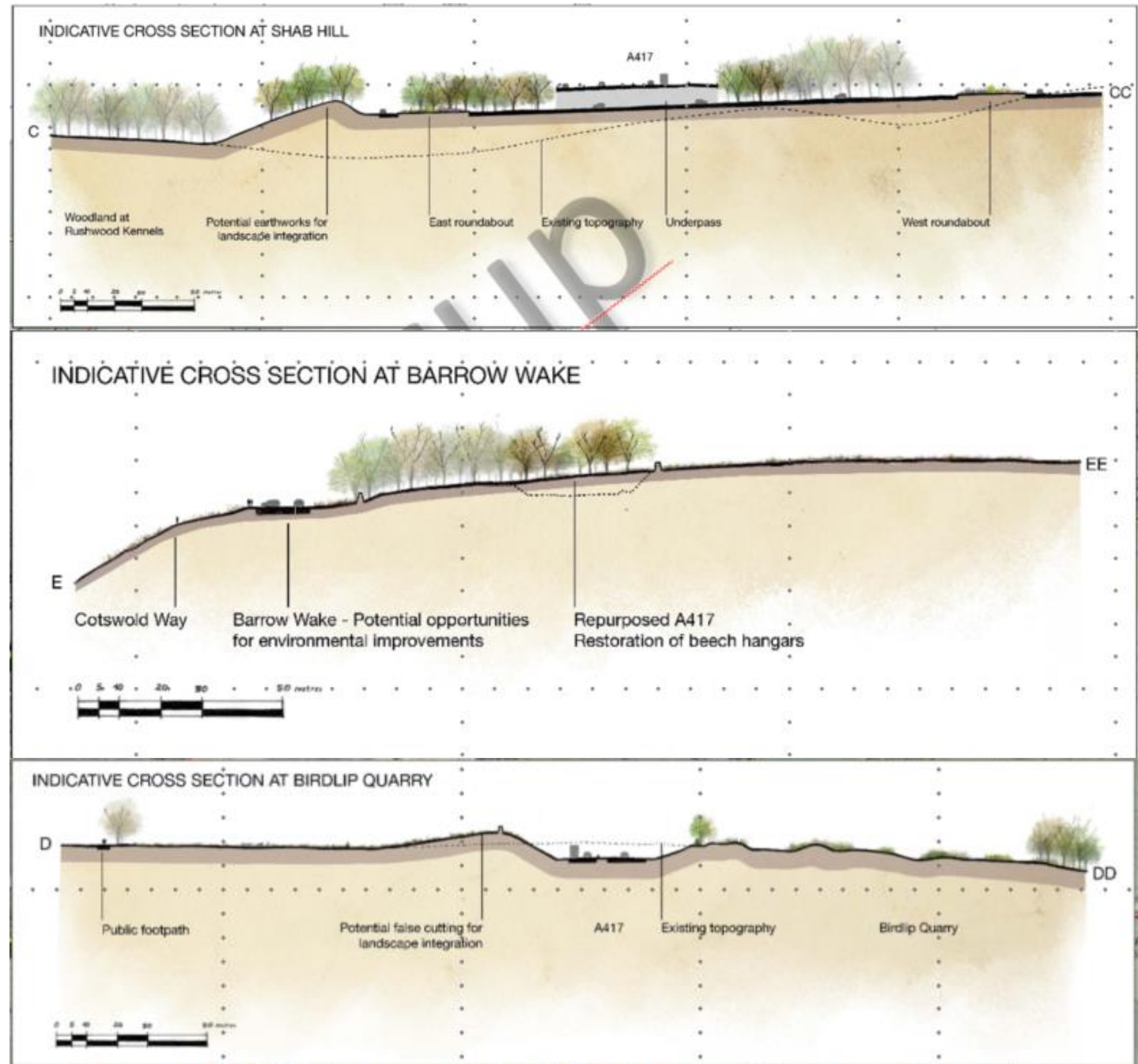
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## A417 Missing Link Important opportunities for benefit

Land use change and biodiversity enhancement

Carbon sequestration (not quantified)

Increased resilience (not quantified)



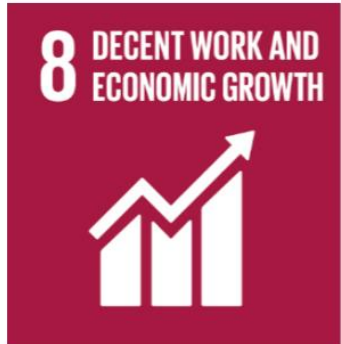
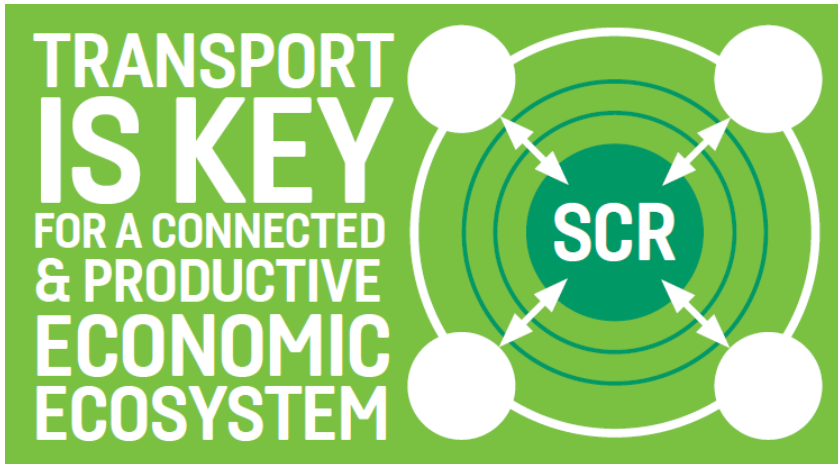


# Outcome-Oriented Approach

Applying the SDGs to our work



Demonstrating the crucial role of transport in the Region's economic growth





Outcome-Oriented Approach

Sheffield City Region Transport Strategy

By 2040 we will be a forward-looking City Region with integrated transport connections that support economic growth and improve quality of life for all



Support inclusive economic growth

Create healthy streets where people feel safe

Improve the quality of our outdoors

Promote, enable and adopt different technologies

**3** GOOD HEALTH AND WELL-BEING

**7** AFFORDABLE AND CLEAN ENERGY

**8** DECENT WORK AND ECONOMIC GROWTH

**9** INDUSTRY, INNOVATION AND INFRASTRUCTURE

**10** REDUCED INEQUALITIES

**11** SUSTAINABLE CITIES AND COMMUNITIES

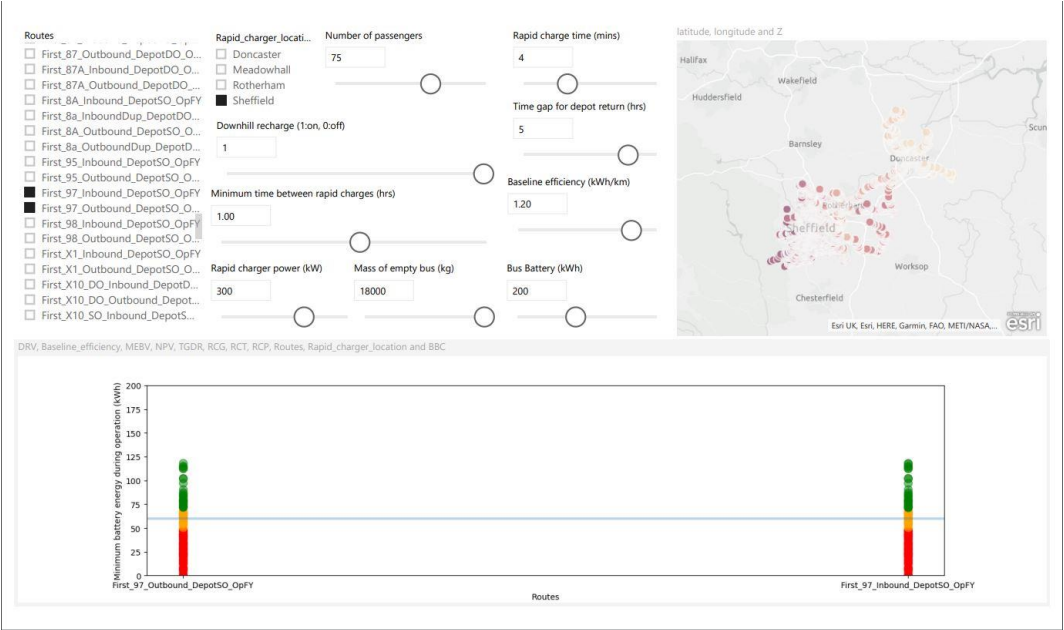
**13** CLIMATE ACTION

Outcome-Oriented Approach

Sheffield Electric Bus Study



© YorkRegionGovt





Outcome-Oriented Approach

Future Mobility – West Yorkshire and Sheffield City Regions



**3 GOOD HEALTH AND WELL-BEING**

**7 AFFORDABLE AND CLEAN ENERGY**

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**9 INDUSTRY, INNOVATION AND INFRASTRUCTURE**

**10 REDUCED INEQUALITIES**

**11 SUSTAINABLE CITIES AND COMMUNITIES**

**13 CLIMATE ACTION**



# DIRTY AIR HITS THE VULNERABLE HARDEST

**Let's clear the air**

find out more [CLEANAIRGM.COM](http://CLEANAIRGM.COM)

**3** GOOD HEALTH  
AND WELL-BEING



**7** AFFORDABLE AND  
CLEAN ENERGY



**9** INDUSTRY, INNOVATION  
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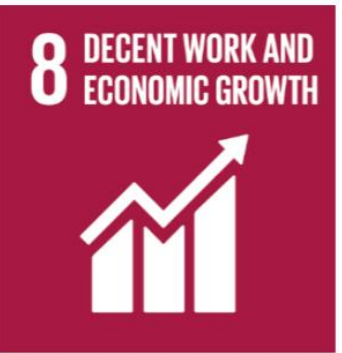
**13** CLIMATE  
ACTION





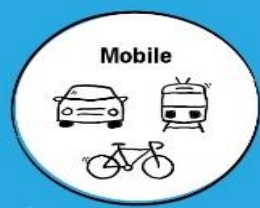
Outcome-Oriented Approach

Inclusive Cycling





# WE NEED MORE FROM ROADS,





Thank you

**ACT NOW**