

Local transport: adapting to climate change

**A practitioner workshop
9 June 2009**

Workshop summary

Introduction

The Local Transport Act (2008) has placed new requirements on local transport planners to respond to climate change. Mitigation policies to reduce climate change emissions from transport are already well established in both central and local government. However, under the new Local Transport Act, local transport authorities must now have regard to Government policies and guidance on climate change adaptation.

Consequently, the [Local and Regional Adaptation Partnership Board](#) (LRAP), a collection of local and regional bodies supporting adaptation and supported by Defra, funded a project to develop thinking about how local transport can adapt to climate change. The LRAP board, established in 2008, aims to facilitate action on climate change adaptation at a local and regional level. The work on local transport forms part of a wider LRAP research and support programme.

This note summarises the proceedings of a practitioner workshop held in June 2009. The workshop discussions recorded here will inform a briefing note on adapting local transport to climate change to be published later this year.

The Practitioner workshop

In June 2009 [The Transport Planning Society](#) (TPS), the [UK Climate Impacts Programme](#) (UKCIP) and the [Nottingham Declaration Partnership](#) hosted a workshop in London called *Local transport - adapting to climate change*. It brought together transport officers from around the country to discuss how local transport needs to respond to the impacts of climate change.

The workshop had two aims:

- To improve understanding of the key issues that must be addressed by the local transport community to strengthen its resilience to climate change.
- To consider what further work is needed to understand these issues and work towards solutions.

Delegate discussion sessions were informed by three keynote presentations:

- *Climate change adaptation in the Local Transport Act and LTP3 guidance*, David Moffat (Regional & Local Transport Strategy) and Michelle Witton-Smith (Climate Change Policy) Department for Transport
- *Climate change projections for the UK*, Laurie Newton, Project Officer, Local Authorities UK Climate Impacts Programme
- *Transport for London's work to adapt London's transport system*, Helen Woolston, Environment and Climate Change Coordinator, TfL.

The invited audience of around 30 practitioners explored the implications for local transport of predicted climate change – notably, a likely increase in severe weather events. These include heatwaves, drought and water scarcity, flooding, storms and high winds, storm surges, landslips, and coastal erosion. While it is unwise to attribute any one severe weather event to climate change, they are projected to become more common as the climate changes, with obvious challenges for local transport planners and operators.

You can download the keynote powerpoint presentations and this workshop summary at www.tps.org.uk.

Local transport adapting to climate change: key issues

A core aim of the seminar was to identify challenges that local transport planners and operators face in adapting transport infrastructure and policies to climate change, and the key issues where further advice is needed. Participants developed a prioritised list of issues of which the most popular are summarised below. The list of issues will inform the content of a briefing note on adapting local transport to climate change that is currently being prepared.

1. Change travel behaviour in the long term

The recent snowfall in London highlighted that the public feel they have a right to travel whatever the weather conditions. But in the future, the cost of adapting transport networks to cater for a much wider range of severe weather could make it more and more impractical to accommodate public expectations. The public may have to accept that some transport options may close in severe weather or that there is no effective means to travel under certain conditions. Potential solutions considered were policies to encourage flexible employment conditions and homeworking. For example, local authorities could consider providing the equipment necessary for call centre staff to work from home, so that travel information websites and phone lines can be kept open during severe weather.

A second aspect of changing travel behaviour is the importance of encouraging the public to use sustainable forms of transport as the climate changes. In particular, minimising the chance of any modal shift away from walking, cycling and public transport as temperatures rise and rainfall becomes more intense. Potential action highlighted included planting trees close to cycle paths and on walking routes to provide shade and using materials other than concrete to minimise heat retention. Reviews of maintenance and investment policy would be required in some instances, for example, action to prevent flooding in pedestrian subways and adapting the design of public transport systems to provide a cooler environment.

2. Advice on how to interpret the UK Climate Projections (UKCP09)

The new UK Climate Projections (UKCP09) published by Defra in June are cutting edge and use the latest science, but the richness and complexity of the data raised questions for delegates as to whether local authorities would have the capacity to use them effectively at the moment. Attendees suggested further guidance is needed on what the data means for transport officers. In particular this needs to cover how to take account of the projections when making investment decisions and ensuring that the climate change projections are incorporated into methodologies for scheme appraisal.

Post workshop notes

- Defra and HM Treasury published [Accounting for the Effects of Climate Change](#) in June 2009. This is a supplement to the Treasury's Green Book Guide *Appraisal and Evaluation in Central Government*.
- Free regional [Projections in Practice](#) events will be held in autumn 2009.

3. Understanding network vulnerability

There was broad consensus that a crucial first step that councils will need to take is to assess the current resilience of transport networks to climate change. This should ideally involve detailed research in a number of areas. Examples cited by delegates include:

- establishing the whereabouts, ownership and condition of drainage systems
- establishing the potential impact of changes to groundwater levels
- identifying areas of the transport system most likely to flood
- assessing the behaviour of pedestrians, cyclists, and passengers during hot weather
- assessing the impact of high winds on bridges and street furniture.

4. Strong message that adapting transport to climate change must be dealt with locally

There was concern that it would be difficult for officers to make the case to local councillors that adapting transport networks to climate change should be a priority, especially as the impact of climate change will not necessarily be obvious in the short term. Several delegates suggested that the government should put across a strong message that adapting local transport networks to climate change must be dealt with locally. The potential impact of rising sea levels and the economic disadvantages of failing to act were felt to be messages that could persuade councillors to take a long term view.

Delegates were uncertain over how much adaptation measures could potentially cost. Lack of understanding of these costs was highlighted as another potential barrier to the rollout of a comprehensive strategy. Delegates thought costs could be high and could require reassessment of priorities.

5. Reassessing criteria and standards / technical guidance for scheme design

A key priority highlighted at the workshop was the need to ensure that new infrastructure can withstand the higher temperatures, heat, and high winds that climate change is expected to bring. This could involve learning lessons from countries which currently experience the conditions the UK is expected to face in the future.

Post workshop note

- The Highways Agency has carried out research into revised materials that will better withstand higher temperatures and increased rainfall. (Not yet published.)
- DfT has published [Maintaining Pavements in a Changing Climate](#).

National activities to support transport adaptation

The Department for Transport (DfT) is closely involved in the government's Adapting to Climate Change Programme and through its adaptation work is aiming to keep the UK's transport network operating in a changing climate.

Along with other government departments, the DfT will produce a high level adaptation strategy in spring 2010. A significant amount of adaptation work is already underway on adapting the strategic road and rail networks. The Highways Agency for example, is preparing a [Climate Change Adaptation Strategy](#) which analyses predicted climate change impacts and how they might affect the strategic road network. It also looks at possible measures that could be implemented to minimise the impacts of extreme weather. When published, this work could be used as a reference by local authorities, but with the caveat that local networks are very different to that of the Highways Agency's. Information can be found at: <http://www.highways.gov.uk/aboutus/24180.aspx>.

The rail industry has an extensive research programme in place to analyse the possible impacts of climate change on its network. It is also looking to identify adaptation measures that could be implemented to build resilience to impacts such as higher temperatures and increased rainfall.

LTP guidance from the Department for Transport highlights the importance of ensuring that climate change adaptation is embedded at a local level.

Local transport authorities' duties to consider adaptation

The requirement for local transport authorities to have regard to the government's adaptation agenda in their Local Transport Plans (LTPs) was set out in the Local Transport Act and included in the DfT's consultation on guidance for the third round of Local Transport Plans. The guidance states: "In addition to measures to reduce greenhouse gas emissions, it is important that local authorities put in place measures to improve the resilience of local transport to the impacts of climate change, in line with the government's Adapting to Climate Change Programme."

The LTP guidance is deliberately short and does not go into detail on individual polices, in line with the spirit of the Local Government White Paper. However, the DfT expect that transport considerations will play a key role in councils' performance on adapting to climate change.

Local authorities control 98% of highways in England and Wales and, in many authorities these roads are the most valuable assets they own, worth hundreds of billions of pounds. DfT therefore recommend that local authorities give serious consideration to integrating their Transport Asset Management Plan (TAMP) with their LTPs. As TAMPs identify asset condition they are a "critical" first step to setting out an adaptation strategy that would make transport networks more resilient to climate change. The DfT has allocated £32m to help English highway authorities to improve asset inventory capabilities, and those allocated the largest sums are required to spread best practice.

The UK Climate Projections

Some climate change is now unavoidable, no matter how successful we are at reducing greenhouse gas emissions in future, because past emissions will continue to influence climate for at least several decades to come.

The new [UK Climate Projections 09](#) (UKCP09) were launched in June. They present information as a range of probabilities and allow users to investigate the relative strength of evidence for climate changes that might affect their local area.

In summary, the projections suggest that annual average rainfall could remain broadly constant in the future, but that seasonal rain will change with increases in winter and decreases in summer, and more rain on the wettest days, increasing the risk of flash flooding. Summers will become progressively hotter, winters milder and wetter. Heatwaves will be more prevalent in some areas.

Unless action is taken, associated damage to transport infrastructure could include more flooding on roads and in pedestrian subways, landslips onto roads, rail and tram lines, greater incidences of cracked tarmac, buckled rails, and broken overhead wires. Pedestrians and passengers on public transport would suffer greater discomfort from heat.

The climate projections are available in a number of formats:

- published material: headline messages, scientific reports and so on
- a user interface that will enable interactive investigation in an area or for specific variables
- analytical tools such as a weather generator that uses the Projections to provide daily time series
- plume diagrams to illustrate change over time.

The richness of the data available means that it is possible for local authorities to base future investment and planning decisions on customised projections that allow them to explore their attitude to risk.

Local transport and severe weather: some lessons so far

Delegates shared their experience and the lessons of the impact of severe weather on local transport networks, covering high winds, rainfall and flooding, snow and heat.

High winds: The Birmingham tornado

One of the most severe weather events that a local authority has had to deal with in recent years is the tornado that hit Birmingham in July 2005. Winds of up to 135mph uprooted hundreds of trees, and hundreds of buildings were left unsafe. The wind was strong enough to lift the roofs off properties. More than 10 roads were closed immediately because they were blocked by debris and were next to unsafe structures. They were still shut days later, until the areas could be declared safe.

Experience from Birmingham suggests that in dealing with such extreme weather transport can not be viewed in isolation. It should instead be seen as part of a holistic approach, including ensuring emergency services and structural engineers can get to affected areas as required, and ensuring that, if necessary, coaches and buses can be laid on to evacuate people. This approach would also take into account issues such as how to deal with the shock experienced by people who have lost their businesses and how to serve the community afterwards.

Birmingham's response to the tornado was rolled out in line with the city council's resilience procedures, and the need to update them to take account of the possibility of future tornados has been recognised. Examples of issues that the council would need to remain vigilant of are advertising on lamp posts and cantilevered signs. Both could potentially act as 'sails' during very high winds.

Rainfall and flooding: Pedestrian subways

Flooding on the A414 main road through Hertford is a major issue and the impact on pedestrian subways tends to be far worse than on the road above.

While roads generally clear rapidly, it can take several days for the subways to drain, with water collecting to a depth of six inches. In one case it took two months. In winter, the problem is intensified by the residual water on the subway floor turning to sheet ice.

A participant from Hertfordshire said "we want to look at adaptation measures that take into account mitigation as well," referring to the need to prevent the possibility of modal shift to cars caused by severe weather making pedestrian routes impassable for a prolonged period.

Rainfall and flooding: Landslips

Heavy rainfall has resulted in growing problems with landslips on embankments.

A road in Surrey suffered a major landslip in 2001. Even though there was no movement there for over a century the incident should not necessarily have come as a surprise. The area is marked on maps as The Landslip. Local authorities could start looking at local maps and historical information.

This could provide clues as to what problems may be encountered in the future.

Some passenger transport executives have also faced difficulties gaining approval from local authorities to run services when embankments have been waterlogged, even when it is safe to do so. Local authorities dealing with an emergency situation may not have a full understanding of the likelihood of landslips. “A specialist can say that it’s fine, but having the methodologies to work with local authorities and convince them that is the case is far more difficult.” Agreeing procedures with local authorities in advance could help to restore services more rapidly.

Keeping the public informed

It is essential to keep the public informed about network operations during severe weather.

Flooding and heavy snowfall in West Yorkshire earlier this year meant the PTE’s call centre was overwhelmed with enquiries and the website crashed at one point due to usage that was five times greater than normal.

Although the public praised the service, recognising that it was under severe pressure, the episode raised issues of resilience. Local authorities need to consider how to keep the public informed during severe weather, especially as call centre staff themselves may be unable to travel.

Changing public expectations

The snowfall which brought London to a halt on February 2nd provoked widespread criticism. A major factor which contributed to lack of resilience in the capital’s transport system was the London boroughs’ decision to sell their snow ploughs. However, participants believed that this was a sensible decision. Rather than spending considerable sums to store and maintain them for an event that will happen maybe once every 10 years.

Although extreme snowfall is not expected to be a feature of climate change in the UK, the incident illustrated the need to address prioritising expenditure. There was broad consensus that it will not be practical to keep all parts of all transport networks open in the most severe weather that will be experienced in future, and that the public needed to be conditioned to accept this situation.

Heat

Although delegates did not have a large amount of experience of infrastructure being affected by heat, they identified potential impacts it could have in future. These included carriageway rutting, tarmac melting, embankment subsidence, deterioration of concrete, problems with expansion joints, increase in dust levels, reduction in skid resistance, and rails could buckle on tram systems.

It was noted that it is not just extreme heat which councils will need to take into account when adapting to climate change, but changes in average temperature too.

Creating comfortable traveling conditions for passengers as temperatures rise will also become a more prominent issue. It was suggested that the government should take account of this when specifying rolling stock for rail franchises.

Responding to climate change - experience from London

Several of the issues raised at the workshop are being addressed by the London Climate Change Partnership (LCCP), a stakeholder group co-ordinated by the Greater London Authority and consisting of over 30 organisations. These include national, regional and local government, the Environment Agency, the UK Climate Impacts Programme, emergency services, residential and commercial developers, transport providers, financial institutions, and the health, utility and voluntary sectors.

Their work on transport was outlined in a presentation by Helen Woolston, environment and climate change co-ordinator at Transport for London's Sustainability Unit.

Over the past year London has been addressing one of the most common issues raised at the seminar - lack of knowledge about drainage systems including who owns them, the condition they are in and where they are located. This project has involved liaising with boroughs and water authorities to draw up the first complete survey of the capital's drainage system. Initially it was a slow process even finding the right people at the boroughs to talk to. Another major obstacle was the view of water companies that the location of drains is commercially confidential.

It has taken a year of hard work by the 'Drain London' partnership with Thames Water and other bodies, but an adequate picture of the data available on the capital's drainage system has now been drawn up. "It took many tiny steps to achieve, but for the first time, all boroughs in London have been asked for information on where the drains are," Helen said.

The next stage is to test whether the systems are adequate and whether the drains are well maintained. The London Borough of Richmond is trialing development of a Surface Water Management Plan.

Flood risk is also being addressed through a range of other initiatives including identifying which assets are most vulnerable and where action needs to be targeted. "Our most valuable at risk assets – the Tube's electrical bulk supply points – are technically nothing to do with transport at all," Helen said. "We need to protect them at all costs to make sure people can be safely evacuated."

With temperatures in London as much as six degrees Centigrade higher than outside, a large body of work has centred on cooling public transport. Initiatives that have been implemented include specifying new buses that are more resistant to heat through painting the roofs white, installing tinted windows that open rather than being sealed and putting air conditioning in the drivers' cab.

On the London Underground, action has been taken to help combat heat, through installing air conditioning on carriages being built for the sub-surface lines (eg Metropolitan and District). For deeper tube lines, work has concentrated on attempting to use the Tube's natural assets to better effect. Maintenance of ventilation shafts is important. Meanwhile, groundwater which is pumped out of the system is being used to TfL's advantage, through the installation of a 'groundwater cooling through heat exchange plant' at Victoria station. The device effectively uses the water to cool air and circulate it into the station.

Heat will also be combated through innovative train designs. The new trains will feature "one long snakelike carriage" to help air circulation rather than the current design of a large number of carriages coupled together.

New infrastructure has been designed to take account of climate change, with the technical standards of bridges, such as the new Acton road bridge, adapted to be more resistant to heat and high winds.

The initiatives outlined during Helen's presentation were devised in response to TfL's 2005 report, [*The Impact of Climate Change on London's Transport Systems*](#), which set out the challenges the

capital's transport network faced with regard to flooding, infrastructure damage in hot weather and cooling London Underground.