Appendix 2A – Life Cycle Management Plan for Carriageways

Introduction

The carriageway is the durable material constructed in an area intended to sustain vehicular traffic, frequently marked or edged to ensure an efficient and safe operation. For management purposes, carriageways are defined in categories 2 to 11 (Category 1 being Motorways). These categories are based on a regional, risk-based hierarchy developed by the South West Asset Management group. This reflects the type and use of different carriageways and forms the basis for a sound asset management approach.

Cat	Hierarchy	Type
2	Strategic Route	Routes for traffic travelling long distances, often with little frontage access or pedestrian traffic. Speed limits are usually in excess of 40 mph and there are few junctions. Pedestrian crossings are either segregated or controlled and parked vehicles are often prohibited. Not always National Speed Limit.
3	Main Distributor	Routes between Strategic Routes and linking urban centres to the strategic network often with limited frontage access. In urban areas speed limits are usually 40 mph or less, parking is often restricted at peak times and there are positive measures for pedestrian safety
4	Secondary Distributor	In rural areas these roads link the larger villages, industrial sites and commercial sites to the Strategic and Main Distributor Network. In urban areas these roads usually have 30 mph speed limits and very high levels of pedestrian activity with some crossing facilities including zebra crossings.
5	Link Road	Roads interconnecting the Distributor Networks with Collector Roads and Local Access Roads with frontage access and frequent junctions. In rural areas these roads link the smaller villages to the distributor roads. In urban areas these form residential, industrial and public transport interconnecting roads, usually with 30 mph speed limits and pedestrian movements.
6	Local Link Road	These roads are residential interconnecting roads, usually with uncontrolled pedestrian movements. They provide well used vehicular links to local access roads.
7	Local Access Road	In rural areas these roads serve small settlements and provide access to a number of properties or land. In urban areas they are often residential streets, cul-de-sacs or small industrial estates.
8	Minor Road	In rural areas these form minor access roads to houses and farms. In urban areas these form minor side roads and vehicular alleyways.
9	Lanes	In urban areas are often metalled no through lanes serving garages or the rear of properties. In rural areas these often narrow metalled roads serving isolated agricultural buildings
10	Green Lanes & Tracks	Lanes and tracks that are unsuitable for vehicular traffic. In rural areas these may be used as a footpath, part of a Cycle Trail, or by horse riders, generally for leisure purposes. In Urban areas, these are mostly residential interconnecting footpaths
11	Disused Tracks	Roads that have become unrecognisable having fallen into disuse through regression or agricultural use.

National condition reporting is based on the following classifications:

- Local Authority Maintained A Roads
- Local Authority Maintained classified B and C roads

The reporting of Unclassified Road condition data is no longer a mandatory requirement.

Condition

Carriageway condition is assessed through machine-based SCANNER surveys and visual inspections. SCANNER uses laser and video technology to rate defects, creating a road condition index (RCI) for each 10m section as **RED** (plan maintenance soon), **AMBER** (plan investigation soon), or **GREEN** (good condition).

Visual safety inspections identify safety defects like potholes. Standards are guided by the Highways Act 1980 and the Well-Maintained Highways Code of Practice. New roads are designed for a minimum 20-year lifespan. Gloucestershire's Highway Maintenance Handbook outlines maintenance strategies. The latest published figures on principal and non-principal roads needing maintenance can be found at the DFT's Road Condition Statistics webpage.

Skid Resistance

The maintenance of adequate levels of skidding resistance on running surfaces is an important aspect of highway maintenance, and one that contributes significantly to safety. The County carries out annual SCRIM surveys (Sideways-force Coefficient Routine Investigation Machine) to measure the skidding resistance of the road surface. These surveys provide data, which combined with wet skidding accident data and information about road layout and geometry helps engineers to identify potential problem sites.

A SCRIM survey vehicle uses a wheel pointed at a 45-degree angle to test the wet skidding resistance qualities of the road surface. Survey data is used to target resurfacing to improve skidding resistance and improve road safety.

The friction or skidding resistance required at a site is related to the type and nature of the road. Higher skidding resistance is required on bends, down hill gradients and approaches to junctions and pedestrian crossings, whereas straight, level roads in rural areas with good visibility do not require as much skidding resistance. The Council has defined its approach in the Skid Resistance Policy.

The Life Cycle

Creation/Acquisition: New sections of roads are created through two main processes – capacity improvements and adoption from developers.
Operations/Maintenance – Operate and maintain the asset on a routine basis
Upgrade or Renew: - Replace and renew based on condition, safety or capacity reasons.
Disposal/Decommission: Roads are rarely 'disposed' of. Roads are declassified in accordance with Highway Law when they are replaced.

Deterioration
As soon as a road is constructed and brought into use it starts to deteriorate. The causes of pavement deterioration are essentially caused by three actions:
Traffic – the effects of the action of traffic tyres and loads which cause abrasion and stress leading to fatigue failure of the road structure.
Weather – the ingress of water into the pavement foundation accelerates deterioration, along with alternating freeze/thaw conditions.
Utility operations – breaking and replacing the carriageway surfacing layers by Utilities excavating to access and repair/replace/lay apparatus contributes to premature failure of the carriageway.

The rate of deterioration will differ across the network depending on the relative construction materials, traffic loading etc. and therefore it is a generalisation to come up with a single figure to represent the deterioration of the network across the county as a whole.

Standstill and Backlog Costs
Various models exist to determine the Standstill and Backlog costs. The Standstill cost is how much needs to be spent every year in order to maintain the asset in the condition it's in today (plus inflation). The Backlog cost is how much you would need to spend to return the whole asset to very good condition. The following figures represent the latest data for carriageways:

- Standstill - £3M Capital
- Backlog - >£10M Capital

Funding from the revenue budget for Reactive/Cyclical repairs to the asset is included in the annual amount provided for Carriageways.

Approach
The Council has a comprehensive surfacing and structural maintenance guidance document. This document creates a 'local' set of design standards as well as address the detailed decision making of treatment selection and the design of carriageway resurfacing or structural maintenance repairs.

This conforms with national standards for structural maintenance which are found in the Design Manual for Roads and Bridges (DMRB). DMRB sets out minimal design standards for motorway and trunk roads. The Gloucestershire policy aims to supplement DMRB to apply the design standards in a common-sense approach to local authority road networks.

To optimise structural maintenance funding, schemes are prioritised based on road condition data, safety defect data, and site assessments. This forms the work programme for each financial year.

- A proportion of the maintenance budget is asked to preventative treatments like patching and surface dressing, following asset management principles for timely, cost-effective interventions.

- The remainder is dedicated to more expensive resurfacing and reconstruction for roads that are beyond the threshold for low-cost repairs.

The Council also works hard with suppliers to develop innovative materials and application techniques that reduce maintenance costs.