

Wiltshire Highways Maintenance and the Environment



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Wiltshire Highway Maintenance and the Environment

Introduction

The highway network, roads, bridges and related infrastructure represents the Council's largest and most valuable public asset. The highway network in Wiltshire comprises 4,500 kilometres of road, 3.9 million square metres of footway, 1,500 bridges and over 40,000 street lights. It has a replacement value of over £5 billion. The effective and efficient management of this infrastructure is a key factor in the ability of the Council to deliver its services.

The Wiltshire Council Business Plan 2017 – 2027 sets out the vision to create strong communities, with priorities for growing the economy, strong communities and protecting the vulnerable. As part of growing the economy it is acknowledged that it is necessary to bring the county's roads up to an acceptable state. The goal is that road infrastructure is improved and to:

- Improve asset management and the use of investment to improve the condition of Wiltshire roads (implementing our Highways Asset Management Strategy).
- Promote and further development the MyWiltshire app to improve and increase the reporting of issues.

Highways Asset Management Policy

The Wiltshire Highways Asset Management Policy was adopted in May 2015:

Wiltshire Council is committed to adopting the principles of asset management, and will take a long term view when making maintenance and investment decisions. The asset management approach will deliver value for money and maximise the benefits for future prosperity by ensuring the right investment decisions are made. It will assist in targeting resources and managing risks associated with the statutory duties to maintain the highway infrastructure.

Highway Maintenance Operations

The environment in Wiltshire is particularly valuable and sensitive, with a majority of the county being within Areas of Outstanding Natural Beauty (AONB). There are a considerable number locations and watercourses designated as Sites of Special Scientific Interest (SSSIs) and Special Areas of Conservation (SACs). Some of the bridges are listed buildings and some are Ancient Monuments.

In maintaining the highway network there are operations which could potentially have an adverse impact on the environment if appropriate precautions are not in place. There are opportunities to improve sustainability and reduce the impact of the

highway authority's operations on the environment, particularly through the use of recycling and other initiatives.

Keeping the highway network safe is a priority, and continues to be a challenge with limited budgets and an increasing population and usage. The Council maintains the highway network in accordance with its legal obligations and best practice guidance. A risk based approach has been adopted for highway maintenance in accordance with the Code of Practice 'Well-managed Highway Infrastructure' which was published in October 2016.

Most highway maintenance operations take place on existing roads and paved areas, and usually would not be expected to have a significant impact on the environment as long as they are carried out in accordance with approved procedures. The appointment of highways contractors and consultants by the Council takes into account their environmental standards and policies before awarding the contracts, and the performance of the contractors closely monitored.

New construction, work over or close to watercourses, drainage schemes and works in protected areas in particular require specific measures and assessments to be undertaken. Procedures are in place to ensure that there is liaison with ecologists, the Environment Agency and others as required.

The energy requirement of the Council's aging street lighting stock has been a concern for many years. Schemes to convert many of the lights to operate for part of the night has reduced energy consumption and reduced the Council's carbon footprint. However, these reductions have to be balanced with road safety and public concerns about crime. A project to replace the older lighting equipment with energy efficient LED units is underway.

Reducing the environmental impact of highway maintenance waste

The largest volume of waste generated by road maintenance arises from resurfacing operations where planings are created when the existing road surface is removed. Other waste materials include concrete, particularly from kerbs, pipes and other structures. The majority of reusable waste is recycled with only a small proportion being disposed of as hazardous waste where recycling is not viable.



Road planings ready for reuse

Recycling Road Planings

The Council resurfaces many kilometres of road each year. This is often because of reduced skid resistance of the surface or because of structural failure of the road construction. Where possible the existing road surface is overlaid, but in many cases adjacent properties, entrances, drainage provision or other limitations prevent this, and the top surface often has to be removed.

There is usually limited scope for reusing the removed material in the top surface of the road because of the need to meet skid resistance standards, and it is generally necessary to use new material on the surface.

Reuse of the old road material in the lower layers is feasible, but the volumes which could be used in this way are usually low compared to the volume of material that needs to be removed. Consequently there are substantial volumes of road planings each year that are available for recycling. A small proportion of them may be contaminated with tar and have to be disposed of as hazardous waste, but the remainder can be recycled to repair rights of way, used on county farms, or provided to community groups or others. They are recycled locally in order to reduce transport

costs and the environmental impact. They have to be transported, stored and used in accordance with environmental regulations and restrictions. The proportion of planings recycled in Wiltshire has been consistently high in recent years:

	2014/15	2015/16	2016/17	2017/18	2018/19
Percentage of planings recycled	96.9%	86.31%	98.6%	99.1%	99.8%

Removing the planings from site to mix them with new materials at the manufacturing plant for reuse has been trialled in the past, but the transport costs and quality control issues made it less attractive than reusing them locally on rights of way and other locations.

Where tar bound material is encountered in the existing road layers it is not usually feasible to transport the planings for recycling because of the regulations in connection with this material, which has to be treated as hazardous waste, and the need to find a suitable facility.

There were 24,235 tonnes of road planings recycled by the Council in 2018/19, and this high recycling rate is expected to continue in future years.

In-situ recycling of road materials

In some cases where there is structural failure of the road construction, an alternative is to recycle the existing material by excavating it and mixing it with cement or other material in order to increase its strength. The road can then be surfaced with new material to seal the construction and provide skid resistance.

The in-situ treatment can be effective on suitable sites, but it can be a noisy process and in some cases managing dust has been an issue. It has been particularly effective on some minor rural roads. There are various processes that can be used and trial sites have been undertaken over the years, most recently in 2017/18.



In-situ recycling makes use of the existing road material by excavating and mixing it and treating it to increase its strength

The success of the treatment does depend on having a suitable depth and type of material to recycle, which is not always the case where there is shallow rural road construction or where there are poor ground conditions. The deeper stabilisation treatments can be used where the ground conditions are poor, and where carriageway deformation is a problem. There are also potential limitations on the type of surfacing which can be used with the different treatments, and the traffic loadings they can be expected to carry.

In 2017/18 there were 4 sites treated with a total length of 5.2 km, which involved 20,777 sqm of surfacing and recycling 4,882 tonnes of material. There is a similar area of road being treated in 2019/20.

The in-situ recycling is not suitable for every location, but has a role to play to reduce the environmental impact of major road repairs in appropriate locations.

Use of recycled material in verge repairs

Wiltshire has many narrow rural roads with grass verges that can be prone to damage by wide vehicles passing, especially during the winter and in wet conditions when the ground is soft. This can result in deep ruts at the road edge which can become a safety hazard to traffic.

A programme of repairing these verges has been undertaken in recent years, generally using crushed recycled concrete. Once the edge is repaired the earth is replaced so that the verge is reinstated. The intention is to return the road to its previous condition without widening it, which could lead to higher vehicle speeds.



Waste concrete is being crushed for reuse in verge and other repairs

In 2018/19 there were 3km of verge repairs carried out using 213 tonnes of recycled material, which included almost 100 tonnes from a site in Swindon. There are 14 sites to be treated in 2019/20, involving the use at least 500 tonnes of recycled material.



Crushed recycled road materials are being used in verge repairs on rural roads

The programme of verge repairs will continue in future years using inert recycled highway and construction materials to address those sites which are a concern for safety reasons.

Gully emptying

Road gullies that drain roads usually have traps that collect debris and spillages to prevent material entering water courses and drainage systems. The silt and debris collected in gullies can be polluted with spilled oil or other potentially harmful materials. When gullies are emptied the waste has to be disposed of in an approved manner.



Gully emptying results in a considerable volume of material being collected, and arrangements are in place to de-water much of it to reduce disposal quantities.

In order to reduce the volume of waste going for disposal, the gully waste is now being de-watered by the Council's contractor at both Churchfields and Melksham depots. The dry material is then transported to tip but as dry arisings, with considerably reduced weight and volume.

In some areas the time to transport the material to the depots for de-watering can adversely affect productivity of the gully emptiers, and it is not always viable to travel to Melksham as disposal can be carried out locally. The possibility of further de-watering facilities will be considered as part of future highway depot developments.

Recycled plastic

The possibility of using recycled plastic in road surfacing has attracted considerable publicity recently. The Council has investigated this possibility, but has concluded that the volume of waste it will be possible to recycle with current techniques will be very low. However, a project to use plastic in road repairs and construction is being progressed by this Council.

Recycled plastic is currently used in various items of street furniture, including bollards and signs. For example it has recently been used in palisades installed on a scheme at Hullavington



There are now a number of manufacturers of different types of street furniture made of recycled plastic and these products are being used on projects where suitable.

Future Projects

There are a number of other potential recycling schemes that are being considered for implementation. This includes the use of foambase material for footways, which is a process that has the opportunity to make use of planings or other waste material in road or footway renewal projects. Locations for mixing the material will need to be identified and the transport implications considered.

The use of in-situ recycling could be used on more sites in the future, but the impact on residents and businesses of these potentially noisy and disruptive operations would need to be taken into account in selecting and managing sites.

Protecting the Environment during highway maintenance works

The environment and ecology of Wiltshire is important, with many sites with national and international designations to protect them. In addition there are locally important sites and features which need to be protected and enhanced.

Highway maintenance operations are undertaken with these restrictions in mind. Watercourses in particular are potentially vulnerable to damage as a result of construction and maintenance operations. Special measures are taken to protect these sensitive areas and habitats.

The Council's highways staff frequently liaise with the ecologists and archaeologists to ensure that the impact of the essential highway works are minimised.

Bridge and structures works

In order to ensure that any works done on behalf of Wiltshire Council is in such a manner as to minimise any potential environmental risk or disruption the Council's contractor Ringway installs comprehensive measures to protect species and habitats.

Easterly and Westerly bridges were originally two adjacent dry stone structures carrying an unclassified road over the River Avon (Tetbury branch) in Brokenborough. The existing structures provided near perfect roosting opportunities for bats, and during initial ecological surveys both Common Pipistrelle and Brown long-eared bats were identified as inhabiting the structures. In view of the works required the existing bat roosts would be destroyed and so as part of the licencing procedure with Natural England alternative provision had to be made.

In the months prior to the works commencing, alternative roosting provision in the form of proprietary bat boxes were positioned in the immediate vicinity of the bridge. A week before the works commenced netting was placed across the faces of the bridges with one way exits for the bats, this enabled the bats to leave the structure and forage for food but not return.



Overnight emergence surveys were undertaken over consecutive nights, and potential roosts inspected to ensure no bats remained in the structure prior to repair (Easterly Bridge) and demolition (Westerly Bridge).

In repairing Easterly Bridge a small number of voids were intentionally left in the arch barrel in non-structural locations to serve as potential roosting sites. Westerley Bridge is an entirely new structure and was built with bespoke bat boxes within the facing masonry. As part of the licencing conditions post work monitoring are required for two years after completion of the scheme. It is encouraging that evidence of bat inhabitation has already been found in the new roosts provided some six months later.



As part of the final works at Brokenborough bat roosting areas were installed in the newly formed cladding work

At other sites particular care has been taken in connection with water quality, especially where pumping has to be used to lower water levels to allow construction.



Filtration tanks can be used as part of the over pumping operation

Measures can be put in place to ensure no crayfish are injured and filtration of the water can take place to avoid disturbance of the riverbed and movement of the silt.

Verge and tree maintenance

There are 50 protected road verges in Wiltshire, of which two are on trunk roads. These locally designated sites contain rare or nationally scarce species, or are linked to other protected sites such as Sites of Special Scientific Interest or County Wildlife

sites. The maintenance of these sites is given special consideration, including with regard to the grass cutting regime.



There are 50 verges in the county which are specially protected because of their environmental value

The sites are monitored regularly to ensure their environmental value is retained, and are they subject to specific work for example the removal of invasive species. The road network verges are monitored to determine the need for particular treatments to enhance their value.

Rural grass cutting is carried out once a year, usually early in the summer, with key areas such as visibility splays at junctions and bends cut as necessary to ensure sight lines for road users. The cuttings are left in place.

A trial is being carried out at suitable locations which will involve removing the arisings following grass cutting, and new equipment is being acquired to facilitate this. In certain circumstances this has the potential to improve biodiversity, especially in combination with cutting later in the summer. A number of potential sites are being identified for a trial next year.



The ecological and landscape value of highways trees are appreciated

A programme of highway tree maintenance is carried out annually. Safety work is carried out throughout the year, especially after storms and high winds. The majority of the tree maintenance work is carried out in the autumn or winter. Unnecessary work and felling is avoided wherever possible as the ecological value of the highway trees and their importance to the landscape is appreciated.

Reducing energy consumption of highway maintenance

The Council's street lighting energy adds significantly to the Council's carbon footprint. In 2013 it was estimated to account for 12% of the Council's carbon footprint. Since then the introduction of part night lighting in some areas, and the conversion of illuminated bollards to more efficient lighting units, has reduced this figure. The longer term plan is to replace the older street lighting units with modern efficient LED units.

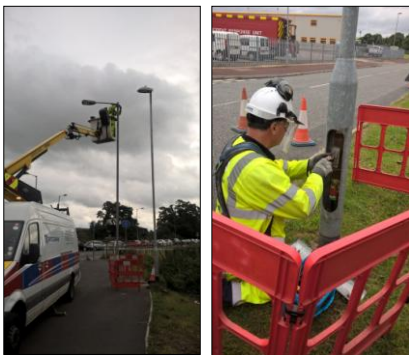
The nature of highway maintenance operations and the materials and transport requirements inevitably have high energy requirements. However, there is some scope to reduce these impacts with modern materials and processes.

Street Lighting

There are almost 45,000 street lights on the Council's highway network. Energy costs have risen sharply in recent years, and they are likely to continue to rise in the longer term. Concern about the carbon footprint of the large street lighting stock is a concern.

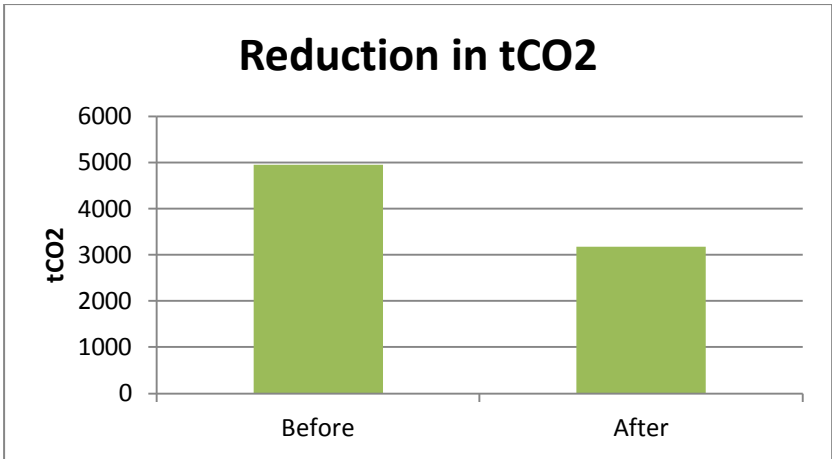
The Council did implement a scheme to reduce energy consumption by operating the street lighting in the side roads in towns for part of the night only. This scheme was introduced from 2014 in all of the larger towns in the county, and has operated successfully.

At present, only 3% of the Council's street lighting is LED lighting, with the majority being the older low pressure sodium (SOX) or high pressure sodium (SON) units. The SOX units are becoming obsolete and going out of production, and are becoming increasingly difficult to obtain. LED lights use considerably less energy than the older SOX and SON units. A major advantage is that LED lights provide the opportunity to dim the lighting during off-peak periods to further reduce energy consumption.



A programme of upgrading the Council's street lighting stock with energy efficient LED units has started.

A two year project to convert the majority of the Council's street lighting to LED at a cost of over £12,000,000 is underway. LED lighting dimmed between 8.00pm and 6.00am, with additional dimming after 11.00pm, would typically reduce energy consumption by 69% compared to the current SOX units.



The LED project will significantly reduce the carbon footprint of the Council's street lighting

Once the installation is complete the scheme is expected to deliver savings of at least £1,312,000 annually at current prices, comprising £250,000 reduction in street lighting maintenance costs and £1,062,000 in reduced energy usage. The project will deliver a reduction in of 1,770 tCO2 annually.

Warm Asphalt

Most road surfacing materials have to be heated to high levels in order to be laid to form a durable surface. This requires considerable energy with a substantial carbon footprint. Materials have now been developed which are supplied at temperatures typically 40 degrees C lower than traditional materials. This reduces the carbon footprint by up to 25%.



The use of 'warm asphalt' can reduce the carbon foot print of surfacing operations

The lower temperature also has benefits as it can be trafficked sooner and has safety benefits with less risk of burns for operatives and reduced fumes and steam when laid. The Council's surfacing contractor Tarmac has been supplying this material for several years, and it is now extensively used in the surfacing operations in Wiltshire where appropriate.

	2015/16	2016/17	2017/18	2018/19
Percentage of warm asphalt	17.9%	60.8%	25.9%	50.5%

The durability of the material has proved to be good and they will continue to be used in future surfacing contracts.

Facts and Figures

Description	Quantity
Percentage of road planings reused in 2018/19	99.8%
Tonnes of road planings recycled in 2018/19	24,235t
Length of road treated with in-situ recycling in 2017/18	5.2km
Area of road tin-situ recycling 2017/18	20,777sqm
Tonnes of material recycled using in-situ process in 2017/18	4,882t
Length of verge repairs carried out with recycled material in 2018/19	3km
Approx recycled material used in verge repairs in 2018/19	500t
Percentage of warm asphalt used in surfacing in 2018/19	50.5%