

**Potholes Review
Progress Report
Highways Maintenance Efficiency
Programme**

December 2011



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Potholes Review
Progress Report for the Department for Transport



1. Background

Potholes are a highly visible road defect and often attract media attention. The current focus on potholes is partly due to the recent series of severe winters. During the past three years England has experienced a series of harsh winters, with December 2010 being the coldest for the last 100 years. The effect of winter weather events on the local highway network is well understood by local highway authorities responsible for their maintenance. This adverse winter weather has caused severe damage to the local highway network, which has manifested itself in a significant increase in the number of potholes, deteriorating a fragile network even further and therefore creating a significant maintenance problem for local highway authorities.

Good customer service is one of the key objectives of highway maintenance, alongside safety, serviceability and sustainability. The recent higher number of potholes arising from winter damage has led to significant criticism from the public and media as to how local highways are managed and how potholes are repaired. It has also led, in cases, to significant additional expenditure from local highway authorities for their repair. The Department for Transport has recognised this. It provided additional resources, firstly as emergency capital funding for those hardest hit in 2008/09 and then as formula-based distributions for all authorities following country-wide damage in 2009/10 and 2010/11, in order to minimise the immediate impact of the problem. However, this funding can only ever partly address the problem and the additional funding pressure on local highway authorities from potholes has occurred at a time of limited financial resources, when all budgets are under significant challenge and it is even more important to drive value for money for taxpayers.

The additional cost of road damage is not limited to local highway authorities. There is a wider cost to the economy arising from potholes, including costs to road users and business, through the increased number of accidents and subsequent compensation and insurance claims. In addition to this, traffic disruption through repairs leads to further costs to the economy through delayed journey times.

The Department for Transport, among others, has raised concerns over the sustainability of current approaches to dealing with road damage, particularly potholes. There is concern on whether asset management principles have been widely adopted to ensure the efficient use of resources. Recognising this, the Parliamentary Under-Secretary for Transport, Norman Baker, announced an initiative to review the pothole problem under the umbrella of the Department for Transport sponsored Highways Maintenance Efficiency Programme (HMEP). The Review is collating evidence on what is already known about the occurrence and management of potholes and will identify best practice in dealing with the pothole problem, hence leading to a more efficient solution.

A Project Board involving a range of key stakeholders was set up in August 2011 chaired by Matthew Lugg, current President of ADEPT and also a Workstream Leader for Group 1 HMEP. The Board is being supported by a Review Team.

The Review will set out how local highway authorities currently deal with potholes and consider the wider stakeholder views and implications. It will provide a series of recommendations and best practice examples that should lead to improved outcomes for all

road users and better value for money for taxpayers. This will include guidance to local highway authorities on how potholes should, and can, be successfully dealt with.

2. Principles of the Review

In conducting this Review, it is recognised that there are constraints within which the recommendations must be considered. As such, the Review will recognise that:

- Additional funding to resolve the problem may not be a practical outcome. The Review focuses on how local highway authorities may make more efficient use of current knowledge and resources.
- Potholes will continue to occur on the local highway network, irrespective of the findings of the Review. This is because many local routes have evolved over time, without engineered design or construction. The lack of information on materials and thicknesses and the irregular construction makes it difficult, if not impossible, to predict future pothole formation. Furthermore, potholes occur due to a variety of reasons and it would be unreasonable to expect that their occurrence could be prevented in all cases. The Review, however, considers how the problem may be reduced by dealing with potholes more effectively and efficiently, as well as looking at the potential benefits of spending to save.
- Local highway authorities have a statutory duty to maintain a safe highway network. Potholes are safety defects that not only have the potential to cause accidents but, if not repaired, will have a longer term effect on the condition of the network, accelerating deterioration. The Review focuses on the immediate risks arising from potholes and how the pothole problem could be addressed. The longer term effect of deterioration is being considered in parallel under the wider HMEP programme and relevant aspects will be linked with this Review.
- Many local highway authorities work within a similar framework of decision making for the identification and repair of potholes. This is largely based on the recommendations in *Well-maintained Highways*, the Code of Practice for Highway Maintenance. However, the service is managed and procured in different ways by local highway authorities. Local decision making is key to how local highway authorities deliver their service. The Review therefore focuses on best practice in order to enable sharing of knowledge, including lessons learnt, between local highway authorities.
- The highway network is very diverse and is essential to supporting the economic prosperity of local communities. As such, it must meet the needs of all its users including cyclists, pedestrians and the vulnerable. The delivery of the highway service to these customers is one of the core objectives of highway maintenance. The Review considers the effect of potholes on the wider use of the highway network.
- The highway network also carries plant and equipment that is managed and maintained by utilities. These utilities have statutory rights to access and reinstate the highway in order to maintain their assets. Their approach has been widely considered through research and guidance. It is also recognised that work carried out by utilities contributes to the occurrence of potholes, and this Review considers the role they have in reducing the number of potholes.

3. Lines of Enquiry for the Review

In order to guide the Review, a Project Board of key stakeholders has been established, including representatives from motoring organisations, interest groups, local highway authorities, utilities and industry groups. The following lines of enquiry have been established for the Review in consultation with the Project Board.

Defining the Problem and future implications

The condition of the local highway network is clearly a concern of all road users and local highway authorities alike. ADEPT published a report in 2010 entitled "*Potholes and Repair Techniques for Local Highways*" that focussed on pothole formation processes in highways and considered the engineering issues related to potholes. However, the extent of the problem is described largely on anecdotal evidence, such as the many public surveys conducted by various motoring and other stakeholder organisations. The long term implications on the network, however, are less understood, as is the overall cost to the economy.

The local highway network is largely an evolved network and therefore has not been designed and constructed in accordance with standards that local highway authorities would expect of newly constructed roads. The consequence is that such roads are less resilient to changing environments and adapt poorly to severe weather events. The winter freeze-thaw cycle is a major contributor to the formation of potholes. The presence of excess water and inadequate drainage systems to remove this water to prevent damage to the highway is also one of the key factors that lead to the formation of potholes. These issues have been researched by ADEPT in a report they published in 2010 titled "*Climate Change and Evolved Pavements*".

Adoption the principles of Asset Management

The Audit Commission has recognised that many local highway authorities have traditionally adopted a "worst first" approach to maintenance. Their report "*Going the Distance*" published in May 2011 recommends that local highway authorities should adopt the principles of asset management when making investment decisions, in order to optimise the use of available resources. Asset management, however, has not been embraced consistently across all local highway authorities, although it is clearly understood that a more preventative approach to maintenance, through long term planning, may reduce the occurrence of potholes.

Pothole Identification and Repair

The approach to identification of potholes varies between local highway authorities. *Well-maintained Highways* was published in 2005 and has been adopted by many local highway authorities, with local variations. However, over the last two years there has been greater pressure on local highway authorities to reduce their maintenance standards to meet funding constraints. The Audit Commission Report "*Going the Distance*" recommends that standards should be adopted by local highway authorities only if they are affordable. The extent to which local highway authorities have adopted this approach, and the potential impact on the long term performance of the network, is being considered by the Review.

The approach to repairing potholes also varies with respect to the quality of workmanship and the durability of the repair materials chosen, even in those local highway authorities that perform well. The Review will also consider what other support local highway authorities may need to implement best practice. This will be done through consultation with local highway authorities and industry groups. The benefits of adopting existing research and guidance will be considered. Consideration will also be given to European research carried out on the durable repair of potholes (ERA-Net).

Funding of Repairs

Funding the additional cost of winter damage has been approached differently by local highway authorities. The different approaches adopted with regards to the use of revenue and capital funding will be investigated. The impact of the current approach to allocating maintenance funding to local highway authorities will also be considered. It is acknowledged that the Department for Transport has set up sector working groups which are currently reviewing the use of the formula approach to allocating capital funds to local highway authorities. Of particular relevance is the allocation of maintenance funding with a view to improving incentives for good asset management, potentially based on data being gathered for Whole of Government Accounts.

Customers and communication

The Audit Commission Report "*Going the Distance*" recommends that local highway authorities publicise their approach to road maintenance and its implications on the long term performance of the network.

There is a high expectation amongst customers that highways should be safe, comfortable and free from defects. When defects are reported, customers expect them to be repaired in a timely manner or understand why action is not taken. It is clear that there is a need for consistent communication with customers on issues like maintenance standards that each authority operates and what they deem to be an intervention for repair of a pothole. It is also clear that communicating responsibilities of local highway authorities and the timing and completion of repairs of potholes is an important part of the customer experience. If road users are going to better understand how roads are maintained, how maintenance standards are set and the cost of improving the standard of service, then they need to be engaged in the decision making processes, so that they understand the challenges local highway authorities face.

Best Practice

Best practice is being identified as part of this Review. It will be a key outcome to identify and disseminate this best practice to ensure that a better outcome may be achieved.

4. Initial Findings

This initial phase of work started in September 2011 and has been carried out through a study of existing guidance and targeted consultation with key stakeholders, including industry, user groups and local highway authorities. The targeted consultation has been based on the lines of enquiry. The Initial Findings from the Review are described below, together with Issues to Consider that will form part of the next steps for the Review. These will be included in the final report.

Initial Finding 1 - Resilience of Road Network to Severe Weather

The local road network includes some roads that are designed and constructed to established standards. However, the vast majority of the network comprises roads which have progressively evolved. The formation of potholes is well understood, as is the effect of winter weather and other factors such as inadequate drainage.

Local roads, especially when evolved rather than constructed, are fragile and therefore less resilient to climate change, including severe and unpredictable weather events. Over the past three years there has been an increase of potholes as a result of severe winter weather, primarily through the physical process of freeze-thaw and the ingress of water.

Customer satisfaction surveys carried out by stakeholder groups over the same period consistently report increased dissatisfaction with the quality of the local road network. Research suggests that the majority of motorists regard maintenance of local roads as the top spending priority.

At present, there is only limited guidance available to local highway authorities on how to deal with the issue of adapting to these weather events and improving resilience of the network. There are also few examples of best practice.

Issue to consider: Improving the resilience of the local road network must be a priority in order to provide efficient and effective service to all road users that meets their requirements. Provision of guidance on the maintenance of local roads that will enable greater resilience should be considered.

Gap: Guidance in *Well-maintained Highways* for maintaining the local road network to improve its resilience. Such guidance is not currently under development.

Initial Finding 2 - Purpose and Use of the Network

The local highway network is essential for both a successful economy and other needs of society. It must be accessible to all. The use of local roads is diverse and varies from commercial use and private vehicles to cyclists and pedestrians. Providing good customer service to all these groups is a key function of local highway authorities who often manage the maintenance priorities of their networks based on road classification.

The current road classification system, however, does not necessarily represent the use and function of the network, especially for non-principal roads, and consequently will not be accurately reflected in the maintenance hierarchies adopted by some local highway authorities. The frequency of inspection and maintenance is linked to maintenance hierarchy and can lead to inappropriate decisions and a greater risk of an inadequate maintenance regime and higher occurrence of potholes.

Issue to consider: Consideration should be given to how local highway authorities develop maintenance hierarchies for all road users based on the function and use of the route. Guidance should be further developed to support such an approach, which would be beneficial in ensuring that maintenance focuses on the needs of all road users.

Gap: *Well-maintained Highways* introduces the concept of hierarchy for carriageway, footways and cycleways but the guidance does not necessarily reflect the current use of the local road network and is not inclusive of all road users. Guidance to update this approach

is needed and is currently being proposed as part of a revision of *Well-maintained Highways*.

Initial Finding 3 - Economic Benefits of Highway Maintenance

The highway network is the most valuable asset owned by local authorities and a well-maintained local road network is essential for economic prosperity. Although some work has been done to assess the costs and benefits of highways maintenance expenditure, the economic benefits of good road maintenance have not been systematically determined at either national or local levels. This would help local highway authorities to demonstrate value for money and efficiency of investment in highway maintenance. In addition, the cost of potholes to the economy, through disruption, increased user costs and vehicle wear and tear, is not known with any certainty and should be included in such an approach.

Issue to consider: Consideration should be given to developing a consistent approach for determining economic costs and benefits of highway maintenance. This will allow local highway authorities to robustly define the need for investment in road maintenance and prioritise against other expenditure.

Gap: There is no central guidance for determining economic benefits of highway maintenance. The Department for Transport and the sector could consider building on some initial work that has been carried out in this area.

Initial Finding 4 - National Policy

Local highway authorities understandably focus maintenance investment on the part of the network that carries higher volumes of traffic, namely the principal road network. In the past, the former National Indicators (NI) 168 and 169 were used to report on the condition of all classified roads with NI 168 focussing specifically on principal roads. The indicators were frequently used by central government to monitor the performance of individual local authorities via Comprehensive Area Assessment. The assessment regime and the National Indicators were abolished by the Coalition Government in October 2010, in line with the policy of freeing up local authorities from central government control.

The use of National Indicators as a measure of a local authority's performance may have encouraged local highway authorities to adopt a "worst first" strategy, only treating roads when they reach poor condition, with obvious signs of failure. This has contributed to an increase in potholes.

Use of NI 168 may also have encouraged local highway authorities to focus their resources on the principal road network as NI 168 was very often used in Comprehensive Area Assessment. Consequently, for a combination of understandable factors, the condition of principal roads is significantly better than non-principal roads.

Road condition is measured annually through a traffic speed survey carried out by all local highway authorities using vehicles fitted with "Scanner" equipment. The data is collected by all local highway authorities on the same basis as the former NI 168 and 169 under an arrangement called the Single Data List. It is then released by the Department for Transport. The Highways Agency collects data using a similar technique for the motorway and trunk road network but processes and releases it in a different format. Despite routine

surveys of all classified roads, there is no national quantitative survey undertaken that specifically measures the number of potholes on the local road network, although the road condition data referred to above may reflect the existence of potholes but not in an explicit way.

Issue to consider: Consideration needs to be given to a more appropriate measure to report road condition that will encourage a more effective and efficient approach to road maintenance. Such a measure could take into consideration the road users' perception of road condition. A more effective and efficient approach to road maintenance will be achieved by adopting a whole life approach measuring performance over the long term. This should also enable funding priorities between the non-principal and principal roads to be determined at a local level.

Gap: The abolition of all National Indicators was announced in October 2010 as an unnecessary burden on local highway authorities. There is still a requirement on local highway authorities to collect road condition data and this is published annually. However, a single indicator of condition does not encourage the adoption of an asset management approach.

Initial Finding 5 - Local Decision Making and Preventative Maintenance

As previously stated, over recent years National Indicators have contributed to local highway authorities adopting a "worst first" approach to maintenance, allowing the roads to deteriorate to a poor condition, rather than focusing on a preventative approach to maintenance. At the same time, there has been an increased use of thin surface course systems which, although offering some safety and environmental advantages, have resulted in road surfaces that may be more prone to pothole formation, if not used and laid in appropriate circumstances. Concerns have also been raised on the durability of such materials.

The risk of potholes occurring may be mitigated by local highway authorities investing in the right preventative treatments at the right time and best practice may be demonstrated in this area, hence adopting an invest to save approach.

How maintenance funding is used is a local decision and therefore there is no consistent approach to allocation of maintenance funding at a local level. At present, some local highway authorities have adopted the principles of asset management leading to an approach that minimises cost of investment over the whole life of the road and supports a preventative approach to maintenance.

Issue to consider: Local highway authorities will benefit from moving towards a whole life approach to funding of highway maintenance. This will ensure that maintenance treatments are prioritised using the principles of asset management.

- The adoption of a preventative approach to maintenance over the whole life of the road will provide a more efficient approach to preventing the formation of potholes.
- Best practice should be established for the use of thin surface course systems and other materials to mitigate the risk of pothole formation in the future. Industry's role in providing such guidance should be considered.

Gap: Current guidance on asset management does not reflect the latest developments in the field. Comprehensive guidance and examples of current best practice are being developed under the Highways Maintenance Efficiency Programme.

Initial Finding 6- National Standard – Defining Potholes

Well-maintained Highways, the Code of Practice for Highway Maintenance, provides guidance to local highway authorities on maintenance, including the inspection of defects such as potholes. Local highway authorities should adopt locally approved policies based on the guidance and recommendations of the Code with local variations, as appropriate.

As local highway authorities make their own decisions regarding maintenance, there is no national standard definition of a pothole, only guidance based on best practice including risk assessment and defect thresholds. Typically, potholes are defined as having a depth of 40mm as highlighted by ADEPT. The Highways Agency has recently adopted the same definition of potholes for the motorway and trunk road network.

Issue to consider: Consideration should be given to developing a national definition for potholes. However, this should be part of a risk based assessment of defects as recommended by *Well-maintained Highways*. Examples of good practice, including testing by the Courts, should be explored. There is a diverse range of views regarding this matter.

Gap: *Well-maintained Highways* provides limited guidance on potholes and best practice in their identification, assessment and reporting. This Review will address this issue.

Initial Finding 7 - Effectiveness of Pothole Operations

Local highway authorities adopt a variety of approaches to managing pothole operations, including identification, recording and repairs.

The use of technology by local highway authorities or their service providers for recording potholes, as part of safety inspections, is variable. Where technology has been adopted, it has been demonstrated beneficial to both customers and local highway authorities. These benefits include improved communication, time savings, audit trail and better management of liabilities.

All staff involved in managing pothole operations, including operatives undertaking pothole repairs, need to be trained and competent in identifying defects, including potholes, and the variety of materials, equipment and technology available. However, there is no consistent approach to providing appropriate training and qualifications.

Issue to consider: Consideration should be given to establishing best practice on the benefits of both investing in and using technology for safety inspections. A review should be undertaken of current training and qualifications available. Work with training organisations to provide training on more efficient and effective pothole repair.

Gap: There is no current guidance on efficient and effective pothole operations. Identifying best practice and developing appropriate guidance should be included in the next phase of this Review. This should include items such as training, qualifications and use of technology.

Initial Finding 8 - Right First Time

Local highway authorities have adopted a variety of response times to repair potholes, many having recently extended response times to enable first time permanent repairs. Initial evidence would suggest that this approach has reduced the need for temporary repairs, which although make the road immediately safe do not provide value for money, as they need to be revisited to be made permanent. This also leads to customer dissatisfaction, as they see work repeated on the network. In defining response times, local highway authorities often need to find a balance between a right first time solution that provides value for money with the need for immediate pothole repairs to ensure the safety of all road users.

At present, there is neither detailed national guidance nor specification for the repair of potholes. The ADEPT Report *"Pothole repair techniques for local highways"* provides a process for right first time pothole repairs but does not include a specification. Furthermore, it does not cover the use of alternative materials and techniques.

Issue to consider: Local highway authorities would benefit from more detailed guidance, including specifications, on the repair of potholes in order to ensure efficient and effective repairs. The objective will be to ensure a balance between safety and a right first time approach, ensuring a more efficient and effective approach to the repair of potholes.

Gap: ADEPT has published a report titled *"Pothole repair techniques for local highways"* which is a starting point on guidance. Industry, including both local highway authorities and service providers, has a role in developing this best practice for the repair and specification of potholes. This should be included in the next phase of this Review.

Initial Finding 9 - Utilities

Utilities have the right to access local highways and will continue to do so. The local road network may be susceptible to weakening of the road structure following intervention by utilities.

Issue to consider: Local highway authorities must undertake appropriate quality control and compliance checking measures through trained personnel. Utilities must undertake reinstatements of the highway to the required standard. Both parties should work together through joint working bodies to continually review specifications and innovative ways to minimise disruption and ensure resilience of the network.

Gap: Industry, including local highways authorities, utilities, suppliers and industry regulators must be encouraged to develop guidance as to how reinstatements can be made more resilient to weather damage. This should be included in the next phase of this Review.

Initial Finding 10 - Stakeholders, Communications and User Perceptions

Providing good customer service is a key function of a local highway authority. Local needs of all road users have to be taken into consideration when developing policies for highway maintenance. However, as already been stated, a reactive approach to maintenance to satisfy a particular requirement, in this case road users, does not provide for efficient use of

resources. Therefore, a balance must be found between delivering a service that is reactive to local needs and one that delivers a sustainable approach to highway maintenance.

Stakeholder groups, including motoring, pedestrian and cycling organisations, have an important part to play in raising awareness of the issues surrounding highway maintenance and providing a service that is responsive to all customer needs.

In September 2011 all local highway authorities published information on their websites describing how they have used the Department for Transport funding for potholes allocated in March 2011. This information needs to be reviewed to identify examples of best practice in transparency and communication with the public.

Issue to consider: Consideration should be given to how a communications strategy can be developed for all stakeholders involved in highway maintenance to ensure the issues are fully understood. Local highway authorities and stakeholder groups must actively work together to promote common interests in determining priorities and demonstrating the importance of a sustainable approach to maintenance.

Gap: Some local highway authorities have produced information on this subject for both members and the public. Such information should be considered in the next phase of this Review, with a view to producing a framework document for use by all. This will be supported by reviewing how local highway authorities have spent the March 2011 Department for Transport pothole funding.

5. Next Steps

This Progress Report covers the initial work in the Potholes Review. Following acceptance of and agreement on the Initial Findings and Issues to Consider with the Department for Transport, the next phase of the Review will include further targeted consultation with stakeholders, leading to the publication of the final report.

The above findings are based on early consultation with key stakeholders and the Project Board. They cover strategic issues related to funding highway maintenance and managing the local road network, as well as pothole repair techniques and communications.

The Issues to Consider should be further investigated in the next phase of the Review. These issues have been supported in this Progress Report by identifying existing gaps. For each of these gaps reference is made to whether they are to be addressed by this Review or parallel work currently being undertaken. Gaps that are currently not addressed are also identified. In summary:

Gaps to be addressed by this Review

- Guidance on defining a pothole.
- Guidance on identification, assessment and reporting of potholes.
- Guidance on effective pothole operations.
- Guidance and best practice on a right first time approach to repairing potholes.
- Guidance on resilient reinstatements by utilities.
- Guidance on stakeholder communications and public perception.

Gaps addressed under HMEP

- Guidance and best practice on asset management.
- Guidance on the standardisation of specifications.

This work will be completed in the next 12 months.

Gaps addressed by parallel work by the UKRLG

- Guidance on hierarchy to reflect the purpose and use of network.
- Use of condition indicators to encourage the adoption of asset management.

Gaps not currently addressed

- Guidance on maintenance to improve the resilience of the road network to severe weather. This could be addressed in *Well-maintained Highways*.
- Guidance on calculating the economic benefits of highway maintenance. This could be considered by the Department for Transport, working with the sector.

Under the HMEP programme, a number of projects are being delivered that are relevant to this Review. These include not only the guidance on asset management, but also guidance on maintenance of drainage, development of standard specifications for repair works and a common framework for procurement of services and collaboration. All of these will contribute towards a more effective approach to addressing the pothole problem. In the final report, information will be provided on some potential benefits and savings.

The Review recognises that significant work has been undertaken in the UK on the identification, management and repair of potholes. To this end, the next phase of this Review should consider how existing guidance and any gaps identified above can be consolidated and promoted for use by local highway authorities.

Furthermore, there are examples of best practice in addressing the pothole problem, with many local highway authorities demonstrating innovative and successful techniques in preventing as well as managing and repairing potholes. These examples should be critically reviewed to ensure that they can deliver benefits to other local highway authorities. Any example of good practice will be supported by guidance on how it should be adopted by others.

The Project Board has identified a number of issues to be addressed by the Review, which have not been evidenced through the stakeholder consultation so far. These include items such as collaboration amongst local highway authorities to address the pothole problem efficiently. These issues should be addressed at the next phase of the Review, learning from parallel HMEP work on collaboration.

Through this Progress Report, approval is sought from the Department for Transport to proceed with the next phase of the Potholes Review, leading to the publication of the final report. The final report of this Review should make recommendations on improving the way potholes are managed. It will also describe the potential benefits and savings.

6. References

Well-maintained Highways, Code of Practice for Highway Maintenance Management, TSO, July 2005

Potholes and Repair Techniques for Local Highways, ADEPT, 2010

Climate Change and Evolved Pavements, ADEPT, 2010

Going the Distance – achieving better value for money in road maintenance, Audit Commission, May 2011

7. Glossary

ADEPT – Association of Directors of Environment, Economy, Planning and Transport

NI – National Indicator

SCANNER – Surface Condition Assessment for the National Network of Roads

UKRLG – UK Roads Liaison Group

8. Acknowledgements

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