

Managing climate change risk as a major infrastructure client

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Sustainable development and design



Previous work

- Climate Change Adaptation Strategy and Framework
- Climate Change Risk Assessment
- Board level risk



The most important effects of climate change on the road network

- Climate change, as described by the projections from global and regional models, will bring about a number of challenges for the road network in Europe.
- In most cases this will be today's challenges, on a different scale, more frequently and at different locations.
- May experience more of unusual weather combinations, e.g. winter floods.
- May be beneficial for the road owners.



Photo: www.comune.genova.it

The most important effects of climate change on the road network

Flood and erosion

Effects of increase in precipitation and more intense rainfall events:

- higher risk of flooding
- higher risk of erosion
- exceeding the drainage capacity
- increased scour risk



Photo: Norwegian Public Roads Administration



Photo: Søren Bentsen, via Vejdirektoratet, Denmark

The most important effects of climate change on the road network

Landslides and avalanches

Effects:

- occurring more frequently and at new locations
- higher share of “wet” landslide types, slush avalanches and debris flow



Photo: Niklas Eriksson, Norwegian Public Roads Administration

The most important effects of climate change on the road network

Droughts and high summer temperatures

Effects:

- problems for the asphalt surfacing, due to softening
- problems with runoff conditions, due to lower permeability
- risk of wildfires may also increase in the southernmost regions
- vulnerability of road users in high temperatures



Photo: ASFINAG, Austria



Rolf Sjögren, Fynske Media, Denmark

The most important effects of climate change on the road network

Deterioration of roads and pavements

Effects:

- increased rutting
- reduced service life, mostly in cases where the drainage is insufficient
- thaw weakening
- loss of permafrost



Photo: Centre for Economic Development, Transport and the Environment, Pirkanmaa, Finland

The most important effects of climate change on the road network

Sea level rise

Effect:

- reduced coastal stability
- increased risk of erosion and traffic disruption
- increased ground water levels in low lying countries
- flooding where insufficient elevation for roads, quays, and bridges, as well as at sub-sea tunnel portals



Photos: Danish Coastal Authority 1999

The most important effects of climate change on the road network

Winter conditions

Effect:

- difficult friction conditions around 0°C temperatures
- in some areas more frequent freeze-thaw changes
- heavy snowfalls



Photo: ASFINAG, Austria



Photo: Tapio Kalliomäki, Destia, Finland

Working procedures

Improving the knowledge base

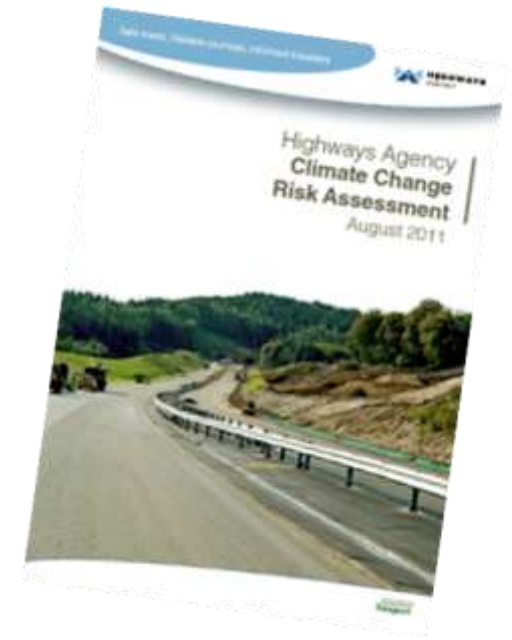
- Adaptation is dependent on a good and developing knowledge base, in the field of work of the road administrations and other professional fields, especially meteorology, hydrology and geology.
- It is important to support research and implementation of new knowledge.
- Interpretation of climate research for practical use is a precondition for adaptation.
- The most important parameters are: rain intensity, projections of flood values, wind, storm frequency and sea level rise.



Photo: Norwegian Public Roads Administration

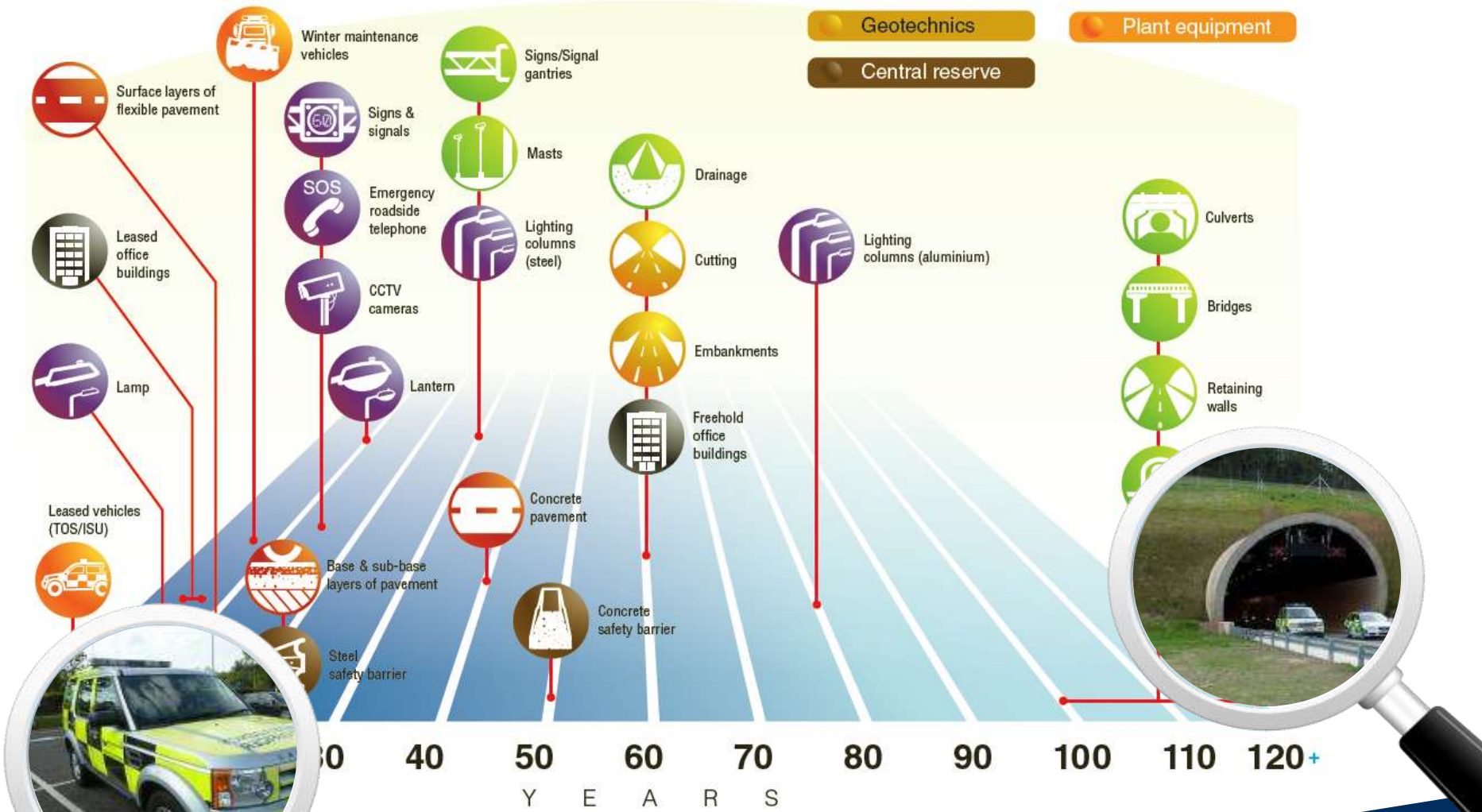
Early adaptation action advisable

- There is a long lead time needed to plan adaptation
- Significant planning/smoothing would be needed due to the many different locations on the network need to be treated
- Adaptation is concerned with a long life, expensive asset where it is suggested that there would be clear benefit from future proofing new designs now.



Design Life

- Pavements
- Technology
- Geotechnics
- Central reserve
- Property
- Structures
- Plant equipment



Desired adaptation outcomes

- A move away from reliance on historical weather record as basis for standards and specifications.
- Climate change considerations are factored into Highways England investment controls and business as usual, including design, construction, maintenance, and operations.
- Early consideration of climate change risks will lead to greatly reduced costs over asset life.
- Residual climate change risks are assigned appropriate management action.
- Highways England can demonstrate an effective approach to climate change risk management.

